

An aerial photograph of a mining camp situated in a lush, green forest. The camp includes several buildings, a dirt road, and a helicopter. In the background, a wide river flows through a valley, with forested hills rising on either side under a blue sky with scattered white clouds.

**GOLDCORP INC.**

# **PROJECT PROPOSAL**

The Coffee Gold Mine

COFFEE GOLD MINE

PROJECT PROPOSAL SUBMISSION FOR SCREENING

*Pursuant to the Yukon Environmental and Socio-economic Assessment Act*

**December 6, 2017**

 **GOLDCORP**

December 6, 2017

Wendy Randall  
Chair and Executive Committee Member  
Yukon Environmental and Socio-economic Assessment Board  
Suite 200-309 Strickland Street  
Whitehorse, Yukon Y1A 2J9

Dear Ms. Randall:

**Re: Coffee Gold Mine Project – Project Proposal Submission for Screening**

Kaminak Gold Corp, a wholly owned subsidiary of Goldcorp Inc. (Goldcorp or Proponent), submitted a Project Proposal for the Coffee Gold Mine (Project) in March 2017 for screening under the Yukon Environmental and Socio-economic Assessment Act (YESAA). On July 12, 2017, the Executive Committee determined that Goldcorp had not met its pre-submission consultation obligations under YESAA s.50(3) with respect to the Project, and as a result, discontinued the assessment.

This letter accompanies the submission of the Project Proposal for the Coffee Gold Mine for screening by the Executive Committee. Since March 2017, Goldcorp has continued to be fully committed to its consultation and engagement program in support of the Project. While comprehensive consultation and engagement activities have been ongoing for the Project since March, no substantial changes to the Project have been made; the Project, including the Project Description and the outcomes from the Project's environmental and socio-economic assessment are unchanged from the version submitted earlier this year. Recognizing, in part, the level of effort committed to review the Project Proposal, Goldcorp has made no changes to the version of the Coffee Gold Mine Project Project Proposal submitted March 31, 2017, and provides several attachments to this letter as supplemental information. Summaries of the supplemental information attachments are provided below.

## **ATTACHMENTS**

### **1.0 ADDENDUM TO CONSULTATION SECTION**

This document and its associated appendices are being presented as supplementary to Section 3.0 Consultation of the Project Proposal, and provide details pertaining to Project consultation activities, which have taken place since March 2017. This submission provides the details of Project engagement, along with additional Project commitments and ongoing engagement commitments that have been made in consideration of the views presented by potentially affected First Nations through the engagement and consultation process. The detailed records that support the information presented in this submission are included as appendices.



To support the Executive Committee's determination under YESAA, s.50(3), Goldcorp has revised and updated the content and format of the information presented in the addendum to the consultation section. By mid-May 2017, the First Nations identified under YESAA s.50(3) had all received hard copies of the entire Project Proposal, in addition to the full electronic copies that were initially provided on March 31, 2017. Since then, First Nations have had more than six months to provide their views and information on the Project Proposal, in addition to the views they presented prior to submission. Goldcorp facilitated dialogue and workshops to provide additional opportunities for potentially affected First Nations to provide their comments. The Addendum to Section 3.0 – Consultation provides descriptions of how the views and information received were incorporated into the Project Proposal.

## **2.0 SUSTAINABILITY EXCELLENCE MANAGEMENT SYSTEM MEMO**

Through the Project engagement and consultation process, additional information was requested on Goldcorp's Sustainability Excellence Management System (SEMS) and how SEMS standards will be incorporated at the Project level.

Comprising a framework and clearly defined performance standards, SEMS provides organizational structure, responsibilities, and practices for implementing and maintaining a desired level of sustainability performance. This system is designed for application across the entire mining lifecycle and across the various jurisdictions where Goldcorp operates. Through its ongoing implementation, the Kaminak Project team can effectively deliver on Goldcorp's commitments to measure and monitor our impacts and achieve our vision of *Together, Creating Sustainable Value*. The attached memo describes SEMS in greater detail.

## **3.0 PROJECT DESCRIPTION ADDENDUM – NORTHERN ACCESS ROUTE CLARIFICATION**

The purpose of this addendum is to provide additional details related to the proposed Northern Access Route (NAR) upgrades and discuss Goldcorp's potential strategies for ongoing road maintenance, in addition to the description provided in **Section 2.0 Project Description** of the Project Proposal.

From March through November 2017, Goldcorp has engaged a wide range of organizations, groups, and individuals regarding the NAR. First Nations and stakeholders expressed a high degree of interest in better understanding two key elements of the Project Proposal related to the NAR. First, based on the knowledge that over 80% of the road already exists and does not require new construction but rather upgrades of various types, several parties have expressed an interest in understanding the breadth of those upgrades; specifically, questions have been raised about where the various upgrades would take place along the route. Second, multiple parties have requested more information about the management approach for the NAR once in operation, specifically in comparison to how the road is currently being

maintained. The purpose of this memo is to provide additional detail related to planned upgrades and discuss the potential strategies Goldcorp has proposed for ongoing road maintenance. Goldcorp is in regular dialogue with affected First Nations, communities, and Yukon Government to arrive at a consensus regarding the proposed management approach. This memo aims to support a better understanding of the proposal regarding the NAR, with the objective of further supporting and advancing those discussions.

#### **4.0 PERIPHYTON AND BENTHIC INVERTEBRATES INTERMEDIATE COMPONENT ANALYSIS REPORT**

A Periphyton and Benthic Invertebrates Intermediate Component (IC) Analysis Report has been prepared to accompany the Project Proposal that was prepared in March 2017. While aquatic biota were considered in the Fish and Fish Habitat Valued Component Assessment report (**Section 14.0 Fish and Fish Habitat VC Assessment** of the Project Proposal), several requests were made in pre-submission consultation and by other reviewers of the Project Proposal to provide additional focus on the aquatic biota in the creeks potentially affected by the Project. The separate document provides additional information and analysis to accommodate these requests.

We look forward to any opportunities where we can support the advancement of the screening process.

If you have any questions please do not hesitate to contact me,

Best regards,

**[Signature Redacted]**

Buddy Crill  
Coffee Gold Mine General Manager



An aerial photograph of a river valley, showing a wide river channel on the left and a dense forest of evergreen trees on the right. The river valley is filled with sediment and has a light-colored, textured appearance. The forest is dark green and covers the surrounding hillsides. A dark blue rectangular overlay is positioned in the upper left quadrant of the image, containing white text.

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An aerial photograph of a mountainous landscape. The foreground and middle ground are dominated by dense, dark green coniferous forests covering the slopes of hills and valleys. The background shows rolling hills and mountains under a sky with scattered, light-colored clouds. A dark blue rectangular box is overlaid on the left side of the image, containing white text.

# **Addendum to Consultation Section**





**Coffee Gold Mine  
YESAB Project Proposal –  
Addendum to Section 3.0 – Consultation**

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Ver. 1

December 2017

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## ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
FNNND	First Nation of Na-Cho Nyäk Dun
Goldcorp	Kaminak Gold Corporation, a wholly owned subsidiary of Goldcorp Inc.
HHRA	Human Health Risk Assessment
HLF	Heap Leach Facility
IR	Information Request
MCDA	multiple criteria decision analysis
NAR	Northern Access Route
Project	proposed Coffee Gold Mine
Proponent	Kaminak Gold Corporation, a wholly owned subsidiary of Goldcorp Inc.
SFN	Selkirk First Nation
SSWQO	site-specific water quality objective
TH	Tr'ondëk Hwëch'in
TK	Traditional Knowledge
TLUS	Traditional Land Use Study
WRFN	White River First Nation
WRSF	Waste Rock Storage Facility
YESAA	<i>Yukon Socio-economic Assessment Act</i>
YESAB	Yukon Socio-economic Assessment Board
YG	Yukon Government



## 3.0 CONSULTATION AND ENGAGEMENT

### 3.1 INTRODUCTION

Kaminak Gold Corporation, a wholly owned subsidiary of Goldcorp Inc. (Goldcorp or Proponent) recognizes that meaningful consultation and engagement has been and will continue to be an integral part of the proposed Coffee Gold Mine (Project) throughout the exploration, scoping, design, assessment, and permitting phases and beyond. This section outlines Goldcorp's approach to consultation and engagement, the issues and interests raised during consultation and engagement to date, and how such issues and interests have been considered and addressed, all since March 31, 2017.

Goldcorp submitted the Coffee Gold Project Proposal to the YESAB Executive Committee on March 31, 2017. Goldcorp provided electronic copies of the submitted Project Proposal to all potentially affected First Nations on March 31, 2017, and hard copies of the complete Project Proposal were delivered to each First Nation by May 15, 2017. The YESAB Executive Committee determined that Goldcorp required further pre-submission consultation with potentially affected First Nations before advancing to the screening stage of the process, and communicated this to Goldcorp on July 12, 2017. This section summarizes consultation on the Coffee Gold Project Proposal that has taken place since providing the full Project Proposal to potentially affected First Nations and the YESAB Executive Committee on March 31, 2017. Consultation with potentially affected First Nations prior to March 31, 2017, as well as consultation with the potentially affected community, and engagement with the public, regulators, and assessors, including supporting appendices, can be found in **Section 3.0 of the Project Proposal**.

Further details of all consultation and engagement activities that have occurred since March 31, 2017 to date, as well as copies of materials used are available in **Appendix 3-A2 Potentially Affected First Nations Consultation Records and Materials**.

### 3.1.1 CONSULTATION REQUIREMENTS

Goldcorp’s approach to consultation was developed in accordance with s. 50(3) of the *Yukon Environmental and Socio-economic Assessment Act*, SC 2003, c. 7 (YESAA), and the Yukon Environmental and Socio-economic Assessment Board’s (YESAB’s) *Proponent’s Guide to Information Requirements for Executive Committee Project Proposal Submissions* (YESAB 2005). Goldcorp’s Consultation and Engagement program was designed to meet or exceed the regulatory and legal requirements of YESAA, which states that proponents shall “consult any first nation in whose territory, or the residents of any community in which, the project will be located or might have significant environmental or socio-economic effects” prior to submitting their Project Proposal to YESAB’s Executive Committee.

The definition of consultation under YESAA further outlines that proponents should provide the following to parties that are to be consulted:

- (a) by providing, to the party to be consulted,
  - (i) notice of the matter in sufficient form and detail to allow the party to prepare its views on the matter,
  - (ii) a reasonable period for the party to prepare its views, and
  - (iii) an opportunity to present its views to the party having the duty to consult; and
- (b) by considering, fully and fairly, any views so presented

Goldcorp provided all potentially affected First Nations (see **Table 2**) with both an electronic copy of the full Project Proposal on March 31, 2017 and a hard copy of the full Project Proposal to all potentially affected First Nations by no later than mid-May 2017. Notice of the matter, meaning the full Project Proposal, was given to all potentially affected First Nations on March 31, 2017. Provision of notice to potentially affected First Nations for consultation events (i.e. opportunities to present views) are detailed later in this section in **Table 7** to **Table 10** and in **Appendix 3-A2 Potentially Affected First Nations Consultation Records and Materials**.

A summary of how the above criteria have been addressed within this section is provided in **Table 1**. The principles and policies of Goldcorp’s consultation and engagement program that are in place to ensure that Goldcorp fulfills these consultation requirements are further discussed in subsequent sections.

**Table 1 Guide to Supporting Information**

YESAA Criteria	Information Format	Section Reference
Provision of Notice in Sufficient Form and Detail	Emails, letters, meetings, teleconferences, and other correspondence that demonstrate information sharing, potentially affected First Nations’ presentation of views, and Goldcorp’s consideration of views	Summaries included in <b>Section 3.3</b> Details included in <b>Appendix 3-A2</b>

YESAA Criteria	Information Format	Section Reference
Reasonable Period of Time to Prepare Views	Timeline of events, dates of invitations to consultation events, notes, or meeting summaries describing information shared with parties being consulted	Summaries included in <b>Section 3.3</b> Details included in <b>Appendix 3-A2</b>
Opportunity to Present Views	Dates, times, locations of where and when parties being consulted presented their views, notes, or meeting summaries articulating the views of the parties being consulted	Summaries included in <b>Section 3.3</b> Details included in <b>Appendix 3-A2</b>
Full and Fair Consideration of Views Presented	Details as to what activities were affected/altere d/modified by views; a list of mitigation measures that will be implemented or have been committed to regarding First Nations' interests	Summaries included in <b>Section 3.3</b> Details included in <b>Appendix 3-A2</b> .

### 3.1.2 CONSULTATION AND ENGAGEMENT OVERVIEW

Engagement with potentially affected First Nations regarding exploration activities and environmental and heritage studies at the Coffee property began in 2009, and Project-focused consultation and engagement with potentially affected First Nations, potentially affected local communities, interested persons, the public, and government agencies began in 2013. This section summarizes consultation with potentially affected First Nations since the Project Proposal was submitted to the YESAB Executive Committee on March 31, 2017 per the Coffee Gold Mine Project Consultation Determination and Reasons document issued to Goldcorp by YESAB on July 12, 2017. A list of all parties consulted is shown in **Table 2**.

**Table 2 Parties Consulted**

Category	Consulted Party
Potentially Affected First Nations	Tr'ondëk Hwëch'in Selkirk First Nation First Nation of Na-Cho Nyäk Dun White River First Nation

### 3.2 CONSULTATION AND ENGAGEMENT APPROACH

The primary objectives of Goldcorp's consultation and engagement program are to inform all potentially affected First Nations and communities, as well as interested persons and other stakeholders of the Project, and to receive and incorporate the feedback from these groups into Project design, studies, mitigation, and management. The knowledge gained in the consultation and engagement process has been, and will continue to be, used to reduce potential adverse effects to and maximize benefits for all potentially affected parties. Through detailed and transparent information sharing, Goldcorp's consultation and engagement program also works to promote positive, productive, and lasting relationships with all potentially affected First Nations and communities. The principles, practices, and methods that support achieving this objective are described in subsequent sections.



### 3.2.1 PRINCIPLES

The principles and policies of the Proponent's approach to consultation and engagement is driven by Goldcorp's values and commitment to working in an open and transparent way with local residents, potentially affected First Nations, and stakeholders as partners in Project design and planning processes.

Goldcorp's consultation and engagement program is guided by the following principles:

- Goldcorp's Values:
- *Be safe.* Make sure every one of our people goes home safe at the end of every shift, and that our mines are Safe Enough for our Families.
- *Be Productive.* Deliver consistent, reliable financial and operational performance by ensuring our asset portfolio is world-class, sustainably developed, and operating to the highest standards of excellence.
- *Be Responsible.* Do the right thing and honour our commitments. Be respectful and ethical, and invest in the well-being of our people, our communities, and our planet.
- **Timeliness:** Ensure that all consulted parties are provided with timely and relevant Project-related information.
- **Participation:** Ensure that all consulted parties are provided with reasonable opportunities to present and communicate their views and interests to both Goldcorp and relevant regulatory agencies throughout various stages of the Project review process.
- **Partnerships and Collaboration:** Create opportunities for all consulted parties to provide input and consider this input while developing the consultation and engagement program.
- **Responsiveness:** Ensure that the interests and views of all consulted parties are fully considered in the development and implementation of the Project.
- **Respectful Relationships:** Ensure a commitment to building, maintaining, and enhancing productive and effective working relationships.

### 3.2.2 PRACTICES

Goldcorp's consultation and engagement program is guided by the following practices:

- Treat potentially affected First Nations, potentially affected and local communities, and stakeholders as partners by including them as early as possible in the consultation and engagement program.
- Be open and transparent with all consulted parties when communicating Project information throughout the YESAB and permitting process.
- Work closely with all consulted parties to incorporate local knowledge into the development of the Project Proposal and Project policies, including the design of monitoring programs.
- Log and track all consultation and engagement activities to facilitate follow-up in a timely manner on issues and comments and questions where applicable.

In addition to the above practices, Goldcorp is committed to incorporating potentially affected First Nations' Traditional Knowledge (TK)<sup>1</sup> into the Project where applicable and commercially practicable, including Project design and assessment. As such, the consultation and engagement program includes specific efforts to collaborate with potentially affected First Nations, particularly with regard to understanding the Project's potential interactions with and effects on the landscape and the people connected to the landscape.

### 3.2.3 METHODS

Goldcorp's primary methods of consulting and engaging with potentially affected First Nations included: personal communications; meetings with First Nations citizens and members; open houses; site tours; and technical workshop meetings (**Table 3**). In addition to providing a dedicated feedback mechanism with a phone number, email, and mailing address in Whitehorse, Goldcorp also staffed an office in the City of Dawson (Dawson) for one week per month from January 2017 through November 2017 to provide Tr'ondëk Hwëch'in (TH) citizens with an additional opportunity to drop in to receive Project information and provide feedback. Drop-in visitors were also welcomed at the Whitehorse office.

Goldcorp has provided capacity funding to certain potentially affected First Nations to support the review of technical Project information related to the specific interests of the First Nation. Details of such funding arrangements are provided below in **Section 3.3**.

**Table 3 Consultation and Engagement Methods and Materials**

Consultation and Engagement Method	Materials
Personal communications	Personal communications included emails, letters, newsletters, phone calls, and individual meetings. Materials included any items specific to the topic discussed, such as a maps, figures, or documents for reference.
Potentially affected First Nation Citizens/Member Meetings, Community Meetings, and Open Houses	At potentially affected First Nations Citizens/members meetings, community meetings, and open houses, Project representatives delivered PowerPoint presentations, and made hard copies of the presentations available to attendees. Goldcorp's community feedback protocol information was also available at all events taking place from November 2016 onward.
Site Tours	During site tours, Project representatives provided packages with an overview of Project information and maps.
Technical Workshops	At technical workshops, Project representatives delivered PowerPoint presentations electronically in advance where possible, and immediately following the meeting where not possible. In addition, Goldcorp provided hard copies of presentations to attendees at all meetings, and where possible, a hard copy calendar of upcoming events and meetings at workshops. Where required, Project representatives also provided memos summarizing relevant technical Project information, as well as information to be discussed in technical workshops in advance where possible. Goldcorp also distributed agendas summarizing the technical workshop topics and discussion points in advance, and collaborated with potentially affected First Nations on agenda development.

<sup>1</sup> As described by Tr'ondëk Hwëch'in, TK is knowledge shared among generations, and can include knowledge about the physical landscape, moral or societal values, ways of living, and spiritual relationships with the world. Traditional Knowledge is both the knowledge transmitted and the process and motivation by which this knowledge is passed from generation to generation.

Consultation and Engagement Method	Materials
Project Proposal Review	<p>On March 31, 2017, Goldcorp provided the final Coffee Gold Mine Project Proposal in electronic format to all potentially affected First Nations via Goldcorp’s online sharing portal (Open Text Core). Through the Completeness Check stage of the YESAB Executive Committee Screening process, Goldcorp was required to update and re-submit Section 3.0 Consultation of the Project Proposal on May 5, 2017; Goldcorp provided this updated section in electronic format to all potentially affected First Nations the same day. A full printed copy was provided to each potentially affected First Nation when the Project entered the Adequacy stage of the YESAB Executive Committee Screening process in mid-May 2017.</p> <p>TH and Selkirk First Nation (SFN) were also provided the relevant sections of this addendum related to their consultation for review and input on November 7 via email.</p>
Community Feedback Protocol (Figure 1)	<p>Beginning in October 2016, Goldcorp implemented a community feedback protocol enabling any person to contact Goldcorp to provide feedback regarding the Project via email, telephone, in person, or in writing. The timeline for response was provided along with contact information.</p>



**Figure 1 - Community Feedback Protocol**

### 3.3 POTENTIALLY AFFECTED FIRST NATIONS CONSULTATION

#### 3.3.1 OVERVIEW

A primary objective of Goldcorp’s consultation and engagement program is to work with potentially affected First Nations as partners to develop a full understanding of the landscape in which the Project is situated to design a Project that minimizes potential adverse effects and provides benefits to potentially affected First Nations. To achieve these objectives, Goldcorp’s consultation and engagement program included, and continues to include, multiple opportunities for feedback and collaboration while allowing potentially affected First Nations time to review information in detail, identify their specific interests, and discuss them with Goldcorp. A key aspect of Goldcorp’s program is working with potentially affected First Nations to understand the consultation process each First Nation prefers, including specific considerations such as timing, frequency of consultation events, topics addressed, and the level of detail of information provided.

To date, the Proponent has met with all potentially affected First Nations. A summary of consultation methods can be found above in **Table 3**.

To support potentially affected First Nations involvement in the consultation process, the Proponent provided capacity funding to TH, Selkirk First Nation (SFN), and White River First Nation (WRFN); engagement with the First Nation of Na-Cho Nyäk Dun (FNNND) is described below). Traditional Land Use studies (TLUSs) have been undertaken with TH, SFN, and WRFN for the Project to provide a fulsome understanding of the Project area, including understanding Coffee Creek as an important gathering place. A summary of TLUSs undertaken for the Project is included in **Table 4**.

The traditional territory of FNNND overlaps with the northern portion of the proposed Northern Access Route (NAR). This portion of the NAR, from the Hunker turnoff of the Klondike Highway to Indian River, currently exists and is seasonally maintained by the Yukon Territory Government’s department of Highways and Public Works. Goldcorp proposes minor upgrades in this area. As such, the level of impact to FNNND traditional territory is expected to be low. Through direct engagement with FNNND, the Proponent has come to understand that FNNND prefers to engage at a low level of intensity. As a result, Goldcorp has not pursued, nor has FNNND requested, either capacity funding or a TLUS.

**Table 4 Traditional Land Use Studies**

Study	Participants	Notes
Tr’ondëk Hwëch’in Coffee Creek Traditional Knowledge Survey (2012)	TH	
Collaborative Heritage Study (initiated 2013, completed 2014)	TH, SFN, WRFN	SFN did not participate to completion, and was provided updates and the final report.
White River First Nation Knowledge and Use Study (2014)	WRFN	Focus on Coffee Creek and surrounding area.
White River First Nation Knowledge and Use Study (2017)	WRFN	Focus on NAR and surrounding area.
Selkirk First Nation Traditional Land Use Study (title to be determined; ongoing)	SFN	Initiated; in progress.

The following sections summarize the consultation events, including the general topics discussed, that took place with TH, SFN, FNNND, and WRFN from March 2017 to November 2017. For the supporting details of each consultation event, please refer to **Table 7** through **Table 10**. **Table 11** and **Table 12** provide information regarding the key views presented by TH and SFN respectively and Goldcorp's full and fair consideration of these views.

### **3.3.1.1 *Tr'ondëk Hwëch'in Consultation Summary***

#### **Prior to March 31, 2017**

The Proponent began engaging TH following acquisition of the Coffee Property in 2009 to obtain input and identify any initial potentially affected First Nations interests. Since that time, consultation with TH has been ongoing, as facilitated through the Exploration Cooperation Agreement signed on May 16, 2013 by the Proponent and TH. Information on consultation and engagement with TH up to March 31, 2017 can be found in **Section 3.0** of the Project Proposal.

Since submitting the Project Proposal to YESAB and TH on March 31, 2017, Goldcorp continued to engage in technical workshops and teleconferences with TH and their technical team at the same frequency and level of detail as prior to March 31. Goldcorp and TH collaboratively developed a Consultation Plan outlining subject matter for and dates of technical workshops and teleconferences. This collaborative plan provided opportunities for TH to continue to provide feedback and present views to Goldcorp on the topics of concern to TH and TH citizens regarding the Project Proposal, which included the potential impacts of the Project on TH rights under the TH Final Agreement.

#### **Addressing Issues Raised in July 12, 2017 Consultation Determination**

As described in the introduction to this section of the Addendum to the Project Proposal, Goldcorp received notification from the YESAB Executive Committee on July 12, 2017 that the Coffee Gold Mine Project Proposal was not being advanced to the screening stage of the process due to inadequate pre-submission consultation, including inadequate consultation with TH. YESAB provided a Consultation Determination to substantiate that decision, outlining its perception that a number of documents TH did not have sufficient time to review and provide comment on including:

- The changed design from three waste rock storage facilities (WRSFs) down to one WRSF
- The water quality benchmark objectives and the water quality model output information, updated to take into account the WRSF change
- The Valued Component (VC) assessment reports for Water Quality and Fish and Fish Habitat, taking into account the WRSF change.

Full electronic copies of the Project Proposal were provided on March 31, 2017, and hard copies delivered in mid-May. Since then, TH has had more than six months to provide views on the Project Proposal. For the purposes of consultation required prior to submission of the Project Proposal, TH citizens have now been



given an opportunity to express their views on these issues, and Goldcorp has considered and responded to them. Goldcorp is continuing with the process of consultation that it had established with TH in advance of its initial submission of the Project Proposal on March 31. At this time, Goldcorp and TH are satisfied with the nature and extent of consultation, in particular the use of the information request system and following up information requests with technical workshops. This ongoing process of engagement with TH is described in greater detail below.

### **April 2017**

Prior to submitting the Project Proposal, Goldcorp provided TH with draft VC reports of the Project Proposal for TH's review and input. The two parties used technical workshops and an Information Request form to receive written and verbal feedback about the Project. Through this process, Goldcorp received in total 445 IRs from TH over the course of four months (January to April 2017). Goldcorp responded in writing to these IRs on a rolling basis. TH and Goldcorp corresponded frequently in April 2017 to develop a Consultation Plan for early June to October in an effort to address TH's key concerns regarding the information presented in the Project Proposal on the NAR, reclamation and closure, socio-economic and human health assessments, and water quality. This correspondence included developing agenda items in collaboration with TH. In consideration of the views presented by TH in the Human Health Risk Assessment (HHRA) workshop that took place in March 2017, Goldcorp provided a document to TH in April 2017 with additional complementary details to the Cyanide Management Plan submitted in the Project Proposal, including information on the International Cyanide Management Code and Goldcorp's approach to cyanide incident response at a corporate level (3-A2-59). The HHRA was discussed in detail during a workshop with TH on October 31; Goldcorp will continue to work with TH on refining the HHRA.

### **May 2017**

By May 5, 2017, Goldcorp had finished responding to the outstanding IRs received from TH. Goldcorp then requested TH to provide confirmation of whether its responses resolved the concern (this was a field on the IR form). At that time, TH communicated that its preference going forward was to have any remaining outstanding issues addressed through the ongoing technical workshops or via the YESAB adequacy and IR screening process. In early May 2017, TH and Goldcorp held a meeting to discuss the Project Proposal and ongoing consultation. Views presented by TH in this meeting included a request for further engagement on the NAR route selection regarding the chosen Maisy May route compared to an alternate Black Hills route. TH requested that Goldcorp organize a site tour of the NAR and Black Hills route, and produce a technical memo summarizing the previous trade-off study work done on the NAR during route selection. At this time TH also requested that a teleconference be held in late May to discuss the information in the Project Proposal on the Heap Leach Facility (HLF) and geochemistry, as these were topics that TH wished to discuss in advance of the workshops scheduled with TH and Goldcorp for June 2017. TH also requested "red-line" comparison versions of the draft VC reports (originally submitted to TH for consultation on

January 31 and February 23, 2017) to the final submitted versions of the VC reports. The purpose of this version review was to provide TH with an understanding of how their views presented prior to submission were incorporated and to reduce the workload that would be required to review the proposal once again.

In consideration and response to the views presented by TH in early May, Goldcorp provided TH with the red-line VC reports on May 19 and the Maisy May vs. Black Hills technical summary memo on May 23. In addition, Goldcorp held a technical teleconference with TH representatives on May 25 to review and discuss information on the HLF and geochemistry presented in the Project Proposal. Site tours of both the proposed Project site and the NAR, including the Black Hills route of interest to TH, took place in June and August respectively.

The views presented in meetings and correspondence by TH in May 2017 were considered by Goldcorp and responded to in the meetings where the views were presented, or in subsequent meetings and correspondence, which is summarized above. Goldcorp's consideration of TH's views presented can be found in **Table 11**; details of meetings in May 2017 with TH can be found in **Appendix 3-A2**.

### **June 2017**

Goldcorp's consultation with TH in June 2017 included workshops in early June to provide a detailed review and discussion of the HLF, water quality and site-specific water quality objectives (SSWQOs), potential effects of the Maisy May portion of the NAR on VCs identified by TH, and discussions about Goldcorp's approach to reclamation and closure for the Project. These discussions took place over a two-day workshop in Whitehorse on June 5 and 6, and included presentations of TH's views on SSWQO and the NAR. TH provided written views on these topics in advance of the June 5 and 6 workshops. PowerPoint presentations delivered by TH can be found in **Appendix 3-A2 (3-A2-309)**. As a result of consideration of questions raised by TH in these workshops on June 5 and 6 and in written form prior to the workshops, Goldcorp also conducted a multiple criteria decision analysis (MCDA) comparing the Maisy May vs. Black Hills portion of the NAR. The results of this analysis were presented in an excel spreadsheet, and can be found in **Appendix 3-A2 (3-A2-673)**. TH and Goldcorp participated in a teleconference to discuss the approach to the MCDA in late June to ensure that both parties agreed on the steps forward. TH and Goldcorp agreed to a teleconference after Goldcorp provided the MCDA results to TH to review and discuss the analysis. Please refer to information in August 2017 below, as well as in **Table 7**, regarding this follow-up teleconference.

In consideration of TH's views presented to Goldcorp at meetings and workshops prior to June 2017, Goldcorp hosted a site tour for TH and their technical representatives on June 20, 2017. This was followed by a TH citizens open house to provide updates to citizens on the workshops with TH earlier in June and to discuss the site tour and Project in general.

In addition to the technical workshops and follow-up consultation events described above, Goldcorp and TH participated in a teleconference to discuss information included in the Project Proposal on geochemistry on June 9, 2017 to follow up on TH's views presented in the teleconference in late-May 2017. Goldcorp and TH also participated in a Project development meeting on June 13. This was an opportunity for TH to present further views on the information discussed in technical workshops and Project meetings to date. TH presented views regarding technical information workshop topics and format moving forward; these views were considered in developing the topics and agendas for technical workshops in September and October 2017.

Goldcorp considered the views presented by TH in meetings and correspondence from June 2017, and responded to comments, questions, and concerns in subsequent meetings where the views were presented, or in additional meetings and correspondence, which are summarized above. Goldcorp's consideration of TH's views presented can be found in **Table 11**; details of meetings in June 2017 with TH can be found in **Appendix 3-A2**.

### **July 2017**

As described in the introduction to this section of the Project Proposal, Goldcorp received word from the YESAB Executive Committee on July 11, followed by official notice on July 12, that the Coffee Gold Mine Project Proposal was not being advanced to the screening stage. Goldcorp and TH discussed responses, which resulted in letters to the YESAB Executive Committee on July 12. Both letters describe TH's position that the Project should move into the screening phase of the process, and in that context the letters re-iterated TH and Goldcorp's commitment to collaborating and addressing TH's concerns regarding information presented in the Project Proposal.

Correspondence between TH and Goldcorp in July 2017 focused on setting out a consultation program for September, October, and November 2017 to engage further on the outstanding matters requiring further assessment and resolution between the parties. By July 31, TH and Goldcorp confirmed the dates, topics, and general format of these technical workshops. The topics for the subsequent technical workshops were water quality and water management, reclamation and closure, human health, and the Socio-economic Management Plan. TH and Goldcorp also set dates for tours of the NAR in August 2017. The purpose of these tours was to see the Maisy May section of the road and support TH's review of the MCDA analysis.

Teleconferences between TH and Goldcorp in July 2017 were held to collaborate on the Consultation Plan moving forward, and follow up on TH's views presented during the closure workshop on June 5. TH and Goldcorp agreed to additional technical workshops as a result of these discussions, which are summarized in **Table 5**.

**Table 5 Tr’ondëk Hwëch’in Technical Workshop Consultation Schedule**

Workshop Theme	Date Preferred by TH	Actual Date and Location of Workshop
NAR Road Options Analysis Review	August 24, 2017	August 24, 2017 (Teleconference)
NAR Tour	August 23 <sup>rd</sup> and 25, 2017	August 23 and 25, 2017 (NAR from Dawson to Stewart River)
Water Quality Objectives, Water Management, WRSF	September 28 and 29, 2017	September 28 and 29, 2017 (Whitehorse)
Closure and Reclamation	October 17, 2017	October 17, 2017 (Whitehorse)
Socio-economic and Health	October 31, 2017	October 31, 2017 (Vancouver)

Goldcorp and TH participated in a teleconference on July 14 to discuss Goldcorp’s estimates of soil available for use in reclamation and closure in consideration of TH’s views presented on June 5. TH’s views presented during the meetings on July 5 and July 14 included requests that Goldcorp consider end land use planning and ecohydrological mapping. Goldcorp agreed to do ecohydrological mapping when the data were available to do so, and has retained technical support to carry this work out at the appropriate time. Regarding the TH request that Goldcorp consider end land use planning, Goldcorp has considered this request, and has incorporated its response into the Engagement Plan. This feedback in turn will be incorporated into the development of the next draft of the Reclamation and Closure Plan. In addition, TH presented views about wanting to further understand the overburden balance for the Project. Goldcorp described and explained the current studies being done at the Project site to determine the overburden balance, and committed to sharing the results of these studies in the future. Goldcorp also reiterated the commitment to ongoing engagement with TH on the Reclamation and Closure Plan throughout the Project’s full life cycle based on the views presented by TH during the July 14 meeting. Please see the October 2017 summary below for details on Goldcorp and TH’s closure workshop.

Goldcorp considered the views expressed by TH in meetings and correspondence in July 2017, and responded in the meetings where the views were presented, or in subsequent meetings and correspondence, the details of which are summarized above. Goldcorp’s consideration of TH’s views presented is presented in **Table 11**; details of meetings in July 2017 with TH are located in **Appendix 3-A2**.

**August 2017**

Consultation with TH in August 2017 focused on discussing the results of the Maisy May vs Black Hills route analysis, which is referred to as the MCDA. Goldcorp completed the analysis, and in mid-August provided the results to TH, along with a memo explaining the methodology and further details of the MCDA results. Shortly thereafter, TH and Goldcorp participated in a teleconference to discuss the results of the MCDA. The results of the MCDA determined that Maisy May, the proposed route for the NAR, was also the preferred route based on the analysis criteria and methodology chosen by TH. To provide additional context for TH on the matter, Goldcorp conducted two sensitivity analyses with the MCDA, both of which resulted

in Maisy May as the preferred route. TH was satisfied with the outcomes of the MCDA. In late August, Goldcorp hosted tours of the NAR by road and by helicopter for TH.

In response to comments made by TH citizens in June 2017, Goldcorp held a dedicated tour of the NAR on August 24 based on information from a representative from TH's Lands and Resources Department to investigate the possible presence of a mineral lick along the proposed NAR. Goldcorp confirmed that no mineral lick is present at the particular location in question.

Goldcorp and TH also had a Project development meeting at the end of August, during which Goldcorp presented a document entitled Technical Engagement Status and Plan, which:

- Provided a synopsis of the topics on which the two parties had been or planned to engage
- Identified concerns from TH as Goldcorp understood them
- Outlined proposed next steps to resolve areas lacking clarity or concern.

This document was provided to serve as the road map for ongoing consultation moving forward. An updated electronic copy was provided on August 31<sup>st</sup> (**3-A2-714**), revised to include an assessment of additional topics for engagement on Human Health, per the feedback from TH during the Project development meeting.

Goldcorp considered the views presented in meetings and correspondence by TH in August 2017, and responded to specific comments in the meetings where the views were presented, or in subsequent meetings and correspondence, which is summarized above. Goldcorp's consideration of TH's views presented can be found in **Table 11**; details of meetings in August 2017 with TH can be found in **Appendix 3-A2**.

### **September 2017**

Goldcorp and TH met multiple times in September to discuss the Project and more specifically potential water quality effects associated with the Project. On September 13, Goldcorp met with TH for a Project development meeting where TH and Goldcorp discussed the current status of technical engagement, including items addressed and items to discuss further as the Project progresses. Goldcorp and TH also discussed the method by which TH citizens receive Project information and communicate concerns to TH. TH has stated to Goldcorp that “as a self-governing Nation with a treaty, the TH government is the proper entity with whom Goldcorp should be engaging and that TH will ensure that the views and concerns of TH Citizens in respect of the potential impacts of the Project on TH treaty rights are appropriately addressed.” (TH, personal communication November 2017, and various Project Development Meetings - see **Table 7**). TH has committed to passing on TH citizens' concerns and feedback regarding the Project Proposal to Goldcorp.

TH also provided a memo to Goldcorp via email on September 13 (**3-A2-1353**) to conclude the consultation on the Maisy May and Black Hills MCDA results. This memo reiterated TH's view that the Maisy May route for the NAR, which is the route currently proposed by Goldcorp, has the lowest overall potential for environmental, socio-economic, and cumulative impacts as compared to the Black Hills route, and is supported by TH. Engagement regarding management and mitigation plans related to the NAR is ongoing.

Goldcorp and TH participated in a two-day water workshop at the end of September 2017. This workshop included detailed discussion of SSWQO, water treatment associated with the HLF, design and management of the HLF, and discussion of ongoing engagement with TH on water management and water quality-related topics as the Project progresses into licensing and beyond. Areas of collaboration on SSWQO and water quality were discussed, and TH and Goldcorp reached agreement on the approach to SSWQO for Coffee Creek and Yukon River. Goldcorp's considerations of TH's views are summarized in **Table 11**. Goldcorp committed to further engagement on SSWQO for Halfway Creek and Latte Creek in consideration of the TH views presented in this workshop. Goldcorp also committed to engaging TH on the development of management plans for the Project. Answers to TH's questions were provided during the workshop; however, in some cases TH's questions were related to topics relevant to the licensing stage of the Project. In these cases, Goldcorp committed to further engagement and specific studies or additional work, which are presented in **Table 14**.

### **October 2017**

On October 17 and October 31, TH and Goldcorp participated in workshops on closure and reclamation and socio-economics and health. The closure and reclamation workshop provided an opportunity for TH to present further views on the topic and for Goldcorp and TH to discuss outstanding items from the June 5 workshop on the same topic. Key interests discussed at this closure and reclamation workshop included cover of the WRSF in closure, as this is not currently proposed, and plans for engagement between Goldcorp and TH on the development of the Reclamation and Closure Plan and throughout the life of mine. In consideration of TH's views presented, Goldcorp has committed to further investigation of WRSF cover material availability at site. Additional detail can be found below in **Table 11** and **Table 14**.

The socio-economic and health workshop provided an opportunity for TH to present further views on the topic. Much of the discussion in this workshop focused on the development of the Socio-economic Management Plan as well as detailed discussions about the HHRA for the Project. Discussions pertaining to the Socio-economic Management Plan focused on TH's priorities related to monitoring and mitigating socio-economic effects. Discussions related to the HHRA focused on updates to the HHRA based on concerns raised by TH regarding assessment of select parameters. Goldcorp is committed to engaging TH on developing and implementing the Socio-economic Management Plan, and initiated this process in the workshop October 31. Goldcorp is also committed to discussing updates to the HHRA with TH and their technical team as information becomes available.



Goldcorp and TH also met for a Project development meeting on October 24. TH and Goldcorp discussed the status of technical engagement action items, and Goldcorp inquired about TH's feedback on the Technical Engagement Status and Plan document originally tabled in August. Goldcorp and TH set follow-up teleconferences to review technical engagement action items with TH and Goldcorp's technical teams. Goldcorp also discussed the plans for the 2018 exploration season and the November 30 target date for the re-submission of the Project Proposal to YESAB.

### **November 2017**

Meetings between Goldcorp and TH included teleconferences to touch base on engagement moving forward regarding management plan development and ongoing engagement topics as iterated in **Table 14**. Goldcorp also provided TH with a draft version of portions of this document relevant to consultation with TH for their review and input. Goldcorp and TH updated the Technical Engagement Status and Plan document via email correspondence throughout November (**3-A2-1356**).

#### **3.3.1.2 Selkirk First Nation Overview**

##### **Prior to March 31, 2017**

The Proponent approached SFN on February 25, 2013 to initiate a relationship and understand how SFN would like to be consulted on the Project. Based on feedback received in a letter from SFN in November 2014, the Proponent has endeavoured to respect SFN's request that SFN will contact the Proponent when SFN is available and willing to meet to discuss the Project. Since this correspondence in 2014, the Proponent has regularly updated SFN by letter on the Project, met in October 2015 to discuss the relationship between SFN and the Proponent, and provided a Project update in a meeting in Pelly Crossing on June 16, 2016. Following the acquisition of Kaminak by Goldcorp, the Proponent has worked to establish a stronger relationship with SFN, meeting with SFN leadership in November 2016 and holding multiple meetings with the SFN technical team since then. SFN invited Goldcorp to Pelly Crossing in March 2017 to introduce the company and the Project team to SFN citizens. SFN attended workshops for the WRSF alternatives assessment, as well as the Batch 1 and Batch 2 information sharing events. Goldcorp offered SFN capacity funding for technical review and ongoing TLUS work; administrative matters related thereto were being finalized at the time of submission. A more detailed account of the consultation with SFN prior to March 31, 2017 is provided in **Section 3.0 of the Project Proposal**.

##### **Addressing Issues Raised in July 12, 2017 Consultation Determination**

As described in the introduction to this section of the Project Proposal, Goldcorp received notification from the YESAB Executive Committee on July 12 that the Coffee Gold Mine Project Proposal was not being advanced to the screening stage of the process due to inadequate pre-submission consultation. YESAB provided a Consultation Determination to substantiate that decision. In the Consultation Determination, YESAB outlined its perception that there were a number of documents on which SFN did not have sufficient time to review and provide comment, specifically the change in design from three WRSFs down to one WRSF.

Since March 31, 2017, SFN has had sufficient time to review those documents, and has participated with Goldcorp in a number of technical workshops to discuss the Project Proposal in detail. Through a capacity funding agreement Goldcorp has supported SFN technical staff as well as expert consultants, providing SFN with the resources they said they needed to review this material. Goldcorp has been active in engaging with SFN and enabling SFN citizens to participate.

SFN provided its views on the Proposal in writing on November 20, 2017, which summarized the views that were presented in workshops, citizens, meetings, and in other direct discussions with Goldcorp, allowing Goldcorp to fully and fairly consider SFN's views and incorporate them into this submission.

### **April 2017**

Since submitting the finalized Project Proposal to YESAB and SFN, on March 31, 2017, Goldcorp continued to attempt to engage SFN on the information presented in the Project Proposal. Correspondence with SFN in April 2017 focused on attempting to schedule meetings with the SFN Lands Department and Selkirk Renewable Resources Councils at the request of SFN to provide a Project overview to these parties, which had been requested by SFN during meetings with Chief and Council in March 2017. Goldcorp and SFN settled on dates for these meetings; however, these meetings were re-scheduled multiple times by SFN, and ultimately planning these meetings was put on hold at the direction of SFN. SFN also entered into an election cycle in late March and early April 2017, which resulted in delays in engaging SFN on the Project during this time. A new Chief and Council were elected on April 6. Goldcorp corresponded with SFN leadership in April 2017 to begin establishing a relationship with the new SFN Chief and Council. During the month of April, Goldcorp also reached out to SFN to finalize the draft Capacity Funding and Confidentiality Agreement to enable release of technical review funding.

### **May 2017**

In early May, Goldcorp and SFN set a date for a first meeting between the newly elected SFN Chief and Council and Goldcorp for May 29. This meeting provided an opportunity for Goldcorp to review the Project with Chief and Council, and for SFN to present views on the Project. Goldcorp considered the views presented by SFN in this meeting, and responded to all questions regarding the Project during the meeting with follow-up correspondence after the meeting as needed. For example, SFN presented views regarding interest in further engagement on the HLF, NAR, and water quality. These views were considered in developing workshop topics with SFN. Please refer to the September 2017 summary below for details regarding technical workshops with SFN. Goldcorp also provided information on Goldcorp's corporate cyanide management practices and information related to proposed NAR management options in consideration of the views presented by SFN on May 29. Prior to submission on March 31, 2017, Goldcorp had added a water quality monitoring station near the confluence of Coffee Creek and the Yukon River in consideration of SFN's views presented. Goldcorp informed SFN during the May 29 meeting that this water quality station had been added.

During the month of May, Goldcorp and SFN also corresponded regarding the draft Capacity Funding and Confidentiality Agreement. The parties agreed upon a separate agreement to provide funding for a regional TLUS that SFN was already conducting and funds released during the month to support that work.

### **June 2017**

Goldcorp and SFN corresponded throughout June to coordinate a Project site tour in consideration of the views presented by SFN during the meeting in May. The site tour occurred June 23. This included a site tour of current Coffee Camp, proposed pits and infrastructure, and HLF location, as well as a flyover of Halfway Creek. SFN and Goldcorp discussed additional tours of the site and NAR for SFN's technical team, and corresponded about potential dates for these tours. During the month of June, Goldcorp and SFN corresponded regarding the draft Capacity Funding and Confidentiality Agreement.

### **July 2017**

Goldcorp notified SFN of the YESAB Executive Committee's decision that the Coffee Gold Mine Project Proposal would not be advanced to the screening stage of the process due to inadequate pre-submission consultation on July 17. In this correspondence, Goldcorp reiterated their commitment to meaningful engagement with SFN on the Project. While the May 29 Chief and Council meeting was a good opportunity for SFN to present views on the Project, Goldcorp had yet to receive information from SFN describing the depth and frequency at which SFN wished to be engaged on the Project. On July 24, Goldcorp provided a letter to SFN proposing how to progress Project consultation with SFN. The letter summarizes the Project Proposal submission on March 31, 2017, and previous meetings with SFN and Goldcorp's commitment to open and transparent dialogue with SFN. Goldcorp's letter highlights the interactions with the Project and SFN territory. Goldcorp also summarized the good progress made with the SFN and Goldcorp relationship, and the technical workshops that SFN representatives attended prior to submission, noting that SFN indicated to Goldcorp that written feedback is not of interest to SFN, as communicated in a workshop in February 2017. Goldcorp therefore requested SFN's preferred method for providing feedback by August 31, 2017.

In late July, Goldcorp and SFN communicated about scheduling site tours and NAR tours with SFN's technical team and Chief and Council. September was decided upon for these tours.

### **August 2017**

During August, the final version of the Capacity Funding and Confidentiality Agreement was agreed upon by Goldcorp and SFN. In early August, Goldcorp provided a suggested engagement calendar to SFN Chief and Council for review and input. SFN provided a document on August 19 outlining SFN's preferred engagement topics and methods, which can be found in **Appendix 3-A2 (3-A2-678)**. This document identified the technical support SFN had hired to review the Project Proposal, and committed to September 18 as the date by which SFN would complete the review of the Project Proposal. SFN proposed the following technical workshop themes:

**Table 6 Selkirk First Nation Technical Workshop Consultation Schedule**

Meeting Theme	Date Preferred by SFN	Actual Date and Location of Workshop
Water Impacts and Operational Mine Waste Management	September 25 or 26, 2017	September 19, 2017 (Whitehorse)
Mine Closure Planning	October 16, 19, or 20, 2017	September 20, 2017 (Whitehorse)
Socio-economic Impacts, Monitoring, and Management	October 30, November 1, or November 2, 2017	September 21, 2017 (Whitehorse)
Operational Wildlife Impacts and Management	None identified	September 22, 2017 (Whitehorse)

Goldcorp and SFN worked collaboratively in late August to schedule the above technical meetings and a site tour for the technical team, to assist them in their review of the Project Proposal.

**September 2017**

On September 1, Goldcorp provided a written response to SFN's document proposing the process for technical engagement on the process (**3-A2-716**). Generally, the response focused on proposing specific timelines for implementing the process and identifying the mechanism for how SFN would provide its formal views. Goldcorp also proposed including one to two citizens meetings during the process. SFN did not correspond further on this document to confirm or reject the proposed changes; however, several of the activities referenced in it took place throughout the month of September, and a meeting was held on October 18 to discuss outstanding issues raised by both parties related to the engagement process. Goldcorp was also invited to present to SFN citizens on November 9 in Pelly Crossing on the Project.

The signed version of the Capacity Funding and Confidentiality Agreement was shared between the parties in early September, and funding was released to facilitate SFN's technical review of the Project.

Goldcorp and SFN engaged frequently in September 2017. Goldcorp hosted a site tour and tour of the NAR for SFN's technical team on September 14, followed by a tour of the NAR for SFN Chief and Council members on September 15. Goldcorp and SFN also participated in four days of workshops on September 19 through 22 on the workshop themes iterated above. Goldcorp's consideration of the views presented during these workshops is summarized below in **Table 12**. Goldcorp also committed to engaging SFN on the development of management plans for the Project. Answers to SFN's questions were provided during the workshops; however, in some cases SFN's questions were related to topics relevant to the licensing stage of the Project. In these cases, Goldcorp committed to further engagement and specific studies or additional work which are iterated in **Table 15**.

## **October 2017**

Following the 4 days of technical workshops with SFN’s technical advisors, correspondence in October 2017 focused on follow up and action items from these technical sessions. Goldcorp worked to provide SFN with clarifying information via email that was requested during the September technical workshops. On October 18, Goldcorp also met with SFN’s technical and legal advisors to discuss next steps in SFN’s presentation of views. SFN advised Goldcorp that SFN was following their internal processes whereby SFN’s technical advisors debriefed Council and in turn would receive direction from Council and initiate the next round of technical discussion. Goldcorp acknowledged SFN’s process, and noted that the Project Proposal had been with SFN for some time for review and feedback, and that Goldcorp’s intent was to re-submit the Project Proposal and appropriate addenda on November 30, 2017.

## **November 2017**

SFN invited Goldcorp to meet with Chief, Council, and citizens on November 9 in Pelly Crossing. This was an opportunity for Goldcorp to meet with citizens and discuss the Project, as well as the feedback Goldcorp had received to date from SFN’s Chief and Council and technical advisors on the Project. SFN confirmed for Goldcorp during this citizens meeting that the comments and interests raised regarding the Project by SFN’s advisors during the technical workshops were fully endorsed by SFN Council.

Goldcorp and SFN met on November 20 to discuss next steps on multiple fronts related to the SFN-Goldcorp relationship and for SFN to provide a package of written comments on the Project Proposal for Goldcorp’s consideration (**3-A2-1354**). This package comprised a letter from the Chief of SFN and three associated appendices of comments from SFN’s advisors that detailed the feedback that had been provided to Goldcorp during the technical workshops in September, and in some cases provided a list of associated recommendations from SFN to Goldcorp on the Project. Most, if not all, of the comments and recommendations in SFN’s written feedback have been addressed through dialogue in the technical workshops and/or commitments to further engagement and/or work. In addition, Goldcorp provided SFN with a document on November 27, which identified SFN’s topics of concern, the recommendations made by SFN’s technical advisors, Goldcorp’s response to each recommendation and proposed next steps for engagement on these and other issues of interest to SFN (**3-A2-1355**). These associated commitments can be found in **Table 13** and **Table 15** below and in the records of the technical workshops in **Appendix 3-A2**.

### **3.3.1.3 First Nation of Na-cho Nyäk Dun Overview**

#### **Prior to March 31, 2017**

The Proponent initiated consultation with the First Nation of Na-cho Nyäk Dun (FNNND) in a letter to FNNND government on July 13, 2015. In a meeting between the Proponent and FNNND government, FNNND noted the fact that the portion of the NAR that is on FNNND Traditional Territory is in an area of

overlap with TH Traditional Territory, and noted that there was a “friendship agreement” between the two First Nations. Following the acquisition of Kaminak by Goldcorp, the Proponent contacted FNNND government in September 2016 to initiate an introductory meeting. The Proponent and FNNND council met in Mayo in January 2017, a date selected at FNNND’s request. Due to unforeseen circumstances, certain key members of the FNNND council were unable to attend the meeting; therefore, the council reserved discussion on future consultation until they were available. As described earlier in this section, FNNND was provided with the complete finalized Project Proposal on March 31, 2017.

#### **April 2017**

After many attempts to coordinate a follow-up meeting with FNNND Chief and Council and to coordinate a citizens meeting in Mayo, Goldcorp was successful in meeting with Chief and Council, followed by a citizens meeting, on April 26. The views presented by FNNND Chief and Council and FNNND Citizens were considered and responded to during the meetings. In consideration of the views presented by FNNND, Goldcorp followed up with FNNND to provide the link to NAR shape files and maps via Open Text Core, Goldcorp’s online file sharing system.

#### **May 2017**

In early May, FNNND and Goldcorp participated in a teleconference to provide an overview of how to use Open Text Core, Goldcorp’s online sharing platform, as well as an orientation of the Project Proposal. Throughout the month of May, Goldcorp and FNNND coordinated Goldcorp’s presentation and attendance at the FNNND Industry Day in June 2017.

#### **June 2017**

Goldcorp attended FNNND’s industry day on June 25, delivering a presentation to attendees about the Project and providing an overview of the proposed mine site and NAR. Questions from FNNND citizens at this event were responded to during the presentation.

#### **July 2017**

Goldcorp notified FNNND of the YESAB Executive Committee’s decision that the Coffee Gold Mine Project Proposal would not be advanced to the screening stage of the process due to inadequate pre-submission consultation via letter on July 17. In this letter, Goldcorp reiterated their commitment to meaningful engagement with FNNND on the Project, particularly in regard to the NAR. Since providing the finalized Project Proposal to FNNND on March 31, FNNND had not formally presented views on the Project Proposal. While the April 26 Chief and Council meeting and Citizens meeting were good opportunities for FNNND to present views on the Project, Goldcorp had yet to receive information from FNNND describing the depth and frequency at which FNNND wished to be engaged on the Project. On July 24, Goldcorp provided a letter proposing how to progress Project consultation with FNNND. The letter summarizes the



Project Proposal submission on March 31, 2017, and previous meetings with FNNND and Goldcorp's commitment to open and transparent dialogue with FNNND. Goldcorp's letter highlights the overlap with the NAR and FNNND territory and the most relevant sections of the Project Proposal with regard to the NAR. Goldcorp requests written feedback by August 31, 2017, or for FNNND to identify their preferred method of providing feedback by this date.

### **August 2017**

Goldcorp followed up with FNNND via phone on August 14 to discuss the letter sent on July 25th requesting comments from FNNND on the Project. During this phone call, FNNND informed Goldcorp that FNNND sees the portion of the NAR that is in FNNND territory as a very small part of the Project in a small portion of FNNND territory. FNNND verbally described how the Nation was not dissatisfied with Goldcorp's consultation with FNNND, noting that FNNND did not have any feedback on the Project Proposal, and wanted to support Goldcorp in the YESAB process. FNNND committed to providing a letter to Goldcorp that week describing this information and any other feedback on the Coffee Gold Project Proposal. Goldcorp followed up on the phone call with an email summarizing the key points of the discussion that same day. On August 18, Goldcorp followed up via telephone with FNNND regarding the letter and to inquire about a good time for a meeting with Chief and Council, leaving a voicemail with the Lands & Resources Manager. Goldcorp followed up via telephone on August 23 with FNNND, where FNNND informed Goldcorp that they were drafting a letter regarding their feedback on the Project Proposal and would send it shortly. Goldcorp followed up this phone call with an email on August 29 to inquire about the status of the drafted letter.

### **September 2017**

On September 1, Goldcorp and FNNND connected via telephone to discuss the progress on FNNND's letter; FNNND summarized how busy the Lands & Resources department was and noted that the letter would be completed soon. Goldcorp left voicemails with the FNNND Lands & Resources Manager on September 15, 18, and 22 to follow up on the progress of FNNND's feedback letter, and sent an email on September 12 for the same reason. On September 21, Goldcorp sent an email to FNNND's Lands & Resources and Governance and Administration departments to follow up on the letter and to inquire about a meeting with Chief and Council and with Citizens at some point in fall 2017. On September 26, Goldcorp followed up with FNNND via telephone and spoke with FNNND's Executive Director, discussing the letter and FNNND's preferences for engagement. During this phone call, FNNND verbally informed Goldcorp that FNNND did not have any feedback on the Project Proposal, and that FNNND requests that Goldcorp does not undertake any further consultation with FNNND on the Project Proposal. FNNND suggested that Goldcorp draft a letter for FNNND to review and sign to send to Goldcorp and YESAB iterating this position. Goldcorp agreed, and provided the draft letter to FNNND via email on September 27.

## **October 2017**

After providing a draft letter to FNNND summarizing FNNND's feedback on the Project Proposal as had been communicated verbally to Goldcorp by FNNND, Goldcorp followed up via voicemail on October 2 and via email on October 4. FNNND contacted Goldcorp via telephone on October 15 to notify Goldcorp that FNNND would discuss their approach to the letter at the next Chief and Council meeting on October 31, 2017 and inform Goldcorp of Chief and Council's decision after this meeting.

## **November 2017**

On November 6, FNNND provided a letter to Goldcorp and to YESAB summarizing pre-submission consultation on the Project to date (**3-A2-1343**). This letter notified YESAB that FNNND is satisfied with the level of consultation from Goldcorp on the Project and that pre-submission consultation on the Project Proposal is complete. FNNND requested that Goldcorp continue to provide updates to the FNNND Lands and Resources department, which Goldcorp is fully committed to do.

### **3.3.1.4 White River First Nation Overview**

#### **Prior to March 31, 2017**

The Proponent has been engaging with WRFN since 2012, signing the Exploration Communication and Cooperation Agreement with WRFN on June 13, 2014. Goldcorp funded and received an additional Traditional Knowledge and Use Study as it relates to the NAR with WRFN. The Proponent provided funding for technical review through a Confidentiality and Funding agreement which was signed April 3, 2017. Consultation with WRFN on the Project included multiple meetings with representatives of WRFN in addition to multiple community meetings and an open house. The Proponent funded WRFN to employ technical consultants to assist in the review of technical information on the Project as a result of WRFN's Exploration Communication and Cooperation Agreement with the Proponent. The technical team from WRFN participated in the document review, and provided written feedback for the baseline information sharing event, and also participated in the WRSF alternatives assessment workshop; WRFN subsequently communicated to the Proponent that it is their preference to engage on technical matters, including providing written feedback on the Project Proposal, only after Goldcorp had entered the YESAB process. Goldcorp continued to share Project information with WRFN through the Batch 1 and Batch 2 information sharing events, and provide opportunities for meetings to discuss and receive feedback on the information provided.

#### **March 31, 2017 to Date**

Since submitting the finalized Project Proposal to the YESAB Executive Committee and to WRFN and other First Nations, WRFN provided limited responses to Goldcorp's attempts to engage WRFN. Goldcorp and WRFN met in June to discuss confidential matters. WRFN entered into an election cycle in September 2017, and informed Goldcorp that engagement would re-commence after the election. Correspondence

between Goldcorp and WRFN took place through September and October 2017 to coordinate a meeting to discuss confidential matters. This meeting has since been rescheduled to December 2017. Throughout the correspondence and during the meeting in June, Goldcorp reiterated its desire to meet with WRFN leadership, community members, and/or the technical team about the Project Proposal. WRFN responded in September that community meetings should not take place until after resubmission, stating that it is “premature to meet with our membership when we do not know what you are submitting for assessment.” Goldcorp and WRFN are currently collaborating on developing topics to be presented by Goldcorp at a WRFN members meeting on the Project in Beaver Creek scheduled for January 15, 2017.

### 3.3.2 CONSULTATION UNDERTAKEN TO DATE

Consultation with potentially affected First Nations included a variety of events and activities, including community meetings and open houses; meetings with potentially affected First Nation governments; Project Proposal document sharing and written feedback processes’ technical workshops; one-on-one and small, targeted group interviews with key individuals; and site visits. Dates and timing of consultation events and activities were coordinated with the parties being consulted; when possible, meeting information was provided in advance of the meeting. During consultation events, feedback from potentially affected First Nations was documented and assisted in guiding Project design where applicable. Questions and comments raised were responded to during consultation events, and as required, follow-up was undertaken to address any information requests, questions, and comments related to the Project.

Consultation events with potentially affected First Nations groups are summarized in **Table 7** to **Table 10** below with information supporting the pre-submission consultation requirements under YESAA s. 50 (3), and as iterated in **Table 1**. These events have been documented with a combination of meeting minutes and sign-in sheets. This supporting information and material can be found in **Appendix 3-A2**. Key views presented by potentially affected First Nations and Goldcorp’s consideration of these views can be found in **Table 11** and **Table 12**. Resulting Project commitments and engagement commitments can be found in **Table 13** through **Table 15**.

**Table 7 Summary of Tr’ondëk Hwëch’in Consultation**

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
	Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient’s Response		
<b>Project Development Meeting May 2, 2017</b>	Meeting date decided in person at a meeting in March 2017. Meeting invite sent via email April 27, 2017.	TH Chief, select TH Representatives	Project update on the progress of the YESAB process, advancing tri-party discussions about NAR management, NAR route through Maisy May, Citizens meetings with Goldcorp, implementation of the Advisory Committee and capacity funding for TH technical review.	TH Chief, select TH representatives	5 days based on meeting invite.	TH Chief, select TH representatives	Detailed comments from TH and Goldcorp’s responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH’s concerns, comments, and requests during the meeting. Regarding follow-up from this meeting, TH requested redline comparison documents to understand the changes made to the submitted Project Proposal based on TH’s feedback. Goldcorp provided redline comparison documents per TH’s request via email on May 19. Based on views presented during this meeting, Goldcorp also provided a memo to TH on May 23 to show a comparison between the Maisy May (proposed) NAR route and the Black Hills route that is of interest to TH. Details can be found in <b>Appendix 3-A2.</b>	3-A2-154
<b>NAR Meeting May 18, 2017</b>	Organized by YG.	TH Executive Director, <sup>(Name Redacted)</sup> (Yukon Government)	NAR governance, possible NAR road users group.	TH Executive Director, John Bailey (Yukon Government)	N/A	TH Executive Director, <sup>(Name Redacted)</sup> (Yukon Government)	Detailed comments from TH and Goldcorp’s responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH’s concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b>	3-A2-206
<b>Heap Leach Facility Teleconference May 25, 2017</b>	Initial agenda and meeting invite sent on May 15, 2017. Updated agenda with TH’s input and approval sent May 17, 2017. (3-A2-200) All of the above provided via email.	TH Chief, TH Executive Director, and TH Technical Consultants	HLF and water treatment, HLF water management and raincoats,	TH Chief, TH Executive Director, and TH Technical Consultants	12 days to prepare views based on topics requested by TH representatives.	TH Technical Consultants	Detailed comments from TH and Goldcorp’s responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting; TH representative presented views regarding requested meeting topics in advance on May 17. (3-A2-201)	Goldcorp responded to TH’s concerns, comments, and requests during the meeting. Discussion topics requested by TH covered in teleconference except for geochemistry. Subsequent geochemistry teleconference planned for June 9 based on views presented during this meeting by TH representatives. Details can be found in <b>Appendix 3-A2.</b>	3-A2-221
<b>NAR and Reclamation and Closure Workshop June 5, 2017</b>	Initial agenda and meeting invite sent May 16, 2017. (3-A2-197) Updated agenda with TH’s input and approval sent May 18, 2017. (3-A2-208) All of the above provided via email.	TH Chief, TH Executive Director, and TH Technical Consultants	NAR route and management, reclamation and closure, water treatment	TH Chief, TH Executive Director, and TH Technical Consultants	20 days to prepare views based on agenda.	TH Chief, TH Executive Director, and TH Technical Consultants	Detailed comments from TH and Goldcorp’s responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting; follow-up between parties occurred via email. TH presented views on the NAR via memo emailed in advance of the meeting on June 2 (3-A2-302)	Goldcorp responded to TH’s concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b> Based on views presented by TH during this meeting, Goldcorp agreed to complete a MCDA for the NAR, and Goldcorp hosted site tours of the NAR to support these discussions with TH. Both of these follow-up items took place over multiple days in August (see subsequent rows in this table). Goldcorp also held a follow-up reclamation teleconference with TH on July 14 based on TH’s views presented during this meeting.	3-A2-309



Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
	Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response		
<b>Water Management and Water Quality Objectives Workshop June 6, 2017</b>	Initial agenda and meeting invite sent May 16, 2017. (3-A2-197) Updated agenda with TH's input and approval sent May 18, 2017. (3-A2-208) All of the above provided via email.	TH Chief, TH Executive Director, and TH Technical Consultants	Block model for the Project (to show where Goldcorp knows there is presence of gold at the site); water management at the site associated with the WRSF and other site infrastructure for operation and closure; the water quality and water balance model; water treatment associated with the HLF; and water quality objectives	TH Chief, TH Executive Director, and TH Technical Consultants	21 days to prepare views based on agenda.	TH Chief, TH Executive Director, and TH Technical Consultants	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting; follow-up between parties occurred via email. TH presented views on SSWQOs via memo emailed in advance of the meeting on June 2. (3-A2-302)	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b> Based on views presented by TH during this meeting, Goldcorp held a subsequent workshop to discuss water quality topics, including water treatment, on September 28 and 29. Goldcorp also provided a conceptual site model and information on semi-passive treatment and active treatment at these September meetings (see subsequent rows in this table).	3-A2-367
<b>Geochemistry Teleconference June 9, 2017</b>	Sent meeting invite on May 30, 2017. (3-A2-291) Provided via email.	TH Chief, TH Executive Director, and TH Technical Consultants	Geochemistry topics	TH Chief, TH Executive Director, and TH Technical Consultants	15 days to prepare views based on original meeting agenda on May 25.	TH Technical Consultants	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b> Goldcorp held a workshop to discuss water quality topics, including water treatment and geochemical source terms, on September 28 and 29. Topics from this meeting were re-visited and discussed in further detail on September 28 and 29.	3-A2-453
<b>Project Development Meeting June 13, 2017</b>	Meeting date and topic decided in person on May 2, 2017 at the previous Project development meeting.	TH Chief, select TH representatives	Project update, hiring and contracting, NAR management, and NAR discussions with YG.	TH Chief, select TH representatives	1 month based on date of previous meeting.	TH Chief, select TH representatives	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b>	3-A2-512
<b>Site Tour June 20, 2017</b>	Decided upon in May 2, 2017 meeting. Provided in person.	TH Chief, TH Executive Director, and TH Technical Consultants	Project design, site infrastructure	TH Chief, TH Executive Director, and TH Technical Consultants	Site tour dates set 38 days in advance.	TH Chief, TH Executive Director, and TH Technical Consultants	N/A	In person at site tour.	Goldcorp responded to TH's concerns, comments, and requests during the site tour. No items required follow-up.	3-A2-541
<b>TH Citizens Open House June 20, 2017</b>	Decided upon in May 2, 2017 meeting. Provided in person.	TH Chief, TH Executive Director, and TH Citizens	Project update, overview of site tour	TH Chief, TH Executive Director, and TH Citizens	Advertised by TH.	TH Chief, TH Executive Director, and TH Citizens	N/A	In person at open house.	Goldcorp responded to TH's concerns, comments, and requests during the open house. No items required follow-up.	3-A2-542
<b>NAR Options Analysis Teleconference June 22, 2017</b>	TH provided documents for discussion via email on June 13, 2017. Goldcorp and TH emailed back and forth June 13-19 to set a date; sent meeting invite on June 19, 2017. (3-A2-536) All of the above provided via email.	TH Chief, TH Executive Director, and TH Technical Consultants	TH views presented on NAR route previously, MCDA methodology.	TH Chief, TH Executive Director, and TH Technical Consultants	9 days based on agenda.	TH Technical Consultants	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b>	3-A2-550

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response	Method		
<b>Reclamation and Closure Teleconference July 14, 2017</b>	Sent meeting invite on June 14, 2017. (3-A2-524) Provided via email.	TH Executive Director, TH Technical Consultants	Reclamation and closure, water treatment, end land use planning, ecohydrological modelling	TH Executive Director, TH Technical Consultants	30 days based on invite.	TH Technical Consultants	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b> Goldcorp held a workshop to discuss closure topics, including end land use planning and water treatment, on October 17. Topics from this meeting were re-visited and discussed in further detail on October 17.	3-A2-597
<b>NAR Site Tour August 22 and 24, 2017</b>	TH and Goldcorp discussed the NAR site tours on May 18 2017 during a meeting. Further discussed and dates agreed to July 25, 2017 in a meeting. All of the above provided in person.	TH Chief, TH Executive Director, and TH Technical Consultants	NAR route	TH Chief, TH Executive Director, and TH Technical Consultants	Site tour date set 1 month in advance.	TH Chief, TH Executive Director, and TH Technical Consultants	N/A	In person at site tour.	Goldcorp responded to TH's concerns, comments, and requests during the site tour. No items required follow-up.	3-A2-682 3-A2-691
<b>NAR MCDA Teleconference August 24, 2017</b>	Goldcorp provided documents for discussion on August 16, 2017; meeting invite sent the same day.  3-A2-673  All of the above provided via email.	TH Executive Director, TH Technical Consultants	NAR route and NAR MCDA	TH Executive Director, TH Technical Consultants	8 days based on date the information was provided.	TH Technical Consultants	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b> TH confirms for Goldcorp in this meeting that their concerns regarding the NAR are now closed-off; Maisy May is seen as the preferred route based on the MCDA and TH's criteria.	3-A2-684
<b>Project Development Meeting August 29, 2017</b>	Meeting date and topic decided in person at previous Project Development Meeting on June 13.	TH Chief, TH Executive Director, select TH representatives	YESAB process, TH Technical Engagement Status and Plan document, exploration program update, NAR MCDA, upcoming technical workshops	TH Chief, TH Executive Director, select TH representatives	2 months based on date of previous meeting.	TH Chief, TH Executive Director, select TH representatives	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b>	3-A2-698
<b>Project Development Meeting September 13, 2017</b>	Meeting date and topic decided in person at previous Project Development Meeting on August 29.	TH Chief, TH Executive Director, select TH representatives	YESAB process, TH feedback on Technical Engagement Status and Plan document, engagement with TH Citizens	TH Chief, TH Executive Director, select TH representatives	2 weeks based on date of previous meeting.	TH Chief, TH Executive Director, select TH representatives	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting.	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b>	3-A2-746
<b>Water Management and Water Quality Objectives Workshop September 28 and 29, 2017</b>	TH confirmed date and topic of workshop on July 31, 2017. (3-A2-644) Goldcorp provided an agenda for review on September 20; TH provided their updated version September 22. Goldcorp suggested minor adjustments to TH's agenda on September 25. (3-A2-836, 3-A2-935, 3-A2-984) All of the above provided via email.	TH Chief, TH Executive Director, and TH Technical Consultants	Water management and water quality objectives, active and semi-passive treatment of HLF water	TH Chief, TH Executive Director, and TH Technical Consultants	Meeting date and topic set 3 months in advance; agenda sent 9 days in advance (note: TH provided their own agenda for this workshop, which was ultimately the agenda that was followed. Goldcorp received 6 days' notice of this agenda).	TH Chief, TH Government Staff, and TH Technical Consultants; TH Chief only attended September 28 workshop due to scheduling conflicts	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2.</b>	In person at meeting. Feedback post-meeting from TH via email/phone call on documents provided during meeting (conceptual site model and memoranda) was encouraged.	Goldcorp provided information to TH on semi-passive and active treatment of the HLF, as well as a conceptual site model, based on feedback received on June 6. Goldcorp committed to a selection of water quality monitoring stations based on TH's views presented over September 28 and 29, and also further engagement with TH on SSWQOs. Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2.</b>	3-A2-997 3-A2-1071

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
	Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response		
<b>Closure Workshop October 17, 2017</b>	Date and meeting topic set on July 31. (3-A2-644) Agenda was reviewed with the TH attendees to the September 29 water workshop; agenda was edited and decided upon on September 29. Agenda was distributed amongst all relevant parties from the TH and Goldcorp parties on September 29. (3-A2-1070) All of the above provided via email.	TH Chief, TH Executive Director, TH Technical Advisors	Reclamation and closure of the Project, including water treatment and backfilling	TH Chief, TH Executive Director, TH Technical Advisors	Meeting date and topic set 3 months in advance; agenda set collaboratively 19 days in advance.	TH Chief, TH Government Staff, TH Technical Advisors	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at the meeting; an Engagement Plan for engagement on social aspects of the Reclamation and Closure Plan was provided via email on November 17. (3-A2-1344)	Goldcorp has committed to engaging TH on the development of the Reclamation and Closure Plan, as well as subsequent iterations required for licensing purposes, and throughout life of mine. Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-1157
<b>Project Development Meeting October 24, 2017</b>	Meeting date and topic decided in person at previous Project Development Meeting on September 13.	TH Chief, TH Executive Director, select TH representatives	Technical engagement action items, TH's feedback on the Technical Engagement Status and Plan document, and plans for the Project Proposal re-submission and 2018 exploration season	TH Chief, TH Executive Director, select TH representatives	40 days based on previous meeting date.	TH Chief, TH Executive Director, select TH representatives	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting; follow up occurred via email on November 7. (3-A2-1312)	Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-1348
<b>Socio-economic and Health Workshop October 31, 2017</b>	Date and meeting topic set on July 31. (3-A2-644) Agenda provided for review and input on October 12, 2017. Goldcorp updates the agenda per TH's feedback on October 24. (3-A2-1138, 3-A2-1229) All of the above provided via email.	TH Chief, TH Executive Director, TH Technical Advisors	Socio-economic effects assessments, Socio-economic Management Plan and engagement process, HHRA	TH Chief, TH Executive Director, TH Technical Advisors	Meeting date and topic set 3 months in advance; agenda set collaboratively 19 days in advance.	TH Executive Director, TH Government Staff, TH Technical Advisors	Detailed comments from TH and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at the meeting; an Engagement Plan for follow-up meetings on Socio-economic Management Plan development was provided via email on November 17. (3-A2-1344) TH also provided topics of interest in advance via email on October 17. (3-A2-1156)	Goldcorp has committed to engagement with TH on the development of the Socio-economic Management Plan. Goldcorp has also committed to incorporating TH's feedback on the HHRA in future updates to this document. Goldcorp responded to TH's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-1240

**Table 8 Summary of Selkirk First Nation Consultation**

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
	Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response		
<b>Chief and Council Meeting May 29, 2017</b>	SFN requested meeting on May 17; Goldcorp agreed. (3-A2-198) Provided via email.	SFN representative	Project update, introductions between newly elected SFN Chief and Council and Goldcorp, steps forward in engagement.	SFN Chief and Council, select SFN representatives	12 days from meeting confirmation.	SFN Chief and Council, select SFN representatives	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-252
<b>Chief and Council Site Tour June 23, 2017</b>	Site tour date confirmed on June 5, logistics and attendees discussed over June 5 to June 20. (3-A2-529) All of the above provided via email.	SFN Chief and Council, select SFN representatives	Project design, site infrastructure	SFN Chief and Council, select SFN representatives	Site tour date agreed upon by both parties 18 days in advance of event.	SFN Chief and Council, select SFN representatives	N/A	In person at site tour.	Goldcorp responded to SFN's concerns, comments, and requests during the site tour. No items required follow-up.	3-A2-557
<b>Technical Team Site and NAR Tour September 14, 2017</b>	Goldcorp initiated coordination of the site tour on July 28. SFN confirms date of site tour on August 28, 2017. (3-A2-643, 3-A2-692) All of the above provided via email.	SFN Technical Advisors	Project design, site infrastructure, NAR route south of the Stewart River	SFN Technical Advisors	Site tour date agreed upon by both parties 17 days in advance of event.	SFN Technical Advisors	N/A	In person at site tour; Goldcorp provided maps to support NAR portion of tour via email on August 28. (3-A2-693)	Goldcorp responded to SFN's concerns, comments, and requests during the site tour. No items required follow-up.	3-A2-752
<b>Chief and Council NAR Tour September 15, 2017</b>	Goldcorp suggested dates for a Chief and Council NAR tour on September 4, and SFN confirms a date on September 7 (3-A2-727) Provided via email.	SFN Chief and Council, select SFN representatives	NAR route south of the Stewart River	SFN Chief and Council, select SFN representatives	Site tour date agreed upon by both parties 11 days in advance of event.	SFN Chief and Council, select SFN representatives	N/A	In person at tour.	Goldcorp responded to SFN's concerns, comments, and requests during the site tour. No items required follow-up.	3-A2-755
<b>Mine Waste Management and Water Workshop September 19, 2017</b>	Technical Engagement Plan provided to Goldcorp by SFN on August 19 (3-A2-678). After multiple days of correspondence, Goldcorp and SFN coordinate all technical workshop dates on August 29. (3-A2-696) After clarifying SFN's needs for the workshop, agenda is sent on September 12. (3-A2-740) All of the above provided via email.	SFN technical advisors	Fish and aquatic health, HLF design, operation, closure, and water management, WRSF design, management, and closure, and water quality and geochemistry	SFN technical advisors	Workshop theme and initial dates suggested one month in advance by SFN, dates and themes decided 21 days in advance.	SFN technical advisors	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting; follow-up provided via email on October 4. (3-A2-1129)	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> . Goldcorp also received a formal memo from SFN on November 20 reiterating SFN's concerns ( <b>3-A2-1354</b> ), comments, and requests. A written response from detailing Goldcorp's consideration of these views was provided via email on November 27 ( <b>3-A2-1355</b> ).	3-A2-766



Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response	Method		
<b>Closure Workshop September 20, 2017</b>	Technical Engagement Plan provided to Goldcorp by SFN on August 19 (3-A2-678). After multiple days of correspondence, Goldcorp and SFN coordinate all technical workshop dates on August 29 (3-A2-696) Agenda sent on September 12. (3-A2-736) All of the above provided via email.	SFN technical advisors	Water balance model, closure planning, proposed closure of the site, closure of the HLF, closure of the WRSF, and water management	SFN technical advisors	Workshop theme and initial dates suggested one month in advance by SFN, dates and themes decided 22 days in advance.	SFN Councilor, SFN technical advisors	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting; follow-up provided via email on October 4. (3-A2-1129)	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> . Goldcorp also received a formal memo from SFN on November 20 reiterating SFN's concerns (3-A2-1354), comments, and requests. A written response from detailing Goldcorp's consideration of these views was provided via email on November 27 (3-A2-1355).	3-A2-834
<b>Socio-economic and Heritage Workshop September 21, 2017</b>	Technical Engagement Plan provided to Goldcorp by SFN on August 19 (3-A2-678). After multiple days of correspondence, Goldcorp and SFN coordinate all technical workshop dates on August 29. (3-A2-696) After collaboration and feedback from SFN, final agenda sent on September 18. (3-A2-759) All of the above provided via email.	SFN technical advisors	SFN primary data relevant to the Project, sustainability criteria, and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use	SFN technical advisors	Workshop theme and initial dates suggested one month in advance by SFN, dates and themes decided 23 days in advance.	SFN Councilor, SFN technical advisors	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting; follow-up provided via email on October 4. (3-A2-1129)	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> . Goldcorp also received a formal memo from SFN on November 20 reiterating SFN's concerns (3-A2-1354), comments, and requests. A written response from detailing Goldcorp's consideration of these views was provided via email on November 27 (3-A2-1355).	3-A2-891
<b>Wildlife Workshop September 22, 2017</b>	Technical Engagement Plan provided to Goldcorp by SFN on August 19. (3-A2-678) After multiple days of correspondence, Goldcorp and SFN coordinate all technical workshop dates on August 29. (3-A2-696) Agenda sent on September 12. (3-A2-736) All of the above provided via email.	SFN technical advisors	NAR, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	SFN technical advisors	Workshop theme and initial dates suggested one month in advance by SFN, dates and themes decided 24 days in advance.	SFN Councilor, SFN technical advisors	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting; follow-up provided via email on October 4. (3-A2-1129)	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> . Goldcorp also received a formal memo from SFN on November 20 reiterating SFN's concerns (3-A2-1354), comments, and requests. A written response from detailing Goldcorp's consideration of these views was provided via email on November 27 (3-A2-1355).	3-A2-933
<b>Technical Feedback Update Meeting October 18, 2017</b>	Meeting date confirmed October 12. (3-A2-1136)	SFN representative, SFN technical advisor	Technical workshops follow-up, SFN's views on Goldcorp's edits to the SFN Technical Engagement Plan, receipt of SFN's views on the Project	SFN representative, SFN technical advisor	6 days based on meeting confirmation.	SFN representative, SFN technical advisor	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting; commitments table and consultation section draft provided via email to SFN on November 6. (3-A2-1313)	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-1212

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response	Method		
<b>Citizens Update Meeting November 9, 2017</b>	SFN informed Goldcorp via email of the meeting on November 6, 2017.	Goldcorp's CSR Superintendent was informed by SFN Chief	Project update and review of views presented by SFN and Goldcorp's consideration of these views	N/A; SFN organized the meeting and invited Goldcorp	N/A; SFN organized the meeting and invited Goldcorp	SFN Citizens	Detailed comments from SFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at the meeting; Goldcorp's contact information was provided to attendees to phone or email at any time following the meeting; November 30 submission date is stated at meeting.	Goldcorp responded to SFN's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-1314

**Table 9 Summary of First Nation of Na-cho Nyäk Dun Consultation**

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response	Method		
Chief and Council Meeting April 24, 2017	Agenda provided April 19. (3-A2-55) Provided via email.	FNNND Chief and Council	Project design, NAR route	FNNND Chief and Council	5 days based on agenda.	FNNND Chief and Council	Detailed comments from FNNND and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting.	Goldcorp responded to FNNND's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-90
Citizens Meeting April 24, 2017	Flyer incorporating FNNND feedback sent April 18. (3-A2-50) Provided via email.	FNNND Citizens	Project design, NAR route	FNNND citizens	6 days from flyer posting.	FNNND Citizens	Detailed comments from FNNND and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at meeting	Goldcorp responded to FNNND's concerns, comments, and requests during the meeting. Details can be found in <b>Appendix 3-A2</b> .	3-A2-66

**Table 10 Summary of White River First Nation Consultation**

Consultation Event	1. Notice in Sufficient Form and Detail			2. Reasonable Period of Time to Prepare Views		3. Opportunity to Present Views			4. Full and Fair Consideration of Views by the Proponent	Documentation
Supporting Details:	Date of Notice	Recipient	Subject matter for Consultation	Recipient	Period of Time to Prepare Views	Recipient	Description of Recipient's Response	Method		
Project Development Meeting June 16, 2017	Meeting date confirmed May 31. (3-A2-292) Provided via email.	WRFN Lands and Negotiations Lead, WRFN Negotiations Advisor, WRFN Legal Counsel	Project update, possible contracting opportunities at the exploration site for 2017, WRFN's technical feedback on the Project Proposal, consultation with WRFN members and community	WRFN Lands and Negotiations Lead, WRFN Negotiations Advisor, WRFN Legal Counsel	Meeting date and topic decided 17 days in advance.	WRFN Lands and Negotiations Lead, WRFN Negotiations Advisor, WRFN Legal Counsel	Detailed comments from WRFN and Goldcorp's responses are found in the meeting minutes in <b>Appendix 3-A2</b> .	In person at the meeting.	N/A; Goldcorp offers to meet with WRFN members and community to present a Project update; WRFN does not think a community meeting will happen in the near future. WRFN will engage post-election (election date September 9 <sup>th</sup> ).	3-A2-531

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### 3.4 CONSIDERATION OF VIEWS PRESENTED AND RESULTING COMMITMENTS

Through Goldcorp's consultation and engagement with potentially affected First Nations since submitting the Project Proposal to the YESAB Executive Committee on March 31, 2017, a number of interests and topics have been raised by potentially affected First Nations. **Table 11** presents a summary of the key topics and interests identified through consultation with potentially affected First Nations and the Proponent's consideration of them.

**Table 11 Summary of Key Issues Identified by Tr’ondëk Hwëch’in and Resulting Project Modifications and Mitigation Measures**

Key Views Presented by TH	Proponent’s Consideration of Views	See Project Proposal Section No.
<p><b>Water Management, Water Quality, Effects to Fish:</b></p> <p>A) TH is concerned about effects to water quality in Halfway Creek as a result of the Project; lower Halfway Creek has documented use by juvenile Chinook salmon. TH requested that Goldcorp consider non-degradation, site-specific water quality objectives (SSWQOs) in Halfway Creek (June 6 Water Management Workshop, September 28 and 29 Water Workshop).</p> <p>B) TH is concerned about effects to water quality in Coffee Creek as a result of the Project; Coffee Creek is of cultural importance to TH and is fish overwintering habitat. TH requested that Goldcorp consider non-degradation SSWQOs in Latte Creek and Coffee Creek. (June 6 Water Management Workshop, September 28 and 29 Water Workshop).</p> <p>C) TH is concerned about effects to water quality in Yukon River as a result of the Project; Yukon River is key fish habitat. TH requested that Goldcorp consider non-degradation SSWQOs in Yukon River (June 6 Water Management Workshop, September 28 and 29 Water Workshop).</p> <p>D) TH is concerned about effects to Chinook salmon as a result of the Project (June 6 Water Management Workshop, September 28 and 29 Water Workshop).</p>	<p>A) Goldcorp considered non-degradation SSWQOs in Halfway Creek, and has determined that this is not possible given the predicted effects to water quality in Halfway Creek as a result of the Project. Goldcorp has committed to use-protection SSWQOs in Halfway Creek, which are set to be protective of aquatic life in Halfway Creek. Goldcorp is committed to ongoing engagement with TH on SSWQOs in Halfway Creek, which includes Goldcorp considering setting use-protection objectives at select water quality monitoring stations in Halfway Creek and non-degradation objectives at other select monitoring stations in Halfway Creek.</p> <p>B) Prior to March 31, 2017, in consideration of TH’s and other potentially affected First Nations’ views presented regarding the importance of Coffee Creek water quality, Goldcorp evaluated the three-WRSF mine site design, and made the decision to move all waste rock to a single WRSF in the Halfway Creek catchment. As a result of this, predicted water quality in the Coffee Creek catchment with the Project during operation and closure was improved. Goldcorp considered non-degradation SSWQOs in Latte Creek, and has determined that this is not possible given the predicted effects to water quality in Latte Creek as a result of the Project. Goldcorp has committed to use-protection SSWQOs in Latte Creek, which are set to be protective of aquatic life in Latte Creek. Goldcorp has also committed to non-degradation SSWQOs in Coffee Creek.</p> <p>C) Goldcorp has committed to non-degradation SSWQOs in Yukon River.</p> <p>D) Goldcorp committed to and implemented additional Chinook salmon spawning surveys in 2017 in consideration of TH’s views presented. Goldcorp is committed to ongoing Chinook salmon spawning surveys in the 2018 and 2019 field seasons. Goldcorp is also committed to ongoing engagement with TH regarding potential biodiversity enhancement initiatives, in particular those related to salmon.</p>	<p>A) <b>Table 13</b> Project Commitments, <b>Table 14</b> Engagement Commitments with Tr’ondëk Hwëch’in</p> <p>B) <b>Table 13</b> Project Commitments</p> <p>C) <b>Table 13</b> Project Commitments</p> <p>D) <b>Table 13</b> Project Commitments</p> <p>E) <b>Table 14</b> Engagement Commitments with Tr’ondëk Hwëch’in</p>



Key Views Presented by TH	Proponent's Consideration of Views	See Project Proposal Section No.
<p><b>Northern Access Route:</b></p> <p>A) TH is concerned about effects to wildlife, particularly moose, related to an increase hunting pressure as a result of improved access related to the Project (June 5 NAR and Closure workshop, NAR MCDA analysis and associated teleconferences and site tours).</p> <p>B) TH is concerned about wildlife mortality related to mine traffic (June 5 NAR and Closure workshop, NAR MCDA analysis and associated teleconferences and site tours).</p> <p>C) TH is concerned about an increase in placer mining activity in the area as a result of improved access related to the Project (June 5 NAR and Closure workshop, NAR MCDA analysis and associated teleconferences and site tours).</p> <p>D) TH is concerned that there is insufficient information on the effects on wildlife using the Maisy May portion of the route, in comparison to an alternative section that would go through the Black Hills (June 5 NAR and Closure workshop, NAR MCDA analysis and associated teleconferences and site tours).</p>	<p>A) Goldcorp has committed to controlling access where possible along the NAR; access control by Goldcorp is possible on the Yukon and Stewart Rivers at the barge landings in the summer and the ice bridges in the winter. Goldcorp does not have the authority to control access on any other points along the NAR; however, Goldcorp has committed to working with TH and with Yukon Government on addressing governance issues related to the NAR. Goldcorp has also committed to ongoing moose surveys throughout the Project life to monitor moose populations.</p> <p>B) Goldcorp has committed to upgrading and building the NAR to specifications that allow for improved line of sight and an increase in pullouts, as well as speed limits along the NAR of 50 km/h in areas of good visibility and grade and 30 km/h in areas of poorer visibility, and areas with switchbacks and/or steeper grade. Goldcorp has committed to strictly enforcing speed limits on the NAR with mine traffic by remotely monitoring the speed of mine vehicles. Goldcorp is also committed to ongoing engagement with First Nations and stakeholders regarding the NAR throughout the life of mine.</p> <p>C) Goldcorp acknowledges this concern raised by TH, and participated in site tours of the NAR between Dawson and the Stewart River in part to show TH how placer mining and access for increased placer mining in the area is an existing condition of the region. Goldcorp does not have the authority to control placer mining in the region; however, Goldcorp is committed to further engagement with TH on ways that Goldcorp can support TH in this regard.</p> <p>D) TH identified additional VCs to be documented in a multiple accounts analysis that compares the Maisy May section and the Black Hills section of the NAR. TH provided a matrix for determining which VCs are ranked highest for priority. Goldcorp completed the multiple accounts analysis of the Maisy May and Black Hills sections of the NAR using information presented in the Project Proposal, including sensitivity analyses. Goldcorp also implemented two site tours of the NAR with particular focus on these areas from both the ground and from the air. TH and Goldcorp participated in a teleconference to review the findings of the multiple accounts analysis. The results showed that the current route through Maisy May is the preferred route. Based on the information provided to TH by Goldcorp, TH was satisfied with the result, and as a result of the outcomes of consultation with TH on this matter, no changes to the NAR alignment were made.</p>	<p>A) Access Route Operational Management Plan (<b>Appendix 31-B</b>)</p> <p>B) Access Route Operational Management Plan (<b>Appendix 31-B</b>), Access Route Construction Management Plan (<b>Appendix 31-A</b>)</p> <p>C) <b>Table 14</b> Engagement Commitments with Tr'ondëk Hwëch'in</p> <p>D) <b>Table 7</b> Summary of Tr'ondëk Hwëch'in Consultation</p>

Key Views Presented by TH	Proponent's Consideration of Views	See Project Proposal Section No.
<p><b>Closure:</b></p> <p>A) TH is concerned about Goldcorp proposing to not cover the Alpha WRSF during closure (May 25 Teleconference, June 5 NAR and Closure Workshop, July 14 Teleconference, September 28 and 29 Water Workshop, October 17 Closure Workshop).</p>	<p>A) Based on the calculated inventory of cover materials available at the Project at the end of operation, Goldcorp is not confident that there is enough material to cover the Alpha WRSF in addition to the HLF in closure, considering that the HLF is required to be capped in closure. Additionally, Goldcorp does not have sufficient evidence that material cover would achieve significant water quality benefits, or the water quality objectives proposed by TH. Goldcorp has committed to ongoing reclamation research for the Project, and has committed to ongoing engagement with TH on the Reclamation and Closure Plan. Should Goldcorp's reclamation research show it to be feasible, practical, and environmentally responsible, Goldcorp is committed to covering the WRSF.</p>	<p>A) <b>Table 13</b> Project Commitments, Table 14 Engagement Commitments with Tr'ondëk Hwëch'in</p>
<p><b>Heap Leach Facility:</b></p> <p>A) TH is concerned about the effectiveness of the proposed active and semi-active water treatment systems (June 6 Water Management Workshop, September 28 and 29 Water Workshop, October 17 Closure Workshop).</p>	<p>A) Goldcorp has committed to ongoing engagement with TH on this topic, including sharing the research plans associated with this topic and engaging TH on the results of this research throughout the life of the Project.</p>	<p>B) <b>Table 14</b> Engagement Commitments with Tr'ondëk Hwëch'in</p>
<p><b>Mine Design:</b></p> <p>A) TH is concerned about Goldcorp's backfilling plans for the Project, and has requested that Goldcorp seek opportunities to increase backfill where possible (June 6 Water Management Workshop, October 17 Closure Workshop).</p>	<p>A) Goldcorp has committed to considering additional backfill as the Project progresses throughout the Operation Phase, and has committed to including language that captures this in future iterations of the Reclamation and Closure Plan. This is a topic of ongoing engagement with TH.</p>	<p>A) <b>Table 14</b> Engagement Commitments with Tr'ondëk Hwëch'in</p>
<p><b>Socio-economic Management Plan and HHRA:</b></p> <p>A) TH is concerned about a lack of TH-specific assessment in the Project Proposal, as well as a lack of a detailed Socio-economic Management Plan in the Project Proposal (October 24 Project Development Meeting, October 31 Socio-economic and Health Workshop).</p> <p>B) TH is concerned with the level of data and assessment presented in the HHRA regarding consumption of traditional food, combustion emissions, and metal concentrations in air and soil (October 31 Socio-economic and Health Workshop).</p>	<p>A) Goldcorp's primary socio-economic data collection program focused on Dawson and TH, and as such Goldcorp is of the view that there is an adequate level of TH-specific information included in the Project Proposal for assessment purposes. Goldcorp is committed to engaging TH on the development of the Socio-economic Management Plan, and has indicated to TH that the Socio-economic Management Plan is to be developed in collaboration with TH to capture TH's priorities for mitigating and monitoring socio-economic effects. A proposed schedule for consultation on the development of this plan was proposed to TH in November 2017.</p> <p>B) Goldcorp and TH have met and discussed these topics in detail on two occasions. Goldcorp is committed to further engagement with TH on these concerns, and will include additional data related to these concerns in future updates to the HHRA, which have an anticipated delivery date of Q1 2018 for engagement with TH.</p>	<p>A) <b>Table 14</b> Engagement Commitments with Tr'ondëk Hwëch'in</p> <p>B) <b>Table 14</b> Engagement Commitments with Tr'ondëk Hwëch'in</p>

**Table 12 Summary of Key Issues Identified by Selkirk First Nation and Resulting Project Modifications and Mitigation Measures**

Key Views Presented by SFN	Proponent’s Consideration of Views	See Project Proposal Section No.
<p><b>Water Management, Water Quality, Effects to Fish:</b></p> <p>A) SFN is concerned about effects to water quality in Coffee Creek as a result of the Project; Coffee Creek is of cultural importance to SFN and is fish overwintering habitat (May 29 Chief and Council Meeting, June 23 Chief and Council Site Tour, September 19 Water and Mine Waste Technical Workshop).</p> <p>B) SFN is concerned about effects to Chinook salmon as a result of the Project (May 29 Chief and Council Meeting, June 23 Chief and Council Site Tour, September 19 Water and Mine Waste Technical Workshop).</p> <p>C) SFN requested an assessment of effects to aquatic biota. (September 19 Water and Mine Waste Technical Workshop)</p>	<p>A) Prior to March 31, 2017, in consideration of SFN’s and other potentially affected First Nations’ views presented regarding the importance of Coffee Creek water quality, Goldcorp evaluated the three WRSF mine site design, and made the decision to move all waste rock to a single WRSF in the Halfway Creek catchment. As a result of this, predicted water quality in the Coffee Creek catchment with the Project in operation and closure was improved. Goldcorp has committed to non-degradation SSWQOs in Coffee Creek, and added a water quality monitoring station in Coffee Creek just upstream of the confluence of Coffee Creek and the Yukon River at the request of SFN.</p> <p>B) Goldcorp committed to and implemented additional Chinook salmon spawning surveys in 2017. Goldcorp is committed to ongoing Chinook salmon spawning surveys in the 2018 and 2019 field seasons. Goldcorp is also committed to ongoing engagement with SFN regarding potential biodiversity enhancement initiatives, in particular those related to salmon.</p> <p>C) Goldcorp included an “<b>Periphyton and Benthic Invertebrates Intermediate Component Analysis Report</b>” assessment per SFN’s recommendations.</p>	<p>A) <b>Table 13</b> Project Commitments</p> <p>B) <b>Table 13</b> Project Commitments, <b>Table 15</b> Engagement Commitments with Selkirk First Nation</p> <p><b>C) Periphyton and Benthic Invertebrates Intermediate Component Analysis Report</b></p>

Key Views Presented by SFN	Proponent’s Consideration of Views	See Project Proposal Section No.
<p><b>Northern Access Route:</b></p> <p>A) SFN is concerned about effects to wildlife, particularly moose, related to an increase hunting pressure as a result of improved access related to the Project (May 29 Chief and Council Meeting, June 23 Chief and Council Site Tour, September 22 Wildlife Technical Workshop).</p> <p>B) SFN is concerned about wildlife mortality related to mine traffic (May 29 Chief and Council Meeting, June 23 Chief and Council Site Tour, September 22 Wildlife Technical Workshop).</p> <p>C) SFN is concerned about an increase in placer mining activity in the area between the Stewart and Yukon Rivers as a result of improved access related to the Project (May 29 Chief and Council Meeting, June 23 Chief and Council Site Tour, September 15 Chief and Council NAR Tour)</p>	<p>A) Goldcorp has committed to controlling access where possible along the NAR; access control by Goldcorp is possible on the Yukon and Stewart Rivers at the barge landings in the summer and the ice bridges in the winter. Goldcorp does not have the authority to control access on any other points along the NAR; however, Goldcorp has committed to working with SFN and with Yukon Government on addressing governance issues related to the NAR. Goldcorp has also committed to ongoing moose surveys throughout the Project life to monitor moose populations.</p> <p>B) Goldcorp has committed to upgrading and building the NAR to specifications that allow for improved line of sight and an increase in pullouts, as well as speed limits along the NAR of 50 km/h in areas of good visibility and grade and 30 km/h in areas of poorer visibility and areas with switchbacks and/or steeper grade. Goldcorp has committed to strictly enforcing speed limits on the NAR with mine traffic by remotely monitoring the speed of mine vehicles. Goldcorp is also committed to ongoing engagement with First Nations and stakeholders regarding the NAR throughout the life of mine.</p> <p>C) Goldcorp acknowledges this concern raised by SFN, and participated in site tours of the NAR between the Project site and the Stewart River in part to show SFN the proposed section of new build between the Stewart and Yukon Rivers, and how placer mining and access for increased placer mining in the area is an existing condition of part of this area. Goldcorp does not have the authority to control placer mining in the region, however Goldcorp is committed to further engagement with SFN on ways that Goldcorp can support SFN in this regard.</p>	<p>A) Access Route Operational Management Plan (<b>Appendix 31-B</b>)</p> <p>B) Access Route Operational Management Plan (<b>Appendix 31-B</b>), Access Route Construction Management Plan (<b>Appendix 31-A</b>)</p> <p>C) <b>Table 15</b> Engagement Commitments with Selkirk First Nation</p>
<p><b>Closure:</b></p> <p>A) SFN is concerned about Goldcorp proposing to not cover the Alpha WRSF in closure (September 19 Water and Mine Waste Technical Workshop, September 20 Closure Workshop).</p>	<p>A) Based on the calculated inventory of cover materials available at the Project at the end of operation, Goldcorp is not confident that there is enough material to cover the Alpha WRSF in addition to the HLF in closure, considering that the HLF is required to be capped in closure. Goldcorp has committed to ongoing reclamation research for the Project, and has committed to ongoing engagement with SFN on the Reclamation and Closure Plan. Should Goldcorp’s reclamation research show it to be feasible, practical, and environmentally responsible, Goldcorp is committed to covering the WRSF.</p>	<p>A) <b>Table 15</b> Engagement Commitments with Selkirk First Nation</p>

Key Views Presented by SFN	Proponent's Consideration of Views	See Project Proposal Section No.
<p><b>Socio-economic Considerations:</b></p> <p>A) SFN is concerned that Goldcorp has not considered SFN primary data in the human environment VCs of the Project Proposal (September 21 Socio-economic Technical Workshop).</p>	<p>A) Goldcorp has considered the views presented by SFN on this topic, and has committed to engaging SFN on the development and review of the Socio-economic Management Plan for the Project. To date, Goldcorp has requested socio-economic primary data from SFN on two occasions, and SFN has committed to providing Goldcorp confidential primary data relevant to the Project. SFN provided a selection of this data on November 20, 2017, and has committed to providing additional primary traditional use and socio-economic data shortly. Goldcorp will review the data and provide a report to SFN to address any new or additional effects as needed. Goldcorp has also committed to considering this data in the development of the Socio-economic Monitoring Plan for the Project and in a potential supplementary socio-economic assessment of this data.</p>	<p>A) <b>Table 15</b> Engagement Commitments with Selkirk First Nation</p>
<p><b>Mine Design:</b></p> <p>A) SFN is concerned about the WRSF design and lack of associated risk assessment and Waste Rock and Overburden Management Plan included in the Project Proposal (September 19 Water and Mine Waste Technical Workshop).</p>	<p>A) Goldcorp performed additional geotechnical studies in the proposed WRSF area in the 2017 field season, and has committed to engaging SFN on the results of this study via the WRSF cover investigation work being done to address SFN's concerns regarding closure of the WRSF. Goldcorp also committed to adding snow courses to the WRSF area to better understand climatic impacts in that location. Goldcorp is of the view that the current level of design of the WRSF is adequate for assessment purposes, and has committed to further engagement with SFN throughout the process of detailed design of this structure. Goldcorp and SFN have discussed Goldcorp's approach to management plans for the Project in detail during the course of the four workshops and subsequent meetings. Goldcorp is committed to developing detailed management plans for Project licensing (including the Waste Rock and Overburden Management Plan) in consultation with SFN.</p>	<p>A) <b>Table 13</b> Project Commitments, <b>Table 15</b> Engagement Commitments with Selkirk First Nation</p>



**3.5 COMMITMENTS RESULTING FROM CONSULTATION SINCE MARCH 31, 2017**

In support of the information presented above in this addendum, Project commitments resulting from consultation since March 31 are summarized in **Table 13** below. Goldcorp has also committed to further engagement on topics of interest to potentially affected First Nations. These engagement commitments are summarized in **Table 14** and **Table 15** below. Engagement with potentially affected First Nations is ongoing.

**Table 13 Project Commitments**

Goldcorp Coffee Project Commitments Resulting from Consultation Post: March 31 – October 24, 2017				
Number	Commitment Summary	Responsible Party	Theme	Reference
Project Commitment 1	Commitment to considering aquatic biota as an intermediate component in the Project Proposal within the Periphyton and Benthic Invertebrates Intermediate Component Analysis Report.	Goldcorp	Water Quality	SFN Water and Mine Waste Workshop September 19, 2017 (also raised prior to March 31, 2017 by TH).
Project Commitment 2	Commitment to adding snow courses to Alpha WRSF area.	Goldcorp	Alpha WRSF	SFN Water and Mine Waste Workshop September 19, 2017.
Project Commitment 3	Commitment to doing 5 in 30 sampling (increasing water quality sampling intensity) in 2018.	Goldcorp	Water Quality	SFN Mine Closure Workshop September 20, 2017 and TH Water Workshop September 28, 2017 (also raised previously on November 21, 2016 with SFN and in pre-March 31 water quality discussions with TH).
Project Commitment 4	Commitment to non-degradation SSWQOs in Coffee Creek and Yukon River.	Goldcorp	Water Quality	TH Water Workshop Day 1 September 28, 2017

Goldcorp Coffee Project Commitments Resulting from Consultation Post: March 31 – October 24, 2017				
Number	Commitment Summary	Responsible Party	Theme	Reference
Project Commitment 5	Goldcorp and TH agree on the following water quality monitoring stations: 1. 1 station upstream of YT-24 on Yukon River 2. 1 station upstream of Halfway Creek on Yukon River 3. 1 station downstream of Halfway Creek on Yukon River 4. 1 station downstream of the Halfway Creek mixing zone 5. 1 station in an upstream location that is not necessarily YUK 2.0.	Goldcorp	Water Quality	TH Water Workshop Day 1 September 28, 2017
Project Commitment 6	Goldcorp and TH agree that two water quality monitoring stations in the receiving environment in Halfway Creek are required.	Goldcorp	Water Quality	TH Water Workshop Day 1 September 28, 2017
Project Commitment 7	Goldcorp and TH agree that the YT-24 water quality monitoring station is appropriate as a water quality objective attainment location.	Goldcorp	Water Quality	TH Water Workshop Day 1 September 28, 2017
Project Commitment 8	Goldcorp and TH agree that the CC-1.5 water quality monitoring station on Latte Creek is an appropriate water quality objective attainment location.	Goldcorp	Water Quality	TH Water Workshop Day 1 September 28, 2017
Project Commitment 9	Goldcorp and TH agree that the CC-X water quality monitoring station and CC-4.5 water quality monitoring station on Coffee Creek are appropriate attainment stations. TH agrees that Goldcorp can drop CC-4.5 as an attainment station if non-degradation can be shown at CC-X (Latte Mix) station.	Goldcorp	Water Quality	TH Water Workshop Day 1 September 28, 2017
Project Commitment 10	Should Goldcorp's reclamation research show it to be feasible, practical, and environmentally responsible, Goldcorp is committed to covering the Alpha WRSF in closure.	Goldcorp	Closure	TH Closure Workshop October 17, 2017, SFN Mine Closure Workshop September 20, 2017

**Table 14 Engagement Commitments with Tr’ondëk Hwëch’in**

Goldcorp Coffee Engagement Commitments Resulting from Consultation Post: March 31 – October 24, 2017				
Number	Commitment Summary	Responsible Party	Theme	Reference
TH Engagement Item 1	Ongoing NAR engagement with TH on issues such as road management strategies and including other stakeholders, such as YG, in the same discussions when appropriate.	Goldcorp	NAR	TH Project Engagement Meeting May 2, 2017
TH Engagement Item 2	Commitment to engaging TH on the development of the Reclamation and Closure Plan and closure objectives.	Goldcorp	Closure	TH Technical Meeting - NAR and Closure June 5, 2017 and TH Closure Teleconference July 14, 2017 and TH Closure Workshop October 17, 2017
TH Engagement Item 3	Commitment to further dialogue with TH on water management, particularly related to the development of SSWQOs required for licensing. This engagement includes topics of permafrost and active and semi-passive water treatment.	Goldcorp	Water Management	TH Technical Meeting - Water Quality and Water Management June 6, 2017
TH Engagement Item 4	Commitment to investigate the feasibility of potential ways to cover the Alpha WRSF in closure; commitment to engaging TH on this information as it comes available.	Goldcorp	Closure	TH Closure Teleconference July 14, 2017
TH Engagement Item 5	Commitment to engaging TH on the development of all management plans.	Goldcorp	Management Plans	TH Water Workshop Day 1 September 28, 2017
TH Engagement Item 6	Commitment to engagement during development of the Socio-economic Management Plan.	Goldcorp	Socio-economic Management Plan	TH Closure Workshop October 17, 2017; TH Socio-economic and Health Workshop October 31, 2017
TH Engagement Item 7	Commitment to further engagement on potential backfilling and potential elimination or reduction of pit lakes.	Goldcorp	Closure	TH Closure Workshop October 17, 2017
TH Engagement Item 8	Commitment to engage further on the topic of social closure.	Goldcorp	Closure	TH Closure Workshop October 17, 2017

Goldcorp Coffee Engagement Commitments Resulting from Consultation Post: March 31 – October 24, 2017				
Number	Commitment Summary	Responsible Party	Theme	Reference
TH Engagement Item 9	Commitment to further engagement on biodiversity enhancement initiatives.	Goldcorp	Biodiversity	TH Water Workshop Day 2 September 29, 2017
TH Engagement Item 10	Commitment to further engagement on future updates to the HHRA.	Goldcorp	Health	TH Socio-economic and Health Workshop October 31, 2017

**Table 15 Engagement Commitments with Selkirk First Nation**

Goldcorp Coffee Engagement Commitments Resulting from Consultation Post: March 31 – October 24, 2017				
Number	Commitment Summary	Responsible Party	Theme	Reference
SFN Engagement Item 1	Ongoing NAR engagement with SFN on issues such as road management strategies and including other stakeholders, such as YG, in the same discussions when appropriate.	Goldcorp	NAR	SFN Wildlife Workshop September 22, 2017 and SFN Chief and Council Meeting May 29, 2017
SFN Engagement Item 2	Commitment to further engagement on cyanide management practices.	Goldcorp	HLF	SFN Chief and Council Meeting May 29, 2017
SFN Engagement Item 3	Commitment to engaging with SFN Citizens on the HLF.	Goldcorp	HLF	SFN Chief and Council Meeting May 29, 2017
SFN Engagement Item 4	Commitment to engaging with SFN Elders Council, Lands Department.	Goldcorp	Engagement	SFN Chief and Council Meeting May 29, 2017
SFN Engagement Item 5	Commitment to engaging SFN on the development of the Reclamation and Closure Plan and closure objectives.	Goldcorp	Closure	SFN Closure Workshop September 20, 2017
SFN Engagement Item 6	Commitment to further dialogue with SFN on water management, particularly related to the development of SSWQOs required for licensing. This engagement includes topics of permafrost and active and semi-passive water treatment.	Goldcorp	Water Management	SFN Water and Mine Waste Workshop September 19, 2017

Goldcorp Coffee Engagement Commitments Resulting from Consultation Post: March 31 – October 24, 2017				
Number	Commitment Summary	Responsible Party	Theme	Reference
SFN Engagement Item 7	Commitment to investigate the feasibility of potential ways to cover the Alpha WRSF in closure; commitment to engaging SFN on this information as it comes available.	Goldcorp	Closure	SFN Water and Mine Waste Workshop September 19, 2017
SFN Engagement Item 8	Commitment to engaging SFN on the development of all management plans.	Goldcorp	Management Plans	SFN Water and Mine Waste Workshop September 19, 2017
SFN Engagement Item 9	Commitment to engagement during development of the Socio-economic Management Plan.	Goldcorp	Socio-economic Management Plan	SFN Socio-economic Workshop September 21, 2017
SFN Engagement Item 10	Commitment to further engagement on biodiversity enhancement initiatives.	Goldcorp	Biodiversity	SFN Water and Mine Waste Workshop September 19, 2017
SFN Engagement Item 11	Commitment to analyzing additional SFN socio-economic primary data when these data are received and including analysis as supplementary information to the Project Proposal when complete.	Goldcorp	Socio-economic	SFN Socio-economic Workshop, September 21, 2017



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## 4.0 REFERENCES

Yukon Environmental and Socio-economic Assessment Board (YESAB). 2005. Proponent's Guide to Information Requirements for Executive Committee Project Proposal Submissions, v. 2005.11. Whitehorse, Yukon. Available at <http://www.yesab.ca/wp/wp-content/uploads/2013/04/Proponents-Guide-to-Info-Requirements-for-EC-Project-Submission.pdf>. Accessed February 2017.

**APPENDIX 3A-2**  
**First Nations Consultation Records**

**TR'ONDĚK HWĚCH'IN**

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-6	31 March 2017	Email	Outgoing	TH	Consultation	Goldcorp notified Tr'ondëk Hwëch'in (TH) of Goldcorp's Project Proposal submission to Yukon Environmental and Socio-economic Assessment Board (YESAB) March 31, 2017. Additionally, the Section 3.0 Consultation and Engagement and associated appendices have been uploaded to Open Text Core. Noted that the remaining Project Proposal documentation will be uploaded in due course on Monday, April 3. An electronic copy of the Project Proposal was also sent via registered mail to TH. TH Lawyer requested USB proposal copy be sent to their office. Goldcorp confirmed it would be sent via express mail. April 7: TH requested 2 additional hard copies.	Consultation					
3-A2-7	02 April 2017	Email	Incoming	TH	Consultation	Goldcorp received a meeting invite confirmation from TH regarding Community Capacity Profiles scheduled for April 27.	Meeting					
3-A2-13	04 April 2017	Email	Outgoing	TH	Engagement	Goldcorp contacted TH noting that they are planning a celebration for Aboriginal Day at Coffee Camp, and are hoping to brainstorm some ideas with the potentially affected First Nations that Goldcorp is currently working with. Welcomed any ideas or feedback regarding the event.	Consultation					
3-A2-14	04 April 2017	Email	Incoming	TH	Consultation	TH's consultant inquired if the YESAB submission had been completed. Goldcorp responded and provided the message that had been sent to TH March 31, as well as links to the information on Open Text Core. Attachment: TH Notification Email	Consultation					
3-A2-17	06 April 2017	Email	Outgoing	TH	Engagement	Goldcorp contacted TH rep to share information on the E-series for women entrepreneurs in the Yukon April 19-21. Provided the requirements of participation, what the series included, and how to apply.	Information Sharing					
3-A2-18	06 April 2017	Email	Incoming	TH	Consultation	TH consultant provided Goldcorp with Information Requests (IRs) from socio-economic assessment (SEA) and TH (numbers #35-67) who noted that these IRs may have been addressed in the most recent submission; however, they have not had time to compare the documents. Attachments: 1. TH Baseline IR Responses 2. Batch 1 SEA 3. Mine Plan IR responses 4. WQM SEA IRs	Consultation					
3-A2-19	06 April 2017	Email	Outgoing	TH	Consultation	April 6, TH rep asked for an update on the IR responses for Vegetation and Land Use, also asked when to expect Batch 2. April 5 Goldcorp consultant provided the following schedule: IRs to be provided by end of day April 7th: Batch 1 Land Use IRs, Batch 2 Socio-Ec IRs, Batch 2 Wildlife IRs, Batch 2 Fish IRs, Batch 2 Access Route, management Plans (31A and 31B) IRs, HHRA additional IR responses. IRs to be provided early next week, if not provided by end of day April 7th: Batch 1 Vegetation IRs, Batch 2 Water Quality IRs	Consultation					
3-A2-21	06 April 2017	Email	Incoming	TH	Consultation	TH lawyer contacted Goldcorp to confirm call on April 10th.	Meeting					
3-A2-22	07 April 2017	Email	Outgoing	TH	Consultation	March 31, Goldcorp consultant contacted Chief Isaac Group rep to inform them about Hemmera study on labour and skills capacity in local communities near the Coffee Project, and to identify some opportunities and challenges for Goldcorp in participating in the Yukon labour force and business community. Noted they hoped to interview the individual, also to invite whoever at Chief Isaac Inc. would be a good fit (both Whitehorse and Dawson offices) to participate in an interview about the Coffee Project and the local economy and workforce. Noted that they would like to participate; Hemmera will be in contact to arrange a time for an interview - the team would be in Whitehorse and Dawson from April 3-14. April 7, Goldcorp followed up on above request.	Consultation					
3-A2-23	07 April 2017	Email	Outgoing	TH	Negotiation	Goldcorp provided TH with April 10 meeting details and call in information, including agenda. Also provided draft chapters 1 and 2 of the Collaboration Agreement. TH confirmed receiving info.	Consultation					
3-A2-24	07 April 2017	Email	Outgoing	TH	Consultation	Noted that Goldcorp would be printing hard copies of the Project Proposal application as soon as YESAB has verified a successful completeness check, which is expected at the end of April. Hard copies will be delivered to YESAB and TH to support adequacy review shortly thereafter. TH thanked Goldcorp for the info.	Consultation					
3-A2-27	10 April 2017	Email	Outgoing	TH	Consultation	April 10, Goldcorp provided responses to TH comments on Batch 1 documents. These responses were for IRs related to vegetation. Noted that there is also an updated response to comment #18, which is related to birds and bird habitat. Noted that responses to TH comments related to birds and bird habitat were originally provided on March 14, 2017. Attachment: Batch 1 IR Responses (Word and PDF)	Consultation					
3-A2-29	10 April 2017	Email	Outgoing	TH	Consultation	March 17, Goldcorp contacted TH rep to notify them that Goldcorp Commissioned Hemmera to study the labour and skills capacity in local communities near the Coffee Project, and to identify some opportunities and challenges for Goldcorp in participating in the Yukon labour force and business community. Invited TH to provide individuals who may want to participate in interviews about the Coffee Project and the local economy and workforce. Noted that if TH wanted to participate Hemmera would be in contact. April 10, TH responded that they had potential individual to participate. Goldcorp then provided the list of interview questions. Goldcorp also provided a list of TH participants they had booked so far.	Consultation					
3-A2-34	11 April 2017	Email	Outgoing	TH	Consultation	Goldcorp provided drafted minutes from March 27, 28 and April 10 meeting for TH make edits or comments. Action items have been outlined in the minutes. Attachments: Meeting Minutes from April 10, March 27 and March 28	Consultation					
3-A2-47	18 April 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to propose technical workshops/meetings on June 1 and 2 in Whitehorse, following the May 30 and 31 negotiations sessions in Whitehorse: <ul style="list-style-type: none"> <li>• Thursday, June 1: <ul style="list-style-type: none"> <li>o Half-day on the Northern Access Route (NAR)</li> <li>o Half-day on reclamation and closure</li> </ul> </li> <li>• Friday, June 2: <ul style="list-style-type: none"> <li>o Full-day on water quality</li> </ul> </li> </ul> Also proposed an engagement session (open house or meeting) with TH citizens on Monday, June 5 in Dawson to provide information related to the information discussed in the technical sessions. Sent additional email changing June 5 to June 6. Attachment: Proposed Agenda for TH Citizen Engagement Session. April 19, TH Lawyer requested dates of May 22 or June 5 for the Technical Sessions. April 20, Goldcorp replied that the week of June 5 worked for Goldcorp team. Requested confirmation that the engagement with TH citizens would take place week of June 19, and technical sessions week of June 5. April 26, TH noted they would try and confirm that day. April 27, Goldcorp asked for the preferred location of the technical sessions.	Meeting					
3-A2-51	18 April 2017	Email	Outgoing	TH	Consultation	April 4, Goldcorp contacted TH to notify them that Goldcorp's Senior Vice President, Operations for the Canadian region, will be visiting the Coffee Project the week of April 17. This will be his first visit to the Yukon, and the objective is for him to understand more of the local context and the current exploration activities. Noted that Goldcorp would be very pleased for him to meet with TH. Asked if TH was available in Whitehorse April 18th. Noted, alternatively, Dawson the afternoon and evening of April 19th would work as well. April 6 TH responded confirming April 12 at 1:30 for a meeting, but needed to double check schedules. April 7 Goldcorp responded that unfortunately April 12 afternoon would not work for the meeting. Suggested a call to work out details. Goldcorp provided another message noting April 18 at 1:30 in Whitehorse would be work. April 12, Goldcorp reached out to confirm April 18. TH Chief replied that they would be available in Dawson at 1:30. Goldcorp responded dinner in Dawson on April 19th would be possible. TH Chief confirmed April 19 dinner meeting. April 18, both parties provided a list of attendees.	Meeting					
3-A2-54	19 April 2017	Email	Outgoing	TH	Engagement	Goldcorp shared the information that YG was providing a technical workshop for the MLII project – Water Quality Objectives and Effluent Quality Standards will be held May 9th at the High Country Inn as a one-day workshop. Noted that a formal invitation with attached documents will be sent out in the next few days in case anyone from TH wanted to attend. TH thanked Goldcorp for the information.	Information Sharing					
3-A2-58	21 April 2017	Email	Outgoing	TH	Consultation	Goldcorp provided responses to TH information requests regarding Land and Resource Use, Demographics, Community Infrastructure and Services, and a general comment regarding cumulative effects. Attachment: Land Use IR Responses	Consultation					
3-A2-59	21 April 2017	Email	Outgoing	TH	Consultation	Goldcorp provided response to TH request for further information regarding Goldcorp's cyanide management and incident response during the Human Health Risk Assessment/Health Impact Assessment workshop on March 8th for information on cyanide management. Attachments: Summary of Feedback and Cyanide Management	Consultation					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-115	27 April 2017	Meeting		TH	Consultation	Hemmera met with TH to discuss local employment and procurement. This was an interview to gather additional socio-economic baseline data for the Proponent's Community Profiles project.	Economic					
3-A2-147	27 April 2017	Email	Outgoing	TH	Consultation	Provided TH with Goldcorp's responses to IRs received from TH regarding Economic Conditions, Demographics, Education Services, and Community Health and Well-being. Attachment: IR responses	Consultation					
3-A2-148	27 April 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with the draft agendas for the upcoming meetings next week. Welcomed any suggestions for edits or additions to the agenda Attachment: Meeting Agenda	Meeting					
3-A2-150	27 April 2017	Letter	Outgoing	TH	Consultation	Goldcorp mailed election congratulatory letters to TH	Consultation					
3-A2-154	02 May 2017	Meeting		TH	Consultation	Project development meeting between Goldcorp and TH.	Regulatory Process	A completeness check on the Project Proposal has been done by YESAB, and the Project Proposal will now be moving into adequacy once the feedback from YESAB on the consultation log is dealt with through submission of an additional summary. In regard to the Coffee Project, the exploration team is half way through infill drilling on the resource pit to move from it from indicated to measured. Diamond drilling will commence shortly. Goldcorp sent TH a water permit notification and land fill permit amendment.				
3-A2-155	02 May 2017	Meeting		TH	Consultation	Project development meeting between Goldcorp and TH.	Northern Access Route	Goldcorp had a meeting with Yukon Government (YG) last week on the road and shared concern about no movement on the road management conversation. Goldcorp is happy to participate in calls or meetings with all three parties at the table (Yukon Government (YG), G (Name Redacted) and TH). The next meeting will take place in several weeks. (Name Redacted) is leading the conversation from the YG. Goldcorp and YG the least preferred option is Goldcorp management of the road.	Goldcorp considers this and agrees. Action item found in subsequent column.	Goldcorp will share PowerPoint (PPT) and letter presented to YG on road with TH.	Goldcorp	Completed May 9.
3-A2-156	02 May 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	TH had a meeting with YG regarding the Gateway Project. TH will begin further discussions with them shortly. TH is still reviewing information provided by Goldcorp regarding the NAR (Maisy May and Black Hills). TH mentioned they had discussed reclamation and will bring it up further in the meeting.				
3-A2-157	02 May 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Information Sharing	TH requests the Batch 2 Workshop document showing the differences between what was filed and what was reviewed. The documents TH reviewed were based on the original mine plan. TH felt it was more efficient to get a sense of what was changed from workshops and mine design so the team doesn't have to re-read large sections of the document.	Goldcorp noted that the single waste rock storage facility (WRSF) was the major change, which had changes in regards to water. Options provided: comparison document with track changes, or TH review with a special budget.	TH will send Goldcorp a list of the chapters that make sense to track changes and the ones that they are requesting Goldcorp sends the differences, then Goldcorp will send the redline documents to TH.	TH, Goldcorp	Complete, Goldcorp provided redline documents on May 19.
3-A2-158	02 May 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	TH is still reviewing road information and looking at environmental impacts on both routes (Maisy May and Black Hills) for the NAR. They will have a more definite response regarding which route they support moving forward by June 5th and 6th workshop, or sooner. TH would like a field visit of the routes. Discussion still has to happen in regards to who is managing the road. TH feels the only process that would work would be to have all three parties sitting at the table. TH will also have to meet with their citizens to discuss their final review of the route.	Goldcorp considers this and invites TH to participate in NAR tours, including both the Maisy May route and the Black Hills route, on August 23 and 25, 2017.			
3-A2-159	02 May 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	At the NAR workshop there was mention of an engineering comparison study by Kaminak that was supposed to be shared with TH. Goldcorp doesn't think an engineering report was created. Decisions on the road route were made while the engineers were evaluating the options rather than developing a document around those decisions. Everything that Goldcorp has on the route is on Open Text Core or in the Project Proposal.	Goldcorp will follow up with Onsite to see if this document exists, and will enquire into what it will take to prepare a comparative study on the Maisy May [Note: it is Goldcorp's understanding that the alternate route is properly referred to Henderson Dome and not Maisy May] vs. Black Hill route. Goldcorp will have an answer on this issue for the June 5th meeting.	Send comparative study on Maisy May vs Black Hills	Goldcorp	Complete, sent May 23.
3-A2-160	02 May 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Consultation	TH discussed the necessity of a citizens meeting. The TH negotiation team is responsible for consultation with their citizens; they are okay with having a citizen's open house but not a detailed meeting. TH noted their citizens are not in a position to review all of the information and therefore can't provide an objective perspective or understanding of the information. TH will have an information update meeting and an Elder's Council meeting in May. At the Open Houses information can be provided using other media (such as posters), but no in-depth presentation of technical details. June 20th open house would work for the citizens. TH can work with Goldcorp on the meeting materials. As appropriate TH will ensure the citizens are advised of all the information.	Goldcorp doesn't want to get to the end of the negotiation process and then have the citizens come back and say that Goldcorp hasn't been communicating or engaged. Goldcorp would like to work collaboratively with TH from both respects on the citizens meeting and the open house. In the same way that you don't just deal with the mayor and council you must work with the community. Goldcorp noted that it is not only best practice but also good from a legal perspective and being involved with the YESAB process ensuring that the community feels engaged. Goldcorp doesn't want the community to feel that the Proponent hasn't been engaging them and giving them information at an on-the-ground level.	Site tour during the day of June 20, with a citizens dinner open house in the evening.	Goldcorp and TH	Complete.
3-A2-161	02 May 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Meeting	An update on the Advisory Committee was brought up as the last meeting was held two months ago. TH noted that all the employment opportunities are coming to the HR department. Goldcorp provided a business registry list template. TH is working on the skills, employment list, and business registry. A notice is going out to the TH citizens in Yukon and across Canada to secure their information. The committee will work on setting up the next meeting.	Goldcorp will complete the community profiles in June, and it will be useful to reference these profiles in the upcoming discussions. Goldcorp appreciated the waiving of the Resource Geologist two-week posting period.	Goldcorp and TH will schedule the next Advisory Committee meeting.	Goldcorp and TH	Ongoing.
3-A2-167	05 May 2017	Email	Incoming	TH	Consultation	TH consultant contacted Goldcorp to note they would like to submit the attached IRs from SEA and TH (numbers #35-67). Noted that their instruction was to send them in as part of the pre-YESAB engagement (apologies for the delay). Noted that SEA has not yet had time to review the new information in the YESAB submission. These IRs may or may not be addressed in the recent submission. TH consultant thanked Goldcorp for responses on previous IRs; noted they were sending three documents back to indicate "resolved or unresolved IRs"; wanted to send one email with feedback on the adequacy of the response summarized.	Consultation					
3-A2-168	05 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided a link to Goldcorp's responses to additional IRs (#35-67 as noted in previous email) from TH and SEA. Responses include one PDF document and one excel spreadsheet. Have been uploaded to Open Text Core for the TH team to access. Files: 1. Batch 2_Tr'ondëk Hwëch'in Coffee Gold WQM SEA IRs_GC 2. Batch 2_IR39_Pit Wall Geology_2016 TH responded - thanking Goldcorp for sending the information.	Consultation					
3-A2-169	05 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with Goldcorp's responses to outstanding HHRA comments received from Tr'ondëk Hwëch'in. Responses to IRs 1 through 32 were provided on March 27, 2017 via email. Attachment: HHRA TH Comment Responses (in Word and pdf)	Consultation					
3-A2-170	05 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with Goldcorp's responses to information requests received from TH regarding Batch 2 documents shared. Noted responses in attachments are related to Fish, Wildlife, NAR, Project Description, and Surface Water Quality sections of the Project Proposal. Attachment: Batch 2 Feedback form (Word and pdf)	Consultation					
3-A2-174	05 May 2017	Email	Outgoing	TH	Consultation	Goldcorp notified TH that Goldcorp submitted the Coffee Gold Project Proposal on March 31, 2017 to the Yukon Environmental and Socio-economic Assessment Board (YESAB). Since submission, the Project Proposal has been undergoing a "Completeness Check" from YESAB. During this process, YESAB recommended that Goldcorp revise Section 3.0 Consultation and Engagement of the Project Proposal to more clearly reflect the requirements of consultation under the Yukon Environmental and Socio-economic Assessment Act (YESAA). The revised version of Section 3.0 Consultation and Engagement has been submitted to YESAB May 5, 2017, and has been uploaded to Open Text Core - USB flash drive was mailed as well. Attached: memo sent to YESAB outlining the specific changes made to Section 3.0 Consultation and Engagement	Consultation					



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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-179	08 May 2017	Email	Outgoing	TH	Engagement	Goldcorp provided TH with Request for Proposal (RFP) for the 2017 drill pad. Noted that this info will be sent out to potential companies; sending it to TH for consideration with respect to the TH business registry. Noted that at this time Goldcorp is looking for one contractor to undertake both the exploration and the geotechnical programs. Noted additional work completed by TetraTech over the past month on footings and stabilization on steep terrain; described in attached memo and spreadsheet. Noted memo is still in draft format and discussions are ongoing; however, this is indicative of the direction we are heading in ensuring integrity of pads and safety of personnel. Attachments: 1. Drill pad anchor memo 2. Drill pad RFP 3. golden guide ENG 4. Geotech points spread sheet	Consultation					
3-A2-182	09 May 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to provide a flyer noting the Dawson Goldcorp office was now open. Inquired if TH individual was free for a lunch meeting May 18. Attachment: Dawson office flyer	Consultation					
3-A2-183	09 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with the minutes from the May 2 meeting. Noted they separated into Negotiation and Project Engagement minutes. Also attached - detailed agendas for the upcoming May 30th and 31st meetings. Noted creation of action tracker for Project engagement and negotiations. Noted to please make any changes/edits to attached documents and return for final formatting. Also noted, one of the items from the last meeting was to share the presentation and letter from Goldcorp's road meeting with the YG (also attached to email). Noted Goldcorp consultant would be in touch to arrange the logistics for the Citizens meeting on June 20th. Requested who to talk to in regards to organizing site tour of Coffee Camp during the day of the 20th. Attachments: 1. Meeting Action Tracker (Engagement) 2. Meeting Action Tracker (Negotiations) 3. Negotiation Meeting Minutes 4. Project Engineering Meeting Minutes 5. Negotiation Meeting Agenda 6. Project Engineering Meeting Agenda	Consultation					
3-A2-185	11 May 2017	Email	Outgoing	TH	Consultation	Goldcorp noted meeting some TH citizens that should reach out to have their businesses put on the TH business registry. Also noted that it would be good to catch up regarding the Exploration Agreement. Noted they would be in Dawson the following week. Noted following up on community interviews asking if there any other individuals that should be included.	Information Sharing					
3-A2-189	15 May 2017	Email	Incoming	TH	Consultation	May 10, TH contacted Goldcorp noting the TH citizens dinner and Open house scheduled for June 20; noted they would book the cook for the dinner. Also requested what the agenda items would be as to include them in the poster. TH also requested the meeting minutes from the meeting the previous week. May 10, Goldcorp provided the May 2 meeting minutes. Attachment: May 2 Meeting Minutes and Agenda. Goldcorp responded, providing the theme of the Open house - NAR, Water and Closure. Noted they would be printing posters. Also provided the requested meeting notes. TH shared poster from previous Open House, noting that it was by request of TH that advertising comes from them; however, they are happy to work on the poster together. May 11, Goldcorp consultant communicated with TH regarding the poster details, noting Goldcorp would very much like to present to the citizens during the event. May 15 Goldcorp consultant noted they would be in Dawson May 15 and would be able to discuss the posters in person.	Information Sharing					
3-A2-190	15 May 2017	Email	Incoming	TH	Engagement	TH contacted Goldcorp consultant to inquire if Goldcorp was still looking for female TH Citizen entrepreneurs.	Information Sharing					
3-A2-191	15 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant contacted TH to inquire if it would be possible to continue conversations around Community Profiles. Proposed to meet that Thursday (May 18) or Friday (May 19) as Goldcorp rep. would be in Dawson at that time. TH responded that unfortunately it was not enough notice and people were not available. Goldcorp noted they would be happy to meet informally with whomever was available or they would be returning June 19-20. TH noted a two- week lead time would be needed; however, one TH rep did note they would be meeting Goldcorp for an informal lunch on May 18.	Consultation					
3-A2-192	16 May 2017	Email	Incoming	TH	Consultation	TH contacted Goldcorp to noted that TH may be providing comments on the NAR and Water Management meeting agenda by the end of that week. Goldcorp responded that the input would be welcome, as meeting materials were being organized that week. TH then requested further clarification on the dates of the technical sessions for NAR and water management - June 5 and 6. Goldcorp provided a breakdown of the agendas for June 5 and 6, highlighting the topics of interest.	Meeting					
3-A2-193	16 May 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to request a meeting in Dawson June 8th - as the board of directors would be in Dawson at that time. Also noted that the Goldcorp CEO and Vice President would be in Dawson July 11; requested a dinner meeting with TH for that day. TH responded, accepting the June at 10:00 am meeting time. Further noted that the July 11 meeting will be confirmed at a later date - will provided times that work best.	Meeting					
3-A2-194	16 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided the meeting invite for TH technical meeting scheduled for June 5 in Whitehorse regarding water management. Requested feedback on the proposed agenda Attachment: Draft Agenda	Meeting					
3-A2-195	16 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided the meeting invite for TH technical meeting scheduled for June 6 in Whitehorse regarding reclamation and closure. Requested feedback on the proposed agenda Attachment: Draft Agenda	Meeting					
3-A2-197	17 May 2017	Email	Outgoing	TH	Consultation	May 16, Goldcorp consultant provided TH with the proposed agendas for the June 5 and 6 technical sessions in Whitehorse. Noted information was also included in the meeting invites. Welcomed any feedback for the agendas. TH consultant responded that they would provide edits to the agenda shortly. Also requested clarification on the order of the Road and Reclamation discussions. May 17, TH provided a revised agenda for June 5/6 meetings, noting that would confirm attendees in advance of the meetings. Attachment: Revised Agenda	Meeting					
3-A2-199	17 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant contacted TH lawyer to confirm delivery of the printed Project Proposal on May 12th. TH Lawyer confirmed delivery.	Regulatory Process					
3-A2-200	17 May 2017	Email	Incoming	TH	Consultation	May 11 TH requested a meeting to discuss and improve understanding of the YESAB Proposal and allow for SEA to ask questions on the review of the YESAB Proposal. The goals of the telephone meeting would be to 1) help speed up the SEA technical review and 2) avoid running out of time for the June 5/6 meetings in Whitehorse. Goldcorp consultant agreed this was a good idea. TH Suggested May 18 for the meeting. May 12 Goldcorp confirmed May 18 at 10:00 am for the meeting, noted they would send the invite. further noted they would have an individual on the call who could answer questions about the Heap Leach Facility (HLF). May 15 Goldcorp confirmed the the technical meeting dates of June 5/6 noting if any changes were needed please let them know. TH asked if the technical people were staying till the very end on June 5. May 17 Goldcorp contacted TH to suggesting the call was not the best use of resources, and suggested deferring the call to the meetings booked for June 5/6. TH responded noting they had a lot of questions to review therefore holding the call the following week would allow for more time to prepare. Goldcorp thanked TH for the update, requesting confirmation for rescheduling the call - asked if it wasn't better to have a broader group attend the discussions - noted they would be happy to proceed with both. May 17, TH consultant (Aquatics) noted they would not have additional topics to those already provided by TH for the discussion.	Meeting					
3-A2-201	17 May 2017	Email	Incoming	TH	Consultation	TH provided Goldcorp with a list of topics they requested to cover before the June 5/6 technical meetings. Also requested to postpone the meeting planned for May 18 to allow for more review time of the IR response document. Proposed times: Tuesday May 23, 9 am to noon or 1-4 pm Thursday May 25, 8:30-10 am, 11-12:30 am; 1-3 pm Attachment: List of Questions/Topics for Technical Meeting. Goldcorp responded that they would reschedule the meeting and send a new invite. Thanked TH for the list of questions, noting they would be helpful. Suggested focus on the more technical/specific areas, as general items should definitely be presented to all parties, e.g. general water management. Noted they would get some materials together for geochemistry/source terms, and will also discuss the HLF.	Meeting					

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-206	18 May 2017	Meeting		TH	Consultation	Meeting to discuss the NAR and plan for future NAR management conversations between TH, YG, and the Proponent.	Northern Access Route	Goldcorp presented an overview of recent meetings with TH: Workshop at end of March – high-level review of GC's main criteria for route selection: Safety Minimization of disturbance Minimization of new road Avoid environmental or heritage sites Workshop at end of March also covered the road route. Discussion of upcoming meetings – site tour, open house, and road workshop meeting scheduled for June 5th – when and what issues will be covered: more in-depth info on comparison between Maisy May and Black Hills route options. This report and materials are currently being prepared. Can be shared when ready. TH mentioned they've also done an internal comparison report that has not been shared to date. Discussion on where YG is at with NIC funding, special consultant for negotiation of road agreements with First Nations, etc. YG notes that the Gateway Project will be split out for the YESAB process into sections. TH, YG, and the Proponent discuss the next meeting with the same three parties meeting today.				
3-A2-207	18 May 2017	Email	Outgoing	TH	Engagement	April 4, Goldcorp noted they would like to plan a celebration for Aboriginal Day at Coffee Camp, and are hoping to brainstorm some ideas with the affected First Nations that we are currently working with. Noted appreciated involvement and feedback in helping create a culturally relevant and fun event for all staff at camp. Goldcorp followed up on April 11. April 11, TH rep responded that they going to have a conversation with the manager of the cultural center and see what they think. Noted they would respond ASAP. April 19 Goldcorp suggested some activities that could take place at the camp. TH responded with some additional suggestions. May 9-18 were further conversations between Goldcorp and TH rep about potential activities at the camp and logistics.	Information Sharing					
3-A2-208	18 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided the meeting invite for TH technical meeting scheduled for June 5 in Whitehorse regarding the NAR and reclamation and closure. Requested feedback on the proposed agenda Attachment: Draft Agenda	Meeting					
3-A2-209	18 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided the meeting invite for the Water Quality and Objectives meeting scheduled for June 6 in Whitehorse. Attachments: Draft Agenda	Meeting					
3-A2-212	19 May 2017	Email	Outgoing	TH	Consultation	As requested at meeting on May 2nd, Goldcorp provided redline versions of the requested Project Proposal chapters for TH review. Noted they are available on Open Text Core: Surface Water Quality VC, Wildlife VC, Fish VC, Heritage VC, Demographics, Economic Conditions VC, Education Services VC, Community Health VC	Consultation					
3-A2-215	23 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with the Black Hills vs. Maisy May Route Selection Trade-off Study - as requested at the May 2 meeting. Asked if TH had any questions regarding the action tracker that was shared. Attachment: Trade-off Study.	Information Sharing					
3-A2-218	23 May 2017	Email	Incoming	TH	Consultation	TH requested a link for the YESAB proposal. Goldcorp provided the link through Open Text Core. TH noted they were having access problem - Goldcorp responded noting that a YESAB online registry was needed. Noted they would be happy to have a call to walk through where to find it on the YESAB registry.	Consultation					
3-A2-219	24 May 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with a PowerPoint presentation with a focus on the HLF, as requested - to cover the heap with a focus on the heap and its relationship with site water (mine water management). Also included was information on geochemistry and source terms for discussion, as per TH request. Noted that in regards to permafrost, Goldcorp realized that they failed to include the 2016 Field Geotechnical report; this documents the work completed by SRK and Tetra Tech in the summer of 2016 and the resulting permafrost data that was collected then. The file is too large to share by email and will be uploaded for TH access. Attachment: Power Point Deck for May 25 teleconference	Consultation					
3-A2-221	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Goldcorp gives an overview of the presentation. Discusses the fundamentals of the HLF processing. Describes closed loop system that will require more water throughout the mine life. Notes gold dore will be poured onsite, no tailings. Goldcorp describes the stacking options trade-off study and the key components of the HLF: describes why pregnant and barren ponds aren't being used; describes the trade-off studies for the HLF design done. Q: TH asks if this was a report and where it resides.	A: This is of feasibility study, these are all included. There is also a summary in the alternatives assessment part of the Project Proposal.			
3-A2-222	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Goldcorp describes the HLF and the stage building; describes the years each stage is built; describes when the event ponds will be built. Goldcorp notes when event ponds should be used and that is only in PMP. Describes the directions that the HLF drains to carry to the plant site. Solution goes directly to the plant, unless the system is in upset. Any water in events ponds is used in the processing, then in closure things change, but the closure session on June 5th will cover closure in more detail. TH notes that they are more interested in progressive reclamation.	Goldcorp will go over that in this presentation. Goldcorp describes the liner system, and notes that the pad will be stripped of permafrost. The liner cover layer will include the drainage pipes for the Project. Drainage pipes are more than double the diameter than what is needed. The industry standard is 1.5-mm liner; Goldcorp is using a 2.0-mm liner. Most HLFs do not have a GCL liner; there are many redundancies built into the system, and Goldcorp is going beyond industry standard. Goldcorp describes the liner systems for the ponds; notes that the rain ponds are more robust due to holding water more often. Most makeup water comes from the site, and is collected from rain on the HLF. The water balance analysis was done using driest period in 30 years. Water management and water treatment are described.			
3-A2-223	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting, and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Does Goldcorp not expect to use water from Kona Pit or facilities?	A: The Project will need water from the alpha sediment pond in year one, and will use water from pit dewatering as well. Using raincoats is a big part of managing water for the HLF, and Goldcorp can accelerate rinsing of the HLF if needed. Very wet conditions were assumed for the event ponds.  Goldcorp adds that in the water quality model, it is assumed that any water generated through meteoric inputs into Kona Pit, and small runoff from ore stack area, will be consumed in the HLF. The plan is no discharge of that water into the environment. This conclusion is based on information from Ken Myers, who did the water balance model and synthetic precipitation record.			
3-A2-224	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting, and will meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	TH comments that it is good to hear that Kona water can be accommodated at any time in the HLF.				
3-A2-225	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Goldcorp continues the presentation and outlines the needs for makeup water throughout the mine life. Irrigating the heap will begin in July just after beginning stacking, based on the current schedule. Q: TH asks about the capacities of the ponds?	A: Event Pond (EP) 2 is well over the capacity of what is needed. Goldcorp describes how the event ponds were sized using a worst-case scenario where there would be a loss of power and pumping ability, the amount of water produced by probable maximum precipitation (PMP) (10,000 year storm), and the number from the water balance model, then on top of that additional freeboard.			
3-A2-226	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Asks if the event ponds will be closed circuit?	A: Yes, until closure, when discharge is needed after water treatment.			
3-A2-227	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Goldcorp describes how the treated water in the rinse cycle of the HLF can be used as part of progressive reclamation. Rinse solution will inoculate the heap and aid in treatment of the HLF in closure. Goldcorp can treat the water and discharge the water to the underdrain system to the Alpha Pond and then to the environment. During closure, Goldcorp will use all of the treated water in rinsing. When rinsing finishes in year 15, the treated water will report to the Alpha Pond. Goldcorp confirms that the design and closed loop system is understood by attendees on the teleconference. Goldcorp's HLF expert has experience in peer reviewing HLF in other areas of the world and in Alaska. The design concept for the Project was to always have a lot of redundancy. Q: Asks what the typical upset conditions at other sites have been like?	A: Goldcorp describes the storm conditions and norms for wet cycles used in design of other facilities. Using the 10,000-year storm is a big contingency in the design, as the industry standard is to use a 100-year storm. For Valley Fill HLF that impound, like the Eagle Gold project, the project uses dam design criteria, where half PMP is used. Goldcorp describes how upset conditions can be split into three categories: one where the ponds are poorly designed; a second where the original HLF design is then added to through increased operations but the pond sizes aren't increased - this can be where the water balance model isn't integrated or verified in the design and in operations. Notes that forecasting based on previous years is all that can be used, but verification annually is best for looking at this and ensuring that the event ponds meet the needs. Third area is where something fundamental goes wrong with the system, e.g., if the rain coats are not used for several years, and then get PMP. Raincoats are important as they are part of the system.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-228	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: How common are raincoats?	A: About 30 Projects have used them, about 15-20 are using them now. Goldcorp describes raincoat use at other operations, and how raincoats are installed. Notes that rain coats can leak. One could do a very poor job of installation and still get less than 3% infiltration.			
3-A2-229	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Are any of these rain coats used in conditions like Coffee?	A: Goldcorp describes studies about rain coats, and describes the three Projects with similar or harsher conditions from Coffee that use raincoats.			
3-A2-230	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Why wouldn't a project like Eagle Gold use raincoats?	A: The advantage of raincoats is that you can control the amount of water in the system very easily, the disadvantage is that one would need a liner deployment crew; if one were to not use rain coat technology the project would require a bigger water treatment plant. Both technologies work well, but if you have a treatment plant that doesn't work right away then you have discharge water.			
3-A2-231	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Where does raincoat water go?	A: Goldcorp describes the raincoat pond location and design and use.			
3-A2-232	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Asks if unused raincoat water would be discharged?	A: Water will be tested and then discharged. Rain coats will cover the whole HLF and then go to ditches on the side of the HLF.			
3-A2-233	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Water Quality	Q: Where does the water discharge?	A: The water from the raincoats goes to raincoat pond, where it is tested and stays there for as long as possible, then it is discharged down to the Alpha Sediment pond. In the model, all of this water is consumed in the heap. Goldcorp went with Ken's recommendations to integrate all components of the HLF into the water quality balance. The model cycles through all climate scenarios to see a variety of scenarios.			
3-A2-234	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Water Quality	Q: Does the precipitation correspond to what happens in the model?	A: The HLF model was built using 30-year record with wet and dry periods applied at the least advantageous times. September is the highest water demand time, so if you wet the heap in May, you'll see dilution.			
3-A2-235	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Are the raincoats moved?	A: The plan is to move the rain coats; every summer and fall the Project will add more rain coats, but may also take rain coats off. In cost modelling, we have factors for damage to the rain coats, as you can damage them when moving them. An advantage to raincoats is you can uncover and re-cover whenever you want.			
3-A2-236	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: Is there a figure about the raincoats?	A: The percent cover of the HLF by raincoats is included in the Project Proposal, and the numbers range between 60-80% coverage over the life of the Project.			
3-A2-237	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Water Quality	Q: Does the inflows to the Mines Group model equal the outflows for the Goldsim model?	A: There are losses within the HLF such as evaporation from emitters, and can change emitters function to increase or decrease evaporation. That functionality is not included at this stage. We keep track of water that may be potentially discharged, and make sure there's sufficient room to move water from Kona Pit or from the facilities pond - we can do that. The model uses the data from the Mines Group model, and we would route water where it makes sense.			
3-A2-238	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Water Quality	Q: It is assumed that Kona water is used, rain coat water is used, Latte pit water is used, but are there triggers in the model? For example, if water is being discharged from Latte pit, then there could be impacts.	A: We don't currently use Latte pit water in the HLF assumptions. With respect to Kona pit, this is comprehensive because this is part of the view. For Latte pit, there are no assumptions; it fills and spills naturally. The main concern for water management is what is coming out of the HLF, and how to divert and treat it. When the HLF model is in excess, then it triggers the Goldsim model to look at source terms and then discharge to the Alpha drain. The most important part of this is that during the Operation Phase, it's very important to keep the water balance updated. The HLF is where we make money, so disruption to this has impacts to the Project. We need to meet end-of-pipe requirements and site-specific water quality objectives (SSWQOs), so it's very important to keep the water balance updated throughout the Project to ensure we meet this.			
3-A2-239	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	Q: What about a long-term treatment plan for the heap? Were any documents missed in the Project Proposal?	A: What you see in the Project Proposal now is not passive treatment proposed as the main treatment method. Passive treatment is included as a contingency to use a barrier at long-term closure. There is a literature review in the Reclamation and Closure Plan, as well as the Water Management Plan. The message is that we are trying to establish a Project and an approach where we are not relying on just one closure method being successful for the Project to be closed out in the best way. The Project has contingency built into the closure plan with the design of the HLF in cells and the ability in year 4 and 5 to be properly testing the closure methods. This includes some similar closure methods to what was used at Brewery Creek. Predictions are difficult, and added contingency is part of the mitigation. In the documentation there are the sources provided that were used in the determination of this closure methodology. The Project is still at the conceptual stage, and the redundancy is to show that the Project does not rely on one single method.			
3-A2-240	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	TH notes that there are many questions, including information about the water treatment tradeoff, but wants to know about the closure plan. It is important to have a clear plan.	Goldcorp replies that there is a clear plan, and in this presentation Goldcorp wanted to highlight that there are a number of options. The closure plan is refined through licensing, and becomes an integral part of the ongoing licensing. This will be discussed on June 5th, and Goldcorp agrees that having a plan that we know is going to work is important. Goldcorp and TH discuss additional engagement on the closure plan.			
3-A2-241	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	Q: When do you know a heap is finished and in the rinsing/in situ treatment process? Does the water treatment run for a short period of time or a long period of time?	A: Normally rinsing would be run for quite a number of years. Goldcorp ran the water balance out to 2030. Rinsing at Coffee is staged, and is estimated at 1.5 years for each stage. Rinse would start with treated water and then finish with clean water. This is clean ore; there aren't complex degradation issues with this ore. Rinsing starts in year 4 and goes into year 15. There is a projected total of 11 years of rinsing, and it's a conservative projection.			
3-A2-242	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	Q: In the Project Proposal rinsing ends in year 20?	A: This is contingency. Projects can run into issues in closure where they run out of money. This is why there's a conservative estimate.			
3-A2-243	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	Comment (TH): There's pressure in the jurisdiction to not actively treat for very long. Concerned about this in terms of money available.	Reply (Goldcorp): The Project will start closing in year 6, and will have 15 years from first cells of the HLF being closed to the end of closure to ensure that closure is successful. While YG doesn't endorse perpetual treatment, it's not uncommon for closure plans to have a component in them for an extended time period of active water treatment as you begin to wind down and ensure that you have operated long enough and met water quality objectives and are ready to close out that component. Goldcorp won't be able to stop treatment until the water quality objectives are achieved.			
3-A2-244	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	Q: Once the water treatment is turned off, is any other treatment included in model?	A: Yes, source term of the permeable reactive barriers.			
3-A2-245	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Water Quality	Q: Is this surface water or ground water?	A: It is for surface water. It's about hydraulic retention time.			
3-A2-246	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Heap Leach	Q: What about cell division on the HLF?	A: Explains the cell divisions, notes that this is a straightforward design concept.			
3-A2-247	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Closure	Q: How much water treatment will take place?	A: The treatment plant came from water balance modelling, where anything that isn't stored or used has to be treated. The treatment plant is added the year before there's too much water, and the plant is designed to be much larger than needed. The current modeled maximum is 10 litres per second (L/s), but Goldcorp will design for 15 to 20 L/s treatment. Goldcorp can buffer the flow into the treatment plant based on the large storage capability, and if needed would be able to double the plant in one construction season.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-248	25 May 2017	Meeting		TH	Consultation	Teleconference with TH representatives to discuss the HLF, water management, and geochemistry. The Proponent and TH do not cover the geochemistry portion of the meeting and meet on June 9th to follow up on the geochemistry discussion.	Meeting	Goldcorp and TH discuss setting a date to cover the geochemistry portions of the presentation that were not able to be covered in this meeting. Goldcorp and TH set June 9 for this follow-up meeting. TH and Goldcorp discuss June 5 as the next opportunity to discuss closure, and Goldcorp notes that there will be a dedicated HLF session scheduled as a future workshop.				
3-A2-249	25 May 2017	Email	Outgoing	TH	Engagement	Goldcorp contacted TH to notify them that Goldcorp was hiring a Project Accountant for a six-month contract on the Coffee Project. Attachment: Job Posting	Information Sharing					
3-A2-288	29 May 2017	Email	Outgoing	TH	Engagement	Conversation with TH Heritage Sites Manager (May 29, 16:00) regarding logistics around tree planting training and volunteer work with TH on June 20, 26-28.	Consultation					
3-A2-289	30 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided meeting information and presentation, noting that the meeting would be a continuation of the conversation that was started May 25 and would cover geochemistry topics. Attachment: Presentation for May 25 teleconference.	Meeting					
3-A2-290	30 May 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH regarding follow-up items from a meeting during the gold show. Noted confirmation of the number of people attending the site tour on June 20th – able to take 15 people from TH. Goldcorp will arrange the charter into site; requested attendee names from TH. Noted there was a conflict for some of the YG team for the Road Users meeting June 7th - have to reschedule. Asked if TH had availability for a call to follow up some items from the exploration agreement. Would like to cover the following: Progress on the supplier database, Development of a list of qualified citizens and human resource inventory, General housekeeping on recent and upcoming requirements (e.g. payments, reports). Asked if afternoon of June 12th or the afternoon of June 15th would work to discuss the exploration agreement.	Consultation					
3-A2-291	30 May 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH regarding re-scheduling the call to continue the conversation about geochemistry. Asked if they had any updates on availability for that day. TH responded that that afternoon would work. Goldcorp requested the meeting move to Wednesday the following week. TH responded that they only had this week or the following Friday. Goldcorp further suggested June 12-16, June 19-23 or June 9. TH confirmed that June 9 would work for a morning call.	Consultation					
3-A2-295	31 May 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided TH with agendas for June 5th and 6th meetings. Attachments: 2 Agendas	Consultation					
3-A2-296	31 May 2017	Email	Incoming	TH	Consultation	Request for a copy of the Forty Mile Caribou Herd winter raster. Goldcorp noted that EDI would provide a copy.	Consultation					
3-A2-297	01 June 2017	Email	Outgoing	TH		Goldcorp consultant provided the meeting invite for TH technical meeting scheduled for June 5 in Whitehorse regarding the NAR and reclamation and closure. Requested feedback on the proposed agenda Attachment: Draft Agenda	Meeting					
3-A2-298	01 June 2017	Email	Outgoing	TH	Consultation	Goldcorp provided the meeting invite for the Water Quality and Objectives meeting scheduled for June 6 in Whitehorse. Attachments: Draft Agenda	Meeting					
3-A2-300	01 June 2017	Email	Incoming	TH	Consultation	TH contacted Goldcorp regarding Goldcorp job postings and ensuring the TH HR department is notified of future postings.	Economic					
3-A2-301	01 June 2017	Email	Incoming	TH	Consultation	TH consultant contacted Goldcorp to confirm they would be attending meeting scheduled on June 5th and 6th. Requested meeting details. Goldcorp provided the meeting invites and noted that the agendas were included in the invites. TH consultant then noted they would be attending meetings by phone.	Meeting					
3-A2-302	02 June 2017	Email	Incoming	TH	Consultation	TH consultant LGL provided Goldcorp with 2 documents that were noted for use during the workshops scheduled for the following week. Attachments: 1. Coffee Gold Mine Project Northern Access Route (Route selection) Dated June 2017 2. Expectations for the development of SSWQOs for the Coffee Gold Project Dated June 2, 2017.	Meeting					
3-A2-304	02 June 2017	Email	Outgoing	TH	Consultation	Consultant provided link to Fortymile caribou WRSF model results to Goldcorp - Goldcorp forwarded this information to TH.	Studies					
3-A2-306	04 June 2017	Email	Incoming	TH	Consultation	TH's legal counsel contacted Goldcorp requesting an internal meeting for 9:00 am June 5th. Goldcorp confirmed time.	Meeting					
3-A2-308	04 June 2017	Email	Outgoing	TH		Goldcorp consultant re-sent the meeting invite for TH technical meeting scheduled for June 5 in Whitehorse regarding the NAR and reclamation and closure. Requested feedback on the proposed agenda Attachment: Draft Agenda	Meeting					
3-A2-309	05 June 2017	Meeting		TH	Consultation	TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route 1. TH presentation of views 2. Review of Black Hills Route vs Maisy May Route 3. Discuss NAR Management Reclamation and Closure 1. Reclamation and Closure Overview 2. Discussion of End Land Use Plan o Land capability studies (TH Presentation of Views) o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge) o Reclamation Research. 3. Define the need for cover materials at closure. 4. Concern with the creation of long-term water bodies and ways to reduce long-term risk. 5. Need to consider permafrost melting in more detail (operation and closure). 6. Social aspects of closure (training, workforce transition strategy). TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations). TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.	Northern Access Route	OnSite (hereafter Goldcorp) provides background to engineering on the NAR. An overview of the NAR is given, notes that upon learning that the NAR route decision was unclear with TH, there was a Maisy May vs. Black Hills route comparison study done and provided to TH. This comparison is discussed, noting that disturbance area, overall safety, and capital expenditures (CAPEX) were the large considerations for choosing the selected route. Goldcorp provides a history of the studies done to support the NAR selection. Notes that field work made it clear that there were issues with building new road and permafrost; in discussion with placer miners, team learned that there was a Black Hills bypass road to be built. Main considerations were the length of new road and permafrost, and considerations of bridges to be built are also important. The Black Hills route required new road, as it currently ends at the last claim, and the wagon trail from this follows a very wet route, and has much permafrost. Therefore, it is required to go a high route to avoid the permafrost, and then resulted in a route that was difficult, engineering wise, to connect to the existing road. At the time, the understanding was to not disturb settlement lands. Discusses the fish presence and stream crossings on the NAR and on each route option. Goldcorp discusses the lower number of crossings of Maisy May with the preferred route as compared to Black Hills. It is also preferred to be in and out of riparian areas as quickly as possible with the route design. Switchbacks are also a main concern for the route, particularly related to safety. There are many switchbacks on the Black Hills route, and currently trucks cannot haul on this section when it has rained. There is a crossing at the bottom of the switchbacks that has 20-30 feet of auefs as well, which is a problem. Goldcorp describes the construction for each route when referring to the map, noting areas of new build and upgrades. Q: Notes that permafrost comes out as a concern, but doesn't come out in the report. How is permafrost considered?	A: Only the engineering considerations are presented in the memo. All heritage sites that were known were avoided. Shallow, ice-rich areas have a lot of "things" in them, for example anecdotally noting that there were lots of moose trails.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-310	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <ol style="list-style-type: none"> <li>2. Discussion of End Land Use Plan <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <p>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</p> <p>5. Need to consider permafrost melting in more detail (operation and closure).</p> <p>6. Social aspects of closure (training, workforce transition strategy).</p> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Q: The considerations are listed, but not discussed, for example heritage and wildlife.	A: This is outside of Goldcorp's consultant's scope. Avoiding permafrost is such a big part of road planning, that makes it a driver for the considerations. Goldcorp presented the decision making of the route, it was not a summary of all of the effects of the NAR.			
3-A2-311	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <ol style="list-style-type: none"> <li>2. Discussion of End Land Use Plan <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <p>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</p> <p>5. Need to consider permafrost melting in more detail (operation and closure).</p> <p>6. Social aspects of closure (training, workforce transition strategy).</p> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Comment: if it is a tradeoff study, it's missing those other features.	A: Thanks TH consultant for the comments. Asks if there's anything about the physical route area before moving on?			
3-A2-312	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <ol style="list-style-type: none"> <li>2. Discussion of End Land Use Plan <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <p>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</p> <p>5. Need to consider permafrost melting in more detail (operation and closure).</p> <p>6. Social aspects of closure (training, workforce transition strategy).</p> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Q: What is the clear definition of new road vs. existing road?	A: Two-wheel-drive pickup access is considered existing, to the last operation on the route. There is a historic trail, but you can't very easily tell that it is there, and it is in permafrost, so there is new road after the final claim on the Black Hills Route. New construction is realignment.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-313	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of "End Land Use Plan" <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Q: What are the implications of road construction and maintenance in permafrost?	A: Permafrost means shallow permafrost, so normally north-facing slopes and an active layer. When building road across this, you don't want to impact the active layer and change the depth of it. When you strip shallow, ice-rich permafrost, you degrade where the active layer is. This causes stability issues on the road. Describes how to build over permafrost using embankment fill and a drainage system. In construction of embankment fills, it is very hard to not disturb the permafrost.			
3-A2-314	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss Northern Access Route Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of "End Land Use Plan" <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at Closure</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operations and closure)</li> <li>6. Social aspects of closure (training, workforce transition strategy)</li> </ol> <p>Tr'ondëk Hwëch'in raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values, and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The reclamation and closure plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Q: The entire area would freeze and thaw seasonally, so what is the problem in certain areas?	A: Goldcorp explain the discontinuous permafrost across the landscape, and the special considerations for shallow, ice-rich permafrost. This is non-thaw-stable permafrost, so it is of concern. Non-ice-rich permafrost is not an issue, as it is very stable. Goldcorp explains how the ice-rich permafrost becomes unstable in thawing. Goldcorp explains the instability of ice-rich permafrost in detail. Goldcorp discusses the Maisy May route and how it is safe and low maintenance, relatively speaking. Goldcorp notes that ice-rich permafrost is a major consideration onsite as well in terms of engineering. Goldcorp continues to discuss the NAR tradeoff study, notes the real-time values used in this now. Notes that switchbacks are difficult to build, expensive, and a safety concern, noting that Goldcorp's switchbacks would be much safer with flatter grades than exist currently.			
3-A2-315	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of "End Land Use Plan" <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Q: Referring to switchbacks and the report, notes a discrepancy in the number of meters of switchbacks in the memo on the NAR provided by Goldcorp.	A: This is likely a typo. Action to check the number in the switchbacks.	Check number on switchbacks.	Goldcorp.	Completed during meeting. Number was accurate.

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3-A2-316	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss Northern Access Route Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <p>2. Discussion of "End Land Use Plan"</p> <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> <p>3. Define the need for cover materials at Closure</p> <p>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</p> <p>5. Need to consider permafrost melting in more detail (operations and closure)</p> <p>6. Social aspects of closure (training, workforce transition strategy)</p> <p>Tr'ondëk Hwëch'in raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values, and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The reclamation and closure plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH reviews the memo sent to the Proponent regarding the NAR route considerations from TH's perspective. TH presents their views as detailed in the memo, and TH and the Proponent discuss the views presented by TH. These views are presented in a document (Draft Goldcorp NAR Analysis June 2017) and discuss potential impacts to heritage, fish, wildlife, and lands and resources.</p>	Note: an analysis of these views (the NAR MCDA) is agreed to and completed by August 22, 2018.			
3-A2-317	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <p>2. Discussion of "End Land Use Plan"</p> <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> <p>3. Define the need for cover materials at closure.</p> <p>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</p> <p>5. Need to consider permafrost melting in more detail (operation and closure).</p> <p>6. Social aspects of closure (training, workforce transition strategy).</p> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH notes that the heritage considerations came from the Heritage Department, who are not present today. Notes that there is not enough information available, and often the effects are similar for the two routes. The conclusion for Routes 1 (R1) is the Henderson Dome and Maisy May - proposed NAR route, and Route 2 (R2) is the Black Hills alternate route proposed by TH. Note that further work is needed for socio-economic and cultural effects. TH notes that the R1 Heritage Resource Impact Assessment (HRIA) is inadequate, and there is no R2 HRIA. TH notes the Han Migration Route and Maisy May farm as important sites, and notes the graves and spirit houses on the east side of Coffee Creek.</p>				
3-A2-318	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <p>2. Discussion of "End Land Use Plan"</p> <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> <p>3. Define the need for cover materials at closure.</p> <p>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</p> <p>5. Need to consider permafrost melting in more detail (operation and closure).</p> <p>6. Social aspects of closure (training, workforce transition strategy).</p> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH notes that further information is needed with respect to studying both routes in the Goldfields area.</p> <p>A (TH): Can't answer that. The baseline information provided in advance has changed with the YESAB submission, so further work may be needed.</p>	Q (Goldcorp): Asks if the studies provided in the Project Proposal were considered when preparing this document from TH?			

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3-A2-319	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH discusses potential effects to the Fortymile caribou for R1 and R2, noting that caribou are often found on the edges and upper parts of the slopes of the valley.</p> <p>A: Henderson dome is quite high, whereas Black Hills descends more quickly to lower elevations, and looking at the model, the impacts appear to be in lesser-quality habitat. Also proximity to core range is a concern as well.</p>	Q (Goldcorp): Asks if this has to do with sloping, or the placement of different habitats?			
3-A2-320	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): Caribou will most likely cross both routes, but based on the selection criteria for the model, the habitat considerations are as noted earlier.</p>	Q (Goldcorp): The conclusion in the Project Proposal is that the core range would expand; is that not a consideration for TH (Forty Mile Caribou)?			
3-A2-321	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Wildlife	<p>TH discusses potential effects to moose as described in the TH memo. Notes that while moose will be moving around, more of the moderate to high-quality habitat is along R1 than R2.</p> <p>A (TH): Focused on winter habitat; don't know how wetlands are used for calving etc. The Henderson route has more of the high-moderate rated habitats for winter observations.</p>	Q (Goldcorp): Asks about the confusion of the quality or existing road in the Black Hills area, but now that we've discussed the new road that would be required in the Black Hills area, are the thoughts the same on the effects, or is it just higher-elevation habitat that is of concern?			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-322	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of "End Land Use Plan" <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): As discussed in a previous workshop, the concern with freeze up there are concerns about when the road is going to be active until. When the barges come out, will the northern section be maintained? Depending on the winter you're having, access will be easy for a 4 wheel or 2 wheel drive, and there's concerns for predation by wolves in the post-rut areas.</p>	<p>Q (Goldcorp): There was concern raised about post-rut and winter habitat, just wondering what the details are.</p>			
3-A2-323	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss Northern Access Route Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of "End Land Use Plan" <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at Closure</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operations and closure)</li> <li>6. Social aspects of closure (training, workforce transition strategy)</li> </ol> <p>Tr'ondëk Hwëch'in raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values, and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The reclamation and closure plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): Sees the point, notes that there will be a change to the use and maintenance of the road with the Project. Notes that this is a relative comparison between two options, rather than an absolute determination of effects.</p> <p>TH continues presenting views on potential effects to moose and moose harvest. Notes the need for a harvest management strategy. TH discusses the potential effects to Thinhorn sheep, such as avoidance or dispersing. TH presents the views on grizzly and black bear, and wolverine as presented in the memo.</p>	<p>Q (Goldcorp): Notes that in October and November, the areas that are being discussed for the post-rut section, those roads are open right now and there is traffic on the road right now. While the scale may change, these areas are open now.</p>			
3-A2-324	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of "End Land Use Plan" <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH discusses how year-round road maintenance can allow for increased rural residential applications when the road is maintained year-round, and may impact TH's hunting rights.</p> <p>A (TH): Typo. Look at "rural residential policy" and "placer residential policy". There can be impacts if the second policy is taken off hold.</p>	<p>Q (Goldcorp): Asks if "year round residential road" is a particular designation?</p>			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

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3-A2-325	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Wildlife	A (TH): The concept is that you don't want to be hunting around where people are. If the person is there, and that's a residence, there's a 1-km buffer.	Q (Goldcorp): Asks if hunting buffers exist around current placer camps?  Goldcorp thanks TH for this; this is the first time this has been heard as a concern.			
3-A2-326	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH goes on to discuss settlement land, notes there are 3 parcels for R1, 2 for R2.</p> <p>A (TH): That would change things</p>	Q (Goldcorp): It is not possible to use the old cart trail there due to the terrain and would have to cross into settlement land as a result. Would that be the same conclusion?			
3-A2-327	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	A (TH): Regardless, potential for impacts are there. TH discusses how cumulative impacts are a major consideration for TH, with an established route there will be much more access and potential for expansion of placer claims.	Q (Goldcorp): Goldcorp notes that if they have to cross settlement land for R2, would that be the same conclusion?			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-328	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): There is much open ground to the west of Maisy May road that could be accessed, better ability to move equipment to move fuel and equipment to open up new ground. Notes that Goldcorp has no control over the additional satellite roads that the placers can build off of the upgraded road, and consider the effects to moose, caribou. Black Hills has been staked and mined historically, and now placers are in the Maisy May area, this is why they want the Maisy May area. Black Hills is reclaiming itself, if you will.</p>	<p>Q (Goldcorp): Given that there's access nearly all along the Maisy May route, do you think there will be more access made when compared to the larger new build on the Black Hills route?</p>			
3-A2-329	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Vegetation	<p>TH discusses traditional plant harvest, notes that there is not enough data to know where the effects that may be.</p> <p>A (TH): Replies that the effects are just unknown.</p> <p>TH describes that for invasive species, the amount of rank 1 invasive species and potential to spread is higher on R1 than on R2.</p>	<p>Q (Goldcorp): Are the effects presented in the Project Proposal unacceptable?</p>			
3-A2-330	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): This would be a concern.</p>	<p>Q (Goldcorp): Given the information on the amount of construction required on the Black Hills route, while they may be more established, but then may be disturbing a new route, would the introduction in the new construction area not be of concern?</p>			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-331	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>Q (TH): Asks if active management is specific to new build?</p> <p>TH: Then there would be less concern for spread of invasive species on the new construction at Black Hills.</p>	A (GC): Yes.			
3-A2-332	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): The concern is how much money GC and YG are giving placers to build those roads. If they had to do this on their own dime, they wouldn't be doing it so quickly. Only reason it is accelerated is because of money from YG. From a traditional economy perspective, what can be potentially lost when opening areas for placer development? How to make sure that these resources aren't just being bulldozed by a cat. TH refers to medicinal plants, traditional uses of forest and timber resources. There needs to be something left for TH to sustain into the future. Agrees that it doesn't make sense to have two access roads in that area, but it depends on what the interests of YG and the KPMA are in this area. Then there's the concern with building satellite roads.</p>	Q (Goldcorp): What is the difference going to be between the two routes, given that placer mining will continue on Maisy May?			
3-A2-333	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>TH notes that the comparison of the routes stopped at the technical level, and the memo is a starting point to display TH's considerations of the routes on these interests of TH, and looking at how the routes rank. This is a starting point for more information, not a conclusive document.</p>	Goldcorp notes the term "ranking". Goldcorp notes their ranking of things is known, but TH's ranking of considerations is not. This is a discussion that needs to happen in terms of ranking priority.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-334	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <ol style="list-style-type: none"> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighing the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>Chief Joseph states that at previous meetings, TH was asked for feedback. This is high-level feedback. TH can continue to work through the questions, as Goldcorp's memo was recently provided. More discussion is needed on this. This needs more discussions with each other. Goldcorp thanks TH for presenting views on the NAR. TH notes the planning efforts with YG to open up the goldfields for timber harvest. TH notes the wetland considerations for R1 and R2 as well as the wildlife considerations.</p> <p>TH summarizes that these considerations are a high-level review of values other than engineering for the NAR route.</p> <p>A (TH): Replies that the alternatives section of the Project Proposal looks at different routes, but Maisy May and Black Hills is captured in one option in the Project Proposal. TH's memo breaks the routes out and looks at them from a TH set of VCs, and looking at this in combination with the engineering information.</p>	Q (Goldcorp): Asks about the comments to adequately understand certain aspects. When Goldcorp sent the memo, this was thought of as an addition to the VC reports in the Project Proposal. Goldcorp would like to know how much of the Project Proposal was considered in this memo from TH.			
3-A2-335	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <ol style="list-style-type: none"> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighing the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): TH needs to ensure that all IRs from before have been answered and review of the Project Proposal that was filed, but generally the lack of data on the Black Hills route is the concern.</p>	Q (Goldcorp): Asks if there are aspects within the Project Proposal where this information is being seen as inadequate for R1? Are there concerns for how R1 was assessed? This will help Goldcorp understand.			
3-A2-336	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <ol style="list-style-type: none"> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighing the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	<p>A (TH): TH would need agreement on the weighting of the considerations. If it's cost and engineering driven, without a weighting of some of these other components, then this can't be answered.</p>	Q (Goldcorp): Goldcorp is looking to understand what are the core issues that would make the difference between the two routes? If Goldcorp is doing additional work, want this to be of value. What study and results are necessary to make a decision on preferring one route or the other?			



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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-337	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <ol style="list-style-type: none"> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	A (TH): There needs to be a set of VCs agreed upon and a ranking exercise.	Q (Goldcorp): Asks if TH has ranked the VCs they have presented?			
3-A2-338	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <ol style="list-style-type: none"> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	TH responds to Goldcorp's considerations of safety and engineering, noting that conclusions of things that we would like information on, include TK of the area, recently an arrowhead was found and returned to TH, there are still things out there that may be higher use areas such as camps, which are usually along routes and have higher-value heritage objects. If people are trapping in the area, what are the trappers' future plans? There is still information that needs to be collected and looked at. When can we collect that information, and when do we look at that? TH notes that rather than looking at this as a particular VC, it's looking at the impacts to TH's rights and interests and considering these all together. That's where TH would like to get to for the two options; the net outcome.	Goldcorp is going to rank the safety and engineering very highly, and struggles to think of a conclusion of a study that would out-rank that. From a technical perspective, these are not shades of grey; there is one route that is very difficult and expensive to make, and one route that is fairly straight forward. It is important to know what valued components are of highest priority and focus on those items.			
3-A2-339	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> </ol> <ol style="list-style-type: none"> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Goldcorp explains that the costs are not the sole concern. Timing and the process for YESAB is also noted. Additionally, Goldcorp notes that we may agree on extra studies or methodology but arrive at different preferences based on the results. TH and Goldcorp need to consider where collective resources are best spent in time and work on the evaluation. Goldcorp notes that this is all being said as a consideration, and not trying to diminish the interests of TH.	TH responds to Goldcorp's comments noting need for more information on the NAR and that TH is looking at the impacts to TH rights. It is TH council's responsibility to look out for citizens' interests, and make sure that these are being considered. TH is reviewing the YESAB application but still has a lot of questions, including related to IR responses on pre-submission document review. TH knew that the March 31 deadline meant that Goldcorp was working hard, and that they wouldn't have all of the answers. That's why we are where we are today.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-340	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	A: TH replies that the considerations around potential effects of having a year-round route, and needing more information on things like heritage values, archaeology assessment, a TK study, a traditional economy study, and how that would have an impact on traffic activity, or if there will be an impact.	Q: Goldcorp asks to clarify if the request for information is not just these two options for the road route, but the entire NAR.			
3-A2-341	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	Goldcorp acknowledges this and notes that there also appears to be broader concerns than just these two route options, so Goldcorp is looking at doing work broader than these two options. Goldcorp acknowledges that there are perceived information gaps, and that Goldcorp is considering the next steps in terms of TH providing some conclusions for Goldcorp, whether that be ranking some of these considerations, whether it's Goldcorp committing to some further work. Goldcorp would like a plan forward leaving the room today, noting that both parties will deliberate and think on it and discuss later in the day.				
3-A2-342	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Reclamation	<p>Source Environmental, representing TH (referred to as "TH" here forward), notes the statements in the Project Description about reclamation and closure about returning the landscape to conditions for future use, but noting not to baseline conditions. Closure is a process, not an event. Notes that the application would benefit from eco hydrologic and end-land-use mapping. Presents on reclamation planning, notes topography and materials are very important in closure. TH discusses land use as an important consideration in closure as well. Ecosystem mapping of the pre-development is an important aspect of creating the land capability inventory. For post-mining conditions, soil conditions are very important. This has to do with the materials for cover and reclamation. Suggests to look at reclamation material available, and to look at material that can become available. Discusses the importance of soils, relief (topography and energy), and climate in the eco-hydrologic projection of post-mining conditions and in a step-wise process. Notes more ecosystem variety in the pre-development case and less in the post-development case. The point is to characterize the habitat pre-development and project the post-mining disturbance to see the changes that are going to occur based on the disturbances, and use this in reclamation planning and research. For example, post-mining capability for culturally important plant species.</p> <p>TH notes that the closure plan is disconnected from the closure goals presented by Goldcorp. Goldcorp replies that this is intentional at this stage; Goldcorp considers it more responsible to present the pessimistic goal. This goes the same for WQ, wildlife. Goldcorp is not presenting the optimistic view This is the starting point.</p> <p>TH notes that in the conceptual period, meaning in the EA stage, that it is expected to see a closure plan that is acceptable. TH doesn't want to say that they're not happy with the conceptual closure plan and see it go ahead, for example not having any soil material for covering the WRSF is not something TH is happy about</p>	Goldcorp's consultant notes that this closure plan is not read in isolation, it is not stand alone. For example, in 2.1 of the conceptual closure plan refers to 15A in vegetation. The site has been characterized already; there's two zones, sub-alpine and boreal. There are 26 different types of soil-vegetation associates and topography. Appendix 15-A has the characterization of these approximate 26 different types of ecosystems. As most people know, you have to re-submit your reclamation and closure plan every 2 years in Yukon. This is not the reclamation and closure plan that takes you into licensing. This is not as detailed as what is required in licensing. Goldcorp adds that if Goldcorp could put soil on the WRSF and be confident in the soil inventory available to commit to that, then Goldcorp would include that in the Reclamation and Closure Plan. This site is unique in that there's not a lot of soil at the site to begin with. This is not new information to TH; Kaminiak has been discussing this for years about the lack of soil and needing to put the soil in priority places. It is not for lack of interest in covering the WRSF, it is for lack of inventory. This isn't a result of Goldcorp not wanting to pay to cover the WRSF.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-343	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Reclamation	TH comments that having no soil for the WRSF set aside is a problem.	Goldcorp comments on the difficulty of sourcing soil: If it means borrow sites for soil, consider how Goldcorp is going to get soil and the options for that.			
3-A2-344	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Reclamation	<p>TH notes that this has been considered. TH's consultant states that based on their analysis, there should be more soil, noting that ice-rich soil is an uncertainty. TH's consultant notes that the vegetation information is strong, but reclamation research should include soil. TH understands that this is a conceptual plan, and that details aren't expected at this point. They want to understand gaps and propose research programs to close them.</p> <p>TH and Goldcorp discuss challenges with soil estimates and geotechnical stability issues.</p>	<p>Goldcorp requests a draft of report that TH has on assessment of soil availability and Goldcorp's conservative approach. TH notes its need to understand what is possible and arrive at a plan that is acceptable. Goldcorp states that if there is extra soil above what is required for the HLF reclamation, it will go to the WRSF. Goldcorp underscores that.</p> <p>The plan is not based on trying to avoid doing something; it's based on the current understanding of the limitations. Additional work is being done this summer on geotechnical components and soil.</p>			
3-A2-345	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Reclamation	TH comments that they have delivered their views, and want to be collaborative with this.	The Proponent agrees.	Set follow up meeting with TH regarding reclamation.	Goldcorp	Complete, teleconference held July 14.

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-346	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>TH's consultant describes the waterbodies in closure, and discussed options where there are no waterbodies. This would return the landscape and reduce the risk around long-term water quality. TH wants to have a big picture discussion of the implications of having many small waterbodies in closure. Goldcorp will need to discuss internally before being able to respond. Goldcorp notes that there's been discussions about what is being proposed for backfill and where Goldcorp stands on that. TH would like more concrete information on why Goldcorp can't backfill.</p>	<p>Q (Goldcorp): Asks to clarify for the pits, that TH wants Goldcorp to look at a concept where there wasn't a surface water expression? In this climate, there is a positive water balance so there will be a surface expression in any case. Goldcorp comments on backfilling, noting that they want to minimize the ex-pit waste, and to economically backfill.</p>			
3-A2-347	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>A (TH): (Comment) TH understands that there could be some additional backfilling without damaging the economics of the Project.</p>	<p>Goldcorp replies to TH's comment noting that this is correct, but there are some significant resources in these pits, and don't want to sterilize something in the future. There is a broader mineral reserve that has potential there, but we are not talking about those now. For the future, there is opportunity to engage in consultation for a permitting application.</p>			
3-A2-348	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>TH replies noting that they think there's more opportunity to optimize the backfilling. TH is interested in a closure concept that doesn't involve waterbodies. TH would like to see rationale for this.</p>	<p>Goldcorp explains that there is significant cost to move rock to a WRSF as compared to backfilling. At this point, Goldcorp is proposing as much backfill as possible for the Project, as Goldcorp does not want to condemn potential resources. When Goldcorp gets to a point in the future where the site is better defined, and potential and deeper resources are better understood at site, other options can be considered for waste rock. Goldcorp is open to further discussions with TH on this as the mine progresses.</p>			

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3-A2-351	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>Q: With the experience with the review process, does the due date adjust based on review period?</p>	<p>A: That would be in the approval letter from the regulatory bodies.</p>			



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3-A2-355	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Reclamation	<p>Goldcorp continues the presentation on general reclamation measures and practices. Discussion of soils and planning to use stockpiled materials. Still work to be done to define how much ice rich soil can be found on site vs the peat-type soil. Goldcorp discusses the reclamation research programs that are ongoing. Describes specific activities for closure at site, including closure of the stages of the HLF.</p> <p>Q: What about the raincoats covering the HLF long term and Goldcorp's experience with them?</p>	<p>A: A Geosynthetic Clay Liner (GCL) goes overtop for a long-term cover. Used in operation and can be used as well in closure, although the GCL is considered the main cover for the GCL. This is not the first time a heap in this climate has been capped this way.</p>			
3-A2-356	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Heap Leach	<p>Goldcorp describes closure of the HLF, including grading and channels for runoff and closure of the event ponds and rain water catchment pond. Discussion of the WRSF and stockpile closure targets. TH and Goldcorp discuss how the CRCP needs to have it built in that Goldcorp will cover the WRSF if possible. Goldcorp notes that the frozen soil stockpile is located conveniently by the WRSF to do this if possible. Water management at site and monitoring at site in post-closure is described.</p> <p>Q: TH asks if the upstream and downstream effects are going to be constricted to Yukon River and Coffee Creek?</p>	<p>A: The aquatic effects monitoring program hasn't been ironed out with details yet. Hope to have many years of data to compare at the site level. See it as a continuation of the baseline studies.</p>			
3-A2-357	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan                             <ul style="list-style-type: none"> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> </ul> </li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>Q: Asks about consideration for the upcoming Mine Licensing Improvement Initiative (MLII) work and how that might influence your closure plan?</p>	<p>A: Goldcorp knows the new guidelines are not set in stone yet, and the timeline isn't known, Goldcorp has had internal discussions about where we're meeting those requirements before they are implemented. Goldcorp can start building those commitments into the plans. There is a discussion regarding the potential class that would be applied under the draft guidelines. Goldcorp notes that many of the requirements, including audits, reviews, and design criteria, are all going to be incorporated anyways. The waste infrastructure management piece is definitely being considered by Goldcorp and the consultants for the Project. Today is meant to be the first of many discussions on closure.</p>			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-358	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan</li> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>VP of Reclamation Operations Business Unit presents on Goldcorp's experience with closure and reclamation. Goldcorp explains where the closure group fits into the mine life cycle and gives an overview of the mines that Goldcorp has that are currently in closure. Goldcorp gives an overview of the reclamation and closure planning standards and guidelines that Goldcorp follows to achieve a similar standard at each site across the Americas. Progressive reclamation is a big piece of ongoing development and research, and informs final closure planning. After acquiring many sites, Goldcorp looked to do things differently in terms of closure. Reclamation of a heap leach in Nevada is discussed. Some sites are close to communities, and closure of the site has led to sustainable business development, such as in Honduras. Goldcorp describes site closure in Mexico where there is no regulatory requirement to do so, and Goldcorp's first steps to reclaim the site by removing and revegetating site infrastructure. Marlin mine stopped production last week, and is a display of progressive reclamation.</p> <p>Q: TH asks about the standards that aren't jurisdictional that will be applied.</p>	<p>Goldcorp notes that some are broad, like chemical and physical stability. Physical stability means in the long term. Also have to work with the conditions at site, which will change between now and end of mine life. Goldcorp also notes that Yukon has the regulatory piece that requires these updates too, which is progressive.</p>			
3-A2-359	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan</li> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Closure	<p>TH revisits issue of backfilling and that TH thinks its corporate culture that Goldcorp doesn't want to backfill.</p>	<p>Goldcorp gives an example of Marlin mine, where it was never to be backfilled, but in mining realized it could be worked to be backfilled and now it is. For the Coffee Project, Goldcorp doesn't want to backfill something that we may want to potentially mine in the future. If the reality is that if we don't want to mine further in those pits, there's great financial incentive to backfill as it shortens haul distance. Many things tie into this, such as water quality.</p> <p>Goldcorp notes that there is a model to show what the pits would look like at \$2,000 gold price, suggests showing the block model first thing on June 6th to explain this more clearly. Goldcorp explains when and why the pits would potentially be mined further in a separate application. Goldcorp notes that the ore continues down, but the HLF becomes less efficient in extracting the gold. There are lots of things that tie into the mine that could allow it to grow or not. Goldcorp is so far away from making those decisions that we need to leave it open at this time and make decisions that allow for further mining if our information points to further mining. The cost of running haul trucks alone is reason itself to backfill, should that be determined to be the economical choice. Goldcorp notes that it's very typical that a proponent puts in updated mine plans, for example sequencing, as a licensing amendment. It's not unreasonable to expect that. Goldcorp notes that the next version of the Reclamation and Closure Plan is required to be quite detailed, and that TH could benefit from reviewing those requirements, determining closure objectives is key for the next steps.</p>			
3-A2-360	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics: Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management</li> </ol> <p>Reclamation and Closure</p> <ol style="list-style-type: none"> <li>1. Reclamation and Closure Overview</li> <li>2. Discussion of End Land Use Plan</li> <li>o Land capability studies (TH Presentation of Views)</li> <li>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</li> <li>o Reclamation Research.</li> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Regulatory Process	<p>Q: TH asks about future YESAB applications.</p>	<p>A: There are some positive results from exploration, and if that pans out then we will pursue another application if it looks feasible. Goldcorp notes that mine sites are dynamic, with constant change and improvement.</p>			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-361	05 June 2017	Meeting		TH	Consultation	<p>TH and the Proponent participate in a technical workshop to discuss the following topics:</p> <p>Northern Access Route</p> <ol style="list-style-type: none"> <li>1. TH presentation of views</li> <li>2. Review of Black Hills Route vs Maisy May Route</li> <li>3. Discuss NAR Management Reclamation and Closure</li> </ol> <p>1. Reclamation and Closure Overview</p> <p>2. Discussion of End Land Use Plan</p> <p>o Land capability studies (TH Presentation of Views)</p> <p>o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)</p> <p>o Reclamation Research.</p> <ol style="list-style-type: none"> <li>3. Define the need for cover materials at closure.</li> <li>4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.</li> <li>5. Need to consider permafrost melting in more detail (operation and closure).</li> <li>6. Social aspects of closure (training, workforce transition strategy).</li> </ol> <p>TH raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).</p> <p>TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The Reclamation and Closure Plan process in Yukon is described in detail by Goldcorp.</p>	Northern Access Route	TH and the Proponent discuss TH's presentation of views on the NAR and discuss next steps. TH will provide information on the NAR comparative analysis.		NAR comparative analysis sent to the Proponent.	TH	Complete June 13.
3-A2-363	05 June 2017	Email	Incoming	TH	Consultation	TH consultant from LGL contacted Goldcorp to notify them that they would not be attending the meeting scheduled for that day, but would call into the meeting scheduled for the next day (June 6).	Meeting					
3-A2-364	05 June 2017	Email	Incoming	TH	Consultation	TH consultant provided Goldcorp with the presentation that had been prepared for the meeting that day (June 5). Attachment: Mine Water Management and Closure	Meeting					
3-A2-365	05 June 2017	Email	Outgoing	TH		Goldcorp consultant provided meeting attendees for the June 5th NAR and Reclamation and Closure meeting with the slide decks and agenda from the meeting. Attachments: 1. Closure Overview 2. Agenda 3. Presentation	Meeting					
3-A2-366	05 June 2017	Email	Incoming	TH	Consultation	The lawyer for TH provided the identified approach and next steps for the NAR and Blackhills comparative analysis. 1. Concern regarding the absence of a comparative analysis between Route 1 and Route 2. 2. In comparison to the Maisy May route, baseline data are lacking or deficient for a number of considerations/VCS covered in the memo. 3. To address this concern, TH will prepare as quickly as possible (i.e. over the next several days) a proposal that will: a. Identify those VC's where TH is of the view that it has enough information to form an opinion as to preference between the 2 routes; b. Identify the subset of VC's deemed to be of greatest importance to TH and where the data/information gaps are so material that TH is not able to form an opinion as to preference between the 2 routes; c. Set out options/steps for addressing the data gaps in a timely and useful manner; d. Set out an approach for conducting a multiple accounts analysis that is sensitive to the importance (i.e., weighting) of a given VC and e. Seek to incorporate the output of point d (above) into a comprehensive MAA that addresses the full suite of considerations/VCS for the alternatives assessment.	First Nations Issues/Concerns					
3-A2-367	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water Management Plan/ water balance - resolving the conceptual model</li> <li>2. Water discharge</li> <li>3. Water quality predictions</li> <li>4. HLF water management and treatment - Operation</li> <li>5. HLD – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc.)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water quality objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs.</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions.</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River.</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on SSWQOs; it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Prior to initiating the original agenda, Goldcorp and TH agree to a discussion on the block model, which will provide insight into why Goldcorp proposed the pit backfill for this stage. Goldcorp explains the block model and the different oxidation facies for the Double-Double pit as an example. Goldcorp describes the meaning behind the colours for the ore, and explains how the ore is formed in the pits. Goldcorp explains how backfilling will condemn the ore and why it makes sense for Double-Double to backfill. Q: TH asks if Goldcorp is committing to the same backfill as Kaminak?	A: Yes, the Project Proposal includes the same backfill as Kaminak.			
3-A2-368	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water Management Plan/ water balance - resolving the conceptual model</li> <li>2. Water discharge</li> <li>3. Water quality predictions</li> <li>4. HLF water management and treatment - Operation</li> <li>5. HLD – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc.)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water quality objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs.</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions.</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River.</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on SSWQOs; it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: TH asks about transitional material being processed.	A: Goldcorp will only process that material if it has the value to be processed. Goldcorp explains the economics of where the value is of the ore depending on pit size and the gold price.			

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-369	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water Management Plan/ water balance - resolving the conceptual model</li> <li>2. Water discharge</li> <li>3. Water quality predictions</li> <li>4. HLF water management and treatment - Operation</li> <li>5. HLD – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc.)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water quality objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs.</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions.</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River.</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on SSWQOs; it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: TH asks about Latte vs. Supremo pit depth limitations.	A: Latte is all gold recovery, Supremo is all limited by gold price. Goldcorp is currently working through multiple lab tests, and in a few years Goldcorp will know what options are there to process the ore.			
3-A2-370	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water Management Plan/ water balance - resolving the conceptual model</li> <li>2. Water discharge</li> <li>3. Water quality predictions</li> <li>4. HLF water management and treatment - Operation</li> <li>5. HLD – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc.)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water quality objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs.</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions.</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River.</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on SSWQOs; it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>TH notes that as gold price increases, would like to see the effects. Goldcorp explains how the Project Proposal was done at a higher gold price. The limit for Goldcorp on this current assessment was the size of the HLF. Any further mining would trigger a new assessment through YESAB.</p> <p>Q: TH asks if it would be an expansion of the HLF?</p>	A: it is impossible to speculate, as there is no business case for this. Unless gold price goes well beyond current price, there's no way to know. Feasibility study mine is the best case scenario, and the Project Proposal is a higher gold price with more ore and more waste. Goldcorp has evaluated a larger mine than would be built under current gold price. This also accounts for the case where there could be more waste mixed with the ore, then that would allow for more to be stacked on the HLF as well.			
3-A2-371	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water Management Plan/ water balance - resolving the conceptual model</li> <li>2. Water discharge</li> <li>3. Water quality predictions</li> <li>4. HLF water management and treatment - Operation</li> <li>5. HLD – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc.)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water quality objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs.</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions.</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River.</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on SSWQOs; it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: TH asks what the process would be if Goldcorp determined to do more backfilling?	A: This would trigger an amendment to licensing. This is a re-assessment as well, as the effects must be included in the licensing amendment.			
3-A2-372	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water Management Plan/ water balance - resolving the conceptual model</li> <li>2. Water discharge</li> <li>3. Water quality predictions</li> <li>4. HLF water management and treatment - Operation</li> <li>5. HLD – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc.)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water quality objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs.</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions.</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River.</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on SSWQOs; it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: TH asks about the timeline for the metallurgy work that is being done.	A: Goldcorp has a metallurgy plan through to the end of the year for the metallurgical testing; will review results and plan accordingly.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-373	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>Goldcorp reviews the guiding principles for water management. SRK (hereafter Goldcorp) provides an overview of the water management infrastructure at the site. Goldcorp notes that the consideration is for the worst-case scenario, and that these catchments have been incorporated into the water balance models. Goldcorp reviews the summary of the flow design criteria, as well as the collection channels and drainage ditch design.</p> <p>Q: TH asks if it is designed to handle backup?</p>	A: There is backup; don't expect it to fill, but will see ponding.			
3-A2-374	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Q: TH asks would it backup more because of the ice or not being able to get through freshet? Is it backing up because it's frozen?</p>	A: A rock drain is like a culvert; it's designed for a 1-in-100-year flow with a safety factor of 2 to account for the potential of clogging. Discussion of rock drains backing up due to ice, freeze, and thaw seasonally and the rock drain's ability to handle freshet. It is a designed and engineered structure.			
3-A2-375	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Q: Asks if it is end dump or segregate material?</p>	A: Plan is end dumping, but there will be quality control of this.			
3-A2-376	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Q: Piping or sediments through the dump clogging the drain, filter plate?</p>	A: Freshet helps to keep sediment from clogging the rock drain. The safety factor accounts for that concept, as well as monitoring station.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-377	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Q: Permafrost impacts on the rock drain, as well as chemical precipitation and how this could clog the rock drain. What water is going through the rock drain? Is water being diverted around the rock drain? What flow will go through the rock drain?</p>	<p>A: Goldcorp notes that the slumping of the WRSF will be for a different person to answer. Water going through the rock drain is from the purple catchment (on the image). In terms of permafrost stability Goldcorp is undertaking a 2017 geotechnical drill program based on this WRSF design; part of the input from the 2016 program fed into this Alpha WRSF design. Final design of the rock drain will consider the stability assessment and thermal modelling, and will make sure that we're retaining rock drain functionality through operation into closure.</p>			
3-A2-378	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>Goldcorp continues to review the water management design, reviews the facility pond design criteria.</p> <p>Q: Asks if this is just for operation?</p>	<p>A: Yes, until water quality objectives are met.</p>			
3-A2-379	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Q: Asks if the facility pond reports to Latte?</p>	<p>A: Yes.</p>			
3-A2-380	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Alpha pond is sized to allow for 100-year freshet volume. Residence time in the pond is 12 days. It is 2 times the volume of a 100-year, 24-hour storm event</p> <p>Q: What is the operating quality of the water in the pond? Half full?</p>	<p>A: It's going to be pumped out 300L/s. In freshet it will fill; in summer will be much lower.</p>			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-381	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Asks how much control Goldcorp will have over the Alpha pond?	A: Goldcorp still expects the pond to fill at a certain rate in winter, and will manage the pond in freshet. Goldcorp will have an adaptive management plan to address some of those details, and still needs to work out details of how water is coming from the pond to the creek.			
3-A2-382	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Asks if the diversion channel reports to Alpha pond?	A: The diversion channel reports downstream. Explains briefly some of the water reporting at site.			
3-A2-383	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Asks about the diversion channel around WRSF; how is the diversion channel is established?	A: Describes road and diversion building for the site.			
3-A2-384	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>Lorax (hereafter Goldcorp) provides a review of the drainage area percentages that are covered by mine infrastructure.</p> <p>Q: Notes the second guiding principle – limit disturbance in Latte/Coffee Creek and YT-24 watersheds. Why?</p>	A: YT-24 has very high-quality water, even though it doesn't support life. Goldcorp reviewed options; there was almost no scenario where that water quality could remain as is, and Goldcorp couldn't put all of the waste in YT-24.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-385	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Asks if Goldcorp could divert some water from Alpha pond into YT-24?	A: Replies that this was not evaluated, but management of water from Alpha pond is going to be very expensive as is, and since the Alpha Pond is at a low elevation, Goldcorp will have to pump the water out of it.			
3-A2-386	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	TH notes that it comes down to the question of the rearing habitat for Chinook salmon and ways for mitigating effects on Halfway Creek.	Goldcorp notes that it's understanding where Goldcorp can best optimize where the waste goes. Goldcorp can look at some scenarios and assess the changes that result. Goldcorp discusses the catchments and water proportions from the site and the conceptual water management diagram. Water is being moved between drainages, but proportionally it is lower.			
3-A2-387	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Do flows increase in Halfway Creek as a result of the Project?	A: Yes, above baseline variability, but it's not drastic. Can be found in Appendix 12-A. 15% above baseline is the range of change.			
3-A2-388	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Goldcorp reviews conceptual water management at site. Q: Notes that all facility ponds would be diverted at all times to the HLF; is that consistent with Water Balance Model?	A: The base case is assuming that facility pond is diverted to the HLF.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-389	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Asks for pie graphs of the water and where it comes from on site.	A: Goldcorp can do this.	Goldcorp to provide pie graphs of water management.	Goldcorp	Complete September 28
3-A2-390	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	<p>Goldcorp describes how the HLF model has an allowance to put the liner out early and catch the early freshet. Goldcorp doesn't want to be using fresh water; want to use water from facility because it is close. Start-up water could come from Yukon River, but hope to come from site.</p> <p>Q: Asks if the facility pond excess to Latte creek flow is not in water quality model?</p>	A: No.			
3-A2-391	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Pit leakage isn't on the conceptual diagram.	A: Goldcorp replies that this is considered in the Project Proposal in Appendix 7-B and Appendix 7.			
3-A2-392	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Asks if there is another diagram with pit leakage?	A: Yes. Notes that the rates of pit leakage are quite low.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-393	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Goldcorp continues the presentation, notes that the model shows that treatment shouldn't be required after year 20, but that this is conceptual. TH notes that they have more questions about water management	Goldcorp and TH discuss water management as an ongoing topic of discussion; there will be additional water management meetings scheduled.			
3-A2-394	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Goldcorp continues presenting, noting that the WRSF has a fairly high infiltration coefficient. This varies from year to year. This has been incorporated into the model and carried through to post closure. Q: Asks if infiltration is 35%?	A: Replies that the average is 35% infiltration, but there is the variation in the report; the minimum is 21% and maximum is about 50%.			
3-A2-395	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Asks if the rest is assumed to be lost to evaporation?	A: Yes.			
3-A2-396	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Asks if passive treatment to Latte pit or to the Alpha pond?	A: The model shows that the water goes to the rock drain. Latte spilling to SU1 might be a holdover from a previous version of the model. In modelling it all goes to HLF or to the pond.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-397	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>Review of the water quality model and the conservative assumptions made. Lorax reviews the water balance model and water quality model in operation.</p> <p>Q: Asks if non-contact water is diverted around the WRSF?</p>	A: Some of it is assumed to make its way to the rock drain through another path. 20% infiltration is a conservative base case assumption.			
3-A2-398	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: What is the 20% for?	A: For non-contact water to the east of Latte pit.			
3-A2-399	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: How much non-contact water is going through the rock drain?	A: Approximately 5%.			
3-A2-400	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Is the diversion efficiency is 65%?	A: It is assumed that the water that is diverted is diverted 100%, but some water might go to the rock drain.			

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3-A2-401	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: What happens in the upper portion of Halfway Creek?	A: A non-contact area will report to the rock drain, the creek becomes the rock drain, and then the diversion will divert non-contact runoff around the WRSF.			
3-A2-402	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	Q: Is there an opportunity to divert more of Halfway Creek?	A: Discussion of diversion channels at site and the challenges with the topography in the area. Permafrost also plays a factor.			
3-A2-403	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Goldcorp reviews water balance and water quality model in closure, describes where the pits will spill, and the diversion around the WRSF remains. Lorax reviews the HLF water balance in operations. Q: What are you treating for in the passive treatment?	A: Replies discussing the guidance from the active treatment phase and the base case.			
3-A2-404	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Can you list COCs for passive treatment?	A: The source term for the passive treatment component for the base case and upper case is different from the water treatment plant. For HLF, it is the residual components, like nitrogen species due to internal natural degradation of cyanide. Nitrate is high on the list, and it is important that this parameter is eliminated. The next parameter is arsenic. There is arsenic in the ore, not naturally in the receiving environment, and is present in groundwater. The goal is to reduce pH in the system to bring arsenic levels down. This is addressed in the water treatment and in-situ treatment system. Uranium is also being watched closely, and will also be targeted biologically. Some parameters complex with cyanide, like copper, cadmium, and zinc. These are handled in our water treatment as well.			

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3-A2-406	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Elevated nitrate exists in operation through to post closure. It is blasting in operation, and HLF in closure?	A: There's a component from the WRSF that is maintained in operation, at the end of operation it is assumed to decay. Might see some contribution of nitrate that has made its way into Latte pit. Denitrification component of the water treatment is very effective.			
3-A2-407	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design	<p>Goldcorp reviews the Latte pit volumes of inflow and outflow through operation to closure. When the HLF is allowed to freely drain through the passive system or not, then the Latte pit fills. Goldcorp reviews the Alpha WRSF contact vs. non-contact hydrograph, describes the times of year and the proportions of precipitation, non-contact, and contact water.</p> <p>Q: Is this in the Alpha WRSF? Or the pond</p>	A: Explains that this is seepage coming from the WRSF. Just upstream of the Alpha pond. Details can be found in the report Figure 3-41. Goldcorp explains how the WRSF pond is included in the water quality model and water balance and the water quality model results for uranium, arsenic, and nitrates. Nitrate concentration is very steady in operation; decays in closure due to the source term being decommissioned. When the alpha pond is decommissioned, then you see the small spike.			
3-A2-408	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>Goldcorp continues to present on the water quality model results for the Coffee Creek and Latte Creek catchments.</p> <p>Q: Do you expect water quality above these sites to be relatively unchanged?</p>	A: There is an additive drainage; CC 1.5 and 3.5 are on Latte Creek, and CC 4.5 is on Coffee Creek. No other major tributary downstream from that.			

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3-A2-409	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: How long is the pumping period in the model? How long does it take to get to your base water level?	A: The reality is that we may not be pumping that high; it depends on the conditions in the environment.			
3-A2-410	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Is the high-flow period something you can control?	A: When we have water to get rid of, it will be when there's a lot of water in that watershed; Goldcorp will still have to look at total suspended solids (TSS). The last thing we want to do is be holding too much water on it due to the restrictions on our water licence.			
3-A2-411	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	First Nations Issues/Concerns	Source Environmental (referred to as TH here forward) begins the presentation. TH brings up the conceptual model, and notes that often the biggest fatal flaws in the water quality model (WQM) are related to the conceptual model. TH reviews the conceptual model from Coffee, noting some of the missing information. TH requests a thorough conversation about the conceptual model. TH discusses the Water Management Plan and its consistency with the water balance model; provides examples where it is unclear where flows are diverted to the HLF and upper Halfway Creek flow during post-closure. TH discusses if the water balance actually balances, and notes it is easy to make a mistake in GoldSim or for GoldSim to make a computational error, and this is a very complicated site. TH requests a simple table to show average flows or summation of flows (note: this is an IR from TH; Goldcorp has committed to addressing TH's IRs in December 2017 and January 2018. As such, this is not captured as an action item). Goldcorp and TH discuss sources of water and reporting locations at different phases in the Project; TH is looking to understand if there's an uncertain trigger or flow in the model as well. TH discusses the loading sources in the WQM, and is unsure if all loading sources are considered in the WBM.				
3-A2-412	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Asks if source terms of beta WRSF included in the water balance model (WBM)?	A: Goldcorp replies that the underdrain is a load base; concentration varies with the flows. Beta WRSF has a source term; notes that this needs to be clearer. This could be responded to in a wholesome way with an IR or detailed discussions.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-413	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>TH notes not being able to understand the concentrations of the different parameters from different sources; suggests pie charts for each parameter. Notes a step-wise approach; can look at the first one and provide comment.</p> <p>TH goes on to discuss the HLF, noting that the site-wide water balance is ongoing work.</p>	Goldcorp notes that the site-wide water balance is the next step of the Project.			
3-A2-414	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	<p>Q: How much water is recycled through the HLF, noting concern about accumulation of parameters such as arsenic?</p>	<p>A: Goldcorp replies iterating all of the studies performed to determine the parameters in the water around site. Goldcorp describes in detail the water quality of the barren solution being put onto the HLF, noting that the scale of the test as a limiting factor. Goldcorp thinks things have been captured, but would need the Mines Group to describe that better.</p>			
3-A2-415	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>Q: TH asks about the irrigation water from the run-of-mine (ROM) and Kona Pit; doesn't want this to have higher arsenic and other chemicals of potential concern (COPCs). TH is also interested in the proportion of total flow at the end of operation that is attributed to Kona Pit and ROM. TH discusses passive treatment and what the water quality would look like without passive treatment. TH also notes general questions, for example when treatment ends. Looking at the long-term source, and noting that there may be long-term water treatment; also noting the permeable reactive barrier is the long-term treatment option.</p>	<p>A: Goldcorp notes that once they get solutions from Coffee Creek they can better answer these questions.</p>			
3-A2-416	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	<p>TH understands the permeable reactive barrier is above ground, and doesn't understand maintaining anaerobic conditions. TH also wants to know what's being treated in passive treatment.</p>	<p>Goldcorp replies that they can summarize the assumptions for these, including case studies for the permeable reactive layer.</p>	<p>Goldcorp to prepare a memo responding to TH's questions about the HLF, HLF closure, and water treatment.</p>	Goldcorp	Complete September 28

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-417	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Inotech, Goldcorp consultant (hereafter Goldcorp) gives an overview of water treatment of heap leach solutions. Almost all HLF solutions will contain elevated nitrates and nitrites due to the cyanide complexes. Q: Asks about ammonia.	A: Ammonia is usually taken up by microbial cells as a building block and then converted to nitrates. Goldcorp provides a table of the HLF expected solution chemistry prior to rinse; discusses the options and the methods that will not work for HLF solution treatment at Coffee. Options for Coffee include rinsing with fresh and/or treated water and treating the HLF solution. An overview of the concentrations of the HLF chemistry after initial rinse is given. Goldcorp discusses the process of rinsing and treating the HLF and the HLF solution with combined chemical and biological processes. Goldcorp reviews how biological processes remove parameters that are not amenable to traditional chemical or pH adjustment treatment, and describes how the process includes microbes receiving electrons. Goldcorp describes how arsenic can be an electron receptor for some microbes, and that's how the electro-biochemical reactor technology.			
3-A2-418	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Q: Asks what goes on inside the treatment cell.	A: Electricity is provided inside to promote the microbial process. Selecting the microbes that are going to do the best at removing particular contaminants.			
3-A2-419	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Q: Asks about what the difference is to electro-coagulation.	A: Higher voltage and amperage. Similar to electro-plating.  Goldcorp explains that there is a carbon source in the bioreactor, and with the electricity it makes the biological processes much quicker; this is faster than providing more carbon source, which they would have to break down for energy. The electricity is the energy.			
3-A2-420	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Q: Asks about the reactor removing sulphate.	A: It does a very good job of removing sulphate.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-421	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Q: What if there's a nitrate and sulphate mix? Would the microbes use one preferentially?	A: Microbes use various contaminants in the process.			
3-A2-422	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Q: The system depends on the microbes, and asks how the effluent chemistry varies with the microbes?	A: The effluent is the same regardless of the microbe, but can vary depending on organic source (i.e., molasses).			
3-A2-423	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	Q: Asks about limitations of the bioreactor technology.	A: One is that we only understand a small portion of the microbial process; we understand in general and how to use it, but we only understand it to a certain point. This is true for all biological processes. TH and Goldcorp and their consultants discuss the effectiveness of this treatment in the Yukon climate. Goldcorp's consultant provides an example from the Wolverine mine where this was very successful; the microbes needed to be in a heated solution.			
3-A2-424	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach	TH's consultant notes that they have more questions about the bioreactor.	Goldcorp presents the water leach solution results from the column tests done for the Coffee Project. Notes that the results from room temperature can be extrapolated to 4 degrees Celsius for example.			



Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-425	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: What biosolids/byproducts from the process should TH be concerned about?	A: Replies that the TSS was 12 milligrams per litre (mg/L) from the Coffee tests. There's potential for mobilization of things like this. The other parameters in the effluent. Goldcorp wants to quantify the amount of uranium taken out of the process throughout the life of mine for TH. Byproducts would be encapsulated and buried. Goldcorp describes some case studies of the bioreactor technology.			
3-A2-426	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Lorax (hereafter Goldcorp) describes Uranium in aquatic environments to provide a background and reviews the baseline Uranium concentrations around the Coffee Project in the various catchments. Q: Asks about the data collection regime and if there is a good understanding of uranium at low flow conditions.	A: Part of the issue at HC 5 during winter time is you can't get water because it is frozen. The U signature is seen in areas where the water isn't frozen at low flow conditions.			
3-A2-427	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Is that 50% increase more toward freshet?	A: There's not much of a discharge during winter time. There's a high change because the flows are so low, and any discharge from HC 2.5 has several kilometres to travel.			
3-A2-428	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Goldcorp explains the seasonal uranium concentrations in the water around Coffee Project. The water quality objectives for specific catchments are described; YT-24 and Coffee Creek are CCME non-degradation objectives. SSWQOs are proposed for Halfway Creek and Latte Creek. Goldcorp reviews the toxicity testing work done for the Coffee Project. Goldcorp notes that the uranium levels are notably high in the areas that fish have been found around site. LGL (referred to as TH here forward) discusses the two water management goals that are used often. One is use protection is to make sure that the water quality stays below the WQOs; the other is non-degradation, and this uses a background-concentration procedure. LGL reviews the approach Goldcorp took to setting SSWQOs using the background concentration procedure (95th percentile) and the toxicity testing to validate these. TH runs through the concerns about this approach include not using seasonal variability.	Goldcorp notes that the British Columbia Ministry of Environment (BC MOE) approach was used, using the entire data set including low and high flow period. TH replies that there's the opportunity to bend the data to do the 95th percentile at low flow conditions and then use water quality guideline (WQG) at high flow. Concern is that it that the non-degradation approach was not adopted. TH describes that the approach allows degradation of water quality from baseline condition in Halfway Creek, which is Chinook rearing habitats. Also concern with altering the exposure scenario. TH is looking to understand how nitrates have been included in the WQM.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-429	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Have blasting and incorporating best management practices been included in the WQM?	A: No. Goldcorp describes the approach they took and how actual nitrogen concentrations were considered in the modelling.			
3-A2-430	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	TH notes the memo sent to Goldcorp with a preliminary list of COPCs to generate discussion.	Goldcorp notes that for nitrogen is driven by how attentive the blasters are. Goldcorp notes that there will be nitrogen coming from the WRSF and from the HLF.			
3-A2-431	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Q: Asks if the total metals concentration was used in developing SSWQOs, any predictions about how the dissolved data look seasonally?	A: In geochemical source terms were their own model. Field Bins, Kinetic Test, all dissolves driven. There is no difference between total and dissolved for uranium, because the rock isn't enriched in uranium. It has to do with the alkalinity of the rock. This has to look more at things like arsenic and other metals.			
3-A2-432	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	Comment (TH): Total copper is related to TSS load, and to look at dissolved fraction vs. total fraction.	Reply (Goldcorp): The model predicts dissolved fraction. The model is calibrated to total concentrations.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-433	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	TH notes that another concern is that when using the ameliorating factors should account for seasonal variability, concerns about sulphate exceeding the WQG in Halfway Creek. Also no discussion of cases where water quality exceeds objectives. TH runs through proposed SSWQO development methodology. TH and Goldcorp discuss the proposed approach by TH, discussing exceedances and allowances.	Goldcorp notes that similar to previous discussions with TH, if non-degradation is an absolute requirement for TH in Halfway Creek, this will not be possible for the mine. Goldcorp is committed to further engagement with TH on this topic to work toward a resolution on SSWQOs for the Project.			
3-A2-434	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	TH replies that an optimistic perspective hasn't been used to run the WQM.	Goldcorp notes that the worst case is the responsible way to do this. TH replies that it's about working it out together to understand if Halfway Creek can be a non-degradation point or learn that it can't be done. TH and Goldcorp want to do this together.			
3-A2-435	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality	TH discusses the main concerns about SSWQOs and working together on SSWQOs through a workplan. TH highlights a collaborative approach and working out the methods through which to develop SSWQOs.	Goldcorp agrees at a fundamental level, noting that the first step in classification Goldcorp and TH may not arrive at the same conclusion. Goldcorp and TH are on the same page when it comes to validating SSWQOs; need to look at the goals for SSWQOs for certain areas. Goldcorp would view Halfway as a use-protection guidance. TH counsel suggests putting the dollar amount on the table and then working on it from there. Goldcorp notes that the suggestions to put waste in YT-24 and or water into YT-24 has geotechnical challenges and costs associated. TH wants to have that discussion.	Further water quality and site specific water quality objective discussions	Goldcorp and TH	Ongoing, commitment to ongoing engagement
3-A2-436	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design			Permafrost and Groundwater discussion	Goldcorp	Ongoing, commitment to ongoing engagement

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-437	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Project Design			Additional review of permafrost degradation related to mine activities, groundwater for TH	Goldcorp	Ongoing, commitment to ongoing engagement
3-A2-438	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach			Provide information on HLF inflow vs outflow	Goldcorp	In progress
3-A2-439	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach			Quantify solids produced by water treatment of the HLF	Goldcorp	In progress
3-A2-440	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Heap Leach			Pie graphs of the water contributing and amount of water going to the HLF.	Goldcorp	Complete September 28

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-441	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality			Conceptual diagram of pit leakage	Goldcorp	Complete September 28
3-A2-442	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality			Label approximate water quality station numbers on conceptual diagram	Goldcorp	Complete September 28
3-A2-443	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality			Include pit lakes water quality in WQ Model update	Goldcorp	Ongoing, water quality model update is underway.
3-A2-444	06 June 2017	Meeting		TH	Consultation	<p>Water Management – Operations and Closure</p> <ol style="list-style-type: none"> <li>1. Water management plan/ water balance - resolving the conceptual model</li> <li>2. Water Discharge</li> <li>3. Water Quality Predictions</li> <li>4. Heap Leach facility water management and treatment - Operations</li> <li>5. Heap Leach facility – Closure and Passive treatment plans</li> <li>6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)</li> <li>7. Time permitting: Groundwater modelling and permafrost</li> </ol> <p>Water Quality Objectives</p> <ol style="list-style-type: none"> <li>1. Discuss issues related to the proposed SSWQOs</li> <li>2. Discuss issues related to the effects assessment/water quality modelling predictions</li> <li>3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River</li> <li>4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.</li> </ol> <p>Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.</p> <p>Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.</p> <p>TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.</p>	Water Quality			Discussion of water quality model by facility	Goldcorp	Ongoing, commitment to ongoing engagement



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-445	06 June 2017	Meeting		TH	Consultation	Water Management – Operations and Closure 1. Water management plan/ water balance - resolving the conceptual model 2. Water Discharge 3. Water Quality Predictions 4. Heap Leach facility water management and treatment - Operations 5. Heap Leach facility – Closure and Passive treatment plans 6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc) 7. Time permitting: Groundwater modelling and permafrost Water Quality Objectives 1. Discuss issues related to the proposed SSWQOs 2. Discuss issues related to the effects assessment/water quality modelling predictions 3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River 4. Development of a work plan for deriving SSWQOs consistent with the principles and methods. Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions. Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings. TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.	Water Quality			Table of summation of average flows	Goldcorp	In progress.
3-A2-446	06 June 2017	Email	Incoming	TH	Consultation	TH consultant contacted Goldcorp to ask a question regarding the presentation logistics and work out presentation order (for that day June 6). Goldcorp accommodated timing request.	Meeting					
3-A2-447	06 June 2017	Email	Incoming	TH	Consultation	TH consultant provided Goldcorp with presentation slides regarding site specific water quality objectives for the presentation taking place that day (June 6). Attachment Power Point presentation - Development of SSWQOs for the Coffee Gold Project	Meeting					
3-A2-448	06 June 2017	Email	Incoming	TH	Consultation	TH consultant provided Goldcorp with the presentation slides for water management for the presentation that day (June 6). Attachment Power Point presentation - Mine Water Management. Second version with change was provided shortly after.	Meeting					
3-A2-449	06 June 2017	Email	Incoming	TH	Consultation	TH consultant thanked Goldcorp for the meeting - noted gained understanding of the Project, and requested any noted action items	Meeting					
3-A2-450	06 June 2017	Email	Outgoing	TH	Consultation	Goldcorp provided meeting attendees with meeting agenda and slide decks for the meeting scheduled that day - technical session - NAR and Reclamation and Closure.	Meeting					
3-A2-451	06 June 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided meeting materials from TH technical sessions on June 5 and 6 via Open Text Core.	Meeting					
3-A2-452	08 June 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided TH with an updated flyer, with added water quality topic. Attachment: Dawson Community Meeting and Dinner flyer (For June 19 2017)	Meeting					
3-A2-453	09 June 2017	Meeting		TH	Consultation	Follow-up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from the Electrochemical Bio Reactor EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Introductions. TH's consultant notes that TH is very interested in the HLF long-term passive treatment and that there might be a gap in information there. Goldcorp notes that one of the action items from the past two days of meetings; Lorax is pulling together a memo, and the group can also do a follow-up group session if preferred. TH's consultant would like to do a follow-up session to the memo, and Lorax replies that it will take a few weeks to do a proper job of the memo. Goldcorp notes that they might be able to provide a PowerPoint in the interim.		HLF active and semi-active treatment information memo	Goldcorp	Complete, provided September 28
3-A2-454	09 June 2017	Meeting		TH	Consultation	Follow-up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	TH's consultant discusses the permeable reactive barrier is the proposed long-term passive treatment and the way to move away from the EBR, and that there is documentation in the summary about this; wondering if there's any more information anywhere. Goldcorp replies that the EBR is a contingency method, it's not seen as long term. The EBR is to deal with the uncertainty, it's to have as double-protection, and is a tool in the toolkit of closure, but Goldcorp is not relying on treatment long term.	Lorax agrees; describes the uncertainties involved in the closure of the HLF and that they wanted an additional mechanism for treatment to address uncertainty. Progressive reclamation of the HLF provides the opportunity to learn and hone the closure processes for the Project. Goldcorp notes that it might be important to put it in the context of the in-situ treatment, and lists the questions from TH's consultant regarding incoming chemistry and outgoing chemistry of the effluent as part of the upcoming memo. TH's consultant notes that they have some challenges with the information described, wants consistency with what's in the model and what is contingency. TH's geochemistry consultant notes that it's not modelled as a contingency, it's in the Water Quality Model.			
3-A2-455	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design		A: It's built into the southern portion of the pit, 6 million tonnes. Goldcorp reviews the source term approach summary, reviewing the testing done to determine the information presented in the Project Proposal.			
3-A2-456	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Did you consider a flushing term?	A: There is not a flushing term in the WQM.			
3-A2-457	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Should there be? Referring to backfill in a sub-aqueous environment.	A: There could be, there could be a flushing load, but this is considered relatively minor compared to sub-aerial loads. This could be incorporated.			
3-A2-458	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Asks about potentially acid-generating (PAG) rock?	A: It's just the granite that is in-situ is PAG. Kona ore is 20% of the pit wall at final build-out.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-459	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Goldcorp notes the Alpha dump underdrain is a source term as well. The underdrain is much more thoroughly flushed, so we assume 100% flushing of the surface area. A single source term is used for the Alpha WRSF underdrain. This is incorporated but not significant. Q: Will that drain loading change as more water is passed through the drain?	A: Currently, it is assumed that 100% of the underdrain is completely flushed by the sub-surface flow.	Clarify source term for the Alpha WRSF	Goldcorp	Complete, information provided and discussed September 28 and 29.
3-A2-460	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Does that just mean during flushing season?	A: The load is proportional to flow; it is a constant concentration.			
3-A2-461	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	TH's consultant requests a breakdown of flows and loads. This request will be submitted as an IR.	Goldcorp continues review of the solubility controls for the Project, discussing arsenic and uranium. Goldcorp discusses the background information on uranium solubility at the site. Goldcorp reviews the site water quality showing the relationship between uranium and alkalinity and how this was used to determine the solubility of uranium at site. Goldcorp reviews arsenic solubility at site and the studies conducted to determine this.			
3-A2-462	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: TH consultant notes that the calculations are conservative, and that this is good, goes on to discuss the trend relating solid content to drainage is dominated by the ore. Wants to know if the same holds true for waste rock. Also wants to know, because arsenic concentration varies, how the arsenic concentration was selected?	A: Replies describing the humidity cell studies, and how the arsenic concentration would start off high and then drop off and stay stable regardless of pH levels; generally look at higher range of arsenic produced.			
3-A2-463	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Were constraints applied to waste rock?	A: Believes that it is a conservative approach. There is not a lot of variability in the arsenic to iron ratio; you see higher arsenic to iron samples. The difference between ore and waste rock is the amount of gold.			
3-A2-464	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Assuming that the material in the field bins isn't very weathered?	A: Yes.			
3-A2-465	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Were post-kinetic tests done to look at this?	A: Yes, don't think enough arsenic has been released to be detectible. 10-30 micrograms per litre of arsenic coming out			
3-A2-466	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Secondary mineral constraint in fresh rock – did you get the same trend as in total arsenic?	A: No, the calculation has to be arsenic over iron, as that's what differentiates schist over gneiss, but it has much lower concentrations because of more iron content in schist. If this was a sulphide deposit, weathered samples would be different from fresh, but because its oxide here, that's not the case. This is why we see such a trend here.			
3-A2-467	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Asks about uranium solubility.	A: Explains relationship between barium and uranium in rock samples. Secular equilibrium is achieved after 10 million years; uranium comes into equilibrium with daughter products (radioactive decay), so one can use relative concentrations of radium to barium, assuming that they're released in similar concentrations, and assuming they decay in a similar manner. Based on the ratio, one looks at barite solubility and radium solubility. Barium solubility is compared to barium to radium in rock samples, and produces a radium concentration; radium by barite concentration comparison.			
3-A2-468	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Notes using solid content ratio as an estimator for drainage chemistry, asks if Goldcorp was unable to use drainage chemistry.	A: Concentrations were too low to rely on. Explains using field bin samples and the limitations there.			
3-A2-469	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: What is the impact of the solubility constraint, just using uranium? How much are we reducing concentrations by? Notes that this is a question that will be submitted as an IR.	A: Goldcorp will answer later in an IR.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-470	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Did Goldcorp use the columns, or superseded by passive source term?	A: Superseded by passive source term.			
3-A2-471	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: What is the passive source term determined by?	A: Based on literature review of field scale operations of those facilities. Some parameters aren't explicitly covered in performance monitoring data, so for that Goldcorp used an estimate of source term chemistry from the HLF prior to a passive treatment system. There are no explicit values in the literature for this, notes the primary species like nitrates. There is a lot of literature looking at influent and effluent chemistry, and they range. There is a range of values for what the end chemistry could be. Generally speaking, most permeable reactive barrier (PRB) literature used had influent values that are much higher than what the Project has. Goldcorp didn't do percent removal, but can go back and look at the data and do that.			
3-A2-472	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: For PRB suggested, were anaerobic conditions present?	A: Yes.			
3-A2-473	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Notes that TH has heard that it will be a wetland. How deep does the contaminated water travel in the ground?	A: Goldcorp proposes converting the effluent ponds into that system; the water would be directed to the bottom of the facility, and the materials would be a mixture of organics with the zero valent iron to promote the anaerobic condition if the system is to address nitrogen species and arsenic.			
3-A2-474	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Asks if uranium and arsenic levels were lower than literature values.	A: Yes. Some uranium values are in systems that have significant uranium contamination, on the parts per million (ppm) levels.			
3-A2-475	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Do most of these literature studies related to typical groundwater plumes?	A: Yes.			
3-A2-476	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Are there examples where it's more constructed? Surface water being put into groundwater conditions?	A: Goldcorp replies and summarizes some examples.			
3-A2-477	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Asks about the ponds.	A: There are the event ponds, which are finished at the end of operation, so if necessary one or two can be covered to use in this type of system			
3-A2-478	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Is this what was modelled?	A: Yes			
3-A2-479	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	closure	Q: Sludge doesn't seem to be considered very much. There's going to be two settlement ponds and the treatment. Is it going to be shipped off site? Not clear what's going to be happening with it?	A: Asks if TH's consultant is referring to the EBR sludge.			
3-A2-480	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	closure	Q: Notes that the question is about the EBR and the settling pond sludge, then asks about the frozen stockpiles having different geochemistry.	A: Replies with examples of how sludge can be dealt with, including shipping it offsite. Replies that in the WQM it is assumed that the overburden stockpile (frozen) would have the same as background, there will be TSS, but not in terms of a geochemical source term.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-481	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Notes that they can have different geochemistry, then notes that the dams in the Water Management Plan note ROM material being used to create the dam; asks if this is the case. If this is the case, are there source terms for runoff from dams, or show that load is minimal?	A: The ROM would not be used for dams, and the source term for dam runoff is not considered at this time. Need to follow up with Tom Sharp's group, thought they were using locally sourced material for the dam.  Goldcorp confirms that TH's consultant is referring to the embankment, and then describes that the Alpha and facility ponds will likely be constructed from waste rock, but Goldcorp is doing more test work to ensure that the materials proposed will be adequate. Currently, it is seen that the waste rock from Supremo Pit, so gneiss rock, will be used.			
3-A2-482	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Is there a source term or load from the Alpha and facility ponds, even if it's minimal?	A: Goldcorp replies that they will discuss internally and answer.	Goldcorp to investigate	Goldcorp	Complete, information provided and discussed September 28 and 29.
3-A2-483	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Are source terms being developed but not incorporated into the WQM? Like stockpiles?	A: Replies that for the facility pond, thinking an estimate of the chemistry was carried forward (will confirm) into HLF as makeup water. The Beta dump is captured in the model as backfill of Kona. Didn't include pre-backfill, as it is a temporary WRSF because Goldcorp modelled the largest mine footprint at the end of the mine.			
3-A2-484	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	studies	Q: Is this a flushing term, not an oxidization controlled term?	A: This is a mine closure water quality model, so the operation source terms have been stripped out and ore stockpile has been stripped out. The previous source term and WQM for ore stockpile was done based on scaling up of the field bin data.			
3-A2-485	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Heap Leach	Q: How much water is recycled through the HLF? How much water comes from Kona? TH's consultant is considering all of the makeup water from these sources, and thinking about the arsenic, and how this looks at the end of operation. Also, why is Kona not backfilled in year 4?	A: Goldcorp needs to synthesize the HLF water balance and site-wide water balance before answering this question. Discusses makeup water onsite. Goldcorp discusses the kinetics of the reactions to occur following mining, over the timeline between mining and backfilling. Goldcorp explains the considerations between 3 months vs. 5 years for acid generation; since the ore is immediately acid-generating, you won't prevent the development of acidic conditions with immediate backfilling.			
3-A2-486	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Where does water from Kona pit go?	A: It goes back to the HLF. It's used in HLF makeup water.			
3-A2-487	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: And acidic water is ok there?	A: The heap is balanced with lime to maintain the pH of 10 at the HLF constantly for the operation of the HLF. As we add that lime to maintain the pH, it's being used in a closed loop. Goldcorp describes what the water chemistry is going to look like in terms of acidity and water chemistry, noting that when the water is sitting at pH of 4.5, acidity is low, sulphate is low. The in-situ sulphur content is at trace levels, not a traditional PAG rock. Kona ore columns are the highest in arsenic, and Goldcorp thinks this is due to low pH in this material. Neutralizing that wouldn't solve the arsenic problem.			
3-A2-488	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: TH's consultant notes the arsenic might be an argument for backfilling Kona earlier.	A: Goldcorp replies that at the volumes of water Goldcorp is proposing, this is relatively small compared to total makeup. The arsenic in the overall system, due to pH of HLF, is going to be 1-2 ppm anyway. Goldcorp describes the ratios of the ore from Kona and water from Kona and the effects to arsenic.			
3-A2-489	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Is the proportion of Kona water going to increase every year?	A: The volume of Kona water compared to other makeup water is a small percentage. The recycling piece has been addressed in the metallurgical test work, as Goldcorp leached that water in a cycle and the resulting chemistry is not a single path of water through that system. These are not typical solutions due to the amount of lime they add to the solution to ensure that there is no cyanide volatilization. Goldcorp notes that all 28-24 trucks will be used to backfill Kona in the year it is currently planned, and this will take 40-60 days of full-time fleet dedication. If Goldcorp were to divert trucks earlier, it would take two years to backfill. It's a large scale of operation consideration to backfill Kona earlier.			
3-A2-490	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Is the bottom of Kona defined?	A: Discusses the block model shown to TH on Tuesday. Discusses limitation based on sulphide, there is not a lot of prospect to make Kona deeper.			
3-A2-491	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Notes that source terms based on concentration applied to load, but they're back calculated based on flow. Asks about backfill source term.	A: Discussion of source terms and the backfill sequencing. Supremo North and South are separated. The causeway to access Supremo north is the reason for the backfill, and there is an elevation drop between pits Supremo North and Supremo South. The transfer of water from Supremo North to South flows through the backfill, and was characterized as a rock drain. It's been factored in as part of the backfill source term.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-492	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Will this impact loading?	A: It's captured in the backfill source term.			
3-A2-493	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: What about clogs in the rock drain?	A: Goldcorp has not done work to model precipitate clogging the rock drain. That usually happens when acidic infiltration through the dump gets neutralized by the flow through the rock drain, and Goldcorp doesn't anticipate change of pH of water through the rock drain, as it will be a dilution. This isn't expected to be an environment where precipitates accumulate.			
3-A2-494	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Information Sharing	Q: Notes solubility constraints, wondering how reasonable it is to constrain to field bin concentration, notes wanting to quantify copper and antimony? Notes that this can be an IR.	A: Goldcorp notes the potential IR from TH on this, and the IR response will provide that information, and then it can be discussed in the broader group.			
3-A2-495	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Water Quality	Q: Notes that the 2016 pit walls used in model; wondering if this changes with 2017 pit walls, and if model will be updated?	A: Yes, the model will be updated, but updates to the model need to be done with respect to integration of the HLF model. If there is additional geochemical information that can fine-tune those terms, don't think the terms will change too much. As part of the overall integration, Goldcorp will update all aspects of the model.			
3-A2-496	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: WRSF and Overburden Management Plan: when will ML/ARD Management Plan be available?	A: This is required for WUL and QML. The previous approach to the YESAB Project Proposal was to co-submit the YESAB Project Proposal with QML and WUL submissions, so the content was going to straddle all applications. This ML/ARD Management Plan will be prepared for QML and WUL submission. Goldcorp further explains the attempt to a harmonized submission process previously, noting that now the process is back to the regular way of doing the application. The reference in the document sounds like a hold-over from early document development. Will develop this management plan moving forward, but not available for PP.			
3-A2-497	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: For WRSF, you use criteria of 60 milligrams per tonne of arsenic; why? In Waste Rock and Overburden Management Plan.	A: Need to check this number.	Check this number	Goldcorp	Ongoing.
3-A2-498	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Asks about ore placement plan on HLF, noting the current plan is to exclude granite from bottom 10 m, and 10 m below final elevation. Asks if considerations for mixing occurred.	A: Goldcorp did consider mixing, but the plan for handling that material is to ensure it is encapsulated and won't have any detrimental effects at closure.			
3-A2-499	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Could Goldcorp blend material as well to prevent localized acid rock drainage (ARD)?	A: Goldcorp did talk about that, but Mark Smith determined that based on previous closure attempts at other facilities, there would be higher success with encapsulation rather than blending. No metallurgical reason to not do that, but this was considered a better way of ensuring long-term chemical stability. Once mixed with lime and neutralized, there's no sulphide mineralization associated with it; will remain stable.			
3-A2-500	09 June 2017	Meeting		TH	Consultation	Follow up from May 25 meeting to review geochemistry topics. Key interests include: Handling of sludge from EBR and Alpha and Facility ponds. Arsenic accumulation due to Kona and other sourced makeup water being cycled on the HLF. Detailed discussion of the geochemical source terms for the Project, considerations for source terms associated with specific infrastructure, such as the Alpha pond. Continued from June 5 and 6 meetings - TH's consultants interest in HLF passive treatment (Lorax to prepare a memo).	Project Design	Q: Will the sulphides be depleted over time?	A: Goldcorp didn't do those calculations, as they are skeptical of those calculations. TH agrees with Goldcorp with respect to the calculations on sulphide depletion.			
3-A2-501	09 June 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided re-sent Geochemistry meeting information to TH (for meeting scheduled that day - June 9) due to concerns that the previous powerpoint file may not have gone through due to size.	Meeting					
3-A2-502	09 June 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided TH with the presentation from the call meeting on geochemistry that occurred that day. Attachment: Geochemistry call presentation	Meeting					
3-A2-503	09 June 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to notify them that Goldcorp would not be responding to a message receiving from Yukon News, noting that would be taking the same position they had previously for other requests regarding other articles published public info through the YESAB process - statements should be aligned and a joint effort. Noted that TH should reach out with any questions. TH responded in agreement and noted they were looking forward to "setting the record straight", and suggested a joint news release with Goldcorp. Goldcorp noted agreement for that approach.	Information Sharing					
3-A2-505	12 June 2017	Email	Incoming	TH	Consultation	Goldcorp was cc'd on email between TH consultants to organize a date for a phone meeting to discuss the Project and reclamation plan. On June 11 TH consultant then contacted Goldcorp consultant directly noting that June 23 was available for a meeting to discuss the Coffee Gold Reclamation and Closure Plan. also inquired if there were any questions Goldcorp could provide in advance of the meeting. On June 12 Goldcorp consultant responded to TH noting they would confirm June 23 with the rest of the team. They also noted that any questions, objectives and agenda items would come directly from TH.	Meeting					
3-A2-508	12 June 2017	Email	Outgoing	TH	Consultation	Goldcorp emailed TH to confirm meetings scheduled for June 13 and 14 in Whitehorse. Attachments: 1. Negotiations Meeting Draft Agenda 2. Project Engagement Meeting Agenda	Meeting					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-511	12 June 2017	Email	Outgoing	TH	Relationship Building	Goldcorp contacted TH to notify them Goldcorp was sponsoring the North American Indigenous Games, and inquired if any TH citizens were participating.	Information Sharing					
3-A2-512	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Contracting and Procurement	Goldcorp provided a project update. TH asked if there are options to extend the EPC beyond two years of construction. Goldcorp responded that it is not in the current draft of the contract. Employees hired will be JDS employees during construction; they would then be let go at the end of the contract and re-hired by Goldcorp. TH noted that they don't know JDS and feel there will need to be more discussion on JDS moving forward. They don't know what the values of JDS are or what their reputation is.	Goldcorp noted that JDS is a contractor of Goldcorp and they will have to work to Goldcorp's values and standards. Anything they do with respect to policies and procedures will have to follow Goldcorp's procedures and guidance.			
3-A2-513	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	TH, Yukon Government (YG), and Goldcorp met a few weeks ago and discussed the necessity of having a group meeting to discuss the road. A meeting date has been proposed (June 22nd) as YG and Goldcorp will be in Dawson. In attendance will be the Assistant Deputy Minister for Highways and Public Works, Allan Nixon, John Bailey Deputy Minister for Energy Mines and Resources, and Brian MacDonald, Deputy Minister Aboriginal Relations.				
3-A2-514	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	None of the direct TH/Goldcorp discussions on the road need to stop, but it is felt that now is the time to bring YG into the equation as well. TH noted that road to resource royalty application is what they are working with YG on at the moment. Goldcorp's does not want to engage in that discussion if possible and only discuss the NAR.				
3-A2-515	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	TH brought up the three potential options for management, does Goldcorp have a preference? Goldcorp doesn't want to manage the road. TH asked if the road options have been discussed with YG?	Goldcorp noted that yes that conversation has happened, and YG agrees that Goldcorp management is not the preferred option. Goldcorp will control the barges, but that is all.			
3-A2-516	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	The road memo last week addresses TH's current views and concerns around the assessment of the two routes.	Goldcorp reaffirmed the fact that Black Hills is extremely difficult technically and it would be a challenge for Goldcorp to make that work in not only construction but also operationally.	Schedule site tour/ground tour of the NAR	Goldcorp	Completed on August 23 and 25.
3-A2-517	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Consultation	Goldcorp asked for technical meeting feedback. TH noted that the workshops help provide understanding. There has been mixed feedback in terms of responding to IRs and that information may still be missing. TH noted that it was mentioned at the last workshop that feedback on ways to improve them could be addressed. TH mentioned that there has been a lot of talking at each other, mainly because TH needed to learn more about the information at the workshop. TH said we are at a point where we can begin engaging and moving forward collaboratively on key issues of concern.	Goldcorp suggested that there has been lots of good discussion in regards to water. A position needs to be provided on what can and can't be further engaged on. Goldcorp doesn't want the consultants to have all the discussions, they need to have Goldcorp and TH at the table as well as in the end that is where the relationship sits. Outstanding workshops include heap leach, permafrost, and site design. Goldcorp and TH need to have a collaborative workshop on all things considered in regards to waste and water onsite. TH wants to set objectives for the technical sessions so that they are less of an information exchange and more of a plan for a work product of each meeting. Management Plan and VCs still require discussion as well.	Goldcorp to provide an outline of technical discussions for coming months to TH.	Goldcorp	Completed on July 31.
3-A2-518	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Water Quality	TH asked what the Plan B is if the water treatment approach isn't viable and is it scalable to deal with heap and waste water.	Goldcorp noted that during operation it would work but it may not in closure.			
3-A2-519	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Contracting and Procurement	TH provided information about the advisory committee meeting that took place last week. Pad building RFP was awarded to a Chief Isaac Inc. partner Back Country Resources. The next RFP will be for a drilling contract. Goldcorp would like to know who else should be sitting on the committee.		TH to put names forward for the Advisory Committee.	TH	Ongoing
3-A2-520	13 June 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Consultation	TH and Goldcorp discuss consultation with TH citizens.				
3-A2-522	13 June 2017	Email	Incoming	TH	Consultation	TH contacted Goldcorp to confirm if the only summary of the passive treatment in the YESAB submission was in Appendix 12. Noted further working being done on passive treatment and inquired if there would be further information on the passive treatment proposed at a conceptual level in terms of depth below ground, and size of the system. Asked if this could be demonstrated in terms of site feasibility. Requested a call if possible	Project Design					
3-A2-524	14 June 2017	Email	Incoming	TH	Consultation	TH consultant provided Goldcorp with availability date of June 23 for meeting to discuss reclamation and closure. Goldcorp noted dates and would confirm with rest of team; later confirmed that June 23 would not work, and suggested June 29 or 30. TH consultant noted June 30 would work. Additional TH consultant noted 30th did not work - On June 14 Goldcorp suggested July 10 for a teleconference. TH then suggested July 14th.	Meeting					
3-A2-525	14 June 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant sent the meeting invite for the scheduled meeting regarding reclamation and closure. Noted that the proposed agenda items from TH would follow.	Meeting					
3-A2-528	14 June 2017	Email	Outgoing	TH	Consultation	Goldcorp provided TH with site tour agenda. Attachment: Tour Agenda	Site Tour					
3-A2-536	16 June 2017	Email	Incoming	TH	Consultation	TH consultant provided Goldcorp with a copy of the proposal to conduct a multiple criteria decision analysis regarding the Maisy May and Blackhill routes. Attachment: Excel workbook. Goldcorp responded in order to set up a call to discuss. On June 15, Goldcorp suggested June 22 or June 29 for the call meeting, TH consultant inquired if the site tour and open house had been cancelled. Goldcorp responded that there was no change for the tour or open house. On June 16 TH consultant confirmed June 22 for call meeting.	Project Design					
3-A2-538	19 June 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH on June 9 regarding the site tour scheduled for June 20, and logistics related to the tour. On June 15, TH responded with questions regarding the tour logistics (set downs, schedule, transportation). June 16, Goldcorp responded to TH questions. June 19 was further discussion regarding having 2 helicopters, and the stops that would be made at the site.	Site Tour					
3-A2-540	19 June 2017	Email	Outgoing	TH	Consultation	Goldcorp consultant provided teleconference details for June 22 meeting on the NAR proposal received June 13.	Meeting					
3-A2-541	20 June 2017	Site Visit		TH	Consultation	Site tour of current Coffee Camp, proposed pits and infrastructure, and HLF location, as well as a flyover of Halfway Creek and a stop at the confluence of Halfway and Yukon River.	Project Design					
3-A2-542	20 June 2017	Community Meeting		TH	Consultation	Citizens dinner and open house was attended by 16 people. Posters displayed throughout the venue included Project Overview, Northern Access Route, Heap Leach Construction, Heap Leach Operations, and Water Quality. The Project and NAR were discussed generally, and a re-cap of the site tour that day was provided.	Project Design					
3-A2-550	22 June 2017	Meeting		TH	Consultation	Objective for the call was to discuss the information sent by TH to Goldcorp on Maisy May vs. Black Hills. LGL (hereafter TH) gave an overview of the reason behind the review of the analysis, used a method used by the federal government (multiple accounts analysis).	Northern Access Route	Goldcorp will be adding a few pieces under the engineering and road safety to capture this consideration more clearly.				
3-A2-551	22 June 2017	Meeting		TH	Consultation	Objective for the call is to discuss the information sent by TH to Goldcorp on Maisy May vs. Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the federal government (multiple accounts analysis).	Northern Access Route	Goldcorp has feedback to provide, and will look to discuss internally the information gaps and what can be done about them. Then looking at the product at the end of the analysis. TH explains that TH didn't expect a workshop, looking for information and perhaps a call.				
3-A2-552	22 June 2017	Meeting		TH	Consultation	Objective for the call is to discuss the information sent by TH to Goldcorp on Maisy May vs Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the Federal Government (multiple accounts analysis).	Northern Access Route	Goldcorp asks about the categories, rating the categories rather than the sub-accounts, noting that rating the categories might make it more effective. TH replies that the indicators likely won't stay where there's overlap. This is to get an idea of what TH's interests are, so some might drop off due to overlap, some might drop off due to lack of information.				
3-A2-553	22 June 2017	Meeting		TH	Consultation	Objective for the call is to discuss the information sent by TH to Goldcorp on Maisy May vs Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the Federal Government (multiple accounts analysis).	Northern Access Route	Goldcorp asks about the differences between the routes; TH replies that column E that informs this.				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-554	22 June 2017	Meeting		TH	Consultation	Objective for the call is to discuss the information sent by TH to Goldcorp on Maysy May vs Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the Federal Government (multiple accounts analysis).	Northern Access Route	LGL did not budget for this work, this isn't something LGL knew they were going to be doing for TH; it is something that has come up.				
3-A2-555	22 June 2017	Meeting		TH	Consultation	Objective for the call is to discuss the information sent by TH to Goldcorp on Maysy May vs Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the Federal Government (multiple accounts analysis).	Northern Access Route	TH is looking for the total package of impacts and comparative analysis, and then look at what the information points to in terms of route.	The quality of information may not be ideal, but can probably come up with an approximation for the indicators TH is interested in. Goldcorp doesn't have a lot of capacity if something requires field studies. Goldcorp wants something robust that TH feels comfortable with, but want to be transparent on that. TH replies that if the results come back so divergent, then lack of information on one account won't sway the decision the other way.			
3-A2-556	22 June 2017	Meeting		TH	Consultation	Objective for the call is to discuss the information sent by TH to Goldcorp on Maysy May vs Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the Federal Government (multiple accounts analysis).	Northern Access Route	TH notes that if Goldcorp needs information, ask TH. TH notes that coming up with the scale for scoring the indicators, might need some discussion.		Next Steps: Goldcorp to provide a draft of the information to TH, then set up a call to discuss. Goldcorp looks at this as concluding the NAR route at the end of this discussion on this analysis. James to prepare a memo on the safety and engineering pieces, then internally Goldcorp will review the other aspects of the indicators listed by TH. Goldcorp will get back to TH shortly with a timeline.	Goldcorp	Complete August 16.
3-A2-565	28 June 2017	Email	Outgoing	TH	Consultation	June 26 Goldcorp contacted TH consultant regarding a follow up item from presentation that took place June 5 regarding estimates for available soil and related calculations - requested document that captured this. On June 27 TH consultant responded requesting further clarification as to which numbers were in question. On June 28 Goldcorp provided further clarification noting - On June 5th, the presentation on eco hydrologic and end-land-use mapping via teleconference to the group (Tr'ondëk Hwëch'in and Goldcorp), analysis of the soil available for closure at the Coffee Project site was discussed. During the meeting, Goldcorp asked for the report and/or summary of the numbers that TH crunched to arrive at a different number than what is presented in the Project Proposal - this was an action item, as this will be helpful information for the teleconference on July 14.	Meeting					
3-A2-566	28 June 2017	Email	Outgoing	TH	Consultation	June 26 Goldcorp contacted TH to provide a photo that was taken during the site tour, and requested if it could be used in the next news letter. Attachments: Photo and Release Form. TH responded that they would send the permissions form around.	Site Tour					
3-A2-569	01 July 2017	Email	Outgoing	TH	Consultation	A compressed folder containing six handouts regarding heap leach processes that were previously provided to TH during the Feb. 9 2016 open house meeting were sent. Attachments: 1. Cold climate heap leaching 2. Electrical leak location technologies 3. Geomembrane raincoat liners in the mining heap leach industry 4. Design considerations for impounding valley leach pads vs. conventional 5. Best practices for groundwater protection 6. evaluation of operational strategies for heap leaching of gold ores under sub-zero temperatures	EA					
3-A2-570	04 July 2017	Email	Outgoing	TH	Consultation	Goldcorp provided the permit application for the planned 2017 Heritage Resource Impact Assessment (HRIA) for the Northern Access Route. Noted that the application includes description of how TH will be involved with the assessment. Attachment: HRIA Permit Application	Heritage					
3-A2-572	04 July 2017	Email	Outgoing	TH	Consultation	Goldcorp sent TH the application for the 2017 HRIA for the NAR. The assessment is focused on three areas, including: areas of higher resource potential following the 2017 LiDAR assessment, previously documented heritage resources that were not revisited in the 2016 HRIA and areas noted by YG staff requiring further investigation. Goldcorp noted that the application also outlines how TH will be involved in the assessment, and that it will be submitted by their consultants at Ecofor. TH heritage staff will be copied when the application is submitted. Goldcorp sent an additional message to introduce TH to Goldcorp's consultants at Ecofor who will be conducting the heritage work along the NAR. Ecofor will start field work on August 12. Ecofor will keep TH in the loop as they move forward, Goldcorp will also have four environmental monitors supporting the work. Goldcorp offered to have the monitors send TH a report of the work when it's complete if that is of interest to TH. Attachment: Coffee Gold Project NAR AOPs and Workplan	Heritage					
3-A2-580	07 July 2017	Email	Outgoing	TH	Engagement	Goldcorp contacted TH to inquire if they had 1 or 2 aid attendants who would be interested in working at the drill rig for the 4th week of July.	Economic					
3-A2-583	10 July 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH with suggested dates for upcoming technical meetings (on heap leach and permafrost), including the tour of the Northern Access Route.	Meeting					
3-A2-584	10 July 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to suggest dates for technical meetings, including a tour of the NAR. Northern Access Route Tour: August 23 or 24 or 25th or September 11 or 15th Heap Leach Technical Session: September 12 or 13th or 14th (alternative day to NAR tour) Permafrost and Water Follow up Technical Session: Week of September 26 or 27th or 29th.	Meeting					
3-A2-585	10 July 2017	Email	Outgoing	TH	Consultation	Goldcorp suggested dates for follow up technical meetings with TH regarding Northern Access Route Tour, Heap Leach, and Permafrost and Water. Goldcorp reaches out twice more with no reply from TH.	Consultation					
3-A2-587	11 July 2017	Email	Outgoing	TH	Consultation	Goldcorp provided a Word version of the requested TH and Goldcorp Joint Letter to YESAB. Attachment: Word version of TH and Goldcorp Joint Letter	Information Sharing					
3-A2-588	11 July 2017	Email	Outgoing	TH	Consultation	June 26 Goldcorp contacted TH representative regarding a follow-up meeting from the June 5 presentation. The follow up item was regarding calculations and estimates regarding available soil. July 11 TH requested a change in the time for a call scheduled July 14, at which this information would be discussed.	Meeting					
3-A2-594	13 July 2017	Email	Incoming	TH	Consultation	June 11 TH provided Goldcorp with potential meeting dates to discuss the Coffee Gold Reclamation and Closure Plan. June 12 Goldcorp noted potential meeting dates and discussed meeting objectives and agenda. June 13-14 Further discussion of meeting dates and working to resolve reclamation issues. Meeting set for July 14. Note from TH to discuss the alpha waste rock cover at closure and comments in written submission to YESAB	Meeting					



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-595	13 July 2017	Email	Outgoing	TH	Consultation	June 14 Goldcorp provided meeting invite for July 14 and proposed agenda for Reclamation and Closure related meeting. July 13 Goldcorp sent TH materials needing for the meeting scheduled for July 14. Attachments: 1. Clarifying Questions 2. Technical memo - SEA Review of Project Proposal	Meeting					
3-A2-596	13 July 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to thank them for the quick response to YESAB, and to follow up on previously suggested meeting dates of July 27 or 28. Noted that water management and waste rock were the two topics of interest for the next session, also, if they were able to review the dates provided, and send any comments.	Meeting					
3-A2-597	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Closure	Goldcorp discusses the Reclamation and Closure plan and the need to add more information regarding soil available for closure. Goldcorp has reviewed the data, and there may be more soil available for cover than originally reported in Feasibility Study. The Reclamation and Closure Plan will be updated to better capture how Goldcorp is doing what they can to characterize soil and volumes available, as well as what can be done to generate more soil cover. Goldcorp will be investigating characteristics of the soil cover, such as infiltration information, through detailed design. The Reclamation and Closure Plan iterations will say more about cover of the WRSF and what Goldcorp is trying to achieve; more details will be available through detailed design and the licensing process.				
3-A2-598	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Reclamation	Lorax (hereafter Goldcorp) notes that there is additional geotechnical work being done currently at site, and part of that will look closely at overburden volumes that could be available as part of the pre-stripping program. All soil cannot be salvaged from disturbed areas, as some soil must be left as a buffer to prevent permafrost degradation, and Goldcorp's teams are currently investigating this in further detail. There will be an update on those soil volumes available in the short-term. The numbers currently do not include the availability of the frozen soil stockpile material, and that is an area to look at for additional material as well. These uncertainties are flagged in the Reclamation and Closure Plan. The frozen soil stockpile is recognized, and the capacity of the frozen soil stockpile can potentially accept additional organic matter such as peat potentially. Goldcorp's consultant adds that section 5 of the appendix to the Reclamation and Closure Plan (Appendix 31-C-A) discusses doing further work to analyze the potential for using the frozen soil. As things progress with the Project, reclamation research, and geotechnical program, Goldcorp will get a better sense of the availability of soil as the Project progresses.	Goldcorp will update TH when the results of the current geotechnical program become available (approx. December 2017).	Goldcorp	Ongoing	
3-A2-599	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Reclamation	TH rep presents views on soil quality and quantity based on information presented by Goldcorp: - Notes that Goldcorp may want to consider that soil developed in situ is better quality than waste material, don't bother characterizing compared to waste material, unless you're planning to have 90% coarse fragment. - Notes that they understand that Goldcorp is using the best information available for soil calculations, but they believe that the numbers can be more optimistic. TH rep acknowledges that Goldcorp is working to improve that. - TH's team has questions around end land use planning and doing hydro-ecological mapping, meaning incorporating what TH and others want the site to look like at the end of the Project to source reclamation materials needed to meet these objectives.  TH reps' responses to Goldcorp's considerations: - Notes that it sounds like Goldcorp is working on this and that engaging Justin is the first step. This is a good opportunity for community engagement and what TH's end land use objectives are, and getting a plan for that engagement	Goldcorp's considerations: - Goldcorp has engaged (Name Redacted) on the topic of hydro-ecological mapping/modelling. - (Name Redacted) followed up recently with Justin, and has spoken to SRK about engaging (Name Redacted) in their work. - Goldcorp is open to something related to the topics presented by TH's consultants, but Goldcorp wants to ensure that whatever study is done is fit for purpose, and is not in a position today to say what the study should be. - Goldcorp needs to consider end land use objectives and confirm what these are before performing long term planning. - Goldcorp is open to advancing that area of planning in collaboration with TH, and Goldcorp wants to make sure that what is done fits the site needs short term and long term. - Goldcorp doesn't mean to be non-committal during this meeting, but wants to know what is needed and ensure that anything that is done suits the needs of the Project.			
3-A2-600	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Reclamation	Goldcorp notes that work on vegetation started with Kaminak, and this previous work in collaboration with Yukon College ties in nicely with the views TH's reps raised in the meeting. Engagement on land use objectives is the next step. Goldcorp's consultant notes that some of the views raised in the technical memo from TH to YESAB regarding the Project Proposal can be part of this.				
3-A2-601	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Closure	TH's reps present views: - TH rep agrees that developing prescriptions requires input from the studies being done, but notes that engagement and end land use objectives inform those studies that need to be done. End land use planning needs to be developed at this time, it is critical. - TH rep would like to see a better closure plan moving forward. - TH rep notes that the TH farm would possibly be able to be used from TH's perspective in closure - TH rep asks when Goldcorp will know about being able to cover the Alpha WRSF in closure - TH rep notes that it would be important for TH to see reclamation in a positive context, as the current perspective TH has on reclamation is of placer mining reclamation, and this is not a positive outlook for TH - Next steps for TH are discussing a group within TH that could communicate this future closure engagement to a larger group within TH	Goldcorp considers and responds to TH's rep's views: - Goldcorp replies that they want to see the next iterations of the Closure Plan include more engagement with Tr'ondëk Hwëch'in. Goldcorp will be engaging with TH on how they want this engagement to move forward. - Related to covering the Alpha WRSF, Goldcorp is looking at this now, it appears that some cover will be available. There will be geotechnical information this fall that can help determine this a bit more. Goldcorp is looking at this in detail, and the commitment is to use the soil that Goldcorp currently knows we have, but the details aren't known now. Goldcorp will know more soil characteristics and volumes at the end of the year. Goldcorp commits to updating TH on the information from the current geotechnical program at the end of 2017. - To help TH understand reclamation in Yukon, Goldcorp is considering bringing TH to the Brewery Creek mine to look at areas of success related to reclamation. There is active reclamation at Minto being done right now on the WRSF. - Goldcorp wants TH integrated in the closure discussion, and will put this forward in an engagement proposal. To date, there has been a set technical group, but if there are others from government and community then Goldcorp is open to that.			
3-A2-602	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Consultation	Goldcorp and TH rep discuss ongoing consultation meetings and Goldcorp's plan for further technical engagement that will be proposed to TH shortly. Goldcorp updates TH rep on the progress of the responses to TH's comments on the Project Proposal, Goldcorp is working on the responses currently.				
3-A2-603	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Closure	TH's reps present views on the Reclamation and Closure Plan: - TH rep asks about the uncertainty on overburden balance and asks when this will be resolved. - TH rep wants to know when TH would see a revised closure plan.	Goldcorp considers and responds to TH's rep's views presented: - Goldcorp is working on determining the overburden balance, it will take approx. 4 months in the near term, depends on drilling results. Goldcorp will have to do analysis once the information is received. - Goldcorp will work with TH on updating the reclamation and closure plan. Goldcorp hasn't started revisiting the costing for reclamation and closure, so there is some internal planning to do on the closure plan prior to engagement with TH on the update.			
3-A2-604	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Regulatory Process	Goldcorp explains the discontinuation of the adequacy review of the Project. This is to allow for further consultation.				
3-A2-605	14 July 2017	Meeting		TH	Consultation	Objective of the meeting representative adds that (Name Redacted) discussions from closure session on June 5. TH wanted GC and TH reps to discuss closure further today.	Consultation	TH rep notes that after the positive experiences with the site visit and community mee (Name Redacted) to take a collaborative approach. TH wants to include (Name Redacted) and move forward in a collaborative way. Goldcorp a termine next steps in engagement.				



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-606	14 July 2017	Meeting		TH	Consultation	Objective of the meeting is discussions from closure session on June 5. TH representative adds that (Name Redacted) wanted GC and TH reps to discuss closure further today.	Information Sharing	Goldcorp's consultant notes a transcription error within the open pit areas, for example there's a line missing – Kona was 30.3 HA, that should've been Latte pit, however the header numbers in bold are correct and the areas for the categories are correct. 358 Ha is the area to be reclaimed, will re-issue the table so that calculations people do can be accurate. The table is total disturbance over life of mine.				
3-A2-607	14 July 2017	Meeting		TH	Consultation	Objective of the meeting is discussions from closure session on June 5. TH representative adds that (Name Redacted) wanted GC and TH reps to discuss closure further today.	Information Sharing	TH asks if there's a compatible map with the disturbance areas, Goldcorp replies that this is in the Reclamation and Closure Plan and are tied to figures 2.11, 2.12, 2.13. TH requests a new table and map that is annotated with disturbance areas.	Goldcorp agrees.	Goldcorp will provide a closure map that is annotated with disturbance areas.	Goldcorp	Complete, provided October 17
3-A2-614	21 July 2017	Email	Incoming	TH	Consultation	TH sent Goldcorp the agenda for the July Negotiation Meeting. Goldcorp forwarded the agenda internally. Attachment: TH Goldcorp Negotiation Meeting Agenda July 25 2017 Conference Call Draft	Meeting					
3-A2-615	21 July 2017	Email	Incoming	TH	Consultation	TH asked Goldcorp to give them a call with regard to July 25 meeting. Goldcorp replied that there would not be anyone available to meet face to face the following week so a teleconference would take place and Goldcorp would send details once TH sends the agenda	Meeting					
3-A2-616	21 July 2017	Email	Incoming	TH	Consultation	TH forwarded Goldcorp the agenda for the July meeting. Goldcorp replied that they thought the meeting was taking place on the 24 of July rather than the 25 and asked if it would be possible to hold the meeting that day instead	Meeting					
3-A2-621	25 July 2017	Email	Incoming	TH	Engagement	Ecofor forwarded TH a job posting for a Heritage Technician to be distributed within the TH community. Ecofor did not have field work dates yet but were anticipating two more projects to be done in August. Ecofor also wanted to check in about TH students to see whether or not they might be interested in more work with Ecofor, and when they would be finished. Attachment: 2017-024 Arch Tech-Trondek FN	Education and Training					
3-A2-623	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Regulatory Process	TH begins the meeting, asks about the update on Coffee re-submission and what Goldcorp will need to do to get to those next steps. TH is meeting with YESAB today regarding next steps on the Coffee Project. TH hopes the steps forward are smoother than before, TH doesn't see this as a big wall to get through.				
3-A2-624	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	First Nations Issues/Concerns	TH provides summary of recent meeting with SFN regarding Coffee Project and concerns SFN raised regarding the Klaza Caribou herd				
3-A2-625	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	First Nations Issues/Concerns	Goldcorp asks if TH has talked to NND; TH has not had any discussions with NND, as NND did not send any comments on the Project to YESAB. Goldcorp notes that YESAB's letter was clear that Goldcorp needs to engage with NND. TH replies that NND is respecting that NND doesn't use any of that area [referring to the northern part of the NAR in the area of overlap between NND and TH traditional territories], TH will think about NND engagement and discuss internally, and will get back to Goldcorp about this. TH talked to NND some time ago, and NND has a lot of things to deal with in their own traditional territory, and they don't need to add more to their plates. TH states that the NAR isn't used by NND citizens. It is used by TH citizens and mining companies.				
3-A2-626	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	First Nations Issues/Concerns	Goldcorp provides an update on the progress on the re-submission, Goldcorp feels that it will take a few months to get to a good position with SFN and NND in engagement for the Project. Goldcorp has been reaching out consistently to both Nations for engagement, and needs to hear more back from SFN to keep engagement going. There have been a few meetings with NND. Goldcorp highlights that any support from TH in this engagement with SFN and NND is appreciated. YESAB has been clear that Goldcorp's attempts and meetings so far have not been enough with neither SFN nor NND.  TH will have further discussion internally about this and will see how TH can provide advice or be involved in engagement with the other First Nations for the Project.				
3-A2-627	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Consultation	TH looks forward to further technical workshops on waste management and water management. Goldcorp agrees, sees follow up and engagement on water management, closure and reclamation of the Waste Rock Storage Facility (WRSF), and the ongoing NAR discussion	Goldcorp hopes to have the Maisy May vs Black Hills information to TH early next week. Goldcorp notes that water management includes water quality discussions, and will also look to schedule a Heap Leach Facility (HLF) session as well.			
3-A2-628	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Consultation	TH wanted to reconnect on next steps. TH agrees that water quality and water management and Site Specific Water Quality Objectives, HLF and reclamation, and the NAR comparative analysis are key topics for engagement from TH's perspective. TH notes that they think that YESAB's letter was interesting and made statements on consultation, but didn't say much more				
3-A2-629	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Regulatory Process	TH asks where things were left between Goldcorp and YESAB, asks if more technical information is needed as well, or if it was just a consultation matter for Goldcorp to overcome for resubmission.	Goldcorp explains that it has to do with consultation. Goldcorp needs to get the consultation done and re-submit. There was no indication that any additional technical work needed to be done from YESAB. Goldcorp is meeting with YESAB later this week to understand more about what the re-submission will look like. The re-submission will have to show that adequate consultation has taken place and show where any changes in the proposal have taken place.			
3-A2-630	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Regulatory Process	TH asks if YESAB gave any criteria or a checklist for consultation.	Goldcorp explains that the initial conversation with YESAB was quite brief, and the meeting later this week will hopefully give Goldcorp more clarity. YESAB's letter to Goldcorp referenced s. 50(3) and the letters from SFN and TH as guidance for Goldcorp in closing the gaps in consultation. Goldcorp will hear what YESAB has to say about Goldcorp's plan to move forward in coming months with consultation.			
3-A2-631	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Regulatory Process	Goldcorp doesn't want to submit something that won't get through the YESAB process. Goldcorp wants to take the time to get it right, currently Goldcorp sees the end of November for re-submission. Goldcorp acknowledges that this is pretty heavy engagement over the next few months				
3-A2-632	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Consultation	TH confirms that Goldcorp is not looking to re-submit the whole proposal, unless something came up in consultation that required changes to the Proposal. Goldcorp confirms this.		ACTION: TH will provide feedback to Goldcorp next week regarding consultation and re-submission.	TH	Complete
3-A2-633	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	Goldcorp notes a road and a site tour may be the end of August. Goldcorp will send the NAR analysis to TH next week. Goldcorp and TH confirm August 22nd as the date for the road/site tour. TH has to check with their technical team before confirming.				
3-A2-634	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Water Quality	Goldcorp suggests a water session on September 12 in Whitehorse, TH confirms September 12th works for the session.				
3-A2-635	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Project Design	Goldcorp proposes a WRSF and mine design session on September 26 in Whitehorse. TH asks if the 26 is on the HLF and closure as well, Goldcorp can look into this. TH and Goldcorp confirm that September 28th is the date for this technical session.				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-636	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Closure	Goldcorp proposes October 17 for a closure workshop and October 31 for socio-ec, but as dates are confirmed can work on the details of the topics. TH confirms that October 17th works for a closure workshop.				
3-A2-637	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Meeting	Goldcorp notes that these technical workshops can also be opportunities for TH and Goldcorp to discuss Goldcorp's responses to TH's IRs provided.				
3-A2-638	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Northern Access Route	Goldcorp and TH can discuss the NAR review during the road tour, and can look to schedule a NAR discussion on September 12 if needed and depending on TH's feedback on the information provided by Goldcorp in the NAR analysis.				
3-A2-639	25 July 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH.	Meeting	TH wants to reconnect with Goldcorp after both parties meet with YESAB. Meeting at 9 am on Friday to debrief.		ACTION: Goldcorp will send a meeting invite for Friday, July 28 at 9:00 am	Goldcorp	Complete
3-A2-640	27 July 2017	Email	Outgoing	TH	Consultation	Goldcorp forwarded CSR Schedule calendar to TH. Attachment: Goldcorp CSR Schedule_Calendar View_July27_FOR TH	Consultation					
3-A2-644	31 July 2017	Email	Incoming	TH	Consultation	TH had a chance to discuss with their technical team regarding availability and have developed a schedule. AUG 24 - Access road options analysis review (alternative is week of SEPT 11-15) AUG 25 - tour of NAR SEPT 28 & 29 - Water quality objectives, water management, waste rock management facility (week of SEPT 12 not available for TH techs) OCT 17 - closure and reclamation OCT 31 - socio/ec and health. TH had also requested a copy of Goldcorp's workplan for the summer. Goldcorp replied and asked to confirm dates and locations for negotiations as well. AUG 29 and 30 - Vancouver at Fasken Office, SEPT 13 - Whitehorse, might move to Vancouver (Goldcorp will advise), SEPT 29 - was supposed to be negotiations but TH had asked that this be Water WS so will move to SEPT 27 in Whitehorse?, OCT 17 and 18 in Whitehorse. Goldcorp asks that TH confirm these dates so that Goldcorp can send out invites and arrange accordingly. TH replies that the negotiation schedule looks good, but asked if it would be possible for some TH people would like to go on the NAR tour on the 22 or 23 and others on the 25. With this exception, the negotiation dates can be left on the calendar unless something arises. Goldcorp replied to let TH know that they are working on planning and will advise accordingly.	Consultation					
3-A2-647	01 August 2017	Email	Incoming	TH	Consultation	Ecofor contacted YG to double check that they had seen the link to the Coffee Creek project information and 60 planned areas of potential as well as logic behind the AOP selection. Ecofor asked whether YG thinks the AOP targeted along the NAR are sufficient when combined with other areas that were previously recommended for revisiting, and whether or not they're adequate with any other AOP's seen in the field.	Heritage					
3-A2-655	07 August 2017	Email	Outgoing	TH	Consultation	Goldcorp contacted TH to let them know that Tetra Tech would be conducting dust monitoring data collection along the NAR in August in order to ensure understanding of baseline dust conditions. Dust monitoring stands and buckets will be placed in four locations approximately 3-5 m off the proposed NAR and will be removed in the Fall. Proposed locations for dust stands have been attached. Additionally, Goldcorp noted that they have continued to build baseline data with remote wildlife cameras. Attachment: NAR_Dust_Stands	Studies					
3-A2-662	10 August 2017	Email	Outgoing	TH	Consultation	Goldcorp's wildlife consultant emails TH to ask TH representatives on a site tour of the NAR to search for a mineral lick in the lower Maysy May valley that TH has described previously. Goldcorp's consultants have been unable to find this reported mineral lick to date, and ask TH for their help. Goldcorp's consultant suggests August 24th. TH's representative suggests an alternate attendee, on August 18th. Goldcorp's consultant confirms doing a site visit to find the mineral lick on August 24th.	Wildlife					
3-A2-673	16 August 2017	Email	Outgoing	TH	Consultation	Goldcorp provides TH the MCDA analysis complete with Goldcorp's input and an additional memo outlining Goldcorp's methodology and additional information. Goldcorp notes the teleconference on August 24th to review the information provided. Attachments: Maysy May Black Hills MCDA excel, 170816 GC NAR MCDA Memo V3 PDF	Northern Access Route					
3-A2-674	16 August 2017	Email	Incoming	TH	Consultation	TH and Goldcorp determine a time for the August 24th teleconference to discuss the MCDA for the NAR.	Northern Access Route					
3-A2-679	22 August 2017	Email	Incoming	TH	Consultation	TH informs Goldcorp that the August 26 and 27 TH General Assembly is now postponed. Goldcorp was scheduled to present on August 27.	Meeting					
3-A2-681	23 August 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the agenda for the NAR MCDA results teleconference.	Northern Access Route					
3-A2-682	23 August 2017	Site Tour		TH	Consultation	Tour of the Northern Access Route by air and by vehicle with TH Chief, Government representatives, and a Councillor. Stop at YG maintained portion of Hunker, stop north of Black Hills, stop at Maysy May, fly to Stewart River, landing point on banks of river near proposed barge crossing and fly-over of Black Hills section that is of interest to TH.	Northern Access Route					
3-A2-684	24 August 2017	Meeting		TH	Consultation	Teleconference to review the findings and results of the Northern Access Route Multiple Criteria Decision Analysis (MCDA) as requested by TH.	Northern Access Route	Goldcorp gives an overview of methodology used – used methodology suggested by TH (environment Canada guidelines). This allows one to evaluate different value systems. Goldcorp discusses decisions regarding why some indicators were carried forward and some were not. Analysis is described, wetlands analysis is used as an example as work done specifically for this MCDA. The wetlands analysis was done using LIDAR data				
3-A2-685	24 August 2017	Meeting		TH	Consultation	Teleconference to review the findings and results of the Northern Access Route Multiple Criteria Decision Analysis (MCDA) as requested by TH.	Northern Access Route	TH asks if Goldcorp looked at relative size of wetland, and asks if was a 50 m buffer of the road or from the ROW?	Goldcorp will need their wildlife expert to answer these questions. TH notes that its not a critical question.			
3-A2-686	24 August 2017	Meeting		TH	Consultation	Teleconference to review the findings and results of the Northern Access Route Multiple Criteria Decision Analysis (MCDA) as requested by TH.	Northern Access Route	Goldcorp reviews the analysis done by TH, and explains that these are the indicators carried forward. Highlighted weightings are those that Goldcorp added, and estimated TH's weighting. TH is welcome to edit these as desired. Goldcorp reviews the TH analysis, including the three sensitivity analyses. All result in Maysy May scoring more highly.				
3-A2-687	24 August 2017	Meeting		TH	Consultation	Teleconference to review the findings and results of the Northern Access Route Multiple Criteria Decision Analysis (MCDA) as requested by TH.	Northern Access Route	Goldcorp reviews the Goldcorp weightings and analysis, and the same result occurs, where Maysy May is the preferred option.				
3-A2-688	24 August 2017	Meeting		TH	Consultation	Teleconference to review the findings and results of the Northern Access Route Multiple Criteria Decision Analysis (MCDA) as requested by TH.	Northern Access Route	TH provides some high-level comments: 1. TH appreciates the work that Goldcorp has done here. The methodology was performed consistent with TH's expectations, and the delay in receiving the spreadsheet from Goldcorp doesn't appear to have any effects. 2. TH appreciates being able to use the spreadsheet and test the results. It is clear that Maysy May is the preferred option, and it is clear that the information is robust. 3. Pending this information and outcomes of the site tour, the result is clear. 4. The transparency and quantified approach is what TH needed to help people understand the implications of each route and move ahead in an informed way. 5. Based on results, doesn't see the need to change some of the sub-accounts. 6. Some technical questions about interpretations, looking at indicators that didn't get carried forward, but in looking at and toggling the weightings, don't think that will change the outcome of the analysis. 7. Sees some need for additional mitigation work.	Goldcorp: 1. Notes that this was a good exercise for the team to go through, thanks TH for the template. 2. Next steps: is there a desire to take this away and discuss further with TH? Or is this the final stage of this analysis. Goldcorp would like some kind of feedback from TH acknowledging this outcome.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-689	24 August 2017	Meeting		TH	Consultation	Teleconference to review the findings and results of the Northern Access Route Multiple Criteria Decision Analysis (MCDA) as requested by TH.	Northern Access Route	Following the site tour, LGL (TH's consultant present on the call) will put together a memo to TH describing conclusions of the MCDA, results of site visit, and recommendations for best steps forward. This will include that Goldcorp would like some feedback on the outcomes of this process, and get that back to Goldcorp. TH identified this as an item that needed further attention, it has received the further attention, and would like to close the loop. The NAR investigation is considered complete by TH's technical advisors.				
3-A2-691	25 August 2017	Site Tour		TH	Consultation	Tour of the Northern Access Route by air and by vehicle with TH technical advisors. Stop at YG maintained portion of Hunker, stop north of Black Hills, stop at Maisy May, fly to Stewart River, landing point on banks of river near proposed barge crossing and fly-over of Black Hills section that is of interest to TH.	Northern Access Route					
3-A2-698	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Information Sharing	TH asked when the full results of drilling will be available.	Goldcorp noted that the mineral reserves and mineral resources report company wide is made public in September every year.			
3-A2-699	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Information Sharing	TH asked if anyone has been contacted in regards to the 100 person camp.	Goldcorp requested the TH Business registry.			
3-A2-700	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Information Sharing	TH asked if there was a plan design for the camp.	Goldcorp noted that there isn't, it would depend on the funding available for the camp items.			
3-A2-701	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Consultation	A Technical Engagement Status and Planning document was shared amongst the group. TH asked what the purpose of the document was	Goldcorp noted that we were asked at the last meeting to prepare this document to walk through the upcoming engagement plans. Mine Design would take place in first quarter 2018. The heap leach workshop may be broken up and discussed in the site design and the water workshops.	TH would like to add human health to the socio-ec workshop and to the technical engagement document; TH would like an electronic copy of the engagement document.	Goldcorp	Complete - see October 31 meeting on Socio-economic and Health. Goldcorp added Health to the engagement document and sent it to TH on August 31.
3-A2-702	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Regulatory Process	TH and Goldcorp discuss the status of pre-submission consultation with TH. Goldcorp hopes that TH and Goldcorp can communicate to YESAB in a joint letter or in individual letters that pre-submission consultation is complete and that consultation will continue between Goldcorp and TH throughout the process. TH will consider this and get back to Goldcorp.				
3-A2-703	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Consultation	TH informs Goldcorp that TH relayed this message to YESAB that they are somewhat content with the pre-consultation and will address concerns through the next phase of the process.		Before mid-September TH and Goldcorp will discuss how they will communicate to YESAB in regards to pre-consultation. TH will use their review of the Goldcorp - TH Technical Engagement Status and Planning document to gain comfort with the content of these communications to YESAB.	TH and Goldcorp	In progress
3-A2-704	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Regulatory Process	TH asked what timeframe Goldcorp is planning to resubmit.	Goldcorp noted that they would like to resubmit by the end of November.			
3-A2-705	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Regulatory Process	TH noted that they will be in touch in regards to timelines.	Goldcorp would like to address timelines as early as possible with TH and are hoping to have the letters submitted by mid-September.			
3-A2-706	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Regulatory Process	TH asked if the resubmission will be addendums to the current proposal?	Goldcorp isn't sure at this point. The resubmission will be as simple as possible. It will be the resubmission of the consultation log but that is all and anything new will be submitted as an addendum.			
3-A2-707	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	First Nations Issues/Concerns	TH asked that any time a First Nation is invited to look at the project that TH be invited as well.	The message should be clear that they are being invited to TH traditional territory. Goldcorp is open to having TH at the table with SFN for any discussion.			
3-A2-708	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Northern Access Route	TH will get back to Golcorp in regards to the NAR analysis in short order.				
3-A2-709	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Consultation	Goldcorp of the view that all IRs have been answered. Any outstanding information requests will be communicated with Goldcorp in the near future.				
3-A2-710	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Meeting	The Socio-economic workshop can be scheduled in Vancouver. TH General Assembly is taking place on October 14th				
3-A2-711	29 August 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. An exploration update is provided and ongoing technical engagement is discussed.	Education and Training	Goldcorp noted that a few TH employees have been off work for injuries. Goldcorp has reached out to the support systems available at TH and wants to ensure that the TH employees know that those support systems are available to them. This is an item that could be added to the upcoming meetings agenda. The Goldcorp HR Specialist can sit in for this discussion at the next meeting. TH thinks that planning ahead for this is a good idea. It's key to support the businesses of Dawson to ensure that there are resources available to support the project efficiently.				
3-A2-714	31 August 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the Technical Engagement Status and Plan reviewed during a confidential meeting. (Attachment: Technical Engagemet Status and Plan). The document outlines key issues raised by TH during consultation, how Goldcorp has considered and addressed these concerns, and a plan for engagement on outstanding topics. Goldcorp requests TH's feedback on the document.	Consultation					
3-A2-722	05 September 2017	Email	Incoming	TH	Consultation	TH leadership notes they are only available for one day of the two-day water workshop September 28 and 29.	Meeting					
3-A2-729	07 September 2017	Email	Outgoing	TH	Consultation	Goldcorp informs TH that the site tour with SFN technical representatives has been confirmed for September 14 and asks TH which representatives TH wishes to attend the site tour per TH's request that a TH representative be present to welcome visitors to TH traditional territory.	Site Tour					



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-738	12 September 2017	Phone	Incoming	TH	Consultation	TH's consultant called Goldcorp to discuss a few things leading up to the technical meetings with TH on September 28 and 29. Goldcorp and TH discussed the following:  1. Comments submitted to YESAB - should they expect to see written feedback?  A) This have been discussed at the leadership level B) Goldcorp will not be responding formally (in writing) until after Goldcorp resubmits to YESAB, and explained why C) Goldcorp can definitely discuss the issues that they have raised, and have thought carefully about all of their comments and our responses D) Goldcorp will share documentation that helps the discussion if we have it prepared, memos etc.  2. Format of meetings:  A) Collaborative B) Small amount of presentation material C) Goldcorp welcomes ideas for questions that will help facilitate discussion. D) TH requests that if there is material they would prefer to have in advance.  3. Meetings' agendas: A) TH is developing agendas too, Goldcorp noted planing to circulate some soon for comment B) TH's consultants will discuss internally and may be in contact again to discuss with Goldcorp	Meeting					
3-A2-739	12 September 2017	Email	Outgoing	TH	Consultation	Goldcorp updates TH on the plan to tour the NAR with SFN Chief and Council.	Site Tour					
3-A2-744	13 September 2017	Email	Incoming	TH	Consultation	TH confirms the names of representatives attending the SFN site tour.	Site Tour					
3-A2-746	13 September 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. Goldcorp and TH discuss next steps in the YESAB application process and engagement with TH citizens.	Consultation	The TH technical team has reviewed the status and plan provided by Goldcorp to determine whether an accurate assessment had been completed by Goldcorp and whether the next steps were sufficient. TH will do a quality control of their results and share with Goldcorp tomorrow. This work will also inform the agendas for the upcoming technical sessions.				
3-A2-747	13 September 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. Goldcorp and TH discuss next steps in the YESAB application process and engagement with TH citizens.	Regulatory Process	Goldcorp hasn't had further discussions with YESAB. The next meeting will be at the end of September or early October in regards to the resubmission date. Goldcorp asked if TH has had further discussion with YESAB and they noted that there hasn't been any futher conversations				
3-A2-748	13 September 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. Goldcorp and TH discuss next steps in the YESAB application process and engagement with TH citizens.	Consultation	In regards to a joint letter to YESAB, TH will have a letter drafted by the end of the day today or tomorrow. It will be a separate letter addressing the consultation section and adequacy review. Similar to what had been sent in July. TH is considering the timing of when the letter should be sent. If it should go in when the proposal is resubmitted and what expectations there are on Goldcorps part and the additional engagement plan. The letter can be sent in at any time and doesn't have to be sent in after the resubmission.	Goldcorp would like to have the letter sent in as soon as possible and is still planning on a November resubmission. The parties discussed current planned engagement and discussions with other affected first nations.			
3-A2-749	13 September 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. Goldcorp and TH discuss next steps in the YESAB application process and engagement with TH citizens.	Consultation	Goldcorp noticed there is a citizens meeting on October 2nd, Goldcorp would like to get a sense of the information that is being shared and requested the meeting minutes. TH has an obligation to keep the citizens updated. The meetings are not for the public and include the negotiation content, updates on the YESAA submittal, and the Northern Access Route update. Goldcorp would like to help to make sure both sides are aligned. To the extent that there is any information received such as concerns, issues, or more information needed by citizens, Goldcorp can help address those needs, and thus would like to know that information. TH appreciates that many of the items in our agreement are based on what TH is hearing from their citizens. The citizens have placed their confidence in the government to address their needs and concerns. TH will gather the concerns of citizens through direct engagement and will pass them on to Goldcorp at these meetings.				
3-A2-750	13 September 2017	Meeting		TH	Consultation	Project Development Meeting between Goldcorp and TH. Goldcorp and TH discuss next steps in the YESAB application process and engagement with TH citizens.	Agreements	TH and Goldcorp discuss the next advisory committee meeting.				
3-A2-1353	13 September 2017	Email	Incoming	TH	Consultation	TH sends Goldcorp a memo to close-off TH's concerns re regarding the Maisy May (proposed) NAR route compared to TH's suggested Black Hills Route. TH agrees that the Maisy May route is preferred.  Attachment: GC NAR MCDA Memo V31	Northern Access Route					
3-A2-763	19 September 2017	Email	Incoming	TH	Consultation	TH asks if Goldcorp has sent a proposed agenda for September 28 and 29, Goldcorp informs TH that these are under development.	Meeting					
3-A2-835	20 September 2017	Email	Incoming	TH	Consultation	TH asks Goldcorp to confirm meeting dates for October and November; Goldcorp notes that the technical meeting schedule still stands as is (October 17 Closure Workshop and October 31 Socio-economic Workshop); however, the November negotiations meetings had been cancelled.	Consultation					
3-A2-836	20 September 2017	Email	Outgoing	TH	Consultation	Goldcorp sends a draft agenda for September 28 and 29 for TH's review and input.	Consultation					
3-A2-890	21 September 2017	Email	Outgoing	TH	Consultation	TH asks for the raw 2016 and 2017 baseline water quality data in Excel format. Goldcorp emails the data and a map with water quality monitoring stations to support the Excel file. TH confirms receipt.	Water Quality					
3-A2-935	22 September 2017	Email	Incoming	TH	Consultation	TH sends Goldcorp a proposed agenda for the September 28 and 29 meetings. This document is a new, separate document from the proposed agenda that Goldcorp provided on September 20.	Consultation					
3-A2-984	25 September 2017	Email	Outgoing	TH	Consultation	Goldcorp provides a version of TH's proposed agenda for September 28 and 29 with tracked changes, and provides feedback on TH's proposed agenda. Goldcorp notes that Goldcorp wishes to promote a collaborative meeting and has made changes to the agenda as such. Goldcorp clarifies that a biodiversity enhancement strategy is a long-term discussion that Goldcorp wishes to initiate during the meetings.	Consultation					
3-A2-989	27 September 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the materials for the September 28 and 29 Water workshop meetings. This includes presentations to be delivered, a memo on water treatment to support the information presented in the Project Proposal, and a memo on areas of collaboration regarding water quality objectives.	Consultation					
3-A2-990	28 September 2017	Email	Outgoing	TH	Consultation	Goldcorp provides the link to TH where additional cyanide management information resides. This information was originally provided to TH in April, and provides information on the International Cyanide Management Code.	Consultation					
3-A2-991	28 September 2017	Email	Outgoing	TH	Consultation	Goldcorp provides meeting materials (Heap Leach Facility slides) to TH for reference of those attending remotely.	Consultation					
3-A2-992	28 September 2017	Email	Incoming	TH	Consultation	TH sends Goldcorp an example of a site conceptual model for reference.	Consultation					
3-A2-993	28 September 2017	Email	Incoming	TH	Consultation	TH sends Goldcorp an example of total inflows vs outflows table for Goldcorp to replicate	Consultation					



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-994	28 September 2017	Email	Outgoing	TH	Consultation	Goldcorp provides meeting materials (toxicity studies slides) to TH for reference of those attending remotely.	Consultation					
3-A2-995	28 September 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the proposed agenda for the October 17 closure meeting. Goldcorp and TH developed the agenda collaboratively during the September 28 meeting, and sent it out to all attendees for reference and further input should it be required. Goldcorp suggested an additional day or half-day for the Closure workshop to address topics of interest to TH including pit lakes, permafrost+groundwater, and semi-passive water treatment.	Consultation					
3-A2-997	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility design, and closure. Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Consultation	Goldcorp and TH discuss Goldcorp providing background information more in advance. Goldcorp agrees to do its best to do this. TH asks Goldcorp to work with TH on developing an environmental workplan.	Goldcorp wants to work collaboratively with TH and use the workshop to discuss and collaborate on technical matters.			
3-A2-998	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility design, and closure. Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp notes how views TH presented in past workshops are being addressed:  Goldcorp reviews the water quality monitoring stations that have been added based on feedback from TH. Goldcorp will eventually be re-labeling the water quality monitoring stations, as Goldcorp understands the feedback from TH and others that the nomenclature is hard to understand. Goldcorp established mixing zone stations and accretion sites as a result of feedback from TH as well. Goldcorp reviews these stations on a map to provide context. At TH's request, Goldcorp highlights the accretion sites.				
3-A2-999	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH would like to discuss the WQ stations in more detail later regarding attainment of water quality objectives. TH has some ideas about the development of WQOs as it relates to compliance stations, and wants to discuss that today. Goldcorp agrees. TH has a strong interest in an Adaptive Management Plan and a response framework.  In response to Goldcorp's commitment to doing 5 and 30 monitoring TH notes to do this sampling at the right time to capture the variability.	Goldcorp notes that 5 and 30 monitoring will take place on Latte Creek this season, and in more locations next season. This is in response to feedback from TH previously.		TH and Goldcorp	Ongoing
3-A2-1000	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp has developed an interactive model that uses the 3-D site model and WQM/WBM and developed an Excel-based model to address TH's questions and requests for a conceptual model at site. Goldcorp has created a presentation on the water quality model loadings in pie-chart format based on TH's feedback. Goldcorp asks TH what window of time TH wants to see pie charts for, due to the flow dependencies for load concentrations.	This is listed as a "parking lot item" for future discussion			
3-A2-1001	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Meeting	Active water treatment will be discussed September 29, and this is conceptual at this time. TH notes that the closure workshop on October 17 is focused on re-vegetation and cover. Wants to have a separate water/HLF discussion for closure.	Goldcorp asks if TH is willing to do these back-to-back. Goldcorp and TH will discuss TH and Goldcorp representation at technical meetings offline.		TH and Goldcorp	Water balance model sent on September 28, TH feedback to come.
3-A2-1002	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp gives a demonstration of the conceptual water balance model (3-D online) in response to views presented by TH at previous workshops. TH notes that this is a very useful tool. Goldcorp is planning to incorporate the GoldSim model and the temporal aspect of the information as well. The 3-D model is at year 11 currently. Goldcorp will provide the current version and get feedback from TH on it. Goldcorp will work on modeling the flow magnitude for the next iteration.	Send conceptual water balance model to TH, TH to provide feedback.			
3-A2-1003	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH asks if there's any biological data in the conceptual model. TH notes salmonid habitat information would be good to include.	Goldcorp replies that biological data could be added easily.			
3-A2-1004	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH asks if there will be a response to the key questions about the water balance, as the 3-D model doesn't address all of the questions.	Goldcorp replies that there is the Excel file to help address those questions.			
3-A2-1005	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp reviews the conceptual site model excel flow tracking diagnostic tool Excel file to address the "does the water balance actually balance" question. Goldcorp describes the assumptions made for the model. The units are m3/h. Goldcorp explains the pathways for the model. Goldcorp explains that the yellow line is for treated contact water or water that didn't start out as contact water. The conceptual model also gives you relative magnitudes.			Goldcorp	In progress
3-A2-1006	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that there is a high proportion of non-contact flow going through the underdrain rather than being diverted, asks why this is	Goldcorp replies that this is due to a topography issue. Goldcorp generally wants to divert as much as possible.	Water balance and water quality model inflow vs outflow table to be provided to TH	TH	Complete.
3-A2-1007	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH replies that they wanted a table of inputs and outputs and these two versions of the site conceptual model that Goldcorp showed weren't exactly what TH wanted	Goldcorp asks TH to send an example or template (SEA). TH sends an example.	TH to send an example of a conceptual site model.	TH	In progress
3-A2-1008	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH wants to understand exposure pathways and the potential receptor groups, so that they can see the complete or partially complete exposure. This will be useful for assessment end points and building a robust monitoring program. TH will send an example.		TH to send their interest in the information to come from the output model.	Goldcorp	In progress
3-A2-1009	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH asks Goldcorp to add concentrations of COPCs to the excel model.	Goldcorp agrees to try that as an option.	The model currently has flow numbers, Goldcorp to consider concentration of constituents of		
3-A2-1010	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that the collaboration memo with 7 topic areas is very useful. TH highlights the need to include water management and water protection goals.	Goldcorp agrees, notes that the last bullet on the collaboration memo somewhat looks at that. Goldcorp notes that there may be a different way of thinking about this.			
3-A2-1011	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes a continuous improvement goal rather than non-degradation may be a solution.	Goldcorp describes common concerns regarding WQOs that have been heard in the past, notes one concern is that proponents will do minimum efforts to meet WQOs once they receive license limits for discharge. Not the intention here. Goldcorp highlights that water management goals and adaptive management will be very important.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1012	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH wants to discuss water management goals and TH needs to take away the environmental protection goals idea and come back to Goldcorp with feedback. General feedback from TH currently is:  Evaluating WQ at a reach level rather than water body level may be a solution to come to agreement on WQOs. TH wants to discuss Halfway Creek in particular, and knows that WQOs need to be achievable for the site.  TH discusses the ideas behind the triggering framework for non-degradation thresholds.  TH agrees, that an appropriate monitoring framework for specific stations is needed.	Goldcorp notes that this needs to tie into monitoring framework that is practical for the Project as well.			
3-A2-1013	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp gives an overview of the memo of suggested components for additional collaboration with TH on Water Quality Objectives:  Goldcorp describes the reason for the memo; the memo is in response to TH's updated agenda for the meeting and is to make sure that Goldcorp demonstrates commitment to collaboration with TH on SSWQOs. The areas of collaboration allow Goldcorp and TH to bridge the gap on the differing positions on SSWQOs.  Goldcorp reviews the points in the memo. Gives an example of continuous improvement goals with a parameter like nitrates. Goldcorp wants to develop a framework with TH to strive towards non-degradation in cases where Goldcorp can't commit to it.				
3-A2-1014	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH asks if there will be a proposal on continuous improvement.	Goldcorp is not looking at a proposal right now, but wants to use this as a potential tool for TH and Goldcorp to get to resolution on some items.			
3-A2-1015	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp highlights that this is currently at an EA level, so the detail isn't there for detailed water management discussions. Goldcorp and TH agree on 3 catchments out of 5 in terms of SSWQOs and water management goals. The other catchments (Halfway Creek and Latte Creek) need discussions on options such as water management goals to address. Goldcorp wants to know TH's ideas on water quality objectives for reach levels, and Goldcorp needs to look at what the model suggests as well.				
3-A2-1016	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH would like to understand other mitigation options better before licensing, like staged discharge or improved water management.  TH hears that Goldcorp indicates that under the current mine plan, they will not be able to meet non-degradation in Halfway Creek. TH wants this to be clearly demonstrated and wants to see that Goldcorp has thought of everything from a water management perspective, and wants to see that before licensing.	Goldcorp wants to talk about water management today with TH and look at options for things like diversions and look at opportunities for water management. Goldcorp very much wants to discuss opportunities in water management to improve water quality at site with TH.  Goldcorp explains why they think it will be very challenging to meet non-degradation in Halfway Creek. For example, if you look at parameters such as sulphate, nitrate which are both very low in concentration in Halfway Creek but present in mine waste, as well as uranium, this will be very difficult recognizing that the mine plan has all waste material in one catchment. Baseline water quality shows that in high flow periods, the concentrations are at the lowest concentration.  With WRSF in catchment, during snowmelt, contact water will be elevated in these concentrations but the background – the measure of non-degradation – will have low concentrations. As such, the metal concentrations become out of phase with baseline concentrations.			
3-A2-1017	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that when the discharge period happens under the current water management regime, the parameters are out of phase with the baseline story for operations and closure. TH highlights that the question is if Goldcorp can shrink the gap between baseline and proposed WQ to meet non-degradation.	Goldcorp doesn't think so. Goldcorp can work toward making that gap smaller. This could be done with diverting water in other locations. There is a need to be conservative so that the Project is not setting the standard too optimistically, as well as for the effects assessment.			
3-A2-1018	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH agrees and wants water quality objectives to be achievable. TH asks about Halfway Creek water management goals, and notes that Yukon River and Coffee Creek water management are agreed upon. Asks about Halfway Creek and Latte Creek. TH has recommended non-degradation for Latte Creek to protect Chinook salmon habitats downstream, and the small portion of chinook habitat in Halfway Creek.  TH suggests looking at the following: o Evaluate or classify Halfway Creek on a reach level o At HC 2.5, set a use protection WQO o At HC 5 set it at non-degradation WQO, or demonstrate why that is not achievable; o Asks Goldcorp to show why they can't meet non-degradation. o TH notes that HC 5 may be too far down the creek to be used as a compliance location, as chinook have moved up the creek a bit. o TH willing to reconsider non-degradation where Goldcorp can demonstrate that it is not achievable.	Goldcorp has a point where they are confident that fish cannot get past on Halfway Creek.  Goldcorp gives an update on fish baseline monitoring this year. Goldcorp describes losses of flow in Halfway Creek, and where the impediments that start at 900 m and up to the middle water quality site. Effects assessment came from middle water quality site to be conservative. The habitat is used in the lower few hundred meters, this year up to 600m.			
3-A2-1019	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH would want non-degradation in that area of use, and would want to look at a new WQ station perhaps (roughly 1 km from mouth). TH also wants to understand flow, as that can alter available habitat.  TH wants to get together to discuss mitigation options/scenarios for Halfway Creek to try to reach non-degradation for fish habitat in Halfway Creek. TH wants to look at HC 5; doesn't want WQ at HC 2.5 to be applied to HC 5	Q: Goldcorp asks if after the review it is determined that non-degradation is unachievable, what is TH expecting to do next? A: TH replies that it comes back to the water management goals. This conversation needs to happen.  Goldcorp notes that placer miners have staked the creeks surrounding the Project, including Halfway Creek, and that's not something that Goldcorp can control. TH understands this.			
3-A2-1020	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp understands that TH's view is that CCME is not sufficiently conservative even though it is designed to be protective; that non-degradation needs to be achieved.  TH confirms this. This is why there's use protection, and then there's objectives that are from a different point of view for non-degradation. Non-degradation is to minimize or remove alteration to aquatic habitats where there is ecological or cultural significance. Believe this for Halfway Creek and lower Coffee Creek because of chinook salmon. Use protection benchmarks open up concern for TH. TH notes that the toxicity work being done by Goldcorp is very important for this.				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1021	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp confirms that there is no desire from TH to limit use of Halfway Creek with a fish barrier or an effluent pipeline to Yukon River; that TH wants to maintain habitat in Halfway Creek.  TH confirms this is correct.			Goldcorp	Ongoing
3-A2-1022	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH explains that non-degradation narrative is to avoid substantial alteration of water quality and flow. The numerical component of the non-degradation approach is an approach where upper limits reflect the average water quality conditions on a seasonal basis in cases where the baseline data show there is a seasonal fluctuation in concentrations of parameters of interest. The upper limit is set using the 95th percentile, and this upper limit allows for movement. For example, this has been 10% in the past. TH wants an evidence-based approach. Upper confidence limit of the mean is one way to do it, or distribution of annual medians. It's about trying to mimic the natural distribution of data that is seen.	Q: Goldcorp asks how those limits look compared to water quality guidelines?  A: TH replies that it depends on the data. It's about understanding the natural water quality guidelines; not considering standard water quality guidelines.	Provide graphical representation of the non-degradation objective		
3-A2-1023	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp notes this is essentially the background concentration procedure, which is the method Goldcorp uses. TH notes that this is mostly true, but the background concentration procedure doesn't get to seasonal variability.	Goldcorp notes that they are going to be introducing contaminants that are not naturally present, like nitrates and sulphate. There's almost nothing to do about those. Goldcorp is also changing the natural flow in these catchments with the presence of a pond below the WRSF. Q: Goldcorp asks TH how they see a proponent practically incorporating seasonality in these situations? If we are considering seasonality, how is it operable? A: TH replies that they want to understand discharge schedules, and diversions, things like that.			
3-A2-1024	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp also wants to understand TH's goal of non-degradation in Latte Creek, as there are no chinook in Latte Creek.  Goldcorp summarizes their understanding that TH wants to know/confirm that Goldcorp did their best to try to achieve non-degradation here because of the chinook in Coffee Creek.			TH	Complete
3-A2-1025	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH wants to see on a graph the non-degradation case and compare to what Goldcorp is proposing.  TH and Goldcorp will calculate this and exchange.  TH wants to work with Goldcorp on a work plan to look at opportunities for options for water management for WQOs in Halfway Creek and Latte Creek. o This includes the issue, pathway to resolution, timeline to resolution. o Timeline for working through a work plan. o TH to send Goldcorp a draft work plan		TH to send draft Work Plan to Goldcorp	Goldcorp	In progress
3-A2-1026	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH discusses their concerns with Latte Creek:  • TH wants non-degradation in Latte Creek to remove or reduce degradation of Coffee Creek. TH is of the understanding that Latte Creek contributes significantly to Coffee Creek catchment. • TH needs the high level of confidence that Goldcorp is achieving non-degradation at Latte Mix WQ station which is located immediately downstream of the confluence of Latte Creek with Coffee Creek. Asks Goldcorp to model that. • TH notes that if Goldcorp can't show meeting non-degradation at Latte Mix, then Goldcorp needs to show non-degradation in Latte Creek. However, if Goldcorp could show that it could meet non-degradation at Latte Mix, then TH would reconsider non-degradation for Latte Creek.	• Goldcorp explains that Coffee Creek catchment is about 400 km2 or more, Latte Creek catchment is about 70 km2. As such, there is not a tremendous flow to Coffee Creek from Latte Creek. • Goldcorp notes that in lower Coffee Creek at CC4.5, the winter has interesting data, and there might be inputs from the Yukon River flow in the Coffee Creek catchment. • Goldcorp can do the modeling TH asks for.	To be included in water quality model updates.		
3-A2-1027	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: Goldcorp asks for clarification that if Latte Creek can't meet non-degradation at all times of year, but Coffee Creek can, is that ok for TH?  A: TH needs to see the data on that. Urges Goldcorp to continue collecting the data for the new locations for licensing.	Goldcorp confirms that continuation on data collection is the plan for the Project.			
3-A2-1028	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH's concern is that non-degradation in Coffee Creek is a must, and there is not enough confidence that the changes in Latte Creek won't translate into changes in Coffee Creek, so TH wants non-degradation in Latte Creek until demonstrated otherwise.  TH wants to leave the environmental protection goals for later discussion.	Goldcorp highlights that it will proceed on this premise at this time and for this mine plan, and that if there was another mine plan in the future, the goals may not be the same.			
3-A2-1029	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes there are 5 catchments and 5 attainment stations listed in the Project Proposal. TH wants to walk through the catchments and discuss areas of agreement and disagreement.  Yukon River – attainment YUK 5.0; TH wants an attainment station closer to Halfway mix.	Goldcorp agrees to non-degradation in Yukon River. Setting an objective where the company is responsible for an objective in Yukon River is not a good idea recognizing multiple upstream users that could affect water quality in the Yukon River that has nothing to do with Goldcorp.			
3-A2-1030	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH suggests that info collected at YUK 2.0 and 5.0 both contribute to determining whether there is a change to the WQ in Yukon River.	Goldcorp understands this. Suggests a station upstream of YT-24 as the "background" prior to the Yukon River receiving inputs from YT-24 and Halfway Creek.			
3-A2-1031	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH and Goldcorp discuss to the following attainment stations to monitor water quality in Yukon River:  1 station upstream of YT-24 1 station upstream of Halfway Creek 1 station downstream of Halfway Creek	Goldcorp explains that this is how the model is set up, so these stations are good. Goldcorp and TH discuss the cost-benefit of additional water quality stations, and ensuring monitoring is appropriate.			
3-A2-1032	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH suggests a different framework for monitoring on Yukon River with respect to seasonality. Goldcorp and TH agree that YUK 5.0 is not the spot to monitor attainment for non-degradation of Yukon River.	TH and Goldcorp agree to the following attainment stations:  1 station downstream of the Halfway Creek mixing zone 1 station in an upstream location that is not necessarily YUK 2.0  Compliance will be a station closer to Halfway Creek.			
3-A2-1033	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH discusses wanting to meet non-degradation at HC 5.0, wants to consider a compliance point at HC 2.5.	Goldcorp is concerned about having too many attainment stations. Alpha pond overflow points will be for the MMER compliance point, as it is downstream of discharge. TH notes these can be the same station with respect to the receiving environment attainment station. Goldcorp will need to meet requirements at end of dilution zone.  TH and Goldcorp agree that there will need to be a discharge point and an MMER point, so HC 2.5 might disappear.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1034	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH and Goldcorp agree two stations in the receiving environment are required. Higher up in Halfway Creek Goldcorp will apply use protection WQOs, and lower down in Halfway Creek TH would like to see non-degradation WQOs if necessary. TH suggests that the station up higher is for MMER, as the MMER point for downstream of Alpha discharge.  TH is ok with an MMER station and 2.5; or making the MMER station and the attainment station the same.				
3-A2-1035	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp notes that the closure attainment points might be different.  TH agrees that the YT-24 sample location is appropriate for attainment  TH suggests to add an attainment station beyond mixing of sump discharge  TH and Goldcorp agree on a monitoring station in Latte Creek.  TH and Goldcorp agree that the CC-x monitoring station is logical. TH is comfortable with CC-4.5 as an attainment station, due to Yukon River effects to CC-x.		TH	Ongoing	
3-A2-1036	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: Goldcorp asks if it is non-degradation at the Latte mix station, can Goldcorp drop CC-4.5 as an attainment station A: TH just needs to see this proven in numbers.  TH notes there may need to be different stations as well for biological monitoring.  Goldcorp notes that activities need to tie into locations and timing for monitoring.		Goldcorp	Ongoing	
3-A2-1037	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH wants to look at various receptors of interest, and look at the endpoints at the right locations. Goldcorp and TH need a framework for next steps, and TH will pass along CSM to Goldcorp.  TH and Goldcorp discuss assessment endpoints, measurement endpoints.  TH notes that if additional baseline data need to be collected to support a BACI type analysis, Goldcorp needs to collect this data.  TH thinks next step is a small technical meeting to work through the AMP design.	Goldcorp describes internal work on management plans and monitoring plans. Goldcorp is looking for TH's input into the development of these plans.  Goldcorp explains that the streams around the site have poor conditions for stream sediment quality. Goldcorp notes that it is good timing now to work out monitoring other potential data sources.	Engagement with TH on management plans, adaptive management		
3-A2-1038	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp is trying to have adaptive management tied into each management and monitoring plan. Goldcorp is considering modeling the adaptive management plan (AMP) after the Minto framework.  TH sees this as a response plan. Goldcorp and TH discuss adaptive management.				
3-A2-1039	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH suggests having things like chronic toxicity as triggers for adaptive management.	Goldcorp agrees.			
3-A2-1040	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that the key endpoints are going to be part of adaptive management, and discusses developing early warning triggers for adaptive management. TH notes that whatever is needed to bolster current baseline data to understand early warning triggers is important to consider now.	TH and Goldcorp agree that further engagement on management plans and reclamation and closure plans will occur.			
3-A2-1041	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that there may be different water quality objectives in closure than in operations; that will be important for TH.				
3-A2-1042	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp and TH discuss calculating non-degradation WQOs: • TH will put something forward for non-degradation WQOs to Goldcorp. • TH notes that it's about trying to have a fairly good understanding between low flow and high flow periods and a robust data set. This helps determine where the break between high and low-flow periods is. • TH urges Goldcorp to consider seasonality when looking at WQOs. • TH will send their version of SSWQOs and how they were calculated.	• Goldcorp is trying to figure out the window for the water quality objective seasonality. Operationally, one objective is best. Goldcorp needs to figure out how to consider multiple WQOs. • Goldcorp notes that it's also about trying to make sure that the site doesn't accumulate water because the WQOs are too stringent. • Goldcorp isn't opposed to TH's suggestions, it just has to be figured out in terms of operational achievement.			
3-A2-1043	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH discusses where background procedure was used for places of natural exceedance, encourages Goldcorp to consider seasonality.	Goldcorp summarizes that the proposed objective is protective.			
3-A2-1044	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH understands, notes using the resident species approach or WER; suggests resident species approach more to see what a safe level of toxicity is.	Goldcorp summarizes the data from toxicity testing, noting that the most sensitive species has been tested for the metals levels and it is not a concern.			
3-A2-1045	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that CMME and BC MOE have guidelines for use protection water quality objective calculation. There are 3 approaches to Use Protection. TH and Goldcorp agree that the resident species approach is best.				
3-A2-1046	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH needs to understand if Goldcorp is meeting the minimum data requirements for the resident species approach. TH will write up what TH is looking for in terms of minimum data requirements for resident species approach, as well as toxicity testing approach. TH notes that there's dissolved vs total metal questions that TH has, and suggests monitoring attainment based on dissolved metal concentrations. If there is naturally high TSS, then that will show it is above WQOs.	Goldcorp notes that TSS is an important consideration when reviewing the water quality data. Goldcorp notes that both total and dissolved are calculated for non-degradation WQOs. Total = dissolved for uranium. Total measurements are for the model. Could look at running the model under the dissolved and total scenarios.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1047	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp gives an overview of the toxicity testing results related to toxicity tests that TH had input on. TH notes that the tests done so far are showing that there is a protective factor; TH and Goldcorp discuss TH setting out the minimum data requirements. TH and Goldcorp agree to run all of the tests in tandem to avoid confounding factors.				
3-A2-1048	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp describes the mixture toxicology testing done as suggested by TH. Goldcorp explains the methodology for the tests. Goldcorp will repeat the summer tests for HC 2.5 and will conduct winter water tests.				
3-A2-1049	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH asks about tests with nitrates	Goldcorp wanted to test the upper case with metals first. Goldcorp will test with nitrates next. TH confirms that the winter water tests will just be with metals as well.		Goldcorp	In progress
3-A2-1050	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that the toxicity tests are progressing very well. TH adds that the information on the minimum data requirements will come separate from the comments on the toxicity testing.		Summer and Winter toxicity testing report to be sent to TH when it is ready for TH to comment on		
3-A2-1051	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp gives an overview of the Kona conceptual site model and confirms the event pond locations for TH. The facility pond currently accepts water from the plant site and the ROM stockpile.				
3-A2-1052	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH confirms that the next update to the WQM will now include the Kona (Beta) WRSF. Goldcorp is proceeding with year by year build out of the Project.	Goldcorp discusses the source loading from the beta dump and why it is a relatively insignificant load source in the WQM. Goldcorp gives an overview of Kona pit water production in the early years of mine life, noting that it is relatively very little water. Goldcorp notes that as the HLF progresses, it will need less external water. This is when other water management will kick in.			
3-A2-1053	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks what happens after the first two years TH confirms that Goldcorp is working out what happens with Kona pit water after year 3. Goldcorp confirms	A: Goldcorp replies that Goldcorp will begin actively managing water in the HLF using raincoats. Goldcorp will be incorporating the HLF water balance into the overall site wide water balance.			
3-A2-1054	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp notes that there is very little water accumulating in the Kona pit. The objective all along is to backfill Kona pit with frozen waste rock to re-establish permafrost. Lots of geotechnical work done at Kona this year, Kona definitely has permafrost. The initial management strategy stands for Kona. Goldcorp confirms that Kona water will be used for makeup in the HLF.				
3-A2-1055	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks what the contingency is for Kona water to be discharged?	A: Goldcorp is going to look at that when the models are integrated. Goldcorp could always put Kona water into Latte pit. Goldcorp is also considering a larger water treatment facility than required for contingency. Depending on chemistry, it could also be discharged to the underdrain to the Alpha pond.			
3-A2-1056	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks about timing for knowing this management situation?	A: Goldcorp replies that this will be worked out in Q1 2018.			
3-A2-1057	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp describes the plan to progress water management planning, and how this depends on the model being built and tested on different climate conditions. Goldcorp notes the earlier discussion about opportunities to work on water management plan.				
3-A2-1058	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp discusses the flushing load for the Project. There are a series of saturated columns initiated right now to look at metal leaching under saturated conditions. There are 6 saturated columns right now, these tests are to look at the long-term metal leaching from submerged waste rock.				
3-A2-1059	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH confirms that attenuating uranium and arsenic only?	A: Goldcorp notes its mostly just uranium due to the potential for uranium to be reduced from soluble U6+ to U4+ which is insoluble. Goldcorp describes the column tests with a small amount of dissolved organic carbon to see if this results in attenuation (or precipitation) of uranium.		Goldcorp	In progress
3-A2-1060	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks about model sensitivity runs, asks if the results will be part of the base case?	A: Goldcorp replies yes.	Add haul roads to surface water model		
3-A2-1061	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp notes that there have been IRs regarding backfill opportunities; and this is about having a geochemical answer to the question about more backfill relative to potential water quality from backfilled pits. Goldcorp reviews the frozen soil stockpile source term work being done. An overburden source term will be assigned to the frozen soil stockpile. The geochemical variability at site wasn't completely clear in the original YESAB submission; Goldcorp provides an overview of the overburden source term. Goldcorp summarizes how overburden at site will be segregated based on where it comes from, and any overburden that will be a problem will be treated as waste rock. Rock drain source term is discussed by Goldcorp; noting that the rock drains will be too coarse to be geochemically significant.				
3-A2-1062	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks if the studies reference look at possible infilling of rock drains, such as 2 millimeter sediments filtering in.	A: Goldcorp replies that SRK will have to answer this regarding the permeability and effectiveness of a rock drain. No one has dug up a rock drain to see if it is filling with sediments. Notes that the exercises in geochemical characterization report for the rock drain show that there is no significant geochemical load from it.			
3-A2-1063	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks about sizing, asks if there is potential for the pre-flowing river to infiltrate the rock drain	A: Goldcorp replies that the rock drain is massively oversized. Depth is 80 m by width 30. Sized for 1 in 100 year rainfall time 2 plus average freshet flow.			
3-A2-1064	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks why selenium and sulphate are high at Brewery Creek and not Coffee.	A: Goldcorp replies that the geology is different at each site.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action	
3-A2-1065	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: Percolation of fines a concern in plugging the rock drain. What would happen if it was blocked or clogged?	A: Goldcorp will review this with the appropriate technical consultants at a later date.  Goldcorp and TH discuss the model checks and balances, Goldcorp can fill a table like this as part of the WQM/WBM check.				
3-A2-1066	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH needs a more complete conceptual model; notes table one in the submission. TH wants a simplified set of diagrams and displays an example.  TH confirms that the majority of their issues regarding additions to the WQM have been addressed, with the issue of the fines in the rock drains being the only outstanding issue.	Goldcorp notes there's no numerical value associated with the example conceptual model. The whole mine site will be on one diagram. Goldcorp will provide a new version of the conceptual site model based on TH's example.				
3-A2-1067	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp discusses the HLF tradeoff studies done. Goldcorp gives an overview of the HLF construction. Goldcorp describes the staged construction of the HLF and the plan to do earthworks in advance, and the edge of each stage includes a berm. Hydraulic dividers are described and will help control processing and rising/progressive closure of the HLF. Goldcorp clarifies for TH that the HLF gets stripped to competent rock before constructing it.					
3-A2-1068	28 September 2017	Meeting		TH	Consultation	Water workshop (day 1) with TH and TH technical advisors. TH and Goldcorp discuss water quality, water treatment, Heap Leach Facility (HLF) design and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks if there is permafrost above or below the frozen bedrock?	A: Goldcorp explains where the thaw stable and unstable materials are around the HLF.				
3-A2-1069	29 September 2017	Email	Incoming	TH	Consultation	TH sends Goldcorp a draft of the "TH Environmental Work Plan" for Goldcorp's review.	Consultation						
3-A2-1070	29 September 2017	Email	Outgoing	TH	Consultation	Goldcorp provides meeting materials (EBR water treatment slides) to TH for reference of those attending remotely.  Goldcorp also sends the October 17 meeting agenda developed in collaboration with the September 29 workshop attendees from TH.	Consultation				Goldcorp	Ongoing	
3-A2-1071	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Goldcorp reviews the Heap Leach Facility design with TH. Goldcorp describes the construction of the HLF.  TH requests a simple image of any one time that shows stages when the HLF is covered by raincoats.	Goldcorp to review and propose an image. Goldcorp discusses raincoat use, the HLF will be covered about 60% at any given time. Goldcorp describes the process solution being contained in pipes within the HLF, discusses the raincoat berm design for the 100 year flow with freeboard. Goldcorp describes how it is unlikely that the raincoat water will ever be contaminated.  Goldcorp can cover 12% of the HLF every 2 weeks; about 6% a week. The HLF will have about a base case of 40%, so it will take about 6-7 weeks to get the HLF fully covered if needed. Goldcorp will look at the performance of the WBM in operations, update the model, and look at the upcoming weather pattern predictions, and deploy the raincoats in the fall. Once Goldcorp is stacking and leaching HLF stage 3, there will be raincoats on stages 1 and 2 and they will stay there.	Parking lot item to discuss HLF covers at a closure workshop (date TBD)	Goldcorp	In progress	
3-A2-1072	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks if Goldcorp is using raincoats to push out water treatment.	A: Goldcorp's biggest reason for using raincoats is to minimize dilution. This has a big effect on metallurgy and gold recovery. Raincoats don't let rain contact the ore unless Goldcorp wants it to.	Staged drawings of the raincoat deployment for the HLF, including the HLF piping and ditch cross-section. Consider colour-coding the drawing for the more "long-standing" raincoats vs the "temporary" raincoats. Include these drawings in the HLF management plan.			
3-A2-1073	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks where the raincoat pond water goes?	A: Goldcorp explains that the water will be used for dust control, and is currently planned to go to Alpha rock drain.  Goldcorp describes raincoat use, noting that evaporation is wanted in the summer/fall. Deploying raincoats is expensive, and you don't want to cover the driplines in the summer. Goldcorp describes the drip emitters.				
3-A2-1074	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks for a HLF management/operation plan, if this plan will include these details?	A: Goldcorp will be creating a plan. Goldcorp is coupling the two water balance models, summarizes the key considerations of the HLF plan.  Goldcorp notes that the requirements under the Quartz Mining License QML to be very detailed when creating the plan for the HLF.		Goldcorp	In progress	
3-A2-1075	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks if the HLF plan gets updated?	A: Goldcorp explains that the closure plan is the only one that has to be updated per the license, but the HLF plan will be updated quarterly with the water balance model updates. There will be fulsome updates yearly.	Ensure that the Reclamation and Closure Plan includes detailed raincoat placement in temporary closure			
3-A2-1076	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks about the training required to be an operator at site related to managing the waterbalance related to the HLF. TH asks about training and qualification requirements for personnel managing this, the auditing procedure, and the failsafe for the environment.	A: Goldcorp explains that the HLF is the money making facility for the Project. There will be more attention paid to the HLF than any other facility. Goldcorp will have qualified professionals in the necessary roles at site.  Regarding general management practices: Goldcorp will have a dispatch system, and this will tell the operators where to go and track the materials. There will be good records of material movement. With respect to training, in order to do a job, the person has to be certified to do the task.		Goldcorp	In progress	
3-A2-1077	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Operations	Goldcorp and TH discuss responsibilities on site, and ensuring that there are qualified professionals on site to ensure plans are implemented. Goldcorp describes environmental audits that are required, and the regulatory inspections required in Yukon. Goldcorp will be clear in management plans about commitments to qualified professionals and clear responsibilities at site. Goldcorp discusses Mine Licensing Improvement Initiative (MLII), and Waste Rock Storage Facility WRSF audits. Goldcorp describes the ways that HLF design accounts for people doing their job imperfectly.		Goldcorp to be clear in management plans about responsibilities on site and need for Qualified Professionals, including who is responsible for the water balance updating.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1078	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Operations	TH discusses inspections. YG EMR staff's niche is the placer industry; this is an issue that TH needs to raise with YG to ensure that they have adequate staff to inspect HLF. This could be a potential problem.	Goldcorp notes how technology can help with this, example of drone footage to help with this. Goldcorp notes their experience with YG inspections for mine sites. Monthly water license reports require reporting on inspections around the site, and these are inspections of facilities as well. Monthly inspections force operators to look for things more often. Goldcorp suggests that TH review the water license reporting online for examples of requirements.			
3-A2-1079	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH wants to make sure that someone is a qualified professional and looking at the water balance from an environmental perspective.	Goldcorp explains that safety and compliance are priorities above ounce production at Goldcorp. Environmental responsibility is the role of the operators, not the environment team. This ensures that it happens. Goldcorp notes the action item to make clear in the management plan who is responsible for reviewing Water Balance from an environmental perspective.			
3-A2-1080	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks about the overlap with the raincoats, how raincoats are held together.	A: Goldcorp explains that the raincoats are welded, and you cut them to move them. The proposal allows for 25% replacement every year, which is very conservative.			
3-A2-1081	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks about the process for welding the liner.	A: Goldcorp explains the practice for the environmental liner (meaning below the HLF). Goldcorp explains that it's not an environmental liner for the raincoats, so the process is less strict.			
3-A2-1082	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks when the raincoats are stationary.	A: Goldcorp explains that the slopes will remain for quite a while, but the top will need to be moved for stacking. When transitioning for closure, the raincoats have to come off for re-grading the slopes.			
3-A2-1083	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks what raincoats will look like if the mine is in care and maintenance?	A: Goldcorp explains that in temporary shutdown Goldcorp can cover the entire heap in 2.5 months. Gives an example of a very big heap at a Barrick operation where the HLF is covered 100% seasonally.			
3-A2-1084	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	TH is looking for a condition where Goldcorp commits to covering the HLF in temporary closure	Goldcorp explains that there are regulations surrounding this. Goldcorp will be very explicit in the temporary closure plan about how the HLF will be dealt with. By not covering the HLF in temporary closure, Goldcorp would find themselves in a potential problematic situation. It is beneficial to cover the HLF in temporary closure. Goldcorp will update the reclamation and closure plan to include detailed raincoat placement in temporary closure. Goldcorp describes the raincoat berm design compared to the solution berm design. Goldcorp has noted that a figure would be useful to portray this, and will produce said figure.			
3-A2-1085	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	TH wants a conceptual figure of raincoat coverage in multiple years, and that details the more permanent vs temporary liners.	Goldcorp describes raincoat deployment practices.			
3-A2-1086	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks about the durability of the raincoat materials, how long they last.	A: Goldcorp explains HDPE liners and how they have a warranty for 20 years for UV exposure. HDPE liners are good until -40 centigrade. HDPE liners could get some freeze cracking at the Project but Goldcorp doesn't anticipate that to be a huge problem. Goldcorp explains that 25% replacement is good contingency, and the Project can move raincoats if necessary in January, but it is much easier to damage them at that point. Raincoat movement will be limited in colder months.			
3-A2-1087	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks about the lined parts of the HLF in closure.	A: Goldcorp explains the current closure plan for the HLF, and notes that HLF closure is on the agenda for October 17 meeting on closure.			
3-A2-1088	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Heap Leach	Q: TH asks if there are source terms and pH for all stages of the HLF?	A: Goldcorp explains what is currently known from the metallurgical test columns, and describes the pH changes over the life of mine in rinsing.			
3-A2-1089	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks about semi-passive treatment system?	A: Goldcorp explains that there was a memo issued about this in response to TH's questions previously about it. This will be discussed at the closure workshop.			
3-A2-1090	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	TH notes that there's leftover ingredients in the water treatment that could be problematic: o Ammonia o Nitrogen o Phosphate o Chloride o Sulphide TH read that this will be dealt with in other aspects of design, TH wants to hear more proof associated with where the system has been applied with metals removal and where the whole treatment system is integrated and removes those other constituents that are there.	Goldcorp reviews how a bioreactor works and summarizes the testing done on leached solution from anticipated ore compositions. Goldcorp describes how the tests would be scaled up. The test shows the Electobioreactor EBR's capability in a non-limiting environment.			
3-A2-1091	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks about different microbe communities being used at a larger scale and do the communities change over time?	A: Goldcorp indicates that microbe communities will change over time and describes how the microbe population would improve, and the degradation rates would improve as well. The genetic ability to remove contaminants is transferable material to other microbes present in the system – improved adaptability over time.			
3-A2-1092	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks about sodium chloride NaCl?	A: Goldcorp explains it is a limiting ion that the microbes need. Chloride was added to ensure the system was non-limiting from the perspective of nutrients. Non-limiting doesn't mean the microbes were not performing optimally. By having it non-limiting, excess Cl was present that was not used and therefore increased the concentration of Cl in treated water.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1093	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks when the pilot test will be done?	A: Goldcorp explains that this will be done on site. Goldcorp acknowledges the uncertainty associated with the system, and detailing the expected date for the development of the water treatment system, including the pilot testing. Bench testing needs to be completed for water licensing. Goldcorp will look at different microbial media that are amenable to full scale solution treatment, and describes examples of these media. The 2 stage EBR is for metals and nitrate, this is not always a stand-alone treatment. Goldcorp will use a pre-treatment, and a pre-treatment was used in the test. In bench-scale testing, will look at post-treatment. Post treatment can remove things like ammonia and phosphate if these are present and treatment systems for these parameters are readily available.			
3-A2-1094	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH understands where Goldcorp is at in terms of testing. TH notes the post-treatments have risk associated with them, noting the Teck Westline creek facility had a fish mortality incident due to sulphite, sulphide, and carbohydrates in the water. Off the shelf treatments need to be demonstrated to be effective. TH notes their experience in Elk Valley with Teck, and that fish still died. This is a concern.	Goldcorp describes examples of effective treatment and different types of treatments. EBR is not claimed to be a complete treatment, and pre-and post-treatment is common. Goldcorp has the ability to retain treated water as the plant is piloted, and there is time in the Project and resources available to react to the uncertainty. Goldcorp notes the contingency built into the system.			
3-A2-1095	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks if the bench-scale testing phase will remove uncertainty.	A: Goldcorp replies that bench-scale testing provides a 90% certainty for on-site testing. Pilot-scale testing deals with real-time water and fluctuations at site. Bench scale will include pre and post treatment if needed.		Goldcorp	In progress
3-A2-1096	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Goldcorp and TH discuss a workplan for active and passive treatment that describes tests to be done, scale, desired outcomes, and certainties resulting from the tests, as well as test timelines. Goldcorp agrees to do sensitivity analysis with WQM on effluent from EBR.		Water quality model sensitivity analysis on effluent from EBR		
3-A2-1097	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks if there's a change in the microbial community throughout the use of the EBR where it would require fine tuning throughout the life of the EBR?	A: Goldcorp replies that the population shifts over time, but do initial screenings to minimize the shift. The microbe community will adapt to consume the key parameters as well. Goldcorp can also re-inoculate the system as well.			
3-A2-1098	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks about the goal of the treatment for the example provided?	A: Goldcorp explains that the goal is to fine-tune the EBR system to achieve contaminant removal.			
3-A2-1099	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	TH suggests to show the discharge criteria on the graph for context.	Goldcorp discusses how EBR and EBR with additional treatment has been able to meet all discharge criteria. Goldcorp has already committed to doing the WQM sensitivity analysis as well. Goldcorp provides an overview of the active treatment residue characterization and management. The EBR system is effective at removing the microbes that have precipitated the metals of interest from the water.		Goldcorp	In progress
3-A2-1100	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	TH notes that they appreciate it is a small mass of metal being removed. There is still a mass at the end of the treatment, what does Goldcorp plan to do with the removed contaminants?	Goldcorp notes that the metals are trapped within the matrix, and that pilot scale tests show that the bacterial matrix can be stored on site as non-hazardous waste. Goldcorp explains that for the tests, not enough sludge was created to investigate TH's question. This hasn't been done yet. Goldcorp provides an example from a different mine in Utah about the sludge being able to be stored on site.	estimate mass of solid produced by EBR and disposal method detail		
3-A2-1101	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks how variable nitrates were for the example?	A: Goldcorp replies nitrates were very low, and selenium variability is even more difficult to address but that the EBR has demonstrated high success with variable influent concentrations at meeting target criteria. Goldcorp discusses residual chloride removal. The system can be tuned to remove chloride from the system. Chloride can be added by pre-treatment processes, this is to optimize removing the target contaminant.			
3-A2-1102	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Closure	Q: TH asks if chloride will have to be added for the Project EBR?	A: Goldcorp replies yes, this will need to be added for the EBR for the Project as part of the nutrient mixture. Agricultural molasses can have chloride in it, or other parameters.			
3-A2-1103	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH and Goldcorp discuss the concentrations of parameters like chloride, and how the volumes in the effluent will be incredibly small due to dilution. The action items capture regarding water quality model sensitivity analysis will address TH's questions about these other parameters.				
3-A2-1104	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Goldcorp discusses Sulphur deportment across active treatment. TH asks about the sulphate levels reported for the Project, and asks if this is an artifact of bench scale testing?	Goldcorp confirms that it is an artifact of bench-scale testing. There were low levels of sulphide produced.			
3-A2-1105	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that the mass balance of Sulphur is important to consider. Sulphide generated in the system will report to the water, so it's important to consider where it is going.	Goldcorp notes that EBR will normally produce sulphide, and its standard practice to use an iron sponge to absorb that, or to off-gas it. Sulphide can be handled in numerous ways. Goldcorp gives an overview of pilot vs full scale EBR performance, the example is from a site that has a similar climate to Coffee. Notes that there's good nitrate removal in variable temperature conditions. Nitrate loss is due to denitrification, and its related to the reduction potential of the redox system.		Goldcorp	In progress
3-A2-1106	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks about thiocyanate	A: Goldcorp has taken a preliminary look at thiocyanate, and will be looking at that more closely in the future.	Ensure thiocyanate is looked at in future EBR testwork		
3-A2-1107	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	First Nations Issues/Concerns	Goldcorp summarizes that the biodiversity enhancement strategy is an idea that Goldcorp would like to discuss with TH. Planning hasn't advanced and Goldcorp understands that there are initiatives that TH and other First Nations are already doing that Goldcorp could support (e.g. salmon enhancement). This is about enhancement, rather than mitigation.		TH	In progress	
3-A2-1108	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Fish	TH is not a big fan of habitat replacement and would rather maintain the current habitat that is there. Offsets are utilized for many other projects, but you can't replicate natural levels. If someone can replicate pH levels in a creek, then that would be different. TH is in discussions about fisheries act changes, will see what happens there. TH notes a rearing program would be more meaningful than offsetting. TH to pull together a list of priorities for biodiversity enhancement.		TH to produce a list of biodiversity enhancement priorities for TH		



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1109	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks about the attenuation factor, notes the concern that Goldcorp attenuating things twice.	A: Goldcorp replies that the attenuation factor for groundwater was only applied to redox sensitive species (arsenic, nitrate, antimony). High arsenic concentrations are present in the natural groundwater system at the ridgetop or areas of groundwater recharge. In the valley bottoms, arsenic doesn't show up anymore. The theory is that the groundwater is reducing in the upper portions of the catchment, know this because small quantities of H2S and other redox sensitive species such as iron that are soluble under reducing conditions are not present in groundwater in the valley bottoms where groundwater is discharging and closer to surface. Arsenic is present in very low concentrations in surface waters which are oxic. In winter, when only groundwater is in surface water flows we see very low concentrations, indicating that removal is happening along the flow path. In IRs, TH asked for upper case geochemistry to be run with and without attenuation, and this work has been completed and it shows that including attenuation has only a minor reduction in predicted concentrations. The groundwater contribution is a small load. Attenuation is only applied as a groundwater seepage component to surface water. Seepage through WRSF doesn't report to groundwater and additional attenuation is not applied to WRSF seepage source term.			
3-A2-1110	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks if there's an aquifer that doesn't act like Kona?	A: Goldcorp explains that some of the Kona water reports to Independence Creek side, there's a WQ station at IC-3.0. Very low arsenic concentrations are found at that station as well.			
3-A2-1111	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH assumes that the attenuation occurs more in the Kona area, asks if this is correct?	A: Goldcorp replies that this is not correct. Kona was just an example.			
3-A2-1112	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH notes that Goldcorp provided good information, but the topic of attenuation isn't quite closed yet.	Goldcorp notes that on the Halfway Creek side with the North Slope that has permafrost, and the latte creek south slope with no permafrost have the same scenario occurring. Goldcorp doesn't think that the permafrost is an issue here.			
3-A2-1113	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH brings up their IR regarding permafrost degradation and how this affects groundwater?	A: Goldcorp explains that the groundwater model is calibrated to the current condition, which has permafrost. Not sure how to calibrate the model in the absence of permafrost scenario.		Goldcorp	In progress
3-A2-1114	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks if there's water in the rock if there's permafrost?	A: Goldcorp explains that right now, its ice-poor permafrost. Goldcorp asks if the concern is in areas where there's ice-rich permafrost. Goldcorp explains that the water table is below permafrost now. The absence of frozen ground over top of the groundwater doesn't really affect it. It doesn't really interact with the permafrost now. Goldcorp discusses potential effects to the recharge rate, there could be an increase in groundwater levels due to higher recharge. There is groundwater chemistry with and without permafrost. The uranium chemistry in both Halfway Creek and Latte Creek is driven by geology, not by permafrost. Might look at the increased recharge as a result of permafrost degradation.	Look at increased recharge in groundwater in the absence of permafrost		
3-A2-1115	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Studies	Q: TH asks about the field bins results scaling, and how this differs from humidity cell scale up?	A: Goldcorp explains that if 6% were applied to humidity cells, this would be a conservative scale up. The field bins have more realistic weathering conditions, so they do not need to be accounted for in the scaling. Three main scale factors are temperature, flushing rate, and grain size. Field bins only have grain size, and the scaling factor is between 0.1 and 0.2; developed 9% scaling factor for these field bins. 6% was base case, 11% was upper case. This landed close to the independently derived 9%. The .9 grain size was based on what was in the field bin vs what is expected at full scale.			
3-A2-1116	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks if 6% for base case is lower than the 9% or 12% for scale up? TH wants to ensure that the analog site didn't have permafrost in the waste rock pile. Goldcorp confirms there was no permafrost in waste rock dump.	A: Goldcorp explains that the upscale based on an analog, which is Mt. Nansen. The base case is 6% and the 11% upper case. Source terms are always based on some sort of scale up of kinetic test data.			
3-A2-1117	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH asks about the solubility controls for copper on pit walls?	A: Goldcorp notes that the scale of the pit walls is similar to the scale of the field bins. Explains the results of the field bin work			
3-A2-1118	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Studies	Q: TH asks what the pH of the water is in the field bin	A: Goldcorp notes that there is very little copper in the ore or waste rock, and expects to see low copper coming off of WRSF, and in the metal leaching test work that was done. Copper has never come up as a concern for the project. Goldcorp explains that the pH coming off of the kinetic tests are representative of what will be full scale and that the pH is around 8.0.			
3-A2-1119	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Studies	Q: TH asks why Goldcorp is applying constraints?	A: Goldcorp replies to produce realistic source terms. Goldcorp can send the copper concentrations without the solubility constraints, but given the geological database available, this is not realistic. Also, the copper concentration with constraints was used in the WQM.			
3-A2-1120	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	Q: TH notes that copper is scaling with mass. Asks if Goldcorp can justify constraining it at low volumes?	A: Goldcorp explains the results of the test work done, justifications behind the copper concentrations.			
3-A2-1121	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Studies	Comment: TH suggests to look at the copper in the field bins at Mt. Nansen.	Reply: Goldcorp notes that the field bins at Mt. Nansen were producing copper concentrations at the same levels as the full-scale WRSF.			
3-A2-1122	29 September 2017	Meeting		TH	Consultation	Water workshop (day 2) with TH and TH technical advisors. TH and Goldcorp discuss water management, water treatment, Heap Leach Facility (HLF) design, management, and closure, and Goldcorp also addresses other topics of interest related to water that TH had raised previously in workshops on May 25, June 5 & 6, June 9, and July 14.	Water Quality	TH confirms with Goldcorp that the constraint was only applied for the pit walls, Goldcorp confirms this is the case. In contrast the copper concentration was scaled up for the WRSF source term.				
3-A2-1124	02 October 2017	Email	Incoming	TH	Consultation	Goldcorp sends TH the flyer for the Dawson Community dinner; TH confirms posting the Dawson Community Dinner flyer in Dawson for October 15.	Meeting					
3-A2-1125	03 October 2017	Email	Incoming	TH	Consultation	TH responds to the email with the closure workshop agenda noting that there is no feedback.	Consultation					
3-A2-1126	03 October 2017	Email	Outgoing	TH	Consultation	TH asks if Goldcorp has heard from TH regarding the proposed additional day or half-day for the closure workshop; Goldcorp informs TH that no one from TH's party has been contacted confirm being able to attend the proposed additional date.	Consultation					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1132	04 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH an update to the Coffee Gold Project pre-season report. The update informs TH of the extended field schedule and additional exploration road building happening at site.	Consultation					
3-A2-1134	11 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends the meeting invite for the Closure workshop. The agenda is attached. The agenda was developed collaboratively and agreed to by TH and Goldcorp on September 29 during a meeting.	Meeting					
3-A2-1135	11 October 2017	Email	Incoming	TH	Consultation	TH informs Goldcorp that their ecotoxicological modeling expert cannot attend. TH asks Goldcorp to invite an ecotoxicological modeling expert to the meeting, and asks if some attendees from TH's party can leave early from the meeting, suggesting that the final hour of the workshop to discuss and revise the Environmental Work Plan	Consultation					
3-A2-1137	12 October 2017	Phone	Outgoing	TH	Consultation	Goldcorp phones TH to discuss the presentation for the TH General Assembly that Goldcorp has been invited to present at. TH and Goldcorp review the presentation outline, and TH informs Goldcorp that TH may be adding new people to the Advisory Committee for the Exploration agreement implementation. Goldcorp sends the presentation on October 13 via email and uploads it to Open Text Core, Goldcorp's online document sharing platform.	Consultation					
3-A2-1138	12 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the draft agenda for the socio-economic and health workshop on October 31 for review and input. TH confirms receipt. TH asks Goldcorp to add the Human Health Risk Assessment updates to the agenda, Goldcorp does this.	Consultation					
3-A2-1139	12 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the meeting invite for the socio-economic and health workshop on October 31.	Consultation					
3-A2-1142	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Education and Training	Q: Does Goldcorp have grants with Yukon College?	A: Not at this time but we are open to suggestions and interested in education. The driller program was successful this year but there were more jobs than people. If anyone is interested they should consider this as there is lots of opportunity for career growth.			
3-A2-1143	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Education and Training	Q: When industry comes to the territory they usually offer scholarships. Also, can any upcoming RFPs be placed on the TH website?  TH representative replies:  Delving into discussions at the IBA table around scholarships. It is appreciated that there is a need to work with Yukon College. They should be put on a training session so that it is exclusively for local citizens. Perhaps rent the truck from Yukon College.				
3-A2-1144	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Northern Access Route	Comment: Her grandfather is Chief Isaac and he talked to her about the white man taking away their gold. It is a hard thing to swallow. Citizens must now look into what the road will do to the moose. Is it already started, what do other First Nations if there is any overlap think about the road?	A: Most of the road already exists. Upgrades will need to take place but we are very early in the process and have done lots of consultation with TH which has been very productive. We constantly hear how important closure is to TH and what we are in discussions around what we can do to turn back the land as close to original as possible.			
3-A2-1145	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Consultation	TH notes that a TH citizens meeting may need to take place in Whitehorse. There was a citizen's meeting one week ago and it is important to keep the citizens informed of the progress and information the consultants are providing. TH have visited the road and understand the impacts.				
3-A2-1146	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Information Sharing	Q: Is Keno Hill a property of Goldcorp? Goldcorp has a 60,000 Hct land package but the project we are submitting is a smaller piece of land package. Keno Hill isn't operated by Goldcorp.	A: No.			
3-A2-1147	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Consultation	Q: Are there any site visits coming up?	A: No upcoming tours as we are closing down camp in the next month but you can talk to Pat in regards to next summer's tours.			
3-A2-1148	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Information Sharing	Q: How much of Goldcorp is owned by Canadian Pension Plan and Chinese entities?	A: It is posted publicly on the website who the top 10 shareholders are. We don't have any major Chinese shareholders that we know of. Most Chinese bought in to miner which are in latin America owned by competitors. It hasn't happened yet with Goldcorp. We have jointly operated mines but they are with Canadian companies.			
3-A2-1149	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Information Sharing	Q: Protection is paramount for TH do we know of any chance of a Kinross or Barrick takeover?	A: We don't know of any takeovers but couldn't legally say if there was. One must be cautious with what they take away from media as it can be skewed, especially in Latin America. There is opportunity for TH to visit Latin America sites if there is interest.			
3-A2-1150	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Consultation	TH has a team that looks after negotiations and project review. Because the project is really portent to the people, the government is being diligent to ensure careful review and recommendations are taking place. Lots of baseline work has already been collected for the past 4 years. In relations to global corporations, these people represent Kaminak, they don't represent the corporate at the top level. TH notes for attendees:  TH can request corporate staff to come to Dawson to present at some point. Whatever is negotiated will be received and help up no matter who owns the project. There is legal assistance at all meetings who provide good advice to TH.				
3-A2-1151	15 October 2017	Meeting		TH	Consultation	Goldcorp presented at the TH General Assembly to TH Citizens. Goldcorp provided a Project update, an update on the exploration program, potential employment opportunities for TH Citizens residing in Dawson, and the plan to re-submit the Project Proposal at the end of November. Goldcorp reviews the Proposed Project construction and operation schedules.	Information Sharing	Q: Upon purchase of Kaminak has there been any exploration on other mines?	A: No exploration is planned for other properties, we are currently determining what we will do with them, we may just let them go.			
3-A2-1154	16 October 2017	Email	Outgoing	TH	Consultation	Goldcorp informs TH that the meeting location is now at the Kwanlin Dun Cultural Centre for the October 17 closure workshop.	Meeting					
3-A2-1156	17 October 2017	Email	Incoming	TH	Consultation	TH sends Goldcorp a memo in advance of the October 31 regarding topics of interest on the Human Health Risk Assessment.	Health					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1157	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	<ul style="list-style-type: none"> <li>• TH notes that there are terms used that can be interpreted in different ways related to the overarching Yukon closure objectives. TH notes that Yukon's views on closure are valid, but it is most important that the closure objectives meet the needs of TH, Citizens, and local people. Yukon's views are generally inconsistent with the needs of First Nations communities for closure.</li> <li>• TH notes to consider the time it will take to achieve end land use objectives, like restoring habitat for certain species. This takes time, and it is important to communicate that in the reclamation and closure plan. TH recommends that the plan also consider the different ecosystem types.</li> <li>• TH notes that from an ecological perspective, the current suitability of the site and the site's capability to host species/ecosystems is a good starting point for consideration of the end land use objectives. TH also notes to consider value added opportunities, but not to extremes, such as making habitat for species that aren't there naturally.</li> </ul>	• Goldcorp agrees that status quo (note: meaning current state of the ecosystem at site) or enhancement is a good goal for closure.			
3-A2-1158	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Reclamation	<ul style="list-style-type: none"> <li>• Goldcorp explains that there are aspects that will not be able to be returned to their current state. An example is the site water balance which will end up being very different than it is currently due to the HLF, but the goal is to stabilize the area in closure.</li> </ul>				
3-A2-1159	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Consultation	<ul style="list-style-type: none"> <li>• TH advises that a smaller table of people will be engaged to go through the closure objectives and to see what would need to be added. TH needs to be involved with this, and expressed at the very beginning that TH wants to be involved in the reclamation process from the beginning to the end, past closure. TH is still in discussions with YG, and has had a few meetings with them regarding a response to TH's proposal to YG regarding closure. It will be a long process, and having very good objectives will be beneficial for those involved into the future.</li> </ul>	• Goldcorp agrees, and it will be important to make it clear about how the objectives were set and ensuring that the objectives are set collaboratively. Goldcorp notes that there is a later agenda item to discuss an engagement strategy for closure.			
3-A2-1160	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Reclamation	<ul style="list-style-type: none"> <li>• TH adds that returning the land to the way it was to the extent possible is important for TH. TH recognizes that there's a level of acceptance that things won't be put back exactly where they started after the Project is over. Looking at the current Project Proposal, it's important to get to a point with a closure plan that is acceptable at a conceptual level that will be included in the EA. TH has problems with the lack of cover for the Alpha WRSF and pits/backfill areas. TH wants to get to a point where the land is returned back to the way it was as much as possible.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp agrees that TH and Goldcorp need to get the closure fundamentals right for the EA.</li> <li>• Goldcorp notes that for the NAR, new parts of the NAR are proposed to be reclaimed, noting that a robust conversation needs to take place as there may be other desires for those areas of new build on the NAR.</li> </ul>			
3-A2-1161	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Reclamation	<ul style="list-style-type: none"> <li>• TH's view at this time is that the new build should be reclaimed, which aligns with the Project Proposal. TH's concern is that a third party would come in and want to maintain and keep the road open even though Goldcorp and TH agree to close and reclaim it.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp hears TH's concerns, and understands that generally, roads are rarely taken out after they are constructed; TH and Goldcorp agree to plan now for closure of the NAR new build and to go from there.</li> <li>• Goldcorp commits to developing detailed site-specific end land use objectives with TH as part of the reclamation and closure plan. Goldcorp notes that the starting point is looking at objectives for each of the key areas, and the ending point is executing on these through post-mining prescriptions and commitments.</li> </ul>			
3-A2-1162	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Regulatory Process	<ul style="list-style-type: none"> <li>• Q: TH asks about timing and what is going to happen before the detailed EA is signed off?</li> </ul>	<ul style="list-style-type: none"> <li>• A: Goldcorp replies that there won't be another plan submitted for the EA phase (during the adequacy phase), but in early 2019 there will be a more detailed, but still at a conceptual-level, reclamation and closure plan submitted for licensing. The goal of this plan is to have conceptual prescriptions tied to ecosites, which will be used to eventually define site-specific prescriptions as project design progresses..</li> </ul>			
3-A2-1163	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Regulatory Process	<ul style="list-style-type: none"> <li>• TH notes that there's the middle stage before the detailed EA is reviewed and accepted that TH is interested in providing input.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp replies that they will continue to input additional detail through adequacy regarding closure. Goldcorp wants to get the management plans done more than a year before they need to be submitted for licensing, and the reason for that is to work with TH on refining the plans in advance. Goldcorp can't define at this time what level of detail various parts of the reclamation and closure plan will be at and at what time. The important part now is to understand the priorities for TH; if TH is most concerned about wildlife, then Goldcorp and TH can start working on closure objectives related to wildlife now. Goldcorp wants to work with TH on the plan now and the first step is understanding priorities. Goldcorp has heard Alpha WRSF cover and open pits as concerns, so perhaps this is where Goldcorp and TH can start. There might not be a resolution, but can work on a process to get to resolution.</li> </ul>			
3-A2-1164	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	<ul style="list-style-type: none"> <li>• Goldcorp notes that the next few years are key in developing a research plan for reclamation and closure, and creating a research plan that is tailored to TH's concerns and interests. Goldcorp needs input from TH on developing this research.</li> <li>• Goldcorp is also required to look at alternatives for closure planning, and that will be a key engagement element with TH as well. The alternatives assessment is ongoing.</li> </ul>				
3-A2-1165	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	<ul style="list-style-type: none"> <li>• Q: TH asks about timelines, and asks about milestones for the reclamation and closure plan. TH asks about changes to the reclamation and closure plan in the resubmission of the Project Proposal.</li> </ul>	<ul style="list-style-type: none"> <li>• A: Goldcorp confirms no anticipated changes to that component of the Project Proposal.</li> </ul>			
3-A2-1166	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Consultation	<ul style="list-style-type: none"> <li>• Q: TH asks about an updated draft reclamation and closure plan in Q1 2018.</li> </ul>	<ul style="list-style-type: none"> <li>• A: Goldcorp replies yes. Goldcorp is working on the reclamation and closure plan now, and is hoping to provide enough of a draft to TH in Q1 for TH to review and critique. There will be gaps identified in the draft, and the conceptual reclamation and closure plan will be a foundation document that can be worked on together. It will have all of the technical requirements for closure required in a regulatory sense.</li> </ul>			
3-A2-1167	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Regulatory Process	<ul style="list-style-type: none"> <li>• Q: TH asks if this will be worked on prior to the EA being accepted by regulatory agencies?</li> </ul>	<ul style="list-style-type: none"> <li>• A: Goldcorp replies that the goal is to agree on the plan prior to submission with license applications. Licensing bodies cannot review the licensing documents until there is a decision document, Goldcorp plans to engage with regulators prior to submitting the documents. There will be a timeline where Goldcorp needs to put pens down on the conceptual reclamation and closure plan and submit it to regulators, but it's most important to develop a process to work on the plan together.</li> </ul>		Goldcorp	Complete, emailed to TH on November 17, 2017.
3-A2-1168	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Consultation	<ul style="list-style-type: none"> <li>• Goldcorp notes that the conceptual reclamation and closure plan needs to be updated every two years in Yukon per regulations, so updating the reclamation and closure plan with TH input will be ongoing.</li> <li>• TH would like to see a plan that is accessible to TH for input. Goldcorp agrees.</li> </ul>	<ul style="list-style-type: none"> <li>• Send reclamation and closure plan development timeline to TH</li> </ul>	Goldcorp	In progress	



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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1169	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Project Design	• TH wants to understand "phases" vs "stages" in the Project Proposal as it relates to the Project life.	• Goldcorp explains phases and stages, and reviews the mine life closure schedule. Goldcorp gives an overview of the types of activities that occur in each phase of the mine life.	Description of stages and phases in the reclamation and closure plan vs the conceptual reclamation and closure plan		
3-A2-1170	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: TH asks about temporary closure, where it fits in the schedule.	• A: Goldcorp explains that temporary closure is not planned for, so it is not scheduled within the construction or operation periods. Goldcorp will assess a state of temporary closure when the Project at its most vulnerable and inconvenient time for temporary closure to occur.		Goldcorp	In progress
3-A2-1171	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: TH asks if the geochemistry work involves a nutrient analysis to understand the productivity of the soil?	• A: Goldcorp replies that they are not looking at this currently, but that this is a good idea. This is added to the action items.	Nutrient analysis – include in current soil analysis being done for the cover investigation	Goldcorp	In progress
3-A2-1172	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Reclamation	• TH notes that they want the land restored to the way it was to the extent possible. TH notes that a land capability assessment, which relies heavily on the ecophysiological modeling, will be key in understanding what can be done with the site and prioritizing objectives.	• Goldcorp agrees with TH, noting that once Goldcorp understands the materials balance, they can understand the capability of the materials for infiltration reduction and revegetation. Goldcorp wants to look at what is supported at site and understand the reasons for the species that are supported at site, particularly from a water perspective. Goldcorp agrees with TH that it is an iterative process of understanding what is at site currently and considering end land use objectives in the context of what can be achieved and is desired at site at closure.  • Goldcorp notes that there will also need to be a scenario evaluation done based on what can be done and the priorities for closure. Goldcorp gives an example where a WRSF could be re-graded and covered to meet aesthetic goals and revegetation goals, but to the detriment of water quality goals. Goldcorp needs to understand TH's priorities.	Goldcorp will do a WRSF Cover Investigation: 1. Material balance investigation and characterization 2. Sensitivity analysis on infiltration reduction 3. Capability for infiltration reduction and revegetation 4. Integration of WQM/WBM and ecophysiological modeling 5. Workshop with TH where to apply scenarios		
3-A2-1173	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Reclamation	• Q: TH asks about the mineral soil horizon on site.	• A: Goldcorp replies that the area was never glaciated, so it is in situ weathered bedrock. There is no clay on site, and not a lot of nutrient rich soil either.			
3-A2-1174	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: TH asks about pit lakes seepage.	• A: Goldcorp explains that the pit lakes will eventually seep into the groundwater table. This will be on a much different timeline than infiltration into the WRSF, and is much less geochemically concerning. Only some of the pit lakes penetrate into the groundwater table. The rock at depth is not very permeable at all. The materials for the pit walls is much less than in the WRSF. The predicted water quality in the pit lakes is expected to be much better than contact water in the WRSF.		Goldcorp	In progress
3-A2-1175	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH wants to engage on the WRSF cover investigation and look at scenarios for cover.	• Goldcorp iterates the workplan that Goldcorp will send to TH regarding the active and passive treatment, notes that it would be good for TH to provide input on the workplan, and then identify the touch-points in the workplan between Goldcorp and TH.	Provide a workplan to TH for the cover investigation work.	Goldcorp	In progress
3-A2-1176	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	• TH notes that biomass can be used to generate heat for the HLF or for buildings as well. TH notes that compost can possibly be used to help keep the microbial community alive in the stockpile.	• Goldcorp summarizes their engagement with Justin Straker, regarding gaining greater understanding of a post-mining landscape based on conducting ecophysiological modeling. Goldcorp notes that ecophysiological modeling is recommended to be done when Goldcorp has more information from the site; Justin recommends not doing detailed modeling on conceptual information.	Send TH the scope of work between Goldcorp and Justin Straker	Goldcorp	In progress
3-A2-1177	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	• TH notes that the workplan will be helpful in understanding next steps. TH also notes that reference sites for the soil conditions and vegetation communities will be important, as this can give information related to changes in conditions due to climate change, for example.	• Goldcorp agrees, notes that the ecosystems across the site vary greatly due to slope, aspect, and other factors. Goldcorp notes that this variability extends past soils and vegetation.	Incorporation of HHRA discipline in reclamation and closure research		
3-A2-1178	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	TH asks if Goldcorp will look at ecophysiological modelling?	• A: Goldcorp replies that a qualitative assessment around site capabilities needs to be undertaken first prior to modelling. Once soil characterization information is available, Justin can incorporate this information into the modeling work. This won't be done in the immediate future, but perhaps the 6 month range. The scope of work will be included in the reclamation and closure plan.		Goldcorp	In progress
3-A2-1179	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH notes that for Golden Bear Mine in BC, the market conditions and the environmental standards at the time in BC contributed to the closure of the site. There were many challenges there due to the amount of water in the climate and the tightness of resources at the time. There was also a lack of wildlife mitigations there.	• Goldcorp describes how progressive reclamation of the HLF will help with learning and improving closure methods.	Share papers regarding HLF closure as they come available/are created		
3-A2-1180	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Reclamation	• Goldcorp prompts feedback from TH on reclamation research for the Project. Goldcorp notes future work to research composting options is being considered. • TH notes the environmental monitor module course taught at the Kaminak site, and that environmental monitors have capacity. There was a plan for the TH Farm to work with Kaminak on nursing and storing a seed collection. The farm will continue, but there may not be an educational component. It will continue as an economic development project. • TH always intended to look at mining reclamation in terms of rearing local plants. TH doesn't know what the educational component looks like with Yukon College at this point. Notes that it may require a test plot on the mine site and then look to replicate at the TH farm. TH notes that there could be a possible business opportunity there, but TH would need to look at the economics of it.			Goldcorp	In progress
3-A2-1181	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	TK/TUS	• Goldcorp asks TH about possible incorporation of Traditional Knowledge (TK) into plant rearing and reclamation research. • TH replies that the module course identified traditional plants and TH elders were part of the courses, so that data collection wouldn't need to be re-done. It's about getting the information. • Goldcorp notes that the information is publicly available online, and it's about making sure that it's incorporated into the plan. • TH adds that there will need to be an analysis of the available data and identifying gaps before moving forward.	• Goldcorp discusses reclamation test plots on site currently. These test plots aren't on waste rock at this time, but they are on areas disturbed during exploration activities.	Follow up with TH regarding TK inclusion in reclamation and closure research, and look at how this was included in the RCP		



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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1182	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	• TH wants a clear understanding of the composition of the soil, which has been discussed in the meeting already. Understanding the soil will help understand what will change at site and influence what can grow at the site in closure. For example, if the soil has been turned over and changes, native plants cannot grow.				
3-A2-1183	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Water Quality	• TH is waiting on a response on the design of the passive treatment system.	• Goldcorp replies that the testing program will look at how the design will be implemented, and various substrates that can be used, the proportions of how they're mixed and used in the system, how the chemistry is modified using the proposed substrates, and the residence time that needs to be looked at. It is an iterative process that will take some time before it is at a level of design. Testing with true solutions from site will need to occur as well to pilot the process.			
3-A2-1184	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	• TH comments that Goldcorp needs as much existing information of the area as possible. Beyond doing test plots, TH hopes that over the mine there is success in growing native plants at the site.	• Goldcorp discusses closure planning, noting that relatively inert rock will be needed for the diversion channels and other such infrastructure in closure. Goldcorp needs to look at using the right rock for the right components on site for water management.			
3-A2-1185	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Vegetation	• TH wants to understand the extent to which plants may be taking up metals or how metals may be put into the food chain. TH gives an example of using plants for photo-remediation and not wanting animals to eat those plants. • TH notes that dust monitoring can play into the bioaccumulation of metals piece as well. TH's interest is in dust deposited on plants, and understanding the dust footprint. TH recommends that Goldcorp do growth trials in the conditions that plants may be living in at site.				
3-A2-1186	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	• Q: TH asks about Goldcorp doing an ecological risk assessment?	• A: Goldcorp replies that ecological risk assessment is something that can be discussed with the right technical experts in the room. Goldcorp describes how monitoring metals uptake in plants could trigger an increase in small mammals monitoring, if the data results suggest significant uptake in plants.		Goldcorp	In progress
3-A2-1187	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH states that if there is going to be a water body on site in closure, then it should be a healthy water body. Healthy means that one could eat the fish and drink the water and not be harmed. • Goldcorp summarizes that such a requirement of a pit lake would be considering long term interactions between animals and pit lakes in closure. • TH notes a vegetative shoreline is an example for creating a healthy water body in a pit lake. • Goldcorp notes that the objective is important to consider here; does TH want to promote use or deter use of pit lakes by species? • TH replies that this depends on the water quality.	• Goldcorp discusses the planned angles for the pit walls and how Goldcorp is considering leaving ramps into pits in closure to allow an escape route for wildlife should they enter the pit lake. Such considerations and design of pits in closure will depend on the objectives that Goldcorp develops in collaboration with TH.	Consider pit lakes in reclamation research.		
3-A2-1188	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: TH asks if the expectation is that the pit lake will fill and have a static shoreline?	• A: Goldcorp replies that this depends on the pit, as some are expected to fill and spill. The design will be advanced and this can be worked out as the design is developed further.			
3-A2-1189	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH states that climate change needs to be considered, and consider land erosion and the slopes proposed for closure. Landslides are happening in the territory that have never happened before. TH's concerns relate to how long-term the slopes are for the Project. • TH states that with climate change the Yukon and Dawson have been identified as warming faster in the Northern Hemisphere than any other place, and for Goldcorp to think about the vegetation in this context. In the past few years, there have been poor seasons for vegetation, for example too much or not enough rain.	Goldcorp notes that when putting covers on facilities, the vegetation used for reclamation depends on the goals and objectives for closure. Different plants will be used for quick stability goals compared to the plants that would be used for long term vegetation diversity goals.			
3-A2-1190	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Vegetation	TH notes that vegetation succession needs to be considered. Plants can be used to enhance the site for future conditions. Some non-native plants could have a role to play there in building the soil and creating desirable conditions.	Goldcorp agrees.		TH	In progress
3-A2-1191	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	TH wants to be involved in developing the long-term reclamation research plan, as well as in monitoring afterwards. It's an opportunity for TH to expand their knowledge and capacity. TH is already involved in reclamation projects, and the people involved in that may be able to participate in Goldcorp's research. TH wants to be involved.	Goldcorp agrees, noting that there's an opportunity for TH to write the research plans for closure. Closure research development will include engagement with TH and having TH participate in the research.	TH to inform Goldcorp of how they want to be involved in reclamation research; Goldcorp to follow up accordingly		
3-A2-1192	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Northern Access Route	TH notes that it's important to see the new build on the NAR reclaimed back to what it was. This reclamation also needs to consider climate change. Culverts aren't always 100% safe, there are wash-outs in early summer. This needs to be considered. Maintenance of culverts is important. Culverts need to be cleaned out.	Goldcorp notes that the current culverts are consistently undersized along the NAR, and replacing culverts with the appropriate size is part of the upgrade plans for the NAR.			
3-A2-1193	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Northern Access Route	• TH confirms that it's just the new sections that need to be reclaimed, not the upgraded sections. • TH notes that concerns for invasive species from trucks to the site being transmitted.	• Goldcorp is committed to inspection and washing vehicles in Dawson if needed as it relates to invasive plants mitigations. • Goldcorp notes that they need to be clearer in the plan regarding monitoring and maintenance on the NAR in closure.			
3-A2-1194	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Northern Access Route	• TH asks about where Yukon Government has actually enforced moving from temporary closure to permanent closure.	• Goldcorp explains that it is up to 3 years of temporary closure, then a proponent is required to move into permanent closure. A proponent can ask the Chief of Mines to extend for two years, then it needs to be re-evaluated. • Goldcorp and TH discuss water licensing in Yukon. Goldcorp clarifies that water licenses do expire, however the expiry requires a revision of the license. Water licenses are not allowed to simply "time-out".		Goldcorp	In progress
3-A2-1195	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Northern Access Route	Q: TH asks about the NAR in temporary closure	A: Goldcorp replies that there would be a requirement to monitor the NAR in temporary closure under the QML. The NAR would be used for resupply in temporary closure as well.	Goldcorp to outline approach to the next iteration of the temporary closure plan.		
3-A2-1196	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Contracting and Procurement	Goldcorp and TH discuss economic benefits of the Project, and how this may affect Chief Isaac Inc. if the Project were to enter into temporary closure. Goldcorp notes there may be lessons learned from the oil sands in recent years that Goldcorp and TH can consider in this respect.			Goldcorp	Complete.
3-A2-1197	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	Goldcorp notes the importance of considering social closure for the Project. TH and Goldcorp decide to discuss social closure at the socio-economic and health workshop on October 31.		Discuss social closure on October 31.	Goldcorp	In progress

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1198	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Studies	Q: TH asks if the submerged source term work has been underway for some time? A: Goldcorp explains that for one source of rock, the work was done for a SU1 partial submerged backfill. Now, Goldcorp is looking at all of the rock that could go into one of the backfills.	Goldcorp to share the submerged column testing work that is currently underway.			
3-A2-1199	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: Goldcorp asks TH for more clarity regarding a closure scenario that does not include long-term pit lakes. • A: TH notes that TH wants to see the site reclaimed back to its original version, if possible. TH also is considering the habitat of the Forty Mile Caribou, as TH has put in a lot of effort to help recover this species.				
3-A2-1200	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: Goldcorp asks if TH is concerned about physical hazards at the site related to pit lakes, or changes to their habitat • A: TH replies that it is about making sure that the environment is safe for the Forty Mile Caribou herd. There were problems at Brewery Creek where caribou went onto the HLF and couldn't get out due to the matting. There are also Citizens who live down river and they do hunting, fishing, trapping annually.				
3-A2-1201	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Q: Goldcorp asks what TH's priority for closure requirements would be in a scenario where backfilling the pits resulted in no pit lakes, but it resulted in poorer water quality? • A: TH replies that there will be a change to the caribou's habitat, so it's about restoring it back to caribou habitat as best as possible. If it can't happen due to adverse effects to fish habitat, or for other reason, then it just needs to be explained.		Goldcorp	In progress	
3-A2-1202	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH notes that there's potentially some fear associated with lakes being created as a result of mining in a landscape where there aren't lakes currently. • Goldcorp and TH discuss the pits being migration/animal movement barriers. TH notes that from a wildlife movement perspective, several small areas rather than one large area is preferred.	• Goldcorp notes that it's important for Goldcorp to understand the ranking of the closure considerations noted by TH, such as the fear of pit lakes, fear of water quality, priority of caribou movement, and uncertainty.	Goldcorp to consider eliminating pit lakes through double-handling, including an evaluation of cost for various scenarios.		
3-A2-1203	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH wants to make sure that the area can be used safely by humans and caribou afterwards. TH understands the challenges Goldcorp faces, and sees what Goldcorp has presented, but TH wants to be certain and wants to take into consideration alternatives.	• Goldcorp replies that there are alternatives, but that alternatives come out of understanding the priorities of TH. • Goldcorp reiterates that if additional backfill doesn't have water quality impacts, then Goldcorp recognizes that additional backfill is in their best interests. This will change as Goldcorp better understands the information from the exploration program, so Goldcorp can't commit to additional areas of backfill at this time.			
3-A2-1204	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH notes that as the Project progresses, Goldcorp will understand where the resource is and can go back and backfill those areas where the resource isn't. • TH wants to work toward a resolution on the backfilling topic and some of the concerns raised with pit lakes.	• Goldcorp explains the significant cost of re-handling materials. • Goldcorp agrees, noting that there will not be a resolution today but wants to work toward a process on reaching a resolution.	Goldcorp	In progress	
3-A2-1205	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH thinks that it is a variable that should be considered for backfilling, but not the only variable. TH notes that Goldcorp is drilling deeper in some of the proposed pits, and one of the main considerations noted by Goldcorp is not condemning potential areas of resources. TH wants Goldcorp to look at these deep assays and consider the results and weigh them against TH's concerns.	• Goldcorp explains that this data will take years to compile. • Goldcorp will ensure that it is clearer in the closure plan that Goldcorp will consider additional backfill should it make sense economically or have significant benefits environmentally	For the next iteration of the RCP, include: 1. Commitment to more backfill if possible 2. timeline to determine when backfill decision will be made.		
3-A2-1206	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• TH notes that there needs to be considerations of effects to wildlife, in particular sloping the pits to blend them into the natural landscape. Everyone needs to be realistic about what the end scenario will be. TH recognizes that Goldcorp will not be able to re-create what the site looks like today. • TH notes that partially filled pits with re-sloping might be sufficient. • TH notes that understanding the drilling results will help Goldcorp figure out where backfilling can happen.	• Goldcorp notes that backfilling the pits to the degree that there are not pit lakes may not necessarily require double-handling. • Goldcorp notes that it's important to understand the vision, and understand the water quality results of submerged waste rock. • Goldcorp agrees, backfilling is cheaper than hauling to WRSF; however infill drilling is providing insight to upgrading the resource.	Goldcorp	Complete for Goldcorp - provided plan to TH via email on November 17.	
3-A2-1207	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Closure	• Goldcorp notes that YG doesn't require social closure, so this is an opportunity to get creative with it. • TH notes that this is a good opportunity for Goldcorp and TH to work on this together. • TH and Goldcorp discuss considering engagement and planning for the proposed Project.	• Goldcorp notes that the steps in engagement can start with discussing what a healthy community looks like when mining is complete. This is something TH needs to inform Goldcorp of. Then, this informs how Goldcorp approaches looking at the options that have been discussed for operations and construction and closure, and the take that to inform the management plans for the Project. • Goldcorp notes that there is good information on what the community wants to see for operations in terms of jobs and things like that. Goldcorp understands that these training programs for the Project need to set up potential employees for the future and jobs outside of the Project.	Goldcorp to propose engagement reclamation and closure plan to TH, TH to provide input	Goldcorp	Complete, discussed on October 31.
3-A2-1208	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Consultation	• TH notes that there is lots to think about in terms of socio-economic closure, noting that transparency provided to employees that speaks to the life of the Project. If there's temporary closure, communicating the potential effects to employees. How to plan for closure, financial impacts of that. • TH thinks that workshops and good orientation packages are important for employees to understand that and manage their budget. • TH notes that an understanding of the mine life and keeping that in the back of the community's mind, being prepared for closure. Perhaps educational programs that people can go into. Also ensuring businesses take that into consideration; TH and non-TH businesses.	• Goldcorp notes that if there are potential cultural and future social uses of the site in closure. Goldcorp asks if there are future social or cultural initiatives that TH wants Goldcorp to help support as well.	Provide examples of social closure to TH.		
3-A2-1209	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Consultation	• Q: Goldcorp asks if TH citizens feel more or less familiar with the Project? • A: TH thinks Citizens are more familiar now with the Project.				
3-A2-1210	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Consultation	• Q: Goldcorp asks if Citizens would have more feedback or different feedback now on closure if they are more familiar? • A: TH replies no.				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1211	17 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on closure. Goldcorp and TH discuss end land use objectives for the mine site and the NAR, closure activities, closure covers, temporary closure, and feedback on the Project Proposal, and engagement on the reclamation and closure plan moving forward.	Education and Training	<ul style="list-style-type: none"> <li>TH notes that citizens are very interested in training and employment for the Project.</li> <li>TH notes that pre-closure meetings with staff and citizens to understand the training and education that Citizens might want in the community.</li> <li>TH notes that it may not require too much training post-mining because most of the training related to construction and operations are transferrable. Need to identify transferrable skills. TH notes training for reclamation as well.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp notes that engagement with Citizens on management plans is the next steps for Goldcorp. Goldcorp wants to understand what TH is doing at a broad level and how Goldcorp can support that. Goldcorp will revisit this topic on October 31.</li> <li>Goldcorp notes that engagement with TH Citizens on the closure plan is very key.</li> <li>TH and Goldcorp agree for Goldcorp to propose an engagement plan for the closure plan and send it to TH for review. This engagement plan will incorporate near term and long term priorities.</li> <li>Goldcorp notes for TH to note other key components of engagement on the reclamation and closure plan and closure research.</li> </ul>			
3-A2-1223	19 October 2017	Email	Outgoing	TH	Consultation	TH asks if there are any materials in advance of the October 31 socio-ec and health workshop. Goldcorp replies with the draft agenda, and notes that the power points that are delivered at the workshops are for reference and summarize information presented in the Project Proposal; the power points at the workshops are not new information. Goldcorp explains that the October 31 meeting is meant to be a brainstorming and discussion session on the socio-economic management plan development and associated engagement plan for its development.	Meeting					
3-A2-1224	20 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH an updated agenda for the October 31 Socio-economic and Health workshop with social closure as an agenda item per the October 17 Closure workshop discussions.	Consultation					
3-A2-1229	24 October 2017	Email	Incoming	TH	Consultation	TH asks if Goldcorp will be able to send an updated HHRA before the meeting on October 31. Goldcorp explains that the HHRA is being updated currently and will not be available prior to Goldcorp's resubmission to YESAB. Goldcorp updates the agenda per TH's feedback.	Health				TH and Goldcorp	Goldcorp provided the items to follow up from this meeting via email to TH on November 7. This included a spreadsheet of action items.
3-A2-1348	24 October 2017	Meeting		TH	Consultation	Goldcorp and TH meet for a Project Development Meeting to discuss technical engagement action items, TH's feedback on the Technical Engagement Status and Plan document, and plans for the Project Proposal re-submission and 2018 exploration season.	Consultation	Goldcorp is looking for feedback on the technical engagement plan that was provided at the end of August. TH sent a response via email prior to the meeting and explained that they understood the Technical engagement plan was to serve as an updated scope of work for the addendum to the Capacity Funding Agreement. In the course of reviewing for completeness and technical teams perspectives it was realized that editing the Goldcorp document with TH material would create more confusion. To determine the budget it was felt the most efficient route would be to provide stand alone plans. The documents together would then form the totality of the scope of work. Additional confusion was created with recorded discussion at a technical level.	Goldcorp wants to confirm that the Technical Engagement Status & Plan document serves two purposes: capacity funding and consultation record. It is important for Goldcorp to have a response on it to ensure that they accurately understood the issues TH is raising through the engagement and ensure nothing was overlooked. TH's consultant's Environmental workplan (tabled following the water workshops in September) serves to duplicate this purpose but therefore seems unnecessary. Furthermore, it includes action items in it that were not discussed and agreed to at the meeting. Goldcorp needs to have a conversation with TH and their consultants about what was included in the document to understand these additional action items.	It was agreed that there are two outstanding deliverables: 1) TH to provide comments on Goldcorp's Technical Engagement Status & Plan to ensure it completely describes what is required for consultation and 2) Goldcorp to provide a list of action items that come out of the workshops	Goldcorp	Ongoing
3-A2-1349	24 October 2017	Meeting		TH	Consultation	Goldcorp and TH meet for a Project Development Meeting to discuss technical engagement action items, TH's feedback on the Technical Engagement Status and Plan document, and plans for the Project Proposal re-submission and 2018 exploration season.	Consultation	For technical sessions, TH requests that the materials ahead of time. Goldcorp was sending the PPT one day in advance as an FYI as to what will be reviewed at the meeting. It was noted that these were sent as a courtesy for situations where people were not able to connect via webex and were not required to be reviewed prior to the workshop. TH noted that when their team gets the slide decks the night before they assume they have to be reviewed. Once the TH technical team realized it was for background information they were less concerned.	Goldcorp acknowledged that some materials should be sent earlier for review and will endeavour to do so. If an item is required further in advance it can be discussed prior to the next session.	Goldcorp will make a note in the email of the PPT deck to the technical teams prior to technical session if review prior to the meeting is required or not, and will send items that require review earlier if possible.		
3-A2-1350	24 October 2017	Meeting		TH	Consultation	Goldcorp and TH meet for a Project Development Meeting to discuss technical engagement action items, TH's feedback on the Technical Engagement Status and Plan document, and plans for the Project Proposal re-submission and 2018 exploration season.	Contracting and Procurement	An update was given on the expanded exploration program. Unfortunately the river levels and barging issues didn't allow for the water truck to get to site in order to continue with the expanded program. Currently two reverse circulation drills are operating on-site. Work on building the road out to the Kona area is 1/3 of the way complete and will not be completed this season. The plan is to close the site on or around November 15. Lessons learned are that there is not a lot of capacity for barging in the summer because of lack of boat captains. Only 10 barges made it in to site this year as compared to 15 last year. Fuel had to be flown in which adds to operational costs. TH asked if we currently are using someone else's barge?  Does Goldcorp use Groundtruth for drilling?	Goldcorp doesn't have a barge and may look into purchasing one.  Not for drilling, however Goldcorp used them for soil sampling this year.		Goldcorp	Complete via email on November 7.
3-A2-1351	24 October 2017	Meeting		TH	Consultation	Goldcorp and TH meet for a Project Development Meeting to discuss technical engagement action items, TH's feedback on the Technical Engagement Status and Plan document, and plans for the Project Proposal re-submission and 2018 exploration season.	Consultation	Goldcorp is on track for a November re-submission. The TH letter is still in a draft awaiting review.  The resubmission will not be substantially different from what was originally submitted. An updated consultation section from March 31 date of submission will be included as well as updates to the commitments table. TH is looking for some clarity around language on discussions moving forwards in the letter. Commitments document review would be appreciated prior to the letter being delivered to YESAB.		Goldcorp to provide TH with a concise document of the updates to the consultation log.		
3-A2-1352	24 October 2017	Meeting		TH	Consultation	Goldcorp and TH meet for a Project Development Meeting to discuss technical engagement action items, TH's feedback on the Technical Engagement Status and Plan document, and plans for the Project Proposal re-submission and 2018 exploration season.	Consultation	Goldcorp asked if there was any feedback from the TH citizens meeting on Oct. 2nd that can be shared? TH gave a presentation on what had progressed since the last meeting and the engagement with Goldcorp to-date. The Northern Access Route (NAR) was also discussed including the analytical assessment of the Blackhills and details around the amount of pre-existing road. The citizens have a lot of confidence in Chief Joseph and the team working with TH on the project. TH confirmed for Goldcorp that no further information was required related to that subject. A couple of youth citizens attended the meeting, which was agreed to be a positive aspect.				
3-A2-1233	27 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends a meeting invite to TH to discuss the Environmental Workplan document on November 1.	Consultation					
3-A2-1236	28 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH a short briefing note in advance of the October 31 socio-economic and health workshop. The briefing note provides TH with background information on what a Socio-economic Management Plan is and how it works. The memo also iterates how TH is to be engaged in the SEMP development.	Consultation					
3-A2-1238	31 October 2017	Email	Outgoing	TH	Consultation	Goldcorp sends TH the Health Canada comments on the Project Proposal as requested.	Consultation					
3-A2-1239	31 October 2017	Email	Incoming	TH	Consultation	Goldcorp follows up with TH regarding the proposed November 1 teleconference to discuss the Environmental Work Plan. TH informs Goldcorp that TH isn't available and will confirm a date for the following week.	Meeting					



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1240	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<ul style="list-style-type: none"> <li>Goldcorp gives an overview of the objectives of a Socio-Economic Management Plan (SEMP). It incorporates commitments as well as feedback from external parties. The SEMP applies throughout the Project life, and it is adaptable.</li> <li>Goldcorp gives an overview of socio-economic effects monitoring to help provide clarity on the differences and linkages between the SEMP and the Socio-Economic Effect Monitoring (SEEM). Socio-economic effects monitoring involves multiple parties, as socio-economic effects are complex.</li> <li>Goldcorp notes that monitoring is an important aspect and for TH and Goldcorp to consider which other parties to engage, like Yukon Government (YG), in order to get value out of the future monitoring.</li> </ul>				
3-A2-1241	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<ul style="list-style-type: none"> <li>Goldcorp notes that indicators are not pre-selected, so it is important for TH to think about what TH sees for the future to choose the indicators that are most important and effective for TH.</li> <li>TH agrees that there's a lot of things to consider and looking at the cross-cultural communication aspect is important.</li> <li>TH notes in some circumstances, they have developed a code of conduct for principles of engagement, and this helped guide discussions so that both parties understood one another.</li> </ul>	Goldcorp notes there will be a place in the SEMP for that concept of principles of engagement. Goldcorp explains that monitoring is not just quantitative data, but also qualitative.			
3-A2-1242	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Quality of Life	<p>TH notes the cultural awareness training that TH offers that they would like to deliver to Goldcorp. Goldcorp notes plans to attend TH training and incorporate concepts into SEMP.</p> <p>TH notes the importance of identifying triggers for changes in approach and the fact that changes [in monitoring results] might be incremental. Goldcorp confirms that TH is expressing that locally developed indicators and thresholds are important.</p>	Goldcorp notes that it is important to understand how the indicators tie back to the Project, and that there may be triggers that result in the need for Government to take action. Being too specific about indicators can be difficult as well.			
3-A2-1243	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	TH notes that by operating in TH traditional territory there is a responsibility of stewardship on Goldcorp's part.	Goldcorp acknowledges this. Goldcorp notes that reporting is part of the SEMP as well.			
3-A2-1244	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<ul style="list-style-type: none"> <li>Goldcorp reviews how the consultation and engagement program and the Sustainability Excellence Management System (SEMS) standards also inform the development of the Project, including the development and implementation of the SEMP. Goldcorp explains SEMS, noting it is a continuous improvement system. Goldcorp notes that part of this was driven by the fact that not every jurisdiction has the same regulatory requirements, so it was a way to standardize Goldcorp's mine development across the world. Goldcorp does internal audits for compliance with SEMS.</li> </ul> <p>Q: TH asks how long SEMS has been around?</p>	A: Goldcorp replies that it has been around since 2014, and has gone through some revisions based on feedback from the sites. Edits each year are done to ensure it is up-to-date with standards. SEMS is not publicly available at this point.			
3-A2-1245	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<p>Goldcorp gives an overview of how the SEMP connects and manages socio-economic activities and how it combines aspects of SEEM, consultation and engagement, and SEMS. Goldcorp explains that a one-page, very conceptual high level SEMP was submitted with the Project Proposal. Now, Goldcorp is working on the draft SEMP, and this requires heavy consultation with potentially affected First Nations and communities. Once the SEMP becomes "final", it is an adaptable living document.</p> <p>Q: TH asks what the consultation program looks like for the SEMP?</p>	A: Goldcorp replies that this is an objective of today to understand what TH wants to see in terms of engagement.			
3-A2-1246	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	Q: TH asks about best practices in Yukon examples?	A: Goldcorp replies that there might be some lessons learned from other mines, like Minto Mine. There is lots to draw on from the environmental side for management plans, but not a lot for socio-economic management and monitoring. Goldcorp doesn't want to just use the Minto program, but wants to understand lessons learned there. Minto's program was very much tri-partite with Minto, Selkirk First Nation, and Yukon Government, and this was a success that Goldcorp wants to draw from. Goldcorp and TH are in a unique position now to engage and create a SEMP together. Goldcorp notes that there are examples in Yukon where a lack of process for integrating the socio-economic into Project management resulted in some failures. While there are not a lot of examples, there are lots of lessons to draw on.			
3-A2-1247	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	Q: TH asks if Goldcorp is looking at Northwest Territories for SEMP examples as well?	A: Goldcorp notes it has been suggested by others and requests for TH to send along examples that TH may be thinking of for this. Goldcorp has lots of internal examples to follow as well. Effective documentation is one piece that Goldcorp is particularly interested in that TH can provide if they have any examples.			
3-A2-1248	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	<ul style="list-style-type: none"> <li>TH notes that it's looking at where Yukon First Nations have been involved and communication has been there. Look at other First nations where they don't have the capacity to follow up, how do you make sure that follow up happens? Look at having consultation with the community on the objectives and layout of the plan</li> <li>TH notes the social and political context since Brewery Creek is so different now. TH is empowered at a different level now. TH notes that not getting caught in tokenism, following up and doing the work. TH notes that looking at TH traditional law, TH constitution, TH acts and legislation, and lots of ways TH law is enacted in ways the non-TH world would understand. Also be aware that there are communication understandings that need to be understood first.</li> </ul>				
3-A2-1249	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	Q: Goldcorp asks about these TH laws that are enacted that aren't understood by non-TH people, how would Goldcorp understand those?	A: TH notes that some laws and acts are very western. TH has been doing things to match a business style or a western style of communication but there's aspects that are missed in that western communication. TH notes that it's like the way you are at home compared to how you would be when you're doing business.			
3-A2-1250	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	TH notes that for First Nations, there's always some level of engagement acknowledgement that there is necessary time that needs to be allowed for things to be established. There needs to be faith in being heard in the meetings and that the consideration is real and the response is real. Good faith piece is very important.				



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1251	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Quality of Life	Goldcorp and TH discuss an approach to engagement on the SEMP. Goldcorp reviews a suggested approach, asks TH for input on the approach. This begins with a discussion of future vision for TH's community, and TH discusses the following points: <ul style="list-style-type: none"> <li>• TH notes that cultural identity, notes there's 7-8 generations of erosion.</li> <li>• Self-identity is important.</li> <li>• TH is often reactive to others coming in. Consider what TH envisions in a territory where mining isn't possible. TH is constantly playing active host to these outside factors coming in. employment for example, thinking about employment from the Project is too narrow.</li> <li>• TH Citizens are one generation out of residential school; this is important to recognize.</li> <li>• Goldcorp should consider revitalizing TH identity and bringing it to the forefront. Cultural identity is not the surface actions of hunting, fishing, beading, it is about how to conduct TH as a community.</li> <li>• Self-determination of self-government, the vision is being self-determined.</li> <li>• Protecting culture and traditions is important for TH.</li> <li>• Health and well-being of citizens and the community is important for TH.</li> <li>• Traditional values through the heritage department.</li> <li>• TH notes that TH's current governance is still colonial, there's a lot of fear around that. It was made illegal to govern as a First Nation the way it is done traditionally. Because of this, it is hard for TH to implement a governance structure that is more traditional.</li> <li>• There is a TH constitution – there is a level of assimilation that has taken place. To govern ourselves in a culturally appropriate manner, how do we do that when people grew up in residential school?</li> </ul>	Goldcorp notes that a mining company fundamentally moves around earth, and that there's a unique tie to the land for First Nations peoples. Goldcorp asks the question: how can Goldcorp support reconnection to the land, given what mining is, given that citizens are not all in Dawson?			
3-A2-1252	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Consultation	Goldcorp asks if it is appropriate to focus on Dawson as a location for TH Citizens, acknowledging that TH Citizens live outside of Dawson and Yukon as well? TH answers Goldcorp: <ul style="list-style-type: none"> <li>• TH notes that Citizens come home (to Dawson) to harvest, there is a tie to the land even if you live out of town. There's the environmental protection piece as well that ties people to the land.</li> <li>• There is a traditional law piece as well when you consider working for a mining company as a Citizen. There is an internal conflict for Citizens, as it's a conflict between having a job and providing for family or being environmental stewards; both of these are traditional law. The question is, how do you manage that internal conflict as an employer? TH suggests that it could be about acknowledging that conflict with traditional law. TH notes an example in Australia where there's a clear recognition that working for the mine is in conflict with traditional values, but its traditional law to also provide for your family.</li> </ul>	Goldcorp replies to TH's statements, noting that the baseline for the Project captures TH's programs in the community, and that there's a fear of being overwhelmed and capacity to respond when jobs and associated issues come up, so part of the mitigation is supporting existing programs so that being the tendency to be overwhelmed is avoided or reduced.			
3-A2-1253	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Quality of Life	<ul style="list-style-type: none"> <li>• TH notes that it's about realized effects or effects that are harder to see TH suggests that Goldcorp look at cultural or mental health supports for Citizens working at a mine, to consider the dissonance that is there. Part of this can be considering closure activities as an opportunity to get Citizens involved in closure of the mine as a healing activity. This will allow Citizens that have been involved in mining to be involved in the healing the land piece as well.</li> <li>• Community sustainability goes beyond economic effects of mining, but continuation of cultural values beyond the mine.</li> <li>• TH notes impacts on community infrastructure and services will occur as well, for example there are healthcare services and community services for Citizens and elders specifically. Dawson daycares are full at the moment, and the Robert Service School has a large population now as well.</li> <li>• Dawson has a lack of mental health and well-being focus in healthcare, and there is a cultural piece as well. There are mental health and well-being, as well as cultural effects, of a parent going out to work for two weeks at a time. In essence, a piece of the family unit is gone for half of the year.</li> <li>• Culture is all year long. For example, there is preparing to go out and hunt a moose, hunting the moose, then coming back and processing the moose. One can't schedule cultural identity.</li> </ul>	Goldcorp replies to TH's statements, noting that the baseline for the Project captures TH's programs in the community, and that there's a fear of being overwhelmed and capacity to respond when jobs and associated issues come up, so part of the mitigation is supporting existing programs so that being the tendency to be overwhelmed is avoided or reduced.			
3-A2-1254	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Education and Training	TH notes that Goldcorp should consider that jobs may not be the best way to support the community, maybe it's supporting these programs. People who struggle with employment need these programs first for the jobs to then come their way. Goldcorp needs to be a community member. TH has experienced many mining endeavors and has experienced ebbs and flows in population and employment. TH acknowledges Goldcorp's support in local sponsorships, noting that this is a positive place for that community member role, as long as it is appropriate to the needs and culture of the community.	Goldcorp acknowledges TH's statements, and notes that it's about being strategic and about supporting existing programs in the community that already have a degree of success. Goldcorp needs to understand how to balance out the urgent, the important, the unseen, and the long-term chronic issues. There might be a natural fit for Goldcorp to support an initiative or program in the community, Goldcorp and TH may need to get creative.			
3-A2-1255	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Quality of Life	Goldcorp asks TH about the self-determination aspect of employment for TH Citizen, TH provides some information: <ul style="list-style-type: none"> <li>• TH notes that the support for TH Citizens from Goldcorp could be investment in scholarships, or investment in the heritage sites, such as roles like the Mayor of Moosehide or the Caretakers of 40 Mile. These positions run based on investment dollars. A future for TH is to invest in TH's future.</li> <li>• Goldcorp should look at future-based training, noting that there is trauma involved with being trained for jobs that don't materialize for the community.</li> </ul>	Goldcorp notes that there was an idea brought up by TH in the Closure Workshop regarding opportunities for TH to grow local plants for reclamation. This kind of operation could be something that Goldcorp helps TH establish to support reclamation at Coffee, and the business could grow to supply other reclamation activities in the territory.			
3-A2-1256	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	TH and Goldcorp discuss ways that Goldcorp can be successful with TH in managing socio-economic effects from the Project: <ul style="list-style-type: none"> <li>• TH notes that it is important for Goldcorp to do the work to understand TH's perspective on the SEMP and effects management.</li> <li>• Goldcorp asks about groups that exist in the community for Goldcorp to reach to provide information and to hear feedback?</li> <li>• TH notes that people process information in the community, not necessarily in a meeting or focus group. By being in the community, one can observe how people interpret and share the information they've heard. TH notes that their observations about people in the community are informed by knowing the community.</li> </ul>				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1257	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Consultation	TH and Goldcorp discuss engaging TH and Dawson-based youth: <ul style="list-style-type: none"> <li>• TH doesn't have any clear direction on how to engage youth. TH notes that people stop engaging because they don't feel heard, and there is engagement fatigue. Goldcorp recognizes engagement fatigue and wants to use existing avenues for engagement.</li> <li>• TH advises Goldcorp to have a meeting specifically for youth. Suggests going to the school to discuss the Project and socio-economic engagement, and Goldcorp can go through TH to organize this.</li> <li>• TH is having their first Youth Council meeting on November 16. This could also be an avenue through which to engage youth.</li> </ul>				
3-A2-1258	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Education and Training	<ul style="list-style-type: none"> <li>• Q: Goldcorp asks about career counselling at the school?</li> <li>• A: TH describes how the school system has First Nations students that are so disenfranchised that the system doesn't help them. There's changes in the Yukon education system that have just happened to help this but that won't be the kids in school right now.</li> <li>• TH notes that there's issues within the community where the message to students/kids is that they need to go away to pursue further education, but at the same time there's the message to not leave Dawson; to not leave the community.</li> </ul>				
3-A2-1259	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	<ul style="list-style-type: none"> <li>• TH discusses vulnerable people in the community and opportunities for those people, such as women. TH is looking to Goldcorp to support those initiatives to give vulnerable people opportunities.</li> <li>• TH emphasizes that it is not about skills as a barrier to employment, it's about teaching Citizens to balance their lives to be an employee (with any organization).</li> </ul>				
3-A2-1260	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	<ul style="list-style-type: none"> <li>• TH notes that there is a crisis mentality within the community, for example people will leave work and return to the community for events that may not even affect them directly. An example is the death of a community member that may not directly affect a Citizen, but the Citizen drops everything and returns to Dawson to support their friends.</li> </ul>				
3-A2-1261	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	<ul style="list-style-type: none"> <li>• TH describes how there are citizens who lack the foundation due to effects of residential school, and the community struggles with that. Part of the hurdle is getting people to adapt to coming to work.</li> <li>• Much progress has been made by TH with TH citizens in the past two decades on this, but work is ongoing.</li> </ul>				
3-A2-1262	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<ul style="list-style-type: none"> <li>• TH notes the TH Constitution is a good reference document for Goldcorp, and the Together Today for Our Children Tomorrow document should be part of the SEMP for relationship with Yukon First Nations.</li> <li>• TH advises to use the TH Constitution as a reference for priorities. Cultural training would speak to this as well.</li> <li>• TH notes that it's important to understand predicted effects as well.</li> </ul>	Goldcorp notes that the importance of these documents is recognized. Notes that Goldcorp wants to focus on what it can carry out directly.			
3-A2-1263	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Education and Training	<ul style="list-style-type: none"> <li>• Goldcorp reviews the education and training topic area for the SEMP:</li> <li>• TH notes that education services or training some barriers for Indigenous peoples is even knowing how to access the opportunities. Also considering time frame for access to such opportunities.</li> <li>• TH notes that there is a role like that in Yukon College for helping guide TH Citizens in their access to school.</li> <li>• TH noted the college has essential skills program for students that will not go back to school for academic learning. Processes need to be in place to help students succeed in achieving their employment goals.</li> <li>• Preferential hiring practices for TH citizens is important. Those policies will be included in an agreement with TH.</li> <li>• TH encourages that Goldcorp considers having a workplace that values cultural values, for example being present for funerals in the community.</li> <li>• TH notes that there are many people in the TH community who are ready to go and competent, but there are some aspects of building a business that are very daunting. Getting loans are daunting. Also CORE certification. Setting people up to be successful.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp notes wanting to hire local wherever possible, however the challenge in Yukon is that the unemployment rate is so low. Considering the gap that is left if Goldcorp takes people away from their current job. It's hard to predict how many people will want to move back to Dawson for a job with Goldcorp, or for people if they move to Yukon to know where they want to live.</li> <li>• Goldcorp is looking to see where jobs don't need to be at the mine, where would you put them. Goldcorp envisions an office in Whitehorse for finance, for example and is looking at management of logistics in Dawson somewhere, with an office.</li> </ul>			
3-A2-1264	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Economic	<ul style="list-style-type: none"> <li>• TH notes that there are quite a few TH people who are able to work in finance and payroll now, so that office could be in Dawson.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp notes that they know that they need to be working closely with TH to be successful. How to work towards local hiring together, and looking at what TH can do that Goldcorp can't, and what to be cognizant of.</li> </ul>			
3-A2-1265	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Economic	<ul style="list-style-type: none"> <li>• TH notes it's about investing in the community, look at a training strategy and having people participate in that. TH has a number of citizens in Whitehorse and other parts of Canada as well. This should be considered in Goldcorp's definition of "local".</li> <li>• TH discusses TH and the City of Dawson and how people coming back make a bigger tax base.</li> </ul>				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1266	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Northern Access Route	<p>TH and Goldcorp discuss the Northern Access Route (NAR) and how this may need to be considered from a socio-economic perspective:</p> <ul style="list-style-type: none"> <li>• TH notes that the NAR is a tricky aspect, and gets talked about more than the mine footprint. Roads are small but they impact a very large geographical area.</li> <li>• TH Citizens are concerned about caribou, as roads disturb migratory herds.</li> <li>• Highway access has allowed people to get around on the land differently and into other area. TH notes an example of TH people who were tied to WRFN people due to river access but changed with highway access and how people travel.</li> <li>• TH notes that there were many comments and questions on the NAR during the Technical Working Group (TWG) but not sure how those have been addressed.</li> <li>• TH notes that the NAR will be a trigger piece, an emotional connection to the area. People may equate development now with the negative aspects of development they've seen over their lifetime. TH gives an example of Indian River, where the land has gone from a green space to a parking lot over 20 years with road access. It's not related to the Project, but there are many reasons that Citizens have a negative connotations with the road.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp discusses the engagement with TH on the NAR to date, and NAR tours and how the current state has been well established as it relates to the road.</li> <li>• Goldcorp notes that engagement the other actors on the NAR are a piece that Goldcorp has to work with on this. It's about discussing how to bring the other actors to the table. The commitment to engagement with multiple actors on the road may be something that is included in the SEMP.</li> <li>• TH needs to have an internal discussions about this first. Goldcorp agrees.</li> </ul>			
3-A2-1267	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	<p>TH and Goldcorp discuss community health and well-being:</p> <ul style="list-style-type: none"> <li>• TH is interested in Goldcorp's view of this topic first.</li> <li>• Goldcorp notes that there's inside the fence and outside the fence. Goldcorp wants everyone to go home safe, and wants to make sure that the public is safe as well.</li> <li>• Goldcorp discusses how Health Impact Assessment (HIA) and significance were discussed in March, and how their significance is interrelated but separately lose their importance. Goldcorp notes that from their technical expert's view, it would be children and youth that would be very important. In terms of the Human Health Risk Assessment (HHRA), the priority might be looking at perceptions and country food quality.</li> <li>• TH notes linking the project mitigations to the potential effects, and looking at the measures may be the best way to view this.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp notes that it is important that the discussion provide a strong sense of priorities, noting that the SEMP will be tied to the mitigations in the Project Proposal and that those mitigations are tied to effects.</li> </ul>			
3-A2-1268	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	<ul style="list-style-type: none"> <li>• TH notes that there are aspects that are regulatory and aspects that are part of the TH-Goldcorp relationship.</li> <li>• TH highlights the important consideration of TH's residential school generation, TH's intergenerational generation, and TH's resource extraction generation and how TH needs to figure the similarities, differences, and needs for each generation.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp notes that the SEMP is a place where Goldcorp and TH can discuss priorities and find areas to work on together. Development of the SEMP is a time to check in on VCs and see if they still apply and make sense.</li> <li>• Goldcorp and TH discuss the Community Health and Well-Being Assessment (CHWB). There are mitigations regardless of significance. Goldcorp notes that the slide is to stimulate conversation about the topic.</li> <li>• Goldcorp notes that a different way to look at priorities could be considering what initiatives are already underway for TH government. TH replies that there are some aspects of the CHWB that are harder for Goldcorp to get information</li> </ul>			
3-A2-1269	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Quality of Life	<ul style="list-style-type: none"> <li>• TH notes that role of women in the community is a topic with more focus nationally in Environmental Assessment so that is something to consider, also considering Elders as a vulnerable group. Chief of TH raised the concern that the elderly may move further into poverty if they're already there; notes for Goldcorp to consider groups with a fixed income.</li> <li>• TH notes that there is an aspect of cultural wellness to be considered as well.</li> <li>• TH notes that an enhancement is economic and social security for citizens. An indicator could be housing, or low income housing or access to child care.</li> <li>• TH notes that there could be a potential spike in single motherhood/births due to mobile workforce.</li> <li>• TH and Goldcorp discuss the Non-wage Economy part of the Project Proposal and how a monetary value was not followed through for the Non-wage Economy, as it was hard to define.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp discusses how some mitigations from other VC reports applied to others, so Goldcorp tried to keep that consistent. Food security is an important part of Non-wage Economy.</li> <li>• Goldcorp notes that it is important to not assess the same effect twice, so Goldcorp was careful about that in the Project Proposal.</li> </ul>			
3-A2-1270	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<p>TH notes that there may be a missing mitigation or one that drops off between versions of the draft Proposal and the submitted version. Goldcorp asks TH to follow up with Goldcorp when they find the missing mitigation and note it.</p>	<p>Goldcorp notes that cultural awareness training is under the Education and Training topic, and that there is also the Community Infrastructure and Services topic.</p>			
3-A2-1271	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<p>Q: TH asks if there is an Air Quality management plan?</p>	<p>A: Goldcorp confirms that there is an Air Quality and Greenhouse Gas Management Plan to be created for the Project.</p>			
3-A2-1272	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	<p>Q: TH asks if Goldcorp is re-submitting the same HHRA?</p>	<p>A: Goldcorp will submit the addendum if it is ready, but there is field data that is still being received. Goldcorp explains that the conversation has advanced with TH beyond "pre-submission" consultation.</p>			
3-A2-1273	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Regulatory Process	<ul style="list-style-type: none"> <li>• Goldcorp will discuss some of the issues identified by TH and look at a reasonable time frame for getting that back to TH. Goldcorp notes that the Project Proposal that was submitted was for the current mine plan. There are updates to the water quality modeling and air quality modeling that are being incorporated into the HHRA addendum, which will be submitted after the Project Proposal is re-submitted.</li> <li>• Goldcorp reviews the general responses to TH feedback regarding management plans. Goldcorp notes that the management plans are to be developed in collaboration with TH.</li> <li>• TH confirms that the SEMP will be developed through consultation in coming months.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp explains that it is appropriate to have a conceptual SEMP at this stage and work in detail from there. The mitigation measures from the socio-economic sections of the Project Proposal, noting that if there are mitigation measures that aren't in the Project Proposal the SEMP is where those should be as well.</li> </ul>			
3-A2-1274	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<p>Q: TH asks about the time frame for the SEMP to be developed? Notes that TH just received the information on this. TH will need to do more visioning, and to be engaged more on this.</p>	<p>A: Goldcorp is looking to develop the first draft of the SEMP in Q1 2018, and today is the first step, looking at how to organize the conversation and develop that communications process. Goldcorp notes that this will involve the community, more conversations with TH.</p>			
3-A2-1275	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<p>Q: TH asks about the SEMP in relation to re-submission?</p>	<p>A: YESAB doesn't require a SEMP. As licensing and the assessment progresses, more details on the Project will be developed. Goldcorp explains that by doing a fully formulated plan before there are opportunities for public comment is not a good idea or will make an effective plan.</p> <p>Goldcorp and TH review the YESAB process and how it relates to the development of the SEMP.</p>		TH	In progress



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1276	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Regulatory Process	Goldcorp and TH discuss the Local Assessment Area (LAA) for socio-economic VCs: <ul style="list-style-type: none"> <li>• TH notes that differentiating TH from Dawson and Whitehorse was the question. Goldcorp explains the EA methodology for including Whitehorse and how it can fall off based on effects identification.</li> <li>• Goldcorp asks if the comment was related to a specific VC as the LAA varies by VC.</li> <li>• TH doesn't know right now, action item to follow up on this.</li> <li>• TH notes that they believe that the scope of the LAA erased TH. TH will follow up on this. TH have different access to resources, different governance. This needs to be considered. TH comments were well-documented in the baseline, but then TH didn't show up in the assessment.</li> </ul>	Goldcorp notes that best efforts were made professionally to identify effects to vulnerable groups. Goldcorp notes data limitation issues are a real factor in Yukon as well. For example when looking at census data, can't distinguish TH from Dawson for certain indicators.	TH to share specific VCs where there are LAA comments. Goldcorp and TH will have a follow-up methodology discussion		
3-A2-1277	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Valued Components	TH notes that the issue is the specificity of effects, and looking at more vulnerable populations.	Goldcorp notes that segregating TH from Dawson would be difficult and take a lot of time, so the question is to look at the effect more broadly and more broad mitigations and then look at ways of monitoring this with TH. Residual effects were difficult to discern, and there may be more value in looking ahead and dealing with things in the SEMP to address vulnerable communities that may not have been addressed in the Project Proposal.			
3-A2-1278	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	Goldcorp and TH discuss the primary data that has come from TH, noting that the majority of it is from TH Citizens, and how this was used to inform assessments for all First Nations in the absence of primary data from other First Nations.				
3-A2-1279	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	TH and Goldcorp discuss how TH does not represent other First Nations.	Goldcorp acknowledges this and describes how there are efforts being made to give voice to potentially affected First Nations as the Project progresses.			
3-A2-1280	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	<ul style="list-style-type: none"> <li>• TH notes that the Project is in TH traditional territory, and other First Nations may be affected, but not as affected as TH. TH's perspective is that they need to be identified in these IRs, and working toward local employment and procurement initiatives for TH, not for other First Nations.</li> <li>• TH notes that identity is an issue, even the term "First Nation", the process needs to be open and transparent.</li> </ul>	Goldcorp notes that there are many vehicles for considering TH specifically, such as the local employment and procurement piece, in areas of the SEMP and perhaps an agreement. It's about making sure that TH Citizens know what it means to have a Goldcorp mine in their traditional territory.			
3-A2-1281	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Consultation	TH notes a strong dialogue between Goldcorp, TH, and YG will be important for this piece as well for infrastructure. Goldcorp notes that some of the infrastructure and services estimates in the PP are based on population assumptions. TH notes that social stability is an example where if a TH citizen can build a house during the Goldcorp era then can they maintain the house afterward. Social closure is part of this.				
3-A2-1282	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Consultation	Q: TH asks how City of Dawson is considered?	A: Goldcorp replies that they are engaged regularly, and are an information source for the Project.			
3-A2-1283	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Studies	TH explains that there is a collaborative report from Dawson and TH in 2006 regarding values intersection between both bodies.	Goldcorp notes that this document was looked at for the Project Proposal development, and that the SEMP is a good place for engagement with TH on separating out information on TH regarding specific infrastructure as well.			
3-A2-1284	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	TH notes that mental health programs are specific to TH, and that is a concern identified in the baseline for the Project. This also is part of cultural integrity for TH Citizens working at the site.				
3-A2-1285	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Economic	TH notes that Goldcorp will have to have flexibility regarding what involvement looks like for infrastructure and services, notes that 1996 a mining company paid for a full time math teacher because it was required.	Goldcorp intends to engage with service providers to ensure they know what these groups need to have information in advance to prepare. This is to prepare for situations and hope that Goldcorp doesn't need to pay for a math teacher because it's been forecasted and handled by the government.			
3-A2-1286	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Valued Components	TH notes that the baseline did a good job of documenting specific comments. It's about considering that in effects and mitigations.	Goldcorp notes that the comments were considered in development of the VCs and mitigations.			
3-A2-1287	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Regulatory Process	Q: TH asks if the rating is non-significant in the case where the effects are both positive and negative?	A: Goldcorp replies that the mitigation is applied and then the residual effect is considered non-significant. Goldcorp describes where in the Project Proposal that NAR mitigations are discussed, such as wildlife mortality is discussed in the wildlife VC reports.			
3-A2-1288	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	Q: TH asks about a scenario where the Project Proposal determines that something is not significant, but through the implementation of the SEMP the item is looked at, and it is found that in the future the effect is significant?	A: Goldcorp replies that the SEMP is to verify the predictions in the Project Proposal and monitor things like land and resource use and effects to that.			
3-A2-1289	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Management Plans	<ul style="list-style-type: none"> <li>• Goldcorp notes that the SEMP is an opportunity to also make sure that mitigations are being applied properly. There will be a reporting component that reports back to TH. Goldcorp and TH will develop this framework together. The SEMP will do what it can, but it will be developed over time, noting that there's only so much that Goldcorp can do. Hunting limits are the responsibility of Yukon Government.</li> <li>• TH notes that the language is important to consider, for example oral history can provide information on moose yield, it is not a number but it is information.</li> </ul>				
3-A2-1290	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	First Nations Issues/Concerns	TH notes that this is where the code of conduct on principles of engagement is so important. TH notes that as far as fish and wildlife go, TH law comes into play as TH Citizens follow different law than non-TH Citizens.				
3-A2-1291	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Northern Access Route	Q: TH asks about a Yukon Government plan for placer mining in the area?	A: Goldcorp explains the YG Resource Gateway project, noting that Goldcorp is receiving no money from YG on the NAR and Goldcorp alone is building it. Gateway is not included in the cumulative effects because YG has not put anything into YESAB at this time.	TH	In progress	
3-A2-1292	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Regulatory Process	Goldcorp explains significance determinations. Goldcorp and TH discuss effects to women as a result of mining Projects. Aspects to consider are access to child care, exposure of young women to a largely mobile and probably male workforce, looking at STIs, unwanted pregnancy, and considering a largely male workforce, women are left at home as full time parents and looking at adjustment periods for re-entry and exit. Looking at how women are able to equally access economic benefit.	TH to share information on considering women as a vulnerable population and equal access to Project benefits.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1293	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	Goldcorp will review the fish tissue, stream invertebrate tissue, and water quality data that were collected previously or are expected shortly (2017 studies). This information will be incorporated into the HHRA addendum. Goldcorp reviews the work being done on diesel particulate matter and the preliminary results.				
3-A2-1294	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	Q: TH asks what ratio being used for DPM to PM2.5	A: Goldcorp needs to review it and get back to TH.			
3-A2-1295	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	Q: TH asks if Goldcorp assumes that all DPM is PM2.5 in the current HHRA?	A: That is a conservative approach, and need to look at the results and determine if it is reasonably conservative.			
3-A2-1296	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	Q: TH asks if Goldcorp has thought about using Health Canada acute toxicity reference value for diesel particulate matter.	A: Goldcorp will look into this and get back to TH.			
3-A2-1297	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	Q: TH asks if the modeled uptake will be compared to baseline data? Notes confusion with data presented previously. How would you interpret data that is modeled where it will be lower than the current measured baseline information?	A: Goldcorp notes the variability for plant uptake is a consideration. This IR comment was misunderstood previously by Goldcorp, and we now understand that the TH reviewers were pointing out that there are good baseline soil chemistry and plant tissue chemistry data that can be used to predict plant uptake and human exposures. Goldcorp will look at this very closely and do a better job of uses the relevant site-specific information.			
3-A2-1298	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	TH thinks that Goldcorp could use current conditions to calculate exposure.	Goldcorp will have a look at this in the addendum.		Goldcorp	In progress
3-A2-1299	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	<ul style="list-style-type: none"> <li>• TH notes that certain plant species, for example berries and manganese, where you don't understand where the metals are. Not just arsenic is being disturbed when the earth's surface is being disturbed for the mine. To narrow the focus to one element isn't how TH's consultants would do this. 95th percentile would generate a new list of COPCs.</li> <li>• Q: TH asks if the 95th percentile used just for screening?</li> </ul>	A: Goldcorp replies that this is correct. This is for arsenic and other metals.	Goldcorp to include the waste rock exposure scenario and dust fall scenario and run a larger suite of COPCs using UCLM 95	Goldcorp	In progress
3-A2-1300	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	TH would like a more robust discussion about why Goldcorp isn't looking at individual metals in truck exhaust, Goldcorp agrees to provide rationale in the HHRA addendum.	Goldcorp reviews the original noise assessment estimates, 65 dB is the conservative estimate for the noise assessment.	Goldcorp to provide a rationale for exclusion of metals from consideration as contaminants of potential concern in combustion emissions		
3-A2-1301	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	TH notes that there is a trap line there and looking at the considerations for that in terms of MPOI (Maximum Point of Impingement) for the air quality predictions.	Goldcorp will ask the air dispersion modelling team if it is possible to get better information on predicted concentrations of airborne contaminants at the MPOI.	Goldcorp to examine acute exposure scenario, in addition to chronic exposures, for the air quality health risk assessment (for contaminants of potential concern other than criterion air contaminants) in the HHRA addendum	Goldcorp	In progress
3-A2-1302	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	TH notes questions about ingestion rates.	Goldcorp will email out this excerpt from the HHRA. (Goldcorp subsequently acknowledged that a rationale for the assumed ingestion rates was missing from the original HHRA appendix, with apologies, and committed to providing this in the HHRA Addendum).	Goldcorp to provide better documentation of the rationale for the assumed consumption rates		
3-A2-1303	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	<ul style="list-style-type: none"> <li>• Goldcorp discusses mercury as a consideration for fish consumption, an issue raised by Health Canada. This is perhaps a misunderstanding, since the project will not change environmental quality for mercury (although this is discussed early on in the HHRA and water quality and aquatics sections of the Project Proposal as a hypothesized project effect).</li> <li>• TH notes that a screening-level ecological risk assessment (ERA) could be done to tackle that, and asked if there are any plans to include a formal ecological risk assessment for assessing project effects on wildlife or fish.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp replies that an Ecological Risk Assessment has not been given a lot more thought, but has been discussed internally. Completing an effects assessment or aquatic life or wildlife can be completed using several different approaches, and ecological risk assessment is only one of these. For cases where the project is predicted to result in increased levels of metals/metalloids or other contaminants in air, soil, plants, water or sediment, comparing the potential exposures of aquatic life or wildlife to a threshold of effects is a risk assessment, but is not always presented in the same structured way that is used in a typical formal ecological risk assessment.</li> </ul>			
3-A2-1304	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	• Goldcorp provides a social closure topics handout, asks TH to take this away and provide feedback. TH provides preliminary feedback to consider women and financial literacy, as well as how land use might change.				
3-A2-1305	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Health	• TH notes that there's the piece of Goldcorp's community involvement managing dependencies on the community level.			Goldcorp	Complete, via email November 17.
3-A2-1306	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Consultation	<ul style="list-style-type: none"> <li>• TH notes there should be participation from TH department heads and staff and Elders, and Citizens for SEMP development. Elders provide direction for mining engagement.</li> <li>• Goldcorp encourages TH to consider experiences with closure in their traditional territory.</li> <li>• Review action items. No additions.</li> <li>• TH provides positive feedback on workshop format.</li> </ul>		Goldcorp to send TH an engagement plan for the SEMP and Closure Plan	Goldcorp	Complete during meeting.
3-A2-1307	31 October 2017	Meeting		TH	Consultation	TH and Goldcorp meet for a workshop on socio-economic and health topics. The Socio-economic Management Plan (SEMP) is discussed, as well as social closure, engagement on the SEMP and reclamation and closure plan, the Human Health Risk Assessment addendum is discussed as well.	Regulatory Process			Send TH the Health Canada comments on the Project Proposal.		

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Tr'ondëk Hwëch'in

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action	
3-A2-1312	07 November 2017	Email	Outgoing	TH	Consultation	<p>Goldcorp sends TH an email per previous discussions regarding the resubmission to YESAB, with the following attachments:</p> <ul style="list-style-type: none"> <li>List of additional Project Commitments resulting from consultation since March 31, 2017</li> <li>Summary of TH consultation &amp; engagement since March 2017, which will be included in the Consultation addendum</li> </ul> <p>These are items which will constitute part of the additional documentation in Goldcorp's resubmission to YESAB, which Goldcorp committed to sending you during our meeting on Oct. 24th.</p> <p>In regard to the ongoing Technical engagement Goldcorp attaches for TH's review:</p> <ul style="list-style-type: none"> <li>Technical Action Items Tracker</li> <li>Technical Engagement Status &amp; Plan (attaching for easy reference)</li> </ul> <p>Goldcorp provides TH with multiple documents per their request, this includes noting that there may be comments on the issues Goldcorp has captured (or potentially other ones we missed) in the Technical Engagement Status &amp; Plan. Goldcorp requests any comments be provided by Nov. 21st for inclusion in the updated resubmission documentation.</p>	Consultation						
3-A2-1344	17 November 2017	Email	Outgoing	TH	Consultation	<p>Goldcorp sends TH the annotated table of contents for the Proposal resubmission, a proposed engagement plan for the SEMP and reclamation and closure plan (social aspects), and a list of all management plans for the Project and proposed dates and time frames for providing drafts to TH for review and input.</p>	Management Plans						
3-A2-1346	23 November 2017	Email	Outgoing	TH	Consultation	<p>Goldcorp provides a memo to TH regarding the discovery of a previously unrecorded mineral lick along the NAR between the Stewart and Yukon Rivers. The memo summarizes how Goldcorp is considering additional mitigation measures associated with this mineral lick, including possible realignment of the NAR within the Local Assessment Area that exists for the NAR.</p>	Northern Access Route						
3-A2-1356	01 December 2017	Email	Outgoing	TH	Consultation	<p>Goldcorp replies to TH's comments on the Technical Engagement Status and Plan document; sends the document back to TH. Goldcorp also provides an updated technical engagement action items list based on TH's environmental work plan. Attached: TH Technical Engagement Plan 01 Dec 2017, TH Technical Action Items 01 Dec 2017</p>	Consultation						

# **SELKIRK FIRST NATION**

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1	14 March 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided SFN with the meeting minutes from the Socio-economic and TLU meeting on Feb. 22. Attachment: Meeting minutes	Consultation					
3-A2-2	24 March 2017	Email	Outgoing	SFN	Consultation	March 20 Goldcorp contacted SFN to provide potential dates for the Renewable Resources Council meeting that had been requested at citizens' meeting in Pelly Crossing and discuss feedback process: Afternoon of April 12th, AM or PM of April 28th. Noted that with the Easter holiday that week of the 12th, they would not be able to combine with other meetings - but happy to come back and do a community meeting or meet with youth and elders on the 28th. Or do it all together at the end of the month. Noted they would send meeting invite along for a call later this week to discuss the feedback process. March 22 SFN responded to book the afternoon of April 28 for the joint RRC and SFN Lands Dept. meeting. Noted they would work on trying to schedule the other community meetings around that time as well. SFN immediately responded noting they made a mistake and changed the date to April 12. Goldcorp confirmed. March 24 Goldcorp contacted SFN to note changes to schedules and unfortunately they could not meet the week of April 12. Asked if SFN had any availability the week of the 24th, 25th or 27th.	Consultation					
3-A2-4	31 March 2017	Email	Outgoing	SFN	Consultation	Goldcorp notified SFN of Goldcorp's Project Proposal submission to YESAB March 31, 2017. Additionally, the Section 3.0 Consultation and Engagement and associated appendices have been uploaded to Open Text Core. Noted that the remaining Project Proposal documentation will be uploaded in due course on Monday, April 3 - An electronic copy of the Project Proposal was also sent via registered mail to SFN.	Consultation					
3-A2-8	03 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp consultant notified SFN that there were new maps of the NAR uploaded to Open Text Core.	Information Sharing					
3-A2-11	04 April 2017	Email	Outgoing	SFN	Engagement	Goldcorp contacted SFN noting that they are planning a celebration for Aboriginal Day at Coffee Camp and are hoping to brainstorm some ideas with the potentially affected First Nation's that Goldcorp is currently working with. Welcomed any ideas or feedback regarding the event.	Consultation					
3-A2-12	04 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN rep to notify them that Goldcorp commissioned Hemmera to study the labour and skills capacity in local communities near the Coffee Project, and to identify some opportunities and challenges for Goldcorp in participating in the Yukon labour force and business community. Noted they would like to interview the individual about the Coffee Project and the local economy and workforce. Noted that if they would like to participate, Hemmera will contact them. Noted that the team would be in Whitehorse from April 3- 7 and 12-13.	Consultation					
3-A2-30	10 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN to let them know they would contact them via phone and to let them know if they have a few alternative dates for the RRC if the 27th does not work. Noted disappointment in having to postpone.	Meeting					
3-A2-35	11 April 2017	Phone	Outgoing	SFN	Consultation	Goldcorp noted to have left a message with SFN rep 2x: • last night around 4:40 to try to connect to reschedule the SFN RRC and Lands department meeting. • Today at 4:32: same message - noted to contact Goldcorp consultant. SFN returned call, noting wanting to reschedule RRC meeting - left contact info.	Consultation					
3-A2-36	11 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided SFN lawyer with SFN Funding Agreements, noted looking forward to feedback. Attachments: SFN Funding Agreement and Agreement with changes.	Agreements					
3-A2-37	11 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp sent SFN Chief a congratulations message on becoming Chief - noted looking forward to meeting and discussing the project.	Consultation					
3-A2-42	13 April 2017	Email	Incoming	SFN	Consultation	Advisory sent by SFN lawyer: Regarding filing with YESAB containing statements relating to consultation with SFN - which effectively amount to verbatim reportage of comments made by SFN, its Leaders or representatives in what SFN understood were private and confidential meetings and discussions - Noted problem and issue. Recommendation that Goldcorp retract anything placed on the public record concerning the content of G/C's discussions with SFN.	First Nations Issues/Concerns					
3-A2-45	17 April 2017	Email	Outgoing	SFN	Consultation	April 17 - Goldcorp consultant wanted to touch base regarding scheduling a meeting with the Selkirk Renewable Resources council next week. Suggested Tuesday, April 25 in Pelly Crossing. April 18 SRRC responded that they are not available until May - requested possible May dates. April 18 Goldcorp suggested May 29. April 20 - Goldcorp provided more possible dates for meeting: week of May 15 or week of May 22. SRRC noted they could check with the RRC and report back. April 26 - Goldcorp added that June 1 would work for Goldcorp as well.	Meeting					
3-A2-49	18 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp noted that Hemmera was commissioned to study the labour and skills capacity in local communities near the Coffee Project, and to identify some opportunities and challenges for Goldcorp in participating in the Yukon labour force and business community. Requested to interview individual - and provide any other people that may be interested from Selkirk Development Corp. Noted Hemmera would be in contact you to arrange a time for an interview.	Consultation					



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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-52	19 April 2017	Email	Outgoing	SFN	Engagement	Goldcorp shared the information that YG was providing a technical workshop for the MLI project – Water Quality Objectives and Effluent Quality Standards will be held May 9th at the High Country Inn - as a one day workshop. Noted that a formal invitation with attached documents, will be sent out in the next few days - in case anyone from SFN wanted to attend.	Information Sharing					
3-A2-64	25 April 2017	Email	Outgoing	SFN	Consultation	Goldcorp consultant contacted SFN individual to see if they would like to participate in the Community Capacity Profile interview studies Hemmera was conducting.	Consultation					
3-A2-149	27 April 2017	Letter	Outgoing	SFN	Consultation	Goldcorp mailed election congratulatory letters to SFN	Consultation					
3-A2-166	05 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp notified SFN that they had submitted the Project Proposal on March 31, 2017, and that it was currently undergoing Completeness Check from YESAB. Goldcorp noted YESAB's recommendation to revise Section 3.0 Consultation and Engagement - Goldcorp noted that the revised section 3.0 had been submitted to YESAB on May 5 2017. Further noted that the files were available on Open Text Core - provided link. Also noted that a usb flash drive was mailed to SFN with the files as well.	Regulatory Process					
3-A2-173	05 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp notified SFN that Goldcorp submitted the Coffee Gold Project Proposal on March 31, 2017 to the Yukon Environmental and Socio-economic Assessment Board (YESAB). Since submission, the Project Proposal has been undergoing a "Completeness Check" from YESAB. During this process, YESAB recommended that Goldcorp revise Section 3.0 Consultation and Engagement of the Project Proposal to more clearly reflect the requirements of consultation under the Yukon Environmental and Socio-economic Assessment Act (the Act). The revised version of Section 3.0 Consultation and Engagement has been submitted to YESAB today, May 5, 2017, and has been uploaded to Open Text Core - USB flash drive was mailed as well. Attached: memo sent to YESAB outlining the specific changes made to Section 3.0 Consultation and Engagement .	Consultation					
3-A2-176	05 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp contact SFN reps regarding Community Profiles study that Hemmera was going to undertake for the Coffee project. Noted the intent was to supplement our Socio-economic baseline. Noted they would like to interview the individual. Also requested assistance identifying other appropriate interviewees from Pelly Crossing business community - to represent SFN.	Consultation					
3-A2-177	08 May 2017	Email	Outgoing	SFN	Engagement	Goldcorp provided SFN with Goldcorp's official Request for Proposal (RFP) for the 2017 drill pad contract. Noted that at this time they are looking for one contractor to undertake both the exploration and the geotechnical programs. Noted additional work completed by TetraTech over the past month on footings and stabilization on steep terrain - described in attached memo and spreadsheet - noted memo is still in draft format and discussions are ongoing, however this is indicative of the direction we are heading in ensuring integrity of pads and safety of personnel. Attachments: 1. Drill pad anchor memo 2. Drill pad RFP 3. golden guide ENG 4. Geotech points spread sheet	Consultation					
3-A2-178	08 May 2017	Email	Outgoing	SFN	Consultation	May 5 Goldcorp contacted SFN to discuss Community Profiles to supplement the socio-ec baseline - noted wanting to interview SFN individual - and also assist in identifying other individuals who would be appropriate for the study in Pelly Crossing. SFN individual responded on May 8 noting they would be happy to participate and provided information for 2 other individuals. Goldcorp Thanked SFN individual for wanting to participate.	Consultation					
3-A2-187	11 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp discussed community profiles work with SFN EcDev corp, and they requested more info on the community profiles.	Studies					
3-A2-198	17 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp responded to SFN meeting date suggestion of May 29 in Pelly Crossing - noting Goldcorp would be happy to meet with Council.	Meeting					
3-A2-203	17 May 2017	Email	Outgoing	SFN	Consultation	Feb 17, 2017 Goldcorp provided SFN lawyer with a copy of the latest version of the Funding Agreement. March 10 Goldcorp requested feedback from SFN on the agreement, and check on the status of the TLUS and Socio-ec studies. March 27 Goldcorp followed up on the requested update. March 27 SFN lawyer responded, noting they still had the draft funding agreement under review. Noted community survey info was to remain confidential. Noted interest to go forward with arrangements for use/adaptation of the Minto Mine Socio-Economic monitoring program for Goldcorp purposes and Coffee context, including offer to fund the next round of program updating. March 30 Goldcorp followed up to ask when they expect the feedback for the funding agreement, also asked what would be required to share info as it relates to the socio-ec and TLUS - as to move things forward. May 17 Goldcorp followed up with SFN to check status of Agreements.	Agreements					
3-A2-204	17 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp sent the revised SFN TLUS TOR noting payment would be made in the noted amount. Attachment: SFN TLUS TOR. - In response to May 9 email from SFN Lawyer that included the revised TLUS TOR	Agreements					

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3-A2-205	17 May 2017	Email	Outgoing	SFN	Consultation	May 5 Goldcorp contacted SFN regarding Community Profiles study. Noted potential date for meeting - June 2. Noted wanting to set meetings with; 1) Lands department and Renewable Resource Council 2) Chief and Council 3) General community 4) Elders Council. Suggested a call to organize. May 8 SFN noting they would be in touch with confirmations and the RRC was considering May 29. May 11 Goldcorp noted they could provide additional dates if needed. May 16 Goldcorp noted May 29 for the Chief and council meeting, asked if that date was still ok for the RRC. SFN replied that May 29 should work, and noted being able to do the Lands Dept and RRC that day as well. Later noted being unable to confirm May 29 with the RRC but could schedule the Lands Dept. for the 29th. May 17 Goldcorp confirmed May 29 for meeting with Lands Dept. - proposed start time of 11am	Consultation						
3-A2-211	19 May 2017	Phone	Incoming	SFN	Consultation	SFN leaves a voicemail for Goldcorp cancelling the meeting with the Lands Department on May 29th.	Meeting						
3-A2-213	19 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN to apologise for missing their message earlier as they were at the Gold Show in Dawson all day. Noted being able to change the meeting booked for the 29th and lengthening it and starting earlier or later depending on when the meeting with Council. Noted they can touch base after the long weekend.	Consultation						
3-A2-216	23 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided SFN with the proposed agenda for the May 29th meeting between SFN Chief and Council and Goldcorp. Noted that they welcome SFN's review and input on the proposed agenda. Also provided Goldcorp's pre- and post-season reports on exploration activities on the Coffee property for 2016 and 2017 for SFN's information. Attachments: May 29 meeting agenda, 2016 and 2017 exploration reports.	Consultation						
3-A2-217	23 May 2017	Email	Incoming	SFN	Consultation	SFN's TLUS consultant provides an update on the TLUS underway. Attachment: progress report.	TK/TUS						
3-A2-251	29 May 2017	Meeting		SFN	Consultation	Goldcorp consultant meets with SFN Development Corporation to discuss local employment and procurement. This is an interview to gather additional socio-economic baseline data for the Proponent's Community Profiles project.	Economic						
3-A2-252	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Economic	SFN Council notes that they are looking for a refresher on the Project to bring all members up to speed. Goldcorp presents an overview of the Project, including Goldcorp's Canadian operations, SEMS, and an overview of the Coffee Project. Goldcorp notes that fleet automation is being looked at and describes the employment numbers expected for the Project, which are the "worst case scenario"; there will be more jobs should Goldcorp not pursue fleet automation. Q: Asks if there will be 320 people on the site at all times?	A: There will be approximately 160 people on site at any time. Goldcorp describes how automation would be considered for a repetitive job, like hauling. Goldcorp provides a description of the mine plan and layout of the site and describes how the Heap Leach Facility (HLF) is free-draining.				
3-A2-253	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Heap Leach	Q: Asks what the HLF is?	A: Goldcorp describes ore processing using a HLF in detail, noting that the process is a closed loop for the Coffee Project.				
3-A2-254	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Water Quality	Q: Asks where the waste water goes?	A: Goldcorp replies that the water is recycled in processing. In closure, once the water is treated, it will be discharged.				
3-A2-255	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Water Quality	Q: Asks how Goldcorp will clean the HLF water?	A: Goldcorp explains how cyanide is broken down, and how Goldcorp will use bacteria and electricity to remove contaminants from the water, explaining the HLF rinsing cycles. Goldcorp will have to meet criteria set out in licenses before discharging any water. The HLF will be covered and re-vegetated in closure. Goldcorp notes that there is no acid rock drainage from this Project because sulphides are not being mined, and explains building the HLF in phases and progressively reclaiming the heap. Cyanide and nitrogen are the species that need to be dealt with in water treatment.				
3-A2-256	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Fish	Comment: Effects to salmon are a concern for SFN, SFN wants to bring salmon back to the territory.	Goldcorp responds by describing the International Cyanide Management Code and how Goldcorp subscribes to this through SEMS. Goldcorp offers to provide more information on cyanide, noting that more conversations about cyanide and the HLF need to occur. SFN notes wanting more conversations about this, particularly as it relates to wildlife. Goldcorp agrees.				
3-A2-257	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Project Design	Q: Asks about concerns on site such as permafrost?	A: Goldcorp describes the geotechnical work being done currently. Goldcorp will remove the permafrost for HLF construction, and is looking at the north facing slopes in detail for permafrost considerations.				
3-A2-258	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Climate Change	Q: One concern is how Goldcorp is considering climate change?	A: Goldcorp is incorporating climate change into all engineering.				
3-A2-259	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Operations	Q: asks if this is a year-round project?	A: Mostly year-round. Stacking of the HLF may not occur for 3 months of the year, as Goldcorp doesn't want to freeze the HLF.				
3-A2-260	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Asks if the road is going to be used year-round?	A: Yes, except during freeze-up and thaw periods.				

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3-A2-261	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Goldcorp describes the route, noting the areas that are currently maintained seasonally by Yukon Government and the proposed areas of new construction, describing the ice bridges and barges along the route, and the alternatives assessment that Kaminak undertook when selecting the NAR. Q: Asks about the alternatives for the NAR and how this is going with Tr'ondëk Hwëch'in?	A: The NAR is what was submitted to YESAB. At this stage, nothing else has been proposed.			
3-A2-262	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Asks if the routing in SFN territory is still there?	A: Goldcorp replies that nothing has changed. A few small changes have occurred, for example the small upgrades performed by a placer miner in the Black Hills area, but nothing in the proposed NAR in SFN territory has changed. The proposal includes new barge landings, which were chosen based on engineering requirements.			
3-A2-263	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Consultation	Goldcorp discusses the delays in technical review with SFN. Goldcorp hopes to schedule technical meetings about the NAR, HLF, and water quality. Goldcorp would bring their technical experts into these conversations. Goldcorp continue to discuss the NAR , highlighting the management approach and the concerns Goldcorp has heard to date				
3-A2-264	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN asks where the public road is?	A: Goldcorp explains the current route that exists and is used by the public but is placer miner maintained.			
3-A2-265	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN notes that there should be an agreement with YG, Goldcorp, and SFN about this road route. SFN doesn't want placer miners coming into the new area that will be opened up by the road. SFN also has concerns about effects to moose.	A: Goldcorp is not allowing public use of the barge and ice roads, but cannot put gates on the road. Goldcorp does not have the authority to gate the road.			
3-A2-266	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Asks if it's the Yukon Government or the federal government that has the jurisdiction to control access on the road?	A: Goldcorp replies that YG would need to come together on this; Goldcorp is at the early stages of the conversation with YG and wants SFN to be a part of those conversations			
3-A2-267	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN asks what will happen to the NAR in closure	A: Goldcorp notes that currently, one is able to drive to the Stewart River. Areas of new build past this point are proposed to be reclaimed; however it is important for SFN to consider the YG Gateway Project. Goldcorp would remove the barges and no longer build ice roads.			
3-A2-268	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN asks if the road would be radio controlled?	A: This is what Goldcorp proposed. The north end of the NAR can be driven quite easily, south of the Stewart is a different story. Radios will be used for safety. Goldcorp will have meetings with First Nation partners and the Dawson community to discuss the road and the radio controls, will post the radio frequency on signs. This is a higher level conversation now, and will need to have more engagement with the multiple interested parties (YG, TH, SFN). Goldcorp notes the vast road network in the Goldfields currently.			
3-A2-269	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN Asks about the landing where the NAR meets the Yukon River, wants to know if someone can use it?	A: Goldcorp is going to gate the landing. Goldcorp cannot control if someone wanted to go up or down the river and access the area from another spot. Goldcorp is one user of the road, and wants to have these conversations with SFN.			
3-A2-270	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN asks what will happen if the NAR is not approved?	A: This depends on the circumstances; regardless, the Project requires a road.			
3-A2-271	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Would Goldcorp consider the Casino route again?	A: Goldcorp wouldn't completely rule the route out, but it would set the Project back years.			
3-A2-272	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Comment: SFN notes a concern about Goldcorp coming in and building the NAR, then YG taking it over. SFN wants to be involved in these conversations.	Reply: Goldcorp agrees with SFN.			
3-A2-273	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN asks if there have been baseline studies along the NAR?	A: Yes.			
3-A2-274	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Studies	Q: SFN asks if Goldcorp has looked at wildlife, fish, and birds, and other aspects of the landscape such as mineral licks?	A: Goldcorp has looked at all of these aspects and more. Goldcorp will be installing culverts and upgrading many stream crossings along the NAR to improve habitats. There has also been much work done on moose habitat, such as mineral licks, and how to manage snow removal with respect to moose and caribou. Goldcorp has been working closely with YG on this.			
3-A2-275	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Comment: SFN comments that there are concerns about the road being public and how this might contribute to poaching in the area. There are also concerns with monitoring the road.	Reply: Goldcorp notes that this concern has been raised by many parties. The road is currently open during moose harvest season. Goldcorp is also considering how to monitor and manage the NAR, Goldcorp is actively monitoring populations, and wants locals to be able to harvest moose, but doesn't want it to result in excessive harvest. Goldcorp comments that they cannot gate the road, but YG could. This is why it is important to have all of these parties at the table for these discussions. Goldcorp notes that the baseline information for the Project was shared in early December 2016, and it would be good to do a road-specific session.			
3-A2-276	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: SFN asks if Goldcorp doesn't want a private lease road?	A: Goldcorp doesn't make this decision, and describes the various options for the road that are currently seen as feasible. The next step is for Goldcorp, YG, TH and SFN, and others, to discuss management options.			
3-A2-277	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Asks if Goldcorp will be hauling gold on the NAR?	A: Goldcorp is just hauling supplies on the NAR, gold will be flown out, and there is no concentrate.			

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3-A2-278	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Asks if Goldcorp looked at barging as an option?	A: Barging was looked at as one of the 7 original options, but it is not practical. Goldcorp does not want to do that much barging.			
3-A2-279	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Goldcorp describes transporting cyanide along the NAR in ISO containers. Comment (SFN): Goldcorp will need lead time for ordering the barge; Goldcorp will want this barge in place to support development.	Reply (Goldcorp): Once out of YESAB with the decision document, Goldcorp will separate the mine and the NAR for permitting. Goldcorp is hoping to have the NAR complete by 2019 and use it to get equipment in. Goldcorp will look at ordering barges when the decision document is in hand.	Send SFN information on cyanide and NAR management.	Goldcorp	Complete May 31.
3-A2-280	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Northern Access Route	Q: Asks if Goldcorp will have the barge as an in-house item?	A: Goldcorp doesn't know yet. Goldcorp will own the barge but may contract out operations. Goldcorp can legally control the barge landings, the barges, and the ice roads. Goldcorp describes the Project schedule, with first gold being poured in April 2021.			
3-A2-281	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Project Design	Q: Asks if Goldcorp will affect all drainages at once?	A: The catchments with impacts are coloured in the information package provided. Goldcorp describes the characteristics of YT-24, Halfway Creek, Latte, and Coffee Creek drainages. The wildlife and traditional use values of Coffee Creek were part of the reason that Goldcorp wanted to move the WRSF out of Latte Creek. Goldcorp describes fish baseline findings, and the natural Uranium signature around the site. Goldcorp notes a technical workshop on water quality is needed with SFN.			
3-A2-282	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Information Sharing	Q: Asks if there are placer operations run by Goldcorp in the area?	A: Goldcorp has placer claims, but don't have plans for placer mining. Notes that the claims are uneconomical in the Coffee Creek area.			
3-A2-283	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Fish	Q: Asks if the creeks could be considered for habitat restoration?	A: Spawning isn't seen in these creeks, but there is TK about spawning in the past. It is not good habitat for spawning.			
3-A2-284	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Consultation	Goldcorp describes the community investment protocol and the comment and response process. Q: SFN notes that the affected community consultation didn't include Pelly Crossing.	A: Goldcorp explains that affected communities are distinct, and that Pelly Crossing is used as a proxy statistically for SFN.			
3-A2-285	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Information Sharing	Q: asks about a newsletter.	A: Goldcorp does newsletter mail drops in Pelly Crossing for all addresses in Pelly Crossing.			
3-A2-286	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Fish	Q: SFN asks about heritage work in Coffee Creek for First Nations and Salmon.	Goldcorp notes doing a water workshop and a site tour with SFN. Workshops are a good way to present information and identify gaps for further discussion. For example, there has been a water quality station added on Coffee Creek based on feedback from SFN technical consultants.			
3-A2-287	29 May 2017	Meeting		SFN	Consultation	the Proponent meets with the new Chief and Council for SFN to provide a Project overview and to create an opportunity for SFN to present views on the Project. Next steps in engagement with SFN are also discussed.	Information Sharing	Goldcorp and SFN review the Coffee Land Package, discuss how there are no plans for the Sugar deposit for the time being.				
3-A2-294	31 May 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided SFN with the following: 1) Goldcorp Cyanide Management Overview powerpoint 2) Road Management strategy options introductory letter 3) Road Management strategy options powerpoint  Also included a calendar with potential dates for consideration related to the site tour and citizens and/or technical meetings on the topics identified in the meeting (water, the road, and heap leach). Requested SFN indicate preferred dates. Noted that Goldcorp was open to making space for additional meetings for the elders council or other groups within the community. Attachments: Goldcorp Cyanide Management Overview powerpoint, Road Management strategy options introductory letter, Road Management strategy options powerpoint and Potential Dates Calendar.	Consultation					
3-A2-299	01 June 2017	Email	Incoming	SFN	Consultation	SFN consultant provided Goldcorp with the SFN TLUS Terms of Reference. Attachment: SFN TLUS TOR	TK/TUS					
3-A2-305	02 June 2017	Email	Incoming	SFN	Consultation	SFN provided Goldcorp with the revised version of the Funding Agreement with Selkirk to which two major changes were made, being substitution of the Work Plan by the Schedule B submitted to Goldcorp with no revision marks nor comments and insertion of a new section 15 to take into consideration that this agreement shall be effective as of November 21st, 2016. Otherwise, if effective date would have been 2017 after application of the proposal to YESAB, then it would have been necessary to review the agreement to remove all language which refers to undertakings or covenants prior to the date of filing of the proposal in March 2017. Goldcorp responded providing Agreements with changes - in respect to what was previously noted. Attachments: SFN Co-operation Agreement and SFN Co-operation Agreement - showing changes	Agreements					
3-A2-307	04 June 2017	Email	Incoming	SFN	Consultation	SFN provided revised versions of the Funding Agreement to Goldcorp, noting 2 major changes. Goldcorp then provided SFN lawyer with the agreement, SFN acknowledged receipt of agreement and noted site tour and the preferred date of June 23 for the Council. Goldcorp responded that they look forward to feedback on the Agreement and will plan the site tour accordingly.	Agreements					
3-A2-504	12 June 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN Lawyer to see if they were available in Whitehorse over the next few days to discuss the SFN funding/confidentiality agreements, as well as the TLUS TOR.	Agreements					



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-507	12 June 2017	Email	Incoming	SFN	Consultation	SFN consultant requested information regarding the changes made to Section 3 (Consultation) of the Project Proposal. Goldcorp responded with instructions as to how to access the correct version and to view the changes that had been made. Goldcorp consultant noted that the changes were made to both the appendices to section 3.0 and the chapter 3.0 itself - the changes are related to re-formatting.	Regulatory Process					
3-A2-510	12 June 2017	Email	Outgoing	SFN	Relationship Building	Goldcorp contacted SFN to notify them Goldcorp was sponsoring the North American Indigenous Games, and inquired if any SFN citizens were participating.	Information Sharing					
3-A2-521	13 June 2017	Email	Outgoing	SFN	Consultation	On June 5 Goldcorp contacted SFN thanking them for the confirmation of June 23 as the preferred date for a site tour with SFN Chief and Council. Logistic details were also provided. SFN responded with confirmation and noted they will have someone appointed to coordinate. On June 13 Goldcorp consultant followed up with SFN as they had not had confirmation from SFN regarding attendees for the flight. SFN responded the same day noting they would supply the list of names shortly.	Site Tour					
3-A2-529	15 June 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN on June 5 to confirm the site tour date of June 23 for Chief and Council. Provided pickup logistics. SFN noted they would coordinate and respond back. June 13 Goldcorp followed up regarding attendees for the tour as they had not had any confirmation. Alternate SFN contacted responded that they would confirm names by the next day. June 15 SFN provided the attendees for the site tour - requested information regarding logistics. Goldcorp responded, noting that a 'packing list' would be provided.	Site Tour					
3-A2-537	18 June 2017	Email	Incoming	SFN	Consultation	June 16 SFN lawyer contacted Goldcorp in regards to meeting to discuss SFN agreements. June 18 Goldcorp noted being in Dawson that week, but was able to have a call - noted hoping to move forward with technical review and business support and move forward on a negotiation agreement.	Agreements					
3-A2-543	20 June 2017	Email	Outgoing	SFN	Consultation	June 19 Goldcorp consultant provided Site Tour logistics information to SFN for the tour scheduled for June 23. Including a detailed flight and tour itinerary in a second email. Noting airport arrival time. Attachment: Site Tour Agenda. June 20 SFN contacted Goldcorp consultant to thank them for the agenda and confirm attendees for the site tour - Goldcorp confirmed flight manifest change. Goldcorp also provided an updated agenda reflecting name changes. Attachment: Updated Site Tour Agenda.	Site Tour					
3-A2-545	20 June 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN to provide the agenda for the SFN site visit scheduled for June 23. SFN responded with names of attendees and confirming arrival times.	Site Tour					
3-A2-548	20 June 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN noting they were looking forward to the site tour scheduled for June 23, and to advise that there would be TH reps at the tour as well.	Site Tour					
3-A2-549	21 June 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN to provide the agenda for the SFN site visit scheduled for June 23 and to confirm which Councillor would be attending. Noted TH reps would also be at the tour. Attachment: Site Tour Agenda. SFN responded with attendee confirmation. Goldcorp thanked SFN for the information.	Site Tour					
3-A2-557	23 June 2017	Site Visit		SFN	Consultation	Site tour of current Coffee Camp, proposed pits and infrastructure, and Heap Leach facility location, as well as a flyover of Halfway Creek.	Project Design					
3-A2-563	26 June 2017	Email	Outgoing	SFN	Consultation	Goldcorp consultant contacted SFN to thank them for their help organizing the site tour. Noted that there was a photo from the tour that Goldcorp would like to use in their newsletter - requested permission to use the photo and provided a release form for individuals to sign. Attachments: 1. SFN Site Tour Photo 2. Release Form. SFN responded that they would forward the request to the Council - Goldcorp thanked SFN and asked what the timeline would be.	Site Tour					
3-A2-564	27 June 2017	Email	Incoming	SFN	Consultation	SFN lawyer contacted Goldcorp in regards to organizing a site tour for the SFN tech/lands team, including a tour of the road route. Requested possible dates. Goldcorp responded they would check on available dates.	Site Tour					
3-A2-571	04 July 2017	Letter	Incoming	SFN	Consultation	Goldcorp received email from SFN regarding proposal consultation Attachment: Letter Dated July 4 2017, Addressed to YESAB from SFN. Letter addresses the Coffee Gold Mine Proposal Consultation. SFN notes the proponent has not met consultation obligations under YESAA.	EA					
3-A2-574	05 July 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided the permit application for the planned 2017 Heritage Resource Impact Assessment (HRIA) for the Northern Access Route. Noted that the application includes description of how SFN will be involved with the assessment. Attachment: HRIA Permit Application	Heritage					
3-A2-579	07 July 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided SFN with revised agreements for Funding and TLUS. Requested that SFN review and advise, and organize a call for the following week. Goldcorp also requested dates for the Negotiations of Collaboration Agreement, Site Tour, Road Tour, and Community Update Meeting. Attachments: 1. Draft SFN TLU Agreement 2. Draft Co-operation in Project Assessment and other matters Agreement July 17 Goldcorp followed up to see if SFN had reviewed the provided documents.	TK/TUS					
3-A2-608	14 July 2017	Meeting		SFN	Consultation	TLUS payment was delivered to SFN during a meeting in Pelly Crossing with Chief and Council.	TK/TUS					
3-A2-609	17 July 2017	Email	Outgoing	SFN	Consultation	Goldcorp followed up with SFN to see if they had the opportunity to review the revised Agreements sent on July 7 2017.	Agreements					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-612	17 July 2017	Email	Outgoing	SFN	Consultation	Goldcorp notified SFN that YESAB had discontinued the assessment of our Coffee Project Proposal. Noted that YESAB identified concerns with record of consultation with SFN. Noted wanting to remain fully committed engaging with SFN. Noted that Goldcorp will be reaching out shortly with a formal outline of next steps and how to proceed. Attachment: YESAB Assessment Ltr	Consultation					
3-A2-619	25 July 2017	Email	Outgoing	SFN	Consultation	Goldcorp provided a letter proposing how to progress project consultation with SFN. The letter summarizes the Project Proposal submission on March 31st, 2017, and previous meetings with SFN and Goldcorp's commitment to open and transparent dialogue with SFN. Goldcorp's letter highlights the interactions with the Project and SFN territory. Goldcorp also summarizes the good progress made with the SFN and Goldcorp relationship, and the technical workshops that SFN representatives attended prior to submission, noting that SFN has indicated that written feedback is not of interest to SFN. Goldcorp requests SFN's preferred method of providing feedback by August 31, 2017. Attachment: project comments letter SFN FINAL	Consultation					
3-A2-643	28 July 2017	Email	Outgoing	SFN	Consultation	Goldcorp reached out to SFN to arrange tours for SFN's technical consultants on August 23 and 24. SFN replied that their technical team would like to see the site, however the dates that Goldcorp had suggested won't work, so SFN suggests that the tour happen the following week. Goldcorp replied letting SFN know that they are unavailable the following week and suggested some dates in mid September, and said they could possibly do both tours in the same day although that would mean that the group would have to be quite small.	Site Tour					
3-A2-646	01 August 2017	Email	Outgoing	SFN	Consultation	Goldcorp thanked everyone for the call the day before and had attached a schedule for consultation and engagement going forward. Goldcorp had proposed a combination of a teleconference in late August to discuss which format SFN would prefer for consultation, a number of technical workshops in September and October in Whitehorse, a site tour for technical staff and leadership, and a citizens meeting in September and October. Goldcorp asked SFN to let them know ASAP if these dates and topics work so that arrangements can begin, and invite SFN to suggest changes to meeting format and subject matter. SFN replied that they will review. Goldcorp forwarded the response internally Attachment: Goldcorp CSR Schedule_Calendar View_July31 SFN	Consultation					
3-A2-648	03 August 2017	Email	Outgoing	SFN	Consultation	SFN provided an update on SFN's Traditional Land Use Survey. Attachment: Progress Report - SFN Traditional Land Use Study (August 2017)	First Nations Issues/Concerns					
3-A2-654	07 August 2017	Email	Outgoing	SFN	Consultation	Goldcorp contacted SFN to let them know that Tetra Tech would be conducting dust monitoring data collection along the NAR in August in order to ensure understanding of baseline dust conditions. Dust monitoring stands and buckets will be placed in four locations approximately 3-5 m off the proposed NAR and will be removed in the Fall. Proposed locations for dust stands have been attached. Additionally, Goldcorp noted that they have continued to build baseline data with remote wildlife cameras. Attachment: NAR_Dust_Stands	Studies					
3-A2-657	08 August 2017	Email	Incoming	SFN	Consultation	The Selkirk Development Corp contacted Goldcorp to ask whether a Goldcorp rep was available to meet and discuss opportunities for Selkirk. Goldcorp replied to put Selkirk Development Corp. in touch with the appropriate person and to let them know that if it doesn't work out that they would be able to set something up for another time.	Meeting					
3-A2-659	09 August 2017	Email	Outgoing	SFN	Consultation	SFN development corp's CEO asks Goldcorp for a meeting to discuss potential opportunities. Goldcorp replies that September would be good timing for the SDC and Goldcorp to connect.	Meeting					
3-A2-661	10 August 2017	Email	Outgoing	SFN	Consultation	SFN tells Goldcorp that the plan is to review the funding agreement with Chief and Council on August 15. Goldcorp replies that the current draft is good for review.	Agreements					
3-A2-664	13 August 2017	Email	Outgoing	SFN	Consultation	SFN provided feedback on the funding agreement on August 8, Goldcorp replied with SFN's suggested changes incorporated into the document on August 13, 2017. Attachment: Funding Agreement	Agreements					
3-A2-668	14 August 2017	Email	Outgoing	SFN	Consultation	SFN asks Goldcorp for an updated funding agreement to review with Chief and Council in coming days. Goldcorp replies providing the black line document to SFN. Attached: revised funding agreement.	Agreements					
3-A2-672	16 August 2017	Phone	Outgoing	SFN	Consultation	Goldcorp and SFN discuss how the funding agreement had been bumped from the Chief and Council meeting agenda on the previous night. SFN notes that they hope to discuss it with Chief and Council on the 18th.	Agreements					
3-A2-677	18 August 2017	Email	Incoming	SFN	Consultation	SFN notifies Goldcorp that the funding agreement is approved by Chief and Council. Attachment: signed funding agreement.	Agreements					
3-A2-678	19 August 2017	Email	Outgoing	SFN	Consultation	SFN sends Goldcorp a proposed technical engagement plan for September and October 2017 (Attachment: SFN Engagement Plan) Goldcorp thanks SFN for the document and notes that they will review internally and provide feedback shortly.	Consultation					
3-A2-683	24 August 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN documents related to an agreement for capacity funding. Attachments revised agreement and comparison.	Agreements					
3-A2-690	25 August 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN proposed dates for site tours and tours of the NAR based on feedback from SFN, SFN notes having been on vacation and will reply shortly.	Site Tour					
3-A2-692	28 August 2017	Email	Incoming	SFN	Consultation	SFN confirms September 14 for the NAR and Site Tour with SFN's technical consultants and Goldcorp confirms the number of passengers that Goldcorp's aircraft can accommodate.	Site Tour					

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-693	28 August 2017	Email	Incoming	SFN	Consultation	SFN asks Goldcorp to provide detailed maps of the NAR related to the new sections north of the Stewart River. Goldcorp provides multiple maps that detail new sections of the NAR and provides access to Goldcorp's online sharing site, Open Text Core, where more NAR maps are located.	Northern Access Route					
3-A2-694	28 August 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up with SFN and sends SFN documents related to an agreement for capacity funding. Attachments revised agreement and comparison.	Agreements					
3-A2-695	29 August 2017	Email	Outgoing	SFN	Consultation	SFN confirms the site tour date and attendees and asks Goldcorp if the NAR tour can fly North over the Maisy May drainage; Goldcorp replies that the tour can fly over the new build section that runs parallel to the Stewart River in lower Maisy May. Goldcorp was unable accommodate going all the way up Maisy May due to time constraints.	Site Tour					
3-A2-696	29 August 2017	Email	Outgoing	SFN	Consultation	SFN confirms the dates for the water and mine waste, closure, socio-economics, and wildlife meetings to take place from September 19 - 22 after multiple emails between Goldcorp and SFN to determine the best dates for the technical workshops. Goldcorp replies to the confirmation and notes that Goldcorp looks forward to further coordination of dates for a Citizens meeting and a meeting with Council.	Meeting					
3-A2-712	30 August 2017	Email	Incoming	SFN	Consultation	SFN notes for Goldcorp that in addition to the technical team tours of the site and the NAR, that Council also requests a tour of the NAR. Goldcorp agrees, and proposes the day following the SFN technical team's tour of the NAR	Site Tour					
3-A2-713	30 August 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up with SFN and sends SFN documents related to an agreement for capacity funding, inquiring again if SFN has any feedback. Attachments revised agreement and comparison.	Agreements					
3-A2-716	01 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN their edits to SFN's technical engagement plan document provided to Goldcorp on August 17. Goldcorp asks SFN to follow up and inform Goldcorp if Goldcorp's changes to the document were accepted. Attachment: Technical engagement plan response	Consultation					
3-A2-717	01 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up on the capacity funding agreement final iteration, asks SFN if there are changes to be made before signing.	Agreements					
3-A2-719	04 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp followed up with SFN to confirm logistics for the site tours on September 14	Site Tour					
3-A2-720	04 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp followed up with SFN to confirm a tour of the NAR with Council as requested by SFN.	Site Tour					
3-A2-721	05 September 2017	Email	Incoming	SFN	Consultation	SFN followed up with Goldcorp regarding changes to the capacity funding documents.	Agreements					
3-A2-723	06 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN a summary of the upcoming site and NAR tours to be conducted with SFN's technical team and Council.	Site Tour					
3-A2-725	07 September 2017	Email	Incoming	SFN	Consultation	SFN confirms the names of those attending the site and NAR tours on September 14.	Site Tour					
3-A2-726	07 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up with SFN regarding the technical engagement plan document with Goldcorp's input, asks SFN for their comments on the changes.	Consultation					
3-A2-727	07 September 2017	Email	Incoming	SFN	Consultation	SFN confirms September 15 for the NAR tour with Council.	Site Tour					
3-A2-728	07 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp provides SFN the signed agreement related to capacity funding. Attached: Signed agreement - signed by Goldcorp and SFN.	Agreements					
3-A2-732	11 September 2017	Email	Incoming	SFN	Consultation	SFN notes for Goldcorp that the names for the Council tour of the NAR will be provided following the Council meeting, on September 13 SFN confirms 7 attendees for the Council NAR tour.	Site Tour					
3-A2-733	11 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp asks SFN for a quick call to touch base on the upcoming workshops.	Meeting					
3-A2-736	12 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp send SFN the proposed agendas for the Closure, Socio-economic, and Wildlife workshops.	Consultation					
3-A2-737	12 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN the agenda for the September 14 site tour.	Site Tour					
3-A2-740	12 September 2017	Phone	Outgoing	SFN	Consultation	Goldcorp and SFN discuss the upcoming Water and Mine Waste Management workshop, Goldcorp seeks clarity from SFN on the key topics of interest for the workshop, SFN provides some guidance. This is then used to create an agenda for the workshop.	Meeting					
3-A2-742	13 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends the invites for all 4 technical workshops to SFN's appropriate technical consultants. Attached are the agendas for each.	Meeting					
3-A2-743	13 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp and SFN email multiple times to adjust the Socio-economic workshop agenda according to SFN's feedback.	Meeting					
3-A2-751	14 September 2017	Email	Outgoing	SFN	Consultation	SFN provides the final list of names for the Chief and Council tour of the NAR. Goldcorp provides a finalized agenda with this information.	Site Tour					
3-A2-752	14 September 2017	Site Tour		SFN	Consultation	Site tour and NAR tour with SFN technical advisors. Tour of Coffee Creek and Latte Creek valleys, discuss infrastructure at Heap Leach Facility site, fly down Halfway Creek and set down at mouth. Fly over NAR from Coffee Site to bottom of Maisy May, stop at barge landing north of the Stewart River.	Consultation					
3-A2-754	15 September 2017	Email	Incoming	SFN	Consultation	SFN confirms that the socio-economic workshop will be a full day; SFN initially informed Goldcorp that it may need to be a half-day due to SFN's technical advisors' availability.	Meeting					
3-A2-755	15 September 2017	Site Tour		SFN	Consultation	NAR tour with Chief and Council. Fly over proposed NAR from Coffee Site to bottom of Maisy May (leaving from Pelly Crossing). Land at North side of Stewart River for proposed barge landing, stop at fish crossing in Barker drainage.	Consultation					
3-A2-759	18 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN the meeting invite and finalized agenda for the socio-economic workshop on September 21, 2017	Meeting					
3-A2-760	18 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN a high-level overview of ongoing and additional work since the Project Proposal was submitted in March. This includes the company responsible, the area of study, and the description of the work being performed.	Consultation					

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-762	19 September 2017	Email	Incoming	SFN	Consultation	SFN informs Goldcorp that their archaeology consultant will attend the socio-economic workshop as well.	Meeting					
3-A2-766	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	Goldcorp provides a update on the fish and fish habitat baseline work done in 2017.  SFN advisor responds to the information presented:  • Notes that lots of streams are low productivity in Yukon, but when you add them up collectively they contribute a significant portion of total productivity. • Streams will be used ephemerally by fish depending on environmental conditions which may vary over the medium to long term. Any overwintering habitat in the lower section of the stream is very important with the harsh Yukon winter climate, and effects are different in the winter when fish are stressed by environmental conditions than they are in the summer.	Goldcorp replies to SFN advisors:  • There is no surface water at the mouth of Halfway Creek over winter. • There's flowing water at HC 2.5 water quality station, which results in lots of aufeis, but you can't measure it, as it's flowing between layers of ice (i.e. it is does not provide for over-wintering habitat). • Goldcorp confirms having seen no slimy sculpin, except at the very mouth of Halfway Creek.			
3-A2-767	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	Goldcorp reviews the work done in 2017 regarding chinook and concerns raised by other First Nations. • SFN advisors notes that overwintering for Chinook is very important, and that those fish could have come from the Teslin or other watersheds, and it will affect people fishing those fish when they return. • Chinook salmon populations have been depressed for the past 15 years; if populations were higher, tributary streams would be used more. • SFN advisors describes the cultural importance of salmon to First Nations, noting that fish camps are culturally important to families as well as for subsistence, and First Nations have been making great efforts and sacrifices to conserve salmon in their territories. • Because of depressed populations current stream utilization does not reflect the potential productivity or past productivity of the stream. • Spending the first winter in freshwater in the Yukon results in high mortality for juvenile Chinook. Overwintering studies are not common, and there are more studies being done. • Notes the work done by Goldcorp such as winter sampling for overwintering Chinook is important.	Goldcorp highlights the mine plan change that eliminated waste rock storage in Latte Creek and YT-24 Creek watersheds; now all waste rock is in Halfway Creek in consideration of the importance of Coffee Creek and Coffee Creek as important fish habitat. Goldcorp discusses ideas about working with TH and with placer miners on reclamation to help reduce impacts to fish. Salmon has been heard as a key area of focus from First Nations.			
3-A2-768	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	SFN advisors asked whether anything Goldcorp found this year in the ongoing baseline studies changes what Goldcorp is proposing.	Goldcorp confirms that no changes will be proposed as a result of the continued baseline data collection.			
3-A2-769	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	SFN advisors discusses mitigations for effects to fish:  • notes that offsetting would be evaluated by DFO. • advocates for compensation and offsetting to be done in a planned way where it counts, where it will have a positive effect on fish over the long term. • promotes a First Nation and community-driven approach to fisheries offsetting and compensation projects, and for long-term.	Goldcorp replies to SFN advisor's points about mitigations:  • Goldcorp agrees with SFN advisor and notes that Goldcorp would like to support initiatives already grounded in the community and that are seeing a measure of success. • Goldcorp indicated that it has considered the concepts of (1) building a barrier to fish at the mouth of Halfway Creek to keep fish out of the stream and (2) discharging water directly to Yukon River where there is additional dilution. However, it is not pursuing either of these concepts. • Goldcorp highlights that the water quality in Halfway Creek is such that there will be no harmful effects on the fish that currently utilize the system during the summer and there is no need to prevent fish from going into that creek. • Goldcorp doesn't want to put a barrier at Halfway Creek as it wouldn't be useful, and it's not required.			
3-A2-770	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	SFN's advisor discusses stream health and recommends that Goldcorp consider an aquatic biota VC or VC sub-component.	Goldcorp replies that aquatic health was assessed in the Fish and Fish Habitat VC report. Goldcorp agrees to consider an "Aquatic Stream Health" sub-component.	Goldcorp to consider "Aquatic Stream Health" as a sub-component	Goldcorp	Complete. Goldcorp has included this in the Project Proposal re-submission.
3-A2-771	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	SFN's advisor comments that when considering Chinook in a study area, the study area is really the Yukon River drainage, as these fish originate from different spawning areas and are fished by every community on the Yukon River. Notes that genetic work on the fish tissue from the Coffee Project baseline to determine stock origin would be interesting, suggests that this genetic work be done-. Notes the importance of this information is that there may be stressors on the fish stock from the source watershed.	Goldcorp can consider SFN advisor's suggested DNA origins work, and Goldcorp notes that for the EA, the origin is not as important as the resource itself.	Goldcorp to consider fish DNA work to ascertain source stocks and and streams that could be potentially affected for juvenile Chinook using the Project watershed.	Goldcorp	In progress
3-A2-772	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Management Plans	SFN and Goldcorp discuss management plan development for the Project, in particular adaptive management. SFN's advisors make it clear that they recommend that Goldcorp include adaptive management plan in the YESAB Project Proposal.	Goldcorp is committed to engaging SFN on management plan development, including development of an Adaptive Management Plan. Goldcorp communicates that the plan is to begin engagement on the management plan development in January 2018 and that management plans will be developed with input and feedback from SFN for the licensing stage for the Project.  Goldcorp has committed to engaging SFN on the development of management plans, including the adaptive management plan, for the Project.	Provide the list of management plans, including how the concept of adaptive management will be integrated, and target dates for sharing with SFN as a way of addressing uncertainty.	Goldcorp	In progress



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-773	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks what the Mines Group did for the water balance analysis. He notes that the driver for Eagle Gold project was freshet over multiple seasons to determine if your sizing was appropriate. Asks why the deterministic as opposed to stochastic analysis was used?	A: Goldcorp replies that the person who did the Eagle Project water balance did the Coffee Project water balance, and that deterministic modeling determined pond size for Eagle as well. Coffee has used a more conservative approach. (note: SFN adds post-meeting that deterministic modelling was used to set storage size for Eagle but this was then tested for being appropriate by using the stochastic modeling)	Run validation of Goldsim model against measured hydrology and water quality data for 2016-2017	Goldcorp	In progress
3-A2-774	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks about raincoats, asks if the conveyance of the rain coats to the rain coat ponds is for the 1 in 100 year events.	A: Goldcorp replies that in the case of a 200 year event or greater, the excess raincoat flow would flow off of the heap to the receiving environment (not to the event ponds). The rainwater pond is meant for normal operations. The big events, +200 year events, are intended to spill into the environment. However, water that enters process circuit (i.e. contact water from the heap) will still go to event ponds. An action item for Goldcorp is to create and provide some detailed drawings for SFN to clearly show the segregation and separate conveyance of contact and non-contact (rain coat runoff) flows from the heap and specifically how large rain coat flows are kept separate.	Create a figure depicting conveyance of raincoat water versus process solution	Goldcorp	In progress
3-A2-775	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor was confused about the logistics of raincoats and progressive closure rinsing.	A: Goldcorp has a HLF operating plan that is currently being drafted, and can share when further developed.			
3-A2-776	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks if re-sloping will happen before or after rain coats, and when HLF rinsing will occur?	A: Goldcorp explains the schedule and plans for closing the HLF. Raincoats are applied as a method for control of the water balance for the heap facility while minimizing contact water. Raincoats are used throughout operation on an as-needed basis. When covered areas are ready for rinsing, raincoats will be removed and rinsing and re-grading will be completed prior to final closure capping.			
3-A2-777	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisor wants Goldcorp to do stochastic water balances to address potential design and operational issues in advance.	Goldcorp agrees to consider this.	Run stochastic simulation of both HLF and site-wide water balance models.	Goldcorp	In progress
3-A2-778	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks about cold weather performance for raincoats?	A: Goldcorp replies that HDPE maintains flexibility down to temperatures of -40C to -60C; but really don't want to do anything with raincoats below zero. Can put a heated tent over the HDPE spool if needed.			
3-A2-779	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor noted that the question about cold weather performance was related to their effectiveness when exposed to northern conditions (not placement limitations).	A: Goldcorp noted it is not counting upon or requiring complete diversion with raincoats. Rain coats will leak a bit. It is typical to see less than 1% leakage with highest leakage seen being 3%. This means it's within the management of the water balance.			
3-A2-780	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks about examples of raincoats in the North.	A: Goldcorp replies some in Russia, Kazakhstan, and in the Andes. There are about 30 projects using raincoats.			
3-A2-781	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks about lessons learned from Northern projects using raincoats?	A: Goldcorp replies that the lesson is that you can use the raincoats, and that you get more heat retained in the HLF than modeled.			
3-A2-782	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks how concerned is Goldcorp about segregation of ore given its gradation and the proposed lift heights? SFN is concerned with segregation related to closure (i.e. presence of zones of fines and zones coarse material and impacts of such on rinsing).	A: Goldcorp replies that this is really good ore, some of the early ore is dirty, but the vast majority of the ore is very stable. Even the dirty ore is good by industry standards. Dirty ore refers to fines content. Goldcorp notes that there will be some segregation. Goldcorp has a metallurgist on the Coffee Staff full time			
3-A2-783	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Q: SFN advisor asks if these injection programs have been implemented in closure?	A: Goldcorp replies that this has been implemented in operations and tested for closure. Goldcorp sees this as an adaptive management measure. By year 4 or 5, under the assumption that cells 1 through 4 are a good proxy for the other phases of the HLF, this will let Goldcorp know what to expect, can update reclamation and closure plan and using information from the HLF and the site. By year 4, all ore types have been represented in the HLF.			
3-A2-784	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	Comment: SFN advisors sees this (progressive reclamation especially rinsing) as a strong part of the Project to be able to close early and test closure early.				
3-A2-785	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	SFN advisor notes the limitations of using sprinklers or surface emitters to irrigate a HLF in northern climates.	Goldcorp notes that the plan is to have buried emitters on the slopes, even though it's more time consuming and expensive to install. Goldcorp notes that the north slope might have a bit of trouble, and plans to account for this in the budget.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-786	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Heap Leach	SFN advisor would like to see recognition of these rinsing challenges in the closure plan as it is developed.	Goldcorp describes the rinsing schedule as proposed. The plan is to rinse a lot in the summer, and pulse rinsing in spring and fall. Likely very little rinsing will occur in the winter.			
3-A2-787	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks about the presence and treatment of unsuitable foundation materials underneath the WRSF?	A: Goldcorp replies materials that have the potential to be unstable would be removed from critical areas. For example, ice rich permafrost around the toes where it could thaw quickly and there's enough ice to have excess pore pressures and cause a problem. This is expected to be a small amount of material. The rock drain will have permafrost and soils beneath it remain intact, the toes will have this material stripped.			
3-A2-788	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks about requirements for interim toes being built for the WRSF.	A: Goldcorp replies this is being determined, but the thinking is that the lower lifts will have the toes that require removal of unsuitable material but as you go up slope you won't be concerned about foundation materials.			
3-A2-789	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks if the ice rich permafrost materials will be removed from only critical areas or throughout the footprint?	A: Goldcorp is doing geotechnical work on the critical areas now, and the design is currently conceptual. On the west side of Halfway Creek by Alpha Pond, permafrost is 8-9 meters. There is less permafrost on the other side, more like 2-3 meters. The east side is more ice rich. Only removal from critical areas is presently proposed.			
3-A2-790	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Closure	Q: SFN advisor is interested in Goldcorp stripping overburden materials from below the WRSF to use this for WRSF cover material. Also asks why Goldcorp is leaving the top soil below the WRSF in areas without ice rich permafrost: if it is not needed to preserve permafrost, why not strip it for reclamation purposes?	A: Goldcorp would need to do a lot of work to figure out where to strip and not strip. The "bad" permafrost can be impacted by stripping the other areas. Goldcorp thinks there are lots of opportunities to find more reclamation materials from pit areas that must be stripped of overburden during operations. Goldcorp doesn't have the design detail yet to know the materials balance and commit to covering the WRSF. If the materials are available, Goldcorp will cover the WRSF. This will be made clearer in future iterations of the closure plan. Goldcorp has looked at stripping all permafrost, and the concern was about managing the muck as the stripped material thaws. This would have created a total suspended solids (TSS) issue for water quality at site.			
3-A2-791	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Closure	SFN advisor notes there are workarounds for the concerns with stripping the whole WRSF footprint (i.e. timing of stripping to avoid the muck issue).	Goldcorp describes the permafrost under the WRSF and the issues with the different materials in the area. The frozen soil stockpile has been relocated to above the Alpha WRSF where that material (once thawed) could be more useful for reclamation.			
3-A2-792	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisor notes that the proposed Alpha WRSF design geometry and footprint must have been based on a tradeoffs/alternatives study and would like to see this design study.	Goldcorp will consider sharing the WRSF geometry tradeoff information in the Project Proposal re-submission and the rationale for the WRSF design.	Consider including WRSF geometry design within the Project Proposal	Goldcorp	In progress
3-A2-793	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisor comments that he generally supports Goldcorp's decision to move waste rock storage out of the Latte catchment.				
3-A2-794	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor has a concern with the Alpha rock drain potentially freezing, and asks Goldcorp what certainty they can provide regarding this?	A: Goldcorp replies that the drain is not expected to act as an air conduit (i.e. to promote convective cooling in the drain) due to its design. Also the thermal load due to water flow is significant, and water is good at thawing, so it is unlikely that the rock drain will freeze up as any winter ice development would be thawed by spring flows. Additionally, the rock drain's capacity is for 2x the sum of the 1:100 year 24 hour rainfall event plus average year snowmelt.	Consider providing thermal modeling to support the conclusion that the WRSF rock drain will not freeze and become ineffective.	Goldcorp	Currently under review and consideration.
3-A2-795	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Comment: SFN advisor notes the bench heights and the bench face steepness (angle of repose) leads to concerns about erosion.	Reply: Goldcorp replies explaining the proposed slope angles (3:1 overall with benches) and noting that erosion is more of a concern if the WRSF is covered.			
3-A2-796	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	<ul style="list-style-type: none"> <li>• SFN advisor notes reducing infiltration, particularly during freshet, is the biggest concern with the WRSF, the more precipitation and snowmelt that can be made to runoff rather than infiltrate the better. SFN advisor wants Goldcorp to optimize runoff.</li> <li>• SFN advisor wants to optimize stability and geometry to limit infiltration and erosion, particularly during freshet.</li> <li>• SFN advisor wants to see the following aspects of the Alpha WRSF design re-evaluated: <ul style="list-style-type: none"> <li>o Covering the WRSF in closure;</li> <li>o Maximize the WRSF design for shedding water in closure; and</li> <li>o Closure slopes for bench faces as angle of repose for bench faces as currently proposed is rarely acceptable in closure.</li> </ul> </li> </ul>	<p>Goldcorp has committed to a WRSF cover investigation, which includes the following:</p> <ol style="list-style-type: none"> <li>1. Produce rationale for selection of current WRSF design approach;</li> <li>2. Run sensitivity analysis using the Water Quality Model;</li> <li>3. Update the materials balance and do further materials characterization; and</li> <li>4. Determine cover capability of materials.</li> </ol> <p>Note: this is captured as an action item in this document already, but applies to a number of SFN's views presented.</p>			

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-797	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks about the Alpha Pond dam site?	A: Goldcorp replies that it has thicker overburden, and there's frozen ground on both the east and west sides of Halfway Creek. Permafrost on the west side was not anticipated. It is a challenging place to build due to location and overburden, but Goldcorp doesn't have concerns about stability. It is noted that water storage in Alpha pond will promote permafrost thaw and that ice in bedrock fractures will prevent grouting of bedrock during initial construction.			
3-A2-798	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks about the east side of Halfway Creek?	A: Goldcorp replies that it is a boulder field. The results of the geotechnical work haven't been analyzed yet, and that the update to the WRSF design report is anticipated to be in 8-12 months. The proposed Alpha dam was sited based on no geotechnical data. For now, the design is conceptual based on using the best information available.			
3-A2-799	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks what is the distance from the Alpha Pond to HC 2.5?	A: Goldcorp replies it is 1.5 km from the Alpha Pond.			
3-A2-800	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks what Goldcorp expects to provide in the updated Project Proposal with respect to the WRSF?	A: Goldcorp replies that there are no plans to add any information to the Project Proposal update on the WRSF as the effects assessment is complete on that.			
3-A2-801	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Q: SFN advisor asks about the process internally to come up with the geometry of the WRSF; encourages Goldcorp to consider that this information be included in Project Proposal. This will be important supplementary information in the Proposal regarding the WRSF.	A: Goldcorp will consider SFN's feedback on this.  Goldcorp has committed to a WRSF cover investigation, which includes the following:  1. Produce rationale for selection of current WRSF design approach; 2. Run sensitivity analysis using the Water Quality Model; 3. Update the materials balance and do further materials characterization; and 4. Determine cover capability of materials.	WRSF cover investigation.	Goldcorp	In progress
3-A2-802	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisors discusses concerns with freezing and thawing of the rock drain.	Goldcorp explains the presence of aufeis in Halfway Creek and explains the discharge point and volume at HC 2.5. Goldcorp discusses the possibility of a few scenarios with freezing of the rock drain and permafrost settling.			
3-A2-803	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisor doesn't understand why the WRSF doesn't fill flush to the valley bottom on the upstream side with a diversion around, notes Goldcorp doesn't need a headpond (which could be created in the upstream depression created by the WRSF) if they think the rock drain will work.	Goldcorp describes options for the rock drain and diversions and why these options weren't used.			
3-A2-804	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisor is interested in seeing the tradeoff studies for the diversions/drains around/under WRSF. Describes some options should the rock drain not work, describes an additional diversion.	Goldcorp will consider the idea. Goldcorp discusses a contingency spillway as suggested by SFN advisor. This is taken as an action item as Goldcorp will consider this as design and engineering of the Project progresses through the YESAB screening process and in preparation for the licensing process (Quartz Mining License and Water Use License)	Consider WRSF additional diversion ditch as a backup for the rock drain.	Goldcorp	In progress
3-A2-805	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisor notes to look at the potential for a headpond on the upstream side of the WRSF for additional (and closer) storage and to reduce Alpha pond size.		Evaluate potential for overflow ditch if a head pond forms on the upslope side of the rock drain	Goldcorp	In progress
3-A2-806	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	Goldcorp gives an overview of the Alpha Pond design. SFN advisor asks to clarify what is being held vs discharged in the pond.	Goldcorp explains the plan to actively discharge to Halfway Creek, and how this would work at freshet. The dam is 30 meters, some Goldcorp team members are concerned that this is too large and is unnecessary infrastructure.			
3-A2-807	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisors would be concerned about discharging water that isn't compliant because the alpha pond does not have sufficient storage to hold it.				
3-A2-808	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisors notes that if alpha pond is big it provides a beneficial level of contingency storage that would likely provide additional confidence to SFN.	While Goldcorp's predictions show that water treatment is not required, Goldcorp will still incorporate adaptive management into the Project Proposal.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-809	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisors discusses concerns related to the information presented:  <ul style="list-style-type: none"> <li>SFN's advisor's concerns with the proposed water management strategy is that the Alpha Pond only provides for TSS removal and there is no discussion in the Project Proposal on contingencies should other parameters required treatment prior to discharge.</li> <li>SFN advisor's big concerns with Alpha pond operational period water quality are nitrates, but also concerns regarding unknowns, as the water quality model starts in year 7.</li> <li>SFN advisor notes that good storage capacity is going to be important for Goldcorp in Yukon.</li> </ul>	Goldcorp replies to SFN advisor's concerns:  <ul style="list-style-type: none"> <li>Goldcorp discusses design parameters based on modeling predictions, and how contingency is still required as you cannot get past a certain level of uncertainty.</li> </ul>			
3-A2-810	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks about dump design related to uranium leaching potential?	A: Goldcorp is looking to dump waste rock in a way that reduces uranium leaching potential. To this end they recommend end dumping to promote segregation and gas transport through the dump.			
3-A2-811	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Operations	SFN advisor notes that the schist is what Goldcorp would want to use for building infrastructure at site.	Goldcorp notes that it is not a very geo-mechanically stable rock, so it cannot be used to build the rock drain, for example.			
3-A2-812	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Operations	SFN advisor notes that for lining ditches, schist would be good. Goldcorp agrees. SFN advisor asks what Goldcorp can do with the schist on site to take advantage of its better geochemical properties.	Goldcorp notes that the ice rich soil stockpile can be a spot where stockpiling schist is possible. Goldcorp notes that it's important to be practical with management so that it is possible in operations and will consider it further	Consider planning to allow for access to schist waste rock materials for reclamation work.	Goldcorp	In progress
3-A2-813	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks about the water quality model starting in year seven	A: Goldcorp replies this is because Goldcorp didn't have the annualized mine design at the time that the water quality model was updated. Goldcorp gives an overview of the water quality model.	Provide an annualized water quality model from year 1 to closure	Goldcorp	In progress
3-A2-814	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks if the water quality model will be built on an annualized basis?	A: Goldcorp replies yes.			
3-A2-815	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks how Goldcorp is considering the source term of the underdrain.	A: Goldcorp explains that the source term for the underdrain and the WRSF were developed separately. The underdrain is such coarse material that it doesn't have the surface area to have much of an effect in terms of leaching contaminants. The loading source term for the underdrain is explained.			
3-A2-816	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks about explosive residue as a source term calculation?	A: Goldcorp explains how this is incorporated as a constant concentration into the WQM. This was created using information from analyzed mines. Goldcorp discusses the need to look at how to calculate the nitrogen loss rates looking at data from existing mines.	Provide a "reader" version of the Goldsim site wide water balance nad water quality model.	Goldcorp	In progress
3-A2-817	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks about the Beta WRSF when its sitting on the surface, are there water management structures associated with it and if there are any concerns associated with it?	A: Goldcorp replies that the Kona waste rock isn't PAG, but has potentially high Arsenic and Uranium. The nitrate source term was derived from an analog site. The runoff from the HLF included passive treatment in the source term for the model. SFN and Goldcorp will discuss the treatment and its ability to deal with uranium at the Closure Workshop.			
3-A2-818	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisors have had questions about sensitivities around higher infiltration rates depending on the slope aspect (i.e. impact of lower solar energy on north facing and sheltered slopes).	Goldcorp is working on that.			
3-A2-819	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Project Design	SFN advisor suggests snow course data to be collected this winter on the north facing slope in the alpha WRSF footprint.	Goldcorp agrees. Goldcorp has included this as a Project Commitment.	Add snow courses to Alpha WRSF area	Goldcorp	Complete. Goldcorp has included this in the Project Proposal re-submission as a commitment.
3-A2-820	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisor asks about using Mt. Nansen data as an analog for the Coffee Project. SFN advisor doesn't have a lot of confidence in the data, noting that he understands that Goldcorp used Mt. Nansen for scale up.	Goldcorp explains the scaling factors developed from Mt. Nansen data are similar to scaling factors independently developed from differences in grain size distribution, which gives confidence in the scaling approach. It is also noted that the Nansen upscaling approach was not used for the As and U prediction.			



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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-821	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks how variable the dissolved organic carbon (DOC) is in creeks around the Project?	A: Goldcorp explains how they see spikes up to 30, usually 10-20.			
3-A2-822	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks how long the toxicity tests were conducted?	A: Goldcorp explains that tests are administered according to Environment Canada suggestions. 7 days for algae and trout, 48 hours on c. Dubia.			
3-A2-823	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks about Canadian Council of Ministers of the Environment (CCME) tests in soft versus hard water, asks about DOC.	A: Goldcorp explains why soft water was used in the tests.			
3-A2-824	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks about the Project removing organics from the system (i.e. the Alpha WRSF footprint).	A: Goldcorp explains that this is unlikely to have a notable effect. Goldcorp explains that hardness is protective in winter, DOC is protective in summer, and the two different seasons result in the need for two tests.			
3-A2-825	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks if temperature is a factor?	A: Goldcorp replies that it isn't a factor for uranium, but can be a stressor in the natural environment.			
3-A2-826	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Fish	SFN advisor notes that there is a concern that the juvenile chinook would be in 0 degree habitat and then exposed to uranium, and that would be cumulative effects.	Goldcorp replies that juvenile Chinook will not be in a 0 degree habitat in Halfway Creek, as there is no overwintering habitat there. Coffee Creek is not being materially affected by the Project, and upper portions of Coffee Creek that have overwintering habitat have uranium signatures already. If Goldcorp is protecting the more sensitive c. Dubia in the WQOs, then that will be protective of Chinook.			
3-A2-827	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks if uranium is calculated with species sensitivity distribution methodology.	A: Goldcorp says yes. Goldcorp thinks this is the best approach.			
3-A2-828	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks where the dilution of the uranium loading is coming from in lower Coffee Creek?	A: There are uranium inputs upper Coffee Creek and from Latte Creek. Goldcorp provides possible theories for the lower concentration of uranium in lower Coffee Creek but acknowledges that there are discrepancies in the load balance.			
3-A2-829	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisor notes that the lower Coffee Creek toxicity testing is of interest for SFN. Uranium is a challenge for First Nations, and this testing would be beneficial for SFN.	Goldcorp agrees to consider this. Goldcorp suggests that SFN consider where SSWQOs get applied around the site as the Project heads into licensing. Goldcorp has committed to toxicity testing in lower Coffee Creek.	Do toxicity testing in lower Coffee Creek	Goldcorp	In progress
3-A2-830	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks if there is anything interesting found with the additional monitoring in Halfway Creek?	A: Goldcorp explains what has been seen and how this aligns well with previous findings.			
3-A2-831	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Q: SFN advisor asks if Goldcorp considered seasonal water quality objectives.	A: Goldcorp explains this is why summer and winter toxicity tests were done. Notes that the determined values for toxicity are so high in relation to proposed SSWQOs that having seasonal SSWQOs is pointless. Goldcorp has non degradation objectives for Coffee and Yukon River. SFN advisor notes that TH suggested seasonal SSWQOs as well.			

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-832	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	Goldcorp and SFN discuss water quality objectives for the site: Goldcorp doesn't want to get into a situation where the site's ability to manage water is restricted when it's protective. Until there's a very strong rationale presented to manage otherwise, Goldcorp will be working with the background concentration method. Goldcorp wants to continue the discussion on this as well. Goldcorp discusses the considerations for SSWQOs and multiple parameters, and two SSWQOs for one parameter makes it difficult to manage.  SFN responds to the information from Goldcorp:  • Notes that the 95th percentile of the whole data set is driven by the winter conditions, and giving the winter number, which is the opposite of the time that Goldcorp proposes to discharge. • Doesn't think it would create an issue for winter discharging, it's more about summer discharging. • Clarifies that the difference in the three watershed systems is based on baseline levels; Goldcorp says yes. The proposed SSWQOs are reflective of the baseline data set for the streams they are particular to, in the particular location in the stream. • Notes that the organisms in those streams could be stressed already due to elevated natural background levels of contaminants of concern.	Goldcorp explains that the organisms are likely tolerant to the elevated background levels. Goldcorp is continuing the discussion on SSWQOs, and appreciates SFN's feedback. Goldcorp notes that the same situation is at Eagle, where the data is skewed by May and June numbers.			
3-A2-833	19 September 2017	Meeting		SFN	Consultation	SFN technical advisors and Goldcorp meet for a workshop on water impacts and operational mine waste management. Goldcorp and SFN discuss fish and aquatic health, Heap Leach Facility (HLF) design, operations, closure, and water management, the Waste Rock Storage Facility (WRSF) design, management, and closure, and water quality and geochemistry.	Water Quality	SFN advisor summarizes that Goldcorp has identified that it has checked proposed SSWQOs based on toxicity, and that they believe the testing validates the SSWQO's.	Goldcorp notes this is correct. Goldcorp encourages feedback.			
3-A2-834	20 September 2017	Email	Incoming	SFN	Consultation	SFN asks Goldcorp to share the meeting minutes after the technical workshops; Goldcorp agrees and notes an approximate one week timeline for Goldcorp to provide those.	Consultation					
3-A2-839	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	SFN and Goldcorp discuss seepage assumptions in the model. Goldcorp might move beyond the bulk approach to the model when there's more data in operations. SFN and Goldcorp discuss how the water balance model will be updated with the year-by-year configuration, and discuss the design of the model with respect to lag and seepage. The group discusses the sensitivity of the system to the lag in seepage, and need to determine key drivers.	Discuss results of new water quality sampling from 2017.	Goldcorp	In progress	
3-A2-840	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor notes that attenuation is assumed for arsenic, as a 75% reduction in arsenic is seen. Asks what this is driven by?	A: Goldcorp replies that it has to do with the groundwater chemistry and the difference in chemistry of the recharge area and the discharge area.	Send load pie charts to SFN.	Goldcorp	Complete.
3-A2-841	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks if Goldcorp was applying attenuation to the three types of flow (runoff, interflow, and deep groundwater) in the model?	A: Goldcorp explains that it is based on concentration, the groundwater story is clear as there is good data. With catchments like YT-24 that don't see groundwater, that data cannot be used.			
3-A2-842	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about the interflow component?	A: Goldcorp explains that the comparison is in between groundwater and surface water concentrations, but isn't a perfect dilution. It is based on a final calibration to the measured monthly water quality data.			
3-A2-843	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks what mining year Latte pit overflows, notes that the water quality model predictions don't include the Latte pit overflow.	A: Goldcorp has carried out this modeling, but just doesn't show it in the powerpoint figure.			
3-A2-844	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about the water quality objectives that are generic vs. the Site Specific Water Quality Objectives (SSWQOs).	A: Goldcorp explains the parameters with generic WQOs.			
3-A2-845	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about copper levels and if there is a relationship between copper and total suspended solids (TSS) concentrations?	A: Goldcorp replies that there is a relationship in the Yukon River, like aluminum, but it is not TSS related. There is not a lot of TSS in Coffee Creek, and it's more related to dissolved organic carbon (DOC). There is a TSS and DOC influence on copper.			
3-A2-846	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	SFN advisor notes that copper, chromium, and iron are of contaminants of interest and under consideration for site specific water quality objectives. SFN advisor suggests also using dissolved concentrations to establish site specific water quality objectives.	Goldcorp has had some discussions around this, and wants to continue these discussions. Goldcorp explains the dissolved and total ions are considered in the non-degradation streams. Goldcorp is considering the WQOs in terms of applicability, enforceability, and how they will work in operations and be protective. SFN advisor notes that dissolved copper should have a WQO: Goldcorp has one for Coffee Creek and Yukon River, but SFN advisor wants to see it considered for the other streams.	look at dissolved metals (Copper and Iron) with respect to water quality objectives in all streams	Goldcorp	In progress
3-A2-847	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about TH's questions regarding solubility controls for certain parameters.	A: Goldcorp explains that TH is looking to understand if Goldcorp is double counting solubility, and explains solubility controls in the model. TH asked for Goldcorp to run the simulation without attenuation, and Goldcorp did that.			

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-848	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about looking at the sensitivities of the system and the predicted receiving environment concentrations to the assumed solubility controls.	A: Goldcorp replies that they can look at varying pH.			
3-A2-849	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Comment: SFN advisor suggests looking at sensitivity of the source term to the solubility controls in the model.	Reply: Goldcorp agrees that this is a good idea.	Share a player version of the water quality/water balance model when it is ready.	Goldcorp	In progress
3-A2-850	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Q: SFN advisor asks about closure of San Martin mine, and if the intent is for the created foundation (organization) to be financially self-sufficient.	A: Goldcorp explains that this is the intent, but haven't achieved that yet. Goldcorp will not walk away until it is self-sustaining.			
3-A2-851	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	<ul style="list-style-type: none"> <li>• Goldcorp hopes to share the updated reclamation and closure plan in Q1-2018 in draft form for review and input before water licensing, but not for YESAB. This draft aims to include SFN's input received during consultation as well. The closure plan will be updated throughout the life of mine based on learnings from the site and through licensing. There will be much more detail in the upcoming version of the RCP.</li> <li>• Goldcorp encourages SFN to take this request for input this back to Chief and Council to discuss how to have these discussions on closure</li> <li>• SFN advisors describes their experience in closure planning. SFN's experience has been varied, recently the experience has been relatively good. Minto has recently moved from a conceptual plan to something that is more solid. Water quality objectives for closure have been an aspect of this.</li> <li>• SFN notes that recently they have noted that conversations at the table with SFN have been incorporated into the closure plan at Minto, and decisions in operations and operations costing that benefit closure are being made.</li> <li>• SFN wants to see progressive reclamation.</li> </ul>	Goldcorp discusses the importance of hearing from the community about the closure plan and objectives. Goldcorp has committed to engaging SFN on the reclamation and closure plan.			
3-A2-852	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	<ul style="list-style-type: none"> <li>• SFN notes that the changes with Minto weren't communicated to the community, and that caused problems. Proposed changes need to reach the community, and Citizens need that opportunity to say what they think.</li> <li>• SFN notes that it is important to say what you are going to do in closure and describe closure actions. This is what Citizens will understand and be able to provide feedback on.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp agrees, and provides an example of wildlife, in terms of: asking the community if people want wildlife to use the area or to not use the area.</li> <li>• Goldcorp notes that SFN advisors suggested an additional VC related to aquatic health in the previous workshop, that understanding and prioritizing VCs for closure will be an important part of engagement with SFN on closure. Goldcorp discusses the lack of clarity in Yukon regarding end land use responsibilities.</li> </ul>			
3-A2-853	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	<ul style="list-style-type: none"> <li>• SFN advisors emphasizes the need for plain language when discussing closure with the community, and concerns with the proponent asking leading questions of the community to get the answers the proponent wants.</li> </ul>	Goldcorp acknowledges the importance of communicating clearly.			
3-A2-854	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Health	<ul style="list-style-type: none"> <li>• SFN highlights how trust is required to have conversations about contaminants, and how First Nations are frightened by the contaminants at the site.</li> <li>• SFN Citizens are concerned about the health of the people and people's food. This is very important. Environmental integrity is non-negotiable.</li> </ul>	• Goldcorp notes the importance of having conversations now, and working together with SFN's technical team to build trust in the community.			
3-A2-855	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	<ul style="list-style-type: none"> <li>• SFN advisor notes that the most promising area for salvaging material is from the Alpha WRSF footprint.</li> <li>• SFN advisor notes that there is a difference between the topsoil and the overburden material that can be used for cover.</li> </ul>	<ul style="list-style-type: none"> <li>• Goldcorp notes the biggest areas for salvaging cover materials comes from pre-stripping for Supremo Pit, then the Latte Pit, and the HLF footprint.</li> <li>• Goldcorp notes that it is not ideal to move material if it isn't needed. There needs to be an evaluation of cost-benefit for covering the WRSF – if covering it doesn't achieve less infiltration, then the only benefit of covering the WRSF is aesthetic. If Goldcorp has the material to cover it, then that will happen. The level of the design of the WRSF is at a point where the amount of cover required and benefits are unknown.</li> <li>• Goldcorp and SFN need to discuss and agree on closure objectives and closure criteria that both parties are comfortable with.</li> <li>• Goldcorp commits to providing more clarity in the closure plan regarding the possibility of covering the WRSF. For example, overburden hasn't been characterized to the point where it is known if it can be used for cover.</li> </ul>			
3-A2-856	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Comment: SFN advisor notes that it would be a waste to bury organic material under Alpha WRSF.	Reply: Goldcorp replies that it depends on the cost and the competency of that organic material to determine if there will be any benefit to excavating under Alpha WRSF. Work is being done currently to determine what that organic material looks like within the Alpha WRSF footprint.			
3-A2-857	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Comment: SFN advisor highlights that once the material is covered by the WRSF, it's gone.	Reply: Goldcorp agrees, and describes how considerations of cost, closure objectives, and other factors need to be considered. For example, if the organic material only reduced infiltration by 5%, it will not be practical.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-858	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	SFN advisor states that Goldcorp will have to evaluate the potential of the organic material below the WRSF, Goldcorp agrees. SFN advisor outlines that cumulative effects, uncertainty, and ongoing leaching from the WRSF are concerns for SFN. SFN advisor states that if Goldcorp is going to bury organic material under WRSF, there needs to be very good justification.	Goldcorp discusses that the closure scenarios will be assessed.			
3-A2-859	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Goldcorp describes upcoming research, notes that post mining site prescriptions for revegetation haven't been determined yet because it is premature at this point. SFN advisor notes that if a First Nation wants to see the site returned to what it is now, then it's not premature.	Goldcorp acknowledges the point being made, and outlines that further research needs to be undertaken to inform such prescriptions.			
3-A2-860	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Q: SFN advisor asks if the goal is to revegetate the site directly?	A: Goldcorp replies that revegetation trials have been conducted in disturbed areas and areas of exploration. Nothing done specifically on core cuttings or bulk samples that would emulate waste rock. Goldcorp notes that there are lots of opportunities to try to grow vegetation on waste rock, once waste rock is available.			
3-A2-861	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor notes that there is a wording discrepancy in the Project Proposal saying that the HLF solution has been detoxified for use during the initial rinsing phase. This is not the case.	• Goldcorp clarifies the wording that should be used, which is pH adjusted water. • Goldcorp clarifies the rinsing schedule and approach for the HLF. SFN advisor is not sure how this fits into the water balance. • Goldcorp notes that the Mines Group completed the HLF balance and that Lorax completed the site wide water balance.			
3-A2-862	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor notes that they assume that Goldcorp is going to take the water from the rainwater ponds for rinsing, and summarizes concerns with availability of clean water for rinsing	Goldcorp notes that this has been accounted for, as some of the rainwater rinse water goes back to makeup. Goldcorp is not adding two additional sources of water.			
3-A2-863	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor thinks Goldcorp will have not enough rainwater and too much "used once rinse water".	Goldcorp replies that there is expected to be too much rainwater and explains the pumping rate and raincoat deployment options. Goldcorp highlights that the water balance model is being updated and will include more HLF details for the next iteration. The points SFN has brought up are the same reason why Goldcorp proposes to build the water treatment plant before it is expected to be needed, to handle these uncertainties.	Parking lot item to discuss HLF and rainwater at a later date.	Goldcorp and SFN	Ongoing
3-A2-864	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor notes that there's a rest period required for the rinse, and that there's times of year that rinsing can't occur, adding to the complicating factors.	Goldcorp notes that the water balance for the HLF isn't at the point where it incorporates that kind of detail.			
3-A2-865	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor notes that the progressive phasing of HLF closure will be a challenge.	Goldcorp agrees, and notes that the significant amount of storage is one potential way to handle that uncertainty.			
3-A2-866	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	Q: SFN advisor comments that nitrate is likely to be finite as a post-closure source term (e.g. eventually it will be exhausted out of the system)	A: Goldcorp agrees.			
3-A2-867	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about Arsenic.	A: Goldcorp replies that the arsenic will be retained on the zero-valent iron			
3-A2-868	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Comment: SFN advisor notes that the arsenic source could continue in to perpetuity; hence it has implications on maintenance of passive treatment system.	Reply: Goldcorp replies yes.			
3-A2-869	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	Q: SFN advisor asks why Goldcorp is not lining the slopes of the HLF in closure?	A: Goldcorp replies that it has to do with the slope angle and difficulty with maintaining a stable cover on the slopes. Potential for the cover to be unstable due to low friction angles. Goldcorp also notes that regrading and making shallower slopes to allow for cover placement would mean that some material would be pushed off of the current lined area of the HLF.			
3-A2-870	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	• Goldcorp and SFN advisors further discuss re-sloping of the HLF. SFN advisor notes that re-grading would need to coincide with the rinsing schedule. • With respect to some rinsed heap material being graded to outside of the current lined area, SFN advisor notes if the material was well rinsed and the grading allowed for placement of a cover over the full heap this might be an appropriate trade off to consider to reduce long term infiltration through the slopes. • Goldcorp and SFN advisors discuss progressive reclamation as it relates to rinsing. Final closure would include regrading and capping.				
3-A2-871	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor notes that covering more of the HLF with GCL or other low permeability cover material provides the opportunity to better manage the water and greatly limit the amount of seepage potentially needing polishing treatment.	Goldcorp notes an action item to look at the potential for 3:1 slopes on the HLF as a closure configuration.	Goldcorp to consider clarification of the justification for not re-grading the HLF in closure; advance 3:1 HLF closure configuration.	Goldcorp	Under review by Goldcorp.



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-872	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	SFN advisor and Goldcorp discuss using a GCL cap instead of using an HDPE liner. Goldcorp wants to use GCL as it is a natural material; does not degrade with UV light and there is little risk of frost/freezing damage or penetration by tree or plant roots. If the cover soil over the GCL is coarse and there is a lack of trees (due to elevation of the HLF) this further support the idea that a GCL is a good cover option.	Goldcorp describes the capping plan for the HLF, and the drainage design. Goldcorp indicates that considerable thought will need to be given to ensuring proper drainage off the covered HLF.			
3-A2-873	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	SFN advisor notes that this is also an area of opportunity to design the drainage network into the cover design (landform design) rather than the current perpendicular drainage system as currently proposed.				
3-A2-874	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	Q: SFN advisor asks about experience using GCL as a cover?	A: Goldcorp notes that there are several successful applications. GCL can handle facility settlement as well.			
3-A2-875	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	SFN advisor reiterates the request for a study on the WRSF geometry. SFN advisor is also looking for a quantitative analysis of the improvement of infiltration reduction with cover vs no cover.	Goldcorp notes that material characterization is a key part, then will be able to look at infiltration rate and changes to model, and then be able to consider a detailed energy balance model after the physical characteristics of the cover are better defined.	See previous action item on September 19 for the WRSF cover investigation work.	Goldcorp	In progress
3-A2-876	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Project Design	SFN advisor suggests looking at geotechnical work to date to look at this information.	Goldcorp can look at a "what if" analysis.			
3-A2-877	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Project Design	SFN advisor notes that there are alternatives for the WRSF configuration design, and SFN wants to see the analysis that supports what Goldcorp presents in the Project Proposal.	Goldcorp will create a work plan to address multiple points raised by SFN. Goldcorp is looking at the WRSF from a conservative effects assessment approach in the Project Proposal; Goldcorp is happy to look collectively at ways to reduce the effects of the Project, but that for the Project Proposal, the analysis on the conservative scenario is appropriate.			
3-A2-878	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Project Design	SFN advisors understands Goldcorp's approach on this, but it is an issue with every project proposal with respect to significance.	<ul style="list-style-type: none"> <li>Goldcorp agrees with SFN advisor that there are opportunities to do better than what is proposed in the Project Proposal in regards to closure, but notes that it is irresponsible to propose something that Goldcorp cannot guarantee at this point.</li> <li>Goldcorp will evaluate the potential for cover material as discussed in this meeting. Goldcorp will include detail in the YESAB submission about the approach to covers.</li> </ul>			
3-A2-879	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Air Quality	Q: SFN advisor asks if there is an air quality and dust monitoring program as well?	A: Goldcorp notes that this is in operations and wasn't planned for closure at this point. If there is a need for this in closure, Goldcorp will do it. Goldcorp will also be doing physical monitoring of facilities in closure.			
3-A2-880	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Management Plans	<ul style="list-style-type: none"> <li>SFN advisors do not have substantial concerns with the approach taken, but concerns with the response to changing conditions – and the delay in getting to real responses.</li> <li>SFN advisor also notes that the Minto plan is complicated with the tiers, it needs to be able to be implemented. The idea is to identify things proactively.</li> </ul>	Goldcorp's other approach is to focus on areas that adaptive management matters most. Goldcorp asks for good examples to be passed along from SFN.			
3-A2-881	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Management Plans	SFN advisors notes that the closure adaptive management plan for Minto was better than the operational one.	Goldcorp agrees that adaptive management is for areas of uncertainty.			
3-A2-882	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Management Plans	<ul style="list-style-type: none"> <li>SFN advisors thinks the staged approach (in the AMP) is fine, but that there are too many stages with Minto's. SFN advisors notes that the monitoring plan needs to be able to detect the changes that the adaptive management plan is associated with.</li> <li>SFN advisors states that there must be an organizational commitment to doing something, rather than just reporting on it.</li> <li>SFN advisors states that the baseline data needs to meet the needs as well for management.</li> </ul>				
3-A2-883	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Q: SFN advisor asks about the closure pit water system, noting that there have been comments about the complex system with discharges, and need for simplification.	A: Goldcorp replies that the topography of the site makes it challenging. The Coffee Mine is unusual with its pit orientation, and how the pits are draped over the ridges. This creates local bottoms that need to be managed. The pit shapes are created by where the ore is, so simplifying pit shapes is difficult. Goldcorp tried to simplify the Project design in terms of water quality by consolidating waste material in one WRSF. Goldcorp notes that there are ways to consider water management and monitoring.			
3-A2-884	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Closure	Q: SFN advisor asks about backfilling?	A: Goldcorp is completely backfilling Double Double and Kona, and parts of Supremo and Latte. Goldcorp is also looking at the geochemical aspect of backfilling all pits. As mining progresses, Goldcorp will look for additional opportunities for backfilling, but this cannot be committed to in the Project Proposal at this stage.			

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-885	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Consultation	SFN advisors summarize their short-term topics of interest: <ul style="list-style-type: none"> <li>SFN technical people are interested in water management</li> <li>SFN would like to see consultation notes in draft form for comment</li> <li>SFN advisors suggest that Goldcorp considers water quality objectives for operations that are different from closure, and consider discussing the possibilities if there are two different sets of objectives applied</li> <li>SFN advisor asks that Goldcorp consider an Aquatic Health VC, name to be determined, ensuring that Goldcorp has the baseline data needed to monitor and evaluate this as part of the AMP during all phases of the project. SFN notes that an example is Halfway Creek sampling numbers where fish populations were dominated by Slimy sculpin, Arctic grayling and juvenile Chinook respectively in different sampling years. SFN notes that Goldcorp needs to develop the aquatic health indicator and consider if Goldcorp has the necessary baseline data for the appropriate baseline sites and stations and control streams.</li> </ul>	Goldcorp is committed to engaging SFN on water quality and water management. Goldcorp had previously committed to considering the Aquatic Biota VC sub component (September 19, 2017) and has included this in the Project Proposal re-submission. Goldcorp shared the draft consultation information with SFN on November 6, 2017.			
3-A2-886	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Q: SFN advisor asks about high intensity water sampling events which were previously recommended (5 in 30 day sampling events), did these happen?	A: Goldcorp replies that the original thought was to have this in the spring freshet. Goldcorp is committed to doing it, and suggests doing it in July/August, as peak flows are not the key time to do it. Goldcorp suggests other methods of reference systems over time.			
3-A2-887	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Water Quality	Goldcorp and SFN advisors discuss the potential for infiltration into the WRSF, and SFN advisor suggests considering additional surface diversions, notes it's better to go through the rock drain than through the WRSF. Goldcorp notes that there are challenges with going around the WRSF due to the topography and the locations where water can flow by gravity  Goldcorp highlights for SFN that they are open to ongoing discussions around water management.				
3-A2-888	20 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on closure. Goldcorp and SFN discuss the water balance model, closure planning, proposed closure of the site, closure of the Heap Leach Facility (HLF), closure of the Waste Rock Storage Facility (WRSF), and water management.	Heap Leach	A SFN advisor notes that with the GCL cover over the entire HLF it could be fine with a rock cover over it, rather than being re-vegetated. This is a trade-off (reducing infiltration but giving up revegetation). It would also allow Goldcorp to use the finer cover soils that are proposed for the heap for re-vegetation on WRSF. Goldcorp will consider this.	Goldcorp will consider this.			
3-A2-891	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Valued Components	SFN advisor notes that there was information from the 2014 Annual Report Minto Mine Socio-economic Monitoring Program that would have been good to incorporate into the Project Proposal released in November 2016. Goldcorp discusses that mitigations about the Project are key discussions today.	Goldcorp discusses the relationship with SFN at the time that the VCs were scoped.			
3-A2-892	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Valued Components	Goldcorp and SFN advisor discuss Goldcorp's analysis of the Minto VCs and how they align with the current Project Proposal; the meeting today is to discuss this and identify gaps. Goldcorp needs to have this discussion today, and then take this information away and see if any gaps identified today may be relevant to other First Nations.	Goldcorp notes that there might be VCs that are more key to SFN, such as Land and Resource Use, rather than Community Infrastructure, and discusses using time strategically when looking at the Minto VCs, and being strategic and effective about incorporating SFN's information into the Project Proposal.			
3-A2-893	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Valued Components	SFN advisor notes that many SFN VCs do line up with those in the Project Proposal, but that there are some details that are missing. SFN advisor thinks there are steps to correct for missing SFN primary data in the Project Proposal. SFN advisor hopes that Goldcorp would consider doing an addendum or supplementary report to address SFN's specific concerns. The supplementary report would not be a rewrite of what is in the Project Proposal but would include new primary data from SFN.	Goldcorp is open to considering this, but the issue is access to primary data. If primary data is made available, then that is great. Goldcorp notes that SFN recently told them that they cannot have primary data. Today is about looking at the key issues and steps forward.			
3-A2-894	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Studies	SFN advisor notes that the primary data under discussion has not been reviewed by SFN citizens and this must take place before the data can be made available. There are issues of sensitivity and sharing. The data must be taken back to the community to discuss the sensitivities before sharing. SFN advisor knows this information would be helpful for the Project.	Goldcorp is sensitive to survey fatigue, so it's a question for SFN to consider internally.			
3-A2-895	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Studies	SFN advisors highlight the spatial analysis that was done by Pearce/Weinstein for LSCFN and SFN in 1988 in response to the Casino Mine proposal. SFN advisors discuss the TLUS information being done currently for Coffee and Casino, and this will be completed in November prior to review by SFN. SFN primary data is the SFN household survey data from 2015 and the 2017 traditional use study spatial data. SFN advisor notes the 2014 monitoring program report from Minto is also available publicly. It does not include information from the 2015 household survey, but it is good information.	Goldcorp notes that the Minto Mine monitoring information was used after the Project Proposal was drafted, in an analysis of SFN VCs and the Project Proposal. Publicly available information on the Minto socio-economic monitoring framework was included in the Project Proposal, but the results of the socio-economic Minto monitoring came out in November 2016 and it wasn't good timing to include the results of the report in the Project Proposal.			
3-A2-896	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	First Nations Issues/Concerns	SFN advisor read through the Proposal, and some of the socio-economic information included seemed to reflect some of SFN's earlier comments on the Coffee Project or on the Casino Project. <ul style="list-style-type: none"> <li>SFN advisor notes that overall, the Proposal is more sensitive to First Nations socio-economic conditions than other Proposals, but the problem is the lack of empirical data.</li> </ul>				

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-897	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	First Nations Issues/Concerns	SFN advisor is aware that if the data can get out soon, it will be beneficial to projects like Coffee.	Goldcorp is sensitive to the fact that SFN wasn't comfortable with sharing primary data before, and wants to be respectful of what SFN wants.  Goldcorp also notes importance of including information from both SFN and TH into the same monitoring program to have the full picture.			
3-A2-898	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	First Nations Issues/Concerns	A: SFN advisor replies that Fate Control is about understanding the capacity and the performance of responsible parties to deliver on jurisdictional responsibilities. The difficult part is that Goldcorp has to make assumptions in the assessment about YG's role and ability. The parties discuss management of the NAR as an example of a project component with multiple parties with various responsibilities.	Q: Goldcorp asks about fate control and preparedness, how SFN advisor defines this?  Reply: Goldcorp notes that the feedback can be incorporated into the SEMP; for example, intensity and frequency of engagement with YG could be part of this.	SFN and Goldcorp to discuss fate control as an additional topic for socio-ec management. Consider engagement with YG as a mitigation measure.	Goldcorp	In progress
3-A2-899	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Consultation	SFN advisor notes that some proponents produce a Venn diagram and show various socio-ec matters where there's overlapping responsibility with YG and the Proponent. This is a good way to show the responsibility to YG.	Goldcorp clarifies that Goldcorp is only proposing the NAR for the Project, and that this includes Goldcorp funding, upgrading, and building the portions of new build. New build will be reclaimed in closure of the Project. Goldcorp notes the distinctions between the NAR and the Yukon Resource Gateway Project; the Yukon Resource Gateway Project proposes a similar route to the NAR, as well as a connector to the Casino Project and further roads south. SFN's comments are related to the cumulative impacts associated with YG's Gateway Project and Goldcorp's NAR.			
3-A2-900	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Economic	Q: SFN advisor asks Goldcorp about what will be left in the community, aside from royalties and portable skills? SFN advisor notes that this is a consideration for the Project and this is a conversation to have with the community.	A: Goldcorp discusses legacies in other communities.			
3-A2-901	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Project Design	SFN advisor finds the sustainability commitments that Goldcorp adheres to refreshing and good thing to highlight operationally and in assessing overall project impacts against GC's sustainability commitments.	Goldcorp and SFN advisors discuss potential ways to incorporate SEMs into the Project Proposal and Management Plans, such as: incorporation of specific items in commitments table. The parties also discuss how SFN can have comfort around commitments in SEMs being tracked for compliance.	Consider enhancements/SEMs in the Project Proposal	Goldcorp	Complete, SEMs memo in Project Proposal re-submission.
3-A2-902	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Regulatory Process	SFN advisor notes concern that by adding Whitehorse into the LAA the results on smaller communities will be skewed. SFN advisor's concern is that the significance determination is affected by including Whitehorse.	• Goldcorp explains that Whitehorse was included as part of appropriate due diligence because there are Project activities in Whitehorse. Assessment of effects can be defined by the specific geographic area affected, so including the larger community of Whitehorse doesn't dilute the assessment of smaller communities. • Goldcorp discusses why Dawson was considered in more detail in the Project Proposal. Goldcorp encourages discussion about where more information on Pelly might need to be included. • Goldcorp discusses the rationale for effects assessment related to population and the Demographics IC. Goldcorp explains that the fly-in/fly-out locations are Dawson and Whitehorse, and they are therefore the most likely communities to which people would move to for the Project. Goldcorp noted that these assumptions needed to be made for the assessment, recognizing that they could manage and monitor and adjust where necessary when the mine is operating			
3-A2-903	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Regulatory Process	Q: SFN advisor asks if Goldcorp included new Stats Canada Census data in the Project Proposal?	A: Goldcorp included 2016 population data. SFN advisor suggests including more of the available data from 2016 now, as the 2011 data is problematic SFN advisors ask if 2016 census data becomes available and SFN advisor thinks it bears on the proposal, then SFN could bring that to the table. Reply: Goldcorp agrees. Goldcorp discusses making potential for doing supplemental assessments as information comes available while in the YESAB process.	Goldcorp to consider 2016 census data and how that can be considered specific to SFN related topics	Goldcorp	In progress
3-A2-904	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Regulatory Process	SFN advisors indicate that the temporal boundaries for each VC seem generally reasonable for assessing impacts on current conditions, but overly narrow and lacking in data points that could establish trend lines to better understand the current relative state (improving, declining or stable) of a number of VCs. As appropriate SFN advisor recommends using 2016 stats data to add more data points.				
3-A2-905	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Northern Access Route	SFN advisor discusses cumulative effects assessments and the role of the government. Goldcorp's approach to the Yukon Resource Gateway Project in the cumulative effects assessment might be a gap.	• Goldcorp explains that at the time the Project Proposal was scoped, Goldcorp cut off the "reasonably foreseeable" with what had been in YESAB at the time; YG's Resource Gateway Project was not in YESAB at the time. The Gateway Project had a funding proposal, but not a Project Proposal.  • Goldcorp notes that YESAB's role is to do the cumulative effects assessment. Proponents put the information forward to assist YESAB in the assessment. If the proponent misses something, it is YESAB's responsibility to include that information.	Scenario analysis for cumulative effects related to the NAR and send to SFN. Consider using the Yukon Energy 20 Year Resource Plan to create this.	Goldcorp	In progress
3-A2-906	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Northern Access Route	• SFN advisors note that Yukon Government's Gateway Project carries with it longstanding SFN concerns with past proposals (dating back to the 1980s) for extension of the Freegold (Casino) Road. SFN advisor notes scenarios would be a stress test for planning tool.  • SFN advisors recognize the effort that Goldcorp put into the cumulative effects assessment and agree that it is a YESAB responsibility to ultimately determine the significance of that assessment	Goldcorp did the assessment as best practice.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-907	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Northern Access Route	SFN advisors indicated that the opening up of the northwestern portion of the SFN traditional territory represents a further encroachment via the NAR on the landscape SFN has relied upon for its traditional use. Roads like the NAR contribute to long history of displacement as evidenced in places like Minto Landing, Fort Selkirk, etc.	Goldcorp discusses the existing access for development that already exists. The road that exists now is considered a public, user maintained road. Anyone with a claim down the road is provided access to the miners below. This rule doesn't apply to the barges or ice roads. While there is placer mining south of the Stewart River, Goldcorp does not have to nor does it intend to provide access to the area south of the Stewart River.			
3-A2-908	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Northern Access Route	Q: SFN notes that YG is taking a piecemeal approach to the Resource Gateway Project, and asks if YG will fund the NAR?	A: Goldcorp doesn't have any indication that YG will fund it.			
3-A2-909	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Northern Access Route	Comment: SFN is concerned that the NAR will be a public road.	Reply: Goldcorp notes that the road is public no matter what. Goldcorp is responsible for managing the barge landings.			
3-A2-910	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Northern Access Route	Comment: SFN is concerned that placer miners can build their own barge landing.	Reply: Goldcorp notes that this already happens now. Placer miners are already south of the Stewart, and there is a process through which SFN can engage the placer mining growth in that area, referring to placer mining licensing.			
3-A2-911	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Wildlife	SFN's main concern is placer miners and effects to wildlife, especially moose. SFN highlights that this is already happening, people are going down the NAR route currently to hunt, due to a world record moose being shot in that area.	<ul style="list-style-type: none"> <li>Goldcorp describes the effects assessment in the Project Proposal regarding effects to wildlife mortality associated with increased access.</li> <li>Goldcorp describes the current opinions on the NAR, how it is already built within 2 km of the Stewart River. Both parties notes the importance of monitoring the situation.</li> <li>Goldcorp notes that based on the feedback from SFN in this workshop, it is clear that the suggestion is to formalize the engagement process to deal with these kinds of issues.</li> </ul>			
3-A2-912	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Valued Components	SFN advisors noted the importance of incorporating important community values into the assessment of project impacts on various VCs relevant to SFN. For example, people stated in community survey that they want to live in Pelly Crossing due to the strong sense of community and family and being able to be out on the land. Strength of community and attachment to land and water are so important for SFN citizens in Pelly Crossing. Access to high quality country foods is also highly important.				
3-A2-913	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Valued Components	SFN advisor notes that Economic Conditions VC is so large that it is not informative. The indicators associated with the VC aren't necessarily associated with the issues identified in the VC. SFN advisors noted that Goldcorp needs to clarify where VCs and Indicators in the project proposal align with SFN VCs and Indicators, where they diverge how any gaps will be addressed. Goldcorp notes that if the indicators are right, the VC they fall under may not be as important. SFN advisor agrees.	<ul style="list-style-type: none"> <li>Goldcorp notes that the purpose of monitoring is to see if the predictions of effects were correct, meaning that one is not monitoring the VC, one is monitoring the effects. The key is to look at the effect and ensure that you have the right indicators to monitor the effect.</li> <li>Goldcorp notes that the Minto socio-ec indicators are more specific than the Goldcorp indicators. Goldcorp understands that SFN advisor wants to make sure that Goldcorp is adequately capturing the things that matter to the SFN community in the management plan.</li> </ul>	Send SFN the synthesis of chosen indicators to Valued Components in the Project Proposal.	Goldcorp	Complete, sent to SFN on October 20, 2017.
3-A2-914	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Studies	SFN advisor notes that the data is being generated for Minto right now, so it's about information sharing across proponents. For example, social assistance cases in Pelly Crossing is something to monitor in terms of whether the mine has an effect on it. The effects pathway may not be clear, but it is a socio-economic condition that can be evaluated against the commitments and asserted benefits of the project.	Goldcorp agrees, and needs to know if this model is going to work for other communities that Goldcorp is monitoring. Goldcorp needs to consider how monitor indicators in other communities in cases where there are other models, even if the indicators are the same.			
3-A2-915	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Valued Components	Q: SFN advisor asks what WRFN and NND want for VCs?	A: Goldcorp replies that NND didn't participate much, and describes the Tr'ondëk Hwëch'in Technical Working Group (TWG) and review with WRFN. Goldcorp discusses the terminology issue, and that Goldcorp covers off very many of SFN VCs, but under different terminology. Goldcorp acknowledges that a few VCs, such as fate control and legacy, weren't touched on in the Project Proposal.			
3-A2-916	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	First Nations Issues/Concerns	<ul style="list-style-type: none"> <li>SFN notes that up Ballarat Creek there's a traditional SFN trail that way, and other areas around Yukon River.</li> <li>SFN advisor notes that it is good that there's additional HRIA work being done on the NAR.</li> <li>SFN advisor will need to see the report in October to make any comments, but Goldcorp's heritage consultants being out on the NAR and spending time in the field is reassuring.</li> </ul>	Goldcorp notes that none of the findings would require a route realignment on the NAR.			
3-A2-917	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Operations	<ul style="list-style-type: none"> <li>SFN advisor notes that keeping the communication going to contractors and construction people is key during construction, and important to ensure that those people adhere to the heritage management plan.</li> <li>SFN advisor notes that heritage resources are more exposed with increased access, so management planning is key, proactively planning for paleontological resources as well.</li> </ul>	Goldcorp discusses heritage training and chance find protocols.			
3-A2-918	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Archaeological Resources	SFN advisor notes that monitoring for heritage is important, and training TH and SFN and whomever to participate in heritage monitoring. Discussion of how workers who are not trained are not able to recognize the less obvious resources. This is why a heritage monitor is key.	Goldcorp notes very little disturbance planned by the rivers.	schedule meeting with Ecofor (Goldcorp's consultant for archaeology) and SFN in October, if possible.	Goldcorp	In progress



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3-A2-919	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	First Nations Issues/Concerns	• SFN advisor confirms that the grave site is still intact at the air strip at coffee, asks if they are marked.	• Goldcorp notes that they are there, but not sure if they are marked and will follow up on that.	Confirm if grave site is marked.	Goldcorp	Complete. Permanent markers to replace current temporary markers in 2018.
3-A2-920	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Management Plans	Goldcorp notes that draft management plans are expected to be ready in Q1-2018, and will look to share those and look for feedback. Goldcorp will circulate the report.				
3-A2-921	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Archaeological Resources	SFN advisor and Goldcorp discuss the HRIA and the assessed area vs. the area of potential. The river crossings are the areas of concern for SFN. SFN notes only three shovel tests between Yukon and Stewart Rivers have been done previously on the proposed Northern Access Route (NAR) between the mouth of Ballarat Creek and the Yukon River. SFN advisor notes a meeting with Goldcorp's heritage consultant would be good when they're back from the field. Goldcorp agrees.		Look at HRIA map and confirm what was assessed and what was looked at for potential and follow up with SFN.	Goldcorp	Complete. Followed up on October 4 via email.
3-A2-922	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	First Nations Issues/Concerns	• SFN notes that not a lot of SFN specific information was presented in the report although some information does exist that could have been used (R. Gotthardt 1987 SFN Culture and Land Use Study and 1988 mapping by Pearce and Weinstein containing valued information for both cumulative effects and road assessments); it was also noted that SFN elders were not happy with the traditional land use section as it was not properly presented and some SFN elders comments were attributed to TH in the 2012 Coffee Creek TK Study • SFN notes an SFN elder living in Dawson was interviewed. • SFN will get back to Goldcorp on the study of interest regarding who the elders were in a Traditional Knowledge (TK) survey. • SFN discusses the interest here is with where the source of the information is, and where the representation is. SFN is concerned by lack of SFN TK.	• Goldcorp notes the ongoing TLUS work that SFN advisor is doing for Goldcorp. The parties discuss potential ways for Goldcorp to consider TLUS data for the Project.	Send SFN the TK report that references interviews with SFN citizens.	Goldcorp	Complete via email on September 22, 2017.
3-A2-923	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Agreements	• At certain times of year SFN Citizens need to get time away to do certain activities. The "2 weeks on, 2 weeks off" model doesn't work for this. • SFN advisors commented that project-specific commitments by Goldcorp to YESAB are not a substitute for entering into bilateral socio-economic and /or impact and benefits agreement with SFN.	• Goldcorp states that Goldcorp needs to hear from SFN what the effects are and what the mitigation could be; reading sources is one aspect but the information needs to come from the community.			
3-A2-924	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Studies	• SFN advisor notes that the effects described in the report are generally the type of the effects that SFN advisor would identify, but the significance is something that needs to be evaluated from an SFN perspective. • SFN advisor highlights that there are comments in the Project Proposal regarding being able to purchase more nutritious food with higher wages from working at the Project; SFN advisor notes country foods are the most nutritious.	• Goldcorp discusses making commitments in the Project Proposal regarding mitigations and indicators, and sorting out the details in the SEMP and management plans.			
3-A2-925	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Studies	• A: SFN notes this seems reasonable, and mentions that in terms of community infrastructure, particularly housing, that Stantec is doing a plan for SFN now on a community land use and infrastructure plan, SFN will look to see if this can be shared.	• Q: Goldcorp asks if SFN sees an assessment carried through focusing on traditional land use, social economy, and community health and wellbeing, or if there are other aspects that need to be focused on. • Goldcorp asks SFN to share the questions asked in the survey, SFN agrees.	SFN to send Goldcorp the "Knowing Ourselves" survey questions if possible. SFN to send 1987 SFN Cultural Land Use Study	SFN	Complete. Provided via email September 22, 2017.
3-A2-926	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Education and Training	• SFN advisor notes that there was very little in the socio-economic VCs discussing community-related interests and concerns for the reclamation and closure phase. • SFN discusses that jobs and training are important for Citizens. SFN states that Goldcorp can work with YG, Yukon College, and other mining companies to work on portable skills and on-the-job training. • SFN notes there is a capacity- building training window now so that by project start-up opportunities can be realized.	• Goldcorp agrees that timing is important. Goldcorp explains that the current strategy is to build up skills for operations, not for construction. Construction is a short time frame, with some specific skills. Goldcorp wants to put the bulk of resources to prepare people for a long term operational role. This is up for discussion as well.	Goldcorp to consider the 2014 Minto Annual Report in future Project Proposal updates	Goldcorp	In progress
3-A2-927	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Management Plans	SFN advisor notes that there are important aspects that need to be addressed during the YESAB process. Training, capacity building, socio-economic monitoring plan, are all critical to be committed to now. SFN advisors indicated that the SEMP is required prior to permitting and a complete draft should be provided as a part of the Project Proposal in the same tranche of management plans that include, for instance, a wildlife protection plan and water management plan.	Goldcorp has committed to engaging SFN on the development of management plans, including the SEMP and has provided a draft SEMP engagement plan to SFN for review and consideration (November 17, 2017).			
3-A2-928	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Management Plans	• Goldcorp would like to have the opportunity to meet with Citizens more, as well as meeting with other groups like the Elders' council, youth council, RRC, etc, as well as Chief and Council. For the SEMP, Goldcorp would like to meet with SFN to discuss this, hoping for Q1 to meet and discuss the SEMP. Part of this is also the reporting mechanisms, and discussing options for receiving information. • SFN advisor wants to know the level of content that Goldcorp is coming in with.	• Goldcorp clarifies that there's management and monitoring, and monitoring is very specific and detailed. Monitoring is about setting up indicators, and the objective is to set them up by the plans that are proposed for activities for management for the Project. • Goldcorp notes that the SEMP will not be just bullet points, it will have content to look at and analyze			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-929	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Management Plans	Q: SFN advisor asks what actions would come out of the SEMP.	A: Goldcorp replies that the actions are around adaptive management, and this will be discussed further in 2018. Goldcorp agrees that there needs to be a threshold to trigger actions. SFN advisor and Goldcorp discuss the difficulties of quantifying socio-economic issues.			
3-A2-930	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Management Plans	• SFN advisors noted that the Minto socio-economic monitoring program is useful because it has a SFN specific agreed-upon tri-partite socio-economic monitoring framework that resulted in an agreed-upon monitoring program, which in turn is being implemented to both track predicted socio-economic effects and identify areas of concern associated with the project, necessitating socio-economic adaptive measures due to identified adverse effects or gaps arising from the project.	• Goldcorp discusses the engagement plan, and how it's important to be talking on a regular basis with SFN as a whole, not just one representative.			
3-A2-931	21 September 2017	Meeting		SFN	Consultation	SFN councillor, SFN technical advisors, and Goldcorp meet for a workshop on socio-economic matters. Goldcorp and SFN discuss SFN primary data relevant to the Project, sustainability criteria and spatial/temporal boundaries, significance judgements, alignment between SFN VCs and the VCs presented in the Project Proposal, archaeology work done for the Project, and traditional land use.	Consultation	• Goldcorp asks if there is an appetite to discuss this with SFN citizens in collaboration with SFN consultants. • Goldcorp asks about the primary data sources that SFN has suggested and how this can be analyzed in time to meet with SFN. • SFN advisor replies that this involves sitting down with SFN leadership to discuss this. • SFN advisor notes that the mapping work that has been done is nearly complete, and Goldcorp and SFN advisor discuss access to the information will help inform SEMP planning.				
3-A2-933	22 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp re-sends SFN the Coffee Creek TK Project Final Report that was originally provided in 2015.	Consultation					
3-A2-934	22 September 2017	Email	Incoming	SFN	Consultation	SFN provides Goldcorp with two socio-economic-related documents discussed during the workshop.	Consultation					
3-A2-936	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Land Use	SFN notes that there is good hunting down the river corridors, and a lot of people went down river this year. People are really worried about caribou and sheep that go down to Fort Selkirk. They're worried about traffic with wildlife (e.g. if a moose gets hit by a vehicle). SFN suggests having people salvage if a moose does get hit. SFN also notes concerns about hunting pressure by non-First Nations people.	Goldcorp discusses the current access to the Stewart River.			
3-A2-937	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Management Plans	SFN notes that a serious area for the community is the Stewart River to the Yukon River. The parties discuss what topics are of concern to other interested parties, and particularly past and potential future engagement with YG on managing moose population. SFN notes that you can measure changes, even if the cause of the change isn't the mine, and work together on them.	Goldcorp notes that it is not certain that harvest will increase with the Project. There will be a change, but the difference the road makes is not expected to create a rush into the area for hunting.  Goldcorp agrees.			
3-A2-938	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	• Goldcorp explains where the YG seasonal maintenance begins and ends, and where the road is user-maintained road. • Goldcorp is proposing that any upgrade and maintenance for the road for Goldcorp will be done and funded by Goldcorp. • SFN notes 37 km of new road is mentioned in the Proposal, but the numbers on the map don't add up to 37 km.	• Goldcorp explains that 37 is the maximum extent of build. This number is not static due to placer miner work on the road each season. • Goldcorp explains that the Maisy May switchback for example exists, but the grades are too high, so Goldcorp has to make changes in certain areas. Upgrades are different wherever they are happening, for example culverts and re-surfacing on placer tailings will be very expensive, but not new disturbance. Also, the numbers for new road south of Yukon to the site aren't labelled on the map.			
3-A2-939	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	• SFN notes that the discussions of closing the road in the Project Proposal are confusing; for example seasonally where it won't be maintained.	• Goldcorp explains that the new build of the road is proposed to be reclaimed. In regard to short term closure, Goldcorp provided the example where there are caribou on the road, Goldcorp hopes that other users will cooperate with Goldcorp on closing the road for a few hours if that is determined to be necessary. • Goldcorp explains that they presented 3 potential options for road management to YG in April, and to SFN in May. Goldcorp management, YG management or a Public-Private Partnership (3rd party). Goldcorp has presented the operational management practices that Goldcorp knows they can control. YG hasn't provided any information back to Goldcorp yet, other than to express less interest in it being fully Goldcorp managed. Governance structure is not described in the Project Proposal because Goldcorp doesn't want to put something in there that Goldcorp can't deliver on; SFN understands. • Goldcorp has control of the crossings, including barges and ice bridges.			
3-A2-940	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	• SFN asks if the ice road is part of the road	Goldcorp replies no. There is a legal liability for Goldcorp if other people use the ice bridge, so Goldcorp will not permit non-project vehicles on the barges or ice-bridges.			
3-A2-941	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	• SFN discusses possibility of others building an ice bridge	Goldcorp notes that anyone can build an ice bridge right now. Goldcorp notes that additional clarity around road sections and management is something Goldcorp can consider providing in the re-submission.	Provide clarity on road management sections and consider additional classifications in the Project Proposal.	Goldcorp	Complete, see road memo in Project Proposal re-submission.
3-A2-942	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	SFN notes that governance of the road will be of key interest for SFN. The parties discuss various aspects of construction and road management in relation to placer miners or groups undertaking maintenance. SFN asks about upgrades?	Goldcorp explains the kinds of upgrades that will take place, noting that water management, pullouts, and surfacing are key upgrades, as well as some brushing for safety.	Clarify upgrade description and how it was used in the assessment. Include expected footprint of disturbance vs assessed.	Goldcorp	Complete, see road memo in Project Proposal re-submission.

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-943	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	SFN notes that from a road upgrade perspective, the upgrades are complex. It would be good to see a breakdown of visuals where the upgrades are happening, such as vegetation clearing and widening. SFN states that the assumption needs to be clear up front, also considerations for habitat loss need to be clearer.	Goldcorp notes that's why the assessment was done on a wider footprint. Goldcorp explains how the assessment was done based on an assumption that clearing is required for all upgraded areas. In reality, some of these areas are already cleared, so the assessment overestimates the extent of vegetation loss. However, Goldcorp explains that mapping each and every upgrade activity may be a lot of work and not change the assessment; also this level of detail is not available at this time.			
3-A2-944	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Wildlife	SFN notes the two air strips, can't find the new air strip on any maps in the Project Proposal. SFN notes that the new air strip also isn't clearly discussed in terms of wildlife effects. SFN wants a table of estimates of aircraft use for the mine site.		Confirm new air strip location is on a map in the Project Proposal, as well as air traffic information.	Goldcorp	Complete. Provided via email October 4, 2017
3-A2-945	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Management Plans	<ul style="list-style-type: none"> <li>• Goldcorp notes that the road management plan and wildlife management plans were included in the Project Proposal, and the company is planning to have all management plans for licensing in draft in Q1 to be reviewed by First Nation partners.</li> <li>• Dust monitoring will have monitoring and adaptive management components to it, how to respond if the management isn't working.</li> <li>• SFN notes that having conceptual plans are helpful in assessment.</li> <li>• SFN and Goldcorp discuss the future dust management plan and vegetation monitoring.</li> <li>• SFN discusses how effects to vegetation from dust are discussed in the PP, and asks about this being carried through to effects on wildlife.</li> <li>• SFN and Goldcorp discuss potential use of Calcium Chloride and how it may attract wildlife. Goldcorp notes that it hasn't been a major attractant in other scenarios.</li> </ul>	Goldcorp encourages SFN to discuss road governance issues with YG and that a broader tri-partite discussion would be valuable.			
3-A2-946	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Closure	SFN confirms the backfilling components of the Proposal, and asks about pit lakes and leakage at closure.	<ul style="list-style-type: none"> <li>• Goldcorp explains the pit filling and spilling in closure, including schedule. The parties discuss channeling and potential measures to avoid trapping wildlife around and in pits in closure. Goldcorp describes how closure is an ongoing discussion with First Nations over the life of mine depending on the concerns. Goldcorp has committed to putting boulder fences around the pits where there are steep areas. Goldcorp notes that there might be more backfill as well, which will change the closure plan.</li> </ul>			
3-A2-947	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Management Plans	Goldcorp describes how there will be a monitoring and adaptive management plan for all plans that require monitoring and adaptive management where appropriate. SFN states that they are currently looking at ways to make sure that the appropriate things are monitored.	Goldcorp encourages suggestions at this stage of plan development.			
3-A2-948	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	Q: SFN asks about the peregrine falcon surveys on the Stewart River, asks if the nest was near the barge landing.	A: Goldcorp explains where the nest is, noting it is down river of the barge landing. SFN notes there will be blasting on the Stewart River, Goldcorp explains mitigations and restrictions in place for nesting raptors.			
3-A2-949	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	Q: SFN asks if the surveys include the sheep at PellyMinto.	A: Goldcorp explains that only one of the baseline surveys went from the Pelly confluence to the White River confluence. The Pelly population is well monitored, so Goldcorp only did it one time. It is noted that this population is monitored by YG.			
3-A2-950	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	Q: SFN asks how YG moose survey data compares to Goldcorp's.	A: Goldcorp explains that YG hasn't done a late winter survey since Goldcorp/Kaminak started. Goldcorp works closely with YG on the surveys, follows similar protocols to YG, and collaborated on a few surveys. Goldcorp has been working with YG Dawson Region Biologist since 2014, collaborated on baseline program development. For example, Goldcorp and YG did sharp tailed grouse studies at the same time and worked together closely on this.			
3-A2-951	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	Q: SFN asks what they were looking for?	A: Goldcorp replies wildlife features like mineral licks, large stick nests. Also documented wildlife and habitat observed. Goldcorp found a mineral lick along the Barker Creek section of the road, and are now looking at the road alignment to see if adjustments can be made to avoid the mineral lick.			
3-A2-952	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Wildlife	Q: SFN asks about the location information sharing and putting wildlife cameras up at the lick.	A: Goldcorp notes that the location of the lick is considered confidential in order to protect the site and the wildlife that use it. The location will be shared in confidence with reviewers as required. Goldcorp explains that remote cameras have been set up at the lick and will be revisited later this fall to get photos. No animals were seen at the lick, but it was heavily tracked by moose.			
3-A2-953	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	Q: SFN asks if there are any additional surveys planned for 2017.	A: Goldcorp responds that the remote camera program is ongoing. Additionally, Goldcorp is planning a fall grizzly bear den survey, pending further discussion with YG.			
3-A2-954	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	Goldcorp notes the challenges to date with spring den surveys for grizzly bear dens due to the issues with snow coming off the slopes too quickly so you can't back track the tracks to the den. The plan is to try to do a survey for when bears are digging their dens. SFN notes high potential in Ballarat and Yukon River areas, and recognizes the challenges.				
3-A2-955	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	SFN brings up the methodology, and notes that more work could have been done at different times of year to capture variability	Goldcorp explains that the surveys were for presence, not for variability. At the lower elevations, Goldcorp found presence, but up at the mine site bats were not present, which was to be expected.			

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-956	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Air Quality	<ul style="list-style-type: none"> <li>SFN notes the noise in the recording system, so there was interference.</li> <li>Goldcorp agrees that there was some interference, but believes that there is enough data to say if bats regularly used the area.</li> <li>SFN and Goldcorp discuss additional bat surveys and what this information would mean for management purposes.</li> <li>SFN notes it was inconclusive due to methods and some interference for the mine site location. SFN suggests that this will be an issue that comes up.</li> </ul>	Goldcorp notes that methods could have been better described. SFN requests additional bat baseline at the mine site, Goldcorp agrees. Goldcorp and SFN discuss ways to reduce interference with helicopter noise and other exploration activities, such as timing of surveys.	Goldcorp commits to additional bat baseline at the mine site with study design reflective of potential interference.	Goldcorp	Commitment added to commitment log.
3-A2-957	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Wildlife	<ul style="list-style-type: none"> <li>SFN notes that a specific assessment was not done. Goldcorp is looking at a habitat model and effects assessment for marten to address concerns raised by First Nations.</li> <li>SFN notes some areas of current access for hunting.</li> </ul>				
3-A2-958	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks if the use of ELC vs broad ecosystem mapping was partially due to the available imagery?</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp explains that both ELC and broad ecosystem mapping were based on ortho and LIDAR collected for the whole NAR; same imagery used for the entire Project.</li> </ul>			
3-A2-959	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks if there would be a benefit to expanding the ELC to cover the areas currently mapped using broad ecosystem mapping?</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp replies that it wouldn't change the effects assessment, mitigation, or management. Acknowledges that having two types of mapping makes it slightly harder to decipher, but change the assessment. SFN understands.</li> </ul>	Send SFN ELC files	Goldcorp	Complete Via email on October 4, 2017
3-A2-960	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks for a summary table of plot distribution for visits to ecosite types. Looking for over/under visitation of sampling by ecosite type.</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp agrees.</li> </ul>			
3-A2-961	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks how rare plant surveys were set up and decisions around total extent of the survey area, and target areas for rare plant potential.</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp replies that the efforts were not limited to just the footprint, they were targeted to the LAA, which was within 1 km of the NAR. Sites were selected based on vegetation communities that existed in the area from Ortho data and information on the region, and later ELC data, and an assessment of stratification of the rare plant potential in the area. There was an aerial overview of the pre-field stratification of the area to verify it, then followed by ground surveys. Targeted surveys for a few sites took place in 2016 that came up in ecosystem mapping. Goldcorp describes how tors and pingos were targeted at the site and along the new sections of NAR.</li> </ul>	Explain process for developing study design for rare plant survets and include a summary of efforts	Goldcorp	In progress
3-A2-962	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks if the rare plant survey efforts were extended to new portions of the road?</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp explains the timing of this and confirms it happened.</li> </ul>			
3-A2-963	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	<ul style="list-style-type: none"> <li>SFN asks about reference sites at Moose and Thistle Mountain, notes Moose Mountain doesn't have access but Thistle Mountain could. Asks if Thistle Mountain is a valid reference point. Notes that it could have influence from placer or other mining, but not from the Project, and SFN just needs to understand the rationale for the reference sites.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp explains how areas of mineralization have metals content in plants, and that exploration teams use metal levels in plants to find mineralization. Goldcorp will review and possibly refine reference sites as the monitoring programs are being developed.</li> </ul>	Detail for reference site selection - consideration in monitoring program for vegetation metal uptake	Goldcorp	In progress
3-A2-964	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>SFN asks about what other site information was collected at the trace metal sample sites, specifically referencing site soil moisture regime and willow species. Concerned about the ability to detect project change if there is too much variability in the data.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp explains ELC has the soil moisture regime information, and has the trace metals information. Where trace metals were done not in conjunction with ELC, then the soil moisture data isn't available.</li> <li>Goldcorp can look at additional data collection for future monitoring opportunities and notes that additional data collection may also be useful for closure planning.</li> </ul>			
3-A2-965	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>SFN notes the variance in results for the metals uptake in plants, and wants to be comfortable with the data, and looking to see if there's additional data that can be used to look into this further, SFN wants to know if there could be a residual effect of metals contamination. SFN wants to know if the information is there to effectively monitor and manage.</li> <li>SFN notes that it's also about the monitoring species, maybe willow is too variable and maybe stick with lichen.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp can share the plot data.</li> </ul>	Provide ecosite plot visitation summary.	Goldcorp	In progress
3-A2-966	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks about comparing metal levels to the Canadian Council of Ministers of the Environment (CCME) industrial standards rather than the parkland or agricultural standards.</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp explains that this is consistent with what is done elsewhere, is happy to look at different reference points if SFN wants. It's a reference for comparative purposes, not a standard that Goldcorp is trying to achieve, as the standards are for contaminated soil and not for plants</li> </ul>	Compare vegetation baseline information guidelines to help provide context for vegetation metals uptake, consider for monitoring	Goldcorp	In progress
3-A2-967	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks if there were considerations for the agricultural consumption guidelines in presenting the baseline results</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp replies that this wasn't considered too far in the baseline, but can be looked at much more closely in monitoring and setting thresholds.</li> </ul>			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-968	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	<ul style="list-style-type: none"> <li>SFN notes that one of their biggest issues is with the NAR, SFN doesn't feel that the effects assessment went far enough.</li> <li>SFN thinks the number of mine related vehicles is underestimated at 8 trucks per day. SFN doesn't think this includes all of the other trucks and vehicles on the NAR, consultants, road maintenance trucks, those are mine related. SFN notes that there are then the other people who will use the road.</li> <li>SFN notes that their concerns along the road include sensory disturbance, wildlife injury and fatality. SFN also notes cumulative effects as a concern.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp replies that there is rationale for the 8 trucks per day and will provide that to SFN.</li> </ul>	Provide rationale for truck average on the NAR	Goldcorp	Complete, provided via email October 4.
3-A2-969	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	<ul style="list-style-type: none"> <li>SFN notes that their concerns along the road include sensory disturbance, wildlife injury and fatality. SFN also notes cumulative effects as a concern.</li> <li>SFN notes that a sensitivity analysis on traffic levels might not change the effects assessment, but it might change the commitment to mitigations. Goldcorp has committed to monitor and enforce speed limits for any mine-related vehicle.</li> <li>SFN notes that the road may allow current users to drive faster.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp can make this clearer in the PP; Goldcorp notes that the mitigations associated with the NAR are fully committed to as part of the Project Proposal. Goldcorp notes that conditions aren't going to change significantly on Hunker and Sulphur as a result of the Project. Sulphur south to the Stewart River is the specific section where SFN's issues are being raised.</li> </ul>			
3-A2-970	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	<ul style="list-style-type: none"> <li>SFN states that the road governance issue is the piece that needs to be worked out first. SFN agrees that Stewart to Yukon River is a lesser effect. SFN believes that people will put their own barge landing in due to the upgraded access.</li> </ul>				
3-A2-971	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	<ul style="list-style-type: none"> <li>Goldcorp discusses ways to look at monitoring the road, such as characterizing the traffic on the NAR. While this may be more reactive, it's still monitoring and looking to manage.</li> <li>SFN states that this is upgrading a public road and making it easier to get to areas that are currently not accessed. When you improve access, it's going to have an effect and there's not much you can do about it.</li> <li>SFN states that vehicle numbers, vehicle speeds can be sorted out, but need to talk more about monitoring. SFN notes that there's an expectation that when you put in a resource road, that there's hunting management.</li> <li>SFN thinks that the effects were underestimated. SFN notes that people will drive a long way to hunt a moose.</li> <li>SFN wants Goldcorp to help talk to YG about controlling moose harvest in the area; Goldcorp wants to promote a healthy moose population in the area and look for ways to do this.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp notes that the road does mostly exist now. Goldcorp clarifies that some game management sub zones in the Dawson area are close to sustainable harvest.</li> <li>Goldcorp acknowledges that this effect may exist and wants that to be very clear to SFN. It's about monitoring it to see the magnitude of this effect.</li> </ul>			
3-A2-972	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Northern Access Route	<ul style="list-style-type: none"> <li>Goldcorp asks SFN for feedback on future studies on the road, as this will be an effective step forward. Goldcorp needs to find ways to work together on management of the NAR.</li> <li>SFN notes that Casino was choosing to go through Settlement Land to give the First Nation control over the area.</li> <li>Goldcorp replies that the only place that could happen is in the Black Hills area, and that area is not suitable for a road. Furthermore, it is understood by Goldcorp that TH doesn't want a road through their settlement land.</li> </ul>				
3-A2-973	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Wildlife	<ul style="list-style-type: none"> <li>SFN and Goldcorp look at the traffic camera data, and SFN states that there is a clear trend north to south with more traffic in the north.</li> </ul>				
3-A2-974	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Wildlife	<ul style="list-style-type: none"> <li>SFN wants to see the new airstrip location and information on the number of flights expected. There are mitigations for the flights and flight areas, but it's not clear how you go there without the numbers. SFN notes that this may require an effects assessment for aircraft.</li> </ul>				
3-A2-975	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Wildlife	<ul style="list-style-type: none"> <li>SFN doesn't see effects to caribou being a big issue, aside from possible collision mortality.</li> <li>SFN notes that the effects assessment is based on current caribou populations and range, but doesn't account for future population size.</li> </ul>				
3-A2-976	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Studies	<ul style="list-style-type: none"> <li>Regarding the late winter aerial survey monitoring for moose and caribou, SFN suggests splitting caribou and moose out, as they are two species that behave differently. SFN notes this is good data to know what's going on, but it doesn't give you an action to take based on your results.</li> <li>SFN suggests revisiting the bigger surveys and determining what you get out of the surveys. SFN notes for example, sheep surveys every year might be more damaging than the mine, and Goldcorp should consider year 1, 7, 12 data, not years 1, 2, 3.</li> <li>SFN notes that the monitoring plans start well, but don't result in clear actions.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp explains that some monitoring is to make other parties feel comfortable that the monitoring is going on, and may not actually be indicate mine impacts</li> <li>Goldcorp thanks SFN for the feedback, and notes that engagement on this is important for the monitoring programs in the management plans.</li> </ul>			
3-A2-977	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Management Plans	<ul style="list-style-type: none"> <li>Q: Goldcorp asks what can be done today to help with the monitoring program?</li> </ul>	<ul style="list-style-type: none"> <li>A: SFN notes that the connection of the monitoring program to adaptive management needs to be clearer. SFN notes caribou monitoring and the action that Goldcorp will take, what is the action going to do</li> </ul>			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-978	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Management Plans	<ul style="list-style-type: none"> <li>Goldcorp and SFN discuss caribou on site, and Goldcorp explains that if caribou end up hanging around site, Goldcorp will engage YG and First Nation partners to figure out a solution.</li> <li>SFN would like to see consideration that there are options for action if there are caribou on site.</li> </ul>	Goldcorp and SFN discuss the phased response levels for certain wildlife mitigations, and Goldcorp will make it clearer how the phases are triggered and how it's thought through. Goldcorp and SFN agree that the best place for this is in the management plan.			
3-A2-979	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Water Quality	<ul style="list-style-type: none"> <li>SFN notes that the construction timing might be more of an issue for the raptors and sheep then effects during operations.</li> <li>SFN is not overly worried about the bird aspect at this point, but is doing further review. SFN notes that the events ponds are small compared to lakes and other water bodies, and there are ways to keep waterfowl from coming in as well. SFN also notes that the alpha pond water is not expected to have any kind of toxicity, so not a concern really for landing.</li> </ul>				
3-A2-980	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	SFN and Goldcorp discuss challenges with assessment of traditional and medicinal plants. It is noted that traditional and medicinal plants encompass a wide range of species. SFN suggests that rare species could be used as a surrogate but notes that rare habitats are considered in the ELC as well, and look at proportionate effects, notes this looks like this has been captured in the VC.	Goldcorp explains the rationale for selecting berry-producing plants as a surrogate.			
3-A2-981	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: SFN asks about the index worked through for the plots and where there may be a lack of data in some plots.</li> </ul>	<ul style="list-style-type: none"> <li>A: Goldcorp will address this with the ecosite plot visitation summary.</li> </ul>			
3-A2-982	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Vegetation	<ul style="list-style-type: none"> <li>Q: Goldcorp asks SFN what parameters and species that would be the greatest importance to SFN? Example of a pathway is arsenic to moose. Asks if there's a specific pathway and contaminant with an animal that raises the biggest question?</li> <li>A: SFN replies that larger ungulates move around and the scale of the Project means the effect will be small.</li> <li>SFN notes that it didn't talk about small mammals and how trace metals moves up the trophic scale.</li> </ul>	<ul style="list-style-type: none"> <li>Goldcorp explains that this is part of the adaptive management and monitoring program, but there aren't plans to add another baseline sampling event for small mammals.</li> <li>Goldcorp notes that if it is of interest to have more studies done on this, Goldcorp can do this.</li> </ul>			
3-A2-983	22 September 2017	Meeting		SFN	Consultation	SFN Councillor, SFN technical advisors, and Goldcorp meet for a workshop on wildlife effects. SFN and Goldcorp discuss the Northern Access Route, management plans, 2017 baseline data, the Project Proposal effects assessments related to wildlife and vegetation, and metals uptake in plants.	Management Plans	<ul style="list-style-type: none"> <li>SFN would like to avoid going out every few years to kill small mammals for this data. Goldcorp agrees and would like to keep this as an adaptive management measure.</li> <li>SFN would look to define more mitigation and recommendations on management to be comfortable with the Project.</li> </ul>				
3-A2-986	26 September 2017	Email	Outgoing	SFN	Consultation	Goldcorp re-sends SFN the Technical Engagement Plan that SFN originally provided on August 17 that Goldcorp provided feedback on on August 19. Goldcorp asks SFN about next steps, as SFN had not confirmed the post-technical workshop engagement approach, asking if SFN would like follow-up technical conference calls. Goldcorp asks SFN to provide a letter outlining that pre-submission consultation requirements had been met under the Act, as Goldcorp was targeting a November re-submission. Goldcorp asks SFN for a meeting on October 18 and/or 19.	Consultation					
3-A2-1129	04 October 2017	Email	Outgoing	SFN	Consultation	Goldcorp thanks SFN for participating in the 4 days of workshops and sends the following items to address action items:  1. Meeting notes from all 4 workshops per SFN's request 2. An excel workbook that addresses action items where answers were immediately available.  Goldcorp also suggests a meeting with Chief and Council to address some action items where SFN technical advisors noted that topics or issues would need to be discussed with Chief and Council. Goldcorp asks SFN if there is a time in the fall to do a Citizens meeting. Goldcorp also re-sends the technical engagement plan that SFN provided on August 19 and of which Goldcorp originally provided feedback on August 30, and asks SFN if there is any feedback on the edits Goldcorp has made, particularly in regard to the timeline Goldcorp had included for SFN to provide formal submissions of views on the Project Proposal. The timeline is a request for official presentation of SFN views within 14 days of the technical workshops.	Consultation					
3-A2-1130	04 October 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN an update to the Coffee Gold Project pre-season report. The update informs SFN of the extended field schedule and additional exploration road building happening at site.	Consultation					
3-A2-1131	04 October 2017	Email	Outgoing	SFN	Consultation	Goldcorp re-sends the technical engagement plan with SFN that includes Goldcorp's input, which includes a request for official presentation of SFN views within 14 days of the technical workshops. Goldcorp suggests a call to discuss the document.	Consultation					
3-A2-1136	12 October 2017	Email	Incoming	SFN	Consultation	SFN confirms meetings with Goldcorp for October 18 and 19. October 18 is to discuss technical engagement, October 19 is to discuss confidential matters.	Consultation					
3-A2-1152	16 October 2017	Email	Outgoing	SFN	Consultation	SFN asks if Goldcorp has an updated flyover graphic for the Project, Goldcorp replies that this is being updated currently and is expected to be complete and ready to share in approximately 6 weeks.	Consultation					

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Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1153	16 October 2017	Email	Incoming	SFN	Consultation	SFN sends Goldcorp a letter in response to the email on October 4 providing SFN with follow up to action items from technical sessions and Goldcorp's request to meet with Chief and Council to discuss some items from the technical sessions in late September. SFN's letter notes that SFN is not in a position to accommodate a meeting with Goldcorp and also does not think a meeting is required. SFN notes that the technical meetings were the first stage of SFN's process as described in the technical engagement plan document. SFN is proceeding with the next steps of their process, including Council's review of reporting from SFN's technical advisors. SFN sees a second round of technical discussions and then to provide SFN's final comments on technical issues for Goldcorp's consideration in November. SFN will be glad to meet with Goldcorp after SFN's technical and other discussions internally are complete. SFN agrees that a community information meeting should be held, and will let Goldcorp know a date for a community meeting in Pelly Crossing in November.	Consultation					
3-A2-1212	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Consultation	The parties discussed the meeting Goldcorp had proposed for this week with SFN Chief & Council and SFN noted it was premature to meet that week due to internal review process that SFN was undertaking. It was noted that it would be appropriate to meet at a different date in the future once SFN had met with all their technical consultants.	Goldcorp acknowledged SFN's process, noting that the meeting request was to discuss matters with Council that had been identified in workshops with SFN's technical team, which Goldcorp understood to be preliminary, but not official concerns for SFN. It was noted that it is an ongoing journey for relationship building directly with SFN Chief and Council and citizens.			
3-A2-1213	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Regulatory Process	Goldcorp explains the goal to get back into the YESAB process and submit by November 30th. Goldcorp requests that SFN provide formalized feedback no later than mid-November.				
3-A2-1214	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Consultation	SFN explains that SFN sees another round of technical meetings where SFN's technical consultants communicate feedback after SFN's consultants brief and receive instruction from SFN Council. Formal feedback will come from Chief Neilson in a letter iterating SFN's views and recommendations for Goldcorp to consider. The first step; however, is for SFN's technical team to brief Council. This will occur in a few days.	Goldcorp confirms with SFN that the November 30th submission date is a firm deadline for Goldcorp. Goldcorp updates SFN on discussions between Goldcorp and YESAB regarding resubmission and the process and provides a summary of what is expected to be included in the resubmission. Goldcorp does not plan to change the existing Project Proposal (PP) unless a fundamental change were required as a result of consultation. Goldcorp will re-submit the existing PP with an addendum with updated information, such as the updated consultation section.			
3-A2-1215	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	First Nations Issues/Concerns	SFN notes the socio-economic primary data from SFN that will come Goldcorp's way after it has been reviewed and packaged appropriately for distribution by SFN. SFN would like to see this contribute to the PP.	Goldcorp replies noting Goldcorp's previous attempts to access the data, and noting that Goldcorp respects that Citizens must review the data first. The question for Goldcorp revolves around how long to wait for data from SFN. At some point, Goldcorp has to submit the PP.			
3-A2-1216	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	First Nations Issues/Concerns	SFN highlights issues with using old census data. The primary socio-economic data from SFN will comprise information from SFN Citizens residing in Pelly Crossing and outside. The parties discussed potential points in the YESAB process where a review of SFN's primary data could be considered and included. It was noted that Goldcorp doesn't get the sense from discussions with SFN's technical team that the new data will materially impact the effects assessments.	Goldcorp acknowledges this, and notes that there are solutions once Goldcorp receives primary data from SFN. Goldcorp does not want to rush through sensitive primary data when it is received just to "get it in" the PP. Goldcorp can acknowledge data gaps in the PP and commit to an analysis of the data when it is received. Goldcorp notes a key opportunity to incorporate SFN primary data into the Socio-economic Management Plan.			
3-A2-1217	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Project Design	SFN highlights some potential enhancements from the Project, and notes that Goldcorp may want to include that in the PP.	Goldcorp notes that such enhancements are more related to a bilateral agreement to be negotiated, and as such, wouldn't be included in the PP.			
3-A2-1218	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Project Design	SFN notes that enhancements are important to understand in the context of the PP and for Citizens to understand the enhancements related to the Project. The PP should be clear about the commitments to enhancements, even if the end result of the enhancement is unknown. SFN would like to see commitments that are more concrete than a plan to make a plan.	Goldcorp will update the commitments table for the re-submission and show how new commitments have arisen from consultation.	Goldcorp to provide the consultation related to SFN and commitments table to SFN in advance of Project Proposal submission.	Complete, emailed to SFN on November 6, 2017	
3-A2-1219	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Consultation	SFN technical team is meeting with Chief and Council to review multiple files, including Coffee and the SFN primary data as well. SFN wants there to be collegial discussions with Goldcorp and for Goldcorp to consider how SFN Citizens will have access to work for Goldcorp. This is an aspect to be discussed outside of the PP.	Goldcorp is happy to discuss opportunities with SFN at any time and is looking to discuss this bilaterally with SFN. Goldcorp hopes that lessons from Minto can be implemented. Goldcorp notes that there are challenges with ensuring that all First Nations partners on the Project are engaged and the opportunities with the Project consider all Nations involved. Goldcorp notes that there are a few key items that could be big wins if Goldcorp and multiple First Nations work together, and gives an example of NAR governance and wildlife management.			
3-A2-1220	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Consultation	Goldcorp asks SFN what the next steps are for technical engagement on the PP. SFN explains that SFN sees another round of technical workshops with Goldcorp. After these meetings, SFN will produce more formal recommendations on the Project and provide them to Goldcorp in the 3rd week of November.	Goldcorp reiterates the deadline of November 30th to submit the PP, and notes that 3rd week of November is very late to be receiving feedback. Goldcorp has been clear about the goal of November 30th, and notes that it has been 5 months of attempts to engage with SFN on the complete Project Proposal. Goldcorp suggests that SFN's feedback includes a letter noting areas of agreement on concepts with Goldcorp and SFN, and status of engagement.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1221	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	First Nations Issues/Concerns	SFN notes that Coffee Creek is an important place and that there is ongoing relationship work for Goldcorp to do with SFN. SFN will need to discuss providing a letter with Chief and Council.				
3-A2-1222	18 October 2017	Meeting		SFN	Consultation	SFN and Goldcorp meet to discuss the Project Proposal and YESAB Assessment, socio-economic aspects of the Project relating to SFN, the status of the Traditional Land Use Study (TLUS) being created, and SFN's approach to technical review on the Project Proposal as well as next steps for technical engagement and SFN's feedback on the Project Proposal.	Northern Access Route	SFN and Goldcorp discuss the NAR and YG's Resource Gateway Project. SFN suggests that Goldcorp may have to be creative in the solution on NAR governance.	The NAR is part of ongoing engagement with SFN.			
3-A2-1225	20 October 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up on an action item from the September 21 Socio-economic workshop with SFN and provides a memo with an analysis of SFN VCs and indicators compared to the Coffee Project Proposal.	Consultation					
3-A2-1226	20 October 2017	Email	Outgoing	SFN	Consultation	SFN asks if Goldcorp will be transporting cyanide to site. Goldcorp explains that Goldcorp will be using ISO containers as this is part of being signatory to the International Cyanide Management Code.	Heap Leach					
3-A2-1227	23 October 2017	Email	Incoming	SFN	Consultation	SFN asks Goldcorp if the Heritage Resources Impacts Assessment for the NAR has gone to YG yet, asks if Goldcorp can send SFN a copy for review. Goldcorp informs SFN that the preliminary report will be ready in December and Goldcorp will engage with SFN on the document when it is ready.	Heritage					
3-A2-1228	24 October 2017	Email	Incoming	SFN	Consultation	SFN sends Goldcorp their revisions to the September 21 socio-economic workshop notes and thanks Goldcorp for the quick turnaround on the SFN VC and indicator comparison analysis to the Coffee Project Proposal	Consultation					
3-A2-1230	25 October 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up with SFN after the meeting on October 18. Goldcorp asks if SFN's technical advisors have been instructed to meet with Goldcorp for a second round of technical sessions, and if so, Goldcorp would like to begin meeting coordination. Goldcorp also asks about a follow up meeting per SFN's request to discuss the heritage work done on the NAR in August and September 2017.	Heritage					
3-A2-1231	27 October 2017	Email	Incoming	SFN	Consultation	SFN provides feedback on the notes from the September 19 Water Workshop and September 20 Closure Workshop.	Consultation					
3-A2-1232	27 October 2017	Email	Outgoing	SFN	Consultation	Goldcorp asks if there are any follow up items for SFN and Goldcorp now that SFN's technical advisors have met with SFN Council. SFN notes that they have been busy and will follow up shortly via telephone.	Consultation					
3-A2-1309	01 November 2017	Email	Outgoing	SFN	Consultation	Goldcorp follows up with SFN again regarding next steps for technical engagement. Goldcorp asks SFN the same questions regarding engagement as on October 25. SFN replies that they have been out of town for personal reasons and will respond within a few days.	Consultation					
3-A2-1313	08 November 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN the following items as a follow-up to the Project Engagement meeting on October 18:  Per our discussion on October 18 with SFN advisors, we are sharing with you (attached): • List of additional Project Commitments resulting from consultation since March 31, 2017 • List of action items that were identified in the technical workshops • Summary of SFN consultation & engagement since March 2017 which will be included in the Consultation addendum discussed on Oct. 18th	Consultation					
3-A2-1314	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Heap Leach	Q: Citizen asks what processing agents Goldcorp will use and in what quantity?	A: Goldcorp explains that the main reagent is Cyanide and summarizes the requirements under the International Cyanide Management Code. Goldcorp notes that under the ICMC, Goldcorp is audited every three years.			
3-A2-1315	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Heap Leach	Q: Citizen asks where Cyanide sits on the dangerous goods scale?	A: Goldcorp will follow up and provide a response.			
3-A2-1316	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Economic	Goldcorp notes that site jobs will be posted in early 2018 and provides an overview of diversity statistics for the 2017 season hiring. Q: Citizen asks if this information includes contractors.	A: Yes. There were ~160 people employed for the 2017 field season.			
3-A2-1317	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Economic	Chief of SFN asks Goldcorp to send jobs information and job descriptions to the training and employment and HR departments at SFN. This way, SFN can prepare Citizens for the work.	Goldcorp to prepare and share with SFN job descriptions.	Goldcorp	In progress	
3-A2-1318	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Education and Training	Q: Citizen notes seeing an ad for a driller helper program through Yukon College. Asks if there will be other training opportunities?	A: Yukon College runs the program in Dawson and Whitehorse. Goldcorp can look to discuss opportunities for this training program with SFN if there is interest in doing it other locations. Goldcorp notes that they have had a few RFPs this year, are looking for Yukon companies and have been discussing opportunities with Selkirk Development Corporation.			
3-A2-1319	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Contracting and Procurement	Q: Chief asks if there are preferred opportunities for affected First Nations?	A: Goldcorp is preferentially looking at First Nations businesses. Goldcorp needs to understand from SFN what the SFN businesses are.			
3-A2-1320	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Contracting and Procurement	Q: Did the Whitehorse office space request for proposal (RFP) go to just affected First Nations, or if it went out more broadly?	A: Goldcorp representative did not see the final list of bidders so not aware of what other organizations may have received it, however they can confirm it was sent the opportunity to Selkirk Development Corporation. Goldcorp took a targeted approach with the office space RFP so some First Nation businesses may have received it if they had relevant office space available. However, Goldcorp will be sending notice of all RFPs to SFN as a standard procedure.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1321	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Water Quality	Q: Citizen is concerned about how many water treatment plants there are for the Project?	A: Goldcorp explains that there is one treatment facility for water for the Heap Leach Facility. Goldcorp explains the considerations of water quality that have been incorporated into the Project, and notes the decision to move the WRSF to one location in Halfway Creek in consideration of water quality in Coffee Creek, as well as the addition of another Coffee Creek water quality monitoring station in response to feedback from SFN advisors. Goldcorp also has also committed to further spawning surveys based on feedback received.			
3-A2-1322	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Fish	Q: Citizen is concerned about spawning and how Goldcorp can help bring back fish for Aboriginal use?	A: Goldcorp explains the spawning results for 2017 and previous years.			
3-A2-1323	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Fish	Q: Citizen asks if Halfway Creek is a spawning creek?	A: Goldcorp explains that it is not a spawning creek and provides details of fish use in lower Halfway Creek. Lower Halfway Creek is primarily Arctic Grayling and juvenile Chinook rearing ground, but even then it is not high use. There is no spawning.			
3-A2-1324	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Water Quality	Comment: The use of the word "potentially" affected First Nations is not accurate. These First Nations will be affected; Citizen does not endorse the use of a word that implies that effects on the nation are potential. In response to the discussion on water quality, SFN appreciates the efforts that have been made to protect Coffee Creek; however SFN is still concerned about water quality. SFN is concerned about Halfway Creek and YT-24, even though these creeks are outside of SFN traditional territory in the Umbrella Final Agreement, as that water flows to SFN traditional territory via the Yukon River. Citizen asks if there will be a water treatment facility within Halfway Creek?	Reply: Goldcorp explains that there is the Alpha Pond below the WRSF. Goldcorp will test water quality at this point. Goldcorp also acknowledges the concern related to the terminology and explains that it uses the term "potentially" because the mine is not approved yet so it is the "potential" concept and acknowledges that if it moves forward, there will be these effects. The Project requires scrutiny from interested parties and regulatory bodies, and it needs to have support to move forward. Goldcorp is not at the detailed planning stage at this point, but will need to be there for the water use license process. Goldcorp has had good discussions with SFN's technical team and is committed to engaging SFN on the development of management plans for the Project. Goldcorp has received some very good feedback from SFN's technical team.			
3-A2-1325	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Project Design	Q: Does Goldcorp have a plan for the WRSF? SFN wants this plan in advance. SFN cannot wait until a water board hearing. SFN asks if the WRSF is in the best spot?	A: Goldcorp is not looking at any other options for the WRSF. Goldcorp explains the original mine plan of 3 WRSFs and the evaluation that Goldcorp went through to decide to move all waste rock to one WRSF in the Halfway Creek catchment. Goldcorp is currently looking at the best configuration of the WRSF and Alpha Pond. Detailed design is not complete at this time, which is typical for a Project in the assessment stage. Goldcorp is going to work with SFN on the management plans and detailed design throughout the YESAB process.			
3-A2-1326	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	First Nations Issues/Concerns	Comment: Goldcorp is new to the Yukon. There is a traditional territory for SFN in the Umbrella Final Agreement (UFA), however those are reference points for treaty purposes. SFN's history and use is across a much larger landscape, and Goldcorp has heard that Coffee Creek is part of SFN's history in an important way. SFN asks Goldcorp to confirm that they recognize SFN's interest in the Coffee Creek area, including the broader Project area.	Reply: Goldcorp is committed to having conversations with SFN on the issues of interest to SFN.			
3-A2-1327	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Management Plans	Comment: Coffee Creek is highly important to SFN. SFN notes concern with the November 30 filing date, as this filing will include a "plan for a plan" (referring to management plans), this is an issue for SFN. Asks if this is an issue for assessors?	Reply: Goldcorp has taken cues from other YESAB proposals, and Goldcorp believes that there is substantial detail for the submission. YESAB doesn't require detailed management plans, however Goldcorp did include a few in the Project Proposal because they provided important details. An example is the NAR Construction and Operations Management Plans. Goldcorp has made commitments to put forward management plans in Q1-2018, and will build out a schedule for these and provide it to SFN (note: this was provided via email on November 17).			
3-A2-1328	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Fish	Comment: SFN believes that Goldcorp needs more detail to support the Project Proposal. Asks what "biodiversity enhancement" means?	Reply: Goldcorp recognizes the importance of Chinook salmon to SFN, and doesn't want to just mitigate effects of the Project. Goldcorp wants to enhance, and wants to work alongside SFN to find ways to do that. For example, if there are current initiatives that SFN has implemented with success, then Goldcorp wants so support that. Goldcorp wants to support initiatives that are already in place and being successful rather than introducing something new.			
3-A2-1329	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Northern Access Route	Goldcorp explains the NAR route selection process that Kaminak undertook. Q: SFN knows that Goldcorp and YG meet, and SFN wants to know how road development will proceed through construction and operations.	A: Goldcorp explains the design of the NAR and construction and operation that is proposed. Goldcorp will pay all costs associated with the road, and construction will be all managed by Goldcorp. Goldcorp proposes to be the party maintaining the road, and explains the concerns associated with the current user-maintained model.			
3-A2-1330	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Management Plans	Q: Asks about dust control measures that Goldcorp is implementing?	A: There will be an air quality management plan and there are dust suppression mitigations in the Project Proposal.			
3-A2-1331	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Northern Access Route	Goldcorp describes the requirement to allow access down the road via the Placer Act. Goldcorp will be following existing placer tailings for most of the road route. Q: Who pays for the access route?	A: Goldcorp is assuming all costs in the Project Proposal. Goldcorp is also proposing to close and reclaim all new build sections of the NAR.			
3-A2-1332	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Consultation	Q: SFN Citizen notes that there are SFN Fish and Wildlife managers, YG managers, the Renewable Resource Council, the Fish and Game and Wildlife officers, and SFN has environmental monitors. SFN wants to know how the NAR opening up new areas will affect the people working in those positions.	A: Goldcorp has heard that there's not enough capacity to get out to all areas. Goldcorp wants to meet with the RRC and other relevant people to better understand this.			
3-A2-1333	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Northern Access Route	Q: Asks about the access route negotiations and why SFN wasn't asked about the route. The route is mostly there, and SFN wasn't involved. SFN Citizen wants to see a management plan for engaging First Nations on the Road.	A: Goldcorp agrees with the SFN Citizen, and that there's conversations that need to take place with YG, SFN, and Goldcorp.			

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3-A2-1334	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Northern Access Route	Comment: SFN notes that the Gateway Project has been approved and understood that the money is lined up for Gateway, including the NAR. SFN's understanding is that companies will be responsible for permitting and construction of the various sections of Gateway. Companies can apply to YG for compensation. SFN and Yukon Government want to pursue different conversations regarding the Goldcorp road. Conversations need to happen with YG and Goldcorp and SFN.	Reply: Goldcorp agrees that the sooner the conversation can happen, the better, more conversation is better than less.			
3-A2-1335	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Closure	Q: Asks if Goldcorp is going to close to a Goldcorp standard, or to the standard that economics at the time allow? Is there a guarantee that closure will take place?	A: Goldcorp explains the closure bonding process in Yukon. The Coffee Project is Goldcorp, so it will be closed to Goldcorp's internal standards. Goldcorp wants to leave a positive legacy anywhere they go. Goldcorp gives an example of Conarium in Timmins that was abandoned and that Goldcorp has built good relationships there and has successful closure and current use of the area. Goldcorp gives an example at San Martin where closure is not yet complete from a social context, so Goldcorp will not leave until it is self-sufficient. The Closure Business Unit can come talk to SFN if that is of interest.			
3-A2-1336	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Consultation	Q: There are land owners and users, trapping concession holders, and First Nations with territory and historic use in the Project area. How is Goldcorp compensating those people?	A: Goldcorp is interacting with trappers individually. For impacted First Nations, Goldcorp is actively engaging and has been talking about an agreement with SFN.			
3-A2-1337	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Regulatory Process	Comment: SFN notes concern with the end of November submission date. Notes that Goldcorp should take the time to get the concerns worked out and working on plans, and that SFN has not heard enough detail about management plans. SFN doesn't want a plan for a plan. SFN needs to understand the guiding principles. SFN acknowledges that the Project Proposal has been on the table for a while, and notes that SFN has been engaging and have been engaging frequently in recent months. SFN wants to understand why Goldcorp is wanting to restart the YESAB process.	Reply: Seasonality of construction is driving the schedule for Goldcorp. The process needs to get started, and the detail required for a YESAB screening is less than what is needed for licensing. Goldcorp shared the Project Proposal documents before submitting the Proposal to YESAB before, and is committed to engaging SFN with transparency, and is sharing data as it becomes available.			
3-A2-1338	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Consultation	Comment: SFN asks if Goldcorp has explored all possible options for the Project, such as management opportunities asked for by the SFN technical team. Adequate consultation to SFN is asking questions and getting answers.	Reply: To date, Goldcorp has been operating based on the instruction that the feedback from the SFN Technical Team isn't necessarily the feedback from SFN. Goldcorp explains the resubmission, which will include new Project and engagement commitments. Goldcorp also notes that an addendum on Aquatic Biota will be included per SFN's technical team's feedback, and that based on requests for clarification regarding NAR information, so Goldcorp will also be including a memo on the NAR. Goldcorp also heard from SFN that benefits such as those associated with Goldcorp's Sustainability Excellence Management System (SEMS) should be captured in the Project Proposal, so there will be a SEMS memo in the Project Proposal resubmission. Goldcorp needs to hear from SFN if there are any critical issues that need to be addressed.			
3-A2-1339	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Fish	Comment: SFN has international agreements to protect salmon. Cyanide is being carried across the landscape, what if there are accidents? This is a very potent material and the SFN Citizen doesn't like the idea of Goldcorp carrying cyanide across SFN's back yard.	Reply: Goldcorp explains the transport requirements for cyanide and the safety precautions that will be taken. Goldcorp explains the closed loop system for the HLF. Goldcorp uses cyanide at all sites, so there are well-established protocols for transporting and handling it. (Note: Goldcorp provided cyanide information and information on Goldcorp's management of cyanide to SFN on November 15).			
3-A2-1340	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Agreements	Q: SFN technical team member asks what the worst case scenario is [meaning a worst-case environmental incident]. Advisor notes that the Project Proposal has low information on SFN. Also asks if there are any compensation programs that Goldcorp would implement if there were to be an environmental event?	A: The emergency response plan for the Project is in the Project Proposal. Goldcorp is willing to consider and provide an addendum to the Project Proposal regarding SFN information once Goldcorp receives this information. Goldcorp does not want to rush the analysis of this data, nor does Goldcorp want to rush SFN's review of this data with citizens. As such, Goldcorp will submit this potential addendum during the YESAB process. If SFN has examples of the type of compensation program they speak of, Goldcorp welcomes it.			
3-A2-1341	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Regulatory Process	Q: SFN technical team member asks about cumulative effects and a workshop to discuss scenarios regarding future development.	A: Goldcorp has a scenario analysis in the action items from the workshop on September 21. Goldcorp notes that a workshop would be valuable though had not previously understood that was desired by SFN. Goldcorp states that cumulative effects are ultimately the responsibility of YESAB. Goldcorp provides information in the Project Proposal to assist YESAB in their assessment. Goldcorp notes that there will be specific engagement with SFN on the development of the socio-economic management plan and wants to develop this collaboratively. There will also be information sessions on contracting and procurement in early 2018.			
3-A2-1342	09 November 2017	Email		SFN	Consultation	SFN Citizens meeting; 38 attendees in addition to SFN Chief, SFN Technical Advisors, and SFN Councillors.	Consultation	SFN notes the following for Goldcorp: <ul style="list-style-type: none"> <li>• Council has been briefed by the SFN technical team and met with Citizens in the morning.</li> <li>• Council supports the comments made in the meeting today by Citizens and the technical team.</li> <li>• SFN wants SFN Citizens to be able to access jobs through Goldcorp contractors, for example, how to get jobs in catering at the exploration site, given that Chief Isaac Inc. has the contract.</li> <li>• SFN wants the Selkirk Development Corporation to get in the door, create partnerships, and get Citizens jobs.</li> <li>• Benefits to the community come through jobs.</li> <li>• When the mine is gone, SFN is still here. Goldcorp needs to ensure that the environment is protected for generations to come.</li> </ul>				
3-A2-1345	17 November 2017	Email	Outgoing	SFN	Consultation	Goldcorp sends SFN the annotated table of contents for the Proposal resubmission, a proposed engagement plan for the SEMP and reclamation and closure plan (social aspects), and a list of all management plans for the Project and proposed dates and time frames for providing drafts to SFN for review and input.	Management Plans					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – Selkirk First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-1347	23 November 2017	Email	Outgoing	SFN	Consultation	Goldcorp provides a memo to SFN regarding the discovery of a previously unrecorded mineral lick along the NAR between the Stewart and Yukon Rivers. The memo summarizes how Goldcorp is considering additional mitigation measures associated with this mineral lick, including possible realignment of the NAR within the Local Assessment Area that exists for the NAR.	Northern Access Route					
3-A2-1354	20 November 2017	Letter	Incoming	SFN	Consultation	SFN provides Goldcorp with a memo of SFN's feedback on the Project Proposal. This includes detailed appendices iterating concerns regarding socio-economic matters, heritage, physical and biophysical topics.	Consultation					
3-A2-1355	24 November 2017	Email	Outgoing	SFN	Consultation	Goldcorp provides a memo to SFN in response of SFN's feedback on the Project Proposal. Attachment: SFN Technical Engagement Status and Plan.	Consultation					

**FIRST NATION OF NA-CHO NYÄK DUN**



Appendix 3-A2 Potentially Affected First Nations Consultation Records – First Nation of Na-cho Nyäk Dun

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-3	31 March 2017	Email	Outgoing	FNNND	Consultation	Goldcorp notified FNNND of Goldcorp's Project Proposal submission to YESAB March 31, 2017. Additionally, the Section 3.0 Consultation and Engagement and associated appendices have been uploaded to Open Text Core. Noted that the remaining Project Proposal documentation will be uploaded in due course on Monday, April 3 - An electronic copy of the Project Proposal was also sent via registered mail to FNNND. FNNND confirmed receiving email.	Consultation					
3-A2-10	04 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp contacted FNNND rep to notify them that Goldcorp commissioned Hemmera to study the labour and skills capacity in local communities near the Coffee Project, and to identify some opportunities and challenges for Goldcorp in participating in the Yukon labour force and business community. Noted they would like to interview the individual about the Coffee Project and the local economy and workforce. Noted that if they would like to participate, Hemmera will contact them. Noted that the team would be in Whitehorse from April 3- 7 and 12-13.	Consultation					
3-A2-15	05 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp provided meeting invite to FNNND Development Corporation reps regarding the community Capacity Profiles Project. Meeting Scheduled for April 6 2017 at 8:30am	Consultation					
3-A2-16	06 April 2017	Meeting		FNNND	Consultation	Hemmera meets with FNNND Development Corporation to discuss local employment and procurement. This is an interview to gather additional socio-economic baseline data for the Proponent's Community Profiles project.	Economic					
3-A2-20	06 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp consultant sent a flyer regarding FNNND open house April 26th for review and approval. Attachment: FNNND Open House Flyer	Consultation					
3-A2-50	18 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp noted receiving approval from Council on the attached flyer regarding meeting for NND citizens. The flyer advertises an open house for NND citizens only. Asked FNNND rep if they were able to follow up with Council regarding this revised flyer. noted event was a week away. Attachment: Open House Flyer. FNNND noted approval of flyer	Consultation					
3-A2-55	19 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp consultant provided the agenda for the scheduled April 26th meeting with FNNND - invited any comments or edits. Attachment: Meeting Agenda. FNNND confirmed receipt of agenda. Goldcorp sent logistic info to FNNND regarding attendees arriving to the meeting. FNNND rep noted they would see what they could do in regards to transportation. April 24 Goldcorp followed regarding transportation from the Mayo airport to the government building for the meeting attendees. April 25 - FNNND rep ensured there would be pick up for the group at the airport. Goldcorp noted there would be 6 people. April 26 - FNNND rep noted pick up confirmation.	Meeting					
3-A2-62	24 April 2017	Meeting		FNNND	Consultation	Hemmera meets with FNNND to discuss local employment and procurement. This is an interview to gather additional socio-economic baseline data for the Proponent's Community Profiles project.	Economic					
3-A2-65	25 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp consultant confirmed FNNND community logistics with venue operators	Meeting					
3-A2-66	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Consultation	Q: How far away from the Yukon River is the project?	A: The mine is approximately 8km from the river.			
3-A2-67	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Heap Leach	Q: How far is the heap leach from the creek?	A: It is about 5km from the creek; A description of how the heap leach works was explained by Goldcorp.			
3-A2-68	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Heap Leach	Q: Renewable Resource Council Chair asked if Heap Leach was double lined.	A: It is a double lined system with two different liners. There is also a boiler system during the winter which will ensure that it doesn't freeze. There is also a rain coat system to keep the heat in.			
3-A2-69	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Studies	Q: Have there been studies done?	A: There have been heritage studies and archaeological studies done.			
3-A2-70	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Heap Leach	Q: What happens with the heap leach waste?	A: The heap leach takes water in but doesn't let any water out until 9 years in. We are doing studies to make sure that we are using the best methods. We will begin rinsing the heap leach in year 4. We will be actively reclaiming the heap leach.			
3-A2-71	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Wildlife	Q: Very concerned about the wildlife, fish and the vegetation.	A: Goldcorp shares the same concerns that you do and something that Goldcorp has done is change the mine plan from three waste rock piles and six discharge points into one waste rock pile and discharging into a creek with very limited fish habitat. It costs more money but it is the better plan to minimize impacts.			
3-A2-72	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	First Nations Issues/Concerns	Comment: The land claim process is different than outside of Yukon but they make the laws on their land that isn't shared. Shared land has to be negotiated with the Government.				
3-A2-73	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Heap Leach	Q: Would the heap leach withstand a large earthquake?	A: Extensive seismic modeling has been done for this facility and those were included in the design of the heap leach. In the event of an earthquake that would cause a failure to that facility, it's a rock structure, it's not tailings which liquid would escape. There would be a very small local impact but it is very contained. It wouldn't impact the salmon stock in the Yukon River. It's not that type of facility.			
3-A2-74	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Health	Q: There are problems in the small communities across Canada being alcohol, drugs and the residential school effect. We need to help those people somehow with employment. Drug and alcohol policies hurts the hiring of locals.	A: The issue is Canada wide, we will engage in the dialogue and come up with solutions.			
3-A2-75	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Consultation	Q: What's the probability of an earthquake?	A: we can't remember the numbers but we can share the report with you.			
3-A2-76	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Closure	Q: What about care and maintenance?	A: We will have 5 years active closure, 5 years active monitoring and if meeting all closure criteria has been met for the project and then we would start the long-term monitoring program.			
3-A2-77	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Closure	Comment: There are two projects in the Yukon now that have closure mistakes that haven't been addressed and FN's want to ensure they aren't caught with those costs.	A: Goldcorp recognizes that closure is important, and Goldcorp has closure successes within the company. It's not in our best interest to be a bad neighbour.			
3-A2-78	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Operations	Q: It would be Goldcorp that would operate it and not sell it?	A: We could bring in a partner to help build the mine, can we promise that it won't be sold at some point, no but Goldcorp is looking to do more business within the territory. We are going to be a responsible operator and hold to our commitments.			
3-A2-79	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Wildlife	Q: How large is the site and are there any wildlife areas?	A: 5km across by 3.5km height wise. There has been a lot of wildlife research around the site. The 40 Mile Caribou Herd is coming back to the Yukon. While they aren't hanging out at the site in the winter now they may in the future. There will be plans to ensure that the caribou are disturbed as little as possible. The site isn't on key habitat for the caribou. There is moose harvest in the area around the road and lots of studies have been done in that area. Very small population of sheep that lives on the north side of the river. Mitigation measures have put in place to ensure they aren't disturbed.			

Appendix 3-A2 Potentially Affected First Nations Consultation Records – First Nation of Na-cho Nyäk Dun

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-80	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Wildlife	Comment: There are wild horses by the White River				
3-A2-81	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Northern Access Route	Q: How will Goldcorp control who has access.	A: Through the river crossings. An overview of the Northern Access Route was given. The route was chosen because most of the route has already been built and cuts down on archaeological, wildlife, vegetation impacts. The shortest of all routes and the least amount of new road. Some switch backs will be realigned. Access points will be controlled at the water crossings at Stewart and Yukon River. Most of the roads have no drainage structures. Goldcorp would upgrade the roads to have ditches and proper drainage and appropriately sized crossing structures at streams.			
3-A2-82	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Northern Access Route	Q: Dawson had problems with their ice bridge this year.	A: That was part of the site management of how long to make the shoulder season. We would just have to ensure there is enough supplies during the shoulder season.			
3-A2-83	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Operations	Q: Is the mine year round?	A: The mine is year round and food supplies would be flown in.			
3-A2-84	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Reclamation	Q: There are issues with airports and having people using airstrips to do illegal animal watching. Will the airstrip be reclaimed?	A: yes after closure the airport will be completely reclaimed.			
3-A2-85	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Operations	Q: Will the diesel be contained and will the camp run of diesel?	A: It will be contained in double walled containers, 110% storage containers and the camp will be primarily diesel heated.			
3-A2-86	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Water Quality	Q: Who is testing the water?	A: We have a third party testing the ground water, surface water. We also have 5 environmental monitors employed with us so that they can be trained and be the monitors at site.			
3-A2-87	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Water Quality	Comment: Goldcorp has to drink a cup of water before you leave the site after closure.				
3-A2-88	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Consultation	Q: How seriously are public comments taken?	A: An example would be the mine plan and that the mine plan was changed after consideration of comments made through consultation. Another example is additional water sampling sites were suggested through consultation and we have started sampling water in those areas. We absolutely value comments and concerns that are brought to our attention.			
3-A2-89	26 April 2017	Community Meeting		FNNND	Consultation	The Proponent presents Project information to FNNND citizens at an open house in Mayo. The presentation gives an overview of Goldcorp and the Project. 15 attendees signed in.	Health	Q: Social problems with alcohol and drugs in the communities. Mining companies fly in and fly out which is ok as long as the interaction isn't negative	A: We've got lots of good examples of projects and mines. Do we have drug and alcohol policies, yes we do. Do we have drug and alcohol screening, yes we do. But that doesn't mean that we can't support people and give them opportunities to be successful. It's part of building capacity.			
3-A2-90	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Consultation	Q: NND asked what the length of the mine area is.	A: Goldcorp explained it is approximately 5km across.			
3-A2-91	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Hunker road has been nominated as an heritage site, has that been considered?	A: It isn't a hands off heritage site that is being nominated. The area is being mined today by many placer miners as well as harvesting by FN and Non-FN as well as heritage. The road is largely already in use so we would just be another user.			
3-A2-92	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Do tourists go there?	A: Yes they do. Fairly significant use by non-industrial users. Tourists were seen all the way down to Maisey May. Most tourism ends at Bonanza and Hunker			
3-A2-93	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: How far down is the road maintained?	A: Dominion, sulphur, hunker, bonanza			
3-A2-94	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: There were issues from coming from the east?	A: Those were routes we looked at but there were many issues in using those roads. Tougher ground, more new build and land disturbance.			
3-A2-95	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: What is the anticipated activity in a year span? Is there anticipated activity beyond that?	A: Yes, there is current active use by placer miners who dot the entire road route. Maisey May down to Stewart River is an area of new build road. It doesn't open up placer ground as the road runs right along the Stewart River. Safety and road parameters there are a wide variety of people maintaining the road. The standards by which they build and maintain the roads are variable. We will include safety upgrades to the currently maintained roads. Water management by the road is a safety issue that Goldcorp will take on. There will be proper road ditching, culverts and sediment inputs. There will be a single lane road with turnouts rather than a large industrial road the whole way. Mitigate risk by having a radio assisted road. An open channel will be used by all miners. The standard of care between hard rock miners and placer miners are on very different levels. Hard rock miners hold themselves too much higher environmental standards.			
3-A2-96	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Is there ice where the area has already been mined? The concern is restoration.	A: There was at one point. The same active layer of permafrost will not be seen because the area has been washed. In areas where overburden has been replaced, plant life is growing back.			
3-A2-97	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: What about the wetlands, we have issues with the wetlands.	A: This route was chosen because we only go through one little 200m wetland south of Maisey May. Other routes had larger wetland.			
3-A2-98	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Heap Leach	Q: What about the cyanide issue?	A: In terms of transportation? We will be subscribing to the International Cyanide code. It has tight parameters around how cyanide can be used and transported. It will be transported by a double walled container. It will not be liquid, it will be a charcoal briquette and will be added to water on-site. The heap leach pad is built with a multi-layer system. Brewery Creek is a more simple system but the system we will be using is a more complex and safe system.			
3-A2-99	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	NND is more concerned with the contaminate issue and their brother and sisters downstream will be affected from this if anything happens with cyanide. Also, what about the overlap issue? NND wants to meet with TH elders and discuss overlap issue politics and economics. They understand it is between the First Nations.	The Proponent said since we have been in the picture, NND and Goldcorp now met twice. The Proponent has been significantly engaged with TH. The Proponent had the understanding that TH and NND would be discussing issues. It is a concern for the Proponent that there hasn't been discussion between TH and NND about the Coffee Project. NND says it is their business and they will be setting up a meeting in regards to TH Elder council and NND Council. NND has a good relationship with TH and they don't want to mess it up in any way. The Proponent wants to ensure we understand what NND needs from us and that there is transparency. The Proponent also want to know how much information should be passed on from the Proponent and how much should come from TH.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – First Nation of Na-cho Nyäk Dun

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-100	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	First Nations Issues/Concerns	Q: Is Selkirk also involved? NND and Selkirk may also want to have dialogue as well.	A: Yes there is an area of the road that is on Selkirk and TH overlap land as well as some Selkirk land on our exploration package, not mine site and Category B land near the mouth of Coffee Creek.			
3-A2-101	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Is Goldcorp using air ships?	A: That isn't in the plans yet. The road construction for this project is fairly minor and there will be 8 trucks a day on average.			
3-A2-102	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Will subsurface be placed on the road?	A: Yes, in the areas where no permafrost will be crossed there will be textile and the free draining material placed down and then a minimum of 1.5 meters of overfill. Water management and draining will also help as well as 50 km/hr speed limits on the road. The big sink holes will be mitigated through this process.			
3-A2-103	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Project Description	Q: Are you building a dam?	A: Casino is proposing a big tailings dam but we are not. We will end up with a mound of crushed rock on the heap leach facility. There is a pond which is where water will be stored and tested before it is released into the environment and will have a small dam.			
3-A2-104	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Heap Leach	Q: Where do you purchase cyanide?	A: Cyanide is purchased in Richmond or Quebec. Both in Canada			
3-A2-105	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Is the truck enclosed which will transport the cyanide?	A: It will look like an oil tanker and will have double liner. They will also be dry bricks and can be shoveled up if somehow the tanker is punctured and the cyanide falls out.			
3-A2-106	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Training and Employment	Q: Is a human resource inventory being done and is that to see who can work from here? Can post secondary students be contacted?	A: We could ensure that is done. It is so that Goldcorp understand what skills and business are available in the community.			
3-A2-107	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Consultation	Q: Have NND been getting any of the reports (heritage, wildlife studies, GIS files etc	A: No but we can definitely share that information. Are there items that you can specifically ask us for now? We just filed the YESAB proposal and we would be happy to share that information. We have been running technical workshops with TH and if you would like to talk to them about it perhaps NND could look to attend.			
3-A2-108	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Is it just a barge or a ferry?	A: It is just a barge. They will be oversized because the Stewart River is shallow and the boats need a low draft. We have to move the current landing slightly because there is a heritage site there. We are not opening up access because we have control at the rivers. There will not be public access to the barges.			
3-A2-109	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	The Proponent discussed some of the concerns around the road which have already been heard. These include opening up the area for increased moose hunting, increased placer mining and increased theft of placer equipment over the winter, increased potential of accidents. Mitigations include training in Dawson for users (safety & maintenance), we have control over the river crossings we don't expect we will be opening up new areas for increased hunting, wildlife ramps will be built in high use areas to ensure their routes aren't interrupted, wildlife signage will be posted along the road, hauling can be compressed into convoys during high use time to ensure the least interaction with animals.				
3-A2-110	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Northern Access Route	Q: Is it a concern to TH in regards to the fact that Goldcorp will have no control? Were wildlife surveys done?	A: There could be potential for more hunting, we will work with YG and TH on the hunt. YG has a role to play and they have the ability to control it. Much of the environmental work has been done in conjunction with YG to ensure we capture TH and YG concerns. The control points we do have are the river crossings.			
3-A2-111	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Contracting and Procurement	Q: Because you are dealing with 3 first nations on 3 different lands, will contracting be open to all?	A: There will be some preference given to TH but we are trying to ensure that everyone benefits and hoping that 3 or four nations work together the help build capacity. We will encourage everyone to work together.			
3-A2-112	26 April 2017	Meeting		FNNND	Consultation	The Proponent meets with Chief and Council to provide a Project update and detailed review of the Northern Access Route. The Proponent describes the Project and NAR in detail. The Proponent's engineering consultant for the NAR presented detailed NAR information and attended to answer questions.	Information Sharing			Add FNNND to Open Text Core	The Proponent	Complete
3-A2-113	26 April 2017	Email	Outgoing	FNNND	Consultation	Goldcorp requested FNNND assistance in posting attached flyer around Mayo so that citizens of the First Nation of Na-cho Nyäk Dun were aware of the citizens open house on Wednesday, April 26 at the curling lounge. Attachment: Open House flyer. FNNND noted they would post around the village. Goldcorp thanked FNNND reps for their help in posting the flyers.	Meeting					
3-A2-114	27 April 2017	Meeting		FNNND	Consultation	Hemmera meets with FNNND to discuss local employment and procurement. This is an interview to gather additional socio-economic baseline data for the Proponent's Community Profiles project.	Economic					
3-A2-152	28 April 2017	Email	Incoming	FNNND	Information Sharing	FNNND provided an invitation to FNNND's Industry Day June 25 2017. Attachment: Industry Day invite. Goldcorp thanked FNNND for the invite.	Information Sharing					
3-A2-164	04 May 2017	Email	Outgoing	FNNND	Consultation	May 4 Goldcorp consultant thanked FNNND coordinator for helping to organize meetings with Chief and Council the previous week in Mayo. Noted action item from the meeting with Chief and Council with respect to sharing documents and maps electronically. Noted use of Open Text Core - noted setting up access for whomever required it. FNNND responded they would advise as to who to add to Open Text Core. May 5 FNNND provided contact info for 2 individuals to be granted Open Text Core access. Goldcorp confirmed information and suggested a call to review how the site worked. Call confirmed for the following tuesday.	Consultation					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – First Nation of Na-cho Nyäk Dun

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-172	05 May 2017	Email	Outgoing	FNNND	Consultation	Goldcorp notified FNNND that Goldcorp submitted the Coffee Gold Project Proposal on March 31, 2017 to the Yukon Environmental and Socio-economic Assessment Board (YESAB). Since submission, the Project Proposal has been undergoing a "Completeness Check" from YESAB. During this process, YESAB recommended that Goldcorp revise Section 3.0 Consultation and Engagement of the Project Proposal to more clearly reflect the requirements of consultation under the Yukon Environmental and Socio-economic Assessment Act (the Act). The revised version of Section 3.0 Consultation and Engagement has been submitted to YESAB today, May 5, 2017, and has been uploaded to Open Text Core - USB flash drive was mailed as well. Attached: memo sent to YESAB outlining the specific changes made to Section 3.0 Consultation and Engagement. FNNND confirmed getting email - forwarded to Council.	Consultation					
3-A2-181	09 May 2017	Email	Outgoing	FNNND	Consultation	Goldcorp provided a meeting invite to FNNND regarding a walk through of Goldcorp's Open Text Core online document sharing platform.	Consultation					
3-A2-184	10 May 2017	Meeting		FNNND	Consultation	Teleconference with FNNND representatives from Lands and Resources to provide a walk-through of the Open Text Core site for downloading Project Proposal documents.	Consultation	FNNND raised questions about the Project Proposal documents and Proposal layout.	The Proponent answered the questions during the teleconference.			
3-A2-210	19 May 2017	Email	Incoming	FNNND	Consultation	May 19 FNNND extended an invitation to Golcorp to attend the FNNND's industry day June 25th. Schedule provided in email. Noted that any donations to the event help. May 23 Goldcorp responded to FNNND invite to confirm their participation. FNNND confirmed schedule time for goldcorp. May 24 Golcorp thanked FNNND for organizing.	Information Sharing					
3-A2-293	31 May 2017	Email	Outgoing	FNNND	Engagement	FNNND provided an updated schedule for the First Nation of Nacho Nyak Dun Industry Day. Attachment: Schedule	Information Sharing					
3-A2-303	02 June 2017	Email	Outgoing	FNNND	Consultation	Goldcorp contacted the FNNND Development Corp, noting they looked forward to working with them moving forward in the development of the Project. Noted that team had been cc'd so that a meeting could be organized.	Meeting					
3-A2-362	05 June 2017	Email	Outgoing	FNNND	Consultation	On June 2 2017 Goldcorp contacted FNNND Development Corp noting that they looked forward to organizing a meeting and working together. June 5 2017 FNNND Development Corp responded thanking Goldcorp for the message and noted that a potential meeting could be booked for the following week.	Meeting					
3-A2-506	12 June 2017	Email	Outgoing	FNNND	Information Sharing	June 12 Goldcorp contacted FNNND to notify them that Goldcorp was sponsoring the North American Indigenous Games. Inquired if NND had anyone competing. June 12 - July 12 - NND responded with participants information and inquired about Goldcorp assisting with logistics. Goldcorp responded with information regarding the sponsorship.	Information Sharing					
3-A2-526	14 June 2017	Email	Incoming	FNNND	Engagement	NND contacted Goldcorp providing names of NND individuals that would be attending the North American Indigenous Games	Information Sharing					
3-A2-530	15 June 2017	Email	Incoming	FNNND	Consultation	FNNND provided information regarding the FNNND Industry Day taking place June 25th.	Information Sharing					
3-A2-559	25 June 2017	Meeting		FNNND	Consultation	Goldcorp attends FNNND Industry Day and delivers a presentation. The presentation provides an overview of the Project and the NAR, and describes the community feedback protocol and 2017 activities for environment and for exploration.	Information Sharing					
3-A2-560	26 June 2017	Email	Incoming	FNNND	Engagement	June 14 FNNND responded to Goldcorp regarding attendees to the North American Indigenous Games - provided names and name of Youth Councilor contact. Goldcorp inquired as to what sports they would be competing. June 26 FNNND that participant would be playing volleyball.	Information Sharing					
3-A2-573	05 July 2017	Email	Outgoing	FNNND	Consultation	Goldcorp provided the permit application for the planned 2017 Heritage Resource Impact Assessment (HRIA) for the Northern Access Route. Noted that the application includes description of how FNNND will be involved with the assessment. Attachment: HRIA Permit Application	Heritage					
3-A2-577	05 July 2017	Email	Outgoing	FNNND	Consultation	Goldcorp forwarded FNNND the permit application for the 2017 HRIA for the NAR. The assessment will build on the 2016 HRIA specifically on areas of higher heritage resource potential following a 2017 LIDAR assessment, previously documented heritage resources that were not revisited in the 2016 HRIA, and areas noted by YG staff requiring further investigation. Goldcorp also noted that the permit application also outlines a description of how FNNND will be involved in the assessment and that the application will be submitted by Goldcorp's consultant, Ecofor, who will copy FNNND when submitting the application to YG and will ensure that they are included in the process. Goldcorp followed up with FNNND in another email to let them know that the desktop analysis was completed and field work would begin mid-August. Additionally Goldcorp mentioned that an updated work plan and maps had been uploaded to Core and provided a link.	Heritage					
3-A2-611	17 July 2017	Email	Outgoing	FNNND	Consultation	Goldcorp notified FNNND that YESAB had discontinued the assessment of our Coffee Project Proposal. Noted that YESAB identified concerns with record of consultation with Na-Cho Nyäk Dun First Nation. Noted wanting to remain fully committed engaging with FNNND. Noted that Goldcorp will be reaching out shortly with a formal outline of next steps and how to proceed. Attachment: YESAB Assessment Ltr	Consultation					
3-A2-618	25 July 2017	Letter	Outgoing	FNNND	Consultation	Goldcorp provided a letter proposing how to progress project consultation with FNNND. The letter summarizes the Project Proposal submission on March 31st, 2017, and previous meetings with FNNND and Goldcorp's commitment to open and transparent dialogue with FNNND. Goldcorp's letter highlights the overlap with the NAR and FNNND territory and the most relevant sections of the Project Proposal with regard to the NAR. Goldcorp requests written feedback by August 31, 2017, or for FNNND to identify their preferred method of providing feedback by this date. Attachment: project comments letter FNNND FINAL	Consultation					
3-A2-652	07 August 2017	Email	Outgoing	FNNND	Consultation	Goldcorp contacted FNNND to let them know that Tetra Tech would be conducting dust monitoring data collection along the NAR in August in order to ensure understanding of baseline dust conditions. Dust monitoring stands and buckets will be placed in four locations approximately 3-5 m off the proposed NAR and will be removed in the Fall. Proposed locations for dust stands have been attached. Additionally, Goldcorp noted that they have continued to build baseline data with remote wildlife cameras, and heritage work for which a notification was sent out in July. Attachment: NAR_Dust_Stands	Studies					



Appendix 3-A2 Potentially Affected First Nations Consultation Records – First Nation of Na-cho Nyäk Dun

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-665	14 August 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp phones FNNND to discuss the letter sent on July 25th requesting comments from FNNND on the Project. FNNND and Goldcorp discuss the following points:  1. NND sees the portion of the Northern Access Route that is in NND territory as a very small part of the Coffee Gold Project in a small portion of NND territory. 2. NND is not dissatisfied with Goldcorp's consultation with NND, and wants to support Goldcorp in the YESAB process. 3. After discussing the approach with NND's Executive Director, NND will send Goldcorp an email this week describing NND's approach to feedback on the Coffee Gold Project Proposal.	Consultation					
3-A2-667	14 August 2017	Email	Incoming	FNNND	Consultation	FNNND Lands and Resources emails Goldcorp asking for a phone call when available.	Consultation					
3-A2-670	14 August 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp followed up with FNNND via telephone on August 14 to discuss the letter sent on July 25 requesting comments from FNNND on the Project. During this call, FNNND informed Goldcorp verbally that FNNND is not dissatisfied with Goldcorp's consultation with FNNND, noting that FNNND did not have any feedback on the Project Proposal. FNNND committed to providing a letter to Goldcorp that week describing FNNND's a feedback on the Coffee Gold Project Proposal.	Consultation					
3-A2-671	14 August 2017	Email	Outgoing	FNNND	Consultation	Goldcorp sent an email to FNNND summarizing the key points of the discussion that took place via telephone.	Consultation					
3-A2-676	18 August 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp leaves a voicemail for FNNND Lands & Resources noting that Goldcorp would like to schedule a meeting with Chief and Council as well.	Consultation					
3-A2-680	23 August 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp follows up with FNNND via phone regarding written feedback on the Project Proposal from FNNND. FNNND informs Goldcorp that they will be sending a letter to Goldcorp this week regarding their feedback on the Project.	Consultation					
3-A2-697	29 August 2017	Email	Outgoing	FNNND	Consultation	Goldcorp follows up with FNNND via phone regarding written feedback on the Project Proposal from FNNND.	Consultation					
3-A2-718	01 September 2017	Email	Outgoing	FNNND	Consultation	Goldcorp and FNNND discussed progress on FNNND's feedback letter; FNNND noted that their Lands & Resources Department is very busy and the letter would be complete soon.	Consultation					
3-A2-734	12 September 2017	Email	Outgoing	FNNND	Consultation	Goldcorp sent an email to FNNND to follow up on progress on the letter.	Consultation					
3-A2-753	15 September 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp left a voicemail with FNNND Lands & Resources to follow up on progress on the letter.	Consultation					
3-A2-756	18 September 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp left a voicemail with FNNND Lands & Resources to follow up on progress on the letter.	Consultation					
3-A2-889	21 September 2017	Email	Outgoing	FNNND	Consultation	Goldcorp sent an email to FNNND's Lands & Resources and Governance and Administration departments to follow up on FNNND's feedback letter and to inquire about a meeting with Chief and Council and with Citizens in fall 2017.	Consultation					
3-A2-932	22 September 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp left a voicemail with FNNND Lands & Resources to follow up on progress on the letter.	Consultation					
3-A2-985	26 September 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp followed up with FNNND via telephone and spoke with FNNND's Executive Director on September 26 discussing the letter and FNNND's preferences for engagement. During this call, FNNND verbally informed Goldcorp that FNNND did not have any feedback on the Project Proposal, and that FNNND requests that Goldcorp does not undertake any further consultation with FNNND on the Project Proposal. FNNND suggested that Goldcorp draft a letter for FNNND to review and sign to send to Goldcorp and YESAB iterating this. Goldcorp agreed, and provided the draft letter to FNNND via email on September 27.	Consultation					
3-A2-988	27 September 2017	Email	Outgoing	FNNND	Consultation	Goldcorp sends FNNND a suggested draft letter per their phone call with FNNND on September 26 (Attachment: FNNND Draft Letter For Consideration)	Consultation					
3-A2-1123	02 October 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp followed up on the draft feedback letter from FNNND by leaving a voicemail with FNNND's Governance and Administration department.	Consultation					
3-A2-1127	04 October 2017	Email	Outgoing	FNNND	Consultation	Goldcorp followed up on the draft feedback letter from FNNND by email with FNNND's Governance and Administration department.	Consultation					
3-A2-1128	04 October 2017	Email	Outgoing	FNNND	Consultation	Goldcorp sends FNNND an update to the Coffee Gold Project pre-season report. The update informs FNNND of the extended field schedule and additional exploration road building happening at site.	Consultation					
3-A2-1141	15 October 2017	Phone	Incoming	FNNND	Consultation	FNNND contacted Goldcorp via telephone on October 13 to notify Goldcorp that FNNND would discuss their approach to the letter at the next Chief and Council meeting on October 31, 2017 and inform Goldcorp of Chief and Council's decision after this meeting	Consultation					
3-A2-1308	01 November 2017	Email	Outgoing	FNNND	Consultation	Goldcorp follows up with FNNND on the letter that was planned to be reviewed with FNNND Council on October 31. Goldcorp suggests a call at 10 am or 2 pm that day.	Consultation					
3-A2-1310	03 November 2017	Phone	Outgoing	FNNND	Consultation	Goldcorp phones FNNND and learns that the letter was not reviewed with Council on October 31 as had been planned. The next Council meeting is scheduled for mid-November.	Consultation					
3-A2-1311	06 November 2017	Email	Outgoing	FNNND	Consultation	Goldcorp sends a letter to FNNND summarizing the status of consultation with FNNND and noting that if FNNND has a letter detailing their feedback on the Project to provide it to Goldcorp as soon as possible. The letter summarizes the feedback Goldcorp received verbally from FNNND, which has been that FNNND has no feedback on the Project Proposal and that FNNND requests that Goldcorp does not undertake any further consultation with FNNND on the Project Proposal. Goldcorp's letter acknowledges that FNNND's preferences regarding engagement on the Project as a whole may change over time and that Goldcorp is committed to updating FNNND via email as the Project progresses and welcomes updates on FNNND's engagement preferences should they change at any time.	Consultation					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – First Nation of Na-cho Nyäk Dun

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action	
3-A2-1343	16 November 2017	Email	Incoming	FNNND	Consultation	<p>FNNND sends a letter to YESAB and Goldcorp regarding their views on pre-submission consultation for the Coffee Gold Mine Project.</p> <p>As you are aware, a portion of Goldcorp's proposed Northern Access Route for the Coffee Gold Mine Project (Project) falls within the Traditional Territory of the First Nation of Na-cho Nyäk Dun (FNNND). The purpose of this letter is to inform you the status of consultation between Goldcorp and FNNND.</p> <p>To date, Goldcorp has met with FNNND government on multiple occasions and FNNND Citizens on one occasion to consult on the Project. The questions, comments, and concerns regarding the Project raised by FNNND and FNNND Citizens were addressed during said meetings. FNNND received a full electronic copy of Goldcorp's Coffee Gold Mine Project Proposal on March 31, 2017 and a full hard copy of the Project Proposal on May 18, 2017. Subsequently, FNNND received a letter from Goldcorp on July 25, 2017 reiterating Goldcorp's commitment to meaningful engagement on the Project, and requesting FNNND's feedback on the Project Proposal. FNNND has verbally informed Goldcorp that it does not have any views to present on the Project Proposal, and this letter serves to advise that FNNND is satisfied with the level of consultation from Goldcorp on the Project. In particular, FNNND is of the view that the YESAA s.50(3) pre-submission consultation requirements on the Project Proposal are complete with respect to FNNND. FNNND requests that Goldcorp continue to provide updates to the FNNND Lands and Resources Department.</p>	Consultation						

**WHITE RIVER FIRST NATION**

Appendix 3-A2 Potentially Affected First Nations Consultation Records – White River First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-5	31 March 2017	Email	Outgoing	WRFN	Consultation	Goldcorp notified WRFN of Goldcorp's Project Proposal submission to YESAB March 31, 2017. Additionally, the Section 3.0 Consultation and Engagement and associated appendices have been uploaded to Open Text Core. Noted that the remaining Project Proposal documentation will be uploaded in due course on Monday, April 3 - An electronic copy of the Project Proposal was also sent via registered mail to WRFN. April 3 WRFN requested an additional USB copy of the Proposal. Goldcorp confirmed they would send another USB to noted address.	Consultation					
3-A2-25	09 April 2017	Letter	Outgoing	WRFN	Consultation	Goldcorp sent a letter summarizing the status of the communications and collaboration between WRFN and Goldcorp. Noting Goldcorp would like to request an opportunity to meet with WRFN to discuss how to best improve the relationship and engage in meaningful dialogue and on-going consultation with WRFN. Attachment: WRFN Resuming Negotiations Ltr	Consultation					
3-A2-40	12 April 2017	Email	Incoming	WRFN	Consultation	April 6 - WRFN requested a forward copy of the following emails identified in the communications log from the document titled, '170330_App_3-A_Part_1_of_4'. 3A-434 (dated June 23rd, 2014) 3A-438 (dated June 26th, 2014) Requested to also include any other emails that relate to the meeting summary topic (e.g. TH involvement in communications between WRFN and Kaminak). April 12 - Goldcorp consultant provided the requested emails from June 23, 2014 related to the 3A-434 record. Noted entry 3A-438 was an error; was incorrectly tracked Attachments: 2 requested emails.	Consultation					
3-A2-43	13 April 2017	Email	Incoming	WRFN	Consultation	WRFN provided a letter from WRFN Chief in response to Goldcorp letter emailed April 9th, 2017. The letter to Goldcorp explains that the WRFN negotiations and technical team has fully briefed WRFN Council on the Coffee Project, and that the negotiations and technical team has been engaging in good faith with Goldcorp, contrary to what Goldcorp stated in their April 9th letter. WRFN states that technical review of the Project Proposal is underway, and that it would be in Goldcorp's best interests to re-engage the WRFN negotiations and technical team with the goal of reaching an Impact Benefits Agreement. WRFN prefers that Goldcorp works and corresponds with WRFN's negotiations and technical team to set up future meetings. WRFN notes wanting to have an ongoing constructive and mutually beneficial relationship with Goldcorp. Attachment: WRFN Ltr	Consultation					
3-A2-53	19 April 2017	Email	Outgoing	WRFN	Engagement	Goldcorp shared the information that YG was providing a technical workshop for the MLI project – Water Quality Objectives and Effluent Quality Standards will be held May 9th at the High Country Inn - as a one day workshop. Noted that a formal invitation with attached documents, will be sent out in the next few days - in case anyone from WRFN wanted to attend.	Information Sharing					
3-A2-165	04 May 2017	Email	Outgoing	WRFN	Consultation	Goldcorp contact WRFN rep regarding Community Profiles study that Hemmera was going to undertake for the Coffee project. Noted the intent was to supplement our Socio-economic baseline. Noted they would like to interview the individual. Also requested assistance identifying other appropriate interviewees to ensure fulsome representation of WRFN.	Consultation					
3-A2-175	05 May 2017	Email	Outgoing	WRFN	Consultation	Goldcorp notified WRFN that Goldcorp submitted the Coffee Gold Project Proposal on March 31, 2017 to the Yukon Environmental and Socio-economic Assessment Board (YESAB). Since submission, the Project Proposal has been undergoing a "Completeness Check" from YESAB. During this process, YESAB recommended that Goldcorp revise Section 3.0 Consultation and Engagement of the Project Proposal to more clearly reflect the requirements of consultation under the Yukon Environmental and Socio-economic Assessment Act (the Act). The revised version of Section 3.0 Consultation and Engagement has been submitted to YESAB today, May 5, 2017, and has been uploaded to Open Text Core - USB flash drive was mailed as well. Attached: memo sent to YESAB outlining the specific changes made to Section 3.0 Consultation and Engagement	Consultation					
3-A2-180	08 May 2017	Email	Outgoing	WRFN	Engagement	Goldcorp provided WRFN with Request for Proposal (RFP) for the 2017 drill pad. Noted that this info will be sent out to potential companies - sending it to WRFN for consideration of any WRFN businesses that may be interested. Noted that at this time Goldcorp is looking for one contractor to undertake both the exploration and the geotechnical programs. Noted additional work completed by TetraTech over the past month on footings and stabilization on steep terrain - described in attached memo and spreadsheet - noted memo is still in draft format and discussions are ongoing, however this is indicative of the direction we are heading in ensuring integrity of pads and safety of personnel. Attachments: 1. Drill pad anchor memo 2. Drill pad RFP 3. golden guide ENG 4. Geotech points spread sheet	Consultation					
3-A2-250	25 May 2017	Email	Incoming	WRFN	Consultation	WRFN notified Goldcorp that they were booked to fly down to Vancouver on June 14th, and requested a meeting that Friday. Noted that WRFN is getting all new computers in the office and want to install the data base but are not sure what program it runs. Asked if Goldcorp could you try and find out for them.	Consultation					
3-A2-292	31 May 2017	Email	Outgoing	WRFN	Consultation	Goldcorp messaged WRFN to confirm that June 16th negotiation meeting from 9am – 1pm in Vancouver works for WRFN. Asked if there were any agenda items WRFN would like to add.	Consultation					
3-A2-509	12 June 2017	Email	Outgoing	WRFN	Relationship Building	Goldcorp contacted WRFN to notify them Goldcorp was sponsoring the North American Indigenous Games, and inquired if any WRFN citizens were participating.	Information Sharing					
3-A2-531	16 June 2017	Meeting		WRFN	Consultation	Project Engagement meeting between Goldcorp and WRFN.	Contracting and Procurement	Project Update Goldcorp gave a project update including safety rate, permitting timeline, exploration, demographics, EPC status. WRFN asked if it is 18 months to the decision date in the YESAB process and	Goldcorp noted that yes, which is what is estimated.			
3-A2-532	16 June 2017	Meeting		WRFN	Consultation	Project Engagement meeting between Goldcorp and WRFN.	Contracting and Procurement	WRFN asked if there is a JV for drilling and who the drilling company is?	Goldcorp mentioned that there will be a drilling RFP coming out later in the year for 2018 and that a pad building RFP was awarded to Back Country Resources.			



Appendix 3-A2 Potentially Affected First Nations Consultation Records – White River First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-533	16 June 2017	Meeting		WRFN	Consultation	Project Engagement meeting between Goldcorp and WRFN.	Contracting and Procurement	WRFN asked who is doing camp catering and will that be an RFP?	Goldcorp noted that CIL has that contract and that won't be an RFP in the near future.			
3-A2-534	16 June 2017	Meeting		WRFN	Consultation	Project Engagement meeting between Goldcorp and WRFN.	Consultation	Community Meeting Goldcorp extends the offer to hold community meetings to present technical information or a project update. WRFN doesn't think a community meeting will happen any time soon. There is a General Assembly on September 9th which also falls on the date of an election.				
3-A2-535	16 June 2017	Meeting		WRFN	Consultation	Project Engagement meeting between Goldcorp and WRFN.	Project Design	Technical Workshops Goldcorp is offering technical workshops in mine closure, permafrost, heap leach, water, and road if WRFN is interested in those. WRFN is currently working on their submission for adequacy and should have it by June 20th for review. The document is extensive and review has been a focus for WRFN. WRFN will finish reviewing and understand what the gaps are before they engage in the technical workshops. Down the road they will look at the need for more specific technical information.	Goldcorp can send some dates for these meetings if there is an appetite for that.			
3-A2-539	19 June 2017	Email	Incoming	WRFN	Consultation	WRFN provided Goldcorp with IR tables regarding the proposal submitted March 31 as part of Adequacy Review. WRFN noted that they intend to share the IR's with YESAB on June 20. Goldcorp thanked WRFN for providing the documents. Attachments: Table 1 - Consultation Table 2 - Effects on wildlife Table 3 - Fish and Fish Habitat Table 4 - Wildlife Table 5 - Geochemistry Table 6 - Surface Water Quality Table 7 - Surface Hydrology Table 8 - Hydrogeology Table 9 - Noise Table 10 - Human Health Table 11 - Terrain Table 12 - Air Quality	Regulatory Process					
3-A2-561	26 June 2017	Email	Incoming	WRFN	Consultation	WRFN contacted YESAB, and included Goldcorp noting that the document titled, "Distribution of the Coffee Gold Mine Project Proposal" submitted by Goldcorp on May 26th, 2017, did not mention WRFN in the document. WRFN noted they were provided the project proposal material in hard copy form by the proponents' consultants at 11:45am on May 15th, 2017 - and to Please correct for the record.	Regulatory Process					
3-A2-568	30 June 2017	Email	Incoming	WRFN	Consultation	WRFN provided Goldcorp with response regarding site tours and technical community meetings - noting they were having internal discussions relating to the matter and would get back to Goldcorp after getting feedback from YESAB on WRFN's adequacy submission. Goldcorp responded that they looked forward to hearing from WRFN.	Regulatory Process					
3-A2-575	05 July 2017	Email	Outgoing	WRFN	Consultation	Goldcorp provided the permit application for the planned 2017 Heritage Resource Impact Assessment (HRIA) for the Northern Access Route. Noted that the application includes description of how WRFN will be involved with the assessment. Attachment: HRIA Permit Application	Heritage					
3-A2-578	05 July 2017	Email	Outgoing	WRFN	Consultation	Goldcorp forwarded WRFN the permit application for the 2017 HRIA for the NAR. The assessment will build on the 2016 HRIA specifically on areas of higher heritage resource potential following a 2017 LIDAR assessment, previously documented heritage resources that were not revisited in the 2016 HRIA and areas noted by YG staff requiring further investigation. The application also outlines the description of how WRFN will be involved in the assessment. Goldcorp also noted that the permit application also outlines a description of how WRFN will be involved in the assessment and that the application will be submitted by Goldcorp's consultant, Ecofor, who will copy WRFN when submitting the application to YG and will ensure that they are included in the process. Goldcorp followed up with WRFN in another email to let them know that the desktop analysis was completed and field work would begin mid-August. Additionally Goldcorp mentioned that an updated work plan and maps had been uploaded to Core and provided a link.	Heritage					
3-A2-581	07 July 2017	Email	Outgoing	WRFN	Engagement	Goldcorp contacted WRFN to inquire if they had 1 or 2 first aid attendants who would be interested in working at the drill rig for the 4th week of July.	EA					
3-A2-622	25 July 2017	Email	Incoming	WRFN	Engagement	Ecofor forwarded WRFN a job ad for a Heritage Technician to distribute within the community. Ecofor noted that they do not have any fieldwork dates set yet but will be working with the client to set dates in August or September.	Education and Training					
3-A2-656	07 August 2017	Email	Outgoing	WRFN	Consultation	Goldcorp contacted WRFN to let them know that Tetra Tech would be conducting dust monitoring data collection along the NAR in August in order to ensure understanding of baseline dust conditions. Dust monitoring stands and buckets will be placed in four locations approximately 3-5 m off the proposed NAR and will be removed in the Fall. Proposed locations for dust stands have been attached. Additionally, Goldcorp noted that they have continued to build baseline data with remote wildlife cameras. Attachment: NAR_Dust_Stands	Studies					
3-A2-658	08 August 2017	Email	Incoming	WRFN	Consultation	WRFN contacted Goldcorp to see whether there was any updates on the database as they were hoping to hire a student to do some data entry. Goldcorp replied that they had received a quote for all database upgrades that had been requested which would cost around \$7000 and Goldcorp would be happy to pay for those. Goldcorp noted that if they wanted to move it to the cloud it would cost \$10-\$15 a month, which would need to be covered by WRFN. Goldcorp requested that WRFN let them know whether or not they would like to move to the cloud so they can get started on database work, which could potentially take until the end of September. Goldcorp can also check to see whether or not its ok for the student to start inputting data.	Education and Training					
3-A2-660	09 August 2017	Email	Outgoing	WRFN	Consultation	WRFN asks Goldcorp if there is an update on the HR database. WRFN has money to spend in September and hopes to hire a student to do data entry. Goldcorp replies that they will push the consultant who is updating the database to have it finished before the end of September, or can ask the WRFN hired student to do data entry and Goldcorp can have their consultant import the data. Goldcorp asks which WRFN would prefer.	Education and Training					
3-A2-675	16 August 2017	Email	Outgoing	WRFN	Consultation	Goldcorp proposes a meeting on August 31st in Vancouver. WRFN replies that the meeting date and time do not work, as WRFN is in an election cycle. When the new Chief and Council have been briefed after September 9th, then WRFN will engage.	Meeting					
3-A2-745	13 September 2017	Email	Incoming	WRFN	Consultation	WRFN provides Goldcorp with a copy of a letter from Yukon Government describing Yukon Government's approach to engagement and consultation with WRFN on the Coffee Project and other projects in WRFN's asserted area. Goldcorp thanks WRFN for the information and notes that since the WRFN election is over, Goldcorp looks forward to receiving proposed dates for a meeting with WRFN leadership.	Consultation					
3-A2-758	18 September 2017	Email	Incoming	WRFN	Consultation	WRFN informs Goldcorp that they are withdrawing their most recent proposal related to agreement negotiations. Goldcorp acknowledges this and asks WRFN what the next steps are with WRFN and Goldcorp.	Consultation					

Appendix 3-A2 Potentially Affected First Nations Consultation Records – White River First Nation

Record ID	Date	Contact Type	In / Out	Organization	Regarding	Meeting Summary	Topics/Issues	Discussion Topics and Views Presented - Description	Goldcorp Response and Consideration of Views	Action Required	Responsible Lead	Status of Action
3-A2-761	18 September 2017	Email	Outgoing	WRFN	Consultation	Goldcorp sends a letter of congratulations to Chief Demit regarding her re-election with WRFN. Goldcorp notes hoping to resume the negotiation process and schedule a community meeting.	Consultation					
3-A2-764	19 September 2017	Email	Incoming	WRFN	Consultation	WRFN informs Goldcorp that they are likely willing to meet after briefing the newly elected council. WRFN is open to Goldcorp proposing dates.	Meeting					
3-A2-765	19 September 2017	Email	Incoming	WRFN	Consultation	WRFN replies to Goldcorp's congratulatory email stating that once Council has regrouped and Council has given instruction, WRFN will contact Goldcorp. WRFN noted that it is premature for WRFN Council or Members and Goldcorp to meet before Goldcorp re-submits the Project Proposal. Goldcorp replies explaining that the re-submission will be the same Project Proposal with an updated consultation log. WRFN notes that they will be in touch after speaking with Council.	Consultation					
3-A2-837	20 September 2017	Email	Outgoing	WRFN	Consultation	Goldcorp suggests dates for a meeting with WRFN in Vancouver. WRFN agrees that this date and location works.	Consultation					
3-A2-1133	04 October 2017	Email	Outgoing	WRFN	Consultation	Goldcorp sends WRFN an update to the Coffee Gold Project pre-season report. The update informs TH of the extended field schedule and additional exploration road building happening at site.	Consultation					
3-A2-1140	12 October 2017	Email	Incoming	WRFN	Consultation	WRFN retracts a financial offer that had been previously tabled to Goldcorp. WRFN asks to confirm a meeting time change in Vancouver in October. Goldcorp informs WRFN that due to the changes in the negotiations progress and need for a meeting time change, that a meeting on December 11 or 12 is best. WRFN confirms December 12 in Whitehorse for a meeting. Goldcorp reiterates the desire to come to Beaver Creek to deliver a Project Update to WRFN members and community and to meet with WRFN Chief and Council.	Meeting					
3-A2-1234	27 October 2017	Email	Outgoing	WRFN	Consultation	Goldcorp informs WRFN of a new procurement bidding process that Goldcorp is implementing for the Coffee Project. Goldcorp asks WRFN for a key contact so that bidders can reach out to WRFN for hiring opportunities and partnerships. Goldcorp informs WRFN of an upcoming RFP as well. WRFN provides the name of the person on October 31.	Contracting and Procurement					
3-A2-1237	30 October 2017	Email	Incoming	WRFN	Consultation	WRFN informs Goldcorp that WRFN is now welcoming Goldcorp to Beaver Creek to engage the community in January 2018 and asks Goldcorp to provide suggested dates.	Consultation					

# **MATERIALS AND MEETING MINUTES**

3-A2-59\_Summary of Goldcorp Cyanide Management.pdf

3-A2-66\_FNNND\_Citizens\_Open\_House.pdf

3-A2-90\_FNNND Council Meeting.pdf

3-A2-154\_TH Goldcorp Meeting Project Engagement Meeting.pdf

3-A2-206\_YG and TH Coordination Meeting on Road Management.pdf

3-A2-215\_GC to TH - Black Hills vs Maisy May Route Selection Trade Off Study.pdf

3-A2-221\_TH HLF Teleconference.pdf

3-A2-252\_SFN Chief and Council Meeting.pdf

3-A2-309\_Agenda for Coffee Gold Technical Meetings June 5th and 6th in Whitehorse.pdf

3-A2-309\_SEA Water Management Issues Coffee Gold June 6.pdf

3-A2-309\_SSWQO Presentation 2017-06-06\_TH presentation.pdf

3-A2-309\_TH Technical Meeting - NAR and Closure+PPTs.pdf

3-A2-309\_TH to GC - Draft Goldcorp NAR Analysis June 2017.pdf

3-A2-309\_TH to GC - TH SSWQO Memo June 2 2017.pdf

3-A2-367\_TH Technical Meeting - WQ Mgmt and Objectives+ppt.pdf

3-A2-512\_TH-Goldcorp Project Development Meeting.pdf

3-A2-531\_WRFN Project Dev Minutes June 16.pdf

3-A2-541\_TH Goldcorp Site Tour Agenda.pdf

3-A2-542\_TH Citizens Open House Agenda+PPT.pdf

3-A2-550\_TH and GC NAR analysis discussion.pdf

3-A2-557\_SFN Goldcorp Site Tour Agenda.pdf

3-A2-559\_FNNND Industry Day.pdf

3-A2-597\_TH and Goldcorp Closure Teleconference.pdf

3-A2-623\_TH Goldcorp Project Development Meeting Call.pdf

3-A2-673\_GC NAR MCDA Memo V3 reduced\_for submission.pdf

3-A2-678\_SFN Technical Engagement Plan for Coffee Project.pdf

3-A2-682+691\_Northern Access Route Tour Agenda August 23&25.pdf

3-A2-684\_TH and Goldcorp NAR MCDA Teleconference.pdf

3-A2-698\_TH GC Project Development Meeting.pdf



3-A2-714\_TH Technical Engagement Status and Plan Aug 31.pdf  
3-A2-716\_SFN Technical Engagement Plan\_GC\_Edits.pdf  
3-A2-746\_TH GC Project Development Meeting.pdf  
3-A2-752\_SFN Goldcorp NAR+Site Tour Agenda.pdf  
3-A2-755\_SFN Goldcorp NAR Site Tour Agenda.pdf  
3-A2-766\_SFN Water+Mine Waste Workshop.pdf  
3-A2-834\_SFN Closure Workshop.pdf  
3-A2-891\_SFN and Goldcorp Socio-Ec Workshop.pdf  
3-A2-933\_SFN Wildlife Workshop.pdf  
3-A2-997\_TH Water Workshop Day 1.pdf  
3-A2-1071\_TH Water Workshop Day 2.pdf  
3-A2-1142\_TH General Assembly.pdf  
3-A2-1157\_TH Closure Workshop.pdf  
3-A2-1212\_SFN and Goldcorp Updates Meeting.pdf  
3-A2-1225\_SFN Coffee VCs+indicators analysis.pdf  
3-A2-1240\_TH Socio-Ec+Health Workshop.pdf  
3-A2-1314\_SFN Citizens Meeting.pdf  
3-A2-1343\_FNNND\_CoffeeGoldProjectFeedback.pdf  
3-A2-1346-1347\_Mineral\_lick.pdf  
3-A2-1348\_TH Project Development Meeting.pdf  
3-A2-1353\_TH Access Options and Site tour for Coffee Gold Project.pdf  
3-A2-1353\_TH NAR MCDA Memo V31\_reduced.pdf  
3-A2-1354\_SFN Letter re feedback on Coffee Gold Mine PP.pdf  
3-A2-1355\_Goldcorp-SFN Technical Engagement Status and Plan\_v3.pdf  
3-A2-1356\_Goldcorp-TH Technical Engagement Status and Plan 01Dec2017.pdf



# Goldcorp Cyanide Management

History, Standards and the Cyanide Management Code

 **GOLDCORP**



# GOLDCORP CYANIDE MANAGEMENT HISTORY

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## Goldcorp Commitment to Cyanide Management (2006 – Current)

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- 2004-2005 Participated in International Cyanide Management Code Development
- 2006 Signatory to the Code in 2006
- 2007 First Operating Facility in the World Certified to the Code (Marigold Mine)
- 2008 First Operating Facility in Mexico Certified to the Code (El Sauzal Mine)
- 2009 First Operating Facility in Guatemala Certified to the Code (Marlin Mine)
- 2010 First Operating Facility in Canada Certified to the Code (Musselwhite Mine)
- 2010-2011 Goldcorp, Corporate Director Co-chair of the Industry Advisory Group
- 2014 Goldcorp Develops Sustainable Excellence Management System (SEMS) includes International Cyanide Management Code and additional internal standards
- 2015 First and ONLY Facility Closed in accordance with the Code (El Sauzal Mine)
- 2016 Cerro Negro Certified to the Code (Argentina)
- 2017 Eleonore Mine, Pending Certification (within 3 years of commercial production)
- 2007- Current All Sites recertified in full compliance with the Code (3-yr cycle)
- 20?? Coffee – nominate upon declaration of commercial production; Certification within 3-years of declaration.



# Sustainability Excellence Management System (SEMS) & Cyanide Management

The Goldcorp Sustainability Excellence Management System (SEMS) provides the framework and standards for Goldcorp sustainability management, and ensures a consistent approach for implementing these global policies across the Company.

SEMS includes leading and lagging indicators to identify potential risks in the management of cyanide at our facilities, such that risks can be mitigated through controls. The controls are determined based on the hierarchy of controls that uses engineering controls as the first line of controls and administrative controls as the last.



## Goldcorp Cyanide Management

# Sustainability Excellence Management System (SEMS) & Cyanide Management

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Within SEMS there are standards specific to cyanide management:

- SEMS standard 9 International Cyanide Management Code (ICMC) - All Goldcorp sites are required to be certified to the International Cyanide Management Code;
- SH Standard 5 Cyanide Safety – requires specific operational requirements that are not addressed or included in the ICMC;
- SEMS standard 13 Event Reporting; and
- Multiple safety standards associated with safe handling of chemicals.



## Goldcorp Cyanide Management

## SEMS requirements:

- **Training & Awareness:**
  - Personnel training in the safety use and handling of cyanide and for emergency response
  - Training local responders to ensure they are competent in cyanide responses
  - Corporate and site designated cyanide management “Champions”
- **Inspections, Monitoring & Audits:**
  - Cyanide specific reviews on facility designs – pre-construction, during operations and with incident investigations
  - Risk assessments for potential incidents to identify specific controls to reduce the potential of an incident
  - Frequent operational inspections
  - Periodic Audits – internal (site) and external (corporate and independent third party)
- **Preventative Measures:**
  - Operational, safety and environmental equipment preventive Maintenance Programs
  - Engineering controls such as cyanide gas Monitors, pH Instrumentation, level controls, etc.

## Further SEMS requirements:

- **Communication:**
  - Internal Communication amongst the Goldcorp sites regarding any potential or real incidents
  - Information Sharing with other companies and through our participation with the International Cyanide Management Institute – Industry Advisory Group.
- **Incident Management:**
  - Requires reporting of ALL; Safety, Environmental, Corporate Social and Security incidents (Events)
  - Incident Investigation Process for Events (incidents)
  - Event (incident) tracking system to evaluate corrective actions their implementation and the effectiveness of corrective actions
  - The development of an Emergency Response Plan at each site to address incidents
  - Adequacy of resources including personnel and equipment to be able to respond to real scenarios
  - Mock scenarios to test, evaluate and improve our systems



# Goldcorp Cyanide Safety Events (Incidents) Summary

Below is a high level summary of Goldcorp cyanide related safety incidents. Reporting history of Goldcorp no exposure to personnel from cyanide that caused a loss of consciousness, long term affects or fatality.

Goldcorp categorizes Events into four levels of severity: Category 1 – Insignificant, Category 2 – Minor, Category 3 – Moderate, Category 4 – Major and Category 5 – Severe.

Safety Events for 2014\* to current:

Category	Number of Events	Summary
1 Insignificant	15	Near miss Event or contact with very low levels of process solution containing cyanide.
2 Minor	35	Contact with low grade cyanide solutions, presence of cyanide gas identified with detectors.
3 Moderate	5	Presence of cyanide gas in work areas as identified by detectors, potential for low level employee exposures, facilities evacuated per Emergency Response Plans. Moderate risk for personnel – no recorded exposures.
4 Major	4	Potential exposures to reagent grade cyanide. Personnel decontamination and monitoring.
5 Severe	3	Personnel exposure to reagent grade cyanide or HCN gas. Personnel provided with medical aid and antidote as a precautionary measure.

\* Note: prior to the implementation of a corporate reporting database (Enablon) the reporting was not easily compiled to provide a comprehensive database and retrieval of Event data. As such the information below is for the period 2014 - current.

# Goldcorp Cyanide Environmental Events (Incidents)

Below is a high level summary of Goldcorp cyanide related environmental incidents. It should be noted that prior to the implementation of a corporate reporting database (Enablon) the reporting was not easily compiled to provide a comprehensive database and retrieval of Event data. As such the information below is for the period 2014 - current.

Goldcorp categorizes Events into four levels of severity: Category 1 – Insignificant, Category 2 – Minor, Category 3 – Moderate, Category 4 – Major and Category 5 – Severe.

Environmental Events for 2014 to current:

Category	Number of Events	Summary
1 Insignificant	10	Near miss Event: spill within containment or low levels and low quantity of process solution containing cyanide released to soils immediately adjacent to facilities.
2 Minor	8	Release of cyanide containing solutions out side of secondary containment but within existing disturbance. Wildlife mortality non-critical species, single or low mortalities per event.
3 Moderate	5	Release of process solution containing moderate cyanide content and moderate quantities of solution. Repeat mortalities or spills, multiple mortalities per event
4 Major	6	Wildlife mortality of a critical species, repeat mortalities
5 Severe	0	No environmental events.

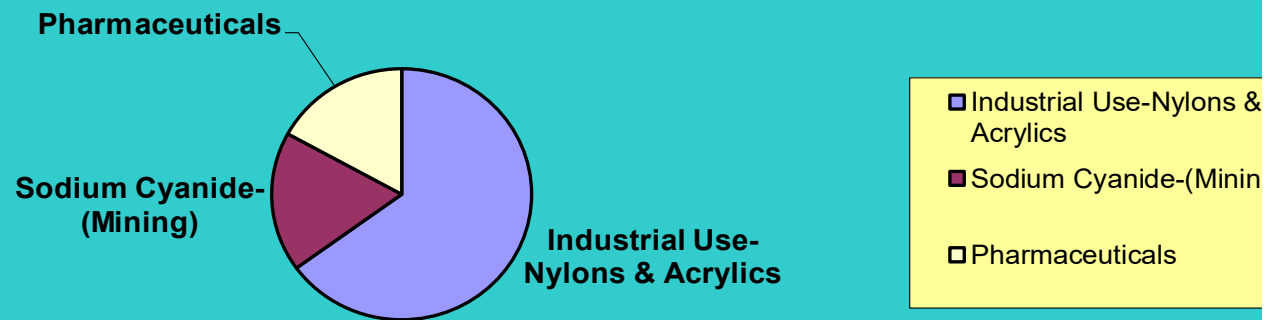


# INTERNATIONAL CYANIDE MANAGEMENT CODE

- Cyanide is produced naturally in the environment by various bacteria, algae, fungi and by over 1,000 plant species including coffee beans, fruit seeds and pits, nuts, vegetables, grains and roots such as potatoes, radish and turnip.
- Cyanide can be highly toxic to humans and wildlife. Liquid or gaseous hydrogen cyanide and alkali salts of cyanide can enter the body through inhalation, ingestion or absorption through the eyes and skin. The salts of cyanide are readily dissolved and absorbed into the bloodstream, where it binds the oxygen in the cell resulting in cellular asphyxiation. The lack of available oxygen causes hypoxia and can result in respiratory arrest and death.



## GLOBAL HYDROGEN CYANIDE USE 1,390,000 MT (2006)



# What is the Cyanide Code?

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- The Cyanide Code is a voluntary industry program established in 2005/2006, designed to improve the management of cyanide use at gold mines.
- Its objective is to reduce the potential exposure of workers and communities to harmful concentrations of cyanide, to limit releases of cyanide and to enhance response actions in the event of an exposure or release.
- The Code was developed in response to concerns raised about the use of cyanide after a tailings spill at a Romanian gold mine.
- The incident demonstrated to the gold mining industry, governments and the public that better management of cyanide was needed, particularly at operations with limited experience or in countries lacking adequate regulatory programs.

The Code focuses exclusively on the safe management of cyanide that is produced, transported and used for the recovery of gold. It is intended to complement an operation's existing regulatory requirements. Compliance with the rules, regulations and laws of the applicable political jurisdiction is necessary; this Code is not intended to contravene such laws.

It also includes requirements related to financial assurance, accident prevention, emergency response, training, public reporting, stakeholder involvement and verification procedures. Cyanide producers and transporters are subject to the applicable portions of the Code identified in their respective Verification Protocols.

The Code consists of two major elements: Principles and Standards of Practice:

- 9 Principles
  - broadly state commitments to manage cyanide in a responsible manner
- Standards of Practice
  - follow each Principle and identify goals and objectives that must be met to comply with each Principle
- The Principles and Practices applicable to cyanide production and transportation operations are included in their respective Verification Protocols.
- Requires independent third party audit for initial certification then recertification audits every three years verifying that operations meet the Standards of Practice, Production Practice or Transport Practice.



# Code Structure: 9 Principles

Code Section	Principle
1. Production	Encourage responsible cyanide manufacturing by purchasing from manufactures that operate in a safe and environmentally protective manner.
2. Transport	Protect communities and the environment during cyanide transport. <ul style="list-style-type: none"><li>• Responsibilities assigned</li><li>• Emergency Response Plan</li></ul>
3. Handling & Storage	Protect workers and the environment during cyanide handling and storage. <ul style="list-style-type: none"><li>• Design of facilities</li><li>• Operating procedures</li></ul>

Code Section	Principle
4. Operations	<p>Manage cyanide process solutions and waste streams to protect human health and the environment.</p> <ul style="list-style-type: none"> <li>• Management Plans and Systems</li> <li>• Minimize Cyanide Usage</li> <li>• Protect Birds and Wildlife from cyanide</li> <li>• Protect Groundwater</li> <li>• Spill Containment</li> <li>• Construction and QA/QC</li> <li>• Monitoring Programs</li> </ul>
5. Decommissioning	<p>Protect communities and the environment from cyanide through development and implementation of decommissioning plans for cyanide facilities.</p> <ul style="list-style-type: none"> <li>• Decommissioning plan in place</li> <li>• Financial surety to carry out plan</li> </ul>

Code Section	Principle
6. Worker Safety	<p>Protect workers' health and safety from exposure to cyanide.</p> <ul style="list-style-type: none"> <li>• Identify potential exposure scenarios and mitigate the risk.</li> <li>• Workplace monitoring, signage and incident investigation.</li> <li>• Emergency response plans to respond to worker exposure to cyanide.</li> </ul>
7. Emergency Response	<p>Protect communities and the environment through the development of emergency response strategies and capabilities.</p> <ul style="list-style-type: none"> <li>• Prepare detailed emergency response plans.</li> </ul>

Code Section	Principle
8. Training	<p>Train workers and emergency response personnel to manage cyanide in a safe and environmentally protective manner.</p> <ul style="list-style-type: none"> <li>• Understand the hazards associated with cyanide use.</li> </ul>
9. Dialogue	<ul style="list-style-type: none"> <li>• Engage in public consultation and disclosure.</li> <li>• Describe cyanide management procedures and</li> <li>• Provide opportunities to communicate issues of concern. responsively address identified concerns.</li> <li>• Make appropriate information regarding cyanide available to stakeholders.</li> </ul>



- **International Cyanide Management Institute**
  - administers the Code
  - promote the Code adoption and implementation
  - evaluate the implementation
  - manage the certification process (audit reviews)
  - make information on safety practices for cyanide widely available
  - Maintain web site [www. cyanidecode.org](http://www.cyanidecode.org)
- **Industry Advisory Group**
  - assists with finalization of administrative aspects
  - provides feedback on the implementation of the Code

# **GOLDCORP**

## **PROPOSED COFFEE PROJECT**

### **First Nation of Na-cho Nyäk Dun Citizens Open House**

**When: April 26, 2017**

**Where: Curling Lounge**

**Agenda: Dinner is served at 5:00 pm**

**Presentation will begin at 5:30 pm,  
followed by Q & A**

Goldcorp is hosting an open house for the proposed Coffee Gold mine project located in west central Yukon, about 130km south of Dawson. We invite all First Nation of Na-cho Nyäk Dun citizens to attend and meet the Goldcorp team, learn about the proposed project, and share feedback.

For more information, please contact:

Kelly Constable at 867.334.9207 or  
Kelly.Constable@goldcorp.com



# Goldcorp Coffee Project Update

## First Nation of Na-cho Nyäk Dun

April 26, 2017

 **GOLDCORP**

- **Introduction**
- **Project Update**
- **Northern Access Route Overview**
- **2016 Overview & 2017 Plan**
- **Project Proposal Submission & YESAB Process**



## The Goldcorp Coffee Project Team Today

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- [Name Redacted] **Sustainability & Human Resources (HR) Director**
- **Jennie Gjertsen, Environment and Permitting Manager**
- [Name Redacted], **Engineering Manager**
- [Name Redacted], **Corporate Social Responsibility (CSR) Specialist**
- [Name Redacted], **HR Specialist**
- [Name Redacted], **OnSite Engineering**

- **Goldcorp is a leading gold producer focused on responsible mining practices with safe, low-cost production throughout North and South America:**
- **Canadian company headquartered in Vancouver**
- **Over 15,000 employees worldwide**
- **Primary product is gold, with silver, copper, zinc and lead by-products**
- **Committed to responsible mining practices and well positioned to deliver long term value**

## Overview of Goldcorp Locations



# Goldcorp's Vision & Values





**Goldcorp subscribes to a number of industry initiatives to ensure we operate in accordance with industry best practice on environmental, safety, community and security issues.**

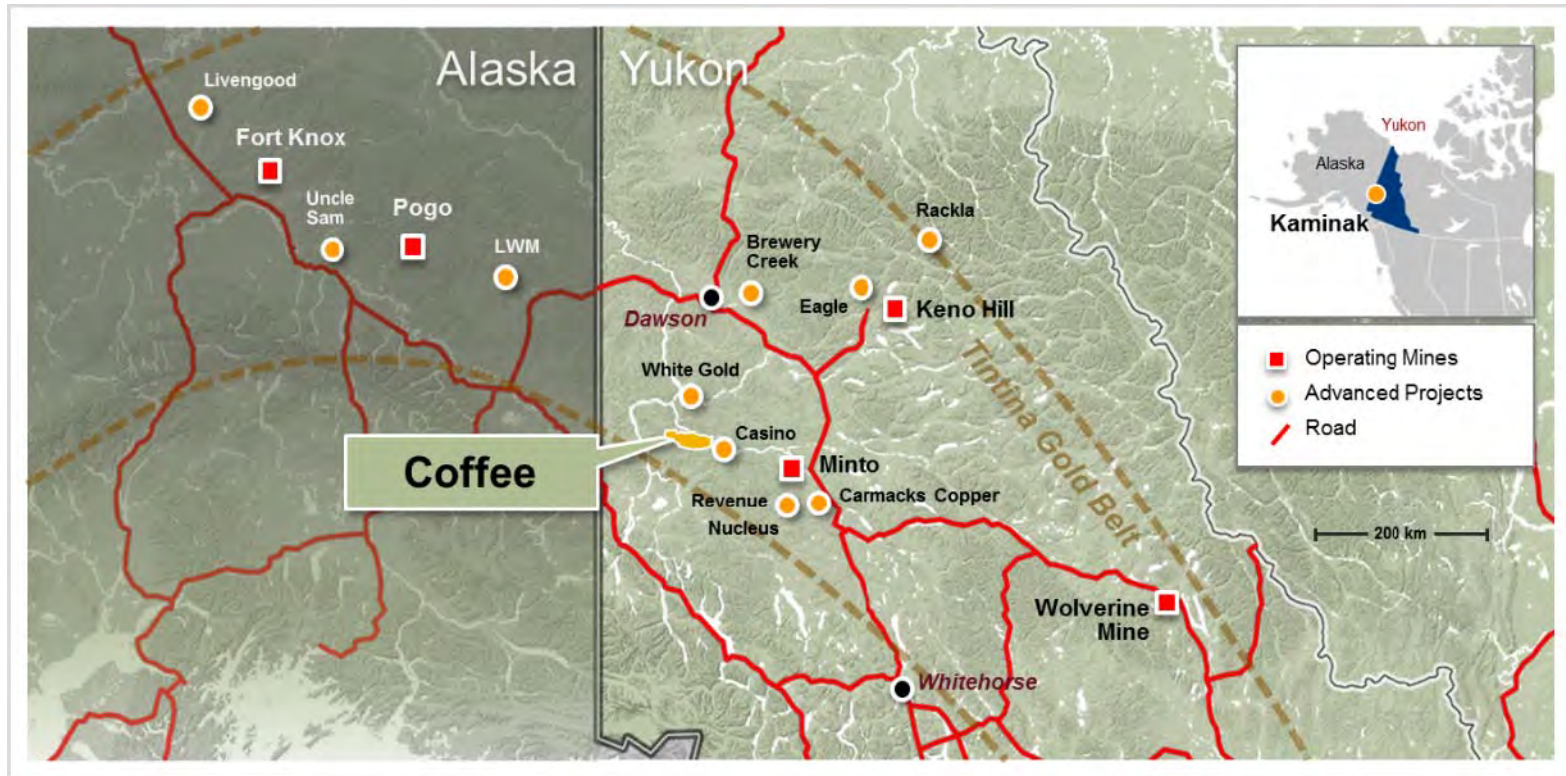




All Goldcorp sites (including Coffee) must implement the Sustainability Excellence Management System (SEMS):

- **Integrated approach to safety, environmental, social and security performance that adheres to best practice**
- **Covers topics such as:**
  - Water management
  - Tailings management
  - Local employment and procurement
  - Risk and impact management
  - Community investments
- **Follows the “Plan, Do, Check, Improve” formula to ensure continuous improvement**
- **Rigorous compliance and accountability process through audits, site self-assessments and internal and external reporting**

# Coffee Project Location



## Project Overview

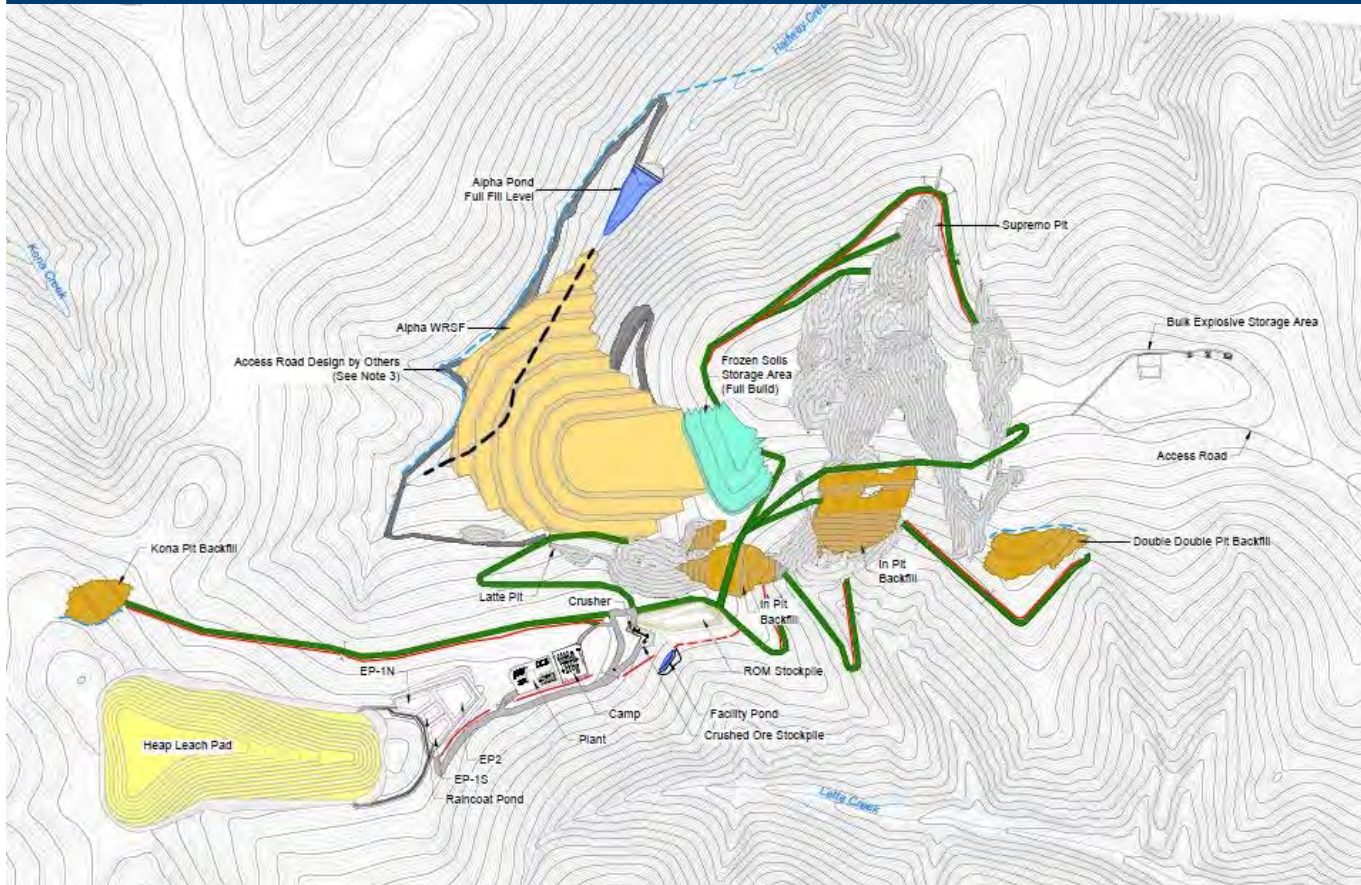
### Mine Site:

- Expected 12 year mine life with additional 11 year closure period
- Ore is processed by cyanide oxide heap leach process on a conventional pad
- Open pit, conventional truck-and-shovel operation, looking at fleet automation

### Employment:

- Over 400 people during construction, approximately 320 people during operations
- 2-weeks-on, 2-weeks-off, primarily transported via air from Whitehorse or Dawson





- 4 open pits
- Heap Leach Facility
- 1 Waste Rock Storage Facility
- 4 In-pit backfill areas
- Soil stockpiles for reclamation



# Coffee Gold Project's Northern Access Route

Proposed Strategies for Management

 **GOLDCORP**

- **Goldcorp's Coffee Gold Project proposes to use the 214 km Northern Access Route (NAR) originating 16 km outside of Dawson City to the Coffee property south of the Yukon River.**
- **The NAR will cross the Yukon & Stewart Rivers:**
  - During open flow, Goldcorp will utilize barges to cross; When frozen, ice roads will be constructed; no land access to site during freeze up and thaw periods.
- **Of the route, over 80% is existing road:**
  - The NAR follows the government-maintained Hunker Road to Sulphur Creek; Past Sulphur Creek is user-maintained road
  - New build is approximately 37 km; Majority of new build is located between the Stewart and Yukon Rivers (Ballarat/Barker areas) with additional portions from Eureka to Henderson dome and along the ridge to Maisy May north of the Stewart.



# Road Route Design Objectives

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- **Ensure safety for all users along the route**
  - Design parameters
- **Follow existing roads**
- **Minimize disturbance, particularly to sensitive features**
  - Archaeological and cultural heritage sites
  - Wildlife, biological, habitat
  - Permafrost
- **Minimize road length**

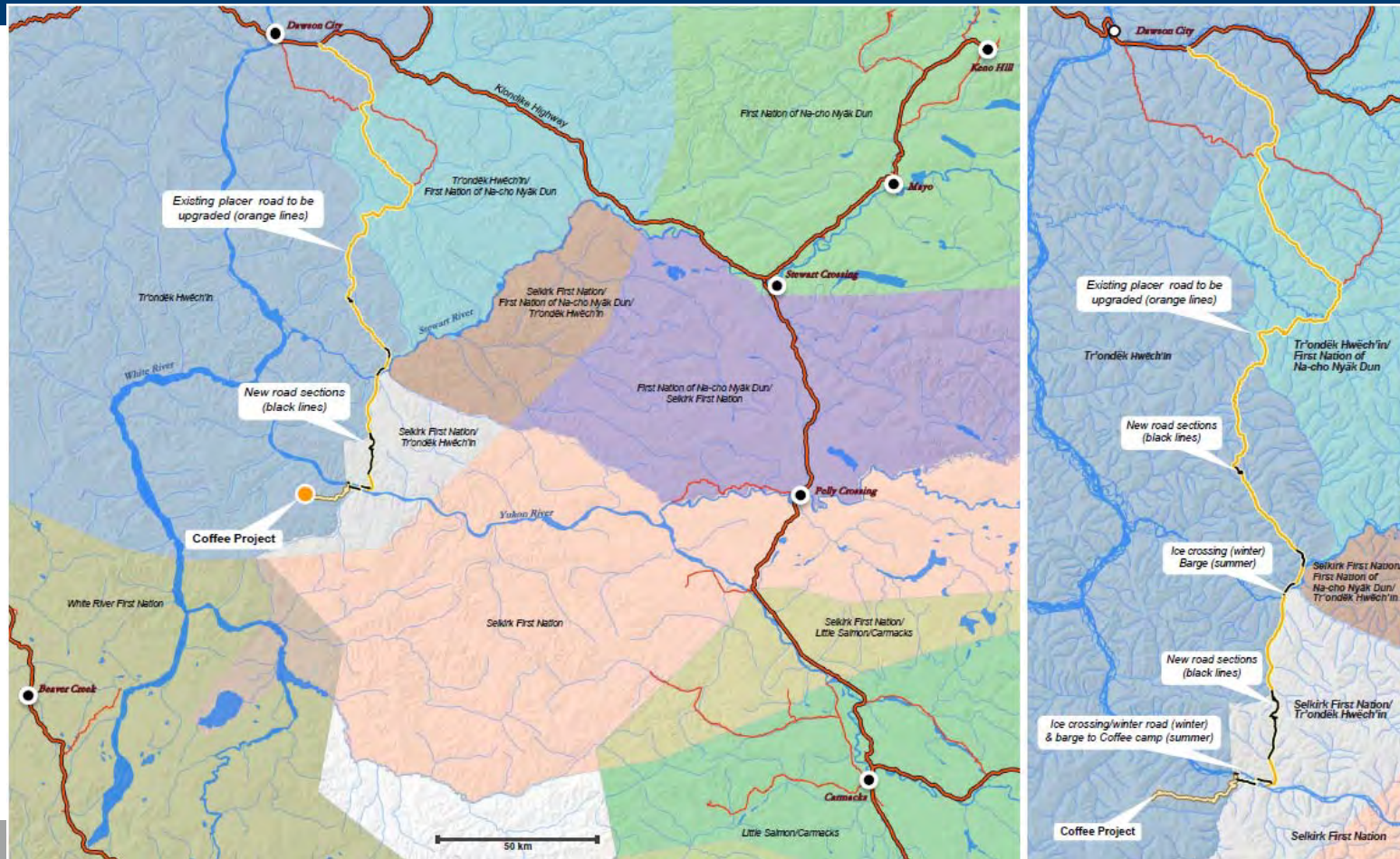




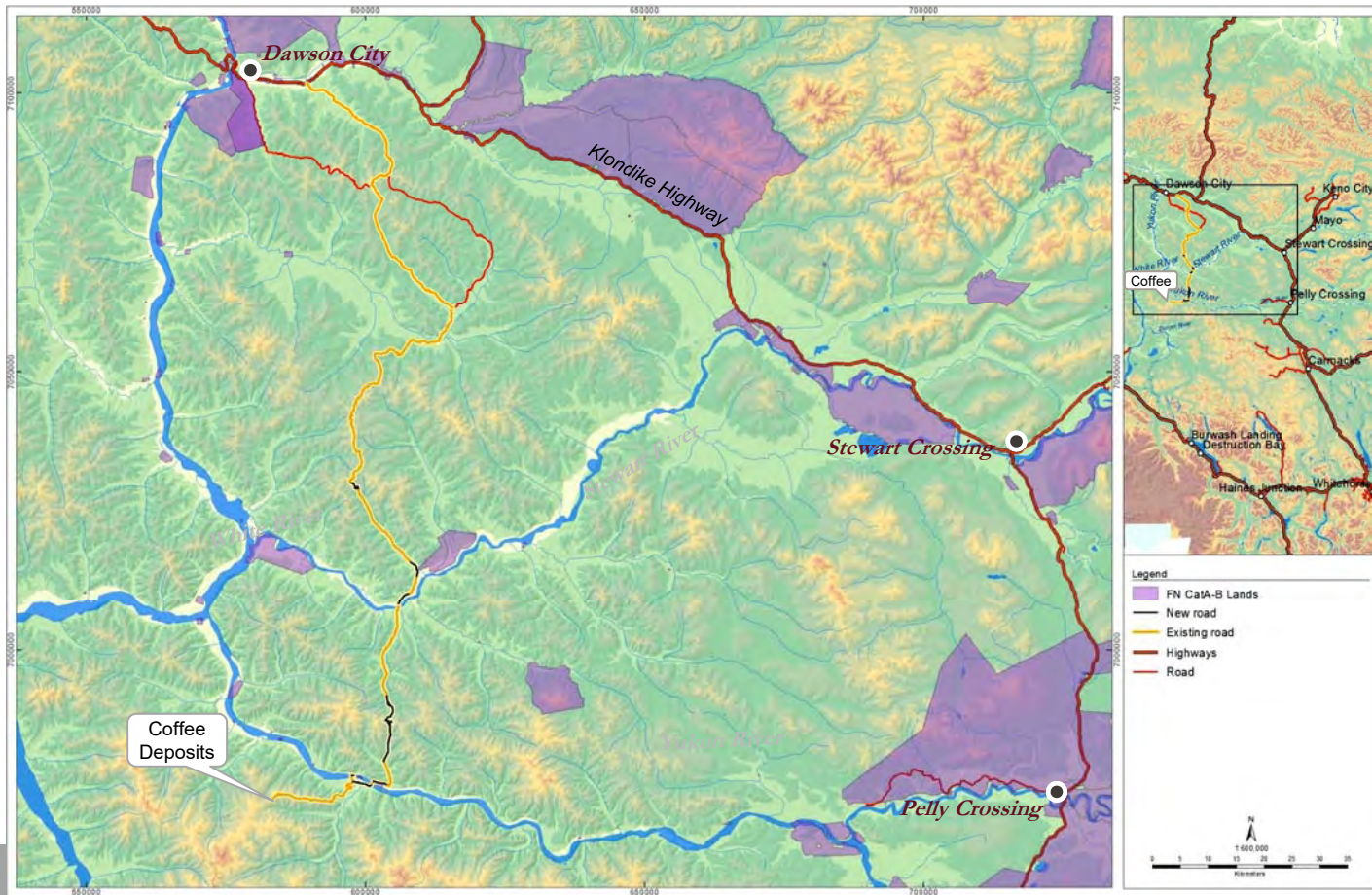
# Design Criteria and Standards

Components	Valley Bottom	Mountainous Terrain
Maximum Road Grade	8% (up to 10% on short pitches). Restricted to 5% on switchbacks	8% (up to 10% on short pitches). Restricted to 5% on switchbacks
Tightest Vertical Curve	1% grade change over 12 m (11 m for crest curves)	1% grade change over 4 m (3 m for crest curves)
Minimum Curve Length	50 m	30 m
Minimum Stopping Sight Distance	135 m	65 m
Minimum Horizontal Curve Radius	80 m (18 m for switchbacks)	35 m (18 m for switchbacks)
Minimum Cross Drain Culvert Diameter	450 mm	450 mm
Ditch Size	0.5 m deep with a 1-m-wide base	0.5 m deep with a 1-m-wide base
Road Width	5 m	5 m
Pullout Size	Additional 4 m width, 15 m long with a 7.5-m-long taper at each end	Additional 4 m width, 15 m long with a 7.5-m-long taper at each end

# Northern Access Route - Context



# Northern Access Route – Full Route

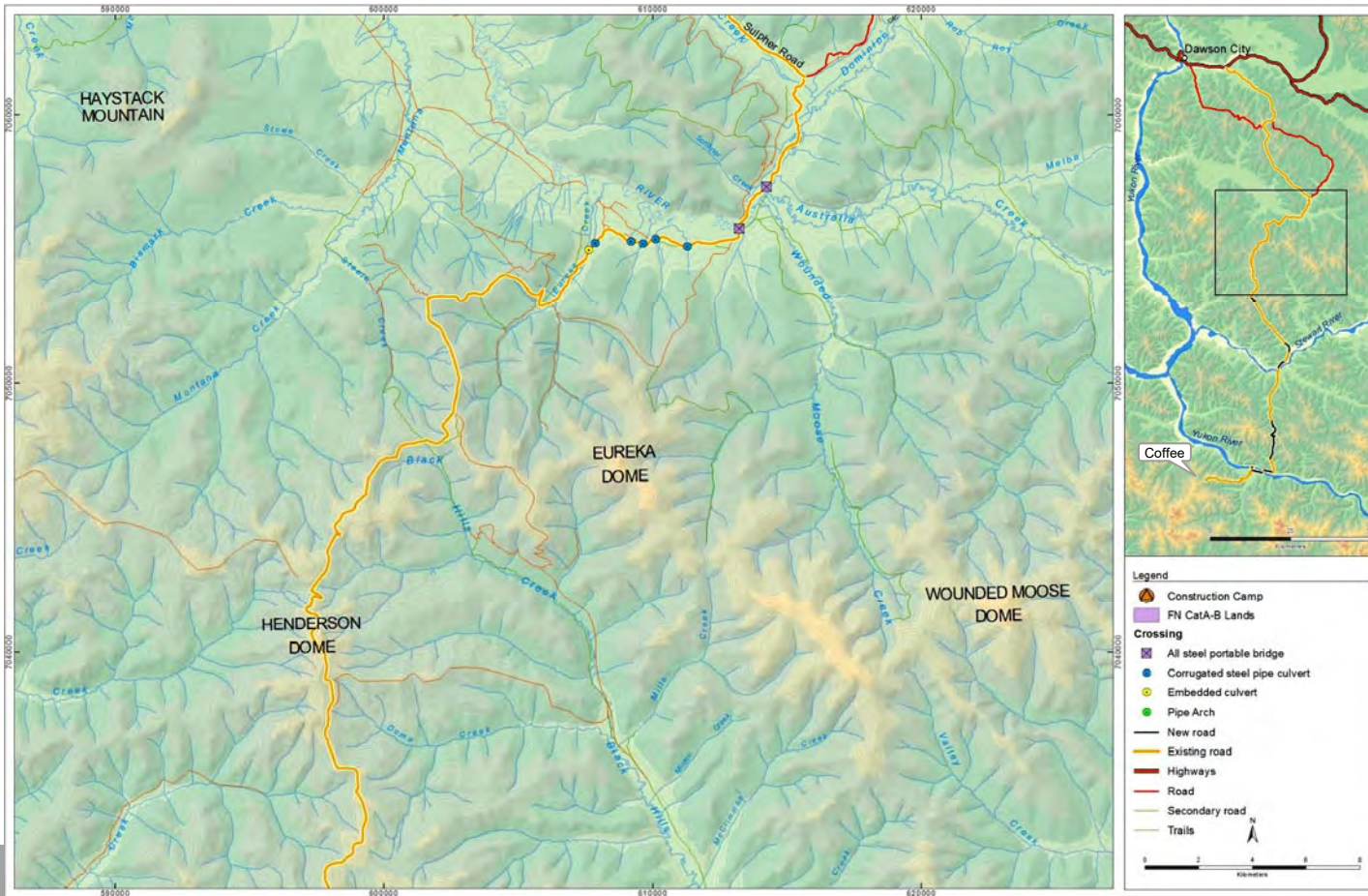




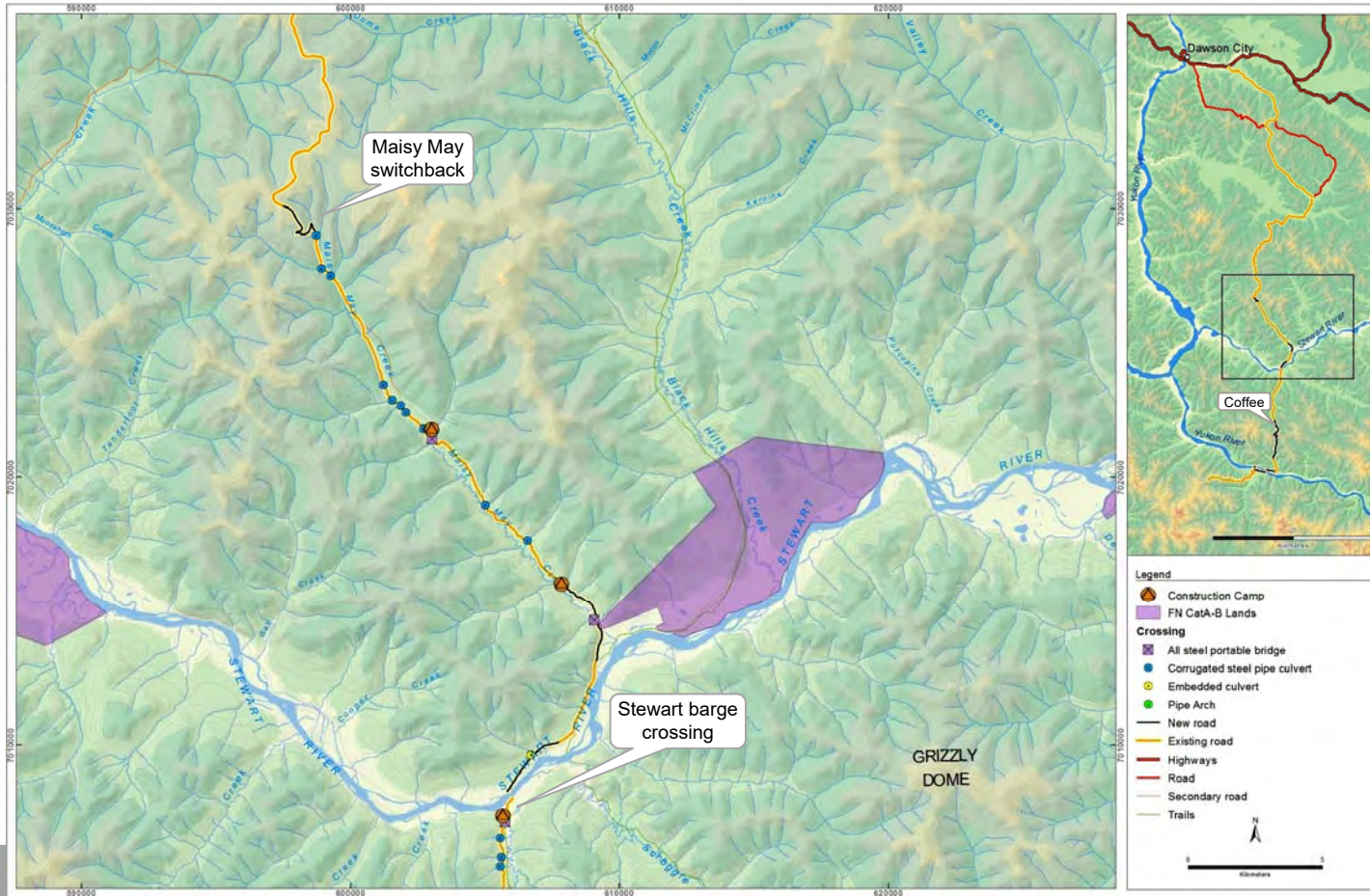




# Northern Access Route – Granville to Henderson

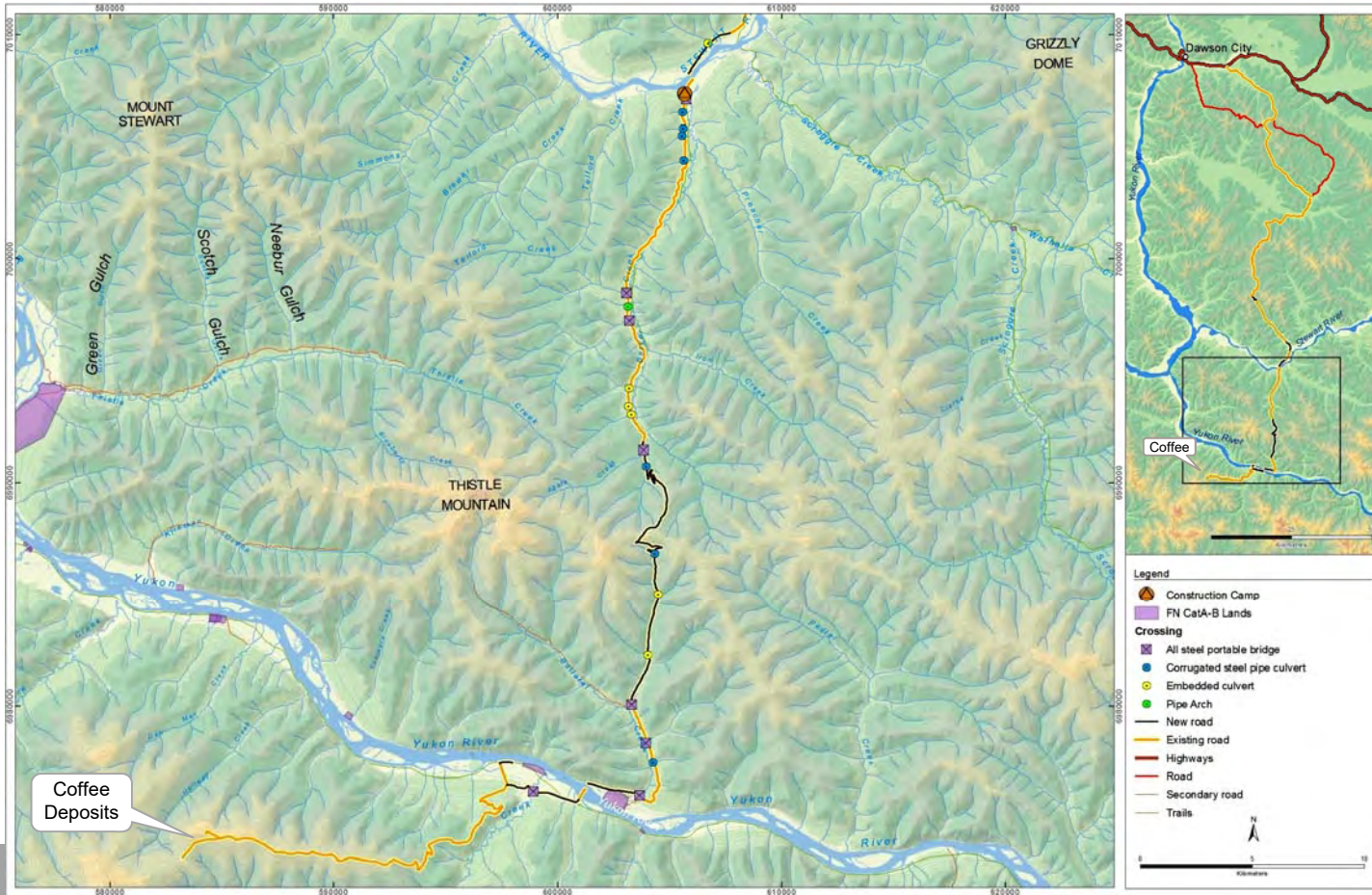


# Northern Access Route – Maisy May / Stewart River





# Northern Access Route – Stewart River to Coffee Creek



## Road Management

22

- **Currently the road up to Sulphur creek is maintained by YG**
- **Beyond YG it is user-maintained public road on crown land with active placer claims**
- **Current users:**
  - Placer miners (during operation season Mar-Nov)
  - Trappers, hunters
  - First Nations (traditional uses such as harvesting)
  - Yukon Quest/River Quest/Yukon Ultra
- **Road maintenance has been conducted primarily by placers.**





## **Safety Considerations:**

- Appropriate speed limits
- Mandatory use of seat belts by all drivers and passengers.
- Prohibited use of cell phones while driving.
- Employee and contractor driver training on the road safety rules.
- Regular vehicle maintenance program
- No parking on the travelling surface (pull into a safe location such as a pullout).
- Driving under the influence of alcohol or intoxicating drugs will be prohibited, and will result in immediate dismissal from the Project.

## **Environmental Stewardship:**

- Protocols for how to manage wildlife interactions along the road
- Project vehicles will have spill response kits.
- Install and maintain erosion control structures
- Refuelling mobile equipment a minimum of 30 m from a watercourse (except barges or small gas engines for water pumps)

## Next Steps: Consideration of Various Options for Management

- **Given that the road is on crown land and well used by a number of other actors, Goldcorp is considering potential strategic approaches to road management.**
- **Goldcorp's recognizes that the road is a shared asset. A core priority for Goldcorp is that First Nation concerns related to the cumulative effects of change in access are adequately managed.**
- **In all options, Goldcorp underscores the need for open and transparent dialogue with first nations and stakeholders regarding this management.**



Supplies and consumables will be moved by northern access road originating in Dawson.

### Construction:

- Road mostly in place and being used; Some new construction and upgrades
- Use of barges and seasonal ice bridges, crossing the Stewart and Yukon rivers
- Construction estimated in 2018

### Operations & Management:

- Estimated 8 trucks per day average during operations
- Road Management Plan
- Access and monitoring
- Wildlife – concerns and mitigations
- Road Users Group – under development





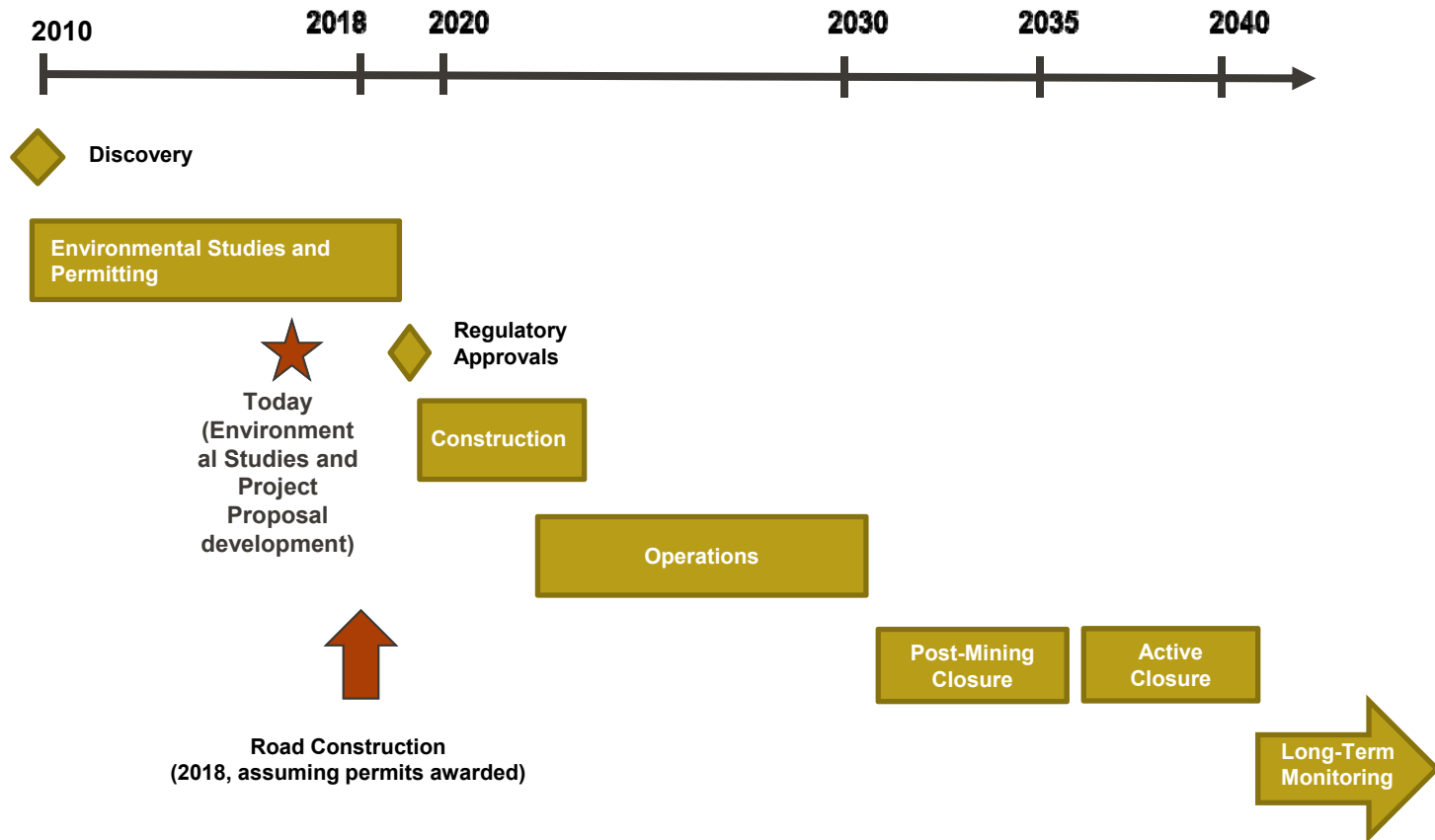
# PROJECT UPDATE

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



# Project Schedule





# ENVIRONMENT & CSR 2016 ACTIVITIES & 2017 PLAN

## Environmental Monitoring

- Ongoing Baseline covering: wildlife, vegetation, fish, water quality, hydrology, groundwater, meteorology
- 5 environmental monitors on site and road
- Steering Committee for Environmental Management Certificate at Yukon College

## Reclamation Research

- Partnership with Yukon College & University of Saskatchewan
- Native seed collection

## Setting up Systems & Procedures

- Sustainability Management Plan
- Community Response Protocol
- Community Investment protocol



## Other Initiatives

### Orientation & Planning

- Site orientation on safety, environment, heritage find protocols

### Strategic Planning:

- Understanding Local economic development – procurement and hiring opportunities
- Community Contributions
- Consultation and Engagement



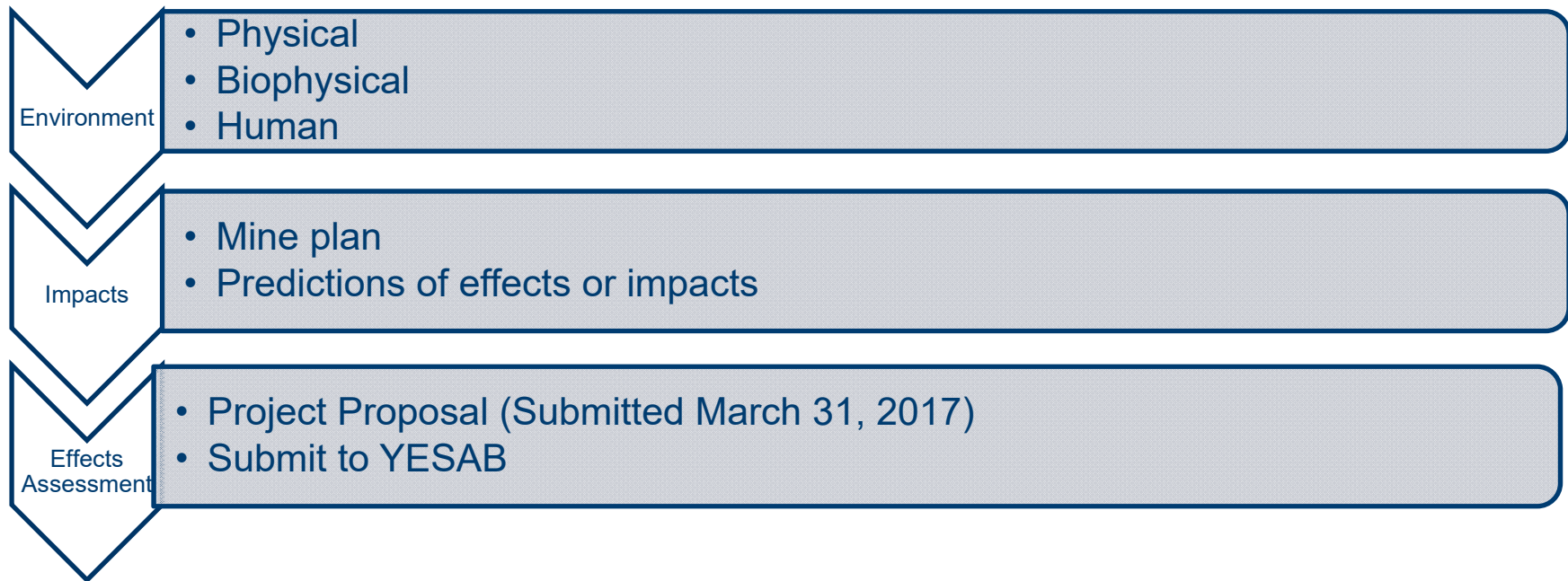




# YESAB APPLICATION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



### Valued Components (VCs):

- Environmental, social, economic topics that could be potentially impacted by the project.
- tailored the selection of VCs to Yukon

Baseline  
Studies



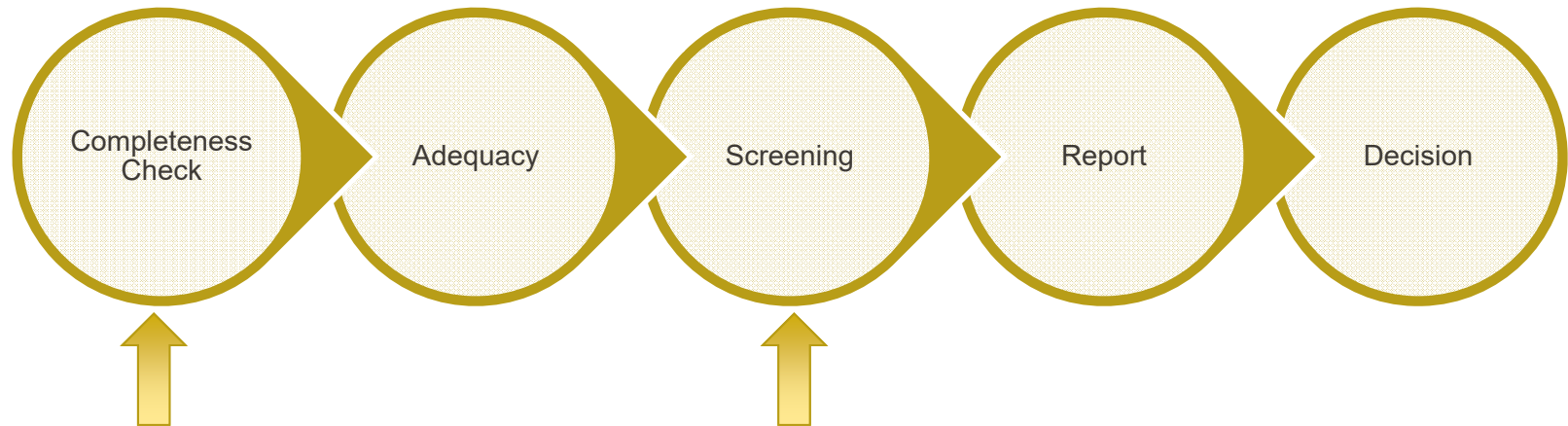
Physical Environment

Biophysical Environment

Human Environment

- **Fish & Fish Habitat**
- **Vegetation**
- **Wildlife & Wildlife Habitat**
- **Groundwater**
- **Hydrology**
- **Air Quality**
- **Noise**
- **Surficial Geology, Terrain & Soils**
- **Surface Water Quality**
- **Birds & Bird Habitat**
- **Demographics**
- **Economic Conditions**
- **Social Economy**
- **Community Infrastructure & Services**
- **Education Services Land & Resource Use**
- **Community Health & Wellbeing**
- **Heritage**





Current stage  
(submitted March 31)

Public comment period

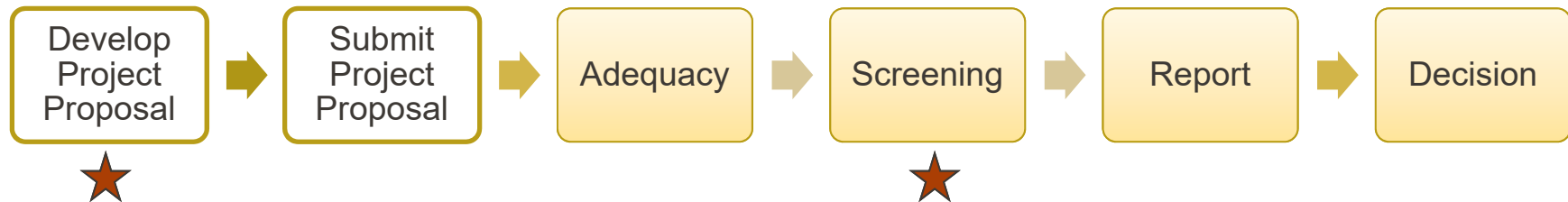


# ENGAGEMENT & CONSULTATION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## The Coffee Project requires an Executive Committee Screening Under YESAB:



- Goldcorp is currently developing the Project Proposal for the Coffee Project to be submitted to the Yukon Environmental and Socio-Economic Assessment Board (YESAB).
- Feedback is heard and incorporated into the Project Proposal prior to submitting:
  - Community Meetings & Open Houses
  - Comment cards
  - Comments received via the Coffee Feedback Protocol
  - Interviews, dialogue and collaborations First Nations and stakeholders
- Your feedback is also heard and addressed while the Project Proposal is in the “Screening” stage of the process via the YESAB Online Registry.

- **Provides a transparent, replicable and confidential process for listening and responding to community ideas, questions and concerns.**
- **We commit to maintaining respect throughout the process will investigate all topics related to Coffee Gold activities.**
- **Contact us with your comments**
  - Toll-free Phone: 1-844-330-0277
  - Email: [coffee.feedback@Goldcorp.com](mailto:coffee.feedback@Goldcorp.com)
  - In person or writing at the Whitehorse office: Attn: Community Relations Dept. Suite 201-208 Main Street, Whitehorse, Yukon, Y1A 2A9



## **Initiatives supported in 2016:**

- Yukon Quest, Moosehide Gathering, Festival of Trees, Yukon Native Hockey Tournament, Adäka Festival and much more!

## **Our objectives are:**

- Respond to local needs and opportunities
- Support initiatives that build economic, social and cultural capacity
- Create a positive social and economic legacy
- Build and support partnerships in the local community

## **Key areas for investment:**

- Arts & Culture
- Community Development
- Education
- Environment
- Health



# NEXT STEPS

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## Engagement with Na-cho Nyäk Dun

- **Citizens Dinner and Open House April 26<sup>th</sup> at the Curling Lounge in Mayo**
  - Presentation with Q&A
  - Dinner at 5:00 pm
- **Ongoing engagement considerations:**
  - **Format:**
    - Examples: Open Houses, meetings
  - **Frequency:**
    - Examples: Quarterly, as needed
  - **Topics:**
    - Examples: General updates, specific themed meetings based on interests
  - **Key contacts for meetings coordination:**
    - Na-cho Nyäk Dun: [Name Redacted]
    - Goldcorp: Reesa Meltzer







# QUESTIONS & DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



Thank you

**Contacts:**

**Buddy Crill**  
**Mine General Manager**

**604-505-7613**

**[buddy.crill@goldcorp.com](mailto:buddy.crill@goldcorp.com)**

[Name Redacted]

**porate Social Responsibility**

[Name Redacted] **[@goldcorp.com](mailto:>@goldcorp.com)**



**We look forward to working  
with Yukon Communities**



**Meeting Title:** Na-cho Nyak Dun Citizen Meeting

**Date and Location:** April 26, 2017 – Mayo Curling Club

## **Introduction: Purpose and Objectives**

An overview of the Coffee Project, Goldcorp and the Northern Access Route

## **Attendance:**

Goldcorp: [Name Redacted]

Onsite: [Name Redacted]

NND: [Name Redacted] and council members

A sign in sheet was used to track citizen attendance

## **Discussion of Key Topics:**

[Name Redacted] welcomed everyone and noted that they are looking forward to an open, transparent relationship with Goldcorp and that there are no contentious issues at the time. Noting that Goldcorp could one day be mining in their territory and that starting to build a good relationship is important.

Goldcorp gave an overview of operations, locations, values and initiatives that are subscribed to was given (International Cyanide Code, Mining Association of Canada), and info on SEMS ensuring that standards are met in regards to security, CSR, safety, environment.

Coffee project location was discussed and basic history of Kaminak's discovery and how that feeds into the engineering and mine planning work that is currently being done. Comparison to what Brewery Creek did and what Victoria Gold is doing in regards to heap leach operation.

Q: How far away from the Yukon River is the project?

A: The mine is approximately 8km from the river.

Q: How far is the heap leach from the creek?

A: It is about 5km from the creek

A description of how the heap leach works was explained by Goldcorp.

Q: Frank Patterson RRC Chair asked if Heap Leach was double lined.

A: It is a double lined system with two different liners. There is also a boiler system during the winter which will ensure that it doesn't freeze. There is also a rain coat system to keep the heat in.

Q: Have there been studies done?

A: There have been heritage studies and archaeological studies done:

Q: What happens with the heap leach waste?

A: The heap leach takes water in but doesn't let any water out until 9 years in. We are doing studies to make sure that we are using the best methods. We will begin rinsing the heap leach in year 4. We will be actively reclaiming the heap leach.

Q: Very concerned with the Yukon River, Coffee Creek and the YT24 Creek. Where does the waste come from and how will it affect the water?

A: The material has never gone through a crusher

Q: Very concerned about the wildlife, fish and the vegetation.

A: Goldcorp shares the same concerns that you do and something that Goldcorp has done is change the mine plan from three waste rock piles and six discharge points into one waste rock pile and discharging into a creek with very limited fish habitat. It costs more money but it is the better plan to minimize impacts.

Comment: The land claim process is different than outside of Yukon but they make the laws on their land that isn't shared. Shared land has to be negotiated with the Government.

Q: Would the heap leach withstand a large earthquake?

A: Extensive seismic modeling has been done for this facility and those were included in the design of the heap leach. In the event of an earthquake that would cause a failure to that facility, it's a rock structure, it's not tailings which liquid would escape. There would be a very small local impact but it is very contained. It wouldn't impact the salmon stock in the Yukon River. It's not that type of facility.

Q: There are problems in the small communities across Canada being alcohol, drugs and the residential school effect. We need to help those people somehow with employment. Drug and alcohol policies hurts the hiring of locals.

A: The issue is Canada wide, we will engage in the dialogue and come up with solutions.

Q: What's the probability of an earthquake?

A: we can't remember the numbers but we can share the report with you.

Q: What about care and maintenance?

A: We will have 5 years active closure, 5 years active monitoring and if meeting all closure criteria has been met for the project and then we would start the long-term monitoring program.

Comment: There are two projects in the Yukon now that have closure mistakes that haven't been addressed and FNs want to ensure they aren't caught with those costs.

A: Goldcorp isn't a fly by not company (not that a junior can't close properly) but we have closure successes within the company. It's not in our best interest to be a bad neighbour.

Q: It would be Goldcorp that would operate it and not sell it?

A: We could bring in a partner to help build the mine, can we promise that it won't be sold at some point, no but Goldcorp is looking to do more business within the territory. We are going to be a responsible operator and hold to our commitments.

Q: How large is the site and are there any wildlife areas?

A: 5km across by 3.5km height wise. There has been a lot of wildlife research around the site. The 40 Mile Caribou Herd is coming back to the Yukon. While they aren't hanging out at the site in the winter now they may in the future. There will be plans to ensure that the caribou are disturbed as little as possible. The site isn't on key habitat for the caribou. There is moose harvest in the area around the road and lots of studies have been done in that area. Very small population of sheep that lives on the north side of the river. Mitigation measures have put in place to ensure they aren't disturbed.

Comment: There are wild horses by the White River.

Q: How will Goldcorp control who has access.

A: Through the river crossings.

An overview of the Northern Access Route was given. The route was chosen because most of the route has already been built and cuts down on archaeological, wildlife, vegetation impacts. The shortest of all routes and the least amount of new road. Some switch backs will be realigned. Access points will be controlled at the water crossings at Stewart and Yukon River. Most of the roads have no drainage structures. Goldcorp would upgrade the roads to have ditches and proper drainage and appropriately sized crossing structures at streams.

Q: Dawson had problems with their ice bridge this year.

A: That was part of the site management of how long to make the shoulder season. We would just have to ensure there is enough supplies during the shoulder season.

Q: Is the mine year round?

A: The mine is year round and food supplies would be flown in.

Q: There are issues with airports and having people using airstrips to do illegal animal watching. Will the airstrip be reclaimed?

A: yes after closure the airport will be completely reclaimed.

Q: Will the diesel be contained and will the camp run of diesel?

A: It will be contained in double walled containers, 110% storage containers and the camp will be primarily diesel heated.

Q: Who is testing the water?

A: We have a third party testing the ground water, surface water. We also have 5 environmental monitors employed with us so that they can be trained and be the monitors at site.

Comment: Goldcorp has to drink a cup of water before you leave the site after closure.



Road users include placer miners, hunters, trappers, Yukon Quest, government and we will be another road user. Speed limits, signage, road design such as pullouts, radio stations, annual public meetings in Dawson to discuss road work, safety considerations are all mitigation measures to ensure we help keep the road safe for people and wildlife.

Exploration is currently taking place and we have just submitted our project proposal. Studies are still ongoing and will continue to be. We have road monitors who are also monitoring the wildlife and vegetation on the road. We want to make sure that we close the mine successfully and that will also continue.

Effects Assessments – some are mandated by YESAB and some of the Valued Components were selected through consultation. We are in the completeness check phase which will then move into the screening process. This is when public feedback can be submitted.

Q: How seriously are public comments taken?

A: An example would be the mine plan and that the mine plan was changed after consideration of comments made through consultation. Another example is additional water sampling sites were suggested through consultation and we have started sampling water in those areas. We absolutely value comments and concerns that are brought to our attention.

Q: Social problems with alcohol and drugs in the communities. Mining companies fly in and fly out which is ok as long as the interaction isn't negative.

A: We've got lots of good examples of projects and mines. Do we have drug and alcohol policies, yes we do. Do we have drug and alcohol screening, yes we do. But that doesn't mean that we can't support people and give them opportunities to be successful. It's part of building capacity.

### Key Issues and Concerns:

Heap Leach

Wildlife

Social issues such as drug and alcohol affecting hiring opportunities

### Action Items/Next Steps:

Action Item	Person Responsible	Date Required



# First Nation of Na-Cho Nyäk Dun and Goldcorp Coffee Gold Team Meeting

April 26, 2017

**Location:** First Nation of Na-Cho Nyak Dun Office, Mayo

**Time:** 1 pm – 3 pm

**Participants:**

**First Nation of Na-cho Nyak Dun (FNNND)**  
FNNND Government [Name Redacted], <sup>[Name Redacted]</sup>

**Coffee Project – Goldcorp Inc.**

[Name Redacted] – Director of Sustainability and HR  
[Name Redacted] – Environment and Permitting Manager  
[Name Redacted] – Engineering Manager  
[Name Redacted] – CSR Specialist  
[Name Redacted] – HR Specialist  
[Name Redacted] – OnSite Engineering

Meeting commenced at 1:05 pm  
[Name Redacted] Recorded the minutes

1. Welcome – Introductions

[Name Redacted] welcomed the group and attendees introduced themselves. Goldcorp started the meeting with a thank you and a seat belt safety share. NND gave a wildlife and PPE safety shares.

2. Project Update

Goldcorp gave an overview of Goldcorp including locations and projects, vision and values (people, sustainability and safety are key), commitment to industry initiatives and standards to continue to attain social licence to operate, SEMS – Environment, safety, security, CSR. Looking at water management programs.

Project location was reviewed as well as the mine overview. 10 – 12 year mine life and heap leach processing with no tailings. Open pit truck and shovel operation, 400 ppl employed during construction and 300 ppl during operation. Two and two rotation and fly in fly out. Mine plan was described and explained.

Q: NND asked what the length of the mine area is.

A: Goldcorp explained it is approximately 5km across.

Onsite gave an overview of how the route was chosen. Least impact route with least amount of new road and least amount of tough crossing. 214 km long with two river crossings. Large road maps were reviewed starting with the overview map. User safety was a large consideration in choosing the road route. Archaeological site, wildlife, and permafrost was also studied and avoided as much as possible.

Q: Hunker road has been nominated as an heritage site, has that been considered?

A: It isn't a hands off heritage site that is being nominated. The area is being mined today by many placer miners as well as harvesting by FN and Non-FN as well as heritage. The road is largely already in use so we would just be another user.

Q: Do tourists go there?

A: Yes they do. Fairly significant use by non-industrial users. Tourists were seen all the way down to Maisy May. Most tourism ends at Bonanza and Hunker

Q: How far down is the road maintained?

A: Dominion, sulphur, hunker, bonanza

Q: There were issues from coming from the east?

A: Those were routes we looked at but there were many issues in using those roads. Tougher ground, more new build and land disturbance.

Q: What is the anticipated activity in a year span? Is there anticipated activity beyond that?

A: Yes, there is current active use by placer miners who dot the entire road route.

Maisy May down to Stewart River is an area of new build road. It doesn't open up placer ground as the road runs right along the Stewart River. Safety and road parameters there are a wide variety of people maintaining the road. The standards by which they build and maintain the roads are variable. We will include safety upgrades to the currently maintained roads. Water management by the road is a safety issue that Goldcorp will take on. There will be proper road ditching, culverts and sediment inputs. There will be a single lane road with turnouts rather than a large industrial road the whole way. Mitigate risk by having a radio assisted road. An open channel will be used by all miners. The standard of care between hard rock miners and placer miners are on very different levels. Hard rock miners hold themselves to much higher environmental standards.

Q: Is there ice where the area has already been mined? The concern is restoration.

A: There was at one point. The same active layer of permafrost will not be seen because the area has been washed. In areas where overburden has been replaced, plant life is growing back.

Q: What about the wetlands, we have issues with the wetlands.

A: This route was chosen because we only go through one little 200m wetland south of Maisy May. Other routes had larger wetland .



Q: What about the cyanide issue?

A: In terms of transportation? We will be subscribing to the International Cyanide code. It has tight parameters around how cyanide can be used and transported. It will be transported by a double walled container. It will not be liquid, it will be a charcoal briquette and will be added to water on-site. The heap leach pad is built with a multi-layer system. Brewery Creek is a more simple system but the system we will be using is a more complex and safe system.

NND is more concerned with the contaminate issue and their brother and sisters downstream will be affected from this if anything happens with cyanide. Also, what about the overlap issue? NND wants to meet with TH elders and discuss overlap issue politics and economics. They understand it is between the First Nations.

Goldcorp said since we have been in the picture, NND and Goldcorp now met twice. Goldcorp has been significantly engaged with TH. Goldcorp had the understanding that TH and NND would be discussing issues. It is a concern for Goldcorp that there hasn't been discussion between TH and NND about the Coffee Project. NND says it is their business and they will be setting up a meeting in regards to TH Elder council and NND Council. NND has a good relationship with TH and they don't want to mess it up in any way. Goldcorp wants to ensure we understand what NND needs from us and that there is transparency. Goldcorp also want to know how much information should be passed on from Goldcorp and how much should come from TH.

Q: Is Selkirk also involved? NND and Selkirk may also want to have dialogue as well.

A: Yes there is an area of the road that is on Selkirk and TH overlap land as well as some Selkirk land on our exploration package, not mine site and Category B land near the mouth of Coffee Creek.

Goldcorp will have to submit emergency response plans and spill response plans to the government. Lots of mitigations will be put in place in regards to contamination.

NND is quite aware of cyanide issues as they are in discussions with Victoria Gold. Goldcorp has an information deck that can be shared with NND in regards to International Cyanide Code and safety. There are some good mitigations that will need to be put in place and complied with to continue to be certified by Goldcorp.

Q: Is Goldcorp using air ships?

A: That isn't in the plans yet. The road construction for this project is fairly minor and there will be 8 trucks a day on average.

Q: Will subsurface be placed on the road?

A: Yes, in the areas where no permafrost will be crossed there will be textile and the free draining material placed down and then a minimum of 1.5 meters of overfill. Water management and draining will also help as well as 50 km/hr speed limits on the road. The big sink holes will be mitigated through this process.

Q: Are you building a dam?

A: Casino is proposing a big tailings dam but we are not. We will end up with a mound of crushed rock on the heap leach facility. There is a pond which is where water will be stored and tested before it is released into the environment and will have a small dam.

Q: Where do you purchase cyanide?

A: Cyanide is purchased in Richmond or Quebec. Both in Canada.

Q: Is the truck enclosed which will transport the cyanide?

A: It will look like an oil tanker and will have double liner. They will also be dry bricks and can be shoveled up if somehow the tanker is punctured and the cyanide falls out.

Q: Is a human resource inventory being done and is that to see who can work from here? Can post secondary students be contacted?

A: We could ensure that is done. It is so that Goldcorp understand what skills and business are available in the community.

It's only the bottom of Maisy May that isn't developed yet. There is an old homestead but it doesn't look like anyone has been there for at least 10 years. There are four active placer mines in the area up to approximately one kilometre from the Stewart River. At the bottom of Maisy May we will be on active placer roads.

Q: Have NND been getting any of the reports (heritage, wildlife studies, GIS files etc...)

A: No but we can definitely share that information. Are there items that you can specifically ask us for now? We just filed the YESAB proposal and we would be happy to share that information. We have been running technical workshops with TH and if you would like to talk to them about it perhaps NND could look to attend.

Q: Is it just a barge or a ferry?

A: It is just a barge. They will be oversized because the Stewart River is shallow and the boats need a low draft. We have to move the current landing slightly because there is a heritage site there. We are not opening up access because we have control at the rivers. There will not be public access to the barges.

It is tough to get across the Yukon River at Ballarat. There will be new build to an area where there is enough water to land a barge in the summer and an ice road in the winter. There is a lot of unstable ground on the south side of the Yukon River which is why the current road design has been chosen with a permanent bridge over coffee Creek.

Goldcorp discussed some of the concerns around the road which have already been heard. These include opening up the area for increased moose hunting, increased placer mining and increased theft of placer equipment over the winter, increased potential of accidents. Mitigations include training in Dawson for users (safety & maintenance), we have control over the river crossings we don't expect we will be opening up new areas for increased hunting, wildlife ramps will be built in high use areas to ensure their routes aren't interrupted, wildlife signage will be posted along the road, hauling can be compressed into convoys during high use time to ensure the least interaction with animals.

Q: Is it a concern to TH in regards to the fact that Goldcorp will have no control? Were wildlife surveys done?

A: There could be potential for more hunting, we will work with YG and TH on the hunt. YG has a role to play and they have the ability to control it. Much of the environmental work has been done in conjunction with YG to ensure we capture TH and YG concerns. The control points we do have are the river crossings.

Q: Because you are dealing with 3 first nations on 3 different lands, will contracting be open to all?

A: There will be some preference given to TH but we are trying to ensure that everyone benefits and hoping that 3 or 4 nations work together to help build capacity. We will encourage everyone to work together.

a. Project Update - Project Proposal Submission  
Discussed above

b. Northern Access Route Overview  
Discussed above

3. Steps Going Forward

[Name Redacted] will get conversations going with TH quickly.

ACTION: Goldcorp will share studies and maps with NND.

4. Other (as required)

3:12pm meeting adjourned.

# First Nation of Na-Cho Nyäk Dun and Goldcorp Coffee Gold Team Meeting

April 26, 2017

**Location:** First Nation of Na-Cho Nyak Dun Office, Mayo

**Time:** 1 pm – 3 pm

**Participants:**

**First Nation of Na-cho Nyak Dun (FNNND)**

FNNND Government (TBA)

**Coffee Project – Goldcorp Inc.**

[Name Redacted] – Director of Sustainability and HR

[Name Redacted] – Environment and Permitting Manager

[Name Redacted] – Engineering Manager

[Name Redacted] – CSR Specialist

[Name Redacted] – HR Specialist

[Name Redacted] – OnSite Engineering

1. Welcome - Introductions
2. Project Update
  - a. Project Update - Project Proposal Submission
  - b. Northern Access Route Overview
3. Steps Going Forward
4. Other (as required)



# MINUTES

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project  
May 2, 2017**

**Location:** Fasken Martineau 550 Burrard Street, Suite 2900

**Time:** 10:00am – 5:00 pm

**Participants:**

**Tr'ondëk Hwëch'in (TH)**

[Name Redacted]

[Name Redacted]

[Name Redacted]

[Name Redacted]

[Name Redacted]

[Name Redacted]

**Coffee Project – Goldcorp Inc.**

[Name Redacted] General Mine Manager

[Name Redacted] Director, Sustainability & Human Resources (HR) Coffee Project

[Name Redacted], Superintendent, Corporate Social Responsibility (CSR) Coffee Project - **Regrets**

[Name Redacted] Specialist, CSR & HR Coffee Project

[Name Redacted] Fasken Martineau

[Name Redacted] Fasken Martineau

The meeting commenced at 9:47am

[Name Redacted] recorded the minutes

## **Project Engagement**

1. Opening Prayer
2. Introductions / Sustainability or Safety Share

Earthquake safety share.  
Mental health share.

3. Project Update

A completeness check on the Project Proposal has been done by YESAB and will now be moving into adequacy, once the feedback from YESAB on the consultation log is dealt with through submission of a further summary. In regards to the Coffee Project, the exploration team is half way through infill drilling on the resource pit to move from it from indicated to measured. Diamond drilling will commence shortly.

A water permit notification and land fill permit amendment were both sent to TH by Goldcorp in regards to the Coffee Project.

# MINUTES

Goldcorp had a meeting with Yukon Government (YG) last week on the road and shared concern about no movement on the road management conversation. Goldcorp is happy to have calls or meetings with all three parties at the table (YG, Goldcorp and TH). The next meeting will take place in a couple of weeks. [Name Redacted] is leading the conversation from the Government. Goldcorp and YG agree that the least preferred option is Goldcorp management of the road.

ACTION: Goldcorp will share PPT and letter presented to YG on road with TH.

TH had a meeting with YG in regards to the Gateway Project. TH will begin further discussions with them shortly. TH is still reviewing information provided by Goldcorp in regards to the Northern Access Route (Maisy May and Black Hills). TH mentioned they had discussed reclamation and will bring it up further in the meeting.

#### 4. Capacity Funding

TH and Goldcorp discuss capacity funding.

#### 5. Feedback on Road Technical Session

TH is still reviewing Road information and looking at environmental impacts on both routes (Maisy May and Black Hills) for the Northern Access Route (NAR). They will have a more definite response in regards to which route they support moving forward by June 5<sup>th</sup> and 6<sup>th</sup> workshop, or sooner. TH would like a field visit of the routes. Discussion still has to happen in regards to who is managing the road. TH feels the only process that would work would be to have all three parties sitting at the table. TH will also have to meet with their citizens to discuss their final review of the route.

ACTION: TH will provide road review information to Goldcorp in two weeks.

ACTION: Goldcorp will follow-up with TH in a few weeks to discuss the outcomes and feedback of TH's road review.

At the NAR workshop there was mention of an engineering comparison study by Kaminak that was supposed to be shared with TH. Goldcorp doesn't think there is an engineering report that was created. Decisions on the road route were made while the engineers were evaluating the options rather than developing a document around those decisions. Everything that Goldcorp has on the route is on Open Text Core or in the Project Proposal.

ACTION: Goldcorp will follow-up with Onsite to see if this document exists and will enquire into what it will take to prepare a comparative study on the Maisy May vs Black Hill route decision. Goldcorp will have an answer on this issue for the June 5<sup>th</sup> meeting.

#### 6. Dates for Upcoming Tr'ondëk Hwëch'in Citizens Meetings & Site Tour

TH discussed the necessity of a citizens meeting. The TH negotiation team is responsible for consultation with their citizens but they are okay with having a citizen's open house but not a detailed meeting. TH noted their citizens are not in a position to review all of the information and therefore can't provide an objective perspective or understanding of the information. TH will have an information update meeting and an Elder's Council meeting in May. At the Open Houses information can be provided using other media (such as posters), but no in depth presentation of technical details. June 20<sup>th</sup> open house would work for the citizens. TH can work with Goldcorp

# MINUTES

on the meeting materials. As appropriate TH will ensure the citizens are advised of all the information.

Goldcorp doesn't want to get to the end of the negotiation process and then have the citizens come back and say that Goldcorp hasn't been communicating or engaged. Goldcorp would like to work collaboratively with TH from both respects on the citizens meeting and the open house. In the same way that you don't just deal with the mayor and council you must work with the community. Goldcorp noted that it is not only best practice but also good from a legal perspective and being involved with the YESAB process ensuring that the community feels engaged. Goldcorp doesn't want the community to feel that we haven't been engaging them and giving them information at an on-the-ground level.

ACTION: TH would like to have the open house in the evening on June 20<sup>th</sup> at 5:30pm. All details to be booked and confirmed

ACTION: Site tour during the day on June 20<sup>th</sup> at 9 or 10am. Attending will be negotiation team, consultants, citizens and elders. 10 people from the TH is the maximum for a site tour.

## 7. Other

An update on the Advisory Committee was brought up as the last meeting was held two months ago. TH noted that all the employment opportunities are coming to the HR department. Goldcorp provided a business registry list template. TH is working on the skills, employment list and business registry. A notice is going out to the TH citizens in the Yukon and across Canada to secure their information. The committee will work on setting up the next meeting. Goldcorp will complete the community profiles in June and it will be useful to reference those in the upcoming discussions. Goldcorp appreciated the waving of the Resource Geologist two week posting period.

ACTION: Goldcorp and TH will schedule the next Advisory Committee Meeting.

**Planning for Road Management Conversations  
Coffee Gold Project  
May 18, 2017**

**Location:** TH office, Dawson City

**Time:** 10:00

**Participants:** [Name Redacted]

GC presented an overview of recent meetings with TH:

- Workshop at end of March – high level review of GC’s main criteria for route selection:
  - Safety
  - Minimization of disturbance
  - Minimization of new road
  - Avoid environmental or heritage sites
- Workshop at end of March also covered the road route.
- Discussion of upcoming meetings – site tour, open house and road workshop meeting scheduled for June 5<sup>th</sup> – when and what issues will be covered: more in-depth info on comparison between Maisy may and black hills. This report and materials are currently being prepared. Can be shared when ready. TH mentioned they’ve also done an internal comparison report that has not been shared to date.

Discussion on where YG is at with NIC funding, special consultant for negotiation of road agreements with first nations, etc.

- YG currently putting together funding for FN capacity to review, not waiting for NIC funding to come through, although fully expect that to then cover back those expenses. Application with Transport Canada looking like it’s moving ahead well and expecting/hoping it all to be wrapped up before Parliament breaks for the summer at end of June.
- Q: how will YG manage the YESAB process for the road?
- A: split out into different parts, don’t want one section that is slower moving to hold up others that are more straightforward.

Next steps: get all three parties in the room to discuss what a road users group would look like

- Discussed some examples GC has and the difficulty of direct comparisons.
- Important to have everyone come to the table to determine what would that management would look like.
- Proposed to meet June 7<sup>th</sup> in the AM to lay out the elements of a road users group together and nominate someone to take away the task of putting pen to paper so that a formal strategy can be reviewed by all papers.

Action items:

- Goldcorp to confirm for TH the number of people to attend from TH for site visit.
- Goldcorp to send meeting invite for June 7<sup>th</sup>



# **GOLDCORP**

## **COFFEE GOLD MINE**

Northern Access Route  
Black Hills versus Maisy May  
Route Selection Trade-Off Study

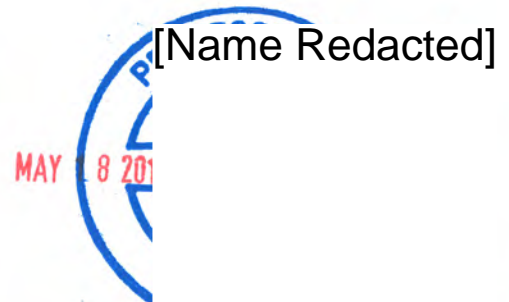
Prepared for:

[Name Redacted]

Coffee Project, Goldcorp Inc.  
3400 - 666 Burrard St.  
Vancouver, BC  
V6C 2X8  
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Coastal Operations

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V9W 2C8



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## 1. INTRODUCTION

At the request of [Name Redacted] of Goldcorp Inc. (Goldcorp), Onsite Engineering Ltd. (OEL) was retained to locate and complete a full geometric road design, stream crossing designs, and barge landing designs for the non-government maintained portion of the Northern Access Route (NAR) to the Coffee Gold Mine (the Project). This document serves to describe the route selection process for the specific portion of the NAR between the ridge top road after ascending out of Eureka Creek to the northern banks of the Stewart River just west of Maisy May. Please Refer to Figure 1-1 for an overview map of the area.

OEL has designed the non-government maintained portion of the NAR, a portion approximately 130 km long that begins approximately 58 km South-East of Dawson City at the Sulphur-Dominion Junction. The road from this junction north to Highway 2 is maintained by the Yukon Territory Department of Highways and Public Works. South of the Sulphur-Dominion junction, the NAR follows a series of roads currently maintained by various placer mine operations.

During the design process, many routes to the Coffee Gold Mine were considered. This included routes from the south, north, and west. The final overall route (the NAR) was selected based upon broad parameters including;

- Ensuring safety for all users along the route;
- Following existing roads wherever feasible;
- Minimizing disturbance, particularly to sensitive features such as archeological and cultural heritage sites, wildlife, biological and habitat, and shallow ice rich permafrost; and
- Minimizing road length.

The original, pre-fieldwork, NAR alignment followed the existing placer miner maintained roads down the Black Hills drainage and then along the north bank of the Stewart River. However, during the initial site investigation, it became clear that there were two potential routes from the hills above Eureka creek to the north bank of the Stewart River. This report describes the design process and decision matrix that was used to decide the selected route to the north bank of the Stewart River for the Coffee Project Proposal submitted to the Yukon Environmental and Socio-economic Assessment Board (YESAB) on March 31<sup>st</sup>, 2017.

Details on the design standards used and details regarding specific design decisions for various ground types, materials standards, and the current geometric can be found in the NAR road report prepared by OEL.

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# COFFEE GOLD MINE

## New Vs Existing Road For Black Hills and Maisy May Route Comparison



Black Hills Route

Maisy May Route

Stewart River

### Legend

### Northern Access Route

### Compared Routes

— Existing Road

— New Road

### Required Bridges



### Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



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NAD 1983 UTM Zone 7N

Page Size: 8 1/2" x 11"

Figure 1.1.

Date: May 18, 2017

Drawn by: M. Dickie

Reviewed: J. Araki P.Eng.





## 1.1. DESIGN PROCESS GENERAL CHRONOLOGY

The following is a general timeline of the design process starting from the time that the NAR was chosen as the preferred route until the selection of the Maisy May drainage route.

- May 2015: The initial site investigation of the entire route was conducted by a senior engineering geologist and senior engineer from OEL. During this investigation the entire route was traversed either by truck, helicopter, or on foot (for the portions of proposed new construction). At the time the Black Hills route was proposed so the field work was completed first along that route. The route was traversed by truck to the southernmost active placer operation and then traversed on foot and in a helicopter. Where existing active placer operations terminate a historic winter road continued toward the Stewart River. This road traversed large sections of ice-rich permafrost and was overgrown. Following the preliminary assessment it was clear the Black Hills route would require many existing fords to be upgraded to bridges and would require significant construction effort to build an all season road through the long sections of permafrost.
- May 2015: Following the site assessment of the Black Hills route, the Maisy May route was assessed by truck and foot. This route followed the existing road down into the Black hills valley but then ascended back up on the existing roads up to Henderson Dome and then back down into Maisy May.
- June, August and September 2015: Due to the uncertainty of the optimal location for the road in this section, LiDAR was collected on both routes. Following the collection of these data, OEL field crews were launched and collected site data for all the major crossings along both routes.
- August 2015: With the general crossing sizes and types confirmed and overall construction categories identified on both routes, OEL compiled cost comparison data for the two route options. From this it was clear that the number of larger bridges required along the Maisy May route was less, the initial construction cost for the road was lower, and there was far less construction on shallow ice-rich permafrost. At this time, it was decided to select the Maisy May route for the Proposal.
- August 2015: During the detailed design process, and as part of consultation with the local placer miners, we became aware that one of the miners was planning to connect the road from just above Eureka Creek over to Henderson Dome without descending into Black Hills at all. This further solidified the decision to use the Maisy May route because it avoided the steep and dangerous descent through the switchbacks down into Black hills and avoided three difficult bridge crossings.

## **2. ROUTE TRADE-OFF STUDY**

### **2.1. NEW ROAD CONSTRUCTION**

The Maisy May valley is developed and has active placer operations to within approximately 2 km of the valley bottom of the Stewart River. Black hills is active to within approximately 7.5km of the Stewart River valley bottom. Further, the Black hills route must traverse the Stewart River Valley west from Black hills to Maisy May. In total, the Maisy May and Black Hills routes have approximately 12.0 km and 18.3 km of required of trail upgrade or new road construction, respectively.

### **2.2. SENSITIVE SITE DISTURBANCE**

The Maisy May route follows existing roads until it enters the Stewart River Valley. It briefly crosses the valley bottom at the toe of Maisy May where it traverses a short section of wetland and ice-rich permafrost. Because Maisy May is heavily and currently disturbed by placer operations, the proposed road will only decrease the impacts that the current road has on the watercourses. Current crossings on this route consist of fords and undersized culverts. During construction of the Northern Access Route, these crossing will be upgraded to structures that have been sized to accommodate 1 in 100 year peak flows and anticipated aufeis issues. These upgrades will decrease sediment delivery to the surrounding watercourses. Cross drain culverts on the current road are non-existent; during construction cross drain culverts will be added to rehabilitate the passage of surface and subsurface flows to their natural paths.

The Black Hills route leaves the last active placer operation and then traverses 14.2 km of undisturbed ground or old inactive road and trail. Further, the Black Hills route stays in the Maisy May valley bottom and wetland for approximately twice the distance as the Maisy May route. In total, the Maisy May and Black Hills routes traverse 1.0 km and 7.9 km of shallow ice-rich permafrost, respectively.

Large stream crossings are another area of potential site disturbance. In total, the Maisy May and Black Hills routes have 3 and 12 bridge crossings, respectively.

The total disturbed area of undisturbed sites is another measure of the impact of a road in the two areas. The Maisy May route has 40% less disturbed area of undisturbed sites (16.6 ha. for Maisy May versus 27.4 ha. for Black Hills).

### **2.3. ROAD SAFETY**

Road safety is related to several factors including consistency of design speed, road grade, and road surface among other considerations.

Consistency of design speed is important because of risks related to vehicles changing travel speeds. For example, a tight corner at the end of a long straight stretch or areas with broad sweeping curves can

cause issues because drivers are not expecting to have to slow down. Switchbacks require the road user to reduce their speed in such a manner. When comparing the two routes, the primary location where this concern becomes evident is where each route descends into their respective valleys. Both alignments descending into the Maisy May and Black Hills valley require adjustments to the horizontal alignment to achieve a desirable vertical alignment. The descent into the Maisy May valley requires significantly less realignment and requires only 2 switchbacks to achieve a desirable grade. The descent into Black Hills requires extensive realignment and requires 6 switchbacks to achieve desirable grades with two additional hard turns at the bottom of the descent that have not been counted as switchbacks but will have a similar effect on travel speed.

Road grades along the Maisy May route are typically lower. The Maisy May route has a higher peak elevation of 1170m but descends into the valley bottom (an elevation of 676m) over 17.0 km. The Black Hills route peaks just before it descends into the valley bottom dropping from its 1130m peak to 650m in only 6.3 km.

The main difference in road surfacing along the two routes is related to winter road use and heavy ice accumulations at the crossings near the bottom of the switchbacks into Black Hills. Further, the existing road network has shown that the upland roads are more stable in the shoulder seasons and have fewer soft spots.

#### **2.4. ROAD LENGTH**

The overall road length affects all road considerations listed above. The overall road length for the Maisy May and Black Hills routes are 48.9 km and 48.8 km, respectively.

#### **2.5. IMPACT AND COST COMPARISONS**

This report is a summary of the analysis that was completed as part of the route selection in the design process. The quantities and totals shown herein reflect those at the time of the analysis. However, the costs have been updated to reflect the more detailed design work completed since that time. These have been applied to both routes to show a fair comparison. The Tables below present the details of the summary quantities presented in the sections above.

For road construction cost and impact comparison, the routes were split into the construction categories shown in Table 2.5.1. Table 2.5.2 summarizes the construction cost estimates by category.

**Table 2.5.1: Construction Categories**

Road Type	Terrain	Gradient	Description
Type 1 (a)	Flat	<4%	No rock or muskeg
Type 1 (b)	Flat	<4%	Ridge top, no clearing/grubbing, no rock or muskeg
Type 1 (c)	Flat	<4%	Muskeg with road fill (within 1km of borrow pit)
Type 2	Hillside	<4%	No rock or muskeg
Type 2 (r)	Hillside	<4%	Rock substrate
Switchback	Steep	8-12%	No rock or muskeg

**Table 2.5.2: Construction Category Unit Costs**

Road Type	OEL Single Lane
Type 1 (a)	\$150,000
Type 1 (b)	\$140,000
Type 1 (c)	\$886,000
Type 2	\$204,000
Type 2 (r)	\$229,000
Switchback	\$1,019,000

The construction categories are summarized by length for each route in Table 2.5.3 and are shown on the maps in Appendix 1. Note that Type 1 (c) is road in shallow ice-rich permafrost. Table 2.5.4 shows the estimated construction costs.

**Table 2.5.3: Construction Category Lengths**

Maisy May Route		Black Hills Route	
Road Type	Length (km)	Road Type	Length (km)
Type 1 (a)	0.2	Type 1 (a)	NA
Type 1 (b)	36.8	Type 1 (b)	30.6
<b>Type 1 (c)</b>	<b>1.0</b>	<b>Type 1 (c)</b>	<b>7.9</b>
Type 2	6.7	Type 2	9.7
Type 2 (r)	3.5	Type 2 (r)	NA
<b>Switchback</b>	<b>0.6</b>	Switchback	0.6
<b>Total</b>	<b>48.9</b>	<b>Total</b>	<b>48.8</b>



**Table 2.5.4: Estimated Construction Costs**

<b>Maisy May Route</b>		<b>Black Hills Route</b>	
<b>Road Type</b>	<b>Estimated Cost</b>	<b>Road Type</b>	<b>Estimated Cost</b>
Type 1 (a)	\$31,000	Type 1 (a)	\$NA
Type 1 (b)	\$5,159,000	Type 1 (b)	\$4,278,000
Type 1 (c)	\$925,000	Type 1 (c)	\$7,037,000
Type 2	\$1,362,000	Type 2	\$1,974,000
Type 2 (r)	\$791,000	Type 2 (r)	\$NA
Switchback	\$655,000	Switchback	\$645,000
<b>Total</b>	<b>\$8,924,000</b>	<b>Total</b>	<b>\$13,934,000</b>

Bridge crossings represent significant capital expenditures. These costs are summarized in Table 2.5.5. Further, with the types of streams in the area have significant aufeis issues which can push the crossings to larger structures and cause significant operating cost increases.

**Table 2.5.5: Estimated Bridge Construction Costs**

<b>Maisy May Route</b>		<b>Black Hills Route</b>	
<b>Chainage</b>	<b>Estimated Cost</b>	<b>Chainage</b>	<b>Estimated Cost</b>
58.5 km	\$165,000	39.7 km	\$250,000
65.3 km	\$150,000	42.1 km	\$135,000
75.2 km	\$165,000	44.2 km	\$165,000
		46.2 km	\$170,000
		46.8 km	\$180,000
		49.3 km	\$150,000
		53.2 km	\$135,000
		54.4 km	\$135,000
		56.1 km	\$165,000
		56.5 km	\$190,000
		60.3 km	\$135,000
		75.7 km	\$180,000
<b>Total</b>	<b>\$480,000</b>	<b>Total</b>	<b>\$1,990,000</b>

### 3. CONCLUSION

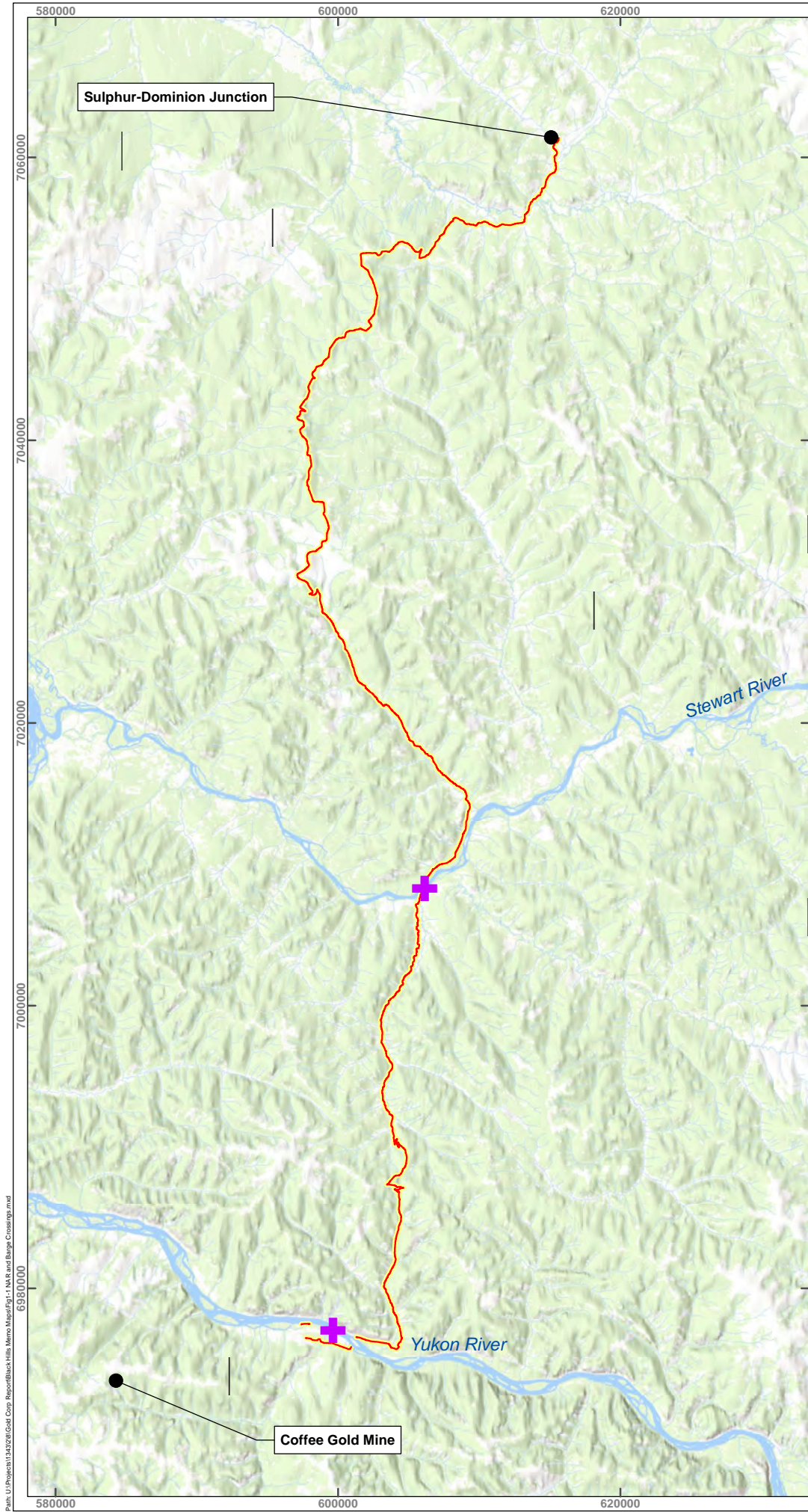
When the two routes are evaluated based on safety, disturbance area and the cost of construction, it is clear the Maisy May route is safer, causes less disturbance to the area it passes through and is cheaper to construct. The reader is referred to Table 2.6 for a summary of the trade-off comparison.

**Table 3.0.: Summary of Trade-Off Study**

<b>Attribute</b>	<b>Maisy May Route</b>	<b>Black Hills Route</b>
<b>Safety</b>	<ul style="list-style-type: none"> <li>• 4 switchbacks on route</li> <li>• Smaller average grade into valley bottom</li> <li>• Less ice accumulation</li> </ul>	<ul style="list-style-type: none"> <li>• 6 switchbacks on route</li> <li>• Higher average grade into valley bottom</li> <li>• Significant ice accumulation</li> </ul>
<b>New Road Construction</b>	12.0 km	18.3 km
<b>Ice-rich Permafrost</b>	1.0 km	7.9 km
<b>Large Stream Crossings</b>	3	12
<b>Disturbed Area in Undisturbed Sites</b>	16.6 ha	27.4 ha
<b>Road Length</b>	48.9km	48.8km
<b>Expected Construction Cost</b>	\$9,404,000	\$15,924,000

## APPENDIX 1

Road Route maps



**COFFEE GOLD MINE**

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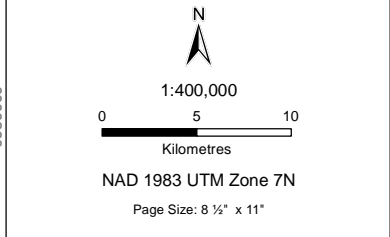
**Northern Access Route  
and Barge Crossing Locations**



- Legend**
- Northern Access Route
  - + Barge Crossing Locations

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



Appendix 1.1	Date: May 18, 2017	Drawn by: M. Lowe	Reviewed: J. Araki P.Eng.
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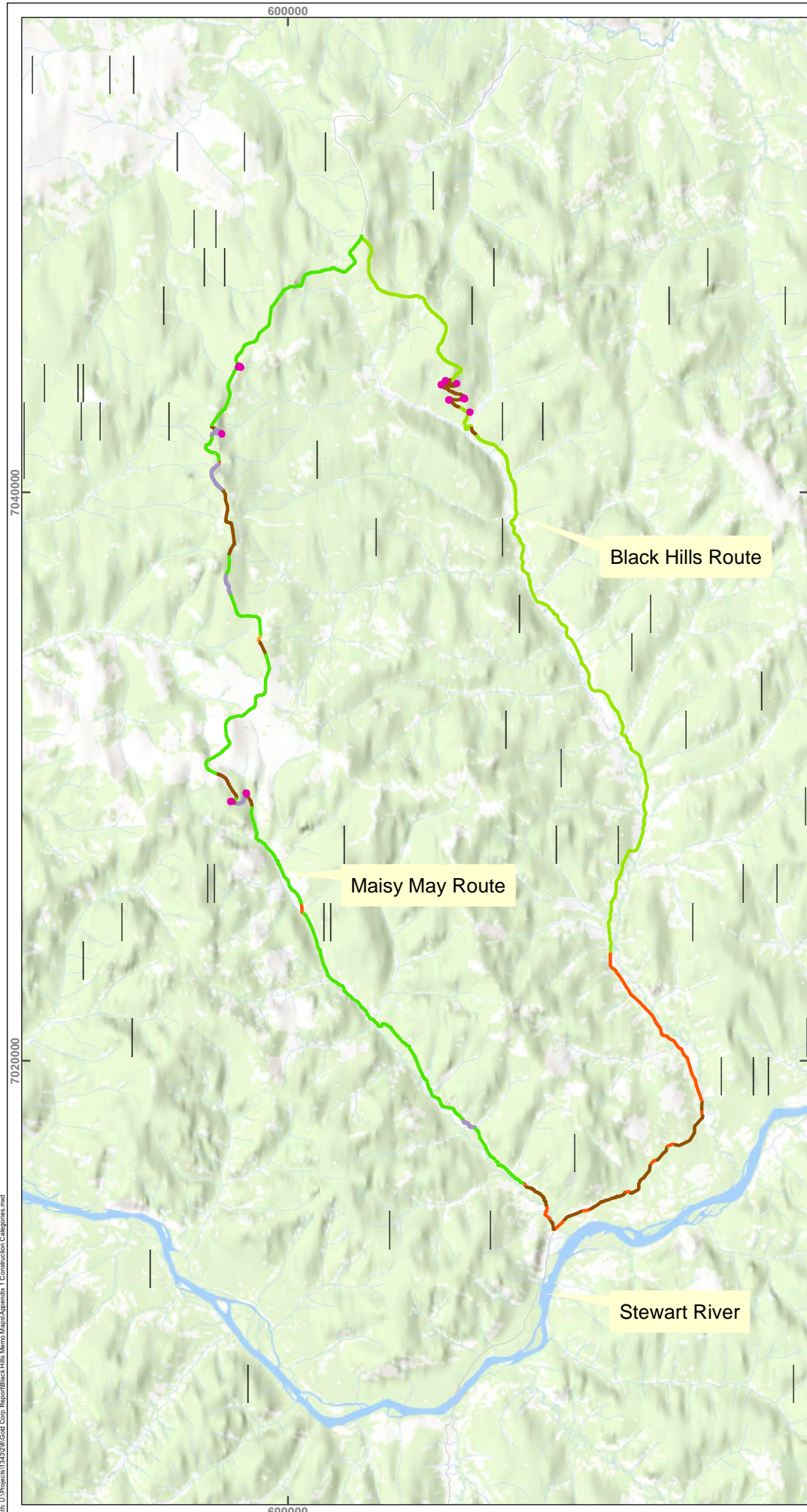


Path: U:\Projects\114326\Gold\_Corp\_Report\Black Hills Memo Maps\Fig-1 NARS and Barge Crossings.mxd



COFFEE GOLD MINE

Construction Categories For  
Black Hills and Maisy May  
Route Comparison



Black Hills Route

Maisy May Route

Stewart River

Legend

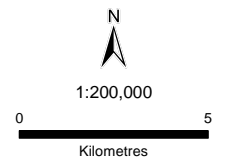
Construction Categories

- 1a
- 1b
- 1c
- 2
- 2r
- Switchback

Northern Access Route

Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



NAD 1983 UTM Zone 7N

Page Size: 8 1/2" x 11"

Appendix 1.2

Date:  
May 16, 2017

Drawn by:  
M. Dickie

Reviewed:  
J. Araki  
P.Eng.



## Tr'ondëk Hwëch'in Consultant Teleconference – Heap Leach Facility and Geochemistry (Water and Permafrost if time allows)

Attendees:

TH:

[Name Redacted]

Goldcorp:

[Name Redacted]

### Meeting Summary

Goldcorp provides introductions and an overview of the meeting topics.

TH confirms that this meeting will cover the Heap Leach Facility (HLF) and geochemistry, but permafrost and water with larger group in June. Goldcorp confirms this and explains reasoning for focus on HLF and Geochemistry due to consultant availability, the appropriate consultants will be available for the workshops June 5 and 6.

#### **Heap Leach Presentation:**

Goldcorp gives an overview of the presentation. Discusses the fundamentals of Heap Leach Facility (HLF) processing. Describes closed loop system that will require more water throughout the mine life. Notes gold dore will be poured on site, no tailings.

Goldcorp describes the stacking options tradeoff study and the key components of the HLF, describes why pregnant and barren ponds aren't being used. Describes the trade-off studies for the HLF design done.

Q: TH asks if this was a report and where it resides.

A: This is of feasibility study, these are all included. There is also a summary in the alternatives assessment part of the Project Proposal.

Goldcorp describes the HLF and the stage building, describes the years each stage is built. Describes when the event ponds will be built, notes when event ponds should be used and that is only in PMP.

Describes the directions that the HLF drains to carry to the plant site. Solution goes directly to the plant, unless the system is in upset. Any water in events ponds is used in the processing, then in closure things change, but the closure session on June 5<sup>th</sup> will cover closure in more detail.

TH notes that they are more interested in the progressive reclamation.

Goldcorp will go over that in this presentation. Goldcorp describes the liner system, and notes that the pad will be stripped of permafrost. The liner cover layer will include the drainage pipes for the Project. Drainage pipes are more than double the diameter than what is needed. The industry standard is 1.5 mm liner, Goldcorp is using a 2.0 mm liner. Most HLF do not have a GCL liner; there are many redundancies built into the system, and Goldcorp is going beyond industry standard. Goldcorp describes the liner systems for the ponds, notes that the rain ponds are more robust due to holding water more often. Most makeup water comes from the site, and is collected from rain on the HLF. The water balance analysis was done using driest period in 30 years. Water management and water treatment are described.

Q: Does Goldcorp not expect to use water from Kona Pit or facilities?

A: The Project will need water from the alpha sediment pond in year one, and will use water from pit dewatering as well. Using raincoats is a big part of managing water for the HLF, and Goldcorp can accelerate rinsing of the HLF if needed. Very wet conditions were assumed for the event ponds.

Goldcorp adds that in the water quality model, it is assumed that any water generated through meteoric inputs into Kona Pit, and small runoff from ore stack area, will be consumed in the HLF. The plan is no discharge of that water into the environment. This conclusion is based on information from Ken Myers, who did the water balance model and synthetic precipitation record.

TH comments that it is good to hear that Kona water can be accommodated at any time in the HLF.

Goldcorp continues the presentation and outlines the needs for makeup water throughout the mine life. Irrigating the heap will begin in July just after beginning stacking, based on the current schedule.

Q: TH asks about the capacities of the ponds?

A: Event Pond (EP) 2 is well over the capacity of what is needed. Goldcorp describes how the event ponds were sized using a worst case scenario where there would be a loss of power and pumping ability, the amount of water produced by probable maximum precipitation (PMP) (10,000 year storm), and the number from the water balance model, then on top of that additional freeboard.

Q: Asks if the event ponds will be closed circuit?

A: yes, until closure, when discharge is needed after water treatment.

Goldcorp describes how the treated water in the rinse cycle of the HLF can be used as part of progressive reclamation. Rinse solution will inoculate the heap and aid in treatment of the HLF in closure. Goldcorp can treat the water and discharge the water to the underdrain system to the Alpha Pond and then to the environment. During closure, Goldcorp will use all of the treated water in rinsing. When rinsing finishes in year 15, the treated water will report to the Alpha Pond. Goldcorp confirms that the design and closed loop system is understood by attendees on the teleconference. Goldcorp's HLF

expert has experience in peer reviewing HLF in other areas of the world and in Alaska. The design concept for the Project was to always have a lot of redundancy.

Q: Asks what the typical upset conditions at other sites have been like?

A: Goldcorp describes the storm conditions and norms for wet cycles used in design of other facilities. Using the 10,000 year storm is a big contingency in the design, as the industry standard is to use a 100 year storm. For Valley Fill HLF that impound, like the Eagle Gold project, the project uses dam design criteria, where half PMP is used.

Goldcorp describes how upset conditions can be split into three categories, one where the ponds are poorly designed, a second where the original HLF design is then added to through increased operations but the pond sizes aren't increased, this can be where the water balance model isn't integrated or verified in the design and in operations. Notes that forecasting based on previous years is all that can be used, but verification annually is best for looking at this and ensuring that the event ponds meet the needs, third area is where something fundamental goes wrong with the system, like if they just didn't use the rain coats here for a few years, and then get PMP. Raincoats are important as they are part of the system.

Q: How common are raincoats?

A: About 30 Projects have used them, about 15-20 are using them now. Goldcorp describes raincoat use at other operations, and how raincoats are installed, notes that rain coats can leak. One could do a very poor job of installation and still get less than 3% infiltration.

Q: Are any of these rain coats used in conditions like Coffee?

A: Goldcorp describes studies about rain coats, and describes the three Projects with similar or harsher conditions from Coffee that use raincoats.

Q: Asks why a project like Eagle Gold wouldn't use raincoats?

A: The advantage of raincoats is that you can control the amount of water in the system very easily, the disadvantage is that one would need a liner deployment crew; if one were to not use rain coat technology the project would require a bigger water treatment plant. Both technologies work well, but if you have a treatment plant that doesn't work right away then you have discharge water.

Q: Where does raincoat water go?

A: Goldcorp describes the raincoat pond location and design and use.

Q: Asks if unused raincoat water would be discharged?

A: Water will be tested and then discharged. Rain coats will cover the whole HLF and then go to ditches on the slide of the HLF.

Q: Where does the water discharge?

A: The water from the raincoats goes to raincoat pond, where it is tested and stays there for as long as possible, then it is discharged down to the Alpha Sediment pond. In the model, all of this water is consumed in the heap. Goldcorp went with Ken's recommendations to integrate all components of the



HLF into the water quality balance. The model cycles through all climate scenarios to see a variety of scenarios.

Q: Asks if the precipitation corresponds to what happens in the model?

A: The HLF model was built using 30 year record with wet and dry periods applied at the least advantageous times. September is the highest water demand time, so if you wet the heap in May, you'll see dilution.

Q: Asks if the raincoats are moved?

A: The plan is to move the rain coats; every summer and fall the Project will add more rain coats, but may also take rain coats off. In cost modelling, we have factors for damage to the rain coats, as you can damage them when moving them. An advantage to raincoats is you can uncover and re-cover whenever you want.

Q: Asks if there's a figure about the raincoats.

A: The percent cover of the HLF by raincoats is included in the Project Proposal, and the numbers range between 60-80% coverage over the life of the Project.

Q: Asks if the inflows to the Mines Group model equal the outflows for the Goldsim model?

A: There are losses within the HLF such as evaporation from emitters, and can change emitters function to increase or decrease evaporation. That functionality is not included at this stage. We keep track of water that may be potentially discharged, and make sure there's sufficient room to move water from Kona Pit or from the facilities pond we can do that. The Model uses the data from the Mines Group model, and we route water where it makes sense.

Q: It is assumed that Kona water is used, rain coat water is used, Latte pit water is used, but are there triggers in the model? For example, if water is being discharged from Latte pit, then there could be impacts.

A: We don't currently use Latte pit water in the HLF assumptions. With respect to Kona pit, this is comprehensive because this is part of the view. For Latte pit, there are no assumptions, it fills and spills naturally. The main concern for water management is what is coming out of the HLF, and how to divert and treat it. When the HLF model is in excess, then it triggers the Goldsim model to look at source terms and then discharge to the Alpha drain.

Goldcorp notes that the most important part of this is that during the operations period, it's very important to keep the water balance is updated. The HLF is where we make money, so disruption to this has impacts to the Project. We need to meet end of pipe requirements and site specific water quality objectives (SSWQO), so it's very important to keep the water balance updated throughout the Project to ensure we meet this.

Q: Asks about long term treatment plan for the heap. Asks if documents were missed in the Project Proposal?

A: What you see in the Project Proposal now is not passive treatment proposed as the main treatment method, passive treatment is included as a contingency to use a barrier at long term closure. There is a

literature review in the reclamation and closure plan, as well as water management plan. The message is that we are trying to establish a Project and an approach where we are not relying on just one closure method being successful for the Project to be closed out in the best way. The Project has contingency built into the closure plan with the design of the HLF in cells and the ability in year 4 and 5 to be properly testing the closure methods. This includes some similar closure methods to what was used at Brewery Creek. Predictions are difficult, and added contingency is part of the mitigation. In the documentation there are the sources provided that were used in the determination of this closure methodology. The Project is still at the conceptual stage, and the redundancy is to show that the Project does not rely on one single method.

TH notes that there are many questions, including information about the water treatment tradeoff, but wants to know about the closure plan. It is important to have a clear plan.

Goldcorp replies that there is a clear plan, and in this presentation Goldcorp wanted to highlight that there are a number of options. The closure plan is refined through licensing, and becomes an integral part of the ongoing licensing. This will be discussed on June 5<sup>th</sup>, and Goldcorp agrees that having a plan that we know is going to work is important. Goldcorp and TH discuss additional engagement on the closure plan.

Q: Asks when you know a heap is finished and in the rinsing/in situ treatment process, asks if the water treatment runs for a short period of time or a long period of time?

A: Normally run rinsing for quite a number of years. Goldcorp ran the water balance out to 2030. Rinsing at Coffee is staged, looking at rinsing for 1.5 years for each stage. Rinse starting with treated water and then finish with clean water. This is clean ore, there aren't complex degradation issues with this ore. Rinsing starts in year 4 and goes into year 15. There is a projected total of 11 years of rinsing, and it's a conservative projection.

Q: Asks about the Project Proposal stating that in year 20 the rinsing ends?

A: This is contingency. Projects can run into issues in closure where they run out of money. This is why there's a conservative estimate.

Comment (TH): There's pressure in the jurisdiction to not actively treat for very long. Concerned about this in terms of money available.

Reply (Goldcorp): The Project will start closing in year 6, and will have 15 years from first cells of the HLF being closed to the end of closure to ensure that closure is successful. While YG doesn't endorse perpetual treatment, it's not uncommon for closure plans to have a component in them for an extended time period of active water treatment as you begin to wind down and ensure that you have operated long enough and met water quality objectives and are ready to close out that component. Goldcorp won't be able to stop treatment until the water quality objectives are achieved.

Q: Asks about once the water treatment is turned off, is any other treatment included in model?

A: Yes, source term of the permeable reactive barriers.

Q: Is this surface water or ground water?

A: It is for surface water. It's about hydraulic retention time.

Q: Asks about cell division on the HLF.

A: Explains the cell divisions, notes that this is a straightforward design concept.

Q: Asks about how much water treatment will take place.

A: The treatment plant came from water balance modelling, where anything that isn't stored or used has to be treated. The treatment plant is added the year before there's too much water, and is designed the plant to be much larger than needed. The current modeled maximum is 10 L/s, but Goldcorp will design for 15 to 20 L/s treatment. Goldcorp can buffer the flow into the treatment plant based on the large storage capability, and if needed would be able to double the plant in one construction season.

Goldcorp and TH discuss setting a date to cover the geochemistry portions of the presentation that were not able to be covered in this meeting. Goldcorp and TH set June 9 for this follow-up meeting. TH and Goldcorp discuss June 5 as the next opportunity to discuss closure, and Goldcorp notes that there will be a dedicated HLF session scheduled as a future workshop.

End of meeting.



# Heap Leach Facility

May 25<sup>th</sup>, 2017

 **GOLDCORP**

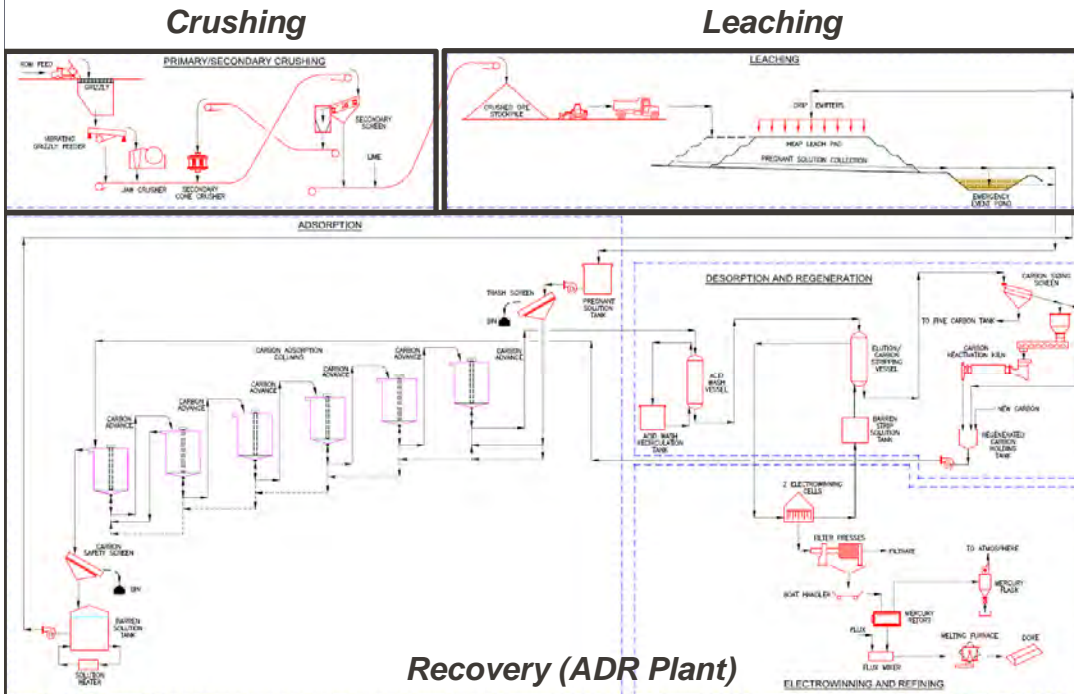


# Heap Leaching Operations

NaCN briquettes  
 Image from <http://info.noahtech.com/blog/turning-cyanide-into-gold-sodium-cyanide-applications-in-mining>



Extraction of gold from crushed rock using dilute CN solution.  
 Gold Doré poured on-site.  
 Cyanide shipped to site as NaCN briquettes, which are mixed in alkaline water (pH~10) to form the Barren Solution.



## HLF – Key Components

3

- **Heap leach pad built in stages and heap stacked using trucks\***
- **Free-draining, non-impounding, “Flat Pad” configuration\***
- **Event ponds to store solution in “upset” conditions**
- **Rainwater pond to store clean water**
- **No barren or pregnant ponds**



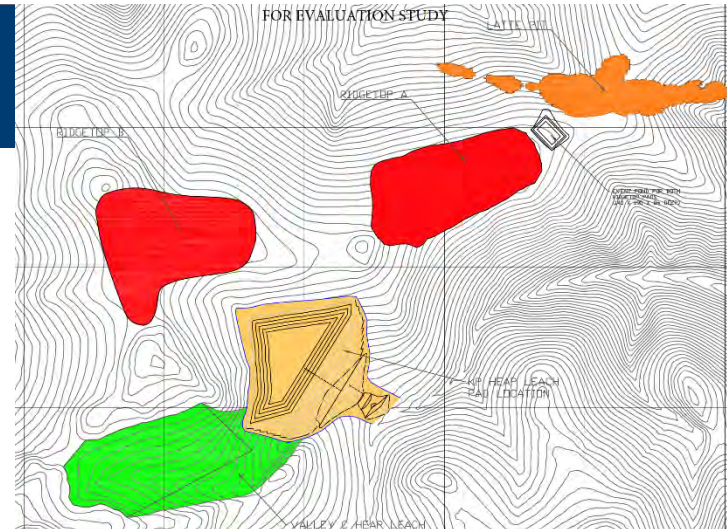
**\*Key trade off studies completed:**

- **Trucks vs. Conveyor stacking**
- **Pad Location & Type**

## Pad Location & Configuration Trade-Off

4

- **Three main locations considered, one of each type (see sidebar)**
- **Rationale for selected option:**
  - Most commonly used technology, including for cold-climate
  - Most flexible design, allowing for adaptive management, staged construction, and staged closure
  - Fastest and simplest to build and simplest to operate
  - Lowest risk:
    - No dam or in-heap solution storage
    - Easiest and safest to close and reclaim
    - Design allows for progressive reclamation



### Pad Types:

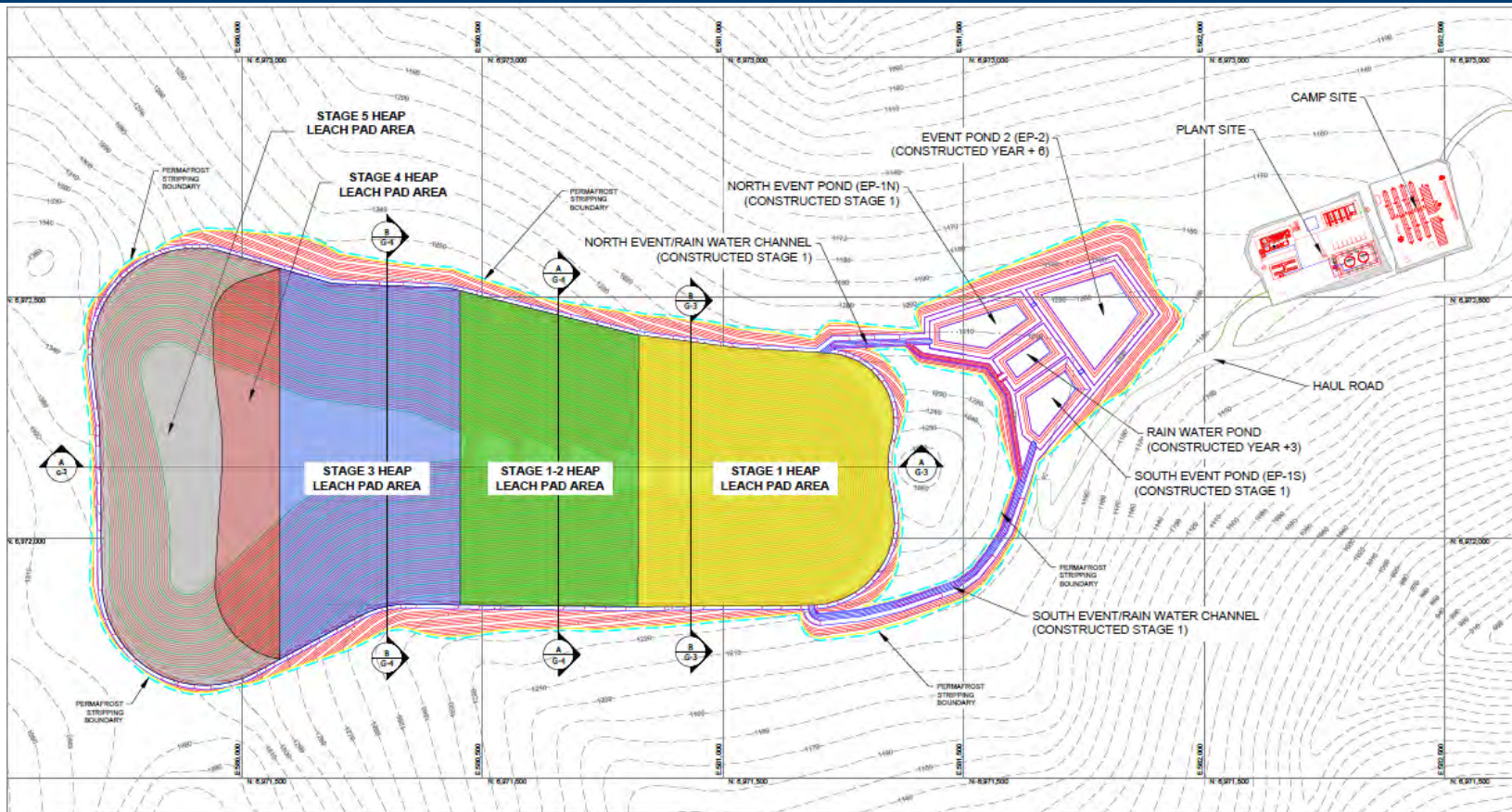
1. Valley fill with solution containment (impounding)
2. Valley fill, free-draining
3. Flat pad, free-draining



# Similar Leach Pad Configurations Used Elsewhere



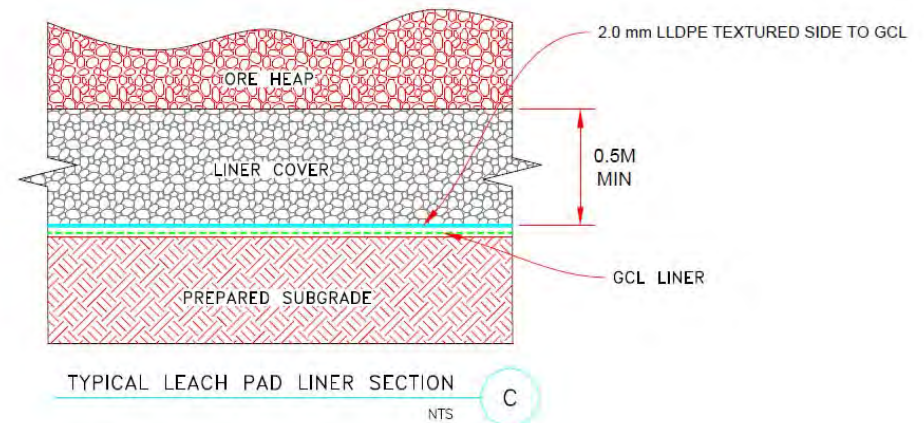




## Liner System – 6 Layers (from top down)

7

- **Overliner: 500mm crushed ore (P100 50mm)**
  - Contains drainage pipes
- **Geomembrane liner: 2.0 mm LLDPE (textured bottom)**
- **Reinforced GCL**
- **Wick drain for leak detection**
- **Prepared subgrade, stripped to bedrock**



- **EP-1S and EP-1N: 5-layer system**

- Geomembrane: 2.5 mm HDPE (smooth)
- Drainage Layer (geonet)
- Geomembrane: 1.5 mm HDPE (smooth)
- GCL
- Prepared Subgrade

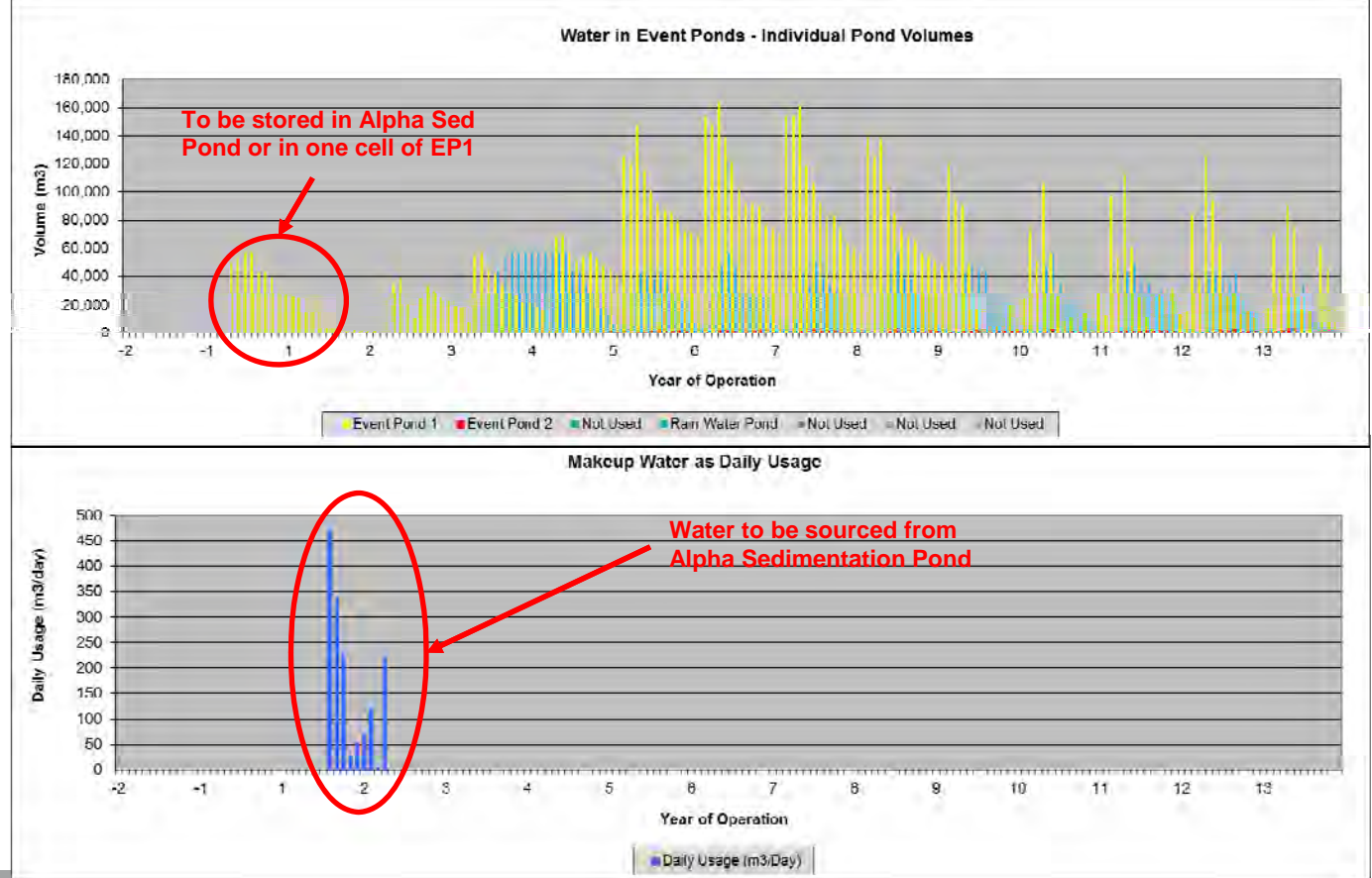
- **EP-2 and Rainwater Pond: 3-layer system**

- Geomembrane: 2.5 mm HDPE (smooth)
- GCL
- Prepared Subgrade
- Liner system simplified because:
  - EP-2 may never hold any solution, or will hold only highly diluted solution for short periods
  - Rainwater ponds only hold non-contact water

- **Water for processing is dominantly sourced from within the heap footprint**
- **System is water neutral or net demand until Year 9**
- **Rinse water to be recycled to next stage of rinsing, or used for make-up water in process circuit**
- **Treatment plant to be commissioned in Year 8**
- **Large events ponds, raincoats allow significant operator control over water balance**
  - Operators can change infiltration volumes quickly by changing the raincoat usage
  - Ponds allow flexibility in timing of decisions; sized for:
    - Wettest year on record, and
    - Probable maximum precipitation, and
    - Heap drainage, and
    - Freeboard
  - Required pond capacity declines as areas of heap are capped, taken off line
    - This capacity becomes available for seasonal storage of surplus water



- **Make-up water is required throughout mine life**
- **External-to-heap water required for Make-up in Year 1 and 2**
- **Starting in Year 4, raincoats will be used to maintain optimal make-up water balance**



- **Fully isolated from environment**
  - Redundant system of liners, pipes, drainage layers, leak detection and monitoring systems
  - Every component that has contact with process solution has multiple, redundant containment layers plus monitoring
- **Event ponds sized for extreme events in excess of industry standards and regulatory requirements:**
  - “Probable Maximum Precipitation”, plus complete heap draindown, plus maximum seasonal water accumulation, plus freeboard
  - Additional contingency measures include: back up power, inventory of raincoats in excess of demands, rain water pond can be converted to events pond for extra containment



- **Freshwater and rainwater are kept away from the process circuit to the maximum extent practical**
- **Diversion ditches and berms around the leach pad**
- **Staged leach pad construction and heap stacking minimize contact water area**
- **Divider berms and ditches within leach pad between stages and cells**
- **Raincoats to divert precipitation from system**
- **Progressive closure to reduce maximum active footprint**



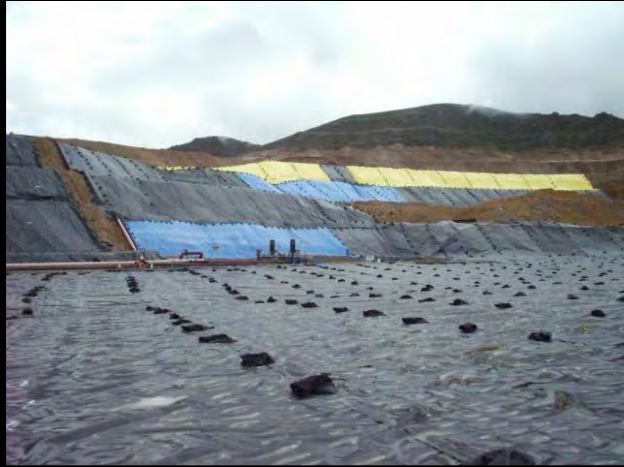
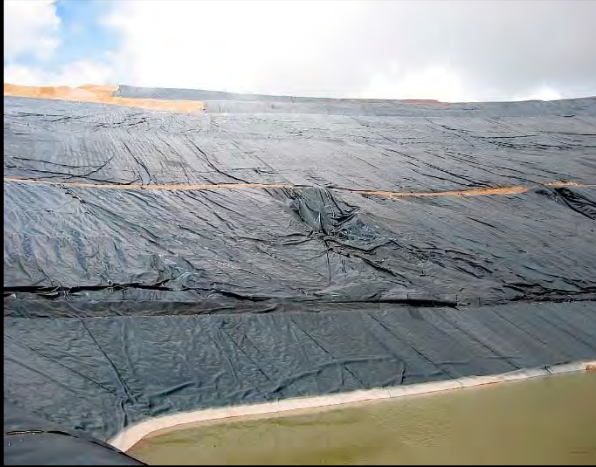


- **Temporary exposed geomembrane covers, or “Raincoats,” have a long history in mining and other industries for reducing or eliminated rainwater and snowmelt from entering operating systems**
- **Raincoats add flexibility to the water management system as the area under coverage can be increased or decreased quickly**
- **Starting in Year 3 to reduce infiltration, avoid dilution of process solutions, and maintain a neutral water balance**
- **Raincoats will also serve to conserve heat and increase heap temperatures in the winter months**





# Raincoats – Examples





# Raincoats - Application



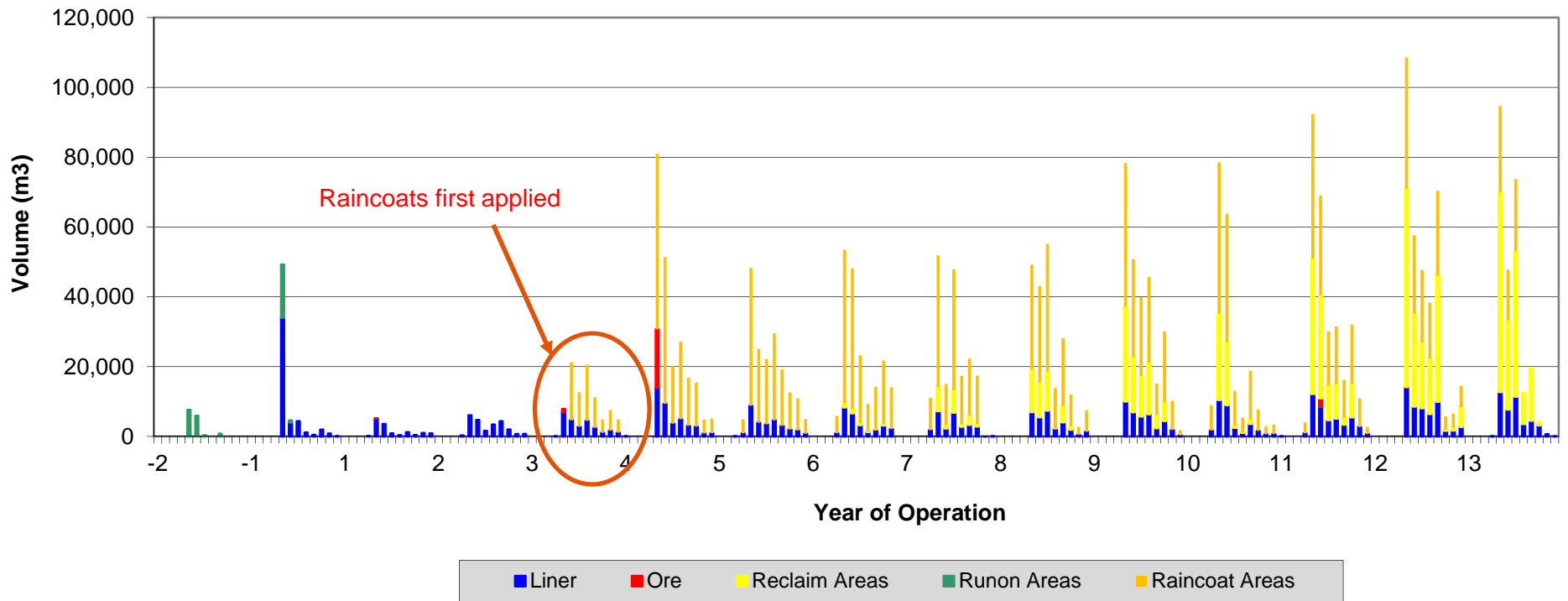
# Raincoats – Demonstrated Technology

16

Project/Owner	Location	Years
Three gold mines	Ghana	1997-06
Newmont Yanacocha Complex	Peru	1988-98, 2012-16
Santa Rosa	Panama	1994-96
Mindanao mine, Philex	Philippines	1999-05
Pierina mine, Barrick	Peru	1999-16
Lagunas Norte, Barrick	Peru	2008-16
Kyisintaung	Myanmar	2000s
Aktogay	Kazakhstan	2000s
Savkino	Siberia, Russia	1990s-2016
Bingham Canyon demo heap	Utah, USA	2012-14

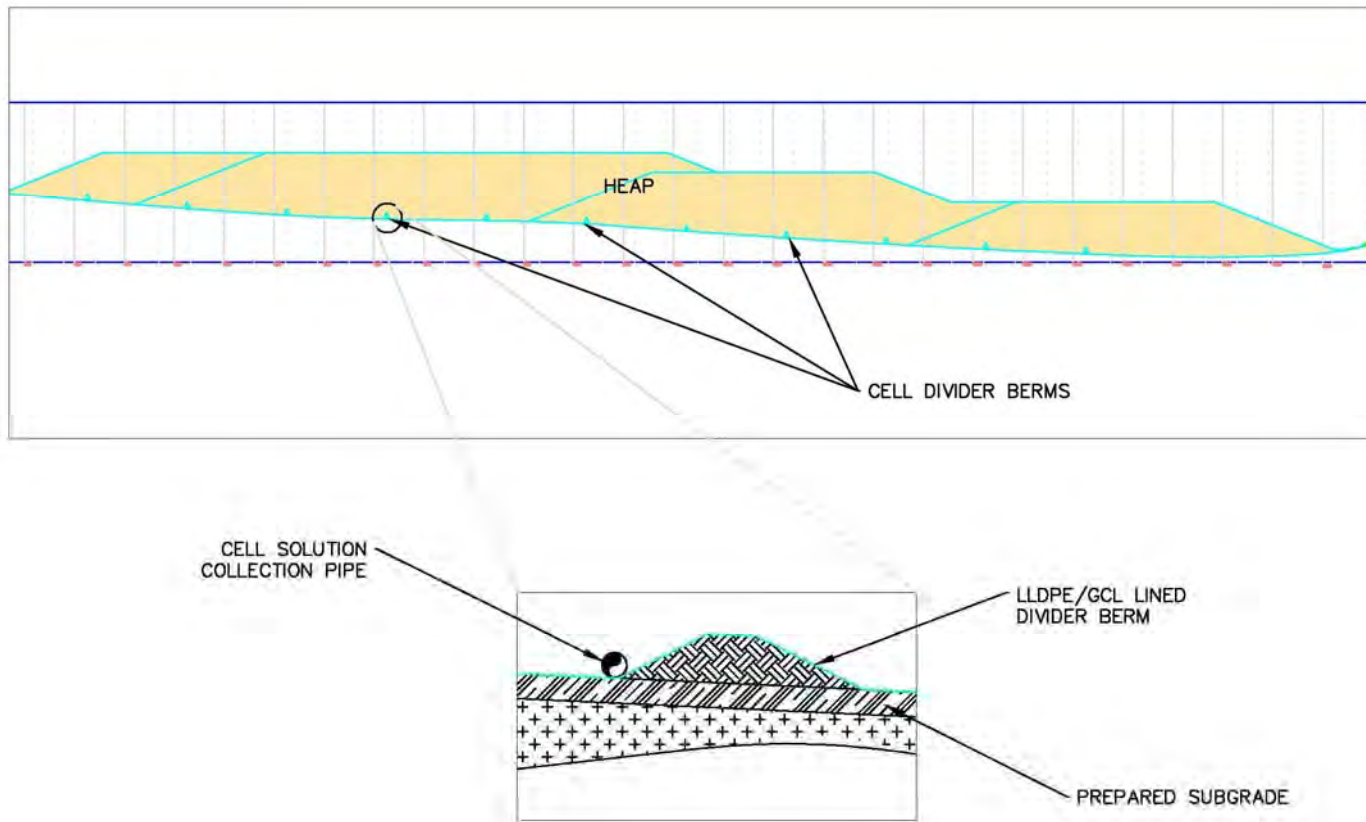


### Summary of Runoff Volumes





# Cell Separation Berms





# Resilient Design

20

**Resilience** is the capacity...to maintain or regain functionality and vitality in the face of stress or disturbance. It is the capacity to bounce back after a disturbance or interruption. Resilient design is the intentional design of buildings, landscapes, communities, and regions in response to these vulnerabilities...resilient design focuses on practical, on-the-ground solutions.

~ Resilient Design Institute

**Resilience Engineering** looks for ways to enhance the ability of organisations to create processes that are robust yet flexible... Success has been ascribed to the ability of groups, individuals, and organisations to anticipate the changing shape of risk before damage occurs.

~ Sidney Dekker, author of Drift into Failure



- Robust design
- Low-risk technologies
- Adaptive management
- Resilient systems



# Geochemical Source Terms

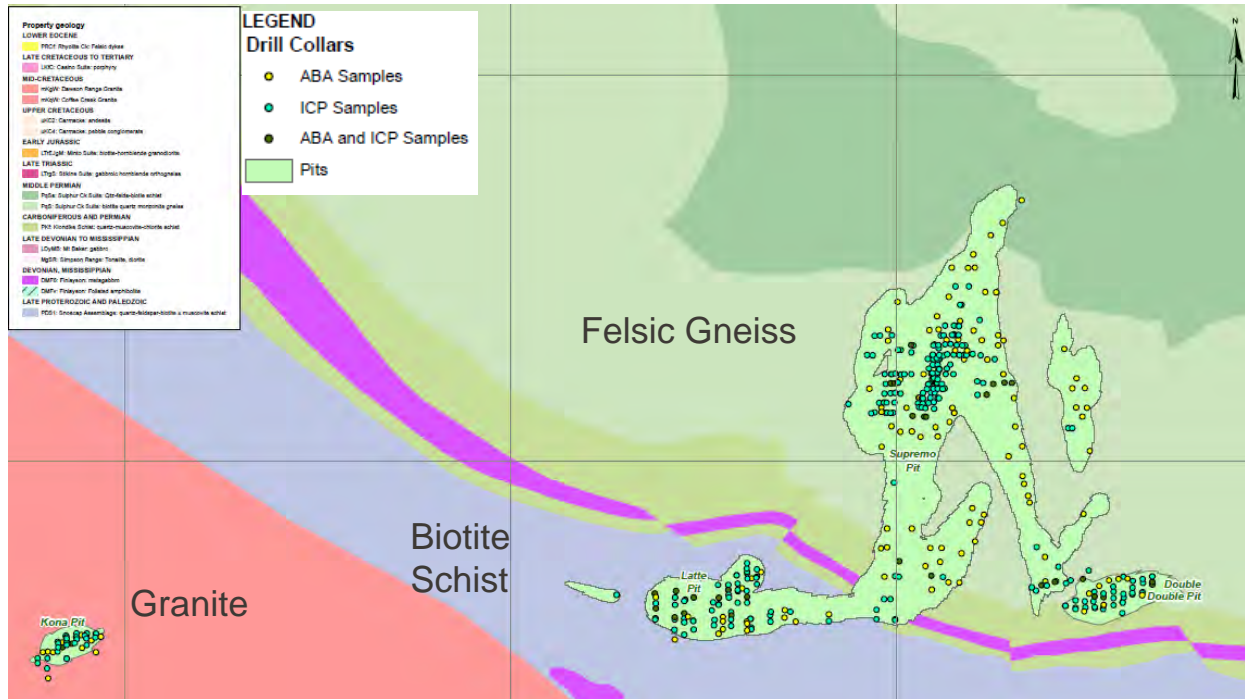
May 25<sup>th</sup>, 2017

 **GOLDCORP**



- **Purpose of this geochemical program is to:**
  - Inform mine planning, waste management and water management
  - Ensure that construction material does not pose a ML/ARD risk
  - Produce geochemical source terms for input into water quality model

# Sample Distribution



- Over 400 ABA samples and 30,000 ICP-OES samples have been collected to characterize ML/ARD potential across the minesite

- **For each mine component, an upper case and a base case source term is calculated.**

- Base case source terms reflect a best estimate
- Upper case source terms reflect a reasonably conservative upper estimate.

- **Source terms were produced for:**

- **Waste Rock Facilities**

- Alpha Dump
- Supremo Backfill
- Latte Backfill
- Kona Backfill
- Double Double Backfill

- **Pit Wall Rock**

- Gneiss oxide – ore/waste
- Gneiss transition – ore/waste
- Gneiss fresh - waste
- Granite oxide – ore/waste
- Granite transition – ore/waste
- Granite fresh - waste
- Schist oxide - ore/waste
- Schist transition - ore/waste
- Schist fresh - waste

- **Heap Leach**

- Treated HLF Drainage
- Post Closure

- **Mine Facilities**

- Plantsite Area

- **Mine Facilities**

- Overburden runoff estimated from shake flask extraction concentrations

- **Heap Leach Facility**

- During operations and early closure HLF drainage will be treated before discharge. Source term based on estimates of treated effluent chemistry.
- At post closure, HLF seepage chemistry based on literature values reported for permeable reactive barrier performance

- **Waste Rock Facilities**

- Field bin loading rates upscaled based on analogue site
- Loading rates then scaled by mass and geologic composition of each dump
- Concentrations estimated based on dump hydrology and footprint
- Solubility controls applied where appropriate (varies by waste dump)

- **Pit Wall Rock**

- Laboratory kinetic test loading rates scaled based on assumptions regarding grain size, flushing, and temperature
- Mass of wall rock per surface area estimated from blast damaged and blast fractured thickness
- Concentrations estimated based on hydrology
- Solubility controls applied where appropriate (varies by wall rock lithology)



- **Uranium (and potentially arsenic) are the two parameters of primary interest with respect to neutral metal leaching**
  - **As** is elevated in all major rock types, with median concentrations >10x average continental abundances
  - **U** is slightly elevated in the gneiss and granite rock types, with median similar or slightly greater to continental abundances.

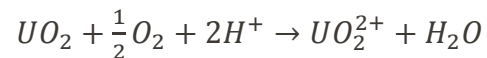
	Schist		Gneiss		Granite	
Waste Rock All Weathering Types	As ppm	U ppm	As ppm	U ppm	As ppm	U ppm
75 <sup>th</sup> Percentile	90	2.6	118	6.4	591	7.9
Median	24	1.9	26	3.6	119	6.4
25 <sup>th</sup> percentile	8	1.1	7	2.3	23	5.3
<i>Average Continental Abundance*</i>	1.8	2.7	1.8	2.7	1.8	2.7

# Uranium Solubility

- **Uranium solubility is related to oxidation state and chemistry of infiltrating ground/surface waters.**

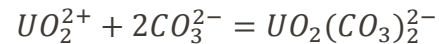
- U<sup>4+</sup> forms relatively insoluble in neutral pH environments, and must be oxidized to U<sup>6+</sup> before release to pore water.

Oxidation of uraninite (U<sup>4+</sup> → U<sup>6+</sup>):



- U<sup>6+</sup> solubility is dependent on carbonate concentrations (alkalinity) in neutral pH environments

Complexation of uranyl cation (cation<sup>+</sup> → anion<sup>-</sup>):

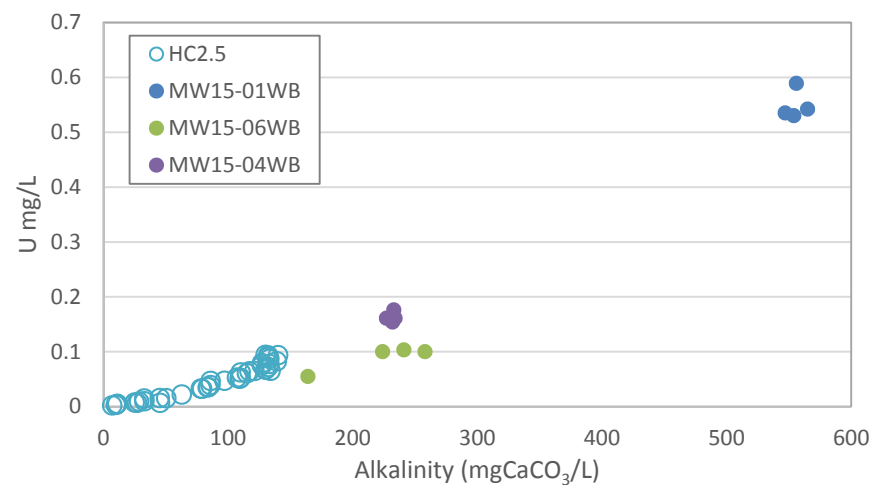


- **Elevated uranium concentrations in site water quality and kinetic test work can be attributed to:**

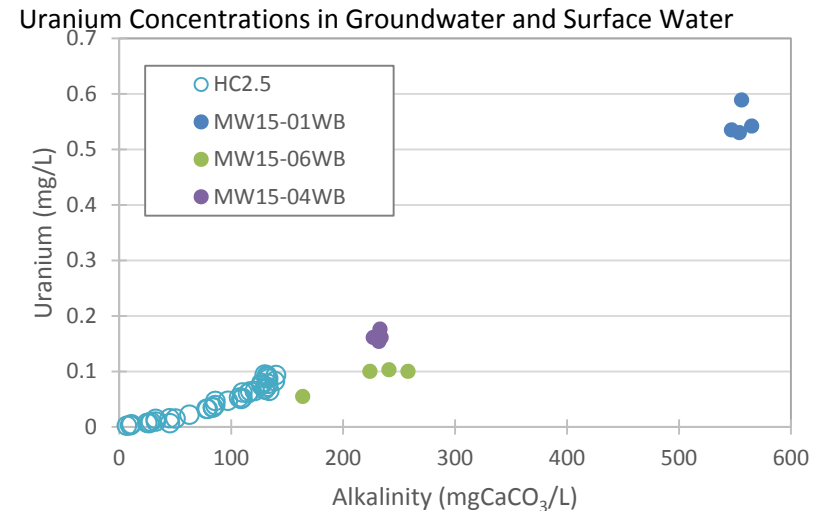
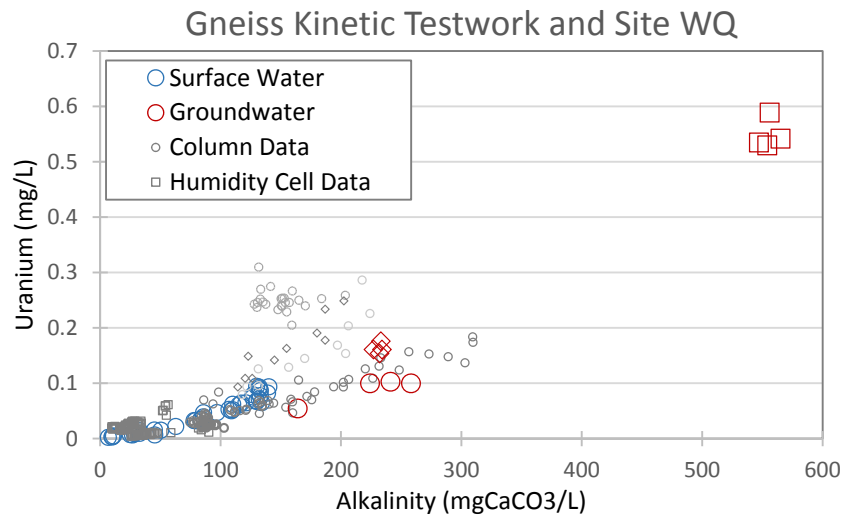
- Occurrence of uranium in the hexavalent (U<sup>6+</sup>) oxidation state
- Highly alkaline surface and groundwater
- Slight enrichment of U values in bedrock.



Uranium Concentrations in Groundwater and Surface Water



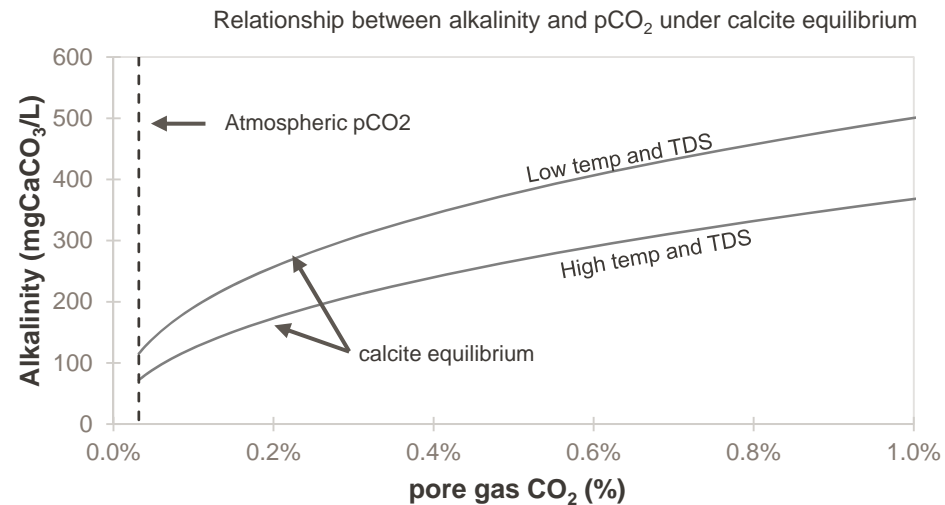
- Site water quality monitoring shows a clear relationship between uranium and alkalinity



- **Stabilized kinetic test loading rates show similar relationship between alkalinity and uranium concentrations as that observed in site WQ**
- **Uranium release from mine waste facilities will be determined by:**
  - Geologic composition (oxidation facies and lithology)
  - Waste type (ore vs. waste rock)
  - **Alkalinity of mine drainage**



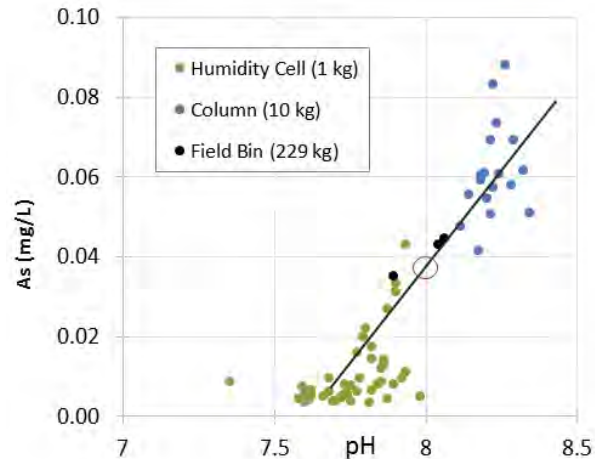
# Uranium Solubility



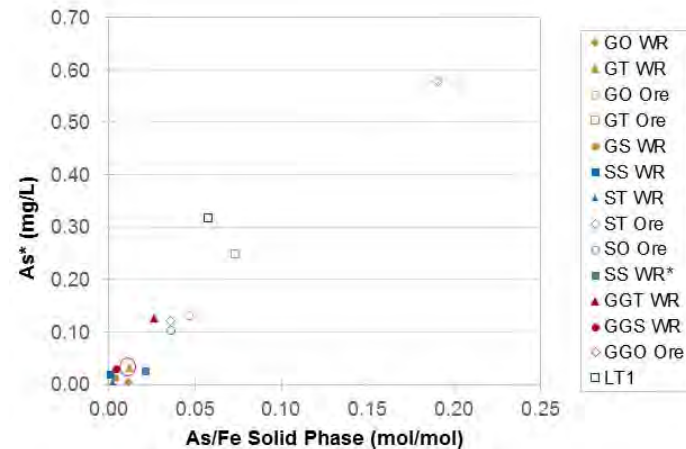
- **The primary source of alkalinity in mine waste environments is from carbonate mineral dissolution.**
- **Alkalinity predictions are based estimates of in-situ conditions (e.g., temp, pore gas  $p\text{CO}_2$  and TDS) and calcite equilibrium.**

# Arsenic Solubility

Duplicate Kinetic Test Results  
As vs. pH in Transition Gneiss Waste Rock

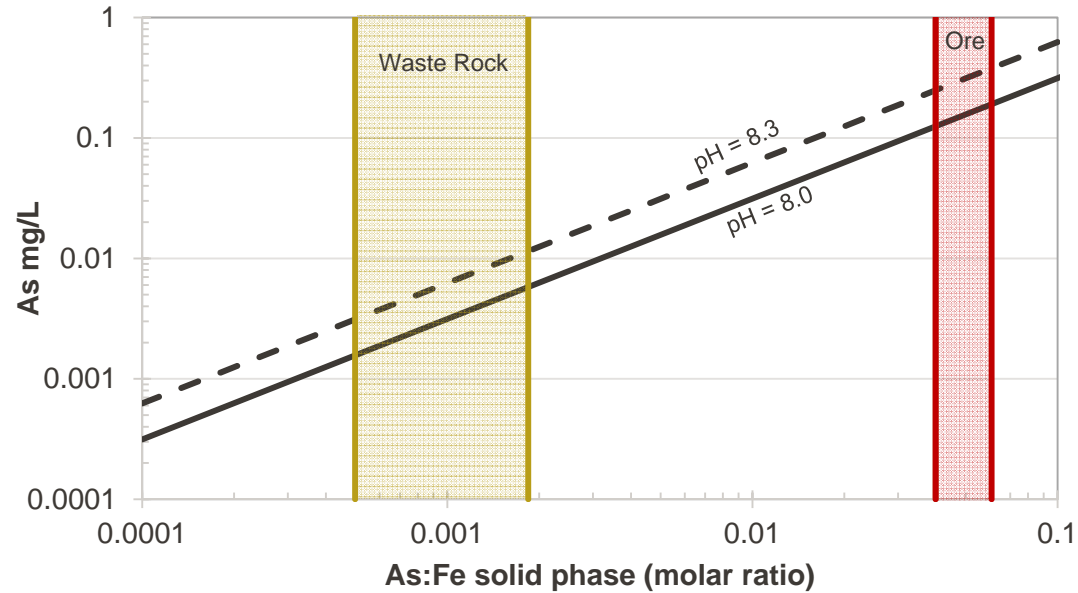


Results from 14 Kinetic Test Samples  
As concentrations at pH 8 vs. solid phase As:Fe ratios



- Kinetic testwork on duplicate samples at different scales shows arsenic solubility is pH dependent.
- The relationship between pH and As varies between samples. This variability can be related to the relative abundance of As and Fe, as represented by the As:Fe molar ratio.
- Arsenic concentrations at pH 8.0 from 14 different kinetic test samples show clear relationship between Fe:As ratios and As concentrations.

# Arsenic Solubility



- Arsenic solubility based on As:Fe molar ratios measured in waste rock and ore database.
  - Ore >> Waste rock
  - Granite > Gneiss > Schist
- Range of As:Fe molar ratios observed in waste rock and ore used to produce As source term predictions for mine waste facilities.

**End of Operations Source Terms for Alpha Waste  
Rock Storage Facility - Expected Case (mg/L)**

<b>Parameter</b>	<b><i>Alpha WRSF</i></b>
<b>As</b>	0.0063
<b>Cu</b>	0.0040
<b>Cd</b>	0.000024
<b>Ni</b>	0.0064
<b>Sb</b>	0.023
<b>Se</b>	0.0021
<b>U</b>	0.332
<b>Zn</b>	0.090





FIN

# Selkirk First Nation and Goldcorp Coffee Gold Team Introductions

May 29, 2017

**Location:** Selkirk First Nation Government Office, Pelly Crossing

**Time:** 1:00 pm

**Participants:**

**Selkirk First Nation**

[Name Redacted]

**Coffee Project – Goldcorp Inc.**

[Name Redacted]

1. Welcome - Introductions
2. Project Update
  - a. Project Proposal
  - b. Engagement with SFN to Date
  - c. Northern Access Route Overview
  - d. Water Management
3. Coffee Land Package Discussion
4. Steps Going Forward
  - a. SFN Business and Employment Opportunities
  - b. Engagement Moving Forward
    - i. Site tour – Northern Access Route and Coffee Project Site
    - ii. Meetings with SFN
5. Other – As Required

**Meeting Title: Selkirk First Nation Chief and Council Meeting**

**Date and Location: SFN Government Building, Pelly Crossing May 29, 2017**

**Introduction: Purpose and Objectives**

Introductory meeting between Goldcorp and the recently elected Selkirk First Nation Chief and Council to provide a Project update and to discuss steps moving forward.

**Attendees:**

Selkirk First Nation:

[Name Redacted]

Goldcorp:

[Name Redacted]

**Discussion of Key Topics:**

SFN Council notes that they are looking for a refresher on the Project to bring all members up to speed.

Goldcorp presents an overview of the Project, including Goldcorp's Canadian operations, SEMS, and an overview of the Coffee Project. Goldcorp notes that fleet automation is being looked at and describes the employment numbers expected for the Project, which are the "worst case scenario"; there will be more jobs should Goldcorp not pursue fleet automation.

Q: Asks if there will be 320 people on the site at all times?

A: There will be approximately 160 people on site at any time.

Goldcorp describes how automation would be considered for a repetitive job, like hauling. Goldcorp provides a description of the mine plan and layout of the site and describes how the Heap Leach Facility (HLF) is free-draining.

Q: Asks what the HLF is?

A: Goldcorp describes ore processing using a HLF in detail, noting that the process is a closed loop for the Coffee Project.

Q: Asks where the waste water goes?

A: Goldcorp replies that the water is recycled in processing. In closure, once the water is treated, it will be discharged.

Q: Asks how Goldcorp will clean the HLF water?

A: Goldcorp explains how cyanide is broken down, and how Goldcorp will use bacteria and electricity to remove contaminants from the water, explaining the HLF rinsing cycles. Goldcorp will have to meet criteria set out in licenses before discharging any water. The HLF will be covered and re-vegetated in closure.

Goldcorp notes that there is no acid rock drainage from this Project because sulphides are not being mined, and explains building the HLF in phases and progressively reclaiming the heap. Cyanide and nitrogen are the species that need to be dealt with in water treatment.

Comment: Effects to salmon are a concern for SFN, SFN wants to bring salmon back to the territory.

Goldcorp responds by describing the International Cyanide Management Code and how Goldcorp subscribes to this through SEMS. Goldcorp offers to provide more information on cyanide, noting that more conversations about cyanide and the HLF need to occur. SFN notes wanting more conversations about this, particularly as it relates to wildlife. Goldcorp agrees.

Q: Asks about concerns on site such as permafrost?

A: Goldcorp describes the geotechnical work being done currently. Goldcorp will remove the permafrost for HLF construction, and is looking at the north facing slopes in detail for permafrost considerations.

Q: One concern is how Goldcorp is considering climate change?

A: Goldcorp is incorporating climate change into all engineering.

Q: asks if this is a year-round project?



A: Mostly year-round. Stacking of the HLF may not occur for 3 months of the year, as Goldcorp doesn't want to freeze the HLF.

Q: Asks if the road is going to be used year-round?

A: Yes, except during freeze-up and thaw periods.

Northern Access Route Discussion:

Goldcorp describes the route, noting the areas that are currently maintained seasonally by Yukon Government and the proposed areas of new construction, describing the ice bridges and barges along the route, and the alternatives assessment that Kaminak undertook when selecting the NAR.

Q: Asks about the alternatives for the NAR and how this is going with Tr'ondëk Hwëch'in?

A: The NAR is what was submitted to YESAB. At this stage, nothing else has been proposed.

Q: Asks if the routing in SFN territory is still there?

A: Goldcorp replies that nothing has changed. A few small changes have occurred, for example the small upgrades performed by a placer miner in the Black Hills area, but nothing in the proposed NAR in SFN territory has changed. The proposal includes new barge landings, which were chosen based on engineering requirements.

Goldcorp discusses the delays in technical review with SFN. Goldcorp hopes to schedule technical meetings about the NAR, HLF, and water quality. Goldcorp would bring their technical experts into these conversations.

Goldcorp continue to discuss the NAR , highlighting the management approach and the concerns Goldcorp has heard to date.

Q: SFN asks where the public road is?

A: Goldcorp explains the current route that exists and is used by the public but is placer miner maintained.

Q: SFN notes that there should be an agreement with YG, Goldcorp, and SFN about this road route. SFN doesn't want placer miners coming into the new area that will be opened up by the road. SFN also has concerns about effects to moose.

A: Goldcorp is not allowing public use of the barge and ice roads, but cannot put gates on the road. Goldcorp does not have the authority to gate the road.

Q: Asks if it's the Yukon Government or the federal government that has the jurisdiction to control access on the road?

A: Goldcorp replies that YG would need to come together on this; Goldcorp is at the early stages of the conversation with YG and wants SFN to be a part of those conversations.

Q: SFN asks what will happen to the NAR in closure

A: Goldcorp notes that currently, one is able to drive to the Stewart River. Areas of new build past this point are proposed to be reclaimed; however it is important for SFN to consider the YG Gateway Project. Goldcorp would remove the barges and no longer build ice roads.

Q: SFN asks if the road would be radio controlled?

A: This is what Goldcorp proposed. The north end of the NAR can be driven quite easily, south of the Stewart is a different story. Radios will be used for safety. Goldcorp will have meetings with First Nation partners and the Dawson community to discuss the road and the radio controls, will post the radio frequency on signs. This is a higher level conversation now, and will need to have more engagement with the multiple interested parties (YG, TH, SFN). Goldcorp notes the vast road network in the Goldfields currently.

Q: SFN Asks about the landing where the NAR meets the Yukon River, wants to know if someone can use it?

A: Goldcorp is going to gate the landing. Goldcorp cannot control if someone wanted to go up or down the river and access the area from another spot. Goldcorp is one user of the road, and wants to have these conversations with SFN.

Q: SFN asks what will happen if the NAR is not approved?

A: This depends on the circumstances; regardless, the Project requires a road.

Q: Would Goldcorp consider the Casino route again?

A: Goldcorp wouldn't completely rule the route out, but it would set the Project back years.

Comment: SFN notes a concern about Goldcorp coming in and building the NAR, then YG taking it over. SFN wants to be involved in these conversations.

Reply: Goldcorp agrees with SFN.

Q: SFN asks if there have been baseline studies along the NAR?

A: Yes.

Q: SFN asks if Goldcorp has looked at wildlife, fish, and birds, and other aspects of the landscape such as mineral licks?

A: Goldcorp has looked at all of these aspects and more. Goldcorp will be installing culverts and upgrading many stream crossings along the NAR to improve habitats. There has also been much work

done on moose habitat, such as mineral licks, and how to manage snow removal with respect to moose and caribou. Goldcorp has been working closely with YG on this.

Comment: SFN comments that there are concerns about the road being public and how this might contribute to poaching in the area. There are also concerns with monitoring the road.

Reply: Goldcorp notes that this concern has been raised by many parties. The road is currently open during moose harvest season. Goldcorp is also considering how to monitor and manage the NAR, Goldcorp is actively monitoring populations, and wants locals to be able to harvest moose, but doesn't want it to result in excessive harvest. Goldcorp comments that they cannot gate the road, but YG could. This is why it is important to have all of these parties at the table for these discussions. Goldcorp notes that the baseline information for the Project was shared in early December 2016, and it would be good to do a road-specific session.

Q: SFN asks if Goldcorp doesn't want a private lease road?

A: Goldcorp doesn't make this decision, and describes the various options for the road that are currently seen as feasible. The next step is for Goldcorp, YG, TH and SFN, and others, to discuss. Goldcorp put forward a "Goldcorp-managed" road option to YG.

Q: Asks if Goldcorp will be hauling gold on the NAR?

A: Goldcorp is just hauling supplies on the NAR, gold will be flown out, and there is no concentrate.

Q: Asks if Goldcorp looked at barging as an option?

A: Barging was looked at as one of the 7 original options, but it is not practical. Goldcorp does not want to do that much barging.

Goldcorp describes transporting cyanide along the NAR in ISO containers.

Comment (SFN): Goldcorp will need lead time for ordering the barge; Goldcorp will want this barge in place to support development.

Reply (Goldcorp): Once out of YESAB with the decision document, Goldcorp will separate the mine and the NAR for permitting. Goldcorp is hoping to have the NAR complete by 2019 and use it to get equipment in. Goldcorp will look at ordering barges when the decision document is in hand.

Q: Asks if Goldcorp will have the barge as an in-house item?

A: Goldcorp doesn't know yet. Goldcorp will own the barge but may contract out operations.

Goldcorp can legally control the barge landings, the barges, and the ice roads. Goldcorp describes the Project schedule, with first gold being poured in April 2021.

Goldcorp provides an environmental update and describes the YESAB process.

Q: Asks if Goldcorp will affect all drainages at once?

A: The catchments with impacts are coloured in the information package provided.

Goldcorp and SFN discuss the Waste Rock Storage Facility Alternatives Assessment.

Goldcorp describes the characteristics of YT-24, Halfway Creek, Latte, and Coffee Creek drainages. The wildlife and traditional use values of Coffee Creek were part of the reason that Goldcorp wanted to move the WRSF out of Latte Creek. Goldcorp describes fish baseline findings, and the natural Uranium signature around the site. Goldcorp notes a technical workshop on water quality is needed with SFN.

Q: Asks if there are placer operations run by Goldcorp in the area?

A: Goldcorp has placer claims, but don't have plans for placer mining. Notes that the claims are uneconomical in the Coffee Creek area.

Q: Asks if the creeks could be considered for habitat restoration?

A: Spawning isn't seen in these creeks, but there is TK about spawning in the past. It is not good habitat for spawning.

Goldcorp describes the community investment protocol and the comment and response process.

Q: SFN notes that the affected community consultation didn't include Pelly Crossing.

A: Goldcorp explains that affected communities are distinct, and that Pelly Crossing is used as a proxy statistically for SFN.

Q: asks about a newsletter.

A: Goldcorp mail drops in Pelly Crossing.

Q: SFN asks about heritage work in Coffee Creek for First Nations and Salmon.

A: An SFN representative notes that the heritage work on the SFN side has been done.

Goldcorp notes doing a water workshop and a site tour with SFN. Workshops are a good way to present information and identify gaps for further discussion. For example, there has been a water quality station added on Coffee Creek based on feedback from SFN technical consultants.

Goldcorp and SFN review the Coffee Land Package, discuss how there are no plans for the Sugar deposit now.

Next steps with SFN and Goldcorp:

1. Water quality workshop
2. Site tour
3. Closure workshop



4. NAR discussion
5. Heap Leach Facility workshop
6. Meet with Elders Council
7. Meet with SFN Renewable Resources Council
8. Meet with SFN Lands department



# Goldcorp Coffee Project Update

## Selkirk First Nation

May 29, 2017

 **GOLDCORP**

- **Introduction**
- **Project Update**
- **Northern Access Route Overview**
- **2017 Activities**
- **Project Proposal Submission & YESAB Process**

## The Goldcorp Coffee Project Team Today

3

- [Name Redacted]
- [Name Redacted]
- [Name Redacted]
- [Name Redacted]
- [Name Redacted]
- [Name Redacted]



- **Goldcorp is a leading gold producer focused on responsible mining practices with safe, low-cost production throughout North and South America:**
- **Canadian company headquartered in Vancouver**
- **Over 15,000 employees worldwide**
- **Primary product is gold, with silver, copper, zinc and lead by-products**
- **Committed to responsible mining practices and well positioned to deliver long term value**

## Overview of Goldcorp Locations



# Goldcorp's Vision & Values



**Goldcorp subscribes to a number of industry initiatives to ensure we operate in accordance with industry best practice on environmental, safety, community and security issues.**



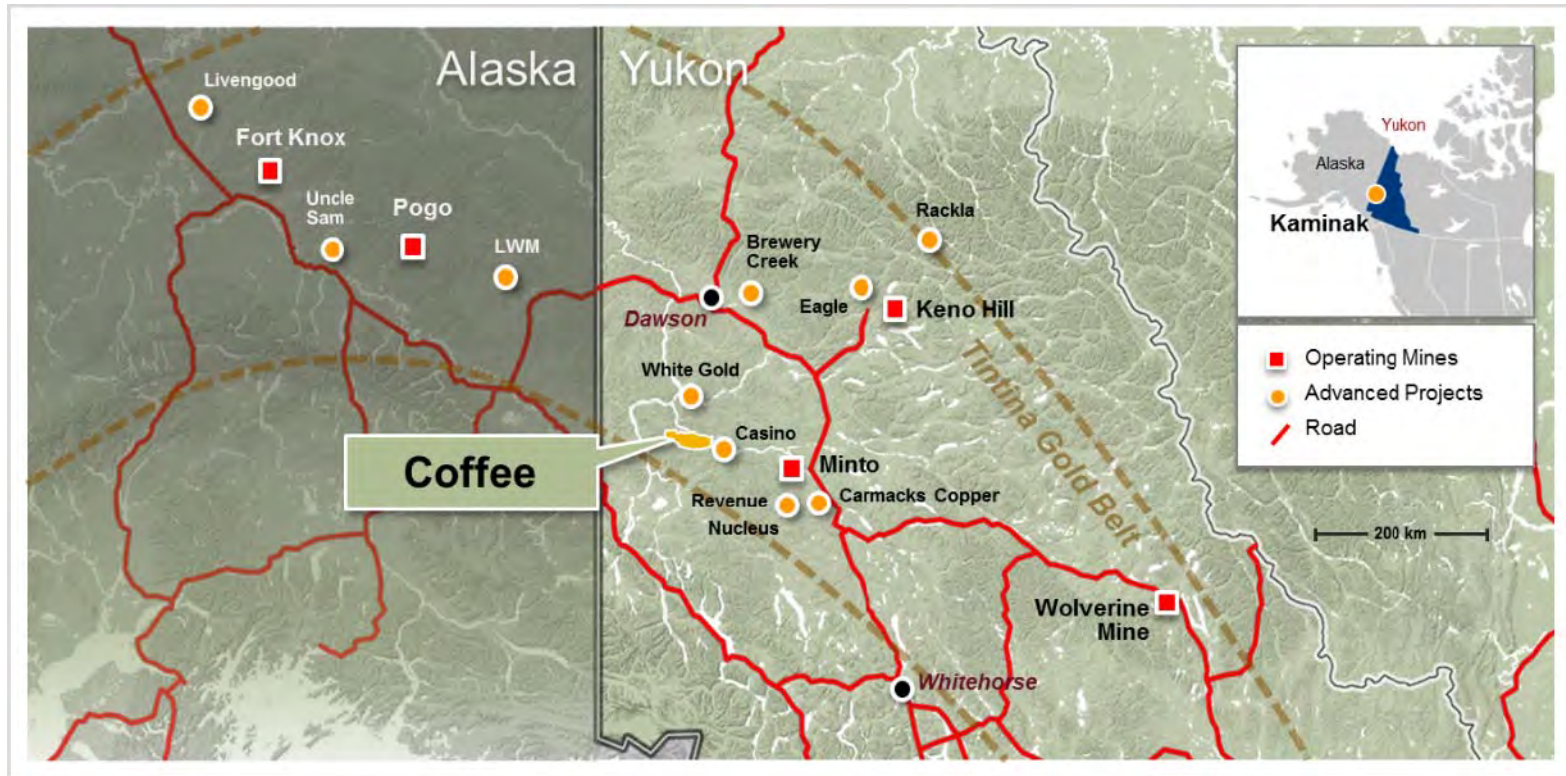


All Goldcorp sites (including Coffee) must implement the Sustainability Excellence Management System (SEMS):

- **Integrated approach to safety, environmental, social and security performance that adheres to best practice**
- **Covers topics such as:**
  - Water management
  - Tailings management
  - Local employment and procurement
  - Risk and impact management
  - Community investments
- **Follows the “Plan, Do, Check, Improve” formula to ensure continuous improvement**
- **Rigorous compliance and accountability process through audits, site self-assessments and internal and external reporting**



# Coffee Project Location



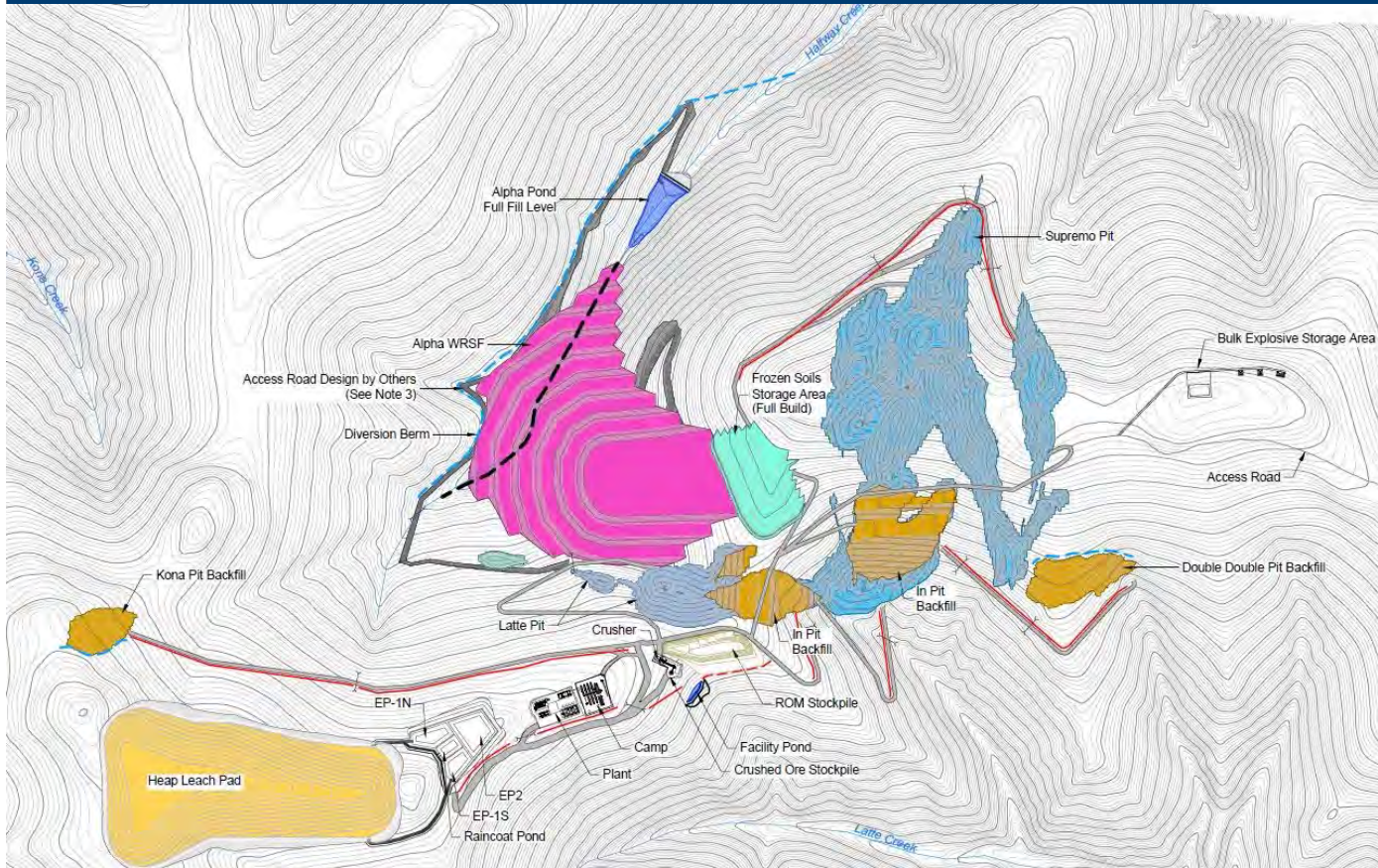
## Project Overview

### Mine Site:

- Expected 12 year mine life with additional 11 year closure period
- Ore is processed by cyanide oxide heap leach process on a conventional pad
- Open pit, conventional truck-and-shovel operation, looking at fleet automation

### Employment:

- Over 400 people during construction, approximately 320 people during operations
- 2-weeks-on, 2-weeks-off, primarily transported via air from Whitehorse or Dawson



- 4 open pits
- Heap Leach Facility
- 1 Waste Rock Storage Facility
- 4 In-pit backfill areas
- Soil stockpiles for reclamation





# Coffee Gold Project's Northern Access Route

Proposed Strategies for Management

 **GOLDCORP**

- **Goldcorp's Coffee Gold Project proposes to use the 214 km Northern Access Route (NAR) originating 16 km outside of Dawson City to the Coffee property south of the Yukon River.**
- **The NAR will cross the Yukon & Stewart Rivers:**
  - During open flow, Goldcorp will utilize barges to cross; When frozen, ice roads will be constructed; no land access to site during freeze up and thaw periods.
- **Of the route, over 80% is existing road:**
  - The NAR follows the government-maintained Hunker Road to Sulphur Creek; Past Sulphur Creek is user-maintained road
  - New build is approximately 37 km; Majority of new build is located between the Stewart and Yukon Rivers (Ballarat/Barker areas) with additional portions from Eureka to Henderson dome and along the ridge to Maisy May north of the Stewart.



# Road Route Design Objectives

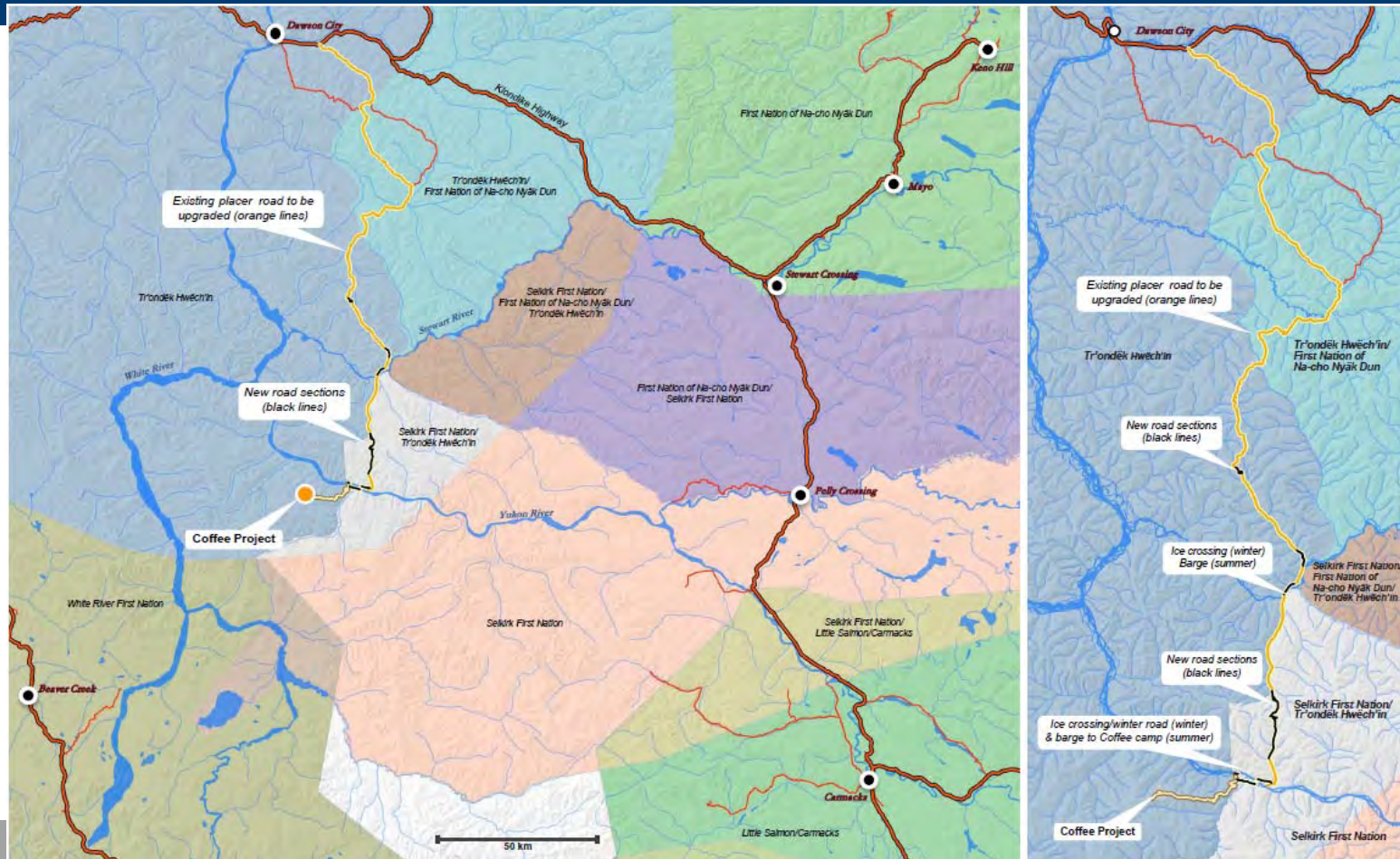
- **Ensure safety for all users along the route**
  - Design parameters
- **Follow existing roads**
- **Minimize disturbance, particularly to sensitive features**
  - Archaeological and cultural heritage sites
  - Wildlife, biological, habitat
  - Permafrost
- **Minimize road length**



# Design Criteria and Standards

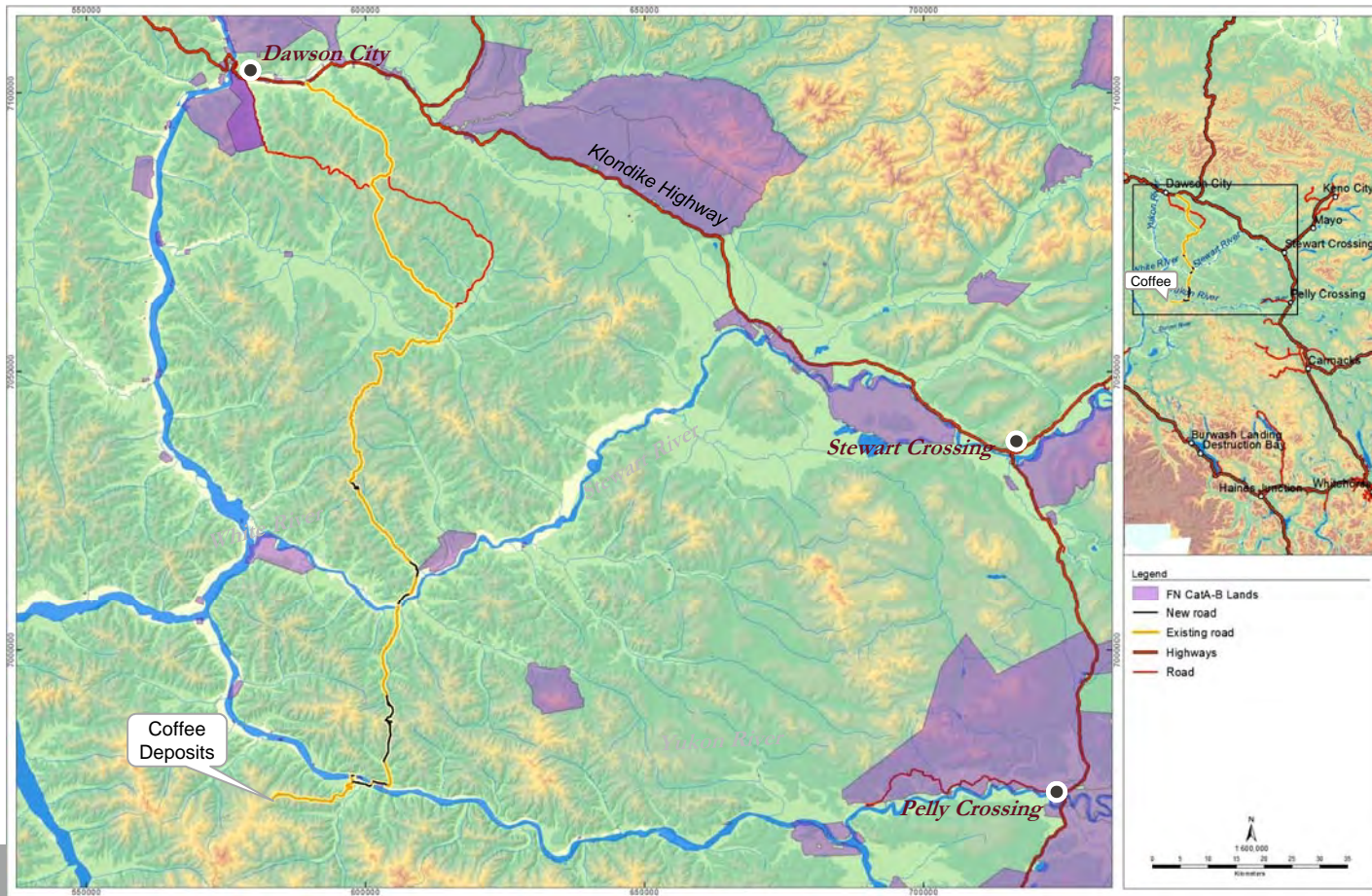
Components	Valley Bottom	Mountainous Terrain
Maximum Road Grade	8% (up to 10% on short pitches). Restricted to 5% on switchbacks	8% (up to 10% on short pitches). Restricted to 5% on switchbacks
Tightest Vertical Curve	1% grade change over 12 m (11 m for crest curves)	1% grade change over 4 m (3 m for crest curves)
Minimum Curve Length	50 m	30 m
Minimum Stopping Sight Distance	135 m	65 m
Minimum Horizontal Curve Radius	80 m (18 m for switchbacks)	35 m (18 m for switchbacks)
Minimum Cross Drain Culvert Diameter	450 mm	450 mm
Ditch Size	0.5 m deep with a 1-m-wide base	0.5 m deep with a 1-m-wide base
Road Width	5 m	5 m
Pullout Size	Additional 4 m width, 15 m long with a 7.5-m-long taper at each end	Additional 4 m width, 15 m long with a 7.5-m-long taper at each end

# Northern Access Route - Context

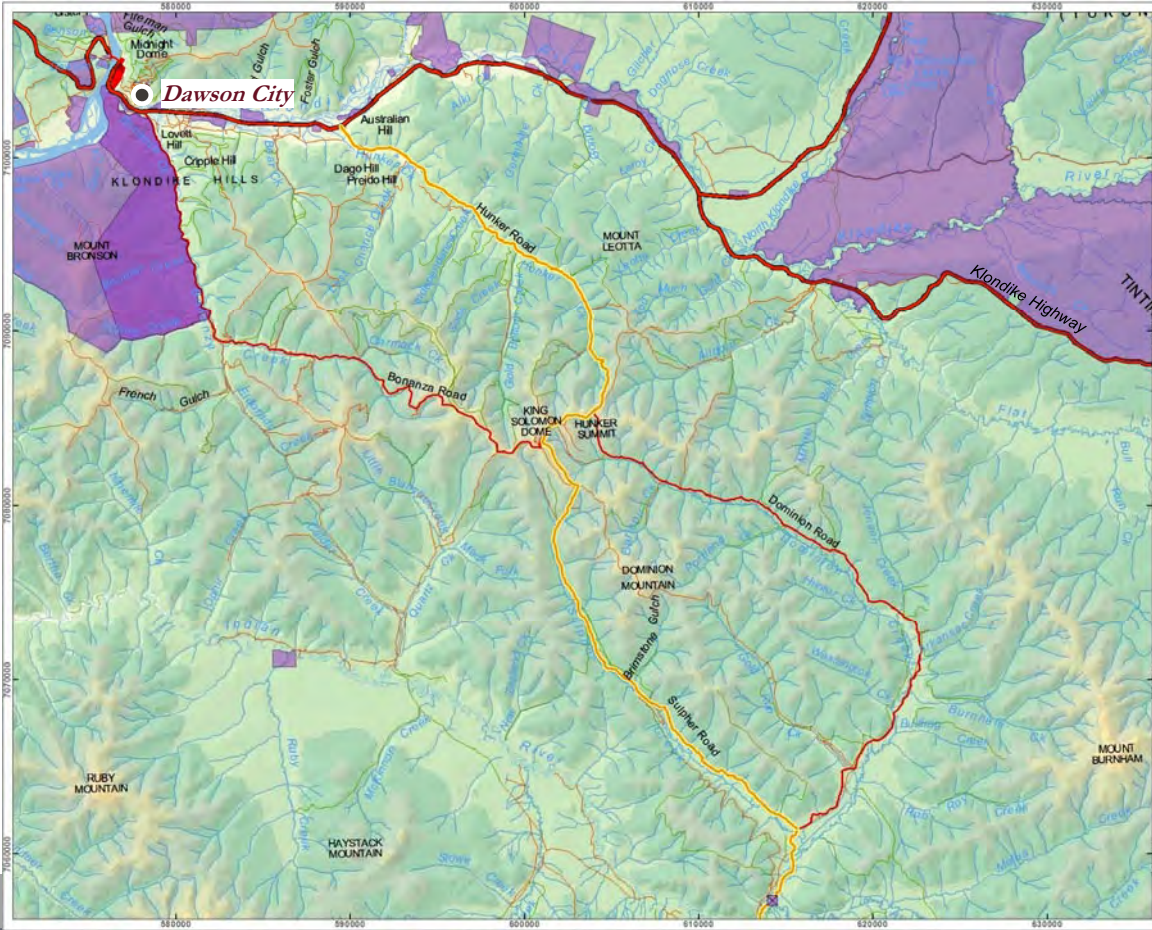




# Northern Access Route – Full Route



# Northern Access Route – Dawson City to Granville



**Legend**

- Construction Camp
- FN CatA-B Lands

**Crossing**

- All steel portable bridge
- Corrugated steel pipe culvert
- Embedded culvert
- Pipe Arch

**Road**

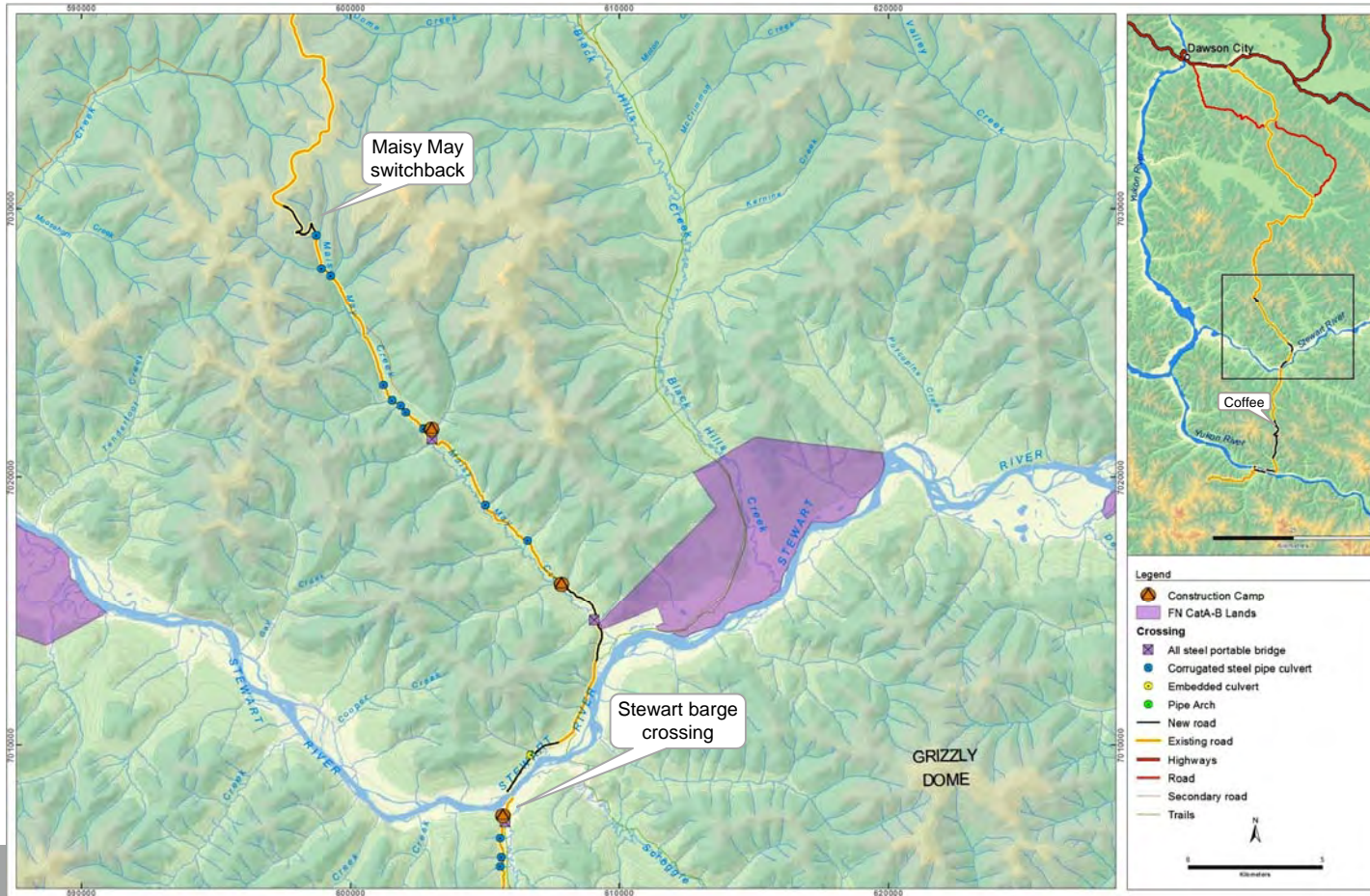
- New road
- Existing road
- Highways
- Road
- Secondary road
- Trails

Scale: 1:1,044,831  
North Arrow



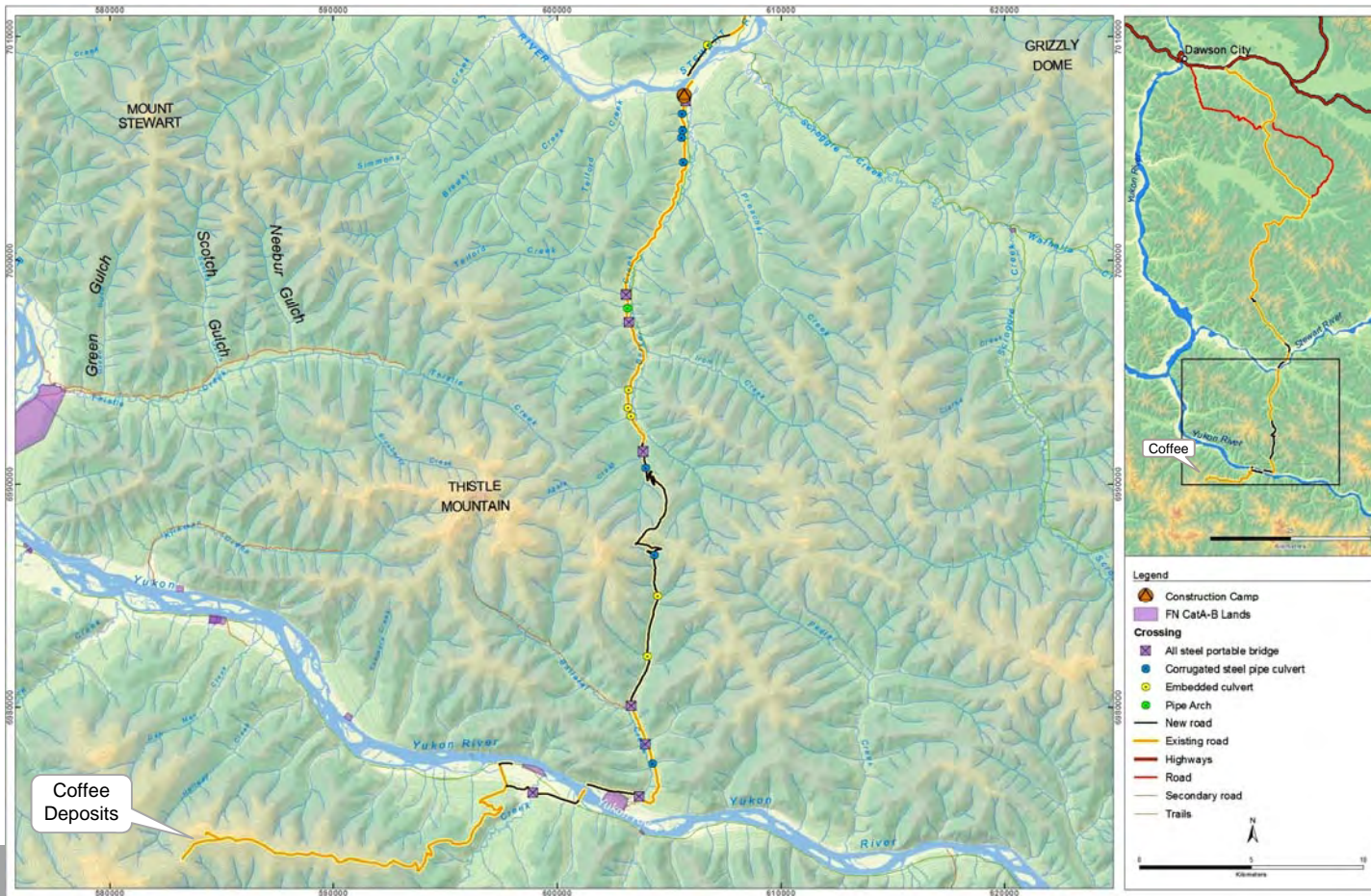


# Northern Access Route – Maisy May / Stewart River





# Northern Access Route – Stewart River to Coffee Creek



## Road Management

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- **Currently the road up to Sulphur creek is maintained by YG**
- **Beyond YG it is user-maintained public road on crown land with active placer claims**
- **Current users:**
  - Placer miners (during operation season Mar-Nov)
  - Trappers, hunters
  - First Nations (traditional uses such as harvesting)
  - Yukon Quest/River Quest/Yukon Ultra
- **Road maintenance has been conducted primarily by placers.**





## **Safety Considerations:**

- Appropriate speed limits
- Mandatory use of seat belts by all drivers and passengers.
- Prohibited use of cell phones while driving.
- Employee and contractor driver training on the road safety rules.
- Regular vehicle maintenance program
- No parking on the travelling surface (pull into a safe location such as a pullout).
- Driving under the influence of alcohol or intoxicating drugs will be prohibited, and will result in immediate dismissal from the Project.

## **Environmental Stewardship:**

- Protocols for how to manage wildlife interactions along the road
- Project vehicles will have spill response kits.
- Install and maintain erosion control structures
- Refuelling mobile equipment a minimum of 30 m from a watercourse (except barges or small gas engines for water pumps)

## Next Steps: 3 Options for Management

- **Given that the road is on crown land and well used by a number of other actors, Goldcorp proposed 3 potential strategic approaches to road management**
- **Goldcorp's recognizes that the road is a shared asset. A core concern is that First Nation concerns related to the cumulative effects of change in access are adequately managed.**
- **In all three options, Goldcorp underscores the need for open and transparent dialogue with first nations and stakeholders prior to making a decision.**



## Option 1: Goldcorp Management

- **Goldcorp applies for a successional permit for up to 3 years under Resource Access Road Framework in order to implement construction.**
- **Once the road is fully constructed, YG leases the road to Goldcorp under a 30 year lease**
- **Road management is entirely under Goldcorp's control/discretion. Access control may be gated.**
  - Placer miners with claims past the control will be registered and given right of passage per Section 48 of the *The Placer Mining Act*.
  - Protocol with First Nations and trapline holders to identify who should have right of passage for hunting, trapping, traditional activities.
  - Non-project related drivers will sign a usage agreement or waiver, noting that use of the road is at their own risk
- **Barges are a natural secondary access control point. Only authorized, project-related vehicles will be permitted to use barges.**
- **New build section maintenance costs are assumed by Goldcorp, with potential agreements for joint maintenance programs with relevant placer miners or the KPMA**



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## Option 2: YG Management

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- **Construction is undertaken by Goldcorp**
- **Operations: Goldcorp contributes to annual maintenance costs but does not manage any implementation (e.g. hiring & managing contractors)**
- **Access control protocols and authorizations are managed by YG**
  - Goldcorp is provided right of passage through an application to the mining recorder to gain entry through existing claims.
  - Goldcorp barges will be for project vehicles only.
  - YG will work with First Nations to ensure that their concerns and rights are respected. Goldcorp will support and participate in these discussions.





## Option 3: Public Private Partnership

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- **A 3<sup>rd</sup> party would build and maintain the road**
- **Financed through the Goldcorp**
- **Road users would pay a toll or annual fee**
- **Road management protocols would be determined by the operator**



Supplies and consumables will be moved by northern access road originating in Dawson.

### Construction:

- Road mostly in place and being used; Some new construction and upgrades
- Use of barges and seasonal ice bridges, crossing the Stewart and Yukon rivers
- Construction estimated in 2018

### Operations & Management:

- Estimated 8 trucks per day average during operations
- Road Management Plan
- Access and monitoring
- Wildlife – concerns and mitigations
- Road Users Group – under development



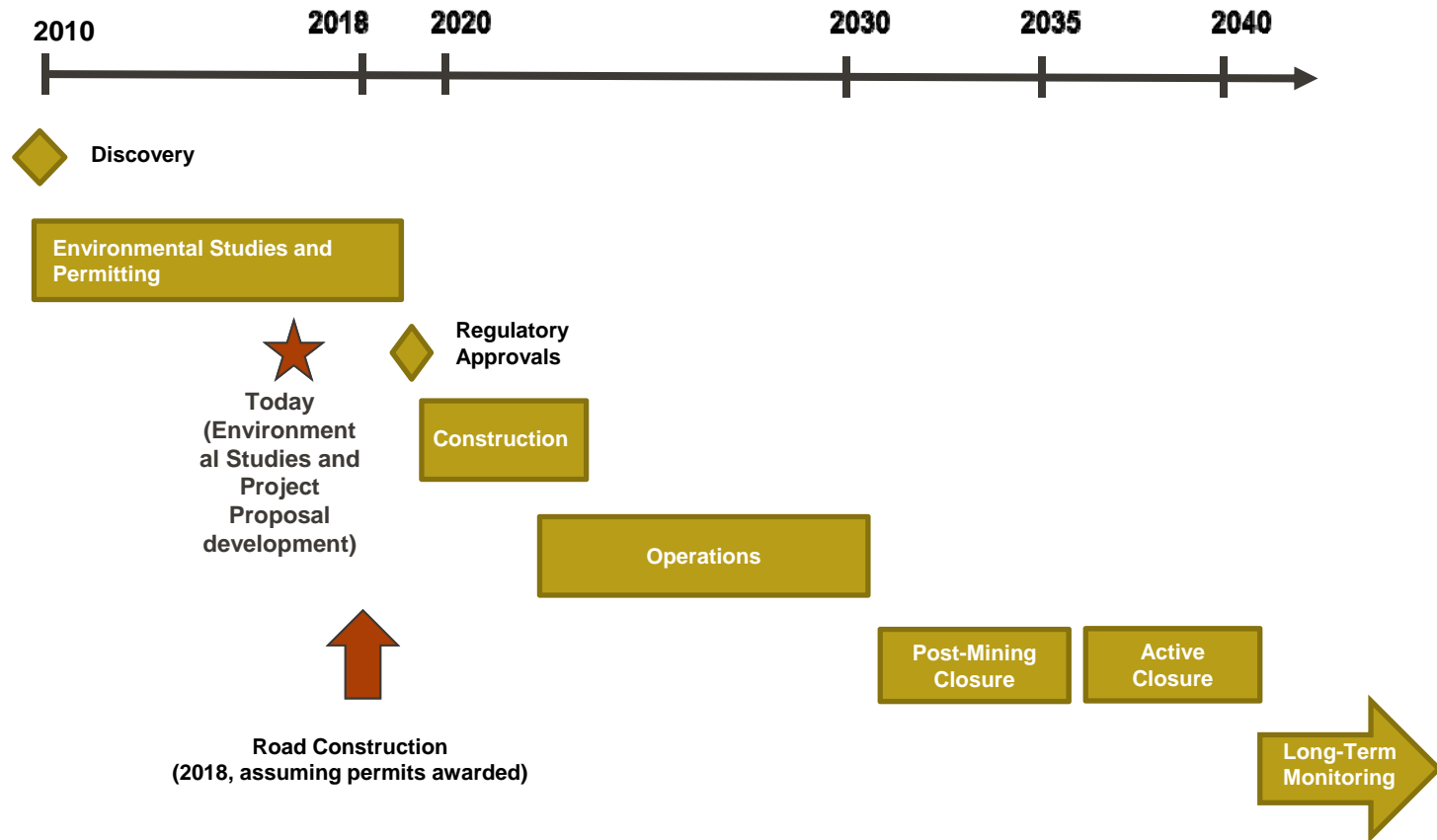


# PROJECT UPDATE

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Project Schedule







# ENVIRONMENT & CSR 2016 ACTIVITIES & 2017 PLAN

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## Environmental Monitoring

- Ongoing Baseline covering: wildlife, vegetation, fish, water quality, hydrology, groundwater, meteorology
- 5 environmental monitors on site and road
- Steering Committee for Environmental Management Certificate at Yukon College

## Reclamation Research

- Partnership with Yukon College & University of Saskatchewan
- Native seed collection

## Setting up Systems & Procedures

- Sustainability Management Plan
- Community Response Protocol
- Community Investment protocol



## Other Initiatives

### Orientation & Planning

- Site orientation on safety, environment, heritage find protocols

### Strategic Planning:

- Understanding Local economic development – procurement and hiring opportunities
- Community Contributions
- Consultation and Engagement





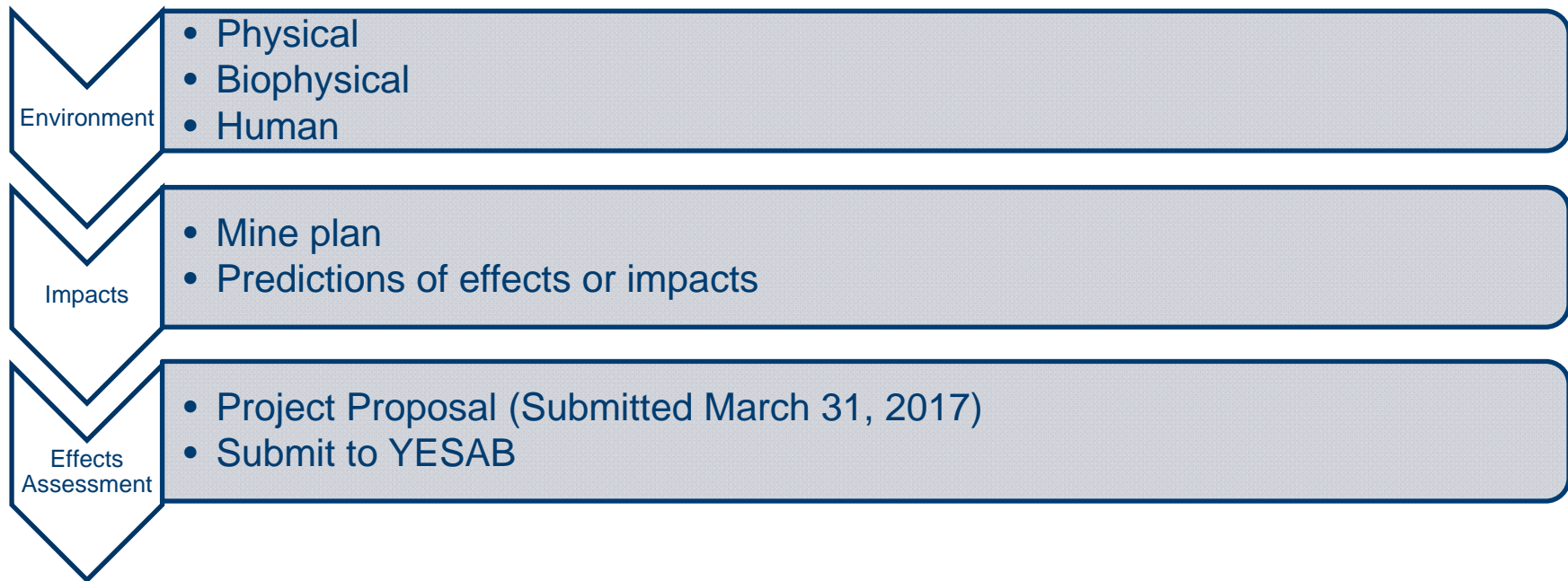


# YESAB APPLICATION

TOGETHER, CREATING SUSTAINABLE VALUE

 **GOLDCORP**





### Valued Components (VCs):

- Environmental, social, economic topics that could be potentially impacted by the project.
- tailored the selection of VCs to Yukon

Baseline  
Studies



Physical Environment

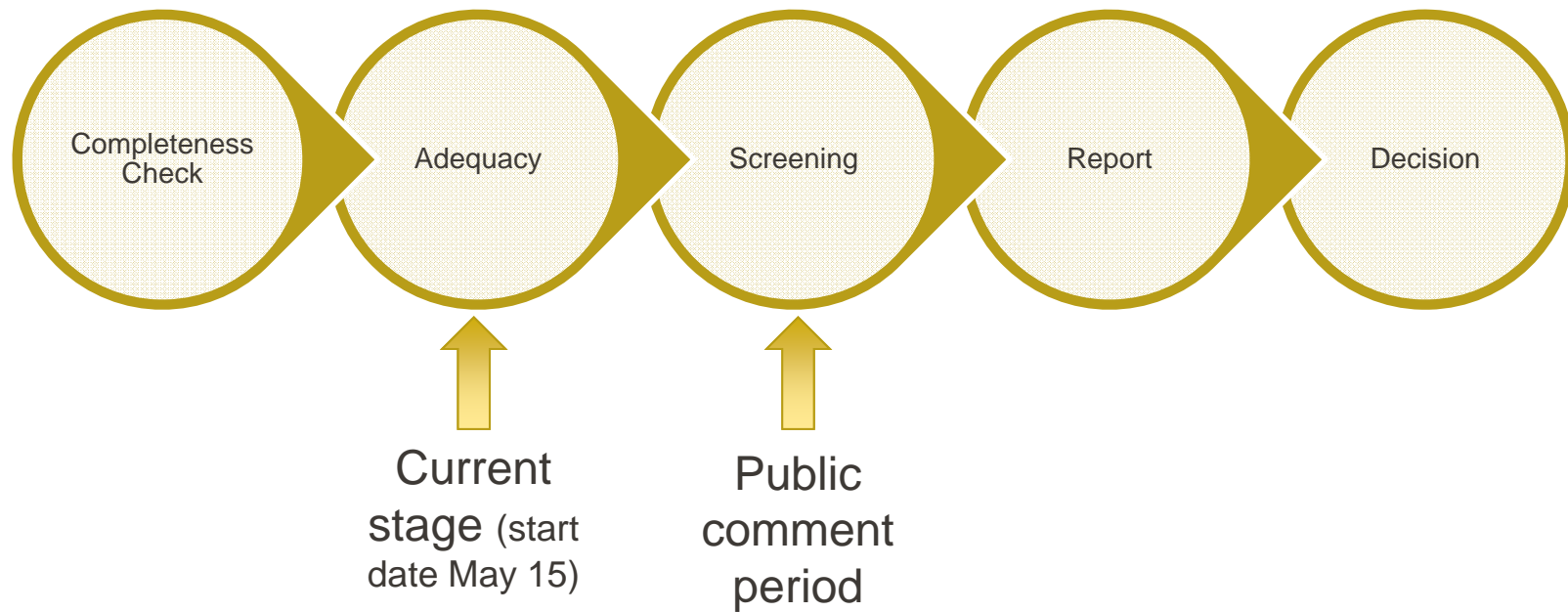
Biophysical Environment

Human Environment

- **Fish & Fish Habitat**
- **Vegetation**
- **Wildlife & Wildlife Habitat**
- **Groundwater**
- **Hydrology**
- **Air Quality**
- **Noise**
- **Surficial Geology, Terrain & Soils**
- **Surface Water Quality**
- **Birds & Bird Habitat**
- **Demographics**
- **Economic Conditions**
- **Social Economy**
- **Community Infrastructure & Services**
- **Education Services Land & Resource Use**
- **Community Health & Wellbeing**
- **Heritage**

Insert information on water quality effects here







# ENGAGEMENT & CONSULTATION

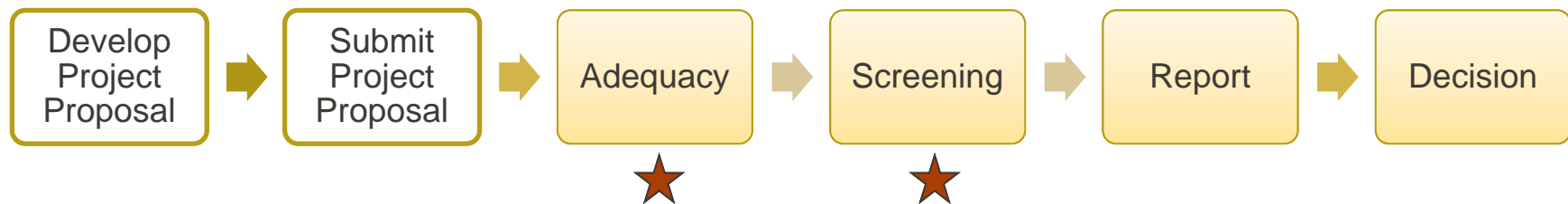
TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Engagement with SFN to Date

Date	Description of Meeting or Event	Purpose
October 7, 2015	SFN Meeting (location: Pelly Crossing)	To discuss the relationship between the Proponent and SFN, provide a Project update, and discuss the NAR.
June 16, 2016	SFN Meeting (location: Pelly Crossing)	To provide a Project update
November 21, 2016	SFN Meeting (location: Whitehorse)	To introduce Goldcorp, discuss consultation moving forward and previous engagement with SFN.
December 1, 2016	SFN Technical Meeting (location: Whitehorse)	To review baseline information and the Project in detail, baseline and road documentation provided (USB).
December 2, 2016	Provide Baseline Studies to SFN	Provide Baseline Studies for review and feedback.
January 13, 2017	Provide Waste Rock Storage Facility Alternatives Assessment information and Document Sharing and Feedback Plan to SFN	Provide WRSF Alternatives Assessment information for review and feedback prior to workshop.
January 25, 2017	SFN Meeting (location: teleconference)	To discuss SFN's preferred engagement methods, timeline for TLUS.
January 31, 2017	Provide Batch 1 information to SFN	To provide Batch 1 VC and IC reports as scheduled for review and feedback.
February 2, 2017	SFN Waste Rock Storage Facility Alternatives Assessment Workshop (location: Whitehorse)	To discuss the WRSF alternatives information provided January 13, engagement preferences, upcoming meeting dates.
February 16, 2017	SFN Meeting (location: Teleconference)	Capacity funding discussion
February 20, 2017	SFN Meeting (location: Teleconference)	Capacity funding discussion
February 22, 2017	SFN Meeting (location: Whitehorse)	To discuss the TLUS progress, socio-economic considerations for the Project.
February 23, 2017	Provide Batch 2 information to SFN	To provide Batch 2 VC and IC reports, management plans, and Project Proposal sections for review and feedback.
March 1, 2017	SFN Citizens Meeting (location: Pelly Crossing)	To introduce Goldcorp and the Project.
March 3, 2017	SFN Technical Meeting (location: Whitehorse)	To discuss Batch 1 information provided on January 31, upcoming meetings.
March 15, 2017	SFN Technical Meeting (location: Whitehorse)	To discuss Batch 2 information provided on February 23, upcoming meetings.

## The Coffee Project requires an Executive Committee Screening Under YESAB:



- The Coffee Gold Mine Project Proposal is currently under adequacy review by the Yukon Environmental and Socio-Economic Assessment Board (YESAB).
- Feedback is heard and incorporated into the Project Proposal prior to submitting:
  - Community Meetings & Open Houses
  - Comment cards
  - Comments received via the Coffee Feedback Protocol
  - Interviews, dialogue and collaborations First Nations and stakeholders
- Your feedback is also heard and addressed while the Project Proposal is in the “Screening” stage of the process via the YESAB Online Registry.



- **Provides a transparent, replicable and confidential process for listening and responding to community ideas, questions and concerns.**
- **We commit to maintaining respect throughout the process will investigate all topics related to Coffee Gold activities.**
- **Contact us with your comments**
  - Toll-free Phone: 1-844-330-0277
  - Email: [coffee.feedback@Goldcorp.com](mailto:coffee.feedback@Goldcorp.com)
  - In person or writing at the Whitehorse office: Attn: Community Relations Dept. Suite 201-208 Main Street, Whitehorse, Yukon, Y1A 2A9

## **Initiatives supported in 2016:**

- **Yukon Quest, Moosehide Gathering, Festival of Trees, Yukon Native Hockey Tournament, Adäka Festival and much more!**

## **Our objectives are:**

- Respond to local needs and opportunities
- Support initiatives that build economic, social and cultural capacity
- Create a positive social and economic legacy
- Build and support partnerships in the local community

## **Key areas for investment:**

- Arts & Culture
- Community Development
- Education
- Environment
- Health



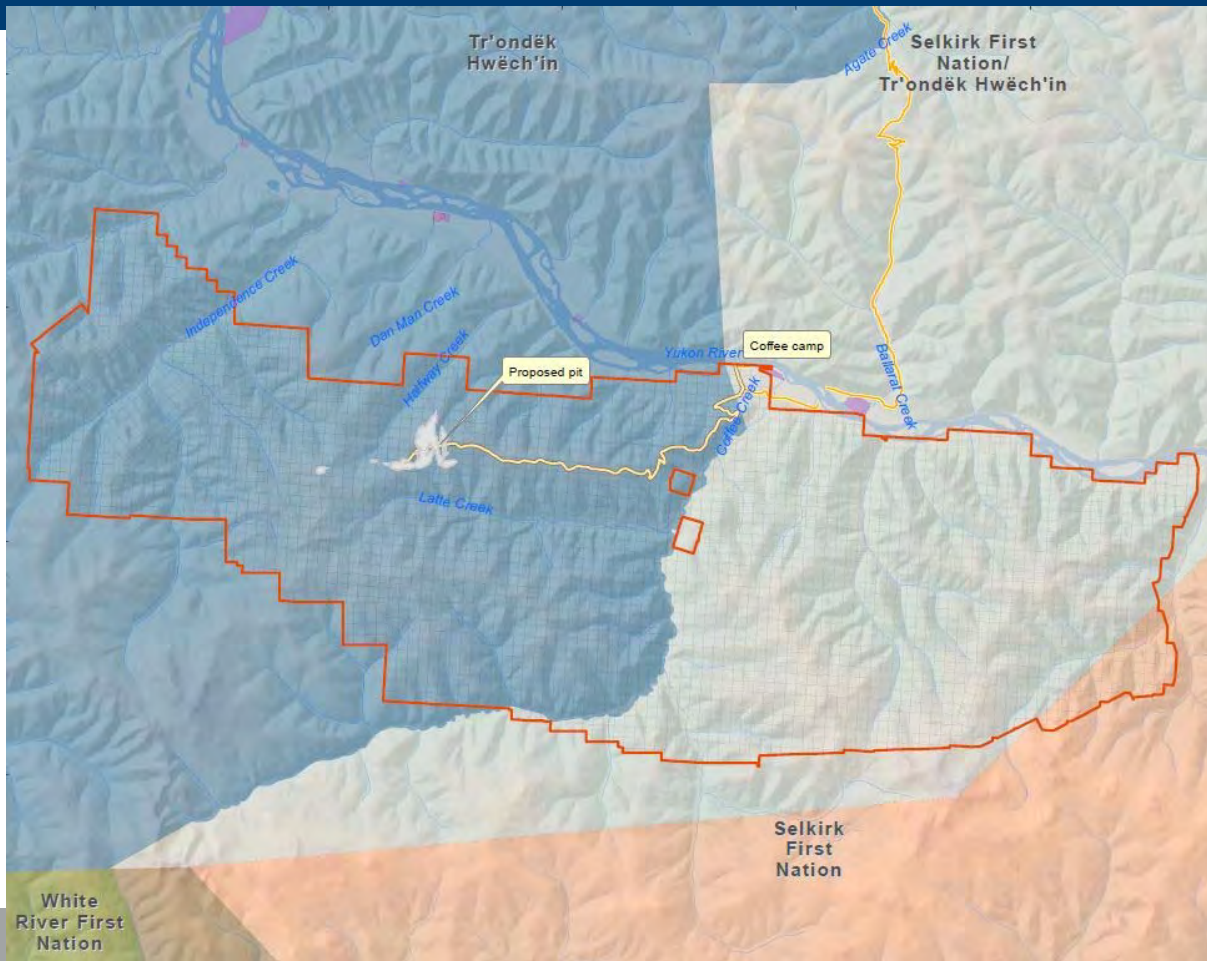
# COFFEE LAND PACKAGE DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

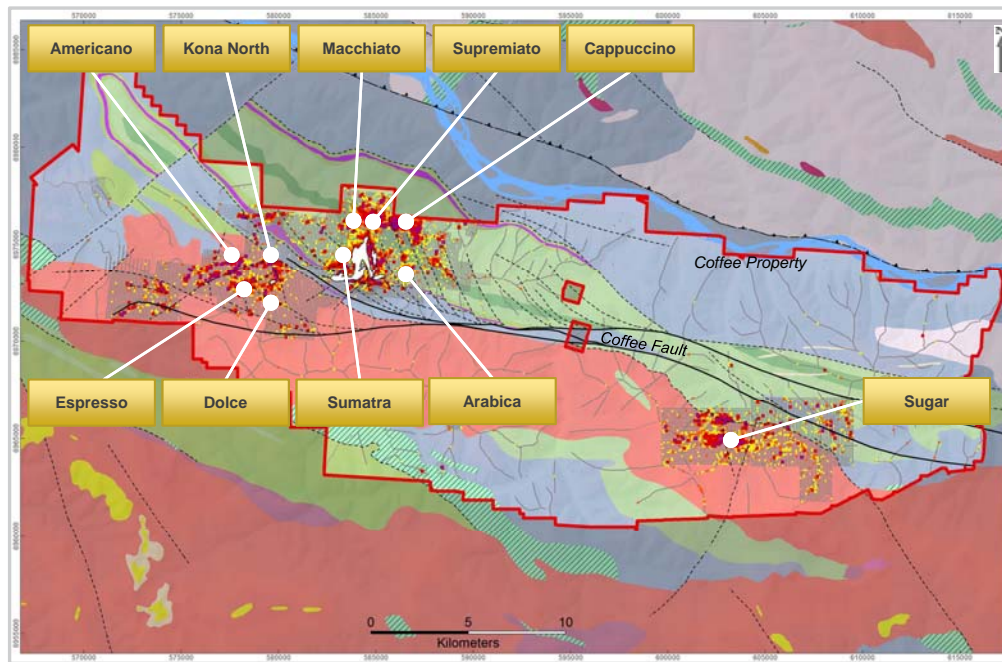


# Coffee Property

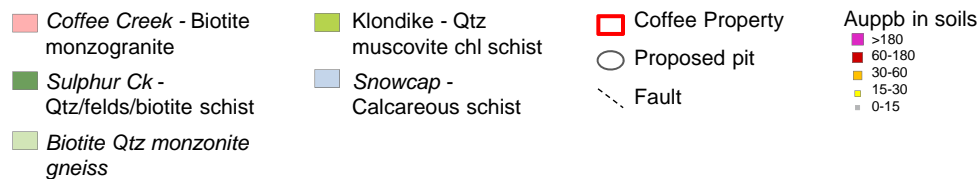




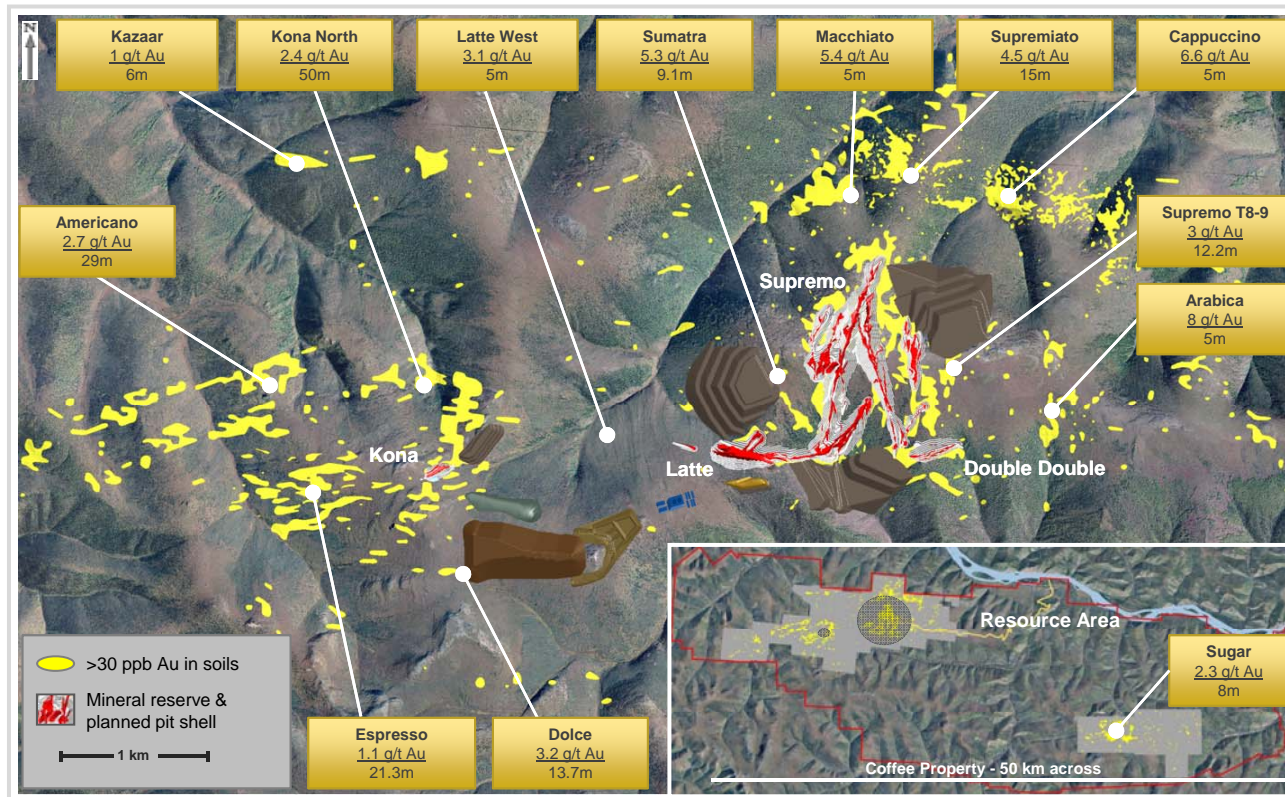
# Coffee Gold Project – Property Geology and Exploration



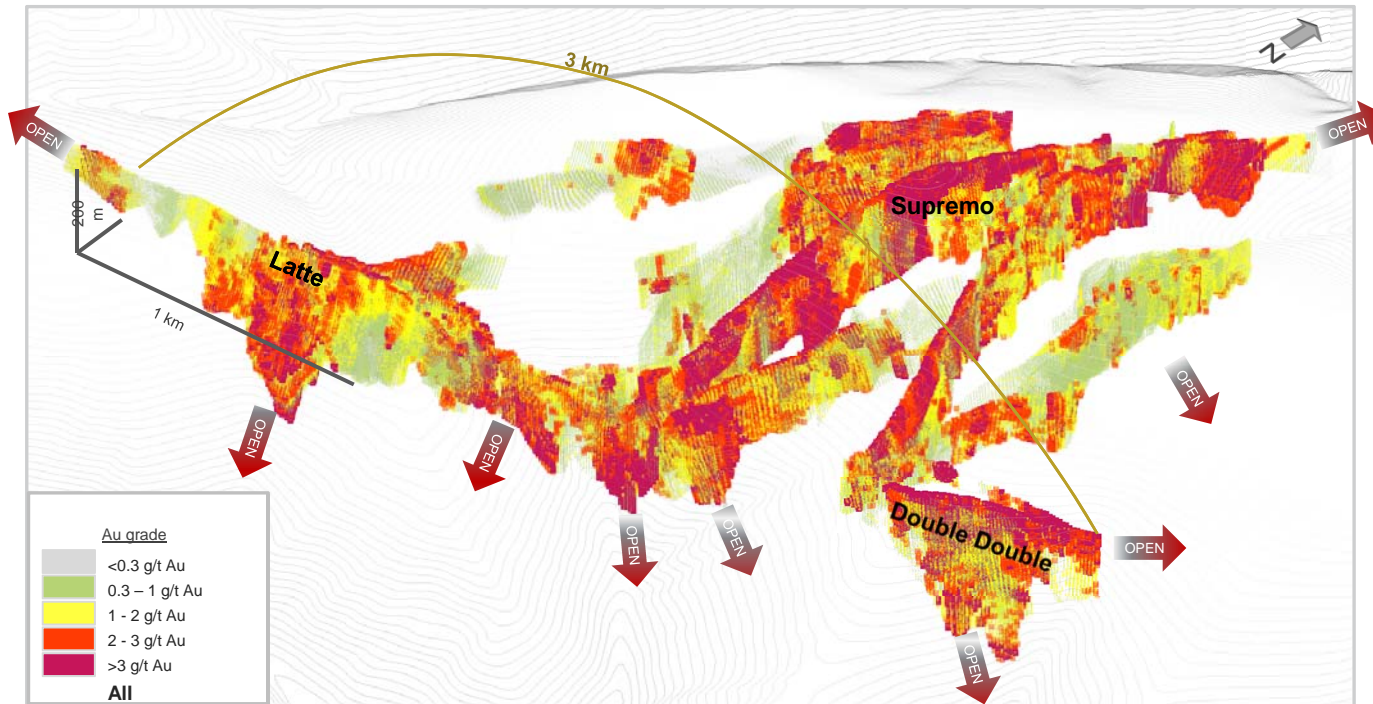
- District scale exploration potential within a 60,000 hectare land package
- Pipeline of soil anomalies to be drill tested
- Coffee property straddles the prospective Coffee Fault system which controls gold mineralization



# Coffee Project – Exploration Drilling Highlights



# Coffee Deeper Potential



- All deposits remain open down dip
- Drilling rarely extends deeper than 200 metres below surface
- Metallurgical testwork is underway to investigate process path for sulphide mineralization

## 2017 Exploration

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- **'Near Mine' Exploration adjacent to the proposed mine plan**
- **New exploration zones in the west and north**
- **Metallurgical testwork and deeper exploration to test beneath the proposed mine**
- **Exploration throughout the property to create a pipeline of new targets**







# NEXT STEPS

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Engagement with Selkirk First Nation

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- **Ongoing engagement considerations:**
  - **Format:**
    - Examples: Citizens meetings, technical meetings, Council meetings
  - **Frequency:**
    - Examples: interest-specific, quarterly
  - **Topics:**
    - Examples: General updates, specific themed meetings based on interests
  - **Key contacts for meetings coordination:**
    - Selkirk First Nation: Jim Harper
    - Goldcorp: Reesa Meltzer



## Future Engagement with Selkirk First Nation

Meeting Topic	Date	Location





# QUESTIONS & DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



# Thank you

## Contacts:

**Buddy Crill**  
**Mine General Manager**

**604-505-7613**

**[buddy.crill@goldcorp.com](mailto:buddy.crill@goldcorp.com)**

**Catherine Tegelberg**  
**Superintendent, Corporate Social Responsibility**

**604-318-0528**

**[Catherine.Tegelberg@goldcorp.com](mailto:Catherine.Tegelberg@goldcorp.com)**



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**We look forward to working  
with Yukon Communities**

## **Tr'ondëk Hwëch'in and Goldcorp Workshops Agenda**

### **June 5<sup>th</sup> – Northern Access Route and Closure**

### **June 6<sup>th</sup> – Water Management**

June 5<sup>th</sup>

830 am - Project update (brief)

#### **9am – 12 pm: Northern Access Route**

1. PROPOSED: TH presentation of views
2. Review of Black Hills Route vs Maisy May Route
3. Discuss Northern Access Route Management

#### **1 pm – 4 pm: Reclamation and Closure**

1. Reclamation and Closure Overview
2. Discussion of "End Land Use Plan"
  - o Land capability studies. Note: TH is offering to have our team present information at this meeting. A key expert on Reclamation and Closure is only available on June 5<sup>th</sup>
  - o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)
  - o Reclamation Research
3. Define the need for cover materials at Closure
4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.
5. Need to consider permafrost melting in more detail (operations and closure)
6. Social aspects of closure (training, workforce transition strategy)

**June 6: 9 - 4:30 pm:**

#### **Water Management – Operations and Closure**

1. Water management plan/ water balance - resolving the conceptual model
2. Water Discharge
3. Water Quality Predictions
4. Heap Leach facility water management and treatment - Operations
5. Heap Leach facility – Closure and Passive treatment plans
6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)
7. Time permitting: Groundwater modelling and permafrost

#### **Water Quality Objectives**

1. Discuss issues related to the proposed SSWQOs
2. Discuss issues related to the effects assessment/water quality modelling predictions
3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River
4. Development of a work plan for deriving SSWQOs consistent with the principles and methods

Exploration  
Disturbance

Latte  
Cr.

Halfway Cr.

Yukon River

Yukon River

# Mine Water Management

June 6, 2017

Rina Freed and Katie Jones

Coffee  
Cr.

Google

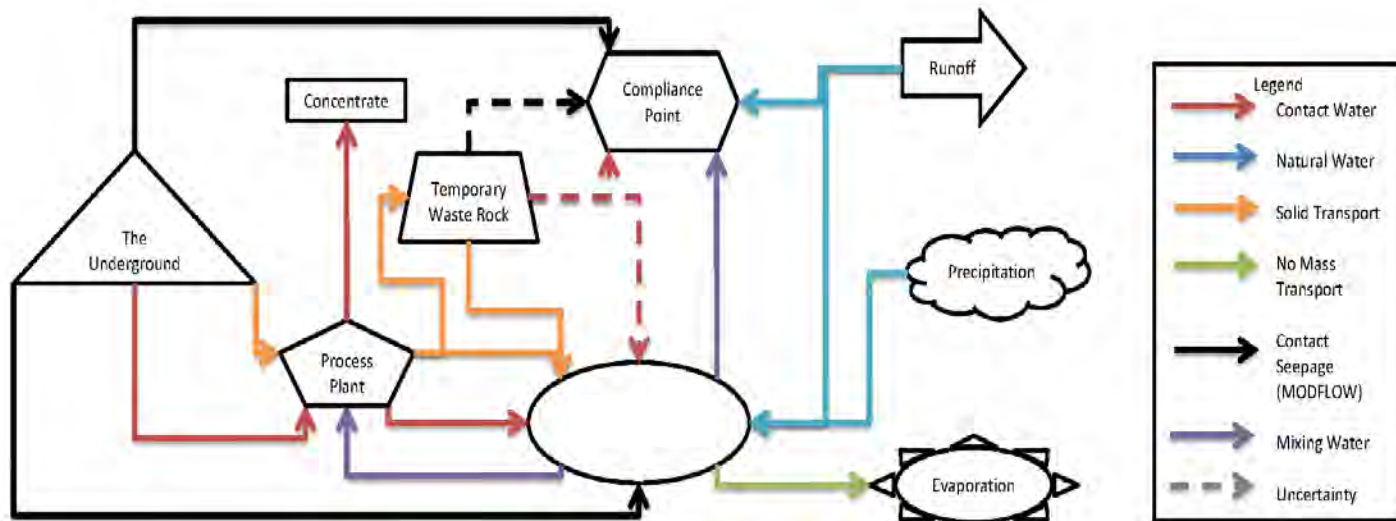
# June 6<sup>th</sup>, 2017 Agenda Items

- Water management plan/ water balance questions
  - Is the conceptual model consistent with the WMP?
  - Is the model balanced?
- Water quality prediction
  - Are all relevant source terms included?
  - Can concentrations for all facilities be presented?
- Heap leach facility
  - How is the HLF WB incorporated into model?
  - Is the water quality of the effluent conservative?
    - Closure and Operations

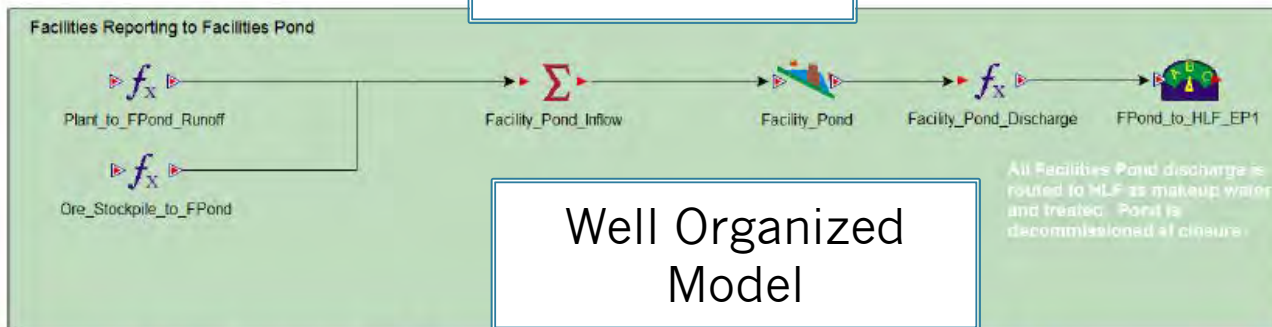
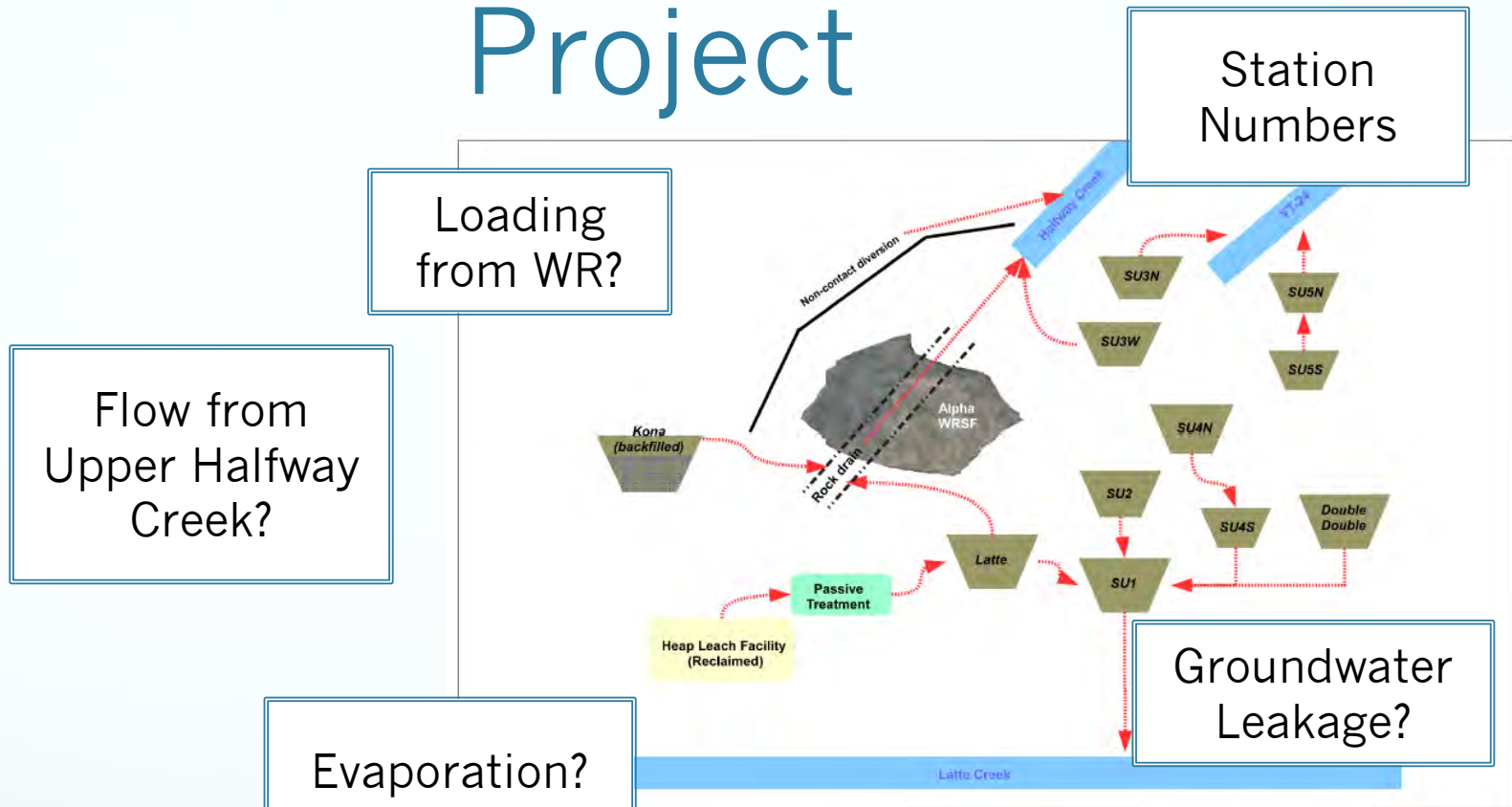


# Conceptual Model is Key

- A conceptual model allows modellers and reviewers to understand all flow and loading sources
- Often the biggest fatal flaws in water quality models are related to the conceptual model
- Request: In depth discussion for each facility



# Conceptual Model for Project



CLIENT <b>GOLDCORP</b>	PROJECT <b>Coffee Gold Project</b>
	FILE <b>Post-closure Water Management Schematic</b>
PROJECT # <b>A362-2</b>	ISSUE <b>2-7</b>

Figure 3-12: Facility Pond conceptual diagram from GoldSim WBM.

# Differences Between Water Balance and WMP

- Water Management Plan (WMP) is conceptual
- The WMP should be consistent with WBM because
  - WMP is carried forward into operations
  - Assumptions in WBM may not be correct / conservative
    - Under predict potential impacts
- Examples
  - Flows diverted to HLF unclear (Kona Pit, Facility Pond, Latte Pit)
  - Upper Halfway Creek flow during post-closure unclear
    - Flow over Alpha WRSF (IRs), flow diverted around WRSF, flow through rock drain

# Water Management Requests

- Where management assumptions in the WQM impact predictions, ensure consistency with the WMP
  - The WMP should expressly state that during all times, Kona water will be diverted to the HLF
  - Flow through rock drain, vs overtop of Alpha WRSF, diversions around WRSF should be defined
  - Diversion efficiencies should be defined and incorporated into the water balance model



# Does the Water Balance Actually Balance?

- Inflows = outflows +/- storage
- Should be conducted for all facilities and entire model
- Easy to make a mistake in GoldSim (or for GoldSim to make a computational error)
- Very complicated site
- Provide similar tables to show average flows or summation of flows

Flow	Average / Total	Total Flow
Precipitation	50	<b>650</b>
Runoff	300	
Diverted Inflows	300	
Leakage	25	<b>650</b>
Overflow Spillway	575	
Evaporation	50	

# Latte Watershed Facilities – Surface Flow

<b>Source</b>	<b>Purpose</b>	<b>Discharge to:</b>
Facility Pond	Make-up for HLF	Latte Creek
Latte Backfill Overflow Spillway	Backfilled pit	Latte Creek/Halfway Creek/SU1
Double Double Backfill Overflow	Backfilled pit (WR)	SU1
SU1 Overflow	Pit	Latte Creek
SU2 Overflow	Pit	Latte Creek
SU4S Overflow	Pit	SU1
SU4N Overflow	Pit	SU4S

# Latte Watershed Facilities - Leakage

<b>Source</b>	<b>Purpose</b>	<b>Discharge to:</b>
Latte Overflow Leakage	Pit	Latte Creek/Halfway Creek/SU1
Double Double Leakage	Pit	Latte Creek
SU1 Leakage	Pit	Latte Creek
SU2 Leakage	Pit	Halfway Creek/SU1
SU4S Leakage	Pit	Latte Creek
SU4N Leakage	Pit	Halfway Creek/YT-24

# YT-24 Facilities – Surface Flow and Leakage

<b>Source</b>	<b>Purpose</b>	<b>Discharges to</b>
SU5S Overflow	Pit	SU5N
SU5N Overflow	Pit	YT-24
SU3N Overflow	Pit	YT-24
SU3W Overflow	Pit	SU3N
SU5S Leakage	Pit	YT-24
SU5N Leakage	Pit	YT-24
SU5N Leakage	Pit	YT-24 and Halfway Creek
SU3W Leakage	Pit	Halfway Creek



# Summary of Halfway Creek Facilities

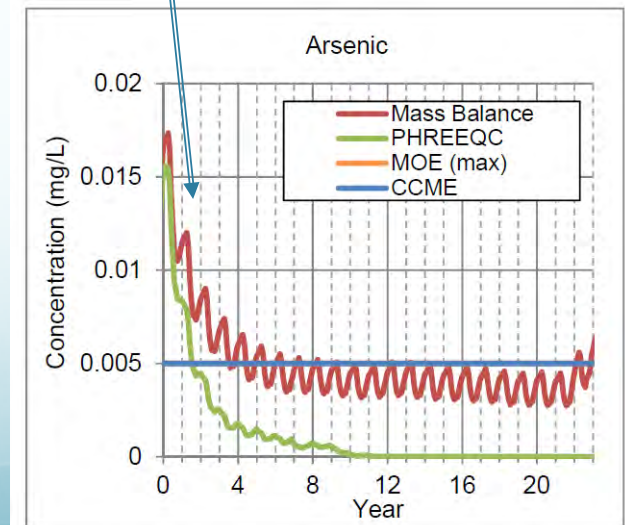
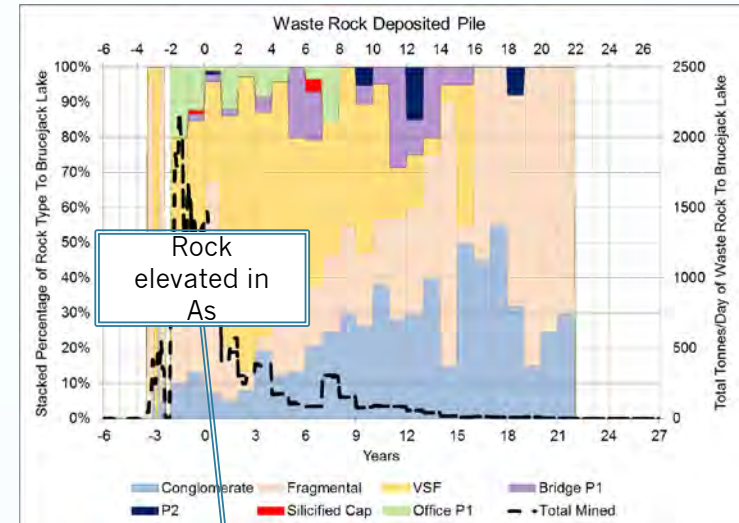
<b>Source</b>	<b>Purpose</b>	<b>Discharges to</b>
Kona Backfill	Pit	Alpha WRSF Rock Drain
Alpha WRSF	WRSF	Alpha Pond on Closure (YR 23) and Halfway Creek Post Closure
Diversion Channel	Divert non-contact water	Halfway Creek (diverts upgradient flows around Alpha for perpetuity)
HLF	HLF	Alpha Rock drain while treated during closure (Yr 20), passive treatment to Latte Pit Lake after year 20

# Loading Sources in WQM

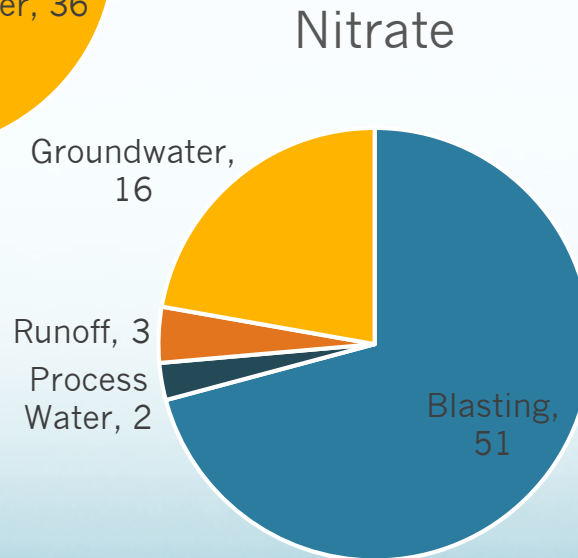
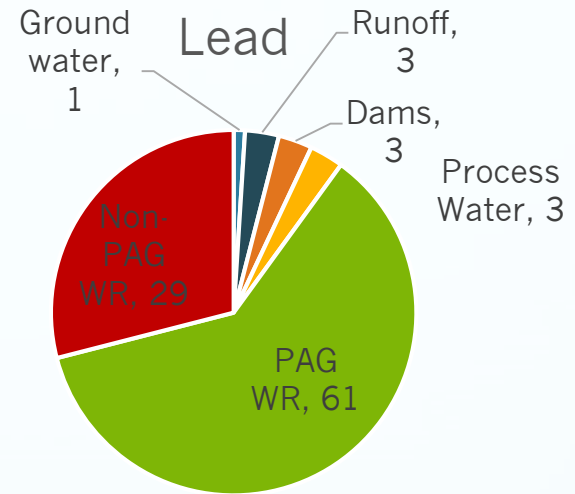
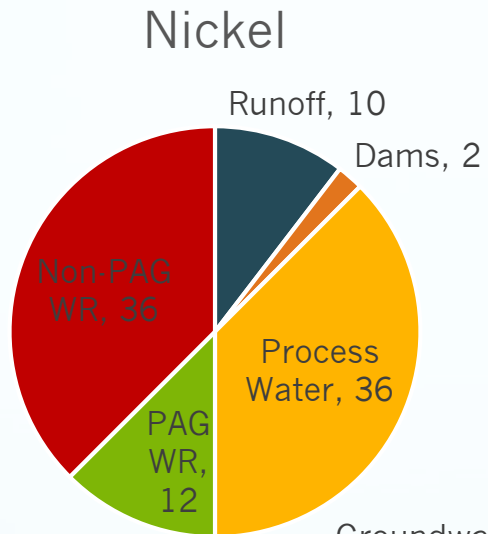
- Unclear if WBM considers all loading sources
  - Cumulative impacts to receiving environment
- Consider Sources such as:
  - Beta Waste Rock Facility
  - Kona Pit Walls
  - ROM Material
  - Overburden Material
  - Frozen Soil Stockpile
  - Construction Material / Roads
  - Dams
  - Untreated Discharge from the HLF for Closure

# Clearly Present All Data in All Reservoirs

- Concentrations in facilities are dependant on inflows and source terms
- Sometime loadings will dominate water quality and this can be evident in the review
- By reviewing the model logically, any potential inconsistencies can be identified



# Contribution from Sources





# Heap Leach Facility

- HLF water balance should be incorporated into the site wide water balance
  - We understand this is currently being conducted by Lorax
- Water quality effluent from HLF - Operations
  - What proportion of water is recycled?
  - Can contaminants such as arsenic accumulate?
  - What proportion of total flow at end of operations is attributed to Kona pit and Facility pond (ROM)

# Heap Leach Facility

- Water quality effluent from HLF - Closure
  - Describe how our the SGS columns incorporated
  - Describe how PRBs will be used for treatment of surface water
  - Describe influent quality and flow for active / passive treatment
- Provide the water quality predictions with no passive treatment
  - to assess risks and see how important passive treatment success is for the proposal
  - Request to see both the end of pipe and receiving environment consequences.

# Conceptual Model Closure - HLF

- When does model predict treatment ends?
  - End is “assigned” for active treatment to transition to passive treatment to avoid perception of perpetual treatment
- Long-term metal leaching expected for heap seepage (5 L/s), potentially with long-term treatment
- Some testing completed but more proposed during operations
  - For EA stage, additional detailed information is required

# Summary - Types of Treatment Proposed

- COPCs: Zn, Al, Ar, U, Cu, As, N-species, SO<sub>4</sub>
- Active water treatment – operations – yr 9-12
  - SART for cyanide
  - Biological treatment for N-species
  - Biological treatment for Uranium
  - Metals removal
- Passive Water treatment (long-term metal leaching)
  - Permeable reactive barrier downstream of seepage



# Development of Site-Specific Water Quality Objectives for the Coffee Gold Project

[Name Redacted]

LGL Limited

June 6, 2017



# Outline

- Issues related to the proposed SSWQOs
- Issues related to the effects assessment/water quality modelling predictions
- Principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, Coffee Creek, YT-24, and Yukon River
- Development of a work plan for deriving SSWQOs consistent with the principles and methods



# Site-Specific Water Quality Objectives - Background

## Two Water Management Goals

### Use-Protection

- Adopt WQGs
- Recalculation procedure
- Resident Species Procedure
- Water Effects Ratio

### Non-Degradation

- Background-concentration procedure



# Site-Specific Water Quality Objectives – Project Proposal

- SSWQOs based on use-protection for **Halfway Creek, YT-24, Latte Creek**
  - **Approach:**
    - Water quality variables that are naturally below WQGs, adopt WQGs as effects benchmarks
    - Water quality variables that are naturally above WQGs, develop SSWQOs using the background concentration procedure (95<sup>th</sup> percentile)
    - Toxicity testing to validate SSWQOs
  - **Concerns:**
    - Proposed approach does not follow recent guidance on SSWQO development (i.e., seasonal variability; BCMOE 2013; YG)
    - Approach allows degradation of water quality from baseline condition in Halfway Creek (chinook rearing habitat)
    - No clear plan for parameters that exceed WQGs due to mine discharges (e.g., total arsenic in YT-24; sulphate in Halfway Creek); may not be achievable





# Site-Specific Water Quality Objectives – Project Proposal

- SSWQOs based on non-degradation for **Lower Coffee Creek, Yukon River**
  - **Approach:**
    - Water quality variables that are naturally below WQGs, develop SSWQOs using the background concentration procedure (90<sup>th</sup> percentile)
    - Water quality variables that are naturally above WQGs, develop SSWQOs using the background concentration procedure (95<sup>th</sup> percentile)
  - **Concerns:**
    - Proposed approach does not follow recent guidance on SSWQO development (i.e., seasonal variability; BCMOE 2013; YG)
    - Alteration of the exposure scenario
    - No clear plan (i.e., mitigation) for parameters that are expected to exceed PSSWQOs due to mine discharges (e.g., total molybdenum in Coffee Creek); may not be achievable



# Issues related to the Effects Assessment and Water Quality Model

- Has the use of best management practices, with respect to blasting, been incorporated into the water quality model?
- Require clarification on the use of the baseline water quality in the water quality model (total versus dissolved).
  - Is there an expectation that the fraction of metals in the dissolved form will increase?
  - Should SSWQOs be developed using the dissolved (i.e., bioavailable fraction)
- Incorporation of ameliorating factors into WQG/SSWQO development should account for seasonal variability.
  - Sulphate in Halfway Creek is predicted to exceed the WQG during high-flows; not addressed in the effects assessment.
- Acknowledgement and discussion with respect to model predictions above non-degradation based PSSWQOs



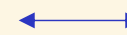
# Tr'ondëk Hwëch'in Proposal for Site-Specific Water Quality Objectives

- SSWQOs based on non-degradation or use-protection
  - **Approach:**
    - **Halfway Creek, Latte/Coffee Creek, Yukon River:** For all water quality variables, develop SSWQOs based on the background concentration procedure, accounting for seasonal variability
      - SSWQOs as an upper limit and a long-term average
      - Exceedances in up to 5% of samples expected
      - Exceedances of up to 10% in magnitude may be acceptable
    - **YT-24:** For all water quality variables, adopt water quality guidelines; for variables that are naturally above WQGs, develop SSWQOs using the background concentration procedure
      - Account for seasonality
  - **Concerns:**
    - Predictions based on the current mine plan show non-degradation of Halfway Creek, Coffee Creek, and Latte Creek is not achievable.



# SSWQO Workplan

- How do we derive SSWQOs that are achievable and consistent with Tr'ondëk Hwëch'in water management goals?
  - Collaborative process
  - Multiple steps involved, include:
    - Classify mine-affected waterbodies (or reaches)
      - Culturally or ecologically sensitive waterbodies (non-degradation)
      - Typical waterbodies (use-protection)
    - Identify chemicals of potential concern based on water classification (model predictions) and refine list of COPCs
    - Select appropriate method for derivation
    - Derive SSWQOs
    - Validation of multiple use-protection based SSWQOs through toxicity testing
    - Confirmation of SSWQOs through AEMP



Identify potential mitigation options (e.g., diversion of water to YT-24, WRSF cover, diversion of WR to YT-24 catchment) and conduct sensitivity analyses





# SSWQO Workplan

- Next Steps
  - Parties to agree to collaboration
  - Develop joint workplan
  - Develop timelines





**Meeting Title: Tr'ondëk Hwëch'in Technical Meeting**

**Date and Location: June 5, 2017 Westmark Whitehorse**

**Introduction: Purpose and Objectives**

**Agenda Items:**

**9am – 12 pm: Northern Access Route**

1. TH presentation of views
2. Review of Black Hills Route vs Maisy May Route
3. Discuss Northern Access Route Management

**1 pm – 4 pm: Reclamation and Closure**

1. Reclamation and Closure Overview
2. Discussion of "End Land Use Plan"
  - o Land capability studies (TH Presentation of Views)
  - o TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)
  - o Reclamation Research
3. Define the need for cover materials at Closure
4. Concern with the creation of long-term water bodies and ways to reduce long-term risk.
5. Need to consider permafrost melting in more detail (operations and closure)
6. Social aspects of closure (training, workforce transition strategy)

**Attendees:**

**Tr'ondëk Hwëch'in:**

[Name Redacted]

**Goldcorp:**

[Name Redacted]

[Name Redacted]

## Discussion of Key Topics:

Introductions and safety share about bears and food waste, TH does a bear safety course for field staff.

Decision to begin with Goldcorp presentation of views prior to TH presentation of views on the NAR.

### NAR Discussion:

OnSite (hereafter Goldcorp) provides background to engineering on the NAR. An overview of the NAR is given, notes that upon learning that the NAR route decision was unclear with TH, there was a Maisy May vs Black Hills route comparison study done and provided to TH. This comparison is discussed, noting that disturbance area, overall safety, and CAPEX were the large considerations for choosing the selected route. Goldcorp provides a history of the studies done to support the NAR selection. Notes that field work made it clear that there were issues with building new road and permafrost, and in discussion with placer miners learned that there was a Black Hills bypass road to be built. Main considerations were the length of new road and permafrost, and considerations of bridges to be built are also important. The Black Hills route required new road, as it currently ends at the last claim, and the wagon trail from this follows a very wet route, and has much permafrost. Therefore, it is required to go a high route to avoid the permafrost, and then resulted in a route that was difficult, engineering wise, to connect to the existing road. At the time, the understanding was to not disturb settlement lands. Discusses the fish presence and stream crossings on the NAR and on each route option. Goldcorp discusses the lower number of crossings of Maisy May with the preferred route as compared to Black Hills. It is also preferred to be in and out of riparian areas as quickly as possible with the route design.

Switchbacks are also a main concern for the route, particularly related to safety. There are many switchbacks on the Black Hills route, and currently trucks cannot haul on this section when it has rained. There is a crossing at the bottom of the switchbacks that has 20-30 feet of aufeis as well, which is a

problem. Goldcorp describes the construction for each route when referring to the map, noting areas of new build and upgrades.

Q: Notes that permafrost comes out as a concern, but doesn't come out in the report. How is permafrost considered?

A: Only the engineering considerations are presented in the memo. All heritage sites that were known were avoided. Shallow ice rich areas have a lot of "things" in them, for example anecdotally noting that there were lots of moose trails.

Q: The considerations are listed, but not discussed, for example heritage and wildlife.

A: This is outside of Goldcorp's scope. Avoiding permafrost is such a big part of road planning, that makes it a driver for the considerations. Goldcorp presented the decision making of the route, it was not a summary of all of the effects of the NAR.

Q: If it is a tradeoff study, it's missing those other features.

A: Thanks TH consultant for the comments. Asks if there's anything about the physical route area before moving on?

Q: What is the clear definition of new road vs existing road?

A: Two wheel drive pickup access is considered existing, to the last operation on the route. There is a historic trail, but you can't very easily tell that it is there, and it is in permafrost, so there is new road after the final claim on the "Black Hills Route". New construction is realignment

Q: What are the implications of road construction and maintenance in permafrost?

A: Permafrost means shallow permafrost, so normally North facing slopes and an active layer. When building road across this, you don't want to impact the active layer and change the depth of it. When you strip shallow ice rich permafrost, you degrade where the active layer is. This causes stability issues on the road. Describes how to build over permafrost using embankment fill and a drainage system. In construction of embankment fills, it is very hard to not disturb the permafrost.

Q: Notes that the entire area would freeze and thaw seasonally, so what is the problem in certain areas?

A: Goldcorp explain the discontinuous permafrost across the landscape, and the special considerations for shallow ice rich permafrost. This is non-thaw-stable permafrost, so it is of concern. Non-ice rich permafrost is not an issue, as it is very stable. Goldcorp explains how the ice rich permafrost becomes unstable in thawing. Goldcorp explains the instability of ice rich permafrost in detail.

Goldcorp discusses the Maysy May route and how it is safe and low maintenance, relatively speaking. Goldcorp notes that ice rich permafrost is a major consideration on site as well in terms of engineering.



Goldcorp continues to discuss the NAR tradeoff study, notes the real-time values used in this now. Notes that switchbacks are difficult to build, expensive, and a safety concern, noting that Goldcorp's switchbacks would be much safer with flatter grades than exist currently.

Q: Referring to switchbacks and the report, notes a discrepancy in the number of meters of switchbacks in the memo.

A: This is likely a typo. Action to check the number in the switchbacks.

Discussion of the mitigations for the ice rich permafrost areas for the crossings proposed for the NAR. A ridgetop road has far less impact in term of effort to build it, thinking about carbon footprint, and far fewer drainage issues, so there are far less water interactions. Goes on to discuss the Maisy May route vs Black Hills route chart, explaining that grade of switchbacks, ice accumulation, ice-rich permafrost, stream crossings are the major considerations.

#### **TH Presentation of Views on NAR:**

TH begins to discuss their memo on the NAR and considerations of impacts. TH is looking at the information, where there may be outstanding questions, where the review is more detailed than just the engineering.

#### **Heritage and Culture:**

TH notes that the heritage considerations came from the Heritage Department, who are not present today. Notes that there is not enough information available, and often the effects are similar for the two routes. The conclusion for Routes 1 and 2 note that further work is needed for socio-economic and cultural effects. TH notes that the R1 Heritage Resource Impact Assessment (HRIA) is inadequate, and there is no R2 HRIA. TH notes the Han Migration Route and Maisy May farm as important sites, and notes the graves and spirit houses on the east side of Coffee Creek.

#### **Fish:**

TH notes that further information is needed with respect to studying both routes in the Goldfields area.

Q (Goldcorp): Asks if the studies provided in the Project Proposal were considered when preparing this document from TH?

A (TH): Can't answer that. The baseline information provided in advance has changed with the YESAB submission, so further work may be needed.

#### **Wildlife:**

TH discusses potential effects to the Fortymile caribou for R1 and R2, noting that caribou are often found on the edges and upper parts of the slopes of the valley.

Q (Goldcorp): Asks if this has to do with sloping, or the placement of different habitats?

A: Henderson dome is quite high, whereas Black Hills descends more quickly to lower elevations, and looking at the model, the impacts appear to be in lesser quality habitat. Also proximity to core range is a concern as well.

Q (Goldcorp): The conclusion in the PP is that the core range would expand, is that not a consideration for TH?

A (TH): Caribou will most likely cross both routes, but based on the selection criteria for the model, the habitat considerations are as noted earlier.

TH discusses potential effects to moose as described in the TH memo. Notes that while moose will be moving around, more of the moderate-high quality habitat is along R1 than R2.

Q (Goldcorp): Asks about the confusion of the quality or existing road in the Black Hills area, but now that we've discussed the new road that would be required in the Black Hills area, are the thoughts the same on the effects, or is it just higher elevation habitat that is of concern?

A (TH): Focused on winter habitat; don't know how wetlands are used for calving etc. The Henderson route has more of the high-moderate rated habitats for winter observations.

Q (Goldcorp): There was concern raised about post-rut and winter habitat, just wondering what the details are.

A (TH): As discussed in a previous workshop, the concern with freeze up, there are concerns about when the road is going to be active until. When the barges come out, will the northern section be maintained? Depending on the winter you're having, access will be easy for a 4 wheel or 2 wheel drive, and there's concerns for predation by wolves in the post-rut areas.

Q (Goldcorp): Notes that in October and November, the areas that are being discussed for the post-rut section, those roads are open right now and there is traffic on the road right now. While the scale may change, argue that these areas are open now.

A (TH): Sees the point, notes that there will be a change to the use and maintenance of the road with the Project. Notes that this is a relative comparison between two options, rather than an absolute determination of effects.

TH continues presenting views on potential effects to moose and moose harvest. Notes the need for a harvest management strategy. TH discusses the potential effects to Thinhorn sheep, such as avoidance or dispersing. TH presents the views on Grizzly and Black bear, and Wolverine as presented in the memo.

Land and Resource Use:

TH discusses how year-round road maintenance can allow for increased rural residential applications when the road is maintained year-round, and may impact TH's hunting rights.

Q (Goldcorp): Asks if "year round residential road" is a particular designation?

A (TH): Typo. Look at "rural residential policy" and "placer residential policy". There can be impacts if the second policy is taken off hold.

Q (Goldcorp): Asks if hunting buffers exist around current placer camps?

A (TH): The concept is that you don't want to be hunting around where people are. If the person is there, and that's a residence, there's a 1 km buffer.

Goldcorp thanks TH for this; this is the first time this has been heard as a concern.

TH goes on to discuss settlement land, notes there are 3 parcels for R1, 2 for R2.

Q (Goldcorp): noting that it is not possible to use the old cart trail there due to the terrain and would have to cross into settlement land as a result, would that be the same conclusion?

A (TH): That would change things.

Q (Goldcorp): Goldcorp notes that if they have to cross settlement land for R2, would that be the same conclusion?

A (TH): Regardless, potential for impacts are there.

TH discusses how cumulative impacts are a major consideration for TH, with an established route there will be much more access and potential for expansion of placer claims.

Q (Goldcorp): Given that there's access nearly all along the Maisy May route, do you think there will be more access made when compared to the larger new build on the Black Hills route?

A (TH): There is much open ground to the west of Maisy May road that could be accessed, better ability to move equipment to move fuel and equipment to open up new ground. Notes that Goldcorp has no control over the additional satellite roads that the placers can build off of the upgraded road, and consider the effects to moose, caribou. Black Hills has been staked and mined historically, and now placers are in the Maisy May area, this is why they want the Maisy May area. Black Hills is reclaiming itself, if you will.

TH discusses traditional plant harvest, notes that there is not enough data to know where the effects that may be.

Q (Goldcorp): Asks if the effects presented in the Project Proposal are unacceptable?

A (TH): Replies that the effects are just unknown.

TH describes that for invasive species, the amount of rank 1 invasive species and potential to spread is higher on R1 than on R2.

Q (Goldcorp): Given the information on the amount of construction required on the Black Hills route, while they may be more established, but then may be disturbing a new route, would the introduction in the new construction area not be of concern?

A (TH): This would be a concern.

Q (TH): Asks if active management is specific to new build?

A (GC): Yes.

TH: Then there would be less concern for spread of invasive species on the new construction on Black Hills

Q (Goldcorp): Asks what the difference is going to be between the two routes, given that placer mining will continue on Maisy May?

A (TH): The concern is how much money GC and YG are giving placers to build those roads. If they had to do this on their own dime, they wouldn't be doing it so quickly. Only reason it is accelerated is because of money from YG. From a traditional economy perspective, what can be potentially lost when opening areas for placer development? How to make sure that these resources aren't just being bulldozed by a cat. TH refers to medicinal plants, traditional uses of forest and timber resources. There needs to be something left for TH to sustain into the future. Agrees that it doesn't make sense to have two access roads in that area, but it depends on what the interests of YG and the KPMA are in this area. Then there's the concern with building satellite roads.

TH notes that the comparison of the routes stopped at the technical level, and the memo is a starting point to display TH's considerations of the routes on these interests of TH, and looking at how the routes rank. This is a starting point for more information, not a conclusive document.

Goldcorp notes the term "ranking". Goldcorp notes their ranking of things is known, but TH's ranking of considerations is not. This is a discussion that needs to happen in terms of ranking priority.

TH states that at previous meetings, TH was asked for feedback. This is high level feedback. TH can continue to work through the questions, as Goldcorp's memo was recently provided. More discussion is needed on this. This needs more discussions with each other. Goldcorp thanks TH for presenting views on the NAR. TH notes the planning efforts with YG to open up the goldfields for timber harvest. TH notes the wetland considerations for R1 and R2 as well as the wildlife considerations.

TH summarizes that these considerations are a high level review of values other than engineering for the NAR route.

Q (Goldcorp): Asks about the comments to adequately understand certain aspects. When Goldcorp sent the memo, this was thought of as an addition to the VC reports in the Project Proposal. Goldcorp would like to know how much of the Project Proposal was considered in this memo from TH.

A (TH): Replies that the alternatives section of the Project Proposal looks at different routes, but Maisy May and Black Hills is captured in one option in the Project Proposal. TH's memo breaks the routes out and looks at them from a TH set of VCs, and looking at this in combination with the engineering information.

Q (Goldcorp): Asks if there are aspects within the Project Proposal where this information is being seen as inadequate for R1? Are there concerns for how R1 was assessed? This will help Goldcorp understand.

A (TH): TH needs to ensure that all IRs from before have been answered and review of the Project Proposal that was filed, but generally the lack of data on the Black Hills route is the concern.

Q (Goldcorp): Goldcorp is looking to understand what are the core issues that would make the difference between the two routes? If Goldcorp is doing additional work, want this to be of value. What study and results are necessary to make a decision on preferring one route or the other?

A (TH): TH would need agreement on the weighting of the considerations. If it's cost and engineering driven, without a weighting of some of these other components, then this can't be answered.

Q (Goldcorp): Asks if TH has ranked the VCs they have presented?

A (TH): There needs to be a set of VCs agreed upon and a ranking exercise.

Goldcorp is going to rank the safety and engineering very highly, and struggles to think of a conclusion of a study that would out-rank that. From a technical perspective, these are not shades of grey; there is one route that is very difficult and expensive to make, and one route that is fairly straight forward. It is important to know what valued components are of highest priority and focus on those items.

TH responds to Goldcorp's considerations of safety and engineering, noting that conclusions of things that we would like information on, include TK of the area; recently an arrowhead was found and returned to TH, there are still things out there that may be higher use areas such as camps, which are usually along routes and have higher value heritage objects. If people are trapping in the area, what are the trappers' future plans? There is still information that needs to be collected and looked at. When can we collect that information, and when do we look at that? TH notes that rather than looking at this as a particular VC, it's looking at the impacts to TH's rights and interests and considering these all together. That's where TH would like to get to for the two options; the net outcome.



Goldcorp explains that the costs are not the sole concern. Timing and the process for YESAB is also noted. Additionally, Goldcorp notes that we may agree on extra studies or methodology but arrive at different preferences based on the results. TH and Goldcorp need to consider where collective resources are best spent in time and work on the evaluation. Goldcorp notes that this is all being said as a consideration, and not trying to diminish the interests of TH.

TH responds to Goldcorp's comments noting need for more information on the NAR and that TH is looking at the impacts to TH rights. It is TH council's responsibility to look out for citizens' interests, and make sure that these are being considered. TH is reviewing the YESAB application but still has a lot of questions, including related to IR responses on pre-submission document review. TH knew that the March 31 deadline meant that Goldcorp was working hard, and that they wouldn't have all of the answers. That's why we are where we are today.

Goldcorp asks to clarify if the request for information is not just these two options for the road route, but the entire NAR.

TH replies that the considerations around potential effects of having a year round route, and needing more information on things like heritage values, archaeology assessment, a TK study, a traditional economy study, and how that would have an impact on traffic activity, or if there will be an impact.

Goldcorp acknowledges this and notes that there also appears to be broader concerns than just these two route options, so Goldcorp is looking at doing work broader than these two options. Goldcorp acknowledges that there are perceived information gaps, and that Goldcorp is considering the next steps in terms of TH providing some conclusions for Goldcorp, whether that be ranking some of these considerations, whether it's Goldcorp committing to some further work. Goldcorp would like a plan forward leaving the room today, noting that both parties will deliberate and think on it and discuss later in the day.

### **Reclamation and Closure:**

#### Source Environmental Presentation (TH Presentation of Views):

Source Environmental, representing TH (referred to as "TH" here forward), notes the statements in the Project Description about reclamation and closure about returning the landscape to conditions for future use, but noting not to baseline conditions. Closure is a process, not an event. Notes that the application would benefit from eco hydrologic and end-land-use mapping. Presents on reclamation planning, notes topography and materials are very important in closure. TH discusses land use as an important consideration in closure as well. Ecosystem mapping of the pre-development is an important aspect of creating the land capability inventory. For post-mining conditions, soil conditions are very important. This has to do with the materials for cover and reclamation. Suggests to look at reclamation material available, and to look at material that can become available. Discusses the importance of soils, relief (topography and energy), and climate in the eco-hydrologic projection of post-mining conditions and in a step-wise process. Notes more ecosystem variety in the pre-development case and less in the post-development

case. The point is to characterize the habitat pre-development and project the post-mining disturbance to see the changes that are going to occur based on the disturbances, and use this in reclamation planning and research. For example, post-mining capability for culturally important plant species.

TH notes that the closure plan is disconnected from the closure goals presented by Goldcorp. Goldcorp replies that this is intentional at this stage; Goldcorp considers it more responsible to present the pessimistic goal. This goes the same for WQ, wildlife. Goldcorp is not presenting the optimistic view This is the starting point.

TH notes that in the conceptual period, meaning in the EA stage, that it is expected to see a closure plan that is acceptable. TH doesn't want to say that they're not happy with the conceptual closure plan and see it go ahead, for example not having any soil material for covering the WRSF is not something TH is happy about.

Goldcorp's consultant notes that this closure plan is not read in isolation, it is not stand alone. For example, in 2.1 of the conceptual closure plan refers to 15A in vegetation. The site has been characterized already; there's two zones, sub-alpine and boreal. There are 26 different types of soil-vegetation associates and topography. Appendix 15-A has the characterization of these approximate 26 different types of ecosystems. As most people know, you have to re-submit your reclamation and closure plan every 2 years in Yukon. This is not the reclamation and closure plan that takes you into licensing. This is not as detailed as what is required in licensing. Goldcorp adds that if Goldcorp could put soil on the WRSF and be confident in the soil inventory available to commit to that, then Goldcorp would include that in the reclamation and closure plan. This site is unique in that there's not a lot of soil at the site to begin with. This is not new information to TH; Kaminak has been discussing this for years about the lack of soil and needing to put the soil in priority places. It is not for lack of interest in covering the WRSF, it is for lack of inventory. This isn't a result of Goldcorp not wanting to pay to cover the WRSF.

TH comments that having no soil for the WRSF set aside is a problem.

Goldcorp comments on the difficulty of sourcing soil: If it means borrow sites for soil, consider how Goldcorp is going to get soil and the options for that.

TH notes that this has been considered. TH's consultant states that based on their analysis, there should be more soil, noting that ice-rich soil is an uncertainty. TH's consultant notes that the vegetation information is strong, but reclamation research should include soil. TH understands that this is a conceptual plan, and that details aren't expected at this point. They want to understand gaps and propose research programs to close them.

TH and Goldcorp discuss challenges with soil estimates and geotechnical stability issues.

Goldcorp requests a draft of report that TH has on assessment of soil availability and Goldcorp's conservative approach. TH notes its need to understand what is possible and arrive at a plan that is

acceptable. Goldcorp states that if there is extra soil above what is required for the Heap Leach reclamation, it will go to Waste Rock Storage Facility. Goldcorp underscores that .

The plan is not based on trying to avoid doing something, it's based on the current understanding of the limitations. Additional work is being done this summer on geotechnical components and soil.

TH comments that they have delivered their views, and want to be collaborative with this. A discussion is held on next steps and action items are noted (see final page)..

### **Long Term Water Bodies:**

TH's consultant describes the water bodies in closure, and discussed options where there are no water bodies. This would return the landscape and reduce the risk around long term water quality. TH wants to have a big picture discussion of the implications of having many small water bodies in closure. Goldcorp will need to discuss internally before being able to respond. Goldcorp notes that there's been discussions about what is being proposed for backfill and where Goldcorp stands on that. TH would like more concrete information on why Goldcorp can't backfill.

Q (Goldcorp): Asks to clarify for the pits, that TH wants Goldcorp to look at a concept where there wasn't a surface water expression? In this climate, there is a positive water balance so there will be a surface expression in any case. Goldcorp comments on backfilling, noting that they want to minimize the ex-pit waste, and to economically backfill.

A (TH): (Comment) TH understands that there could be some additional backfilling without damaging the economics of the Project.

Goldcorp replies to TH's comment noting that this is correct, but there are some significant resources in these pits, and don't want to sterilize something in the future. There is a broader mineral reserve that has potential there, but we are not talking about those now. For the future, there is opportunity to engage in consultation for a permitting application.

TH replies noting that they think there's more opportunity to optimize the backfilling. TH is interested in a closure concept that doesn't involve water bodies. TH would like to see rationale for this.

Goldcorp explains that there is significant cost to move rock to a WRSF. At this point, this is what Goldcorp proposes to do with waste rock. When Goldcorp gets to a point in the future where the site is better defined, other options can be considered for waste rock.

TH notes that the objective is returning the landscape to a similar condition to the surrounding landscape; it's not about returning it back to the way it was necessarily. TH also expresses concern regarding the pit lakes related to both water quality and hazards to wildlife. TH adds that reclamation is one of the most important parts of the mining application. Describes rights in the TH Final Agreement, Chapter 12 and 16 took the longest to negotiate in the agreement because of the sensitivity and values placed on the environment, wildlife, traditional foods. Those chapters were negotiated to put processes in place to deal

with these environmental concerns. This sets out expectations for using the land and protecting the environment for future generations. Understands that the application is trying to meet the minimum standards in some cases, wants to be collaborative for setting the objectives and goals for closure. Goldcorp thanks TH for the views presented.

TH delivers views on permafrost, noting the information presented in the Project Proposal on thaw of permafrost soils. Notes that in post-closure, the thawing of permafrost could have significant impacts, and is likely most important to groundwater. TH presents multiple permafrost concerns, including not using it for a waste management/contingency, deepening of the active zone and increased groundwater flow pathways, increased pit leakage rates, ground setting and undrained failure, destabilizing facilities and/or alpine slope failures, change in groundwater flow patterns and baseflow rates, and degradation in baseline/background water quality as a result of increased flow through mineralized zones. TH notes more uranium might be seen in groundwater with permafrost thaw, and has requested additional thermal modeling to be conducted related to mine activities, assess pit leakage from the pits without permafrost, assess the impact of alpine slope failures or destabilization of facilities, and assess the impact on baseline water quality/stream flow. Particular interest around Kona pit and groundwater flow patterns and pathways.

Goldcorp notes that there are some sub-topics here, in terms of water quality, which will be discussed tomorrow. Notes that this is valuable feedback, and suggests an additional session to bring the groundwater and geotechnical people around for a discussion on this.

#### **Reclamation and Closure Presentation by Goldcorp:**

In interest of time, the discussion is moved ahead and Goldcorp notes that there are many conversations to be had, this is just the start. Goldcorp acknowledges the need to set broad closure objectives together. Goldcorp explains that Yukon has a closure policy that Goldcorp has to meet, noting that there are some details to be ironed out within the policy in terms of the final view of closure. Goldcorp gives an overview of the permitting process from the current stage Goldcorp is at, describes the third party reviews that occur as part of the permitting processes for quartz and for the water licensing. Notes the review of closure plans as an important aspect of these processes. Goldcorp describes the reclamation plans and security process, and how this is renewed every two years. Closure estimates are based on the costs today and in two years to close the operation, and helps to show the level of disturbance in the next two years, as well as an end of life cost. This gets re-iterated every two years. Cost has to be updated in one year. Every plan submission goes through review and approval under both licenses.

Q: How long is the review process for two year updates?

A: It can take anywhere from 3 months to up to a year or two.

Q: With the experience with the review process, does the due date adjust based on review period?

A: That would be in the approval letter from the regulatory bodies.

Closure planning is discussed, notes that conversations with TH haven't happened yet. It's important that people who are using the land have the input. Reclamation research is key to success in closure. Goldcorp discusses the conceptual reclamation and closure plan, describes the 7 sections of the CRCP, and was developed based on industry best practice and informed by Yukon regulatory, policy, and guidance requirements. It is noted that the objective is to permanently close the mine with minimal long-term monitoring and maintenance by implementing a technically feasible plan, which is why WRSF cover is not included, as it is not technically feasible at this time. Discusses the values included in the closure objectives and displays reclamation and closure timelines and figures. Goldcorp describes the small opportunities along the way for reclamation at the site. Goldcorp describes the key activities in post-mining closure and in active closure, including the monitoring. The triggers for post-closure are discussed and how monitoring is reduced over time.

Q: Asks about the active phase vs the post-mining phase.

A: replies that this was in the feasibility study, and describes the definitions of these.

Q: Notes that there will be work to do on the HLF, not walking away.

A: Goldcorp explains that monitoring will occur, but unplanned activities will occur should anything arise. This is just planned activities. Goldcorp adds that post-closure is only met when all objectives are met; objectives need to be determined with TH.

Q: TH asks about minimal soil depth for closure?

A: Goldcorp replies that there is none in the guidance.

Goldcorp continues the presentation on general reclamation measures and practices. Discussion of soils and planning to use stockpiled materials. Still work to be done to define how much ice rich soil can be found on site vs the peat-type soil. Goldcorp discusses the reclamation research programs that are ongoing. Describes specific activities for closure at site, including closure of the stages of the HLF.

Q: TH asks about the raincoats covering the HLF long term and Goldcorp's experience with them?

A: A Geosynthetic Clay Liner (GCL) goes overtop for a long term cover. Used in operations and can be used as well in closure, although the GCL is considered the main cover for the GCL. This is not the first time a heap in this climate has been capped this way.

Goldcorp describes closure of the HLF, including grading and channels for runoff and closure of the event ponds and rain water catchment pond. Discussion of the WRSF and stockpile closure targets. TH and Goldcorp discuss how the CRCP needs to have it built in that Goldcorp will cover the WRSF if possible, Goldcorp notes that the frozen soil stockpile is located conveniently by the WRSF to do this if possible. Water management at site and monitoring at site in post-closure is described.



Q: TH asks if the upstream and downstream effects are going to be constricted to Yukon River and Coffee Creek?

A: The aquatic effects monitoring program hasn't been ironed out with details yet. Hope to have many years of data to compare at the site level. See it as a continuation of the baseline studies.

Q: Asks about consideration for the upcoming Mine Licensing Improvement Initiative (MLII) work and how that might influence your closure plan?

A: Goldcorp knows the new guidelines are not set in stone yet, and the timeline isn't known, Goldcorp has had internal discussions about where we're meeting those requirements before they are implemented. Goldcorp can start building those commitments into the plans. There is a discussion regarding the potential class that would be applied under the draft guidelines. Goldcorp notes that many of the requirements, including audits, reviews, and design criteria, are all going to be incorporated anyways. The waste infrastructure management piece is definitely being considered by Goldcorp and the consultants for the Project. Today is meant to be the first of many discussions on closure.

TH requests more information about passive water treatment plan.

#### **Goldcorp Closure Presentation:**

VP of Reclamation Operations Business Unit presents on Goldcorp's experience with closure and reclamation. Goldcorp explains where the closure group fits into the mine life cycle and gives an overview of the mines that Goldcorp has that are currently in closure. Goldcorp gives an overview of the reclamation and closure planning standards and guidelines that Goldcorp follows to achieve a similar standard at each site across the Americas. Progressive reclamation is a big piece of ongoing development and research, and informs final closure planning. After acquiring many sites, Goldcorp looked to do things differently in terms of closure. Reclamation of a heap leach in Nevada is discussed. Some sites are close to communities, and closure of the site has led to sustainable business development, such as in Honduras. Goldcorp describes site closure in Mexico where there is no regulatory requirement to do so, and Goldcorp's first steps to reclaim the site by removing and revegetating site infrastructure. Marlin mine stopped production last week, and is a display of progressive reclamation.

Q: TH asks about the standards that aren't jurisdictional that will be applied.

Goldcorp notes that some are broad, like chemical and physical stability. Physical stability means in the long term. Also have to work with the conditions at site, which will change between now and end of mine life. Goldcorp also notes that Yukon has the regulatory piece that requires these updates too, which is progressive.

TH revisits issue of backfilling and that TH thinks its corporate culture that Goldcorp doesn't want to backfill.

Goldcorp gives an example of Marlin mine, where it was never to be backfilled, but in mining realized it could be worked to be backfilled and now it is. For the Coffee Project, Goldcorp doesn't want to backfill something that we may want to potentially mine in the future. If the reality is that if we don't want to mine further in those pits, there's great financial incentive to backfill as it shortens haul distance. Many things tie into this, such as water quality.

Goldcorp notes that there is a model to show what the pits would look like at \$2000 gold price, suggests showing the block model first thing on June 6<sup>th</sup> to explain this more clearly. Goldcorp explains when and why the pits would potentially be mined further in a separate application. Goldcorp notes that the ore continues down, but the HLF becomes less efficient in extracting the gold. There are lots of things that tie into the mine that could allow it to grow or not. Goldcorp is so far away from making those decisions that we need to leave it open at this time and make decisions that allow for further mining if our information points to further mining. The cost of running haul trucks alone is reason itself to backfill, should that be determined to be the economical choice. Goldcorp notes that it's very typical that a proponent puts in updated mine plans, for example sequencing, as a licensing amendment. It's not unreasonable to expect that. Goldcorp notes that the next version of the RCP is required to be quite detailed, and that TH could benefit from reviewing those requirements; determining closure objectives is key for the next steps.

Q: TH asks about future YESAB applications.

A: There are some positive results from exploration, and if that pans out then we will pursue another application if it looks feasible. Goldcorp notes that mine sites are dynamic, with constant change and improvement.

#### **NAR Follow up and Next Steps Discussion:**

TH presents on proposed next steps for the NAR analysis from TH's perspective.

- Propose approach to next steps on NAR and Black Hills comparative analysis:
- As identified in TH's memo and TH's submissions to YESAB on the PP, concern with analysis of R1 and R2 and impacts on TH rights and interests
- In comparison to Maisy May route, baseline data are lacking for a number of the VCs presented in the memo for R2
- To address concern, TH will prepare ASAP a proposal that will identify VCs that TH has enough info on to prepare views,
  - will identify VCs deemed to be of greatest importance and data gaps are so material such that TH is unable to determine a preference over the two routes (not all VCs are equal, will identify top priorities),
  - will set out options or steps for addressing data gaps in a timely manner,
  - set out an approach for doing a multiple accounts analysis such that the R1 and R2 effects on TH rights
  - Seek to incorporate output of 3D into a comprehensive multiple accounts analysis that considers the full suite of VCs and considerations (i.e. engineering) for the routes.

TH notes that they are not focused on one of the two routes, but focused on finding the route where they understand the implications of the route on TH rights and can discuss with citizens.

Goldcorp thanks TH for allowing them to caucus, Goldcorp would like a commitment from TH for a date to provide the information, and is looking for a 30 day conclusion process. Goldcorp thinks that TH and GC are aligned, but would like to see the information and go from there. It is decided that TH will provide a proposal by June 13.

### Key Issues and Concerns:

Tr'ondëk Hwëch'in raises the concern that impacts to TH rights are considered and not diminished in the selection of a road route. This is related to the multiple values discussed by TH in their comparison memo. Goldcorp notes the importance of safety and permafrost as it relates to route engineering and selection. TH and Goldcorp discuss weighting the values, and coming to a consensus on the values to then have further conversations. Goldcorp highlights being willing to do more studies, as long as the studies will have a useful outcome. Goldcorp and TH discuss the desired outcomes of any further studies; TH notes that the outcome is to consider all of the values presented by TH as well as the engineering and permafrost considerations. Goldcorp and TH caucus to discuss, and decide to re-visit the topics at the end of the meeting (after the closure presentations).

TH's consultants present information on reclamation and closure, and there is a detailed discussion of the amount of soil cover available for reclamation. TH and Goldcorp both acknowledge that the conversation about reclamation and closure has just begun. TH's consultants highlight the long-term water bodies proposed in closure, and want to review this further. Backfilling is discussed in detail, and Goldcorp iterates the reason for the currently proposed levels of backfilling at site. The reclamation and closure plan process in Yukon is described in detail by Goldcorp.

### Action Items/Next Steps:

Action Item	Person Responsible	Date Required
Check number of meters of switchbacks in the memo.	[Name Redacted]	Both are .6, the Maisy May switchbacks are broader.
TH to present NAR views after closure presentation	TH	Occurred June 5 in the meeting; additional action item identified.
Set date for TH + YG meeting on NAR	GC	Today
Permafrost and groundwater technical session	GC	In the short term.
TH to provide NAR info gap request	TH	Completed June 13, 2017
TH to provide the report from [Name Redacted] regarding calculations of available soil at the Coffee Project Site	TH	ASAP

TH requests additional thermal modeling to be conducted related to mine activities, assess pit leakage from the pits without permafrost, assess the impact of alpine slope failures or destabilization of facilities, and assess the impact on baseline water quality/stream flow. Particular interest around Kona pit and groundwater flow patterns and pathways.	GC	TBD
TH requests a teleconference with [Name Redacted] to discuss closure in more detail	TH and GC	Tentatively scheduled for July 14.



# TH Technical meeting NAR and Reclamation & Closure

June 5, 2017

 **GOLDCORP**



- **Introductions**
- **Northern Access Route**
  - Review of Black Hills Route vs Maisey May Route
  - Access Route Management
  - TH presentation of views
- **Reclamation and Closure**
  - Reclamation and Closure Overview
  - Discussion and TH presentation of views
    - End land use plan
    - Land capability studies
    - TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)
    - Reclamation Research
    - Cover materials
    - Concern with the creation of long-term water bodies and ways to reduce long-term risk.
    - Social aspects Need to consider permafrost melting in more detail (operations and closure)
    - of closure (training, workforce transition strategy)

## The Goldcorp Coffee Project Team Today

3

- [Name Redacted]

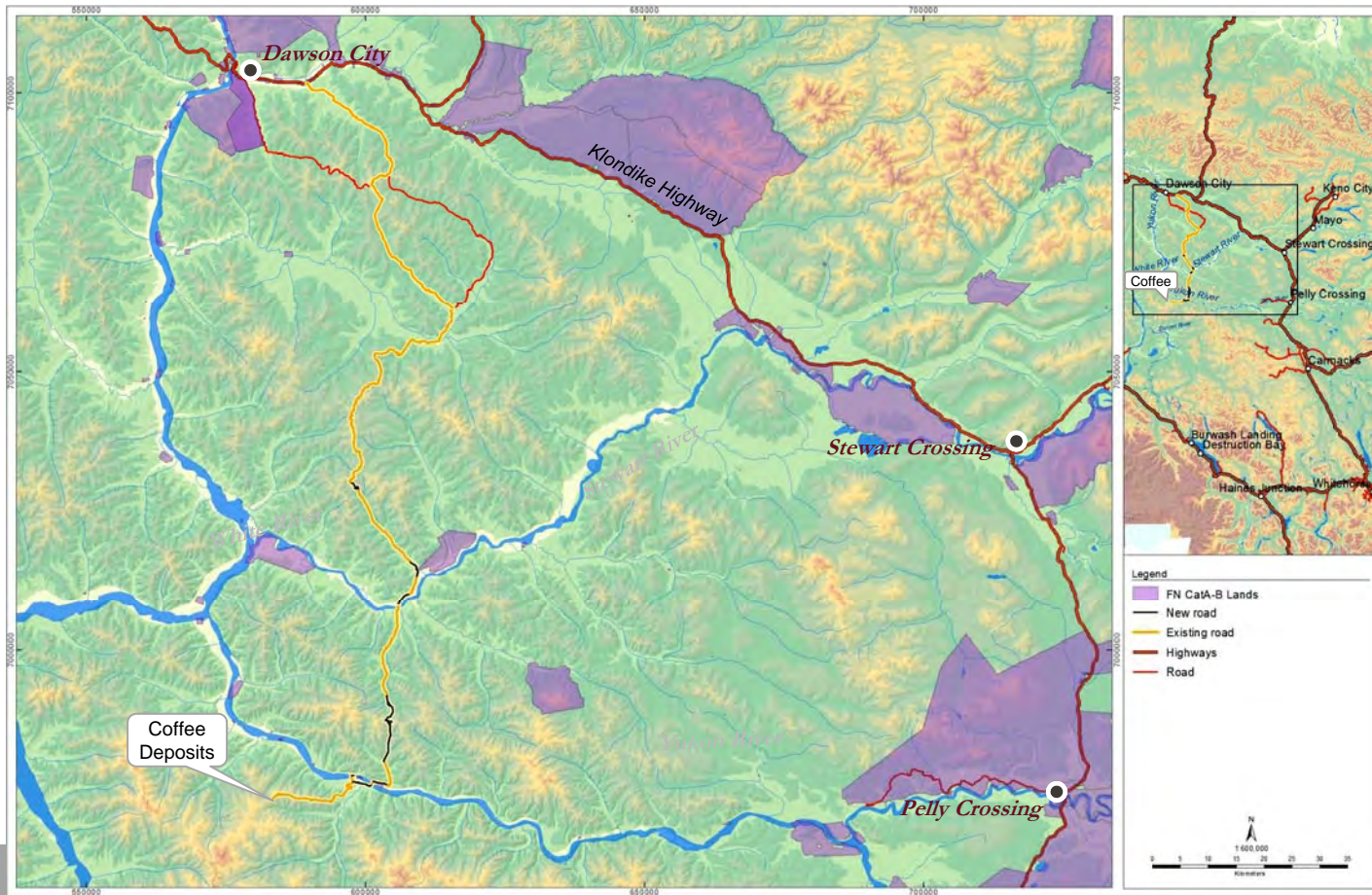


# Coffee Gold Project's Northern Access Route

Proposed Strategies for Management

 **GOLDCORP**

# Northern Access Route – Full Route







# Maisy May and Black Hills Route Comparison



- **Maisy May Vs. Black Hills**
  - Disturbance Area
  - Overall Safety
  - CAPEX



- **May 2015**
  - Initial site investigation.
- **June, August and September 2015**
  - Lidar flown.
- **August 2015**
  - Site data collected.
  - Cost comparison for both routes.
  - Henderson Dome connector.



- **Disturbance**

- More new road
- More permafrost
- More major crossings

- **Safety**

- More Switchbacks
- Steeper average grades
- More ice accumulation



# New Versus Existing Construction

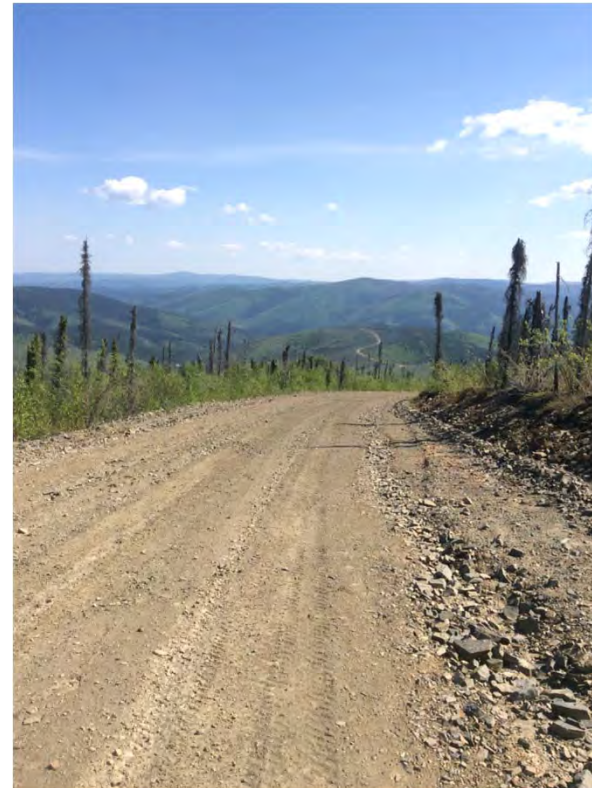


- **Type 1a**
  - Flat
- **Type 1b**
  - Existing road
- **Type 1c**
  - Overlanding ice-rich permafrost
- **Type 2**
  - New road on hillside terrain
- **Type 2r**
  - New road on hillside terrain with rock
- **Switchbacks**





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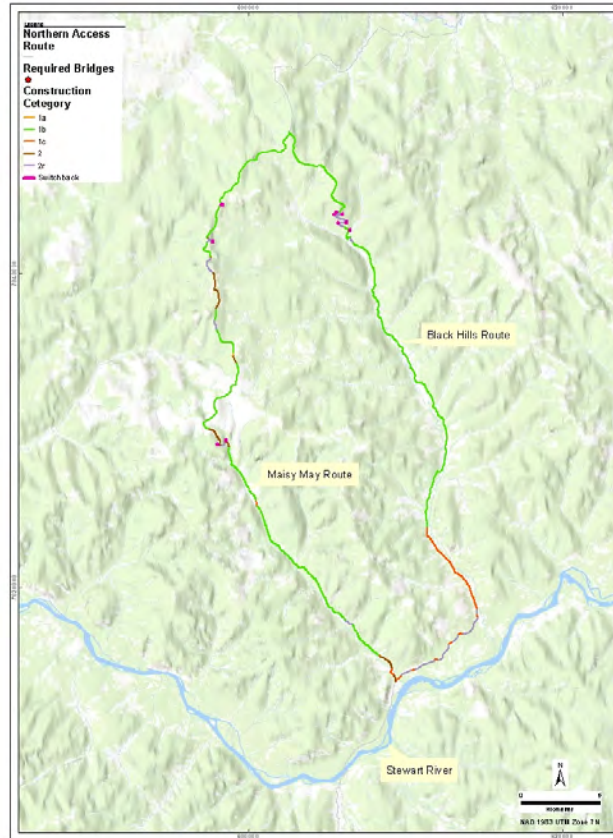


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- **Switchbacks**





# Construction Categories



Attribute	Maisy May Route	Black Hills Route
New Road Construction	12.0km	18.3km
Ice-Rich Permafrost	1.0km	7.9km
Large Stream Crossings	3	12
Disturbed Area in Undisturbed Sites	16.6	27.4
Safety	<ul style="list-style-type: none"> <li>• 4 switchbacks</li> <li>• Smaller average grade into valley bottom</li> <li>• Less ice accumulation</li> </ul>	<ul style="list-style-type: none"> <li>• 6 switchbacks</li> <li>• Higher average grade into valley bottom</li> <li>• Significant ice accumulation.</li> </ul>
Road Length	48.9km	48.8km
Expected Construction Cost	\$9,404,000	\$15,924,000

## Conclusion

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### **Maisy May Route:**


- **Causes Less Disturbance**
  - Less new road construction
  - Less ice-rich permafrost crossed
  - Fewer large stream crossings
- **Is Safer**
  - Fewer switchbacks
  - Smaller average grade from ridgetop to valley bottom
  - Less ice accumulation
- **Is Cheaper**
  - 40% cheaper to build.



- TH presentation of views







# RECLAMATION AND CLOSURE

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



## Reclamation and Closure

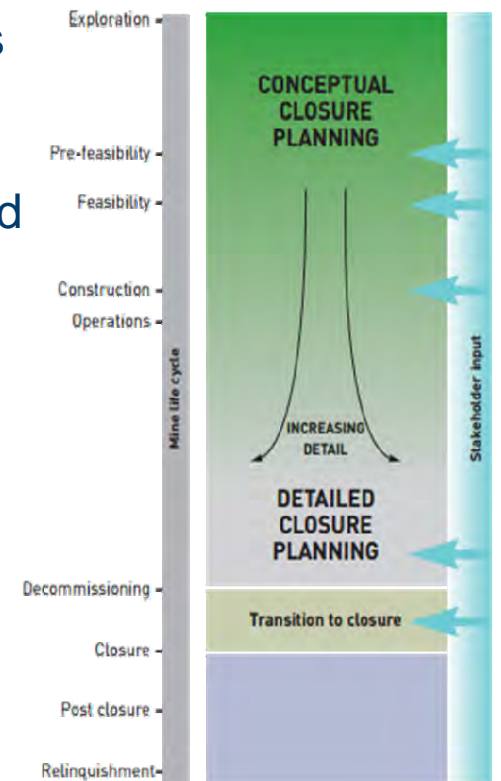
- **Goldcorp Reclamation and Closure**
- **Yukon Closure Policy**
- **Regulatory Process**
- **Coffee Gold Mine - Conceptual Reclamation and Closure Plan**



Reclamation and Closure Planning, including cost estimating, is a fundamental aspect of meeting Goldcorp's regulatory and social responsibilities and managing the financial health of the company. Goldcorp will leave sites in a condition that is safe and stable, that minimizes environmental impacts, and considers long term social benefits.

Reasonable and accurate financial assurance is an important aspect of our social license to operate and must be updated annually.

This standard clearly identifies the requirements of responsible closure planning, cost estimating and financial assurance.



## The Policy

- The Yukon Mine Site Reclamation and Closure Policy for New Mines consists of our Vision, Goals and our Implementation Principles.

## Vision

- Our vision is responsible and progressive mine reclamation and closure in the Yukon, conducted in a manner that fosters sustainable development and a healthy environment.

## Our Goals Our goals are to:

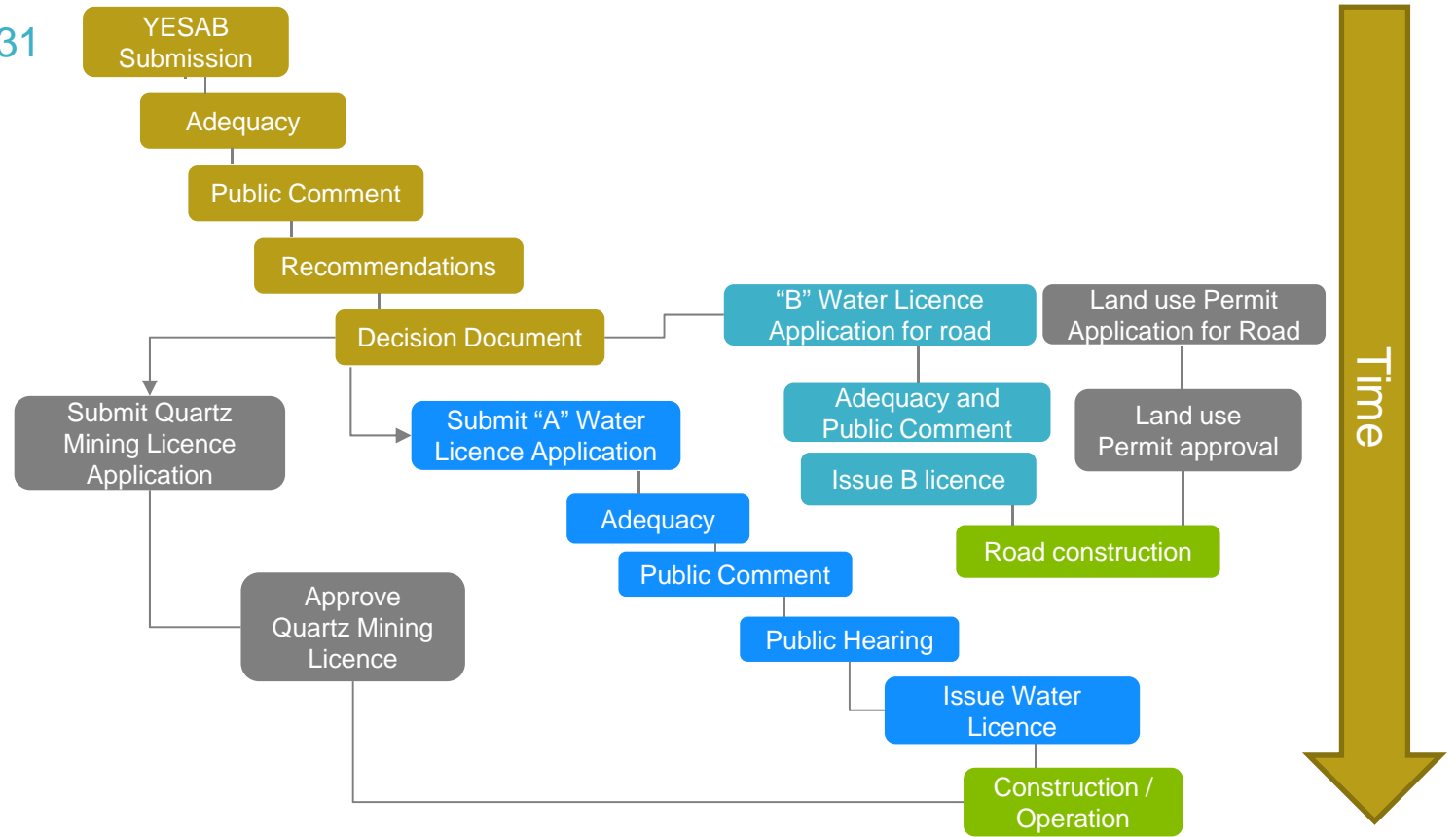
- ensure the development and viability of a sustainable, competitive and healthy quartz mining industry that operates in a manner that upholds the essential socio-economic and environmental values of the Yukon;
- ensure mine operators manage their mine sites in an environmentally sound manner and reclaim these sites to meet the principles stated in this policy;
- fully protect public and environmental health and safety and ensure that any potential discharges during mine

operation and following mine closure will be managed to prevent harm to the receiving environment or to the public;

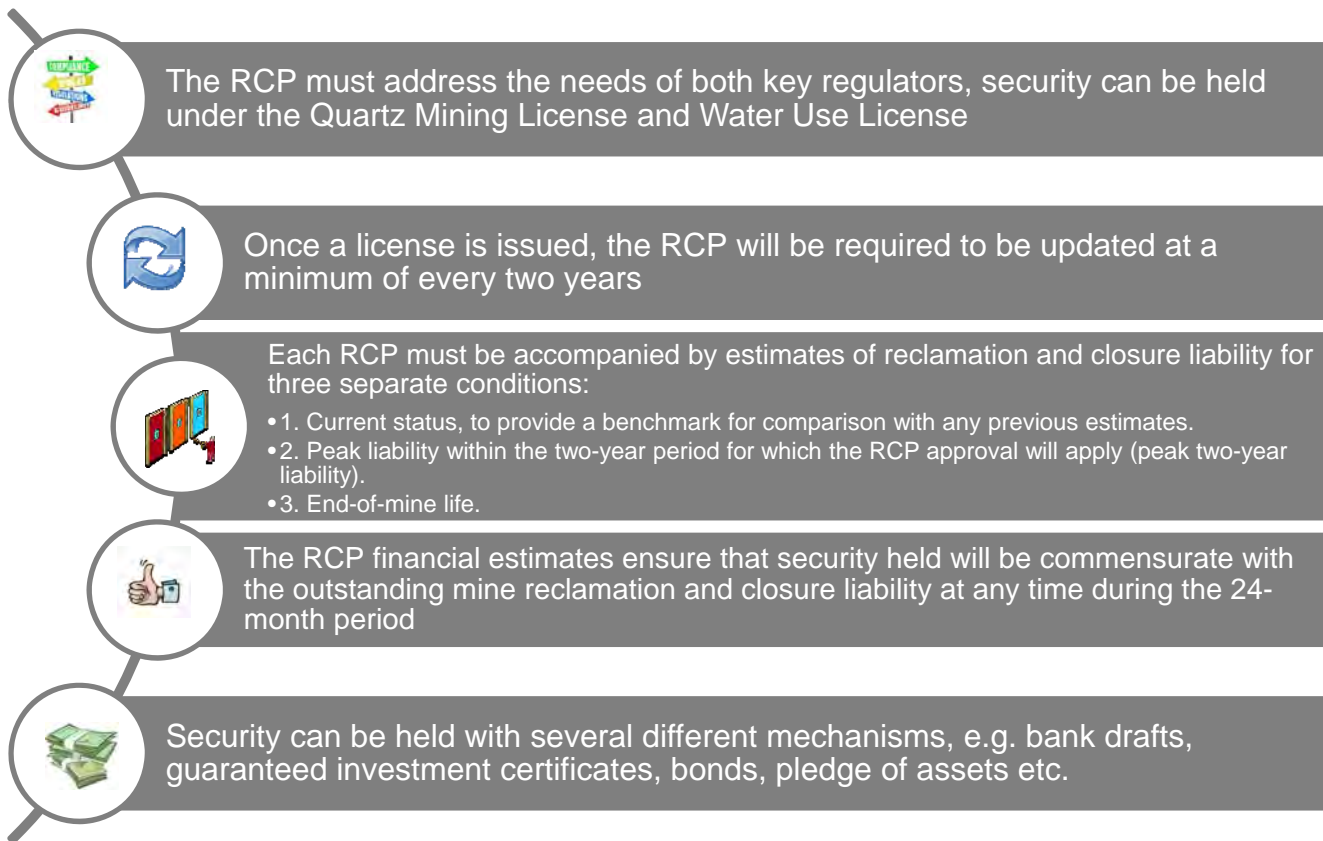
- ensure a government-approved reclamation and closure plan, prepared by the mine operator, to return the mine site to a viable and, wherever practical, self sustaining ecosystem, is in place prior to mine development;
- ensure any approved reclamation and closure plan is updated by the mine operator periodically to reflect results of new information, such as ongoing environmental and technical studies, changes to operations, and progressive reclamation, and that this updated plan is approved by government and financial security requirements are adjusted accordingly; and
- ensure mine operators provide financial assurance in the form of security and that the cost of reclamation (including but not limited to shutdown, closure and post-closure, and related environmental monitoring in the approved reclamation and closure plan)

# Permitting from here

Submitted March 31

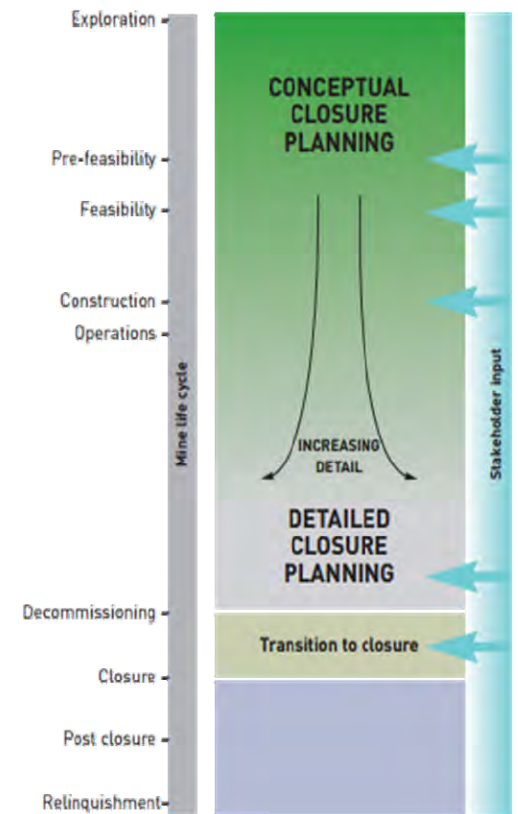


# Reclamation and Closure Plans and Security





- **Closure planning is a continuum**
- **Coffee is in the conceptual stage of its planning, and we are confident the project can be closed responsibly**
- **The engagement on the closure plan with TH is at the initial stages, and will continue until into the closure period.**
- **Need to progress our planning to:**
  - Refine closure objectives with citizen input
  - Further refine reclamation research plan
  - Determining path forward with TH
  - Meet requirements for licensing phase including costing update
  - Update plan to include social aspects of closure



- **Purpose of the Conceptual Reclamation and Closure Plan (CRCP)**

1. Provide proposed approach to decommission mine features and reclaim landforms
2. Outline a monitoring program to be conducted until mitigation and reclamation measures have achieved closure objectives

## CRCP Document Sections

- 1. Introduction
- 2. Reclamation and Closure Planning
- 3. Conceptual Reclamation and Closure of Mine Features
- 4. Site Water Management
- 5. Monitoring and Surveillance for Closure Phases
- 6. Reclamation and Closure Execution Strategy
- 7. Reclamation and Closure Liability

- **CRCP** - developed in accordance with industry best practice, and was informed by Yukon regulatory, policy, and guidance requirements.
- **Overall closure objective** - permanently close the mine with minimal long-term monitoring and maintenance by implementing a technically feasible plan.
- **Key strategies include:**
  - Early and ongoing community and regulatory engagement;
  - Designing for closure, including reclaiming disturbed areas progressively during the Operation Phase;
  - Reducing affected water and controlling contaminants at source; and
  - Planning for long-term monitoring and maintenance, while minimizing long-term operational activities.



# CRCP – Reclamation and Closure Objectives















Value	Coffee Gold Mine Reclamation and Closure (R&C) Objectives
<b>Physical Stability</b>	Structures and facilities perform in accordance with designs (including withstanding severe climatic and seismic events).
<b>Chemical Stability</b>	Release of contaminants do not cause unacceptable exposure in the receiving environment.
<b>Health and Safety</b>	Eliminate or minimize adverse health and safety effects on the public, workers and area wildlife.
<b>Ecological Conditions and Sustainability</b>	Protect the environment from degradation and restore a self-sustaining biological community to achieve land use objectives for the mine site.
<b>Land Use</b>	Lands are restored to pre-mining conditions typical of surrounding areas or provide for other land uses that meet community expectations. Site access is consistent with community land use expectations.
<b>Aesthetics</b>	Restoration outcomes are visually acceptable.
<b>Socio-economic Expectations</b>	Avoid or minimize adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits and achieving outcomes that meet community and regulatory expectations.
<b>Long-term Certainty</b>	Minimize the need for long-term operations, maintenance and monitoring after R&C activities are complete.
<b>Financial Considerations</b>	Minimize outstanding liability and risks after reclamation activities are complete.

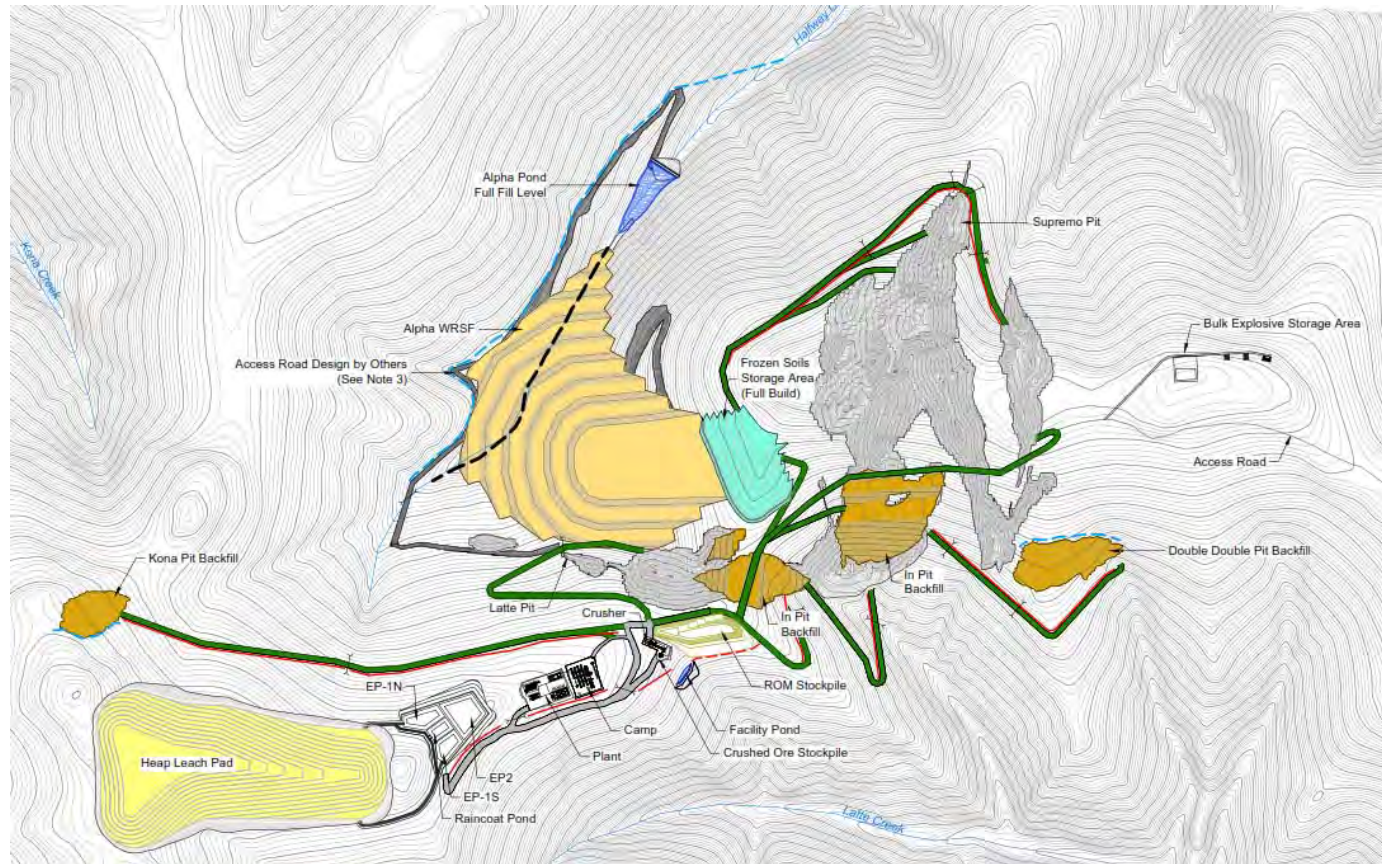
# CRCP – Closure Stages and Schedule of Activities

Phase / Activity	Project Year																										
	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>CONSTRUCTION PHASE</b>																											
Northern Access Route Construction																											
Mine Site Construction																											
<b>OPERATION PHASE</b>																											
Mining (including pre-production)																											
Ore Processing (including pre-production)																											
Heap Leach Rinsing																											
Operational Closure																											
<b>RECLAMATION AND CLOSURE PHASE</b>																											
Water Treatment																											
Reclamation and Decommissioning																											
<b>POST-CLOSURE PHASE</b>																											
Ongoing Monitoring																											



# CRCP – End of Operation Phase in Year 12

- Legend**
-  Diversion Berm
  -  Rock Drain
  -  Road Drainage Ditch
  -  Waste Rock Collection Channel
  -  Active Pit
  -  Frozen Soils Storage Area
  -  Pit Backfill
  -  Pit Footprint
  -  Sedimentation Pond
  -  Waste Rock Storage Facility
  -  Heap Stack
  -  Access Road
  -  Haul Road
  -  Culvert



### Activities:

- Progressive reclamation of disturbed areas within the Mine Site footprint that are no longer required to support mine operations
- Partial backfill of Latte and Supremo pits and closure of disused haul roads
- Commence backfill of Kona and of complete backfill of Double Double pits and closure of disused haul roads
- Progressive reclamation and closure of early stages of HLF
- Installation of water treatment facility and commencement of water treatment of drain-down rinse water from closed HLF stages

### Monitoring:

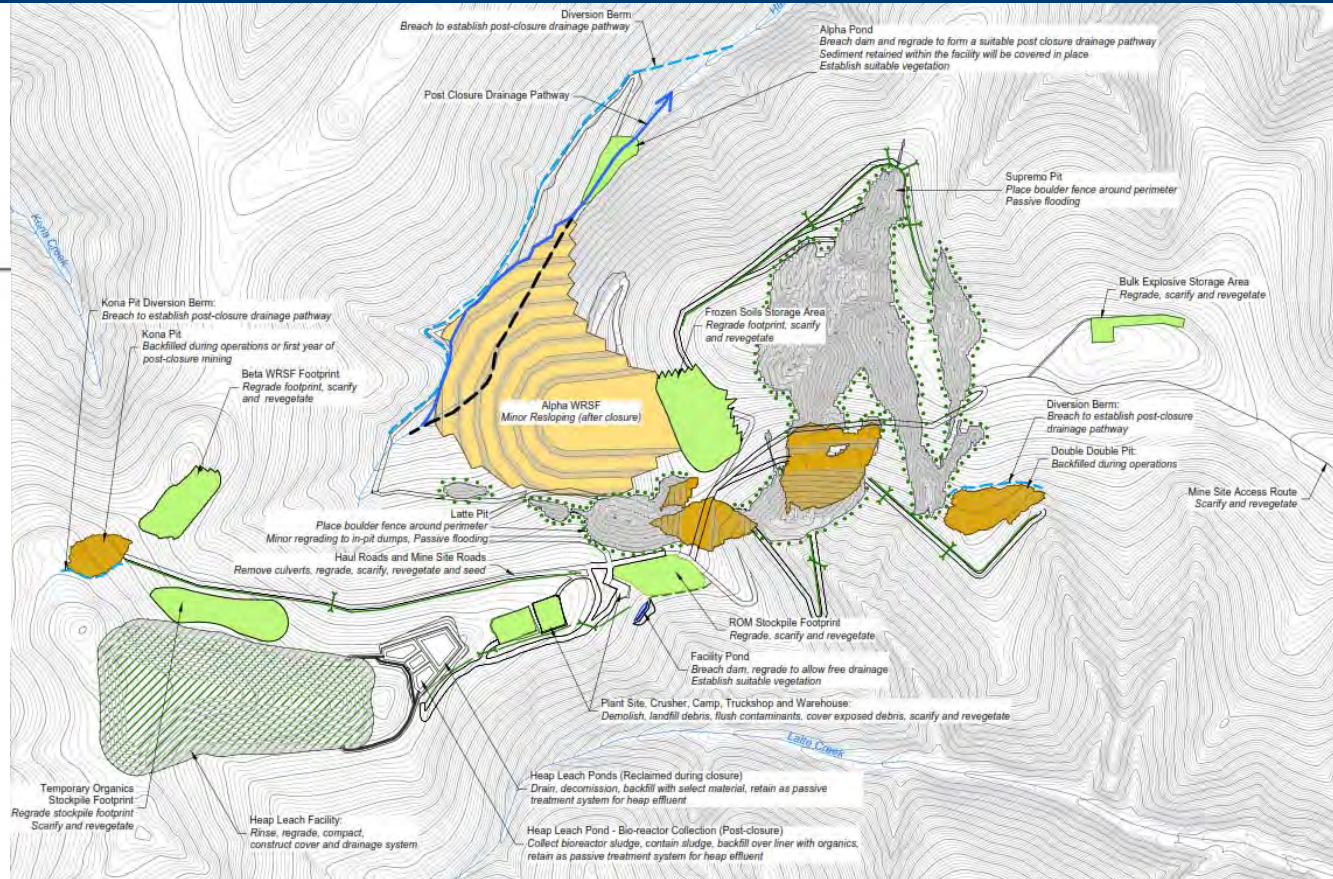
- Routine monitoring in accordance with mine operating licenses and permits





# CRCP – Post-mining Closure Stage R&C Activities (Year 13 to 18)

- Legend**
- Diversion Berm
  - Rock Drain
  - Reclaimed Road Diversion Ditch
  - - - Reclaimed Waste Rock Collection Channel
  - Reclaimed Footprint
  - Reclaimed Heap Leach Pad
  - Pit Backfill
  - Pit Footprint
  - Sedimentation Pond
  - Waste Rock Storage Facility (WRSF)
  - Removed Culvert Alignment
  - Boulder Fence



## Activities during the first stage of the Reclamation and Closure Phase:

- Complete backfill of Kona pit and closure of associated haul roads
- Reclamation of disturbed areas within the Mine Site footprint that are no longer required to support closure activities
- Equipment removed from service when no longer required to support closure activities
- Excavation of contaminated soil followed by on-site treatment or temporary storage and off-site disposal
- Reclamation of Latte Pit, Supremo Pit, Alpha WRSF (including frozen soil storage area), and Beta WRSF footprint area
- Reclamation of the temporary organic stockpile area once depleted and reclamation of the ROM stockpile area
- Continued water treatment of drain-down rinse water from closed HLF stages until heap rinsing is complete, then reclamation and closure of water management structures
- Dismantling and removal of Plant Site buildings, power plant, and bulk fuel storage tanks, explosives storage facility
- Dismantling and removal of Camp Site buildings, potable and fire water systems, sewage treatment plant, and waste management infrastructure at the end of this stage
- Decommissioning and reclamation of new sections along the NAR and the Project airstrip at the end of this stage

## Monitoring:

- Routine monitoring in accordance with mine operating licenses, and monitoring of reclaimed areas

## Activities during the final stage of the Reclamation and Closure Phase:

- Dismantling and/or removal of remaining infrastructure and equipment
- Reclamation of remaining disturbed areas within the Mine Site footprint
- Continued water treatment until HLF effluent is of suitable quality for discharge











## Monitoring:

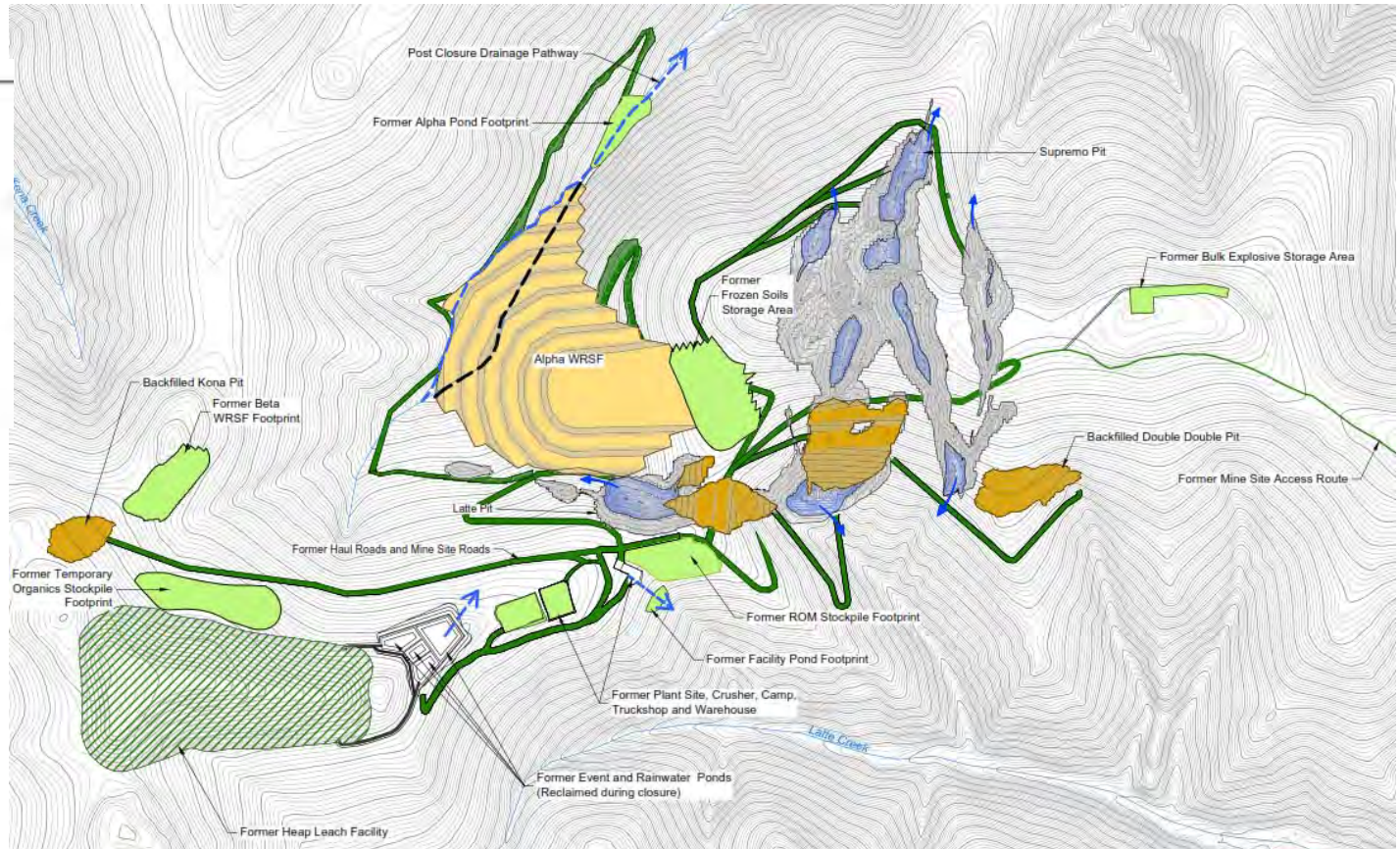
- Monitoring undertaken to observe progress towards closure objectives





# CRCP – Active Closure Stage (Year 23)

- Legend**
-  Rock Drain
  -  Reclaimed Footprint
  -  Reclaimed Heap Leach Pad
  -  Reclaimed Haul and Mine Site Roads
  -  Pit Backfill
  -  Pit Footprint
  -  Pit Lake
  -  Waste Rock Storage Facility (WRSF)
  -  Pit Outflow Direction
  -  Flow Direction



### Activities:

- None planned – reclamation and closure activities are complete

### Monitoring:

- Monitoring is reduced as performance criteria is met and reclamation and closure objectives are achieved

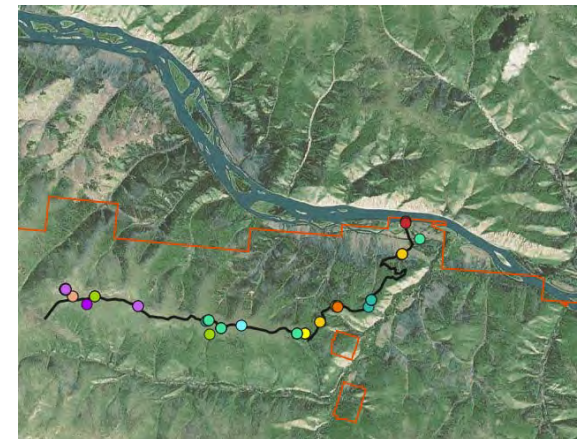


- **Salvage and stockpile organic material and topsoil**
  - Salvage from footprints of open pits, heap leach pad, infrastructure foundations (~1.5 Mm<sup>3</sup>)
  - Store in temporary organics stockpile near heap leach pad
- **Implement erosion and sediment control measures**
  - Minimize size of disturbed areas and retain vegetation cover and buffers where possible
  - Limit work on unstable areas, slopes, on permafrost where possible
  - Install perimeter sediment controls
- **Progressively reclaim and revegetate disturbed sites to minimize erosion and prevent establishment of invasive plants**
  - Implement prevention and control measures for invasive plant (e.g., surveys, equipment monitoring, removal and incineration, targeted herbicide application)
- **Dispose of waste materials properly and remediate contaminated areas (as necessary)**
- **Ongoing reclamation research programs**

**Objective – to inform and refine R&C plans to return the mine site to a state as near as possible to that in existence pre-mining.**

## 1. Revegetation Reclamation Research Program

- 2013 to current - investigating basic site prescriptions at demonstration sites and monitoring plots established in areas disturbed during exploration activities
- Seed Collection, Inventory and Mapping Program – to determine target plant species for site restoration
- Training program partnership with Tr'ondëk Hwëch'in and the Yukon College
  - Introduction to Environmental Monitoring Pilot Project
  - Northern Terrestrial Restoration (NTR)
- Yukon Research Centre (and NTR)
  - Revegetation and soil amendment trials
  - Greenhouse trials
- Establish/support nursery to grow native species
- Program ongoing through Construction and Operation phases



## 2. Plant-soil Interaction Studies

- Characterize the plant-root interface (rhizosphere) of native plants that are potential candidates for restoration
- Examine use of local peat as a soil amendment
- Establish a three-year field trial at disturbed sites in subalpine areas

## 3. Heap Leach Facility – Water Treatment Plant Pilot Program

- Bench-scale treatment testing of chemical and biological processes using metallurgical cyanide leach solutions completed
- During Operation Phase, conduct field-scale pilot program to refine plant operating requirements

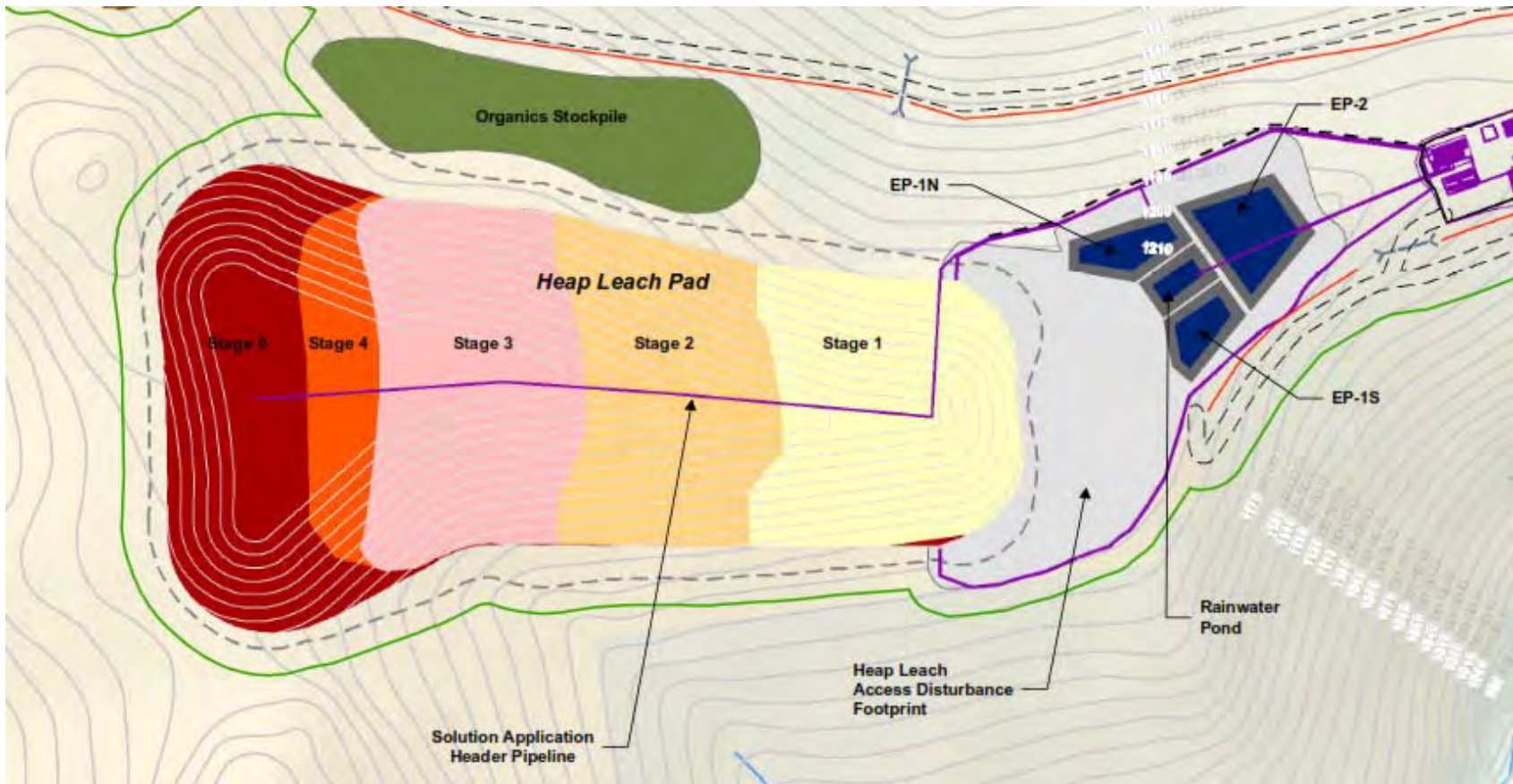
## 4. Heap Leach Facility – Vegetation Cover Trials

- During latter half of Operation Phase, conduct field-based revegetation trial program on Stage 1 of HLF, informed by results of other research programs



- **Specific R&C activities at a conceptual level described in the CRCP for:**
  - Open pits - Double Double, Kona, Latte, Supremo
  - Heap Leach Facility and process ponds - event ponds and rainwater pond
  - Waste rock storage facilities (Alpha, Beta), Temporary Organics Stockpile, Frozen Soil Storage Area
  - Site Closure Water Management
  - Roads - Northern Access Road, haul roads, mine site roads, exploration camp access road
  - Airstrips - exploration airstrip, Project airstrip
  - Crusher system and ore stockpiles
  - Plant Site - process plant, reagent storage area, truck shop, warehouse building, power plant, bulk fuel storage area
  - Other infrastructure – camp, bulk explosive storage area, utilities, laydown and storage areas, waste management areas

# CRCP – Heap Leach Facility (HLF) and Process Ponds: Layout



**Heap Leach Facility - performance targets for closure include effectively managing transitional solutions and draindown to achieve suitable final heap quality conditions, and ensuring long-term physical stability.**

**Control of transitional solution management achieved through:**

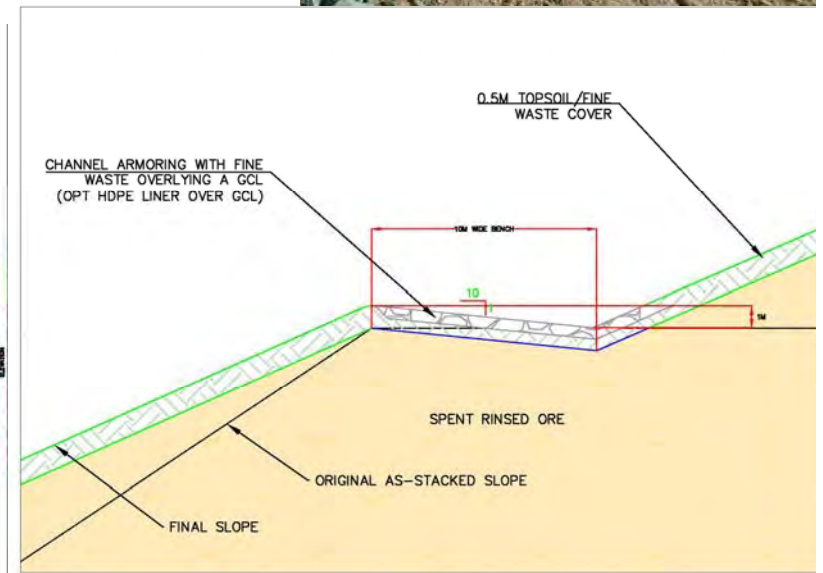
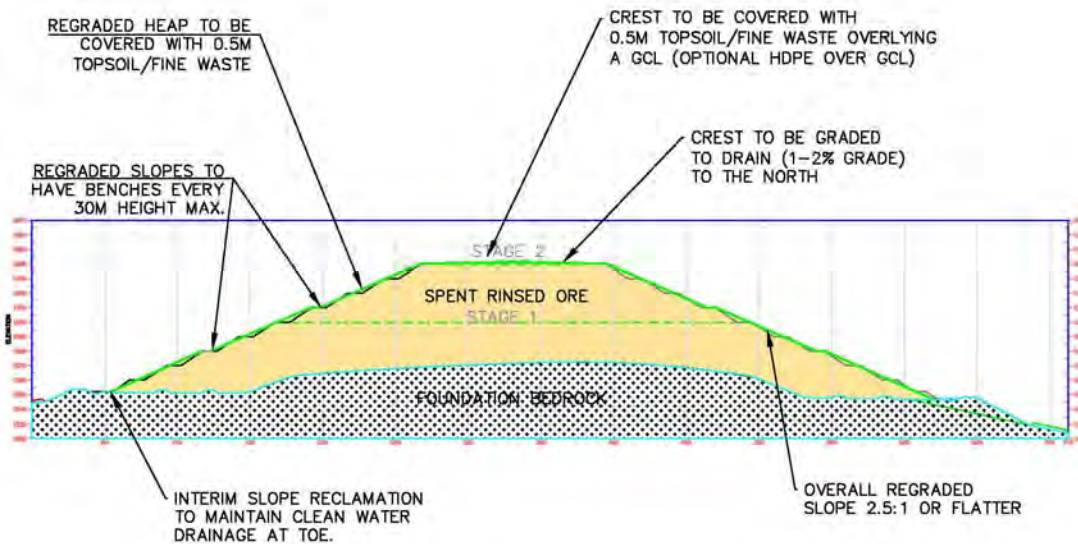
1. Progressive rinsing of the heap and collection and treatment of rinse fluids:
  - Preliminary rinsing starting in Year 4 of leached ore using pH-adjusted barren solution for removal of cyanide
  - Final rinsing with fresh water and/or treated rinse solution to reduce contaminant concentrations to levels acceptable for direct discharge
  - Surplus water treated via water treatment plant from Year 9 to ~Year 15 (possibly to Year 20 depending on treatment circuit performance) with discharge to Halfway Creek drainage
2. Use of geomembrane covers (raincoats) and progressive grading the heap and capping to limit infiltration and reduce heap seepage volumes
3. Implement, if necessary, passive treatment using permeable reactive barriers for polishing of heap solutions within event ponds prior to release to the environment

## Long-term physical stability achieved through:

- **Siting pad on stable foundation and pad construction according to geotechnically-stable design**
- **Grading the heap**
  - Grading and rinsing can be done concurrently
  - Capping completed progressively after rinsing and grading are complete
- **Capping the heap - engineered cover design for:**
  - Ensuring physical stability
  - Reducing infiltration and minimizing creation of saturated zones
  - Routing runoff away from heap

# CRCP – HLF: Grading of Heap

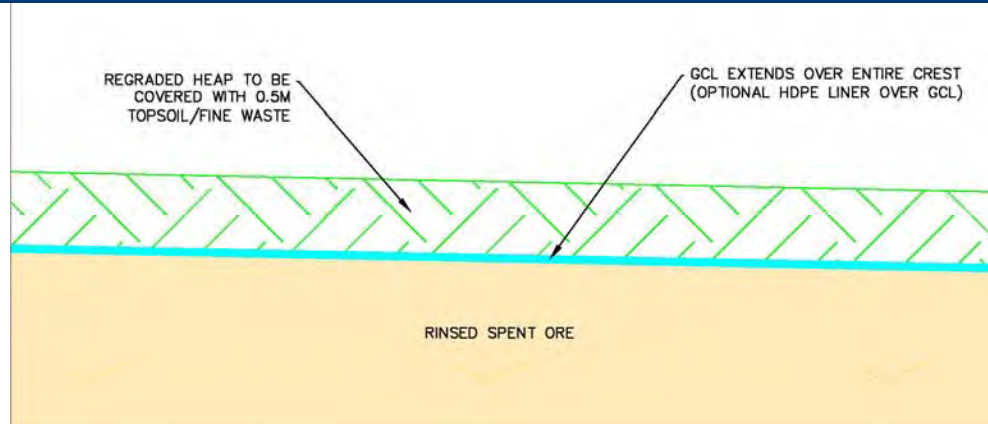
- Grading to consistent 2.5:1 slope with armored channels to control run-off





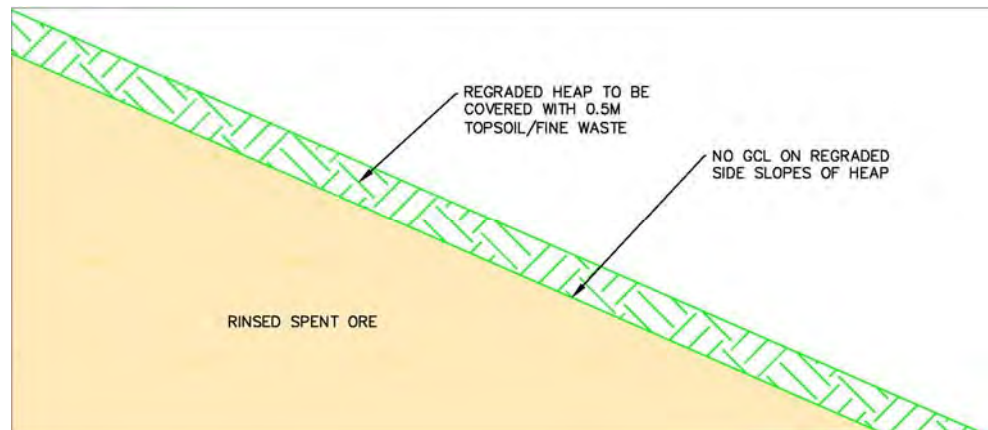
- **Crest & Benches:**

- Slope to drain
- Compact upper 1 m of ore
- Geosynthetic clay liner (GCL) – optional HDPE liner over GCL
- Cover with 0.5 m topsoil/fine waste rock



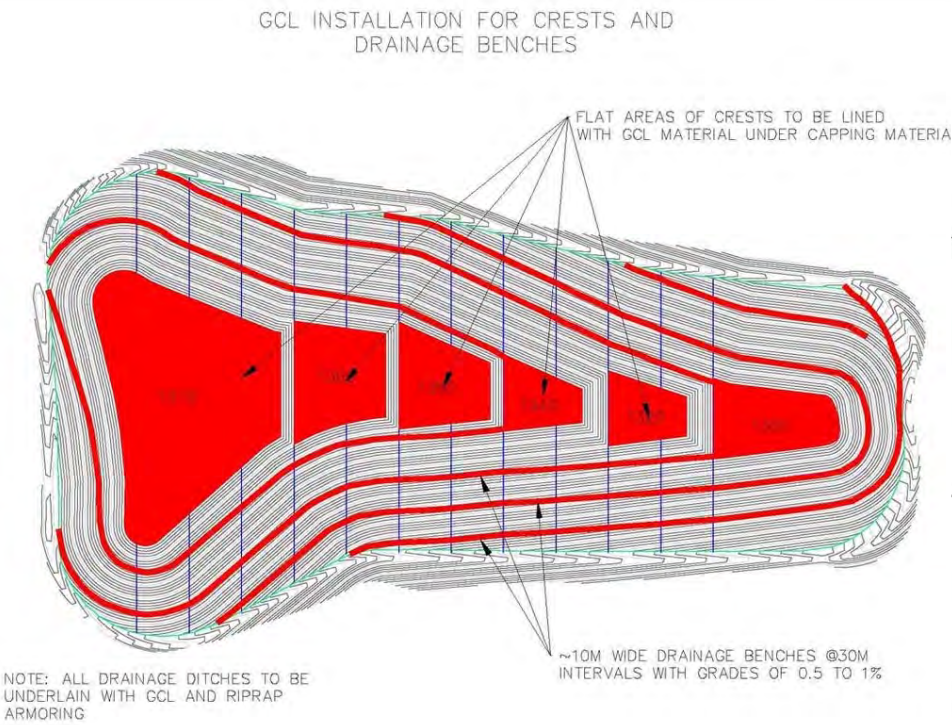
- **Slopes**

- Benches every 20-30 m vertically
- Compact upper 1 m of ore
- Cover with 0.5 m topsoil/fine waste rock

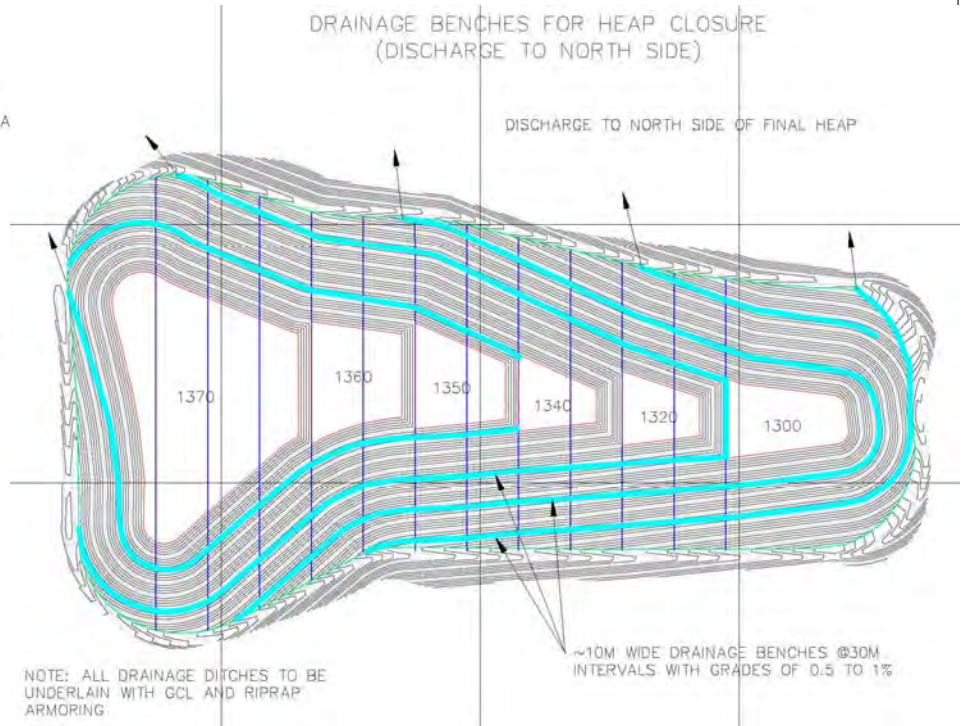


# CRCP: HLF – Capping of Heap

GCL cover (red) installed on crests and drainage benches



Surface drainage ditches (blue) drain north



- **For two or three of the four process ponds, the closure activities will include:**
  - Drain the pond and wash the pond liner, with wash water recycled for preliminary heap rinsing
  - Perforate the liner at the bottom of the pond
  - Fold the liner from the slope and anchorage into the pond, and,
  - Fill the empty pond with selected material (e.g. zero valent iron, coarse organic composted wood chips from tree clearing, suitable geologic materials) to serve as contingency final polishing and passive treatment of heap seepage waters following completion of active treatment.
- **One pond - used for the duration of the water treatment period for disposal of water treatment plant sludge**
  - Subsequent closure of this pond will involve folding the liner over the sludge and welding to produce water-tight seams.
- **A second pond may also remain open during the water treatment period, and may be used as part of passive treatment polishing system**

- **Performance targets for closure include: ensuring long-term physical stability, avoiding unacceptable release of contaminants to the receiving environment, and avoiding risks to humans and wildlife.**
- **Targets achieved through:**
  - **Alpha WRSF** - Adhering to facility designs (including safety factors for long-term stability), and construction and maintenance practices to avoid re-sloping at the end of active waste dumping
  - **Beta WRSF** – during Post-mining Closure, removal of waste rock for backfilling of Kona Pit; grade footprint of WRSF for appropriate surface runoff, scarify surface, and revegetate.
  - **Temporary Organics Stockpile** – use material in reclamation activities; after material is depleted, grade base of stockpile, scarify surface, and revegetate.
  - **Frozen Soil Stockpile Area** - use material in reclamation activities, or if unsuitable for reclamation, reclaim material in place.

- **Water management infrastructure components include:**

- Underdrains
- Diversion Channels
- Drainage Ditches
- Diversion Berms
- Sedimentation Ponds – Alpha Pond and Facility Pond
- Water Treatment Plant

- **Sequence of activities:**

Stage/ Phase	Years	Active Water Management Features	Features Decommissioned	Water Treatment
<b>Post-Mining Closure</b>	13 to 18	All conveyance structures, Alpha Pond, Facility Pond, Water Treatment Plant	Culverts are removed when no longer necessary toward the end of stage.	Water Treatment Plant operational, and total suspended solids (TSS) settling in the existing ponds
<b>Active Closure</b>	19 to 23	All conveyances, Alpha Pond, Facility Pond, Water Treatment Plant (through Year 20).	At the end of Active Closure, all conveyances and sedimentation ponds. Water Treatment Plant decommissioned after Year 20	Water Treatment Plant (operational through Year 20), with TSS settling in the existing ponds
<b>Post-Closure</b>	24 onward	Passive treatment within the former footprint of the sedimentation ponds.	None (decommissioning complete by start of phase)	Passive TSS removal in vegetated swales and/or stilling pools constructed in reclaimed footprint of former sedimentation ponds.













- **Summary of activities during Post-Mining Closure Stage:**

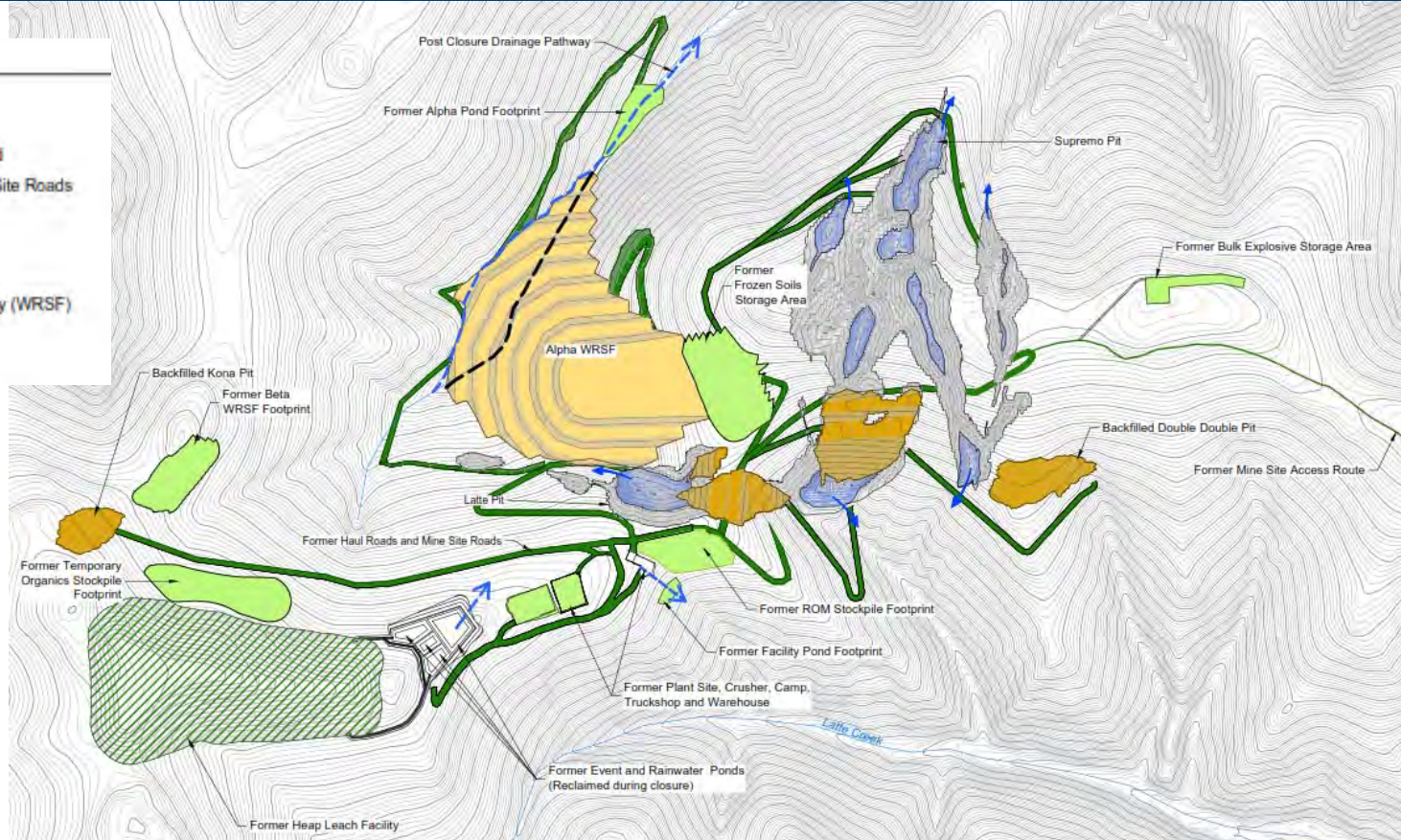
- Mine surface water management system operational as per Operation Phase
- Monitoring of sedimentation ponds and conveyance structures during open water season weekly for 2 years, then monthly for 4 years
- Removal of pit sumps and dewatering systems from Supremo Pit
- Spillways constructed at pit pour points to direct overflow to natural drainage courses, underdrains, other

- **Summary of activities during Active Closure Stage:**

- Monitoring of sedimentation ponds and conveyance structures during open water season monthly
- Sediment ponds and conveyance structures will operate until water quality objectives are met
- Sediment ponds will be drained and accumulated sediment either covered in place or disposed of in pits or other designated site
- Sedimentation pond dams will be breached, with material used for backfilling pond excavations or in construction of drainage pathway, grading as necessary
- Conveyance structures will be graded to provide adequate drainage, and covered (to the extent possible) with soil or organics
- Seed or plant disturbed areas with native vegetation or allow to revegetate naturally

# CRCP – Site Water Management: Post-Closure Phase

- Legend**
-  Rock Drain
  -  Reclaimed Footprint
  -  Reclaimed Heap Leach Pad
  -  Reclaimed Haul and Mine Site Roads
  -  Pit Backfill
  -  Pit Footprint
  -  Pit Lake
  -  Waste Rock Storage Facility (WRSF)
  -  Pit Outflow Direction
  -  Flow Direction



- **Aquatic Environment Monitoring Program**

- Environmental effects monitoring as per Metal Mines Effluent Regulations to characterize effluent
- Water quality monitoring at the mine infrastructure as per regulatory requirements - flow monitoring from mine facilities, effluent monitoring in sediment control ponds and sumps, and at water treatment plant
- Water quality monitoring as per regulatory requirements – hydrology, surface water quality, ground water quality and quantity
- Biological monitoring in the receiving environment upstream and downstream of points of discharge to confirm compliance with regulatory requirements
- Annual reports and periodic comprehensive reports to present comparisons of data collected over time and describe trends



- **Fish and Aquatic Habitat Monitoring Program**

- Fish sampling to determine abundance and species diversity
- Detailed habitat assessment to evaluate pool frequency and average pool depth
- Fish sampling to assess fish species health and population age structure
- Quantify the extent of Chinook and Chum salmon spawning
- Collecting and analyzing benthic invertebrate communities, primary producers, and sediments

- **Terrestrial Environment Monitoring Program**

- Surveillance monitoring including routine, annual and event-driven inspections
- To be dictated by licenses and permit, but likely to include monitoring for the presence of invasive plants, trace metal uptake in soil and vegetation, effectiveness of reclamation activities, and wildlife protection



- Discussion and TH presentation of views
  - End land use plan
  - Land capability studies
  - TH Land-users workshop on Closure (mechanisms for incorporating traditional knowledge)
  - Reclamation Research
  - Cover materials
  - Concern with the creation of long-term water bodies and ways to reduce long-term risk.
  - Need to consider permafrost melting in more detail (operations and closure)
  - Social aspects of closure (training, workforce transition strategy)





# QUESTIONS & DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Thank you

## Contacts:

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**13**

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[Name Redacted]

**porate Social Responsibility**

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**We look forward to working  
with Yukon Communities**

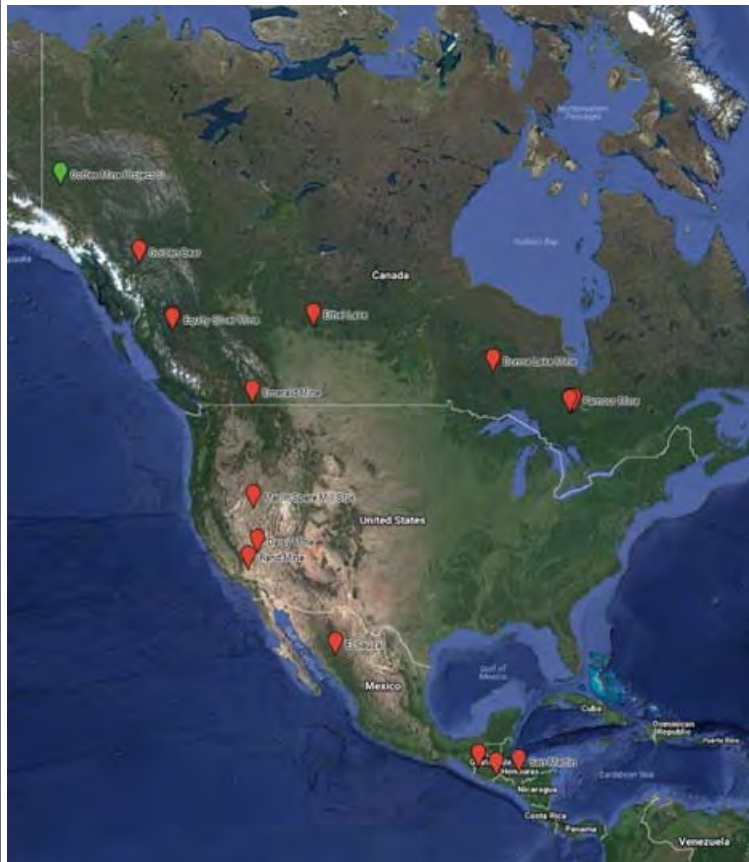




# Goldcorp Reclamation Operations

Coffee Project Meeting – June 5<sup>th</sup>, 2017

 **GOLDCORP**



- **Goldcorp currently has 35 closed sites under active reclamation, custodial care**
- **All 35 sites acquired since 2006, Wheaton River, Placer Dome and Glamis acquisition and mergers**
- **Goldcorp has committed ~\$250M since 2006 on reclamation, remediation and active care since taking ownership**
- **Dedicated closure group created in 2015**
- **Focus on consolidated management and remediation throughout Goldcorp properties**

## Reclamation operations strategic focus

- **Centralized management and planning for all closed sites**
- **Manage risk while providing focus and accountability within business unit**
- **Focus on adding long term value through;**
  - **Utilizing existing resources and expertise throughout company**
  - **Prioritizing projects to reduce liability and risk**
  - **Integrate progressive reclamation and improve performance**







## SUSTAINABILITY EXCELLENCE MANAGEMENT SYSTEM

### Reclamation & Closure Planning at sites and projects;

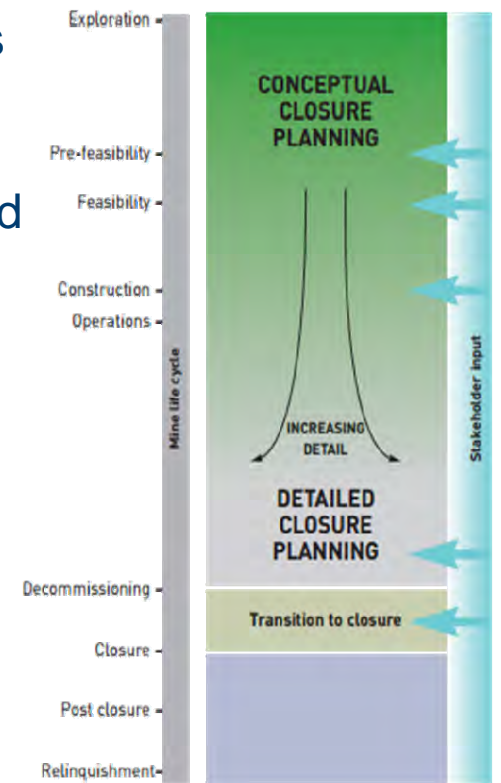
- Will be integrated
- Will be prepared and maintained in LOM plan
- Will include terms of reference
- Will address chemical stability
- Will address physical restoration and stability
- Will include concurrent reclamation activities & costs
- Will develop and maintain a current “Best Estimate” of the total actual costs for the life-of-mine or project.



Reclamation and Closure Planning, including cost estimating, is a fundamental aspect of meeting Goldcorp's regulatory and social responsibilities and managing the financial health of the company. Goldcorp will leave sites in a condition that is safe and stable, that minimizes environmental impacts, and considers long term social benefits.

Reasonable and accurate financial assurance is an important aspect of our social license to operate and must be updated annually.

The closure standard clearly identifies the requirements of responsible closure planning, cost estimating and financial assurance.



## Progressive Reclamation – ongoing development

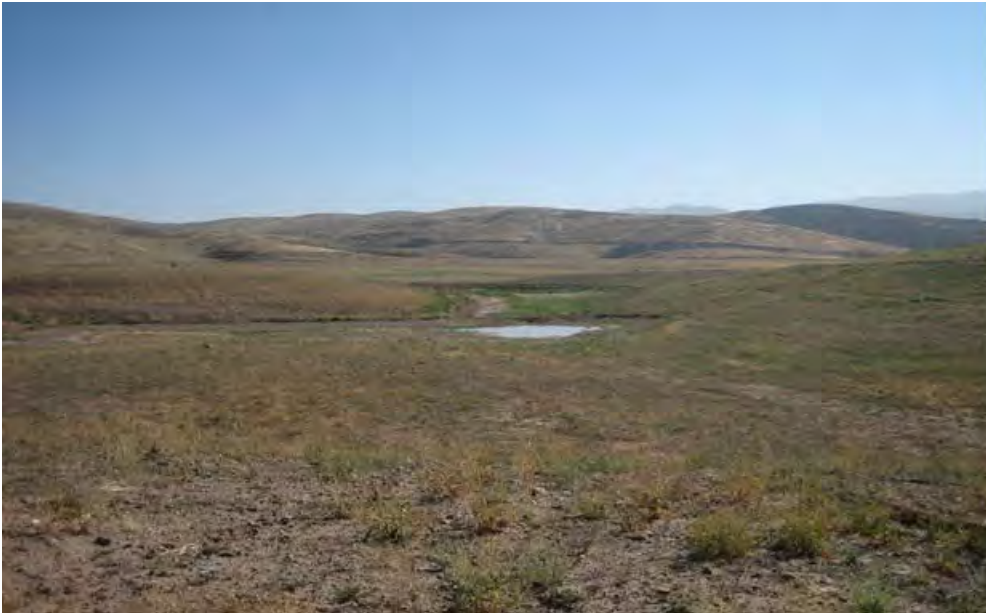
- **Remediation over the life of the operation**
- **Supports long term performance monitoring**
- **Opportunity for ongoing research**
- **Informs final closure planning**
- **Land returns to productive use sooner**





# Coniaurum – commitment to closure





- **Daisy Mine post closure permit received in 2007**
- **Reclamation, monitoring and remediation continued on site**
- **In 2016, the US Government approved a full relinquishment of the project**



## San Martin – A transition to post closure land use

9

- San Martin closed ~10 years ago
- Foundation established to manage the land and productive projects
- Goldcorp is finalizing design of a passive water treatment system
- Working to make foundation self sufficient by 2019 (business eggs & tilapia)

1998

2007

2010

2017





- **Reclamation and natural recovery have fully reclaimed the site over the last 10 years**
- **End use planning and re-planning based on success**
- **Land is now being utilized for productive projects**
  - Tilapia fish harvesting
  - ~5-10,000 eggs per day
  - Lemons, limes
  - Raising pigs & testing cattle







- **Mine closed in Jan 2015**
- **Goldcorp completed the reclamation of El Sauzal in Oct 2016**
- **Working with the Ejido to monitor and re-vegetate in post closure**

Dec 2011



Jan 2016



Mar 2017



- **Marlin Mine's final production was last week after 12 years in operation**
- **Progressive reclamation occurred concurrently with operations**
- **Goldcorp committed to closure and post closure monitoring 2017 – 2026**
- **Development of a foundation for productive projects on the land ongoing**



## Reclamation Opportunities - tailings re-use





# Reclamation Opportunities - research into bio diversity – biosolids





# Reclamation Opportunities - turning a liability into a future







THANK YOU  
QUESTIONS?

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



# **Coffee Gold Mine Project Northern Access Route: Review of Route Selection Criteria and a Comparative Analysis of Goldcorp's Proposed Northern Access Route (Henderson Dome - Maisy May Creek) and an Alternate Route (Black Hills Creek)**

DRAFT June 2017

Developed by Tr'ondëk Hwëch'in Natural Resources Department and Heritage Department together  
with LGL Limited

## Foreword

This review of two road access routes was conducted from a technical perspective and does not necessarily reflect consultation with or feedback from TH citizens about potential impacts of the proposed project on TH interests and rights. Similarly, the outcomes of the comparative analyses presented here must be considered in the context of the full suite of factors, such as geotechnical, cost, social, which are addressed in reports prepared by Goldcorp Inc.

We acknowledge that the baseline data that Goldcorp has presented is primarily limited to one of the routes examined here. As such, our comparison of two routes contains inherent limitations. Information in this report leads us to conclude that, according to the parameters reviewed herein, there may be a better option for the Northern Access Route (NAR) than the one currently proposed by Goldcorp Inc.

**We submit to Goldcorp Inc. that a comprehensive multiple accounts analysis of the two routes be conducted. This multiple accounts analysis needs to consider potential threats and impacts to the TH values as presented in this report, together with impacts to constitutionally protected Treaty Rights, using comparable data for both routes. Additional information is required to address a number of information gaps identified herein.**



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## Background

The Coffee Gold Mine Project is proposed as an open pit mine using heap leach technology. It is estimated that ~5 million tonnes of ore per year will be processed within a 12-year operational mine life. The mine site is located ~130 km south of the City of Dawson in TH Traditional Territory. Goldcorp Inc. is proposing to develop an access route that will take advantage of existing cat trails, placer/quartz mining roads, public access. In addition, there will be a need for the construction of new roads and barge landings in areas that are currently inaccessible. The full life cycle of the project (construction, operations, and closure) is estimated at 24 years; however, post-closure treatments beyond 24 years are expected.

Goldcorp Inc. has proposed a single access route, the Northern Access Route (NAR), which is a combination of upgraded access, limited new access, and barge crossings on the Stewart and Yukon Rivers. The NAR includes a section known as Henderson Dome-Maisy May Creek. Currently, the proponent is indicating access south of the Stewart River would be under control of Goldcorp Inc. Access management north of the river is expected to be by the Yukon Government. The NAR is not proposed to overlap with any TH Settlement Land, but there are several parcels of Settlement Land within 100 m of the route.

The previous owner of the project, Kaminak Gold Corporation<sup>1</sup>, had presented access routes to TH, including an access route via Black Hills Creek connecting from near the headwaters of Eureka Creek southward to the Stewart River barge crossing. The original, pre-fieldwork, NAR alignment followed the existing placer miner maintained roads down the Black Hills drainage and then along the north bank of the Stewart River. However, during the initial site investigation, it became clear that there were two potential routes from the hills above Eureka creek to the north bank of the Stewart River (Onsite Engineering 2017).

In the interests of being able to make an informed decision on route preference, TH is interested in understanding how these two routes compare with respect to their respective predicted effects to Treaty Rights, interests and values.

Goldcorp Inc. submitted a project proposal to the Yukon Environmental and Socio-economic Assessment Board (YESAB) Executive Committee on March 31, 2017. That proposal included additional information not provided to TH or their technical consultants, such as mitigation and monitoring plans for wildlife, water, closure and reclamation, updated baseline reports, and an updated project description. The updated project description included an alternatives assessment for nine road options including the NAR and Black Hills Creek options (Volume 1, section 2.10.4.8, Figure 2.10-2 in that report). However for the alternatives assessment the two routes listed above were considered as one route when compared to the other seven access options (Table 2.10-11). In other words, the alternatives assessment did not compare the environmental impacts of Route 1 (labeled as “Henderson Route” in Figure 2.10-2 in that report) and Route 2 (labelled as “Route 5” in Figure 2.10-2 in that report).

TH has expressed concerns about the NAR and associated impacts to fish, wildlife, trapping, traditional uses, and impacts to TH land and cultural areas.

TH has continued to express concerns with the NAR (i.e., Route 1) and the rationale used by the proponent in selecting this route as the preferred one. Goldcorp Inc. commissioned Onsite Engineering

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<sup>1</sup> Kaminak Gold Corporation is a subsidiary of Goldcorp Inc.

Ltd. (Onsite Engineering 2017) to prepare a report on the criteria and rationale used to select the NAR route. A final report was completed in May 2017 and provided to TH and their technical consultants.

## Purpose

The purpose of this report is to review the information provided to date by Goldcorp Inc. with a focus on the project proposal and recent technical reports.

There are two routes under review in this report:

1. **Route 1:** The route traversing from the headwaters of Eureka Creek past Henderson Dome south to Maisy May Creek and ending at the proposed barge crossing on the Stewart River. This is the route currently proposed by Goldcorp Inc. and is referred to in their documentation as the NAR.
2. **Route 2:** This route begins near the headwaters of Eureka Creek and travels south via Black Hills Creek and ending at the proposed barge crossing on the Stewart River. Within this route there are two options to reach the proposed barge crossing: one option avoids TH settlement land parcels (R-83A and R-18) and another involves going through a parcel of TH settlement land<sup>2</sup>.

The TH comparative analysis included objectives to:

- Provide a comparative analysis that would be available to TH citizens to provide information about the two routes;
- Summarize information on the range of potential impacts to rights and interests; and
- Provide an estimate of potential impact levels for each route to assist in evaluating a preferred route.

The scope of the present review includes the alternatives assessment for the two routes shown in the YESAB project submission, recent technical reports provided Goldcorp Inc., and includes an analysis of potential impacts of both routes to fish and wildlife, heritage, land and resources, and vegetation.

## Goldcorp Inc. Assessments

Route 1 and 2 are addressed, to varying degrees, in two key Goldcorp Inc. documents: 1) the YESAB proposal and 2) a recent trade-off study by Onsite Engineering Ltd. Both documents concluded that Route 1 was preferred, as discussed below.

### *1) Access Alternatives Assessment– Coffee Gold Mine Project YESAB Proposal March 2017*

Nine road-access routes and one barge option were assessed by Goldcorp Inc. for technical feasibility and economic viability (Volume 1, Section 2.10.4.8). The barge route was dropped due to the short season of use during construction and operation periods. The nine road routes are shown on Figure 2.10-2 where the Henderson route (referred to as Route 1 in this report) and Route 5 (referred to as Route 2 in this report) are shown as separate routes; however, they are not differentiated in Table 10-13, 10-14, 10-15, and 10-16 where the NAR and Route 5 are not described or distinguished in the text of the YESAB proposal.

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<sup>2</sup> We note that, through proximity, roads and the traffic they support can adversely affect a given parcel of land even though the road alignment and/or right-of way does not impinge on the property per se.

The preferred access route was selected based on technical feasibility, economic viability, and due to the lack of significant adverse environmental and socio-economic effects predicted by Goldcorp Inc. Several of the other route options were reported to have potentially significant adverse effects to the Klaza Caribou Herd and traditional land use (Table 2.10-16).

The access alternatives assessment is not consistent with the review and analysis by TH and LGL Limited involving those concerns related to potential effects on fish and wildlife, culture and heritage, social, economic, traditional economy and traditional land use associated with the NAR and the proposed project. Moreover, we note that the arguments Goldcorp Inc. used for effects on caribou and traditional land use could also be applied to the NAR.

## ***2) Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study- Onsite Engineering Ltd. May 2017***

Onsite Engineering Ltd. was commissioned by Goldcorp Inc. to conduct a comparative evaluation of Routes 1 and 2. Onsite Engineering completed a geometric road design, stream crossing designs, and barge landing designs for the non-government maintained portion of the NAR south of the Sulphur-Dominion Junction (~58 km southeast of Dawson City). The roads north of this junction are maintained by the Yukon government and were not part of that assessment.

The Onsite Engineering report states:

*During the design process, many routes to the Coffee Gold Mine were considered. This included routes from the south, north, and west. The final overall route (the NAR) was selected based upon broad parameters including:*

- *Safety for all users along the route;*
- *Using existing roads wherever feasible;*
- *Minimizing disturbance, particularly to sensitive features such as archeological and cultural heritage sites, wildlife, biological and habitat, and shallow ice rich permafrost; and*
- *Minimizing road length.*

The analysis in the Onsite Engineering report provides data and rationale for all the above criteria except features such as cultural, wildlife, biological, and habitat sites. They are not included in the Route Trade Off Analysis and Conclusion sections 2 and 3. The only natural resource value discussed in that report is permafrost. It is not clear if or how the other criteria were used in the analysis leading to the preferred route (i.e., Route 1).

When it became known there was interest by placer miners in opening a road south of Eureka Creek through the Henderson Dome and it was possible to avoid Route 2, this further supported Goldcorp Inc's decision to select this route for the NAR (Onsite Engineering 2017). In the post-hoc review conducted by Onsite Engineering, Route 2 raised concerns about the steep descent into the valley, areas of shallow ice-rich discontinuous permafrost, the number of bridge crossings required, and the overall cost to build the road. Onsite Engineering concluded that Route 1 was the preferred route based on safety, cost, and an overall smaller area of disturbance.

# Tr'ondëk Hwëch'in Assessment of Comparative Impacts to Heritage, Fish and Wildlife and Land and Resources Key Values

## *Heritage*

### General

TH heritage centers on a knowledge and understanding of TH history, culture, and survival that is passed on from generation to generation. The oral, cultural, experience-on-the-land basis of heritage makes it flexible, adaptive and evolving. It is a dynamic, living heritage and culture directly connected to the land. TH way of life includes relationships with people, other animals, plants, the spirit world, and the land (e.g. rivers, lakes, mountains, wetlands, and many others).

It is to be expected that either route, if developed, would cause impacts to the landscape. Creating new roads, interconnecting with existing roads and trails, and upgrading old roads could create a road corridor 214 kilometers long that transects the entire lower half of the TH Traditional Territory. The route to the mine will entail periods of continuous traffic and river crossings on two major waterways – both of which are vital to TH for fishing, hunting, and travel. Further work with citizens to determine the socio-economic and cultural effects on their way of life today and into the future is needed to adequately assess the effects of either route on TH heritage.

It is also important when considering the potential range of effects of access and the proposed project that the approach applied by Goldcorp Inc. assesses potential effects on culture, heritage, traditional economy, and traditional land uses. The effects assessment conducted on traditional land and resource use grouped TH with other Nations for an overall effects analysis. It was recognised the potential effects were greatest to TH but when assessed collectively no 'significant adverse effects' were found (Volume 4, Section 24). Note that traditional harvesting of vegetation is covered in the 'Vegetation' section, below.

*From the perspective regarding heritage, neither route can be identified as 'preferred' as each has potential for adverse effects.*

### Traditional Economy

During the Dawson Regional Land Use Planning, TH adopted the concept of traditional economy, which offers lessons on using natural resources and landscape features sustainably, adapting to changing environmental conditions, and incorporating new technologies and industries while still upholding the core values of environmental stewardship, cultural preservation and social development. TH strongly encouraged a plan that would 'maintain and enhance' a traditional economy.

An investigation into how the NAR may impact the traditional economy within the affected region should be undertaken. Currently this has not been considered and impacts are not fully understood or known. In the absence of regional land use planning this may be hard to determine.

*From the perspective of traditional economy, neither route can be identified as 'preferred' at this time as each has potential for as-yet undetermined adverse effects.*



## Archaeological and Historic Sites

Only a very limited amount of spatial data regarding archaeological and historic sites exists for the area. This limits TH's ability to engage in internal analysis and review of the project. Goldcorp Inc. has conducted assessments that include archaeological sites and historic sites within 200 m of the NAR and Goldcorp Inc. has committed to heritage assessments that will generally mitigate any impacts to these. That said, the Heritage Resource Impact Assessment: Kaminak Gold Corporation/Goldcorp Inc. Coffee Creek Mine Access Road (16-13ASR; Appendix 26-A4) is limited in that it only assessed new road construction and only focussed on Route 1. New road construction only includes sections of the proposed route that requires new design and not upgrading of roads. It is estimated to be only 37 km of the entire road route. Upgrades, pullouts, and quarries were not adequately assessed. As such it is hard to determine if there are more or fewer sites that would be impacted by one route over the other. Moving forward, the TH Heritage Department should be directly involved in these assessments, including planning, review, and fieldwork.

*From the perspective regarding archaeological and historic sites, neither route can be identified as 'preferred' at this time as each has potential for as-yet adverse effects with those of Route 2 being largely unknown at the present time.*

## Stewart River & Maisy May Farm

The Stewart River is an important area for hunting, fishing, recreation, and travel by TH citizens and others. The Stewart River is part of the Hän Migration Route recognized in Chapter 13 of the TH Final Agreement. TH needs to understand the effects of continual river crossing on the Stewart River as well as periods of constant traffic along the road section which parallels the river. The area which follows along the Stewart River is considerably longer for Route 2, but there is overlap with Route 1. Route 2 passes close to the historic Maisy May Farm.

*Both routes are expected to have impacts on TH values associated with the Stewart River and Route 2 passes near the Maisy May Farm.*

## East Side of Coffee Creek

Coffee Creek was once an integral stop along the seasonal movements of many TH families. It is known that the Coffee Creek area was traditionally important as a seasonal fish camp, gathering place, tool-making site and as a resource-rich area, where people lived and died. There are ancient and historic artifacts in the area, as well as gravesites. It is also known that TH continues to have strong cultural, spiritual and historical ties to Coffee Creek. Physical sites, oral history, census data, and archival imagery attest to the occupation of the area.

On the east side of the creek there is a cemetery with five graves and three spirit houses. There is also evidence of an old First Nation's camp nearby which is likely associated with early occupations at Coffee Creek. To date there has been very minimal investigation on this side of the creek. The proposed road is about 200 meters from these resources, though there is a pretty good chance there may be other sites or resources in the area. TH will need to decide whether this road is appropriate in such close proximity to these graves. It should also be noted that the current Heritage Resource Impact assessment did not consider these graves, or the camp remains located on the east side of the creek.

*Both routes are expected to have impacts on TH values associated with Coffee Creek.*

## Fish and Wildlife

### Fisheries

Some fisheries baseline information was collected for both routes in 2015, but after the decision was made to avoid the Black Hills Creek watershed, information on Route 1 is the primary focus of the reporting (Section 2.3.2, Appendix 14-A). Goldcorp Inc. reported 66 potential water crossings (53 stream crossings visited), 14 species of fish (2 salmon species and 12 resident freshwater species), 16 fish bearing streams, 19 non-fish bearing streams, and 21 non-classified drainages. On behalf of Goldcorp Inc., Environmental Dynamics Inc. (EDI) conducted beach seining and minnow trapping (two locations) at the barge landings.

Common species reported are Chinook, Chum, Arctic grayling, burbot, northern pike, longnose sucker, lake chub, slimy sculpin, and round whitefish (Appendix 14-A). Arctic grayling, burbot, juvenile Chinook salmon and slimy sculpin were found in the Maisy May Creek drainage.

Spawning Chum salmon were observed in the Yukon and Stewart Rivers (Appendix 14-A); however, It must be noted that the current state of decline of this Chinook salmon stock warrants concern that spawning surveys can not be reflective of past use or potential future need. Juvenile surveys (presence/absence) should consider the depressed population as well.

Stream crossings by route are summarized in the following figure.

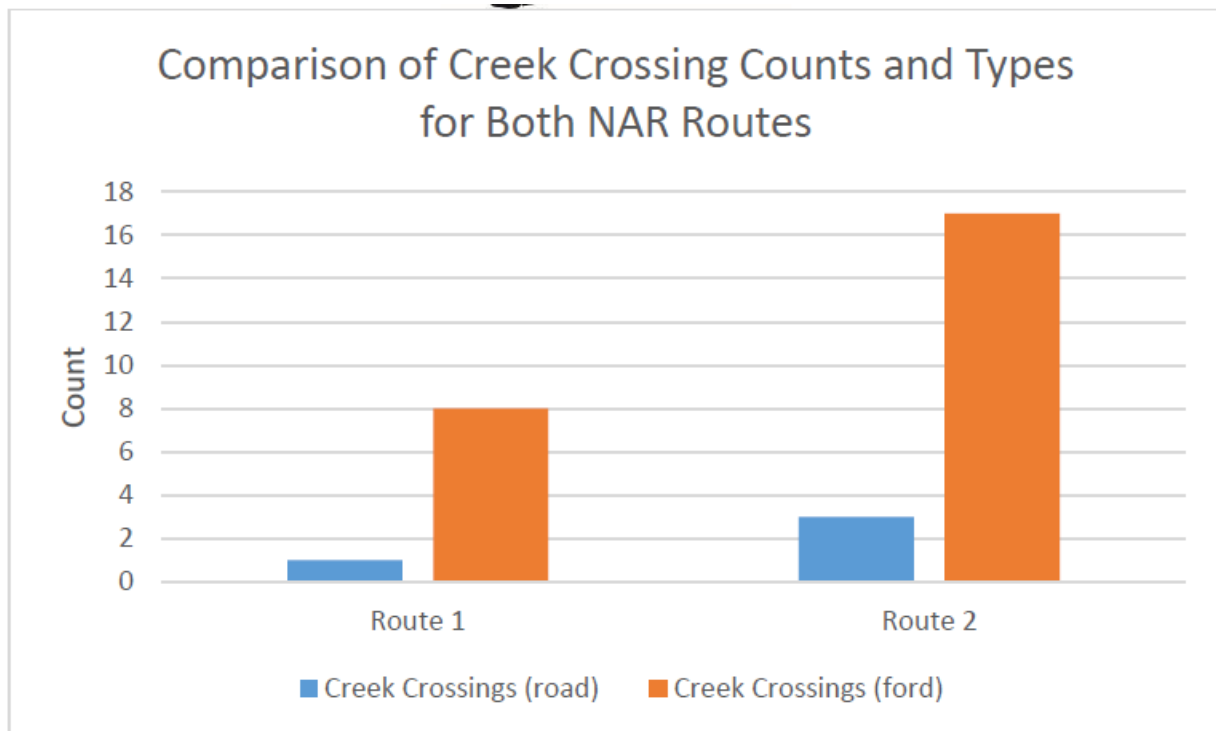


Figure 1.0 Comparison of creek crossing types for both routes. Road crossings mean that the road currently crosses over top of the creek. It is not known with accuracy what type of road crossings these are, ie: bridge versus culvert. (Onsite Engineering (2017) reported 3 large bridge crossings for Route 1 and 12 large bridge crossings for Route 2).

*From the perspective regarding fish and fisheries, neither route can be identified as ‘preferred’ at this time as each has potential for as-yet adverse effects with those of Route 2 being largely unknown at the present time. That said, Route 2 involves a larger number of stream crossings, which might present higher risks to fish and fish habitat.*

## Wildlife

### *Fortymile Caribou Herd*

The Fortymile Caribou Herd (FMCH) has been documented using habitats located in Goldcorp Inc’s regional and local study areas over the last several winters. The area is used as winter habitat and migratory movements on and off winter range. This herd has been reported as increasing in population numbers, and reusing historic range in the Yukon. It is expected that if these trends continue, they will cross the border more in the coming years and potentially spend more time in the area. TH wants to ensure that the landscape does not present limiting factors (such as linear disturbance, disturbance from development and loss of habitat, or human activities) to the herd in order to allow them to continue expanding their presence in the territory. Additionally, while the herd is increasing, there are studies in Alaska indicating that the herd is facing limiting factors in their summer range (e.g., food availability). That research shows that calf survival is expected to decline in coming years if the herd does not expand their summer range. It is important to acknowledge this research and ensure there is access to quality habitats without prolific road and/or development disturbance creating barriers to range. A year-round road could affect the future use of the area by FMCH, access to habitats, and movement to adjacent habitats/range.

A resource selection function (RSF) model was developed for winter range of FMCH in the Yukon Territory (Murphy 2017). The model examined a winter period from December 1st to February 26<sup>th</sup>, and it used location data from 60 collared caribou (55 females, 5 males) from 2012–2016 (Murphy 2017). The key findings were that caribou selected for slopes 20–30 degrees, burns 41–60 years, east and west aspects, and that caribou avoided young burns, roads (high use and low use/seasonal), and lower elevation habitats (this is inferred from avoidance of dense coniferous forests and habitat preferred further from large rivers). The model results were validated with positive predictive results, using a sub-sample of location data not used in the model analysis. The results appear consistent with caribou observations from recent surveys (Appendices 16-A and 16-D).

The habitat selection analysis indicates moderate- and high-rated winter habitats within the Regional Study Area for those areas at higher elevations in the Henderson Dome/Black Hills Creek Area, Stewart River to Yukon River route, and south of the Yukon River. So, while it is important to note the greater areas of moderate- and high-rated winter habitats are west and northwest of the Regional Study Area, there are still areas noted that are important habitats/range in the project footprint (Figure 1, Murphy 2017). Also, caribou sightings and tracks were reported for several of the winters since 2012 in the project footprint including both routes.

In comparing the two access routes, Route 1 extends over a greater distance at higher elevations, in moderate-rated and high-rated winter habitats, and exhibits a higher frequency of caribou observations along the route. Route 2 has similar conditions at the north end of the drainage but within 10–15 km the valley slopes increase and the road drops in elevation towards the Stewart River. This does not occur for Route 1 until it begins the southern descent into Maisy May Creek valley.

The Stewart River to Yukon River and Yukon River to mine site road sections have similar conditions with caribou observations at higher elevations and the road corridor within moderate-rated and high-rated winter habitats.

The model result of avoidance of roads is interesting as it applies to year-round and seasonal roads (not active in winter); however, the author reports the model does not provide evidence that the avoidance is from human disturbance effects such as traffic volume, hunting, or predation risk learned from range in Alaska as the effects have been limited in the Yukon (Murphy 2017). So it is acknowledged roads are being avoided by caribou, but further analysis is needed to better define the influence of roads on their distribution (Murphy 2017). Also the timing of movements in and out of the project area needs to be monitored in order to determine whether seasonal road closures already associated with freeze up and breakup of the Stewart and Yukon Rivers need to be modified to allow for caribou seasonal range movements.

The survey data, model outputs, and TH knowledge indicate caribou are expected to occur along the access routes and within the project footprint. A precautionary approach is needed to avoid and mitigate potential impacts – especially if the herd is forced to expand its summer range eastward as a result of food limitations in habitats to the west (i.e., Alaska). In this regard, the available information suggests that the adverse effects of Route 2 on caribou are less than for Route 1 in that Route 2 is further removed from the herd’s core range.

*From the perspective regarding the Forty Mile Caribou Herd conservation, Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.*

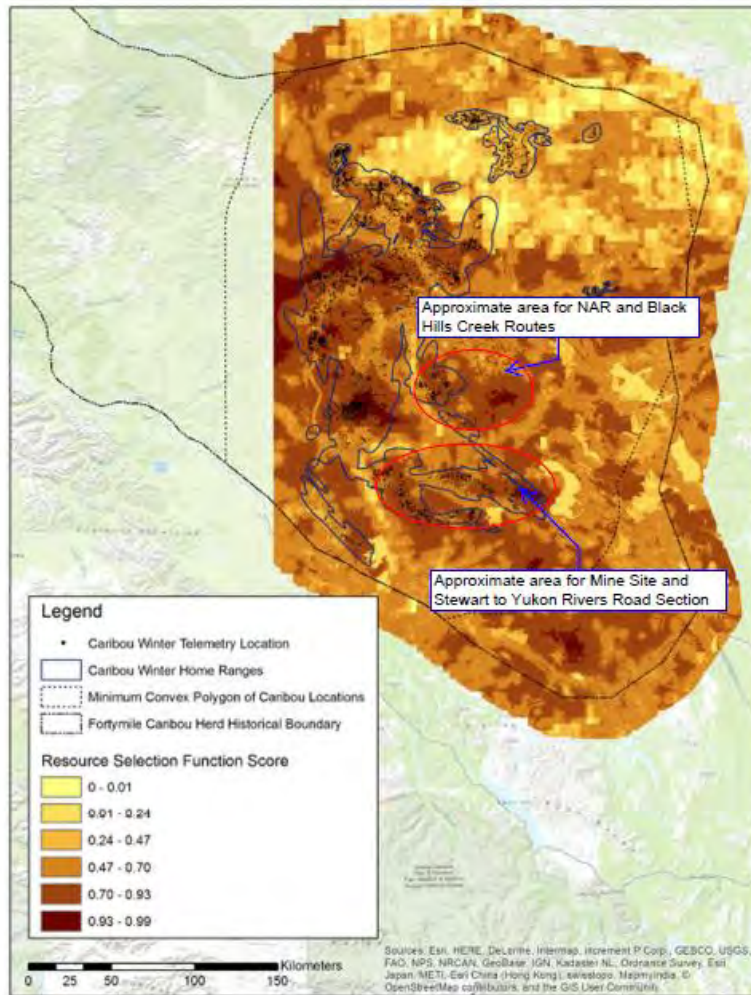


Figure 6. Predicted resource selection by caribou in the Fortymile caribou herd historical range. The middle four resource selection function (RSF) score categories are equivalent to one standard deviation of the RSF scores for the region.

### *Moose*

Moose densities in the Yukon average ~150 to 249 moose/1000 km<sup>2</sup> and a recent winter survey for the Dawson Goldfields Region (2015), which included the NAR and a 10 km buffer, estimated population of 814 moose (90% CI of 723-917) with a reported density of 247 moose/1,000 km<sup>2</sup> (Appendix 16-A). While densities vary in the Goldfields and beyond, this is similar to recent moose population estimates for the Dawson region (Section 2.2.1 Appendix 16-A).

In regards to the NAR and the overall project, key areas where moose are abundant during the early winter include the King Solomon Dome area and the Henderson Dome area. The Henderson Dome area is recognised as an important post-rut area. The value of this wilderness area, with the current limited (and seasonal) accessibility, is of major importance to health of the Dawson Goldfields population of moose (Appendix 16-A, Volume 3). Year-round disturbance from the access road threatens to disrupt this post-rut aggregation.

In addition, high-quality late-winter moose habitat is found throughout the Regional Study Area including the NAR and Black Hills Creek areas (Volume 3). Higher concentrations of moose were observed in the southwestern sections of the NAR general area along the upper sections of the



Henderson Creek and Black Hills Creek drainages and just north of the Indian River. It is also noted by TH that numerous mineral licks occur along the NAR.

The proposed length of the upgraded section of road along Route 1 cannot be considered in isolation as future spur roads from newly staked placer claims can be expected along this upgraded portion of road; this will create its own pressures on moose and moose habitat. Current road access into the area is maintained seasonally, resulting in relatively inaccessible wilderness that provides refuge for the wildlife for many months of the year. The impacts associated with opening up new access and upgrading existing access for placer mining causes major concern to the area as a whole.

An alternative route needs to be considered. Road access already exists almost the entire length of Black Hills Creek (with a trail reaching the Stewart River already). While two Settlement Land (SL) parcels are located at the mouth of Black Hills Creek, a viable option (to avoid SL) could include going down Black Hills Creek to one of the smaller hills that occur upstream from the SL parcels. The road could be pushed over the hills there and connect with the bottom end of Maisy May Creek. This avoids having to do road upgrades along the Henderson Dome section (which has high value as moose post-rut habitat), reduce the amount of new road that is being created in the TH Traditional Territory, and reduce the inevitable placer mining spur roads because the road on Black Hills Creek is already pushed through and this valley is staked.

Generally, Route 2 will avoid the Henderson Dome post-rut area and it is predominantly located within low-rated late-winter habitats with only 10 km of the upper drainage intersecting moderate- high-rated habitats. The NAR intersects ~25 km of moderate- and high-rated habitat areas before descending to the Stewart River.

It is likely given the steeper topography of Route 2 (after 10–15 km of the north end of the route, the valley slopes increase and the road drops in elevation towards the Stewart River) there would be a greater density of early winter moose use along Route 1 with similar densities in the upper drainage of Route 2 as shown by the moose early winter density estimates model (Appendix 16-A, Figure 2-10).

*From the perspective regarding moose habitat conservation, Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.*

### ***Moose harvest***

With a total mean annual harvest of 48 moose, 5 to 10% of the total Yukon annual moose harvest occurs within the Dawson Goldfields region (Appendix 16-A). The Dawson Goldfields Game Management Subzones (GMSs) in particular are some of the most intensely hunted areas in the Yukon as a result of having above average moose density and above average access (Cooley et al. 2012 in Appendix 16-A). The NAR will upgrade access to create good quality roads that will attract hunting activity to this area; roads that create circuits are also attractive to hunters. This attention will draw harvesters and will increase harvesting pressure on moose within the TH Traditional Territory. As indicated by TH, harvest/hunting pressures is a regional concern and a moose management strategy, is needed.

Yukon moose management guidelines recommend a bull harvest rate (licenced hunting) of 2–3 % of total population size ( $0.11 < 0.35$  moose/km<sup>2</sup>, Environment Yukon 2016). The current estimates by Game Management Subzone for the project peg harvest rates at 0.8%–4.9% (Appendix 16-B, Section 4.5, Page 4.63). Game Management Subzones 3-07 through 3-12, north of Stewart River, have harvest rates of 1.1–2.9% and based on Yukon management guidelines, 3-07 and 3-12 are close to the 3% threshold (Appendix 16B, Section 4.5, Page 4.63). It is understood that population management typically occurs at

a broader scale, but the current situation reflects bull harvesting rates near recommended limits for two of the Game Management Subzones. Overall, for the five Game Management Subzones, the bull harvest rate is estimated at 1.7 %. An additional 20 bull moose harvested annually in these subzones will increase the harvest rate to 3% of the total population. Goldcorp Inc. acknowledges that the moose harvest is currently at or near sustainable thresholds in their effects assessment for the project (Suitor 2015 in Appendix 16B, Table 1.2-2).

As indicated by TH, either route would provide upgraded access for hunting if no access controls were applied by either the territorial government or the proponent. Unregulated access can have adverse effects on the bull moose harvest rate and, potentially, the populations in the project area. As a result, a harvest strategy will need to be adaptive to be able to take management actions quickly, notwithstanding the regular period to enact regulations in the Yukon.

*From the perspective regarding moose harvest and conservation, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects until such time as a harvest strategy is developed and applied.*

#### ***Thinhorn Sheep***

There are key habitats for thinhorn sheep at Ballarat Creek and Yukon River which is midway between two other known sheep habitat areas on the Yukon River. These habitats are key as connectivity and movement habitats between the White River and Minto habitats. Recent surveys have observed very low numbers of sheep (i.e., 4–8 sheep) in the Ballarat Creek area but are known to use the area (Appendix 16-A, Table 2-11).

It is important to recognise that sheep are found in the Ballarat Creek area and the NAR can have potential significant effects that could result in sheep avoiding or dispersing from the area due to the construction and operation of the NAR. This could result in isolating the thinhorn sheep in the White River and Minto habitat areas.

There is only one route proposed to the Yukon River barge crossing, but it recommended to take actions to avoid the Ballarat Creek habitat area for road development and consider other crossings in broader Ballarat Creek area.

*Both routes have similar potential to impact thinhorn sheep.*

#### ***Grizzly Bear***

Grizzly Bear are known to occur at low densities in the region and have large home ranges with seasonal movements across elevations following green-up of forage plants, berries, and prey species. For this proposed project, grizzly bear habitat models have been developed. As is the case with large mammals, the models estimate habitats at a regional scale so site-specific foraging areas such as berry patches, alpine meadows, or fish spawning habitats may not be captured sufficiently.

Both routes are rated “Not Secure” habitats for grizzly bears within the right of way with Route 2 having more such habitat within its footprint. However both have large areas of “Secure” habitats associated with the routes and most of the regional study area (Appendix 16-C4).

The greatest impact by either route will be the mortality risk posed by increased potential for human-bear interactions. Bears are expected to be attracted to the access corridor where they will forage on invasive plant species, berry communities, and/or garbage.

*From the perspective regarding grizzly bear conservation, neither route can be identified as 'preferred' at this time as each has potential for adverse effects.*

#### ***Black Bear***

Black bears are common throughout the region and the NAR. There has been no assessment of black bear habitats, similar as grizzly bear, and there is no indication of which route has greater or lesser potential effects. However, bears are expected to be attracted to the access corridor where they will forage on invasive plant species, berry communities, and/or garbage.

*From the perspective regarding black bear conservation, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.*

#### ***Wolverine***

Wolverine are found in the region and the NAR at low densities. Wolverine have large home ranges, generally found at higher elevations, with denning expected to occur with the appropriate snow depth, cover, and structure. Generally, there is limited information to assess the potential effects of either route.

For this proposed project a denning habitat model has been completed for wolverine; however, the denning habitat model, overestimates the denning habitat potential which makes it very difficult to assess the two routes because of the model's inability to accurately identify habitat with the highest suitability for denning.

Modeling habitats for wolverine is relatively new for environmental assessments. Most projects use other methods to determine population status and habitat use (e.g. DNA sampling-hair stations, radio tracking). Some projects focus on the attractants aspect and recommend mitigations and monitoring to reduce or avoid effects.

*From the perspective regarding wolverine conservation, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.*

#### ***Wolf Predation on Ungulates***

Wolves are in the region and the NAR with local knowledge indicating abundant and "healthy" populations (Appendix 16-A). Wolves and tracks were observed during aerial surveys, snow track surveys, and remote cameras (Appendix 16-A).

There are concerns that the additional linear development from the NAR, associated spur roads (existing and future), and year-round maintenance of the NAR will improve the vagility of wolves and thereby result in increased predation on ungulates. Having a maintained access corridor, with potentially greater density of spur roads and trails, can provide easier access for wolves to ungulates, especially moose. There are valid concerns with increased predation potential on moose during post-rut and winter from the upgraded access with the NAR. Route 2 will avoid the Henderson Dome area and only the upper section of the route is within moderate- to high-suitability moose winter habitats. Also, winter caribou locations were observed on higher elevations on gentler slopes and the Black Hills Creek route has steeper terrain. In addition, the route will descend to lower elevations in a shorter distance which may reduce the predation potential compared to Route 1.

*From the perspective regarding wolf predation on ungulates Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.*

### ***Furbearers and Trapping***

Furbearers trapped in the region include lynx, marten, red fox, coyote, wolf, red squirrel, mink, muskrat, northern river otter, ermine, least weasel, and beaver. Snow track surveys by Goldcorp Inc. have documented most of the species along Route 1, but not Route 2 (though the latter area is expected to have similar species).

Trapping occurs within the region by TH citizens and Registered Trapline Concessions (RTCs) holders. RTC 54 is located within the NAR corridor and project footprint and is held by a TH citizen. There are seven RTCs intersected by a route between Dawson City and the mine site (i.e., RTCs 54, 57, 58, 62, 64, 115, 116) with two RTCs that would see access along their entire north-south axis (i.e., RTCs 54, 62).

There are concerns that RTCs will be affected by the increased traffic, additional year-round road activity, and additional spur roads that will occur with the NAR access. There exists high fur-bearer trapping potential in this area currently, but increased road access can diminish numbers of furbearers due to year-round road activity and increased development activity on the land.

It is TH's view that compensation for long-term loss to trapline productivity for either route selected must be properly addressed.

It is expected that either route will have negative effects on trapping and furbearer species.

*From the perspective regarding furbearers and trapping, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.*

### ***Land and Resources***

There are numerous land and resource considerations for road access to the mine site. The following offers some brief summaries of what Land and Resources values should be considered with a new access route. This is by no means a comprehensive list, but tries to capture key values that could be impacted by the NAR.

#### ***Year-Round Road Maintenance***

The development and maintenance of a year-round road has numerous implications that could impede TH hunting and subsistence rights. Not the least of which includes a YG Policy entitled, "Rural Residential Policy" that provides applicants with the ability to apply for rural residential lands if the parcels are located within a year-round maintained road<sup>3</sup>. This could result in more occupied residences out on the land, which will further impede TH's hunting rights. Further impacting TH hunting rights is the 1-km radial buffer that prevents hunting activities for safety reasons. There is also the potential for the "Placer Residential Policy" to move forward. It is currently on hold and TH have expressed strong opposition to the initiative<sup>4</sup>. Regardless of the policy, as the distribution and density of rural residences occur, so too do impacts to TH rights and interests.

*It is expected that either route will have negative effects to the TH if a route is classified as a year-round residential road and the density and distribution of rural residential parcels increase.*

*See Map 2, Appendix A*

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<sup>3</sup> [http://www.emr.gov.yk.ca/landmanagement/pdf/Rural\\_Residential\\_2016.pdf](http://www.emr.gov.yk.ca/landmanagement/pdf/Rural_Residential_2016.pdf)

<sup>4</sup>

[http://www.yukonndpcaucus.ca/liz\\_hanson\\_highlights\\_the\\_importance\\_of\\_strong\\_government\\_to\\_government\\_first\\_nations\\_relations](http://www.yukonndpcaucus.ca/liz_hanson_highlights_the_importance_of_strong_government_to_government_first_nations_relations)

## Settlement Land

Proximity of the NAR to Settlement Land is an important consideration in determining impacts to TH's established Treaty Rights. For example, there could be direct physical impacts to the Settlement Land from right-of-way clearing, impacts to water quality rights adjacent to or through Settlement Land from construction and maintenance, impacts to hunting and gathering rights protected by the TH Final Agreement (THFA), impacts to Heritage values as per TH's Heritage Act and FA rights, and impacts to the peaceful use and enjoyment of that Settlement Land, such as noise and dust disturbance. TH has both Category A and Category B Settlement Land adjacent to both Routes 1 & 2. As per Chapter 5 sub 4 of the THFA, TH has law-making authority and the following authority over Settlement Land:

5.4.1.1 for Category A Settlement Land,

(a) the rights, obligations and liabilities equivalent to fee simple excepting the Mines and Minerals and the Right to Work the Mines and Minerals, and (b) fee simple title in the Mines and Minerals, and the Right to Work the Mines and Minerals;

5.4.1.2 for Category B Settlement Land the rights, obligations and liabilities equivalent to fee simple reserving therefrom the Mines and Minerals and the Right to Work the Mines and Minerals but including the Specified Substances Right;

There are three parcels that are in close proximity to Route 1:

- S-93B is located south of where Dominion Road and Sulphur Road meet. The proposed road will wholly avoid S-93B by travelling on the opposite side of the creek. S-93B was selected for recreational purposes and a hunting cabin.
- R-82A is at the Stewart River, and borders the east side of Maisy May Creek. A new section of road will head south past R-82A on the west side of Maisy May Creek.
- S-83A is at the Yukon River and Ballarat Creek. A new section of road will pass between the north side of the parcel and the hillside. S-83A was selected because of an existing fish campsite, future homestead considerations, and agricultural potential.

There are two large Settlement Land parcels in close proximity to Route 2:

- R-18A is located to the east side of Black Hills Creek as it enters the Stewart River. Route 2 travels directly west of R-18A, directly along the border of the parcel.
- R-82A is located directly west of Black Hills Creek as it enters the Stewart River. Route 2 travels along the east and south boundaries of this parcel.
- Note that the Settlement Land R-18A and R-82A do not include the road ROW for Route 2, as per TH land selection files.

## Cumulative Effects

It is important to consider the cumulative effects from both routes with respect to probable increases in both placer and quartz mining activities in the TH Traditional Territory. Not only does the improved and expanded access increase the likelihood of new projects coming on line, such as Class 3 quartz exploration projects like Lucky Strike becoming project ready (along Route 1), it also benefits current miners in the area and helps them expand their operations. For example, many placer mining operations along the existing access will have improved road conditions and longer mining seasons due to increased road maintenance and year-round access from plowing. The developed NAR could also increase access for placer miners into adjacent creek valleys such as Three Kings Creek or Copper Creek along Route 1, heading south to the Stewart River.



Onsite Engineering (2017) reports that it was the interest of placer miner(s) to build a road to the Henderson Dome area that was a reason for selecting Route 1 versus Route 2. This strongly suggests that road densities will increase from other mining activity in the area and contribute to cumulative effects, including effects on TH rights and interests.

*From the perspective regarding cumulative effects Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.*

*See Maps 3&4, Appendix A*

## **Vegetation**

### **Traditional Harvesting**

Consideration must be given to the effects on current traditional plant harvest along the NAR as well as impacts to future harvest potential. There will be physical loss of traditional plants along the NAR from road construction, widening and maintenance and there will also be negative impacts from dust to harvestable plants along the NAR from increased frequency of traffic. Although improved roads could allow for increased access by TH citizens for traditional harvest, the increase in traffic frequency from the Goldcorp project will be more likely to deter traditional harvesting activities.

Goldcorp Inc. conducted detailed ecosystem mapping for the portions of the NAR that are considered new road construction, whereas they have chosen to use a coarser Broad Ecosystem Mapping, for sections of road that are considered as upgrades. Goldcorp should consider the increase in frequency of traffic as a project activity and should use the detailed ecosystem mapping approach, Ecological Land Classification, to account for the effect of this project activity on traditional plants and vegetation. Without this detailed level of baseline information, it will be challenging to determine the true impacts of the NAR on local vegetation types, including traditionally harvested plants, along the majority of the NAR.

Traditional plant species and communities were not included in the trade off study of the two routes by Goldcorp Inc. Approaches could be used to estimate the distribution and abundance of traditional plant species and communities of the two routes.

*From the perspective regarding traditional harvesting of vegetation, neither route can be identified as 'preferred' at this time as each has potential for as-yet adverse effects with those of Route 2 being largely unknown at the present time.*

*See Map 5, Appendix A*

### **Invasive plants**

According to Goldcorp's baseline studies on invasive species, there are numerous occurrences of invasive plants along Route 2. This is likely because this route is already a well-established road and established roads offer high potential for invasive plant presence and movement, due to traffic moving seeds. Goldcorp states that during the baseline collection work, the final alignment of the NAR was unknown so baseline was collected for all NAR options. However, there is a portion of their currently proposed Route 1 that was not included in the baseline data collection or study area for their work on invasive species. As such, the baseline work for Route 1 is incomplete. This is a concern, especially for a

less established route, as one would expect increases in invasive plant occurrences to be more significant, from no occurrence to presence, than already impacted, established routes.

Route 2 already has invasive species, greater distance of existing access, and moderate effects due to the presence of species already in the corridor. Goldcorp Inc's YESAB Proposal does not address invasive plant monitoring along the NAR – only around the mine site. Similar to the moose harvest assessment, an invasive species strategy or agreement with Yukon government and the proponent is recommended.

*From the perspective regarding invasive plants, Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.*

*See Map 6, Appendix A*

## Timber and Wetlands

Currently timber harvesting is not an immediate concern but there is the potential for future timber harvesting with improved year round access. Yukon government is currently developing a Timber Harvest Plan for the entire Goldfields region, which could make harvestable areas more accessible for commercial pursuits. There are stands of merchantable timber with a larger area of stands such as white spruce leading stands near Route 2.

Wetlands are an important component of the boreal forest and are of ecological significance. Wetlands have many functions, such as providing habitat for specialist species, or maintaining water quality. Wetlands are rare in the TH Traditional Territory. Avoiding or mitigating wetlands are important considerations in evaluating either route. Route 2 has more wetlands and a greater area of wetlands than Route 1. For example, Route 2 would cross over wetland features, located slightly north of the Stewart River and within/near Settlement Land parcels R-82A and R-18A. Through route refinements, it might be possible to avoid those wetlands. According to Goldcorp Inc.'s baseline studies for Route 1, there are a few small wetland features. It is also important to state that other sections of the NAR will traverse through areas, like the Indian River Valley, where wetlands are located.

*From the perspective regarding timber, Route 2 is believed to have greater potential for adverse effects, thus Route 1 is preferred. However, given that there is presently access along much of Route 2 and that timber harvest planning is underway for the Goldfields region, the incremental increase in risk to timber as a result of the NAR is likely modest.*

*From the perspective regarding wetlands, Route 2 is believed to have greater potential for adverse effects, thus Route 1 is preferred.*

*See Map 7, Appendix A*

## Wildfire

Fire Action Zones are areas where the Yukon Wildland Fire Management will attempt to put out wildfires. These zones are determined by human assets on the landscape. For example, if a wildfire were to occur next to Dawson, Fire Management would action the fire and try to put it out to protect those values. In wilderness areas where immediate threats to human life and infrastructure are not apparent, Wildland Fire Management allows the fires to burn, thus allowing for more natural fire cycles. The more Fire Action Zones there are, the more the fire cycle deviates from the natural cycle. This leads to fuel loading and the need for other forms of fuel abatement to manage the likelihood of catastrophic or stand replacing fire regimes.

The NAR and mine infrastructure should be considered an additional Fire Management Zone, as the infrastructure and human life would be protected or fire suppression would be actioned in the event a fire were to impact the NAR or mining operation. The currently lesser established Route 2, would result in a change to the Fire Action Zone, versus a new route that would need to be established.

Note, Goldcorp's definition of existing route needs to be defined more clearly. There are significant portions of Route 1, for example, that are defined as existing road; however, some of this existing road is in fact a cat trail, not adequate for truck traffic. This changes the perception of current use on the land base, as well as has implications for things like Fire Action Zones and wildlife movement.

*From the perspective regarding fire, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.*

## **Appendix A**

### **Maps 1–7:**

[https://www.dropbox.com/sh/bbew059v2hcyios/AAAGaOMEXEEkdHj\\_eLm7yAR8a?dl=0](https://www.dropbox.com/sh/bbew059v2hcyios/AAAGaOMEXEEkdHj_eLm7yAR8a?dl=0)

**Table 1.0 Comparison Analysis for Route 1 and Route 2 to construct a Northern Access Route (NAR) with anticipated impact outcomes on TH's rights along with a general conclusion about the routes.**

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
<b>Heritage</b>					
General Heritage/ 'Way of Life'	It is expected that either route, if developed, would cause impacts to the landscape.  Further work with citizens to determine the socio-economic and cultural effects on their way of life today and into the future is needed to adequately assess the effects of either route on TH heritage.	Unknown	Same conditions as R1	Unknown	<i>From the perspective regarding heritage, neither route can be identified as 'preferred' as each has potential for adverse effects.</i>
Traditional Economy	An investigation into how the NAR may impact the traditional economy within the effected region should be undertaken. Currently this has not been considered and impacts are not fully understood or known.	Unknown	Same conditions as R1	Unknown	<i>From the perspective regarding traditional economy, neither route can be identified as 'preferred' at this time as each has potential for as-yet undetermined adverse effects.</i>

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
Archaeological/Historic Sites (HRIA 16-13ASR)	Only 2 sites were investigated along R1. HRIA is inadequate.	Unknown	Only 1 Site located along R2. No HRIA was conducted for R2.	Unknown	<i>From the perspective regarding archaeological and historic sites, neither route can be identified as 'preferred' at this time as each has potential for as-yet adverse effects with those of Route 2 being largely unknown at the present time.</i>
Stewart River and Maisy May Farm	The Stewart River is an important area for hunting, fishing, recreation, and travel by TH citizens and others. The Stewart River is part of the Han Migration Route recognized in Chapter 13 of the TH Final Agreement. TH needs to understand the effects of continual river crossing on the Stewart River as well as periods of constant traffic along the road section which parallels the river. R1	Moderate	Similar conditions as R1 but a longer distance along river and passes close to historic Maisy May Farm	Moderate	<i>Both routes are expected to have impacts on TH values associated with the Stewart River and Route 2 passes near the Maisy May Farm.</i>



Consideration	Route 1 (R1) (Henderson Dome, Maisy May)	R1 Impact (High, Moderate, Negligible, None, Unknown)	Route 2 (R2) (Black Hills)	R2 Impact (High, Moderate, Negligible, None, Unknown)	Conclusion
	has a shorter distance along river.				
East Side Coffee Creek	It is known that the Coffee Creek area was traditionally important as a seasonal fish camp, gathering place, tool-making site and as a resource-rich area, where people lived and died. On the east side of the creek there is a cemetery with five graves and three spirit houses. The proposed road is about 200 meters from these resources, though there is a pretty good chance there may be other sites or resources in the area.	Moderate	Same conditions as R1.	Moderate	<i>Both routes are expected to have impacts on TH values associated with Coffee Creek.</i>
<b>Fish</b>					
	An investigation is required to provide all technical studies that have been conducted in the Goldfields area (both routes). Fish Habitat Suitability model should not be relied on during a comparison exercise				<i>From the perspective regarding fish and fisheries, neither route can be identified as 'preferred' at this time as each has potential for as-yet adverse effects with those of Route 2 being largely</i>

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
<p>b/c DFO classified habitats as “low” for all streams that were lacking data at the time of classification. Recommendation includes having TH consultant team research all studies that have been conducted in this area over the past decade.</p>					<p><i>unknown at the present time. That said, Route 2 involves a larger number of stream crossings, which might present higher risks to fish and fish habitat.</i></p>
<b>Wildlife</b>					
<p><i>Forty Mile Caribou Herd</i></p>	<p>Increased development has the potential of isolating habitats and deterring use by FMCH. Migratory movements could be impeded.</p> <p>R1 extends over a greater distance at higher elevations, in moderate-rated and high-rated winter habitats, and exhibits a higher frequency of caribou observations along the route until it begins the southern descent</p>	<p>Moderate to High</p>	<p>Increased development has the potential of isolating habitats and deterring use by FMCH. Migratory movements could be impeded.</p> <p>R2 has similar conditions as R1</p>	<p>Moderate</p>	<p><i>From the perspective regarding the Forty Mile Caribou Herd conservation, Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.</i></p>

Consideration	Route 1 (R1) (Henderson Dome, Maisy May)	R1 Impact (High, Moderate, Negligible, None, Unknown)	Route 2 (R2) (Black Hills)	R2 Impact (High, Moderate, Negligible, None, Unknown)	Conclusion
into Maisy May Creek valley			at the north end of the drainage but within 10–15 km the valley slopes increase and the road drops in elevation towards the Stewart River.		
<i>Moose</i>	<p>Henderson Dome area is recognised as an important post-rut area and winter aggregation area. year-round access will impact moose populations including increased harvesting and predation potential.</p> <p>R1 intersects ~25 km of moderate- and high-rated habitat areas before descending to the Stewart River.</p>	High	<p>Established route in place, year-round access will impact moose populations including increased harvesting and predation potential.</p> <p>R2 will avoid the Henderson Dome post-rut area and it is</p>	Moderate	<p><i>From the perspective regarding moose habitat conservation, Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.</i></p>

Consideration	Route 1 (R1) (Henderson Dome, Maisy May)	R1 Impact (High, Moderate, Negligible, None, Unknown)	Route 2 (R2) (Black Hills)	R2 Impact (High, Moderate, Negligible, None, Unknown)	Conclusion
			predominantly located within low-rated late-winter habitats with only 10 km of the upper drainage intersecting moderate- high-rated habitats.		
<i>Moose Harvest</i>	Increased harvest likely due to road upgrades. It can be controlled by harvest management strategy (undeveloped)	Moderate	Increased harvest likely due to road upgrades. It can be controlled by harvest management strategy (undeveloped)	Moderate	<i>From the perspective regarding moose harvest and conservation, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects until such time as a harvest strategy is developed and applied.</i>
<i>Thinhorn Sheep</i>	There are key habitats for thinhorn sheep at Ballarat Creek and Yukon River which is midway between two other known sheep habitat areas on the Yukon River. These habitats are key as	High	Same conditions as R1.	High	<i>Both routes have similar potential to impact thinhorn sheep.</i>

Consideration	Route 1 (R1) (Henderson Dome, Maisy May)	R1 Impact (High, Moderate, Negligible, None, Unknown)	Route 2 (R2) (Black Hills)	R2 Impact (High, Moderate, Negligible, None, Unknown)	Conclusion
<p>connectivity and movement habitats between the White River and Minto habitats.</p> <p>The construction and operation of the NAR. could result in sheep avoiding or dispersing from the area. This could result in isolating the thinhorn sheep in the White River and Minto habitat areas.</p>					
<i>Grizzly bear</i>	<p>Grizzly Bear are known to occur at low densities in the region and have large home ranges with seasonal movements across elevations.</p> <p>Both routes are rated “Not Secure” habitats for grizzly bears within the right of way with Route 2 having more such habitat within its footprint. However both have large areas of “Secure” habitats associated with the routes and most of the</p>	Moderate	Same conditions as R1.	Moderate	<p><i>From the perspective regarding grizzly bear conservation, neither route can be identified as ‘preferred’ at this time as each has potential for adverse effects.</i></p>



Consideration	Route 1 (R1) (Henderson Dome, Maisy May)	R1 Impact (High, Moderate, Negligible, None, Unknown)	Route 2 (R2) (Black Hills)	R2 Impact (High, Moderate, Negligible, None, Unknown)	Conclusion
regional study area.					
<i>Black bear</i>	Black bear are common throughout the region and the NAR. Use of habitat is widespread throughout the Dawson Goldfields region.	None	Same conditions as R1.	None	<i>From the perspective regarding black bear conservation, neither route can be identified as 'preferred' at this time as each has potential for adverse effects.</i>
<i>Wolverine</i>	Wolverine are found in the region and the NAR at low densities, large home ranges, and generally found at higher elevations.	None	Same conditions as R1.	None	<i>From the perspective regarding wolverine conservation, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.</i>
<i>Wolf</i>	Wolves are in the region and the NAR with local knowledge indicating abundant and "healthy" populations (Appendix 16-A).	High	R2 will avoid the Henderson Dome area and only the upper section of the	Moderate	<i>From the perspective regarding wolf predation on ungulates Route 1 is believed to have greater potential</i>

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
	There are valid concerns with increased predation potential on moose during post-rut and winter from the upgraded access with R1. R1 has a greater distance than R2 within moderate- to high-suitability moose and caribou winter habitats.		route is within moderate- to high-suitability moose and caribou winter habitats.		<i>for adverse effects, thus Route 2 is preferred.</i>
<i>Furbearers and Trapping</i>	There exists high fur-bearer trapping potential in this area currently, but increased road access can diminish numbers of furbearers due to year-round road activity and increased development activity on the land.	Moderate	Same conditions as R1.	Moderate	<i>From the perspective regarding furbearers and trapping, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.</i>
<b>Land and Resources</b>					
<i>Year-Round Maintenance</i>	Rural residential lands can be applied for if the parcels are located within a year-round maintained road. This could result in more occupied residences out on the land which will further impede TH's hunting rights.	Moderate to High	Same conditions as R1.	Moderate to High	<i>It is expected that either route will have negative effects to the TH if a route is classified as a year-round residential road and the density and distribution of rural</i>

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
<i>Settlement Land</i>	S-93 B, S-82A, S-83A	High	R-18A, R-82A	Moderate	<i>residential parcels increase. Route 2 is preferred.</i>
<i>Cumulative Effects</i>	Improved and expanded access increases the likelihood of new projects coming on line, such as current Class 3 quartz exploration projects like Lucky Strike. It also benefits current miners in the area and helps them expand their operations.	High	It is expected R2 will not result in the same increased density and distribution of new projects as R1. It will benefit existing miners in the area.	Moderate	<i>From the perspective regarding cumulative effects Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.</i>

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
<i>Traditional plants</i>	The information is lacking granular baseline data which makes it challenging to determine the true impacts of the NAR on local vegetation types, including traditionally harvested plant communities.	Unknown	The information for fine scale baseline data for R2 is not available which does not make it possible to estimate potential effects to traditional plant communities.	Unknown	<i>From the perspective regarding traditional harvesting of vegetation, neither route can be identified as 'preferred' at this time as each has potential for as-yet adverse effects with those of Route 2 being largely unknown at the present time.</i>
<i>Invasive species</i>	The information is has poor baseline data, but does indicate a lower frequency of occurrence where it is expected increases in invasive plant occurrences to be more significant, than already impacted, established routes.	High	RA 2 already has invasive species, greater distance of existing access, and moderate effects due to the presence of species already in the corridor.	Moderate	<i>From the perspective regarding invasive plants, Route 1 is believed to have greater potential for adverse effects, thus Route 2 is preferred.</i>

<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
<i>Timber</i>	There is the potential for future timber harvesting with improved year round access but there is a lesser area of potential merchantable stands found in R1 than R2.	Low	There is the potential for future timber harvesting with improved year round access. There is a greater area of potential merchantable stands adjacent to R2.	Low	<i>From the perspective regarding timber, Route 2 is believed to have greater potential for adverse effects, thus Route 1 is preferred. However, given that there is presently access along much of Route 2, the incremental increase in risk to timber as a result of the NAR is likely modest.</i>
<i>Wetlands</i>	R1 has a lesser area of wetlands and are smaller wetlands than those found within R2.	Negligible	R2 has a greater area of wetlands and are larger wetlands than those found within R1.	Moderate	<i>From the perspective regarding wetlands, Route 2 is believed to have greater potential for adverse effects, thus Route 1 is preferred.</i>



<b>Consideration</b>	<b>Route 1 (R1)</b> (Henderson Dome, Maisy May)	<b>R1 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Route 2 (R2)</b> (Black Hills)	<b>R2 Impact</b> (High, Moderate, Negligible, None, Unknown)	<b>Conclusion</b>
<i>Wildfire</i>	R1 and the mine infrastructure would result in a new fire action zone	Negligible to Moderate	R2 and the mine infrastructure would result in modifying an existing fire action zone	Negligible to Moderate	<i>From the perspective regarding fire, neither route can be identified as 'preferred' at this time as each has similar potential for adverse effects.</i>

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June 2nd, 2017

**RE: Expectations for the development of site-specific water quality objectives for the Coffee Gold project.**

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## **1.0 Introduction**

On February 9<sup>th</sup>, 2017, [Name Redacted] a letter outlining the expectations for water management goals for the affected tributaries draining the Coffee Creek Gold project (i.e., Latte/Coffee Creek, Halfway Creek, YT-24, and the Yukon River). The water management goals described in the February 9<sup>th</sup> letter are based on the following protection principles:

- **Non-degradation** of culturally or ecologically sensitive waters such that they remain substantially unaltered in regard to water quality and flow; and,
- **Use-protection** of typical waters to ensure that the designated uses of the waters (e.g., aquatic life, wildlife, agriculture, human health, recreation) are protected.

In the February 9<sup>th</sup> letter, Tr'ondëk Hwëch'in recommended that site-specific water quality objectives (SSWQOs) developed for Latte Creek, Coffee Creek, Halfway Creek, and the Yukon River reflect the non-degradation principle to protect rearing habitats for Chinook salmon which are a species of salmon that Tr'ondëk Hwëch'in have a constitutionally protected right to harvest under the Final Agreement and which are extremely important culturally. Adhering to the non-degradation principle would ensure that water quality through mine life, post-closure and reclamation is consistent with background (i.e., pre-mining) concentrations for all contaminants of potential concern (COPCs). To meet that goal, SSWQOs would need to be derived using the background concentration procedure and account for seasonal variability (e.g., as a result of variability in surface water flow). Tr'ondëk Hwëch'in stated the expectation that SSWQOs would be developed in a manner that is consistent with guidance provided in MacDonald (1997), Canadian Council of Ministers of the Environment (CCME; 2001), or any superseding guidance promulgated by the Yukon Government.

Tr'ondëk Hwëch'in also recommended that use-protection be the water management goal for YT-24. Accordingly, concentrations of COPCs in YT-24 would need to meet CCME water quality guidelines (WQGs), or benchmarks that are functionally equivalent (e.g., SSWQOs). Again, Tr'ondëk Hwëch'in has stated the expectation that SSWQOs would be developed in a manner that is consistent with guidance provided in MacDonald (1997), CCME (2001), or any superseding guidance promulgated by the Yukon Government.

The following memorandum describes the process used by Goldcorp Inc. to derive SSWQOs for waters affected by the Coffee Creek gold mine, provides Tr'ondëk Hwëch'in recommendations for the derivation of SSWQOs using the background concentration procedure, and proposes additional plans to support the management of water resources for the project.

## **2.0 Site-Specific Water Quality Objectives Proposed by Goldcorp Inc.**

Under the mine plan developed by Goldcorp Inc. in the project proposal (the Proposal), non-degradation in Halfway Creek is not achievable. To support the Environmental Assessment application, Goldcorp Inc. has proposed SSWQOs for Latte Creek, Halfway Creek, and YT-24 that are intended to meet the water management goal of use-protection. The proposed SSWQOs are not consistent with the non-degradation principle (i.e., may be less protective) in that they allow for change in water quality condition (either in concentration or exposure scenario).. The following sections describe the SSWQOs proposed by Goldcorp Inc. for each of the affected waterbodies.

### **2.1 Proposed Water Quality Objectives for Latte Creek**

In the Proposal, Goldcorp Inc. selected to apply the use-protection principle in the derivation of SSWQOs for Latte Creek. Specifically, British Columbia Ministry of Environment (BCMOE) or CCME WQGs were selected for all substances in which the concentrations of COPCs under background (i.e., pre-mining) conditions are below the WQG. For substances with natural background concentrations that exceed WQGs (i.e., dissolved aluminum, total copper, and total uranium), the background concentration procedure was used. However, the proposed SSWQOs do not consider seasonal variability in the concentrations of COPCs. It is the perspective of Tr'ondëk Hwëch'in that by not accounting for seasonal variability in water quality, the proposed SSWQOs allow for an exposure scenario (i.e., COPC concentrations over time) that is elevated relative to the pre-mining condition. For aquatic life utilizing these habitats year-round or during periods of low exposure (under pre-mining conditions), there is the potential for adverse effects.

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Tr'ondëk Hwëch'in has recommended that the principle of non-degradation be applied to Latte Creek to ensure the non-degradation of downstream habitats (i.e., Coffee Creek). Based on a review of the water quality model and surface water valued component assessment, the COPCs for which SSWQOs need to be developed for Latte Creek using the background concentration procedure, accounting for seasonal variability, include:

- Nitrate (base case is predicted to be above background conditions);
- Nitrite (base case is predicted to be above background conditions);
- Dissolved aluminum (base case is predicted to be above WQG, but consistent with background conditions);
- Total antimony (base case is predicted to be above background conditions);
- Total arsenic (base case is predicted to be above background conditions);
- Total copper (base case is predicted to be above WQG, but consistent with background conditions);
- Total molybdenum (base case is predicted to be above background conditions); and,
- Total uranium (base case is predicted to be above the WQG and background conditions during high-flow periods).

## 2.2 Proposed Water Quality Objectives for Coffee Creek

In the Proposal, Goldcorp Inc. selected to apply the non-degradation principle in the derivation of SSWQOs for Coffee Creek. This is consistent with the recommendation provided by Tr'ondëk Hwëch'in to protect rearing habitats for Chinook salmon. However, the proposed SSWQOs do not consider seasonal variability in the concentrations of COPCs. It is the perspective of Tr'ondëk Hwëch'in that by not accounting for seasonal variability in water quality, the proposed SSWQOs allow for an exposure scenario (i.e., COPC concentrations over time) that is elevated relative to the pre-mining condition. For aquatic life utilizing these habitats year-round or during periods of low exposure (under pre-mining conditions), there is the potential for adverse effects.

Based on a review of the water quality model and surface water valued component assessment, the COPCs for which SSWQOs need to be developed for Coffee Creek using the background-concentration procedure, accounting for seasonal variability, include:

- Nitrate (base case is predicted to be above background conditions);
- Nitrite (base case is predicted to be above background conditions);
- Total antimony (base case is predicted to be above background conditions);
- Total molybdenum (base case is predicted to be above background conditions); and,
- Total uranium (base case is predicted to be above the WQG and background conditions during low-flow periods).

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## 2.3 Proposed Water Quality Objectives for Halfway Creek

In the Proposal, Goldcorp Inc. selected to apply the use-protection principle in the derivation of SSWQOs for Halfway Creek. Specifically, BCMOE or CCME WQGs were selected for all substances in which the concentrations of COPCs under background (i.e., pre-mining) conditions are below the WQG. For substances with natural background concentrations that exceed WQGs (i.e., dissolved aluminum, total copper, and total uranium), the background concentration procedure was used. However, the proposed SSWQOs do not consider seasonal variability in the concentrations of COPCs. It is the perspective of Tr'ondëk Hwëch'in that by not accounting for seasonal variability in water quality, the proposed SSWQOs allow for an exposure scenario (i.e., COPC concentrations over time) that is elevated relative to the pre-mining condition. For aquatic life utilizing these habitats year-round or during periods of low exposure (under pre-mining conditions), there is the potential for adverse effects.

Tr'ondëk Hwëch'in has recommended that the principle of non-degradation be applied to Halfway Creek to protect rearing habitats for chinook salmon. Based on a review of the water quality model and surface water valued component assessment, the COPCs for which SSWQOs need to be developed for Halfway Creek using the background-concentration procedure, accounting for seasonal variability, include:

- Nitrate (base case is predicted to be above background conditions);
- Nitrite (base case is predicted to be above background conditions);
- Sulphate (base case is predicted to be above the WQG and background conditions during high-flow periods);
- Total phosphorus (base case is predicted to be above background conditions during periods of closure);
- Weak-acid dissociable cyanide (base case is predicted to be above background conditions during high-flow periods);
- Total antimony (base case is predicted to be above background conditions);
- Total arsenic (base case is predicted to be above background conditions during high-flow periods);
- Hardness (base case is predicted to be above background conditions);
- Total chromium (base case is predicted to be above the WQG and background conditions during high-flow periods);
- Total manganese (base case is predicted to be above background conditions during high-flow periods);
- Total molybdenum (base case is predicted to be above background conditions);
- Total selenium (base case is predicted to be above background conditions);
- Total thalium (base case is predicted to be above background conditions);
- Total uranium (base case is predicted to be above the WQG and background conditions during high-flow periods); and,
- Total zinc (base case is predicted to be above the WQG [during periods of post-closure] and background conditions during high-flow periods).

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## 2.4 Proposed Water Quality Objectives for Creek YT-24

In the Proposal, Goldcorp Inc. selected to apply the use-protection principle in the derivation of SSWQOs for Creek YT-24. Specifically, BCMOE or CCME WQGs were selected for all substances in which the concentrations of COPCs under background (i.e., pre-mining) conditions are below the WQG. For substances with natural background concentrations that exceed WQGs (i.e., total copper), the background concentration procedure was used. However, the proposed SSWQO does not consider seasonal variability in the concentrations of COPCs. It is the perspective of Tr'ondëk Hwëch'in that by not accounting for seasonal variability in water quality, the proposed SSWQOs allow for an exposure scenario (i.e., COPC concentrations over time) that is elevated relative to the pre-mining condition. For aquatic life utilizing these habitats year-round or during periods of low exposure (under pre-mining conditions), there is the potential for adverse effects.

Based on a review of the water quality model and surface water valued component assessment, the COPCs for which SSWQOs need to be developed for YT-24 using the background-concentration procedure, accounting for seasonal variability, includes:

- Total copper (base case is predicted to be above the WQG during high flow periods)

## 2.5 Proposed Water Quality Objectives for the Yukon River

In the Proposal, Goldcorp Inc. selected to apply the non-degradation principle in the derivation of SSWQOs for the Yukon River. This is consistent with the recommendation provided by Tr'ondëk Hwëch'in. However, the proposed SSWQOs do not consider seasonal variability in the concentrations of COPCs. It is the perspective of Tr'ondëk Hwëch'in that by not accounting for seasonal variability in water quality, the proposed SSWQOs allow for an exposure scenario (i.e., COPC concentrations over time) that may be elevated relative to the pre-mining condition. For aquatic life utilizing these habitats year-round or during periods of low exposure (under pre-mining conditions), there is the potential for adverse effects.

Based on a review of the water quality model and surface water valued component assessment, the COPCs for which SSWQOs need to be developed for the Yukon River using the background-concentration procedure, accounting for seasonal variability, include:

- Nitrate (base case is predicted to be above background conditions at YRdsHC);
- Total antimony (base case is predicted to be above background conditions at YRdsHC);
- and,
- Total uranium (base case is predicted to be above background conditions at YRdsHC).

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### 3.0 Recommended Procedures for Developing Site-Specific Water Quality Objectives using the Background-Concentration Procedure

Tr'ondëk Hwëch'in is recommending that SSWQOs for Latte Creek, Coffee Creek, Halfway Creek and the Yukon River be developed following the non-degradation principle for all phases of mine life and post-closure/reclamation. To accomplish this, SSWQOs would need to be developed for each COPC using the background concentration procedure. Specifically, the natural background concentrations of a COPC in water are determined (through implementation of a baseline monitoring program) and the resultant information is used to define acceptable water quality conditions at the site.

Using the background concentration procedure, numerical SSWQOs should be derived by conducting statistical analyses of the surface water chemistry data that have been collected to define background concentrations of the water quality variables of concern. As a first step, the background concentration data should be examined and sorted into relatively homogenous populations (e.g., turbid-flow conditions, low-flow conditions). Then, an average (e.g., 95% upper confidence limit of the mean) and upper limit (i.e., 95th percentile concentration) should be calculated for each COPC for each population of data. These statistics should then be adopted as the average and maximum SSWQOs, respectively. The resultant SSWQOs are directly applicable to the population of data for which they are developed (e.g., turbid-flow period average and maximum concentrations).

### 4.0 Aquatic Effects Monitoring Program

An aquatic effects monitoring program (AEMP) that is consistent with guidance provided in INAC (2009) must be developed and implemented for all sites in the local study area. The AEMP provides the information needed to determine if the SSWQOs are being met and to evaluate the effects of the project on aquatic life. The recommended framework consists of the following elements:

- Identification of issues and concerns associated with a development project;
- Problem formulation for aquatic effects monitoring;
- Development of the conceptual study design and data quality objectives (DQOs);
- Documentation and verification of the sampling design;
- Implementation of the AEMP;
- Evaluation, compilation, interpretation, and reporting of aquatic effects data and information; and,

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- Application of AEMP results within an adaptive management framework (e.g., to identify the need for refining SSWQOs; development of an adaptive management plan and/or a response plan provides a systematic basis for implementing adaptive management for a project).

The results of the AEMP provide essential information for evaluating the numerical SSWQOs that have been established at the site under consideration. In this context, SSWQO attainment monitoring results are evaluated together with the biological monitoring results to determine if the SSWQOs are adequately protective of aquatic life.

## 5.0 Adaptive Management Plan

Development of an adaptive management plan (AMP) represents one of the key elements of the AEMP development and implementation process. The AMP is intended to provide a basis for addressing issues related to the release of toxic COPCs into the environment at the site. To be effective, the AMP must include specific triggers for management actions and clearly defined response schedules (i.e., to ensure that unacceptable changes in the concentrations of toxic substances in surface water and/or adverse effects on aquatic organisms are addressed through the timely implementation of specific mitigation measures). Tr'ondëk Hwëch'in recommends that the AMP be developed in conjunction with the AEMP.

## 6.0 Summary

This memorandum describes the expectations of Tr'ondëk Hwëch'in for development of SSWQOs for the waterbodies affected by the Goldcorp Inc. Coffee Gold Project through mine life and post-closure/reclamation. The development of SSWQOs proposed here requires detailed discussions and development of a joint workplan between Tr'ondëk Hwëch'in and Goldcorp Inc. to derive SSWQOs that are consistent with the right for waters to be substantially unaltered in terms of water quality and flow, as well as achievable by Goldcorp Inc. In addition, it is expected that the information generated within this process will be incorporated into an AEMP and AMP that will be developed during later stages of the water licencing process. We look forward to participating in these discussions.

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Sincerely,

[Name Redacted]

[Name Redacted]

Senior Aquatic Biologist

LGL Limited

[Name Redacted]



## **Meeting Title: Tr'ondëk Hwëch'in Technical Meeting – Water Management and Water Quality**

**Date and Location: June 6, 2017**

### **Introduction: Purpose and Objectives**

#### **Agenda:**

Water Management – Operations and Closure

1. Water management plan/ water balance - resolving the conceptual model
2. Water Discharge
3. Water Quality Predictions
4. Heap Leach facility water management and treatment - Operations
5. Heap Leach facility – Closure and Passive treatment plans
6. Time permitting: Issues to resolve with the geochemistry issues – source term development concerns (solubility, rock drain, etc)
7. Time permitting: Groundwater modelling and permafrost

Water Quality Objectives

1. Discuss issues related to the proposed SSWQOs
2. Discuss issues related to the effects assessment/water quality modelling predictions
3. Discuss principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River
4. Development of a work plan for deriving SSWQOs consistent with the principles and methods.

#### **Attendees:**

Tr'ondëk Hwëch'in (TH)

[Name Redacted]

## Coffee Project – Goldcorp Inc.

[Name Redacted]

### Discussion of Key Topics:

Introductions and sustainability and safety share.

Review agenda, TH would like to talk about passive treatment. This will be discussed during Goldcorp's consultant's presentation on the Heap Leach Facility (HLF) closure and water treatment.

#### **Block Model Review:**

Prior to initiating the original agenda, Goldcorp and TH agree to a discussion on the block model, which will provide insight into why Goldcorp the proposed pit backfill for this stage. Goldcorp explains the block model and the different oxidation facies for the Double-Double pit as an example. Goldcorp describes the meaning behind the colours for the ore, and explains how the ore is formed in the pits. Goldcorp explains how backfilling will condemn the ore and why it makes sense for Double-Double to backfill.

Q: TH asks if Goldcorp is committing to the same backfill as Kaminak?

A: Yes, the Project Proposal includes the same backfill as Kaminak.

Q: TH asks about transitional material being processed.

A: Goldcorp will only process that material if it has the value to be processed Goldcorp explains the economics of where the value is of the ore depending on pit size and the gold price.

Q: TH asks about Latte VS Supremo pit depth limitations.

A: Latte is all gold recovery, Supremo is all limited by gold price. Goldcorp is currently working through multiple lab tests, and in a few years Goldcorp will know what options are there to process that ore.

TH notes that as gold price increases, would like to see the effects. Goldcorp explains how the Project Proposal was done at a higher gold price. The limit for Goldcorp on this current assessment was the size of the HLF. Any further mining would trigger a new assessment through YESAB.

Q: TH asks if it would be an expansion of the HLF?

A: It is impossible to speculate, as there is no business case for this. Unless gold price goes well beyond current price, there's no way to know. Feasibility study mine is the best case scenario, and the Project Proposal is a higher gold price with more ore and more waste. Goldcorp has evaluated a larger mine than would be built under current gold price. This also accounts for the case where there could be more waste mixed with the ore, then that would allow for more to be stacked on the HLF as well.

Q: TH asks what the process would be if Goldcorp determined to do more backfilling?

A: This would trigger an amendment to licensing. This is a re-assessment as well, as the effects must be included in the licensing amendment.

Q: TH asks about the timeline for the metallurgy work that is being done?

A: Goldcorp has a metallurgy plan through to the end of the year for the metallurgical testing, will review results and plan accordingly.

### **Water Management:**

Goldcorp reviews the guiding principles for water management. SRK (hereafter Goldcorp) provides an overview of the water management infrastructure at the site. Goldcorp notes that the consideration is for the worst case scenario, and that these catchments have been incorporated into the water balance models. Goldcorp reviews the summary of the flow design criteria, as well as the collection channels and drainage ditch design.

Q: TH asks if it is designed to handle backup?

A: There is backup, don't expect it to fill, but will see ponding.

Q: TH asks would it backup more because of the ice or not being able to get through freshet? Is it backing up because it's frozen?

A: A rock drain is like a culvert, it's designed for a 1 in 100 year flow with a safety factor of two to account for the potential of clogging.

Discussion of rock drains backing up due to ice, freeze and thaw seasonally and the rock drain's ability to handle freshet. It is a designed and engineered structure.

Q: Asks if it is end dump or segregate material?

A: Plan is end dumping, but there will be quality control of this.

Q: Piping or sediments through the dump clogging the drain, filter plate?

A: Freshet helps to keep sediment from clogging the rock drain. The safety factor accounts for that concept, also monitoring station as well.

Q: Permafrost impacts on the rock drain, as well as chemical precipitation and how this could clog the rock drain. What water is going through the rock drain? Is water being diverted around the rock drain? What flow will go through the rock drain?

A: Goldcorp notes that the slumping of the WRSF will be for a different person to answer. Water going through the rock drain is from the purple catchment (on the image). In terms of permafrost stability Goldcorp is undertaking a 2017 geotechnical drill program based on this WRSF design, part of the input from the 2016 program fed into this alpha WRSF design. Final design of the rock drain will look at the stability assessment and thermal modelling, and will make sure that we're retaining rock drain functionality through operations into closure.

Goldcorp continues to review the water management design, reviews the facility pond design criteria.

Q: Asks if this is just for operations?

A: Yes, until water quality objectives are met.

Q: Asks if the facility pond reports to Latte?

A: Yes.

Alpha pond is sized to allow for 100 year freshet volume. Residence time in the pond is 12 days. It is 2 times the volume of a 100 year 24 hour storm event

Q: What is the operating quality of the water in the pond? Half full?

A: It's going to be pumped out 300L/s. In Freshet it will fill, in summer will be much lower.

Q: Asks how much control Goldcorp will have over the alpha pond?

A: Goldcorp still expects the pond to fill at a certain rate in winter, and will manage the pond in freshet. Goldcorp will have an adaptive management plan to address some of those details and still needs to work out details of how water is coming from the pond to the creek.

Q: Asks if the diversion channel reports to Alpha Pond?

A: The diversion channel reports downstream. Explains briefly some of the water reporting at site.

Q: Asks about the diversion channel around WRSF, how is the diversion channel is established?

A: Describes road and diversion building for the site.

### **Water Management – Water Movement Around Site at End of Mine:**

Lorax (hereafter Goldcorp) provides a review of the drainage area percentages that are covered by mine infrastructure.

Q: Notes the second guiding principle – limit disturbance in Latte/Coffee Creek and YT-24 watersheds. Why?

A: YT-24 has very high quality water, even though it doesn't support life. Goldcorp reviewed options, there was almost no scenario where that water quality could remain as-is, and Goldcorp couldn't put all of the waste in YT-24.

Q: Asks if Goldcorp could divert some water from Alpha Pond into YT-24?

A: Replies that this was not evaluated, but management of water from Alpha Pond is going to be very expensive as-is, and since the Alpha Pond is at a low elevation, Goldcorp will have to pump the water out of it.

TH notes that it comes down to the question of the rearing habitat for Chinook salmon and ways for mitigating effects on Halfway Creek. Goldcorp notes that its understanding where Goldcorp can best optimize where the waste goes. Goldcorp can look at some scenarios, and assess the changes that result.

Goldcorp discusses the catchments and water proportions from the site and the conceptual water management diagram. Water is being moved between drainages, but proportionally it is lower.

Q: Do flows increase in Halfway Creek as a result of the Project?

A: Yes, above baseline variability, but it's not drastic. Can be found in Appendix 12-A. 15% above baseline is the range of change.

Goldcorp reviews conceptual water management at site.

Q: Notes that all facility ponds would be diverted at all times to the HLF, is that consistent with Water Balance Model?

A: The base case is assuming that facility pond is diverted to the HLF.

Q: Asks for pie graphs of the water and where comes from on site.

A: Goldcorp can do this.

Goldcorp describes how the HLF model has an allowance to put the liner out early and catch the early freshet. Goldcorp doesn't want to be using fresh water, want to use water from facility because it is close. Start-up water could come from Yukon River, but hope to come from site.

Q: Asks if the facility pond excess to Latte creek flow is not in water quality model?

A: No.



Q: Notes that pit leakage isn't on the conceptual diagram.

A: Goldcorp replies that this is considered in the Project Proposal in Appendix 7-B and Appendix 7

Q: Asks if there is another diagram with pit leakage?

A: Yes. Notes that the rates of pit leakage are quite low.

Goldcorp continues the presentation, notes that the model shows that treatment shouldn't be required after year 20, but that this is conceptual.

TH notes that they have more questions about water management. Goldcorp and TH discuss water management as an ongoing topic of discussion; there will be additional water management meetings scheduled.

Goldcorp continues presenting, noting that the WRSF has a fairly high infiltration coefficient. This varies from year to year. This has been incorporated into the model and carried through to post closure.

Q: Asks if infiltration is 35%?

A: Replies that the average is 35% infiltration, there is the variation in the report; the minimum is 21% and maximum is about 50%.

Q: Asks if the rest is assumed to be lost to evaporation?

A: Yes.

Q: Asks if passive treatment to Latte pit or to the Alpha Pond?

A: The model shows that the water goes to the rock drain. Latte spilling to SU1 might be a holdover from a previous version of the model. In modelling it all goes to HLF or to the pond.

#### **Water Quality Model Design and Assumptions:**

Review of the water quality model and the conservative assumptions made. Lorax reviews the water balance model and water quality model in operations.

Q: Asks if non-contact water is diverted around the WRSF?

A: Some of it is assumed to make its way to the rock drain through another path. 20% infiltration is a conservative base case assumption.

Q: What is the 20% for?

A: For non-contact water to the east of Latte pit

Q: How much non-contact water is going through the rock drain?

A: Approximately 5%.

Q: Is the diversion efficiency is 65%?

A: It is assumed that the water that is diverted is diverted 100%, but some water might go to the rock drain.

Q: What happens in the upper portion of Halfway Creek?

A: There is a non-contact area will report to the rock drain, the creek becomes the rock drain, and then the diversion will divert non-contact runoff around the WRSF.

Q: Is there an opportunity to divert more of Halfway Creek?

A: Discussion of diversion channels at site and the challenges with the topography in the area. Permafrost also plays a factor.

Goldcorp reviews water balance and water quality model in closure, describes where the pits will spill, and the diversion around the WRSF remains. Goldcorp reviews the HLF water balance in operations.

Q: What are you treating for in the passive treatment?

A: Replies discussing the guidance from the active treatment phase and the base case.

Q: Can you list COCs for passive treatment?

A: The source term for the passive treatment component for the base case and upper case is different from the water treatment plant. For HLF, it is the residual components, like nitrogen species due to internal natural degradation of cyanide. Nitrate is high on the list, and it is important that this parameter is eliminated. The next parameter is arsenic. There is arsenic in the ore, not naturally in the receiving environment and is present in groundwater. The goal is to reduce pH in the system to bring arsenic levels down. This is addressed in the water treatment and in-situ treatment system. Uranium is also being watched closely and will also be targeted biologically. Some parameters complex with cyanide, like copper, cadmium, and zinc. These are handled in our water treatment as well.

Q: What the inflow of passive treatment vs outflow?

A: Goldcorp will discuss this later in the presentation.

Q: Elevated nitrate exists in operations through to post closure. It is blasting in operations, and HLF in closure?

A: There's a component from the WRSF that is maintained in operations, at the end of operations it is assumed to decay. Might see some contribution of nitrate that has made its way into Latte pit. Denitrification component of the water treatment is very effective.

Goldcorp reviews the Latte pit volumes of inflow and outflow through operations to closure. When the HLF is allowed to freely drain through the passive system or not, then the Latte pit fills. Goldcorp reviews

the Alpha WRSF contact vs non-contact hydrograph, describes the times of year and the proportions of precipitation, non-contact, and contact water.

Q: Is this in the Alpha WRSF? Or the pond?

A: Explains that this is seepage coming from the WRSF. Just upstream of the Alpha pond. Details can be found in the report Figure 3-41

Goldcorp explains how the WRSF pond is included in the water quality model and water balance and the water quality model results for Uranium, Arsenic, and Nitrates. Nitrate concentration is very steady in operations, decays in closure due to the source term being decommissioned. When the alpha pond is decommissioned, then you see the small spike.

Goldcorp continues to present on the water quality model results for the Coffee Creek and Latte Creek catchments.

Q: Do you expect water quality above these sites to be relatively unchanged?

A: There is an additive drainage, CC 1.5 and 3.5 are on Latte Creek, and CC 4.5 is on Coffee Creek. No other major tributary downstream from that.

Q: How long is the pumping period in the model? How long does it take to get to your base water level?

A: The reality is that we may not be pumping that high, it depends on the conditions in the environment.

Q: Is the high flow period something you can control?

A: When we have water to get rid of, it will be when there's a lot of water in that watershed; Goldcorp will still have to look at TSS. The last thing we want to do is be holding too much water on site due to the restrictions on our water license.

#### **Source Environmental Presentation on Mine Water Management (TH Presentation of Views):**

Source Environmental (referred to as TH here forward) begins the presentation. TH brings up the conceptual model, and notes that often the biggest fatal flaws in WQM are related to the conceptual model. TH reviews the conceptual model from Coffee, noting some of the missing information. TH requests a thorough conversation about the conceptual model. TH discusses the water management plan and its consistency with the water balance model, provides examples where it is unclear where flows are diverted to the HLF and upper Halfway Creek flow during post-closure. TH discusses if the water balance actually balances, and notes it is easy to make a mistake in GoldSim or for GoldSim to make a computational error, and this is a very complicated site. TH requests a simple table to show average flows or summation of flows.

Goldcorp and TH discuss sources of water and reporting locations at different phases in the Project, TH is looking to understand if there's an uncertain trigger or flow is in the model as well. TH discusses the loading sources in the WQM, and is unsure if all loading sources are considered in the WBM.

Q: Asks if source terms of beta WRSF included in the water balance model (WBM)?

A: Goldcorp replies that the underdrain is a load base, concentration varies with the flows. Beta WRSF has a source term, notes that this needs to be clearer. This could be responded to in a wholesome way with an IR or detailed discussions.

TH notes not being able to understand the concentrations of the different parameters from different sources, suggests pie charts for each parameter. Notes a step-wise approach, can look at the first one and provide comment.

TH goes on to discuss the HLF, noting that the site wide water balance is ongoing work. Goldcorp notes that the site wide water balance is the next step of the Project.

Q: How much water is recycled through the HLF, noting concern about accumulation of parameters such as arsenic?

A: Goldcorp replies iterating all of the studies performed to determine the parameters in the water around site. Goldcorp describes in detail the water quality of the barren solution being put onto the HLF, noting that the scale of the test as a limiting factor. Goldcorp thinks things have been captured, but would need the Mines Group to describe that better.

Q: TH asks about the irrigation water from the ROM and Kona Pit, doesn't want this to have higher arsenic and other COPCs. TH is also interested in the proportion of total flow at the end of operations that is attributed to Kona Pit and ROM. TH discusses passive treatment and what the water quality would look like without passive treatment. TH also notes general questions, for example when treatment ends. Looking at the long term source, and noting that there may be long term water treatment, noting the permeable reactive barrier is the long-term treatment option.

A: Goldcorp notes that once they get solutions from Coffee Creek they can better answer these questions.

TH understands the permeable reactive barrier is above ground, and doesn't understand maintaining anaerobic conditions. TH also wants to know what's being treated in passive treatment. Goldcorp replies that they can summarize the assumptions for these, including case studies for the permeable reactive layer.

#### **Water Treatment – Operations and Progressive Reclamation:**

Inotech, Goldcorp consultant (hereafter Goldcorp) gives an overview of water treatment of heap leach solutions. Almost all HLF solutions will contain elevated nitrates and nitrites due to the cyanide complexes.

Q: Asks about ammonia

A: Ammonia is usually taken up by microbial cells as a building block and then converted to nitrates.

Goldcorp provides a table of the HLF expected solution chemistry prior to rinse, discusses the options and the methods that will not work for HLF solution treatment at Coffee. Options for Coffee include rinsing with fresh and/or treated water and treating the HLF solution. An overview of the concentrations of the HLF chemistry after initial rinse is given. Goldcorp discusses the process of rinsing and treating the HLF and the HLF solution with a combined chemical and biological processes. Goldcorp reviews how biological processes remove parameters that are not amenable to traditional chemical or pH adjustment treatment, and describes how the process includes microbes receiving electrons. Goldcorp describes how arsenic can be an electron receptor for some microbes, and that's how the electro-biochemical reactor technology.

Q: Asks what goes on inside the treatment cell

A: Electricity is provided inside to promote the microbial process. Selecting the microbes that are going to do the best at removing particular contaminants.

Q: Asks about what the difference is to electrocoagulation.

A: Higher voltage and amperage. Similar to electroplating.

Goldcorp explains that there is a carbon source in the bioreactor and with the electricity it makes the biological processes much quicker, and this is faster than providing more carbon source, which they would have to break down for energy. The electricity is the energy.

Q: Asks about the reactor removing sulphate?

A: It does a very good job of removing sulphate.

Q: What if there's a nitrate and sulphate mix? Would the microbes use one preferentially?

A: Microbes use various contaminants in the process.

Q: The system depends on the microbes, and asks how the effluent chemistry varies with the microbes?

A: The effluent is the same regardless of the microbe, but can vary depending on organic source (ie. Molasses).

Q: Asks about limitations of the bioreactor technology

A: One is that we only understand a small portion of the microbial process, we understand in general and how to use it, but we only understand it to a certain point. This is true for all biological processes.

TH and Goldcorp and their consultants discuss the effectiveness of this treatment in the Yukon climate. Goldcorp's consultant provides an example from the Wolverine mine where this was very successful; the microbes needed to be in a heated solution.

TH's consultant notes that they have more questions about the bioreactor.



Goldcorp presents the water leach solution results from the column tests done for the Coffee Project. Notes that the results from room temperature can be extrapolated to four degrees Celsius for example.

Q: What biosolids/byproducts from the process should TH be concerned about?

A: Replies that the TSS was 12 mg/L from the Coffee tests. There's potential of mobilization for things like this. The other parameters in the effluent

Goldcorp wants to quantify the amount of Uranium taken out of the process throughout the life of mine for TH. Byproducts would be encapsulated and buried. Goldcorp describes some case studies of the bioreactor technology.

### **Water Quality Objectives:**

Lorax (hereafter Goldcorp) describes Uranium in aquatic environments to provide a background and reviews the baseline Uranium concentrations around the Coffee Project in the various catchments.

Q: Asks about the data collection regime and if there is a good understanding of U at low flow conditions?

A: Part of the issue at HC 5 during winter time you can't get water because it is frozen. The U signature is seen in areas where the water isn't frozen at low flow conditions.

Q: Is that 50% increase more toward freshet?

A: There's not much of a discharge during winter time. There's a high change because the flows are so low, and any discharge from HC 2.5 has several kilometers to travel.

Goldcorp explains the seasonal U concentrations in the water around Coffee Project. The water quality objectives for specific catchments are described; YT-24 and Coffee Creek are CCME non-degradation objectives. Site Specific Water Quality Objectives are proposed for Halfway Creek and Latte Creek.

Goldcorp reviews the toxicity testing work done for the Coffee Project.

Goldcorp notes that the Uranium levels are notably high in the areas that fish have been found around site.

### **LGL Presentation on Site Specific Water Quality Objectives (SSWQOs) (TH Presentation of Views):**

LGL (referred to as TH here forward) discusses the two water management goals that are used often. One is use protection is to make sure that the water quality stays below the WQOs; the other is non-degradation, and this uses a background-concentration procedure. LGL reviews the approach Goldcorp took to setting SSWQOs using the background concentration procedure (95<sup>th</sup> percentile) and the toxicity testing to validate these. TH runs through the concerns about this approach include not using seasonal variability.

Goldcorp notes that the BC MOE approach was used, using the entire data set including low and high flow period. TH replies that there's the opportunity to bend the data to do the 95<sup>th</sup> percentile at low flow

conditions and then use WQG at high flow. Concern is that it that the non-degradation approach was not adopted. TH describes that the approach allows degradation of water quality from baseline condition in Halfway Creek, which is chinook rearing habitats. Also concern with altering the exposure scenario. TH is looking to understand how nitrates have been included in the WQM.

Q: Have blasting and incorporating best management practices been included in the WQM?

A: No. Goldcorp describes the approach they took and how actual nitrogen concentrations were considered in the modeling.

TH notes the memo sent to Goldcorp with a preliminary list of COPCs to generate discussion. Goldcorp notes that for nitrogen is driven by how attentive the blasters are. Goldcorp notes that there will be nitrogen coming from the WRSF and from the HLF.

Q: Asks if the total metals concentration was used in developing SSWQOs, any predictions about how the dissolved data look seasonally?

A: In geochemical source terms were their own model. Field Bins, Kinetic Test, all dissolves driven. There is no difference between total and dissolved for Uranium, because the rock isn't enriched in U. it has to do with the alkalinity of the rock. This has to look more at things like arsenic and other metals.

Comment (TH): Total copper is related to TSS load, and to look at dissolved fraction vs total fraction.

Reply (Goldcorp): The model predicts dissolved fraction. The model is calibrated to total concentrations.

TH notes that another concern is that when using the ameliorating factors should account for seasonal variability, concerns about sulphate exceeding the WQG in Halfway Creek. Also no discussion of cases where water quality exceeds objectives. TH runs through proposed SSWQO development methodology. TH and Goldcorp discuss the proposed approach by TH, discussing exceedances and allowances. Goldcorp notes that if these are the expectations, then there will not be a mine. TH replies that an optimistic perspective hasn't been used to run the WQM. Goldcorp notes that the worst case is the responsible way to do this. TH replies that it's about working it out together to understand if Halfway Creek can be a non-degradation point or learn that it can't be done. TH and Goldcorp want to do this together.

TH discusses the main concerns about SSWQOs and working together on SSWQOs through a workplan. TH highlights a collaborative approach and working out the methods through which to develop SSWQOs. Goldcorp agrees at a fundamental level, noting that the first step in classification Goldcorp and TH may not arrive at the same conclusion. Goldcorp and TH are on the same page when it comes to validating SSWQOs, need to look at the goals for SSWQOs for certain areas. Goldcorp would view Halfway as a use-protection guidance. TH counsel suggests putting the dollar amount on the table and then working on it from there. Goldcorp notes that the suggestions to put waste in YT-24 and or water into YT-24 has geotechnical challenges and costs associated. TH wants to have that discussion.

## **Key Issues and Concerns:**

Water management is discussed in detail. Goldcorp and TH will continue the water management discussion, as there are many outstanding questions.

Water treatment at site, including active and passive treatment of the HLF, is discussed in detail. TH discusses the Electrochemical Bio Reactor's function and effectiveness with Goldcorp's consultant. Passive treatment and byproduct disposal remain of interest and topics of upcoming meetings.

TH presents views on site specific water quality objectives, it is determined that this is the beginning of the discussion on SSWQOs and the methodology for determining these.

### Action Items/Next Steps:

Action Item	Person Responsible	Date Required
Pie graph of the water contributing, and amount going to the HLF	Lorax	Prepared in time for next water management and/or HLF meeting
Conceptual diagram of pit leakage	Lorax	Prepared for next Water management meeting
Label approximate WQ station numbers by each on conceptual diagram.	Lorax	Prepared for next Water management meeting
Pit lakes water quality included in water quality modelling	Lorax	To be included in model update
Water management meeting	Goldcorp and TH	
Inflow concentrations vs outflow concentrations of the passive treatment system (merge with report on passive treatment)	Lorax	Prepared for next water management meeting
SEA requests an in depth model discussion for each facility	Lorax and Goldcorp	To be performed at next water management meeting
SEA requests a simple table to show average flows or summation of flows. Inflows = outflows +/- storage	Lorax and Goldcorp	Prepared for next water management meeting
Lorax to confirm the table source, purpose, and discharge that SEA notes. Goldcorp notes do different ones in operations and closure	Lorax	Prepared for next water management meeting
Further discussion of source terms in the water quality model.	Lorax and Goldcorp	Meeting held on June 9, 2017.
Source loading graphs, see SEA's pie chart example.	Lorax and Goldcorp	Prepared for next water management meeting

Proportions of parameters in the recycled water on the HLF (Column Test work). Lorax to look at data and evaluate.	Lorax	
SEA asks for a report on passive treatment, displaying what is going on in active treatment and then what is going on in passive treatment. Comparing the COCs in active treatment vs in passive treatment.	Lorax and Goldcorp	Deadline to be discussed w Lorax, min. 2 weeks, probably assign one month
Quantification of the solids from HLF water treatment, including disposal location	Goldcorp	
Water Quality objectives workplan	Goldcorp	End of June



# TH technical meeting Water Management and WQ Objectives

June 6, 2017

 **GOLDCORP**



- **Introductions**
- **Water Management**
- **Water Quality Model and Predictions**
- **Water Treatment Operations and Progressive Reclamation**
- **Water Quality Objectives**
- **Discussion and TH presentation of views**

## The Goldcorp Coffee Project Team Today

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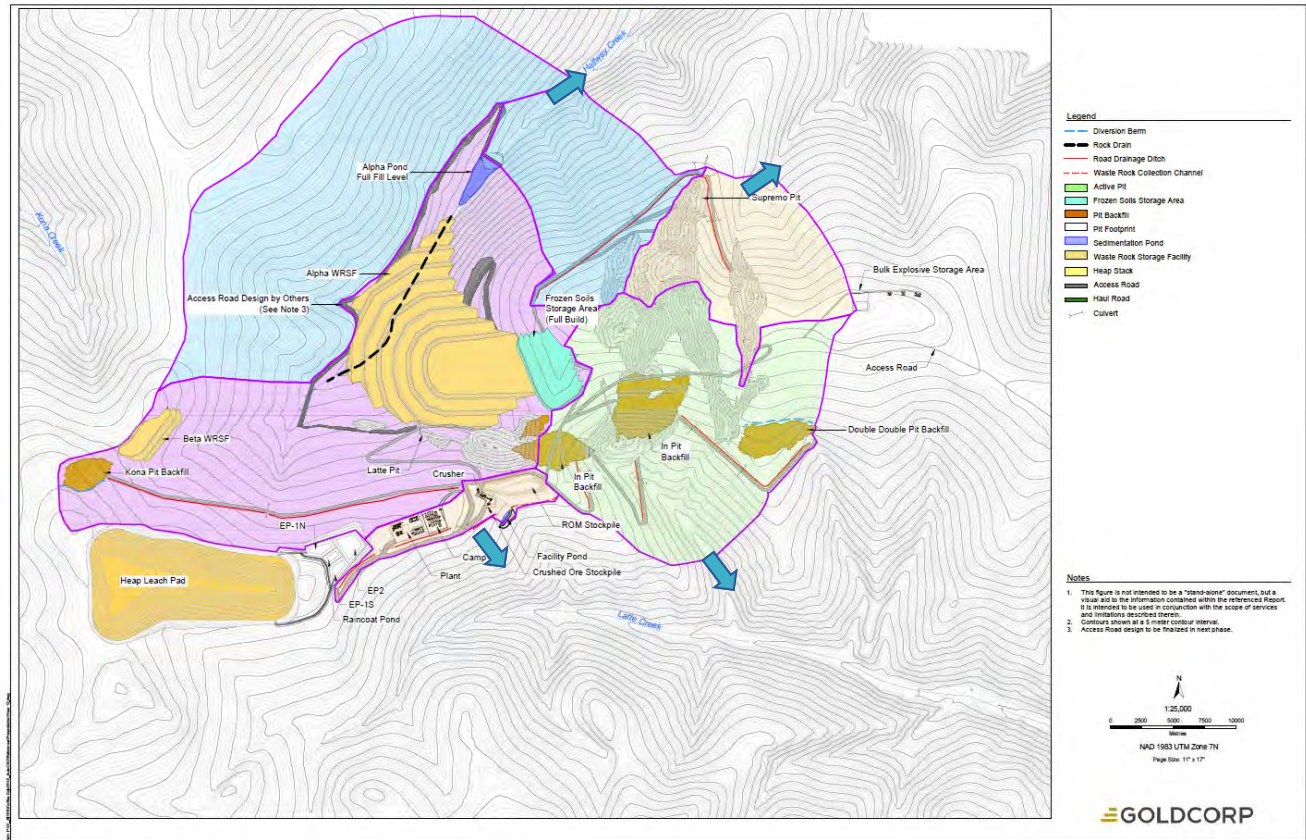
- [Name Redacted]



# Water Management

## Water Management Infrastructure

- Collection Channels
- Diversion Berm
- Rock Drain
- Alpha Pond
- Facility Pond



Item	Value
Facility Pond	10-year 24-hour storm (as per BC MOE)
Alpha Pond	100-year freshet with discharge (5,000 GPM)
Rock Drain	100 year 24-hr hour peak flow with a safety factor of 2
Diversion Berm	100 year peak flow
Collection Channels	100 year peak flow

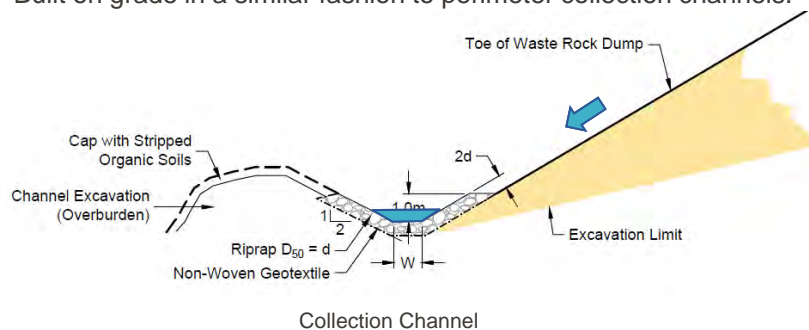


- **Waste Rock Perimeter Collection Channels**

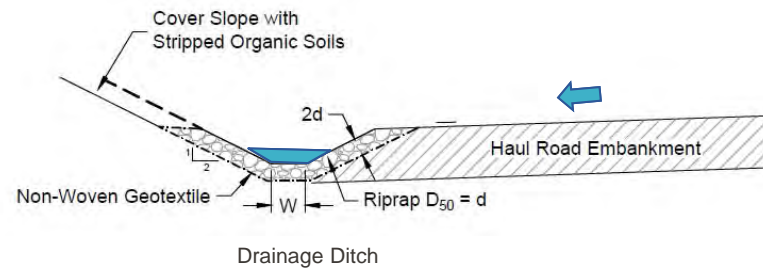
- Designed for 100-year peak flow
- Excavated into existing ground.
- Collect waste rock runoff and captures flows to the downstream pond.
- Built on grade to minimize excavation and lined with nonwoven geotextile with a layer of riprap.

- **Drainage Ditches**

- Designed for 100-year peak flow
- Runoff from roads will drain across the road to the up gradient side slope.
- Ditches will convey flows downgradient to discharge culverts or pits.
- BMPs applied along haul and access roads to reduce erosion.
- Built on grade in a similar fashion to perimeter collection channels.



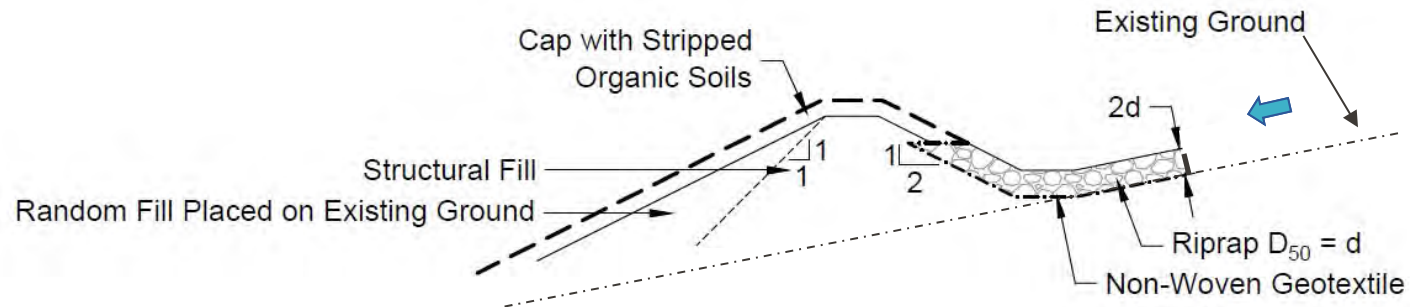
Collection Channel



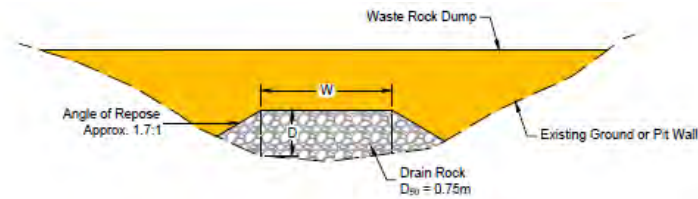
Drainage Ditch

- **Diversion Berm**

- Designed for 100-year peak flow.
- Non-contact water diverted around Double Double Pit and up gradient of the Alpha rock drain.
- Alpha WRSF diversion berm formed by the access road to the Alpha Pond.
- lined with nonwoven geotextile with a layer of riprap



- Drain is oversized to reduce the potential of permanently and completely freezing
- Sized to accommodate 2 x 100-year peak flow.
- Portions of the rock drain may freeze during the winter and thaw during freshet.
- The most effective way to melt ice is to have water flow over it.
- If the drain did freeze and could not convey the entire flow, water would pool upstream of the drain until the drain thawed.

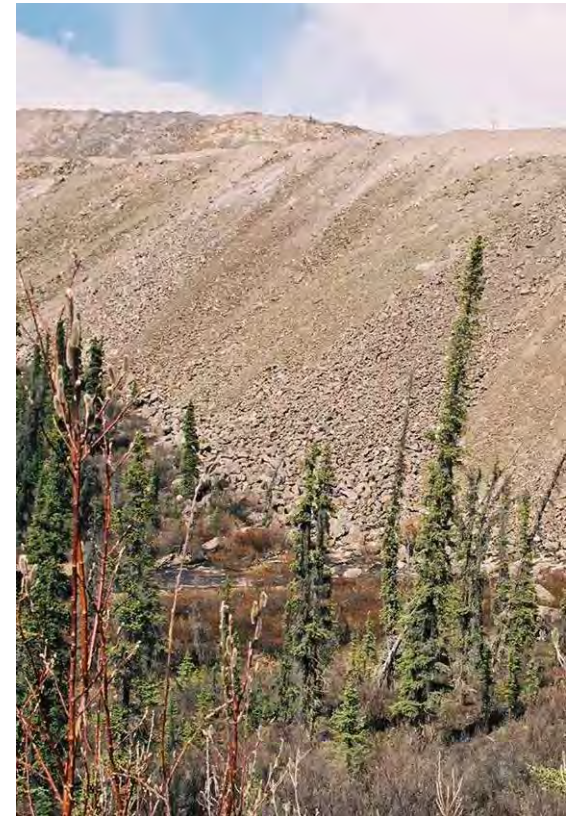


## Rock Drain Size

Name	Storm "Q" (m <sup>3</sup> /s)	Minimum Bottom Width (m)	Minimum Height (m)	Drain Rock D <sub>50</sub> (m)	Approximate Volume (m <sup>3</sup> )
Alpha Rock Drain	17.9	30	8	0.3	985,000

## Analogs:

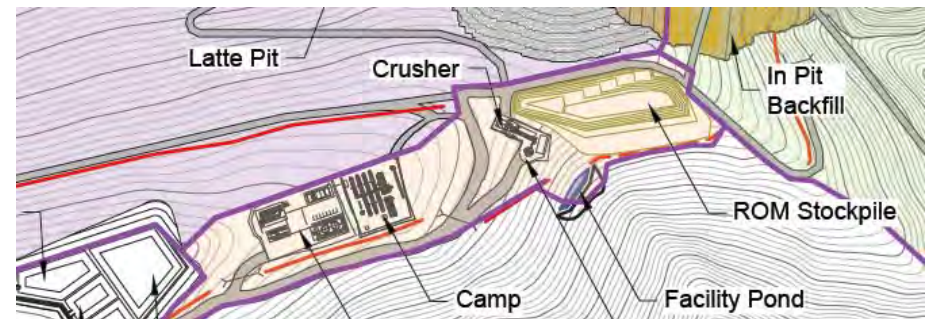
- **Faro (Yukon)**
- **Minto (Yukon)**
- **Pogo (Alaska)**
- **Eagle Gold (Yukon – Proposed)**





## Facility Pond

- Collect water from plant area.
- Sized for 10-yr 24-hour runoff volume (BC MOE).
- Designed to settle TSS and attenuate peak flows.
- Flows up to the 200-year storm will be discharged through an outlet structure.
- Storms greater than 200-year will be discharged via an emergency spillway.



Description	Drainage Area [km <sup>2</sup> ]	Required Storage Volume [m <sup>3</sup> ]
Facility	0.32	9,400

Upstream Side Slope = 3:1  
 Downstream Side Slope = 2:1  
 Crest Width = 15 m

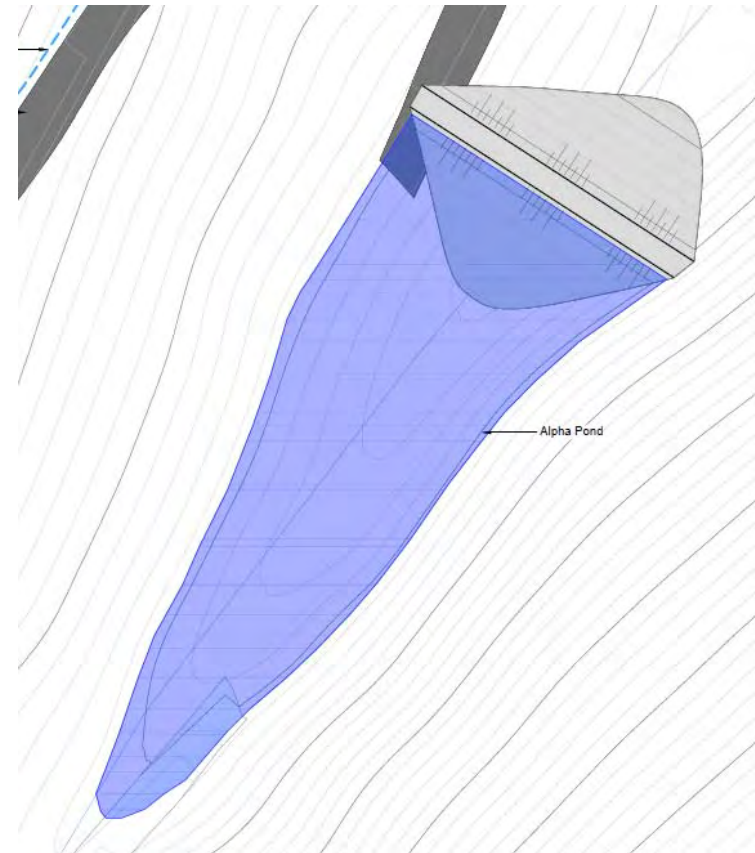


## Alpha Pond

- **Sized to allow management of the 100-year freshet volumes while discharging water from the pond (5,000 GPM).**
- **Gives flexibility to manage runoff and seepage from Alpha WRSF.**
- **Also has ability to attenuate peak flows and provide enough residence time (~12 days) for settling TSS. Alpha Pond volume is approximately 2x the volume of the 100-year 24-hr storm event (i.e. 163,000 m<sup>3</sup>)**

Description	Drainage Area [km <sup>2</sup> ]	Required Storage Volume [m <sup>3</sup> ]
Alpha	6.27	357,400

Upstream Side Slope = 3:1  
Downstream Side Slope = 2:1  
Crest Width = 15 m



## Water Management - Guiding Principles

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- **Limit contact water volumes to extent practical by reducing mine footprint, use of raincoats on HLF**
  - Use contact water for HLF makeup where possible
  - Backfill waste rock in pits
  - Install flow-through rock drain beneath Alpha WRSF
  - Surface diversion around Alpha WRSF
- **Limit disturbance in Latte/Coffee Creek and YT-24 watersheds**
  - Place WRSFs and majority of site discharge in Halfway Creek drainage
- **Control discharge quantity and quality**
  - Use of pit sumps, sediment ponds, raincoat ponds and water treatment of HLF solutions
  - Alpha Pond pumped at 300 L/s (May-Sept)

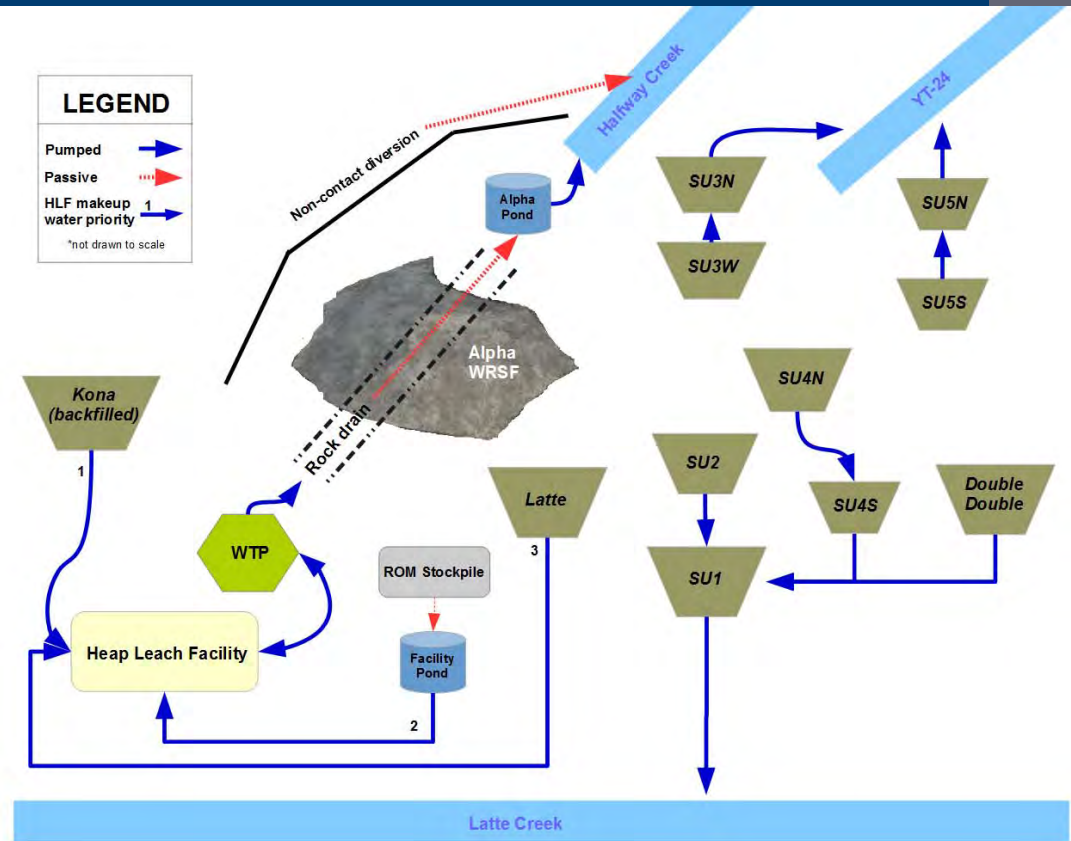


### Mine infrastructure covers:

- 3% of Latte Creek drainage area
- 0.4% of Coffee Creek drainage area
- 3% of YT-24 drainage area
- 11% of Halfway Creek drainage area

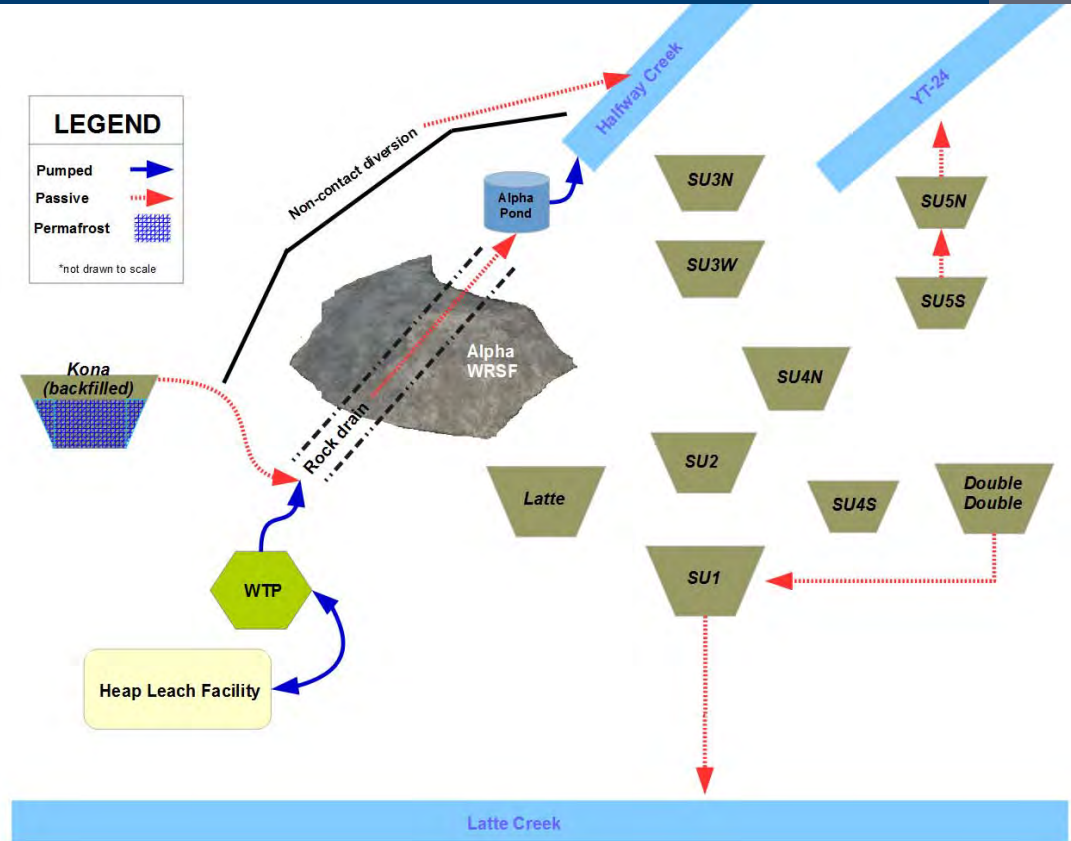
# End of Operations Phase – Conceptual Water Management

- Initial HLF makeup water sourced from HLF footprint
- Subsequent makeup water sourced from:
  1. Kona pit sump
  2. Facility Pond – excess to Latte Creek
  3. Latte Pit – excess to Alpha Pond
  4. Raincoat Ponds – excess to Alpha drain
- Kona backfill runoff reports passively to Alpha WRSF rockdrain
- HLF treated draindown water routed to Alpha WRSF rockdrain
- Supremo South pit complex dewatered SU1 → Latte Creek
- Supremo North pit complex dewatered to YT-24

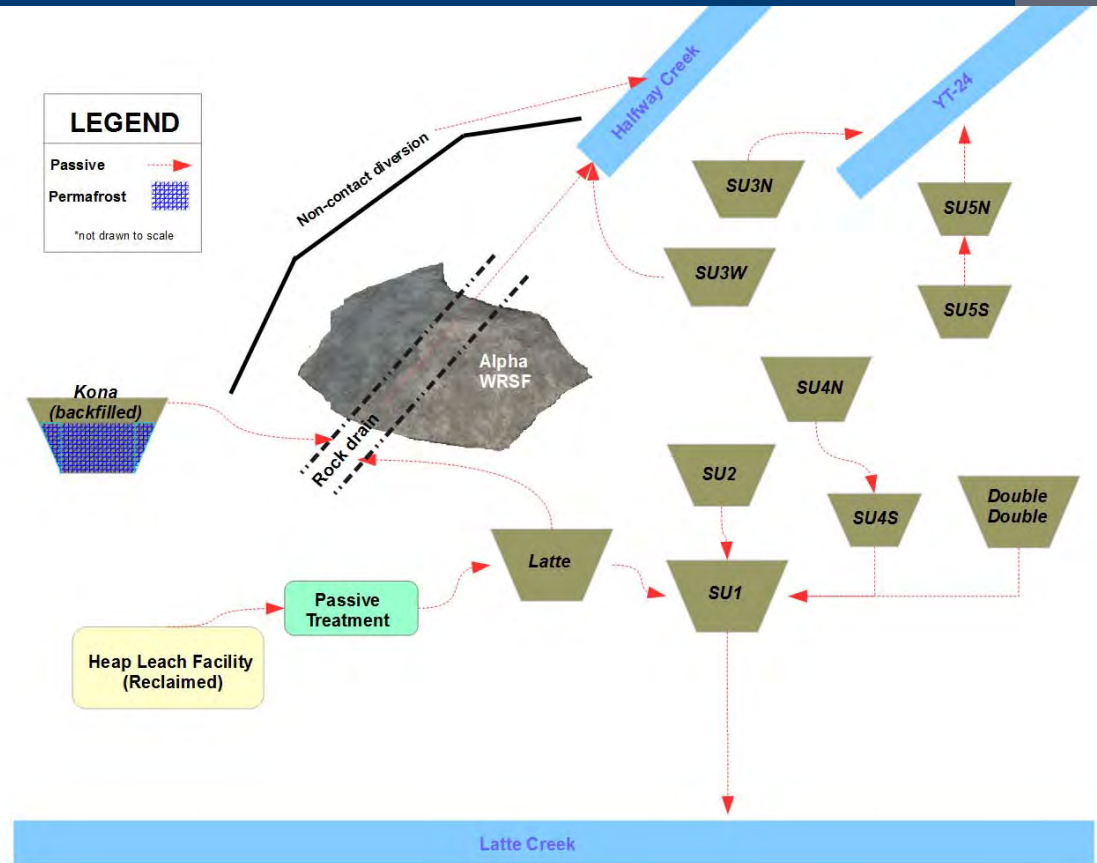


# Closure Phase – Conceptual Water Management

- **Most open pits still filling**
  - Double Double full and spilling to SU1, → Latte Creek
  - SU5N and SU5S full and spilling to YT-24
- **HLF draindown and treatment**
  - CN destruction and polishing step for metals
  - Treatment needed in Year 9 of Operations
  - April – 2 L/s, 4 L/s (May-Sept)
  - Ore stacking stops – treatment ramps up to 5 L/s in April, 11 L/s (May-Sept) for another 3 to 4 years, or until Year 20
  - HLF covered by end of Closure

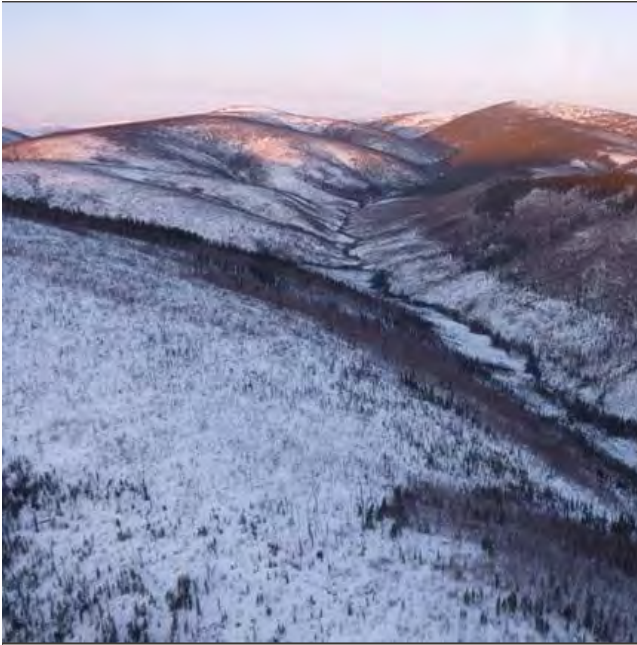


- Alpha Pond decommissioned
- Alpha WRSF diversion remains in place
- Kona backfill runoff reports to Alpha WRSF rock drain
- Alpha WRSF WBM assumes no cover
- HLF seepage passively treated and routed to Latte Pit → Alpha WRSF rock drain
- Assumed covered with infiltration at 25% mean annual precipitation
- All pits passively spill to receiving streams





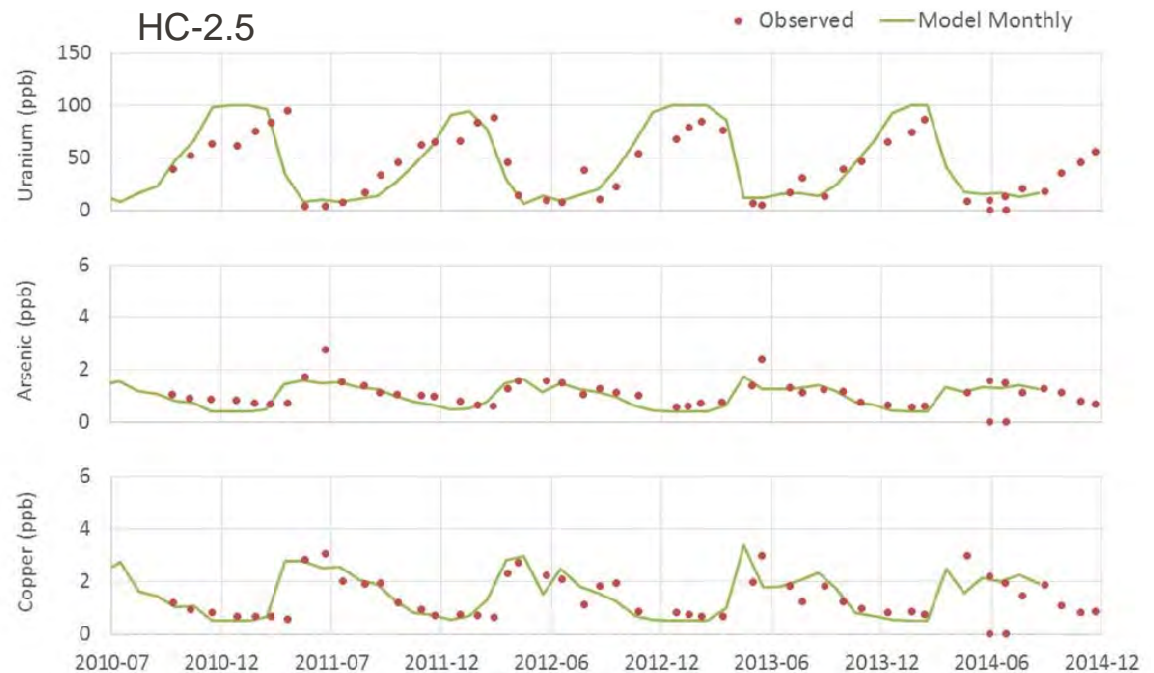




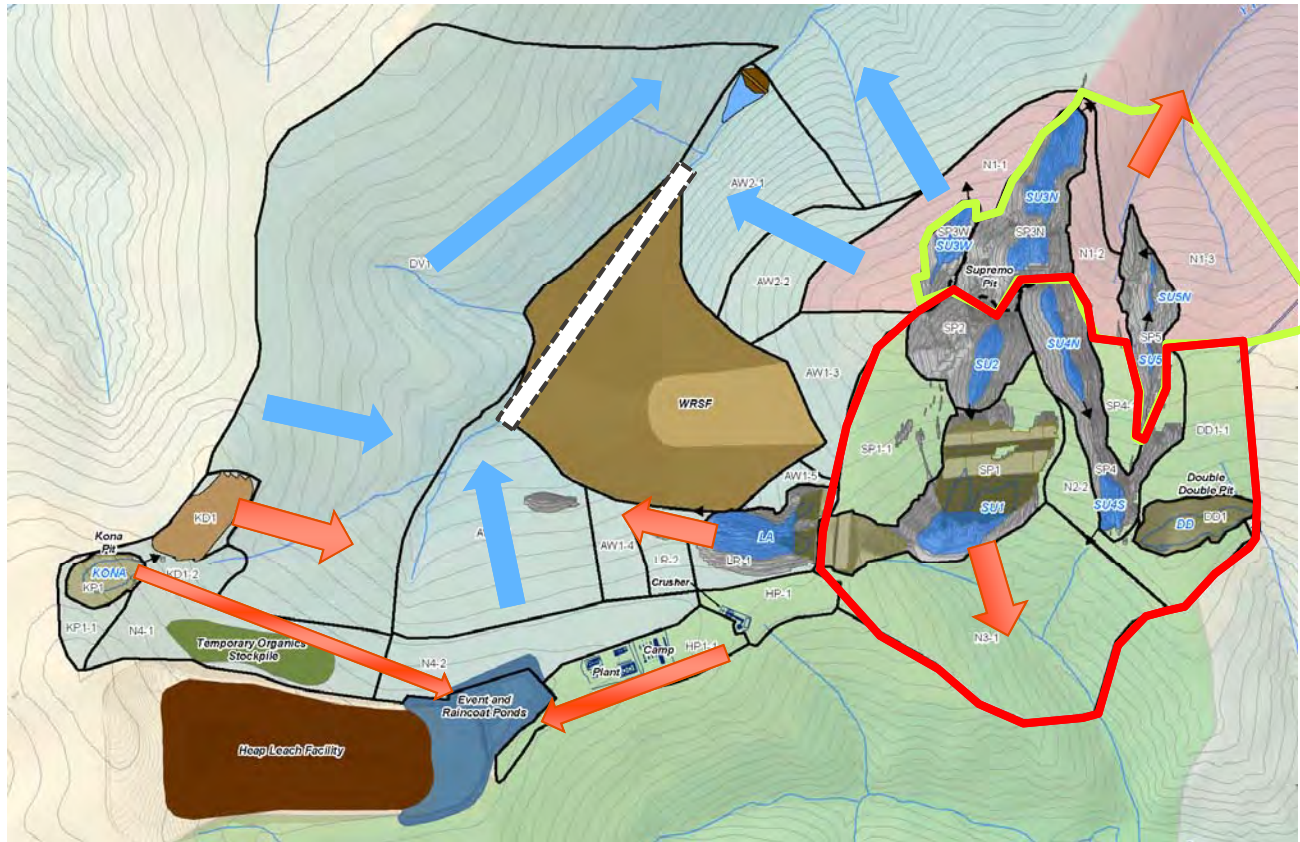
# Water Quality Model and Predictions



- **WBM uses imbedded snowmelt-runoff models for each sub-catchment**
- **WQ Integrated into the background flow components**
  - Quick flow (fast runoff)
  - Interflow
  - Baseflow (winter/low-flow)
- **26 Parameters in each of 7 catchments**
  - HC-2.5, HC-5.0
  - CC-1.5, CC-3.5, CC-0.5, CC-4.5
  - YT24

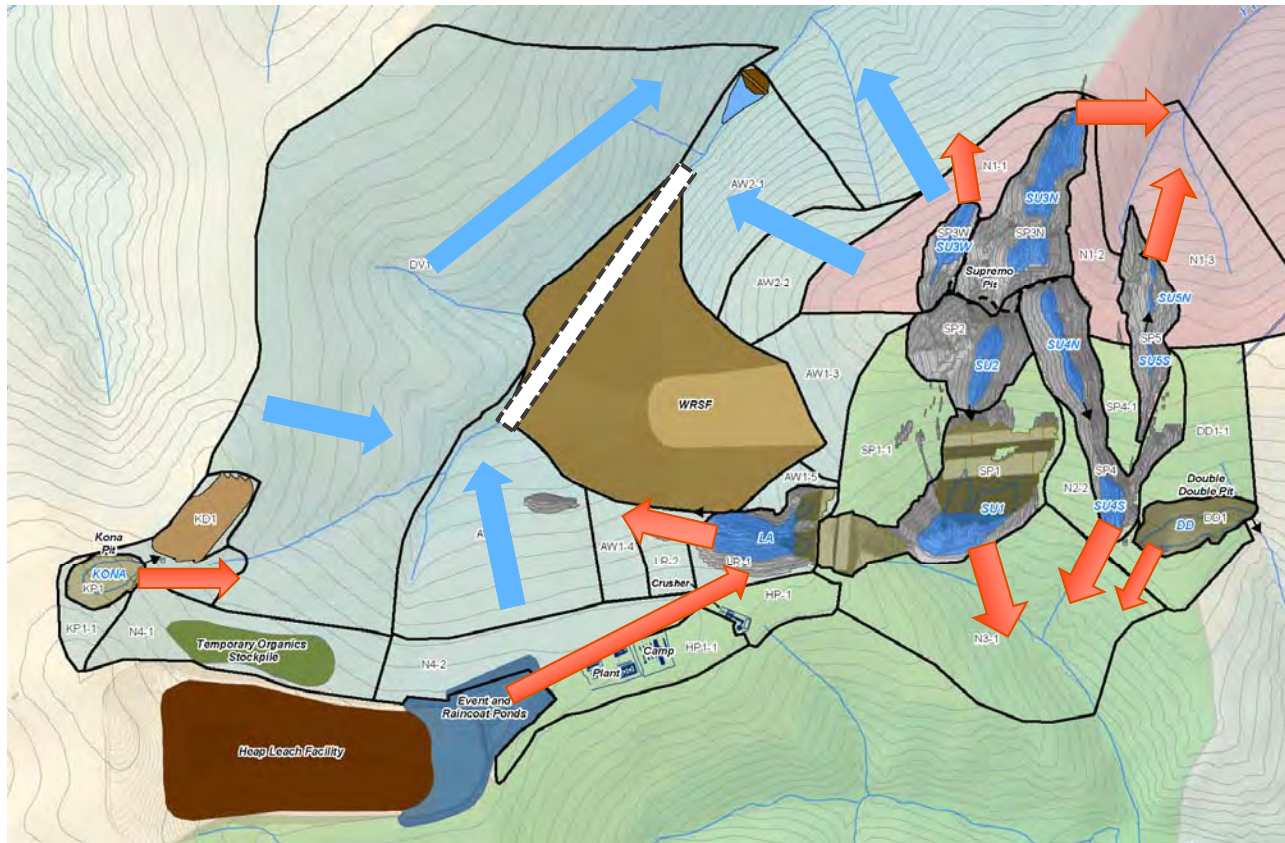








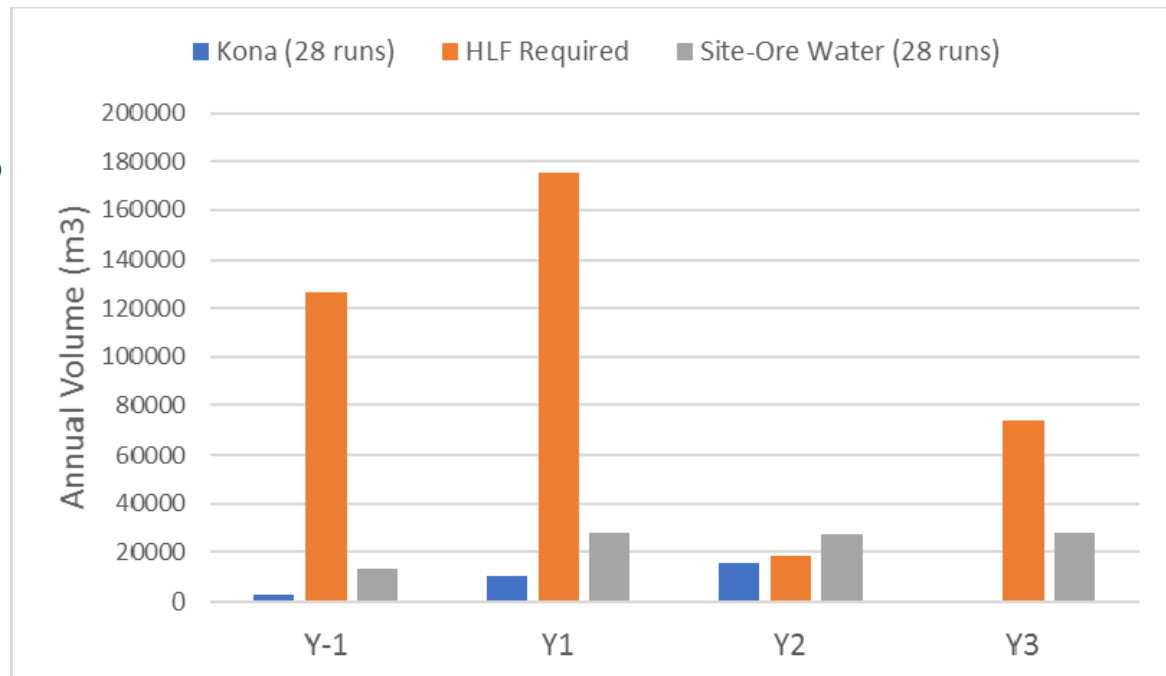
# WBM/WQM Closure



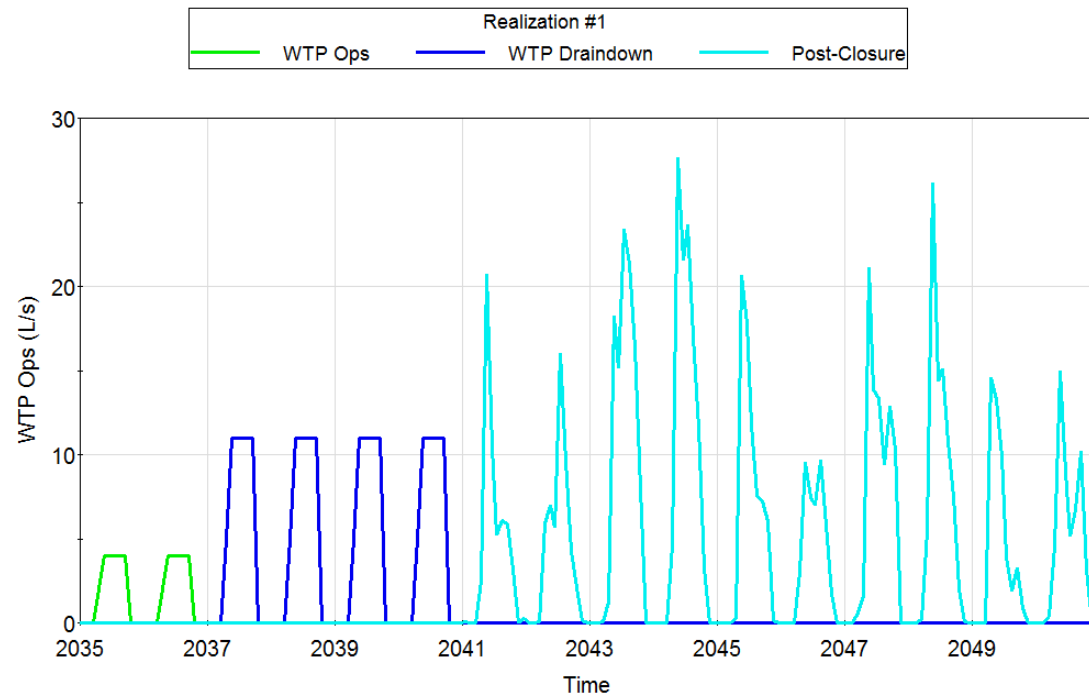
## HLF: Early Operations Y-1 to Y2

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- **HLF Requires make-up water early**
- **Kona produces relatively little water during dewatering (Y-1 to Y2)**
- **Site water includes**
  - Runoff from plant site
  - Runoff from Ore Stockpile
- **Event Ponds hold ~460,000 m3**
- **Raincoats are needed around Y6 to begin limiting infiltration**
  - Raincoat pond ~57,000 m3
  - Excess RCP water tested and discharged to under-drain

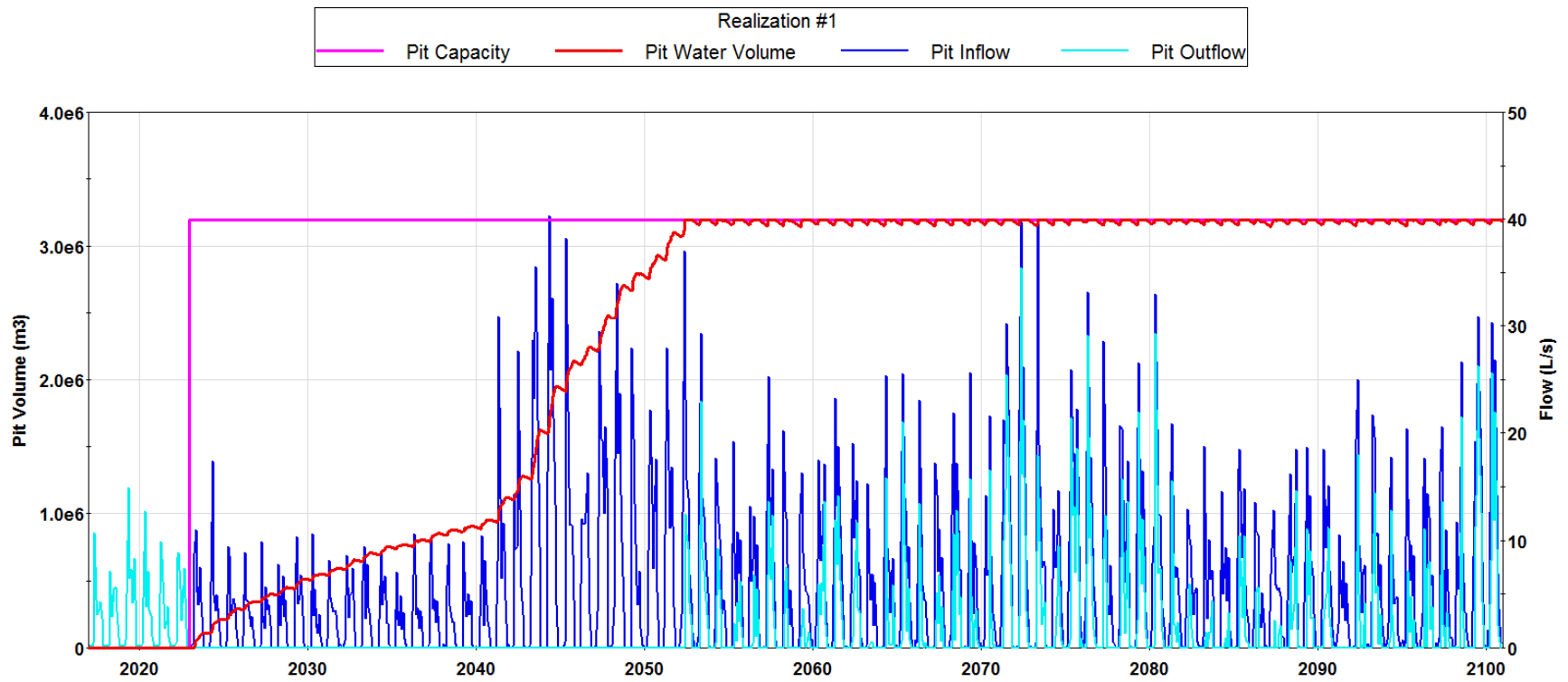


- **Treatment starts late in operations (4 to 11 L/s)**
- **Treatment rate is 11 L/s during draindown (5 L/s in April)**
- **Direct discharge/passive treatment begins when active WTP no longer required**

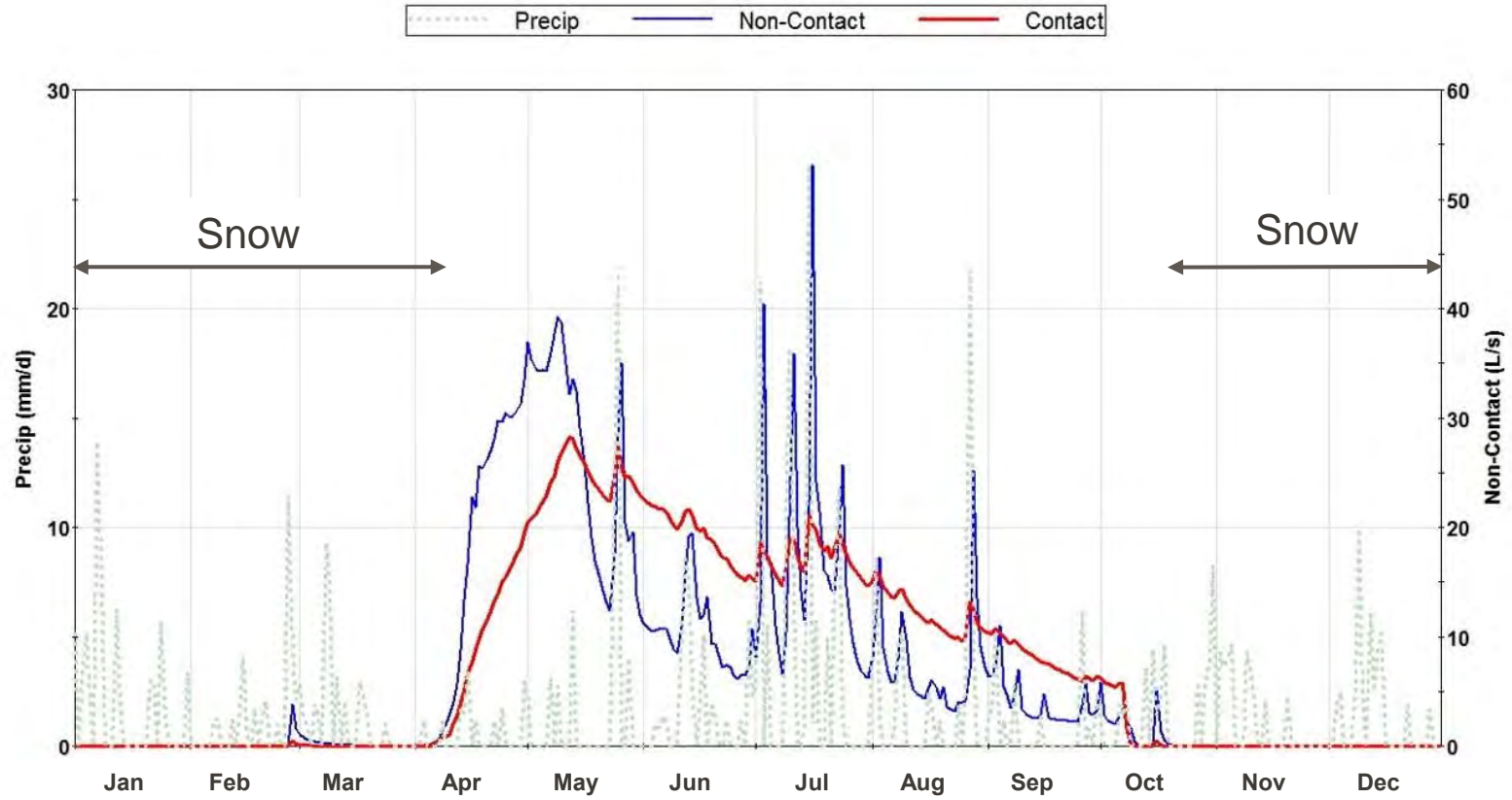


# Latte Pit: Operations to Closure/Spill

Latte Pit Volume and Inflow/Outflow

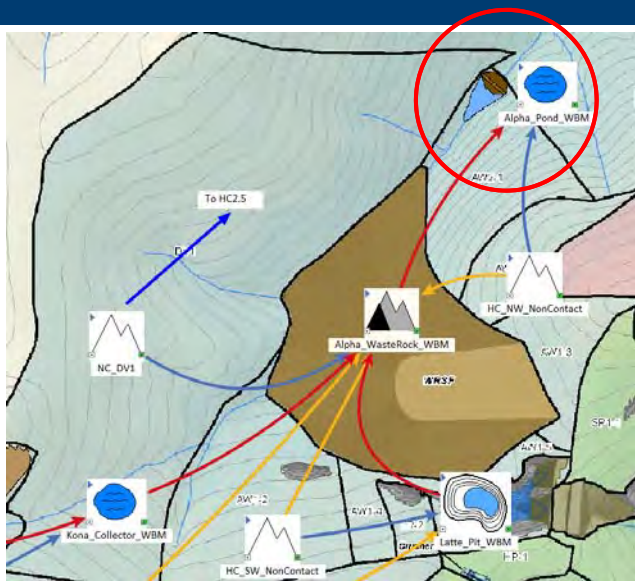


# Alpha WRSA: Contact vs. Non-contact Hydrograph

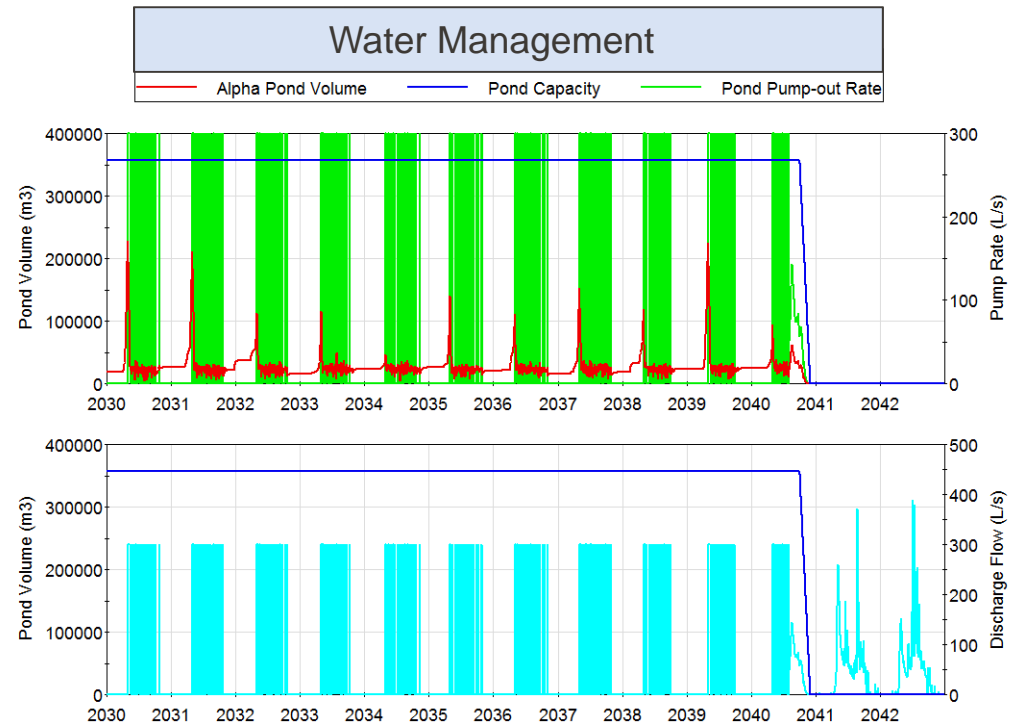




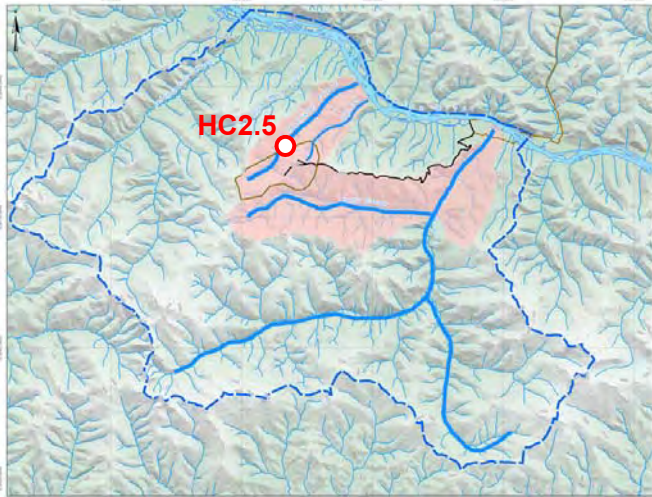
# Alpha Pond: Operations to Closure



- **Alpha Pond**
  - Capacity 357,400 m<sup>3</sup>
  - Max pump-out rate 300 L/s

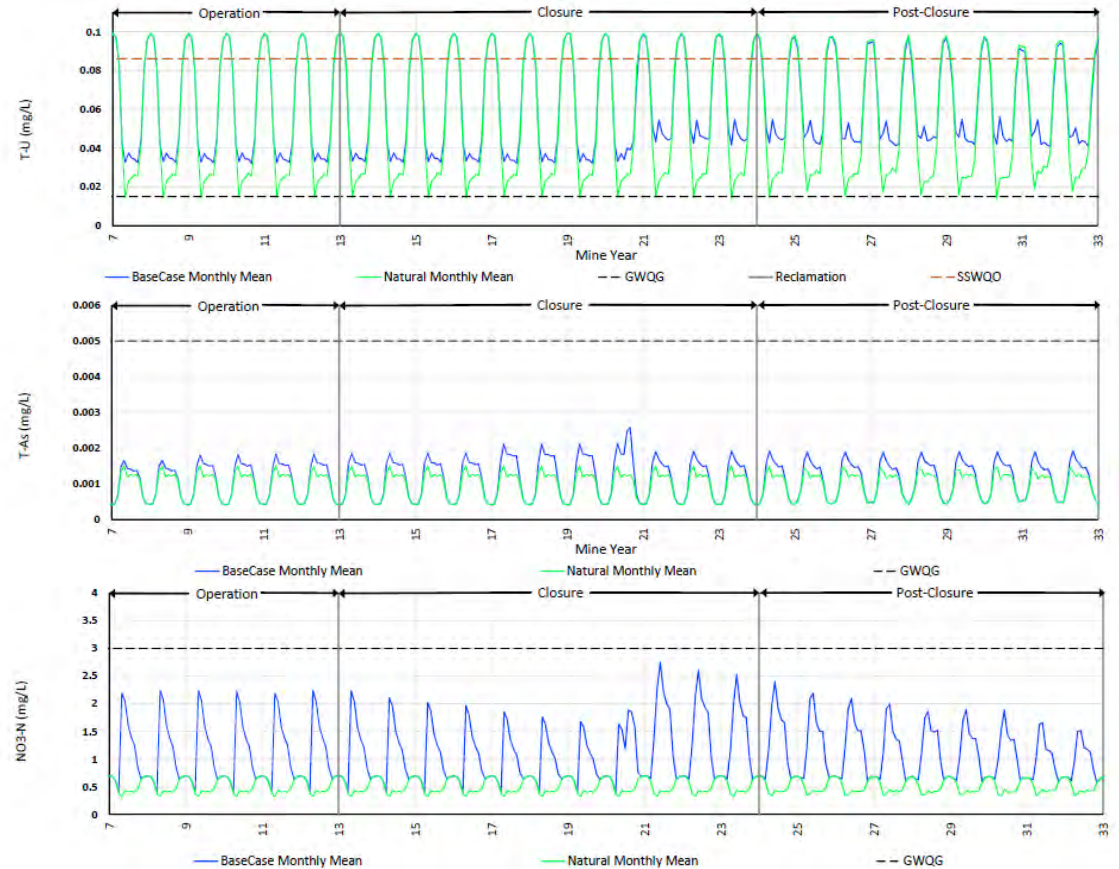


# HC-2.5 WQM Results: Base Case

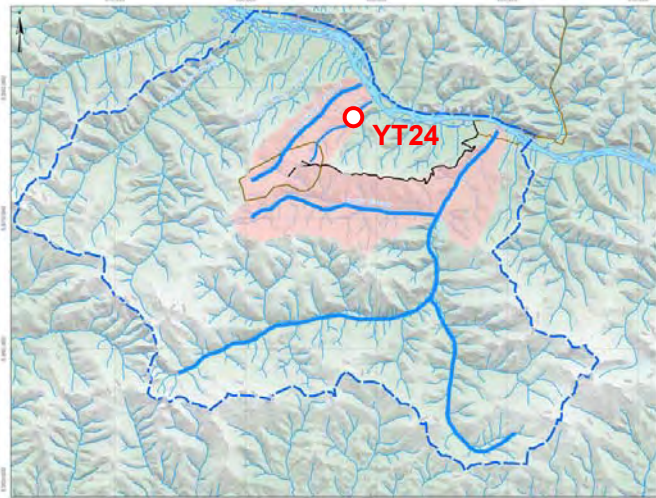


### WQO:

- **U = 0.086 mg/L (SSWQO)**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**

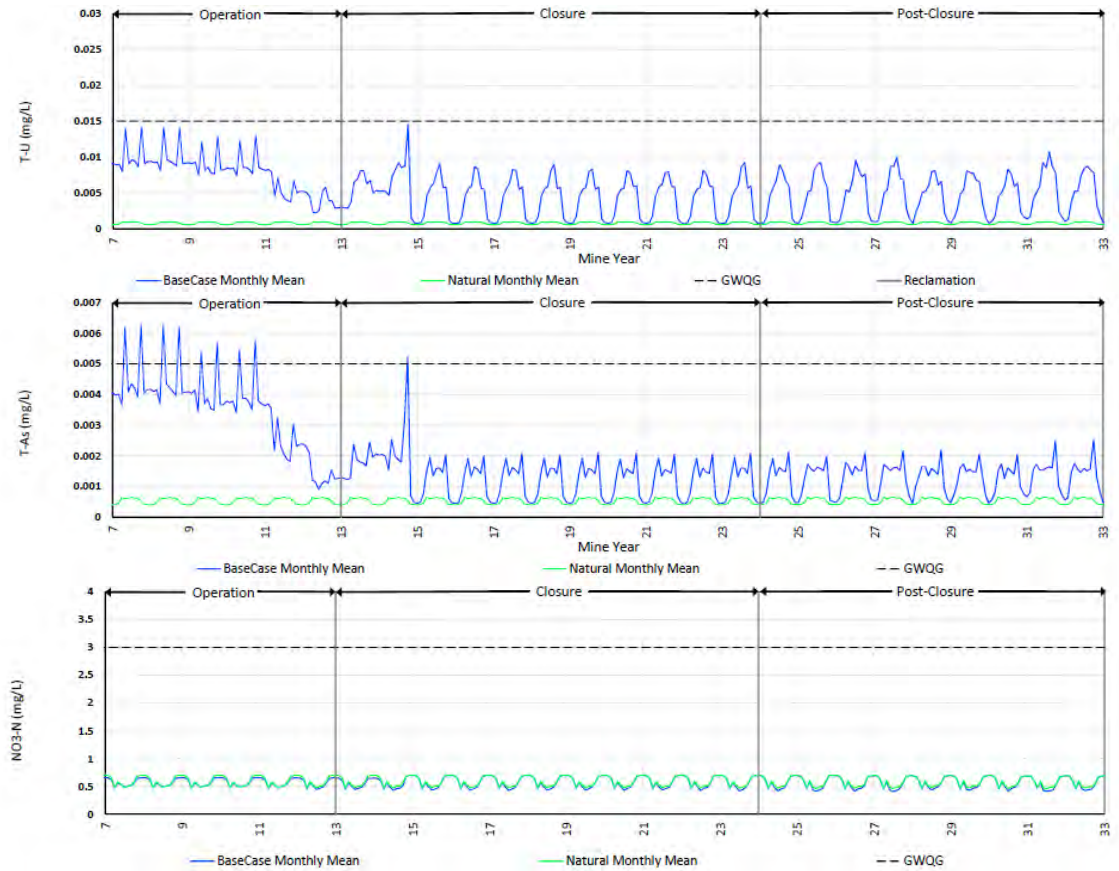


# YT24 WQM Results: Base Case



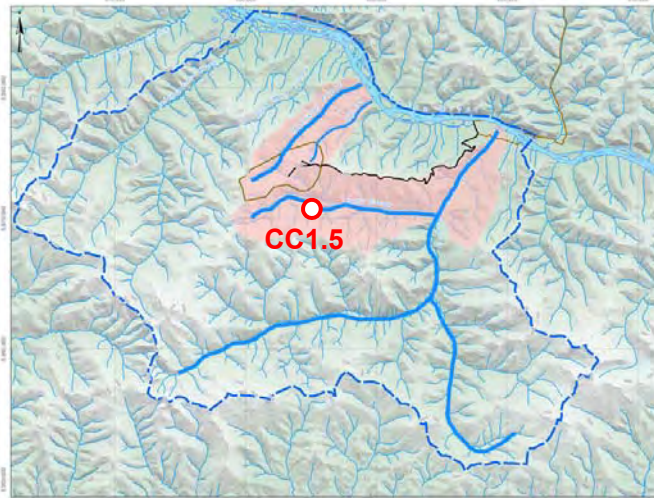
### WQO:

- **U = 0.015 mg/L**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**



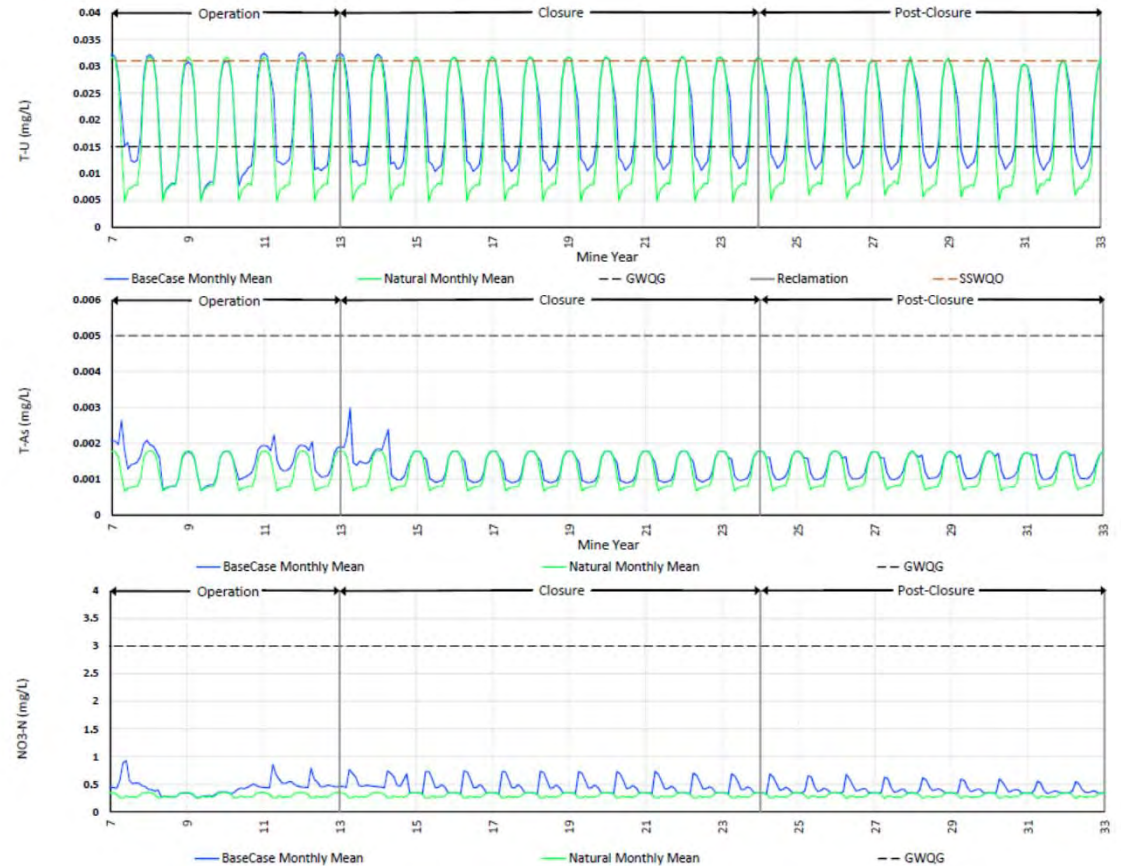


# CC-1.5 WQM Results: Base Case

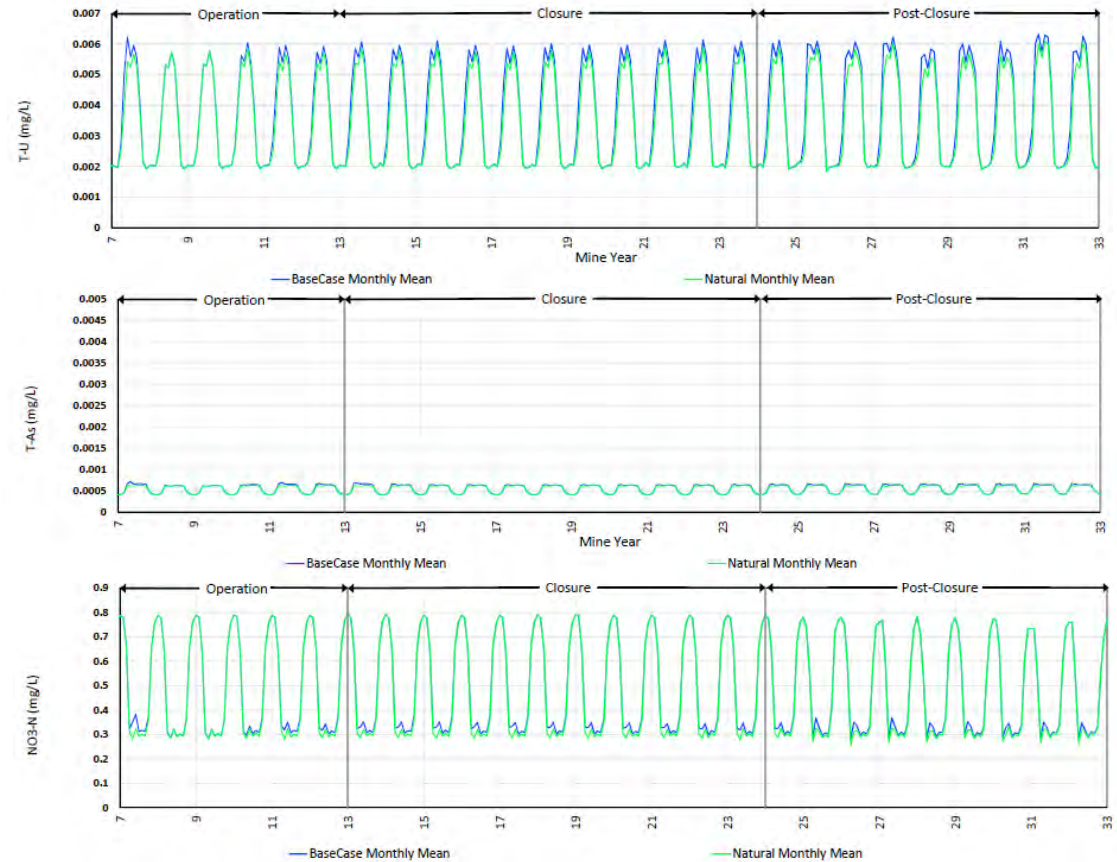
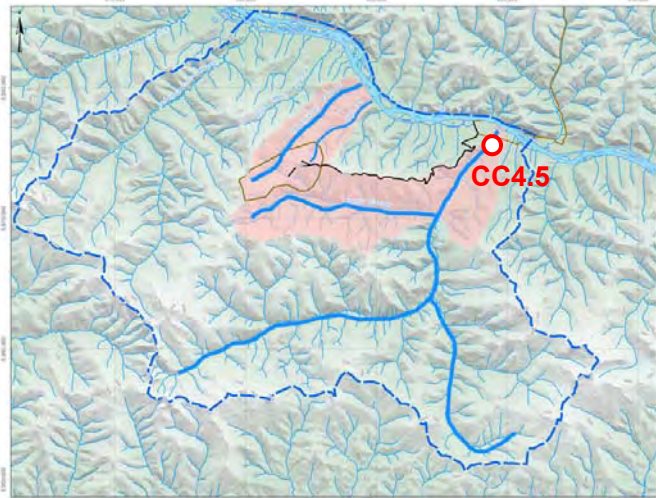


### WQO:

- **U = 0.031 mg/L (SSWQO)**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**



# CC-4.5 WQM Results: Base Case







# Water Treatment

## Operations and Progressive Reclamation

- **Overview of projected leach solution chemistry and potential treatment options**
- **Overview of INOTEC**
- **Electro-biochemical reactor (EBR) process and theory**
- **Coffee bench heap leach and treatment**
- **Treatment technology performance case studies**
  - EBR
  - In situ treatment to accelerate closure

- **Leaching of heap leach ores with cyanide solutions produces pore water leachate chemistry characterized by:**
  - High pH solutions (pH 9.0 to 11.0)
  - Solutions potentially elevated with parameters that are more soluble at high pH (e.g., arsenic, selenium) or more soluble in the presence of excess alkalinity (e.g., uranium)
  - Elevated concentrations of nitrogen species (most notably  $\text{NO}_3^-$ ) from *in situ* CN degradation within the pad and residual explosives
  - Potentially elevated levels of metals known to form metallo-CN complexes (e.g., Fe, Cu, Cd, Hg, Zn)

- Coffee Project HLF expected solution chemistry (prior to rinse)**

Parameter	Concentration
pH	9.0 - 11.0
CN(WAD)	100 - 150
Sulphate	200 - 500
Ammonia-N	50 - 90
Nitrate-N	25 - 200
As	1.0 - 5.0
Cd	0.005 - 0.02
Cu	1.0 - 3.0
Hg	0.005 - 0.04
Se	0.005 - 0.008
U	0.100 - 0.500
Zn	0.5 - 1.2

All units as mg/L (except pH)

Expected concentrations based on results from metallurgical testing

- What water management/ treatment options are available to address heap leach solution chemistry?**

- ~~Natural attenuation (“do nothing”)~~
- Rinsing using fresh and/or treated water ✓
- ~~Move solution to another repository (tailings impoundment)~~
- ~~Evaporate excess solution~~
- Further treatment of post-rinse solutions and discharge to ✓  
environment



- **Coffee Project HLF expected chemistry – post initial rinse**

Parameter	Concentration
pH	8.0 - 9.0
CN(WAD)	0.5 - 5.0
Ammonia-N	5 - 20
Nitrate-N	100 - 300
As	1.0 - 2.0
Cd	0.0005 - 0.001
Cu	0.01 - 1.0
Hg	0.0005 - 0.001
Se	0.001 - 0.005
U	0.05 - 0.300
Zn	0.1 - 0.5

- Reduce pH and remove CN and CN-complexes (Cu, Zn)
- Reduce As concentrations (primarily due to increased sorption at lower pH)
- Increase in NO<sub>3</sub> due to in situ CN degradation

All units as mg/L (except pH)

- **Rinsing using fresh and/or treated rinse water**
  - Accelerates the degradation process by decreasing pH of porewaters and converting free cyanide to HCN and volatilizing
  - Exporting soluble species (nitrate, metals, cyanide) in rinse solution and subsequent removal during treatment process
- **Rinsing alone likely will not achieve water quality objectives and allow discharge to environment without additional treatment**
- **Treatment options:**
  - Chemical – acceptable for CN and some metals but not N-species or U
  - Ion exchange/RO – expensive and produces concentrated solution
  - **Combined chemical and biological**

- **Require a biological process to remove those parameters not amenable to traditional chemical or pH adjustment treatment:**
  - Nitrate and nitrite-N
  - Se (not a parameter of concern at Coffee Project)
  - U (not amenable to chemical precipitation but can be removed through microbial reduction to insoluble form)
  - Biological reduction process also very successful at removing metals as insoluble metal sulphides

•  
**Proposed biological treatment for Coffee:  
Electro-Biochemical reactor (EBR) Process**



2712 S 3600 W, Ste. A  
Salt Lake City, UT 84119

## INOTEC and Electro-Biochemical Reactor (EBR) Technology

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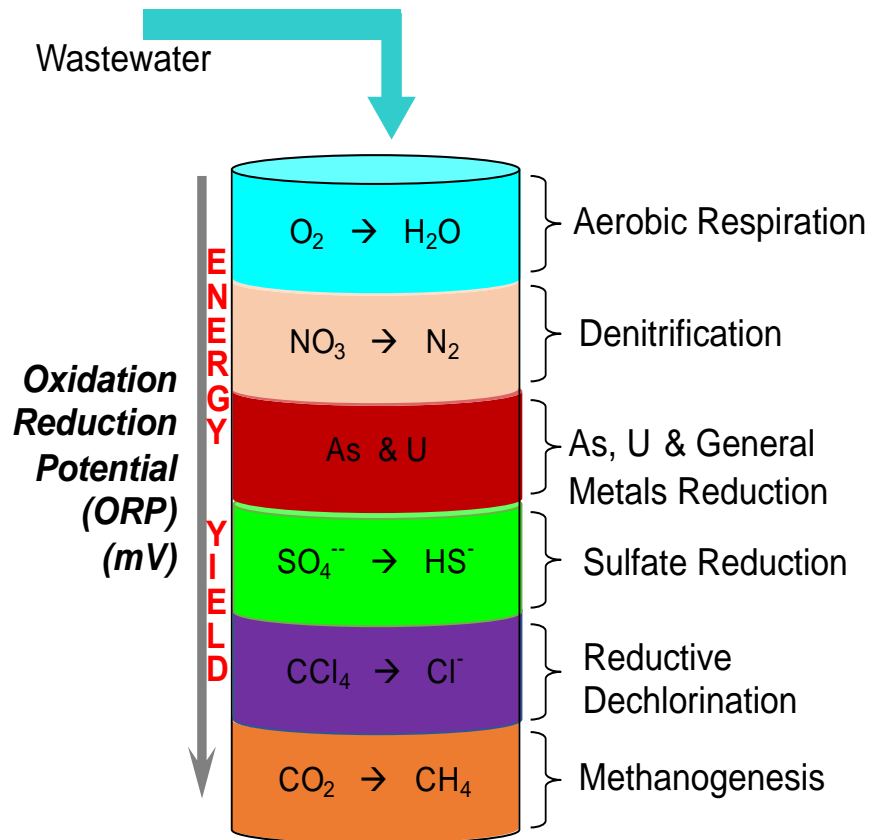
Ola Opara, Ph.D.  
Vice-President  
[oopara@inotec.us](mailto:oopara@inotec.us)  
(801) 966-9696

- **Over 30 years experience in microbial optimization and source/water treatment development and implementation**
  - **Inotec provides water treatment solutions for the Mining, Power and Oil & Gas industries to remove common contaminants from these wastewaters**
    - Nitrate/Nitrite, Selenium, Arsenic, Mercury, Cyanide, Sulphate, Uranium, Zinc, and others
    - Includes the Electro-Biochemical Reactor (EBR) technology and holistic site treatments combining active, semi-passive, and in situ approaches



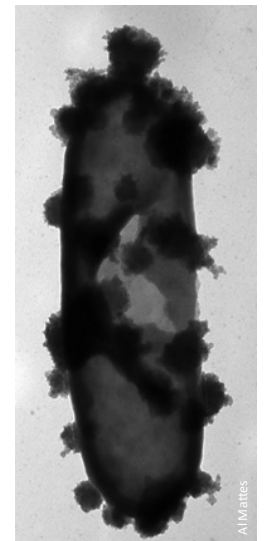
# Electro-Biochemical Reactor (EBR) Technology

42

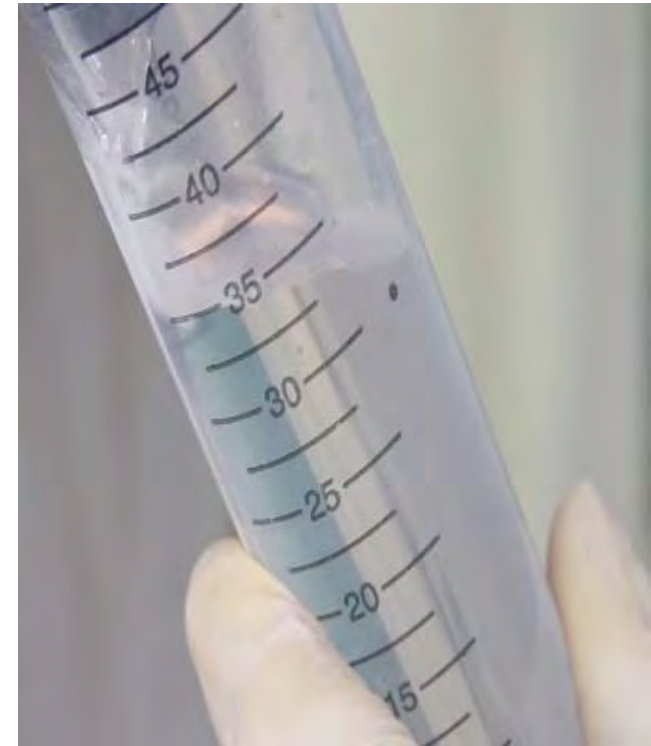
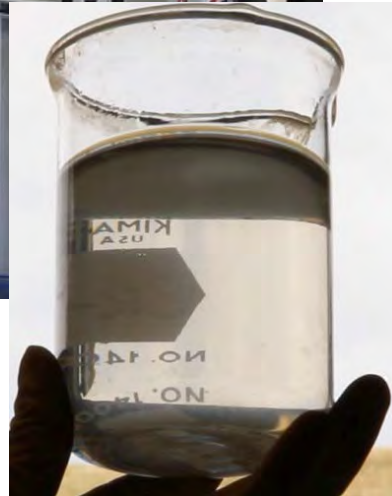


- **Microbes mediate the removal of metal and inorganic contaminants through oxidation/reduction reactions**
  - $NO_3^- + 5e^- + 6H^+ \rightarrow 1/2N_2 + 3H_2O$
  - $SO_4^{2-} + 8e^- + 10H^+ \rightarrow H_2S + 4H_2O$
- **Anaerobic, reductive conditions**
- **Supports treatment of a broad range of water chemistries**
- **The EBR represents a patented method to minimize or overcome short-comings of conventional bioreactors**

- **EBR technology directly supplies electrons to the microbes to provide energy for cell growth and contaminant reduction without adding excess nutrients (carbon) to the system**
- **Low voltage (1-3 Volts potential and low milli-amps) provides:**
  1. Electrons and electron acceptor environments for controlled contaminant removal environments
  2. Compensation for inefficient and fluctuating electron availability through nutrient metabolism used by conventional bioreactors to supply electrons. **(1 mA provides  $6.24 \times 10^{15}$  electrons per second)**
- **The EBR uses less nutrients and added carbon (lower OPEX) and produces less bio-solids and TSS**
  - Greatly reducing or eliminating post processing to remove and store excess biomass containing some of the contaminants removed from the wastewaters treated



## Typical EBR Effluent Quality

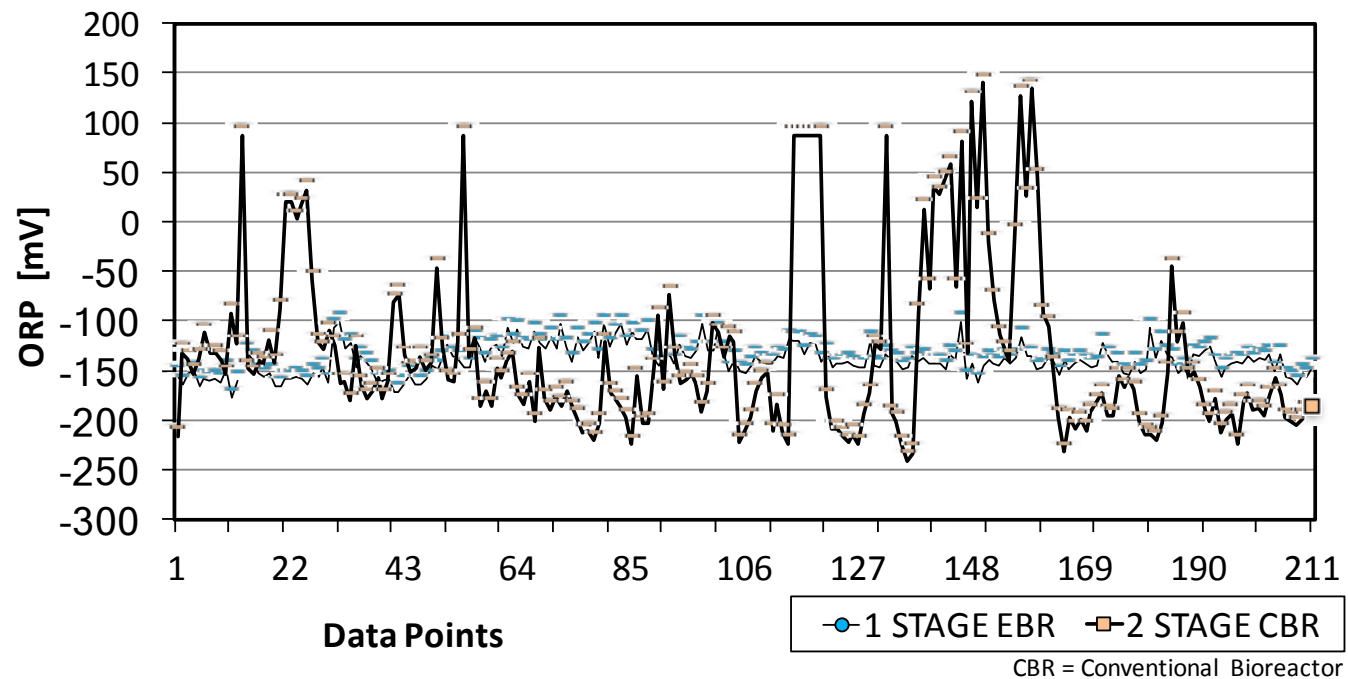


- From onsite EBR effluent, no filtration or post-treatment

# Electro-Biochemical Reactor (EBR) Technology

45

- Providing electrons directly has numerous benefits including better Oxidation/Reduction Potential (ORP) control and stability



# Electro-Biochemical Reactor (EBR) Technology

46

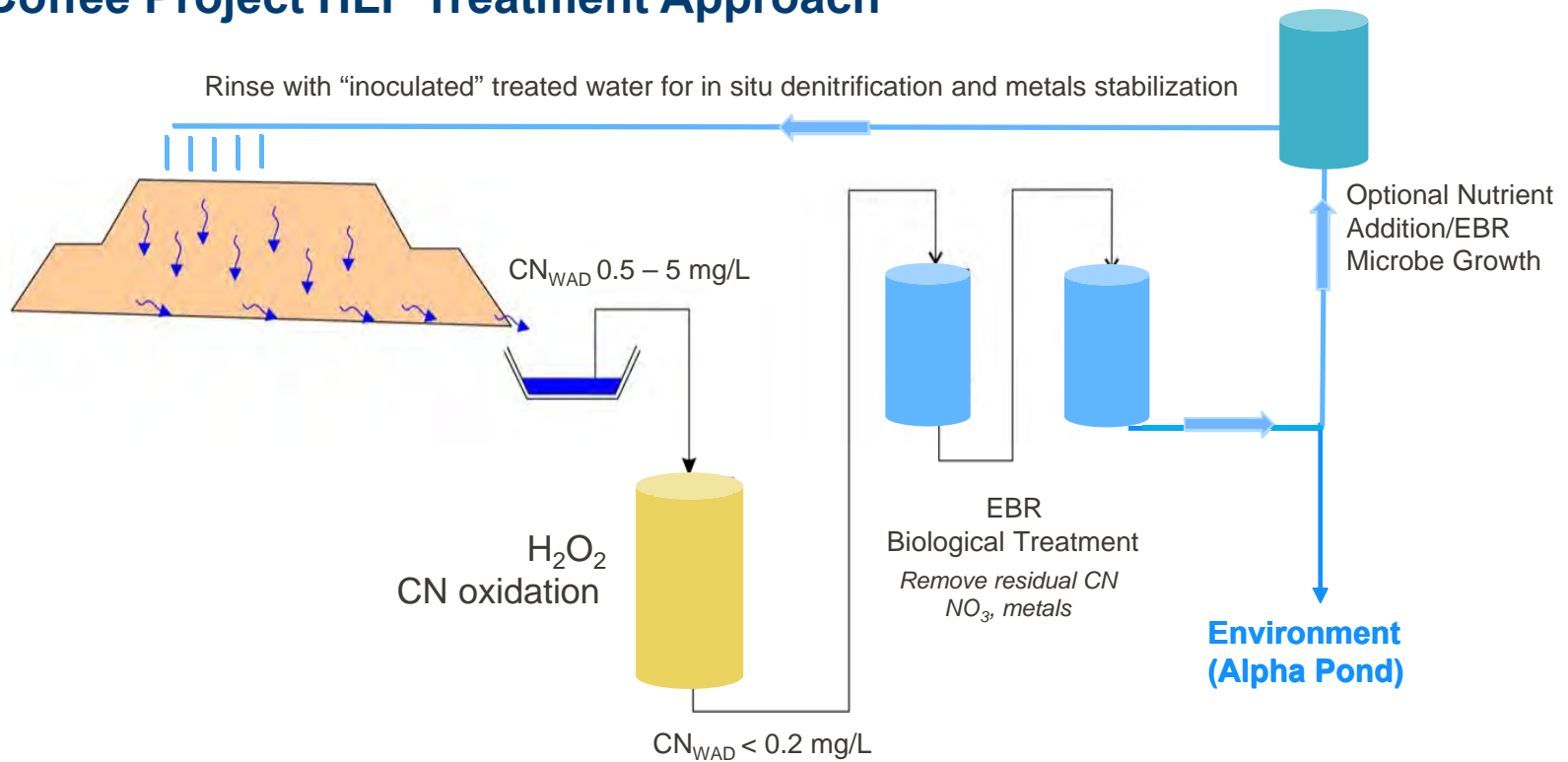




# Proposed EBR Water / In Situ Treatment Approach at the Coffee Project

47

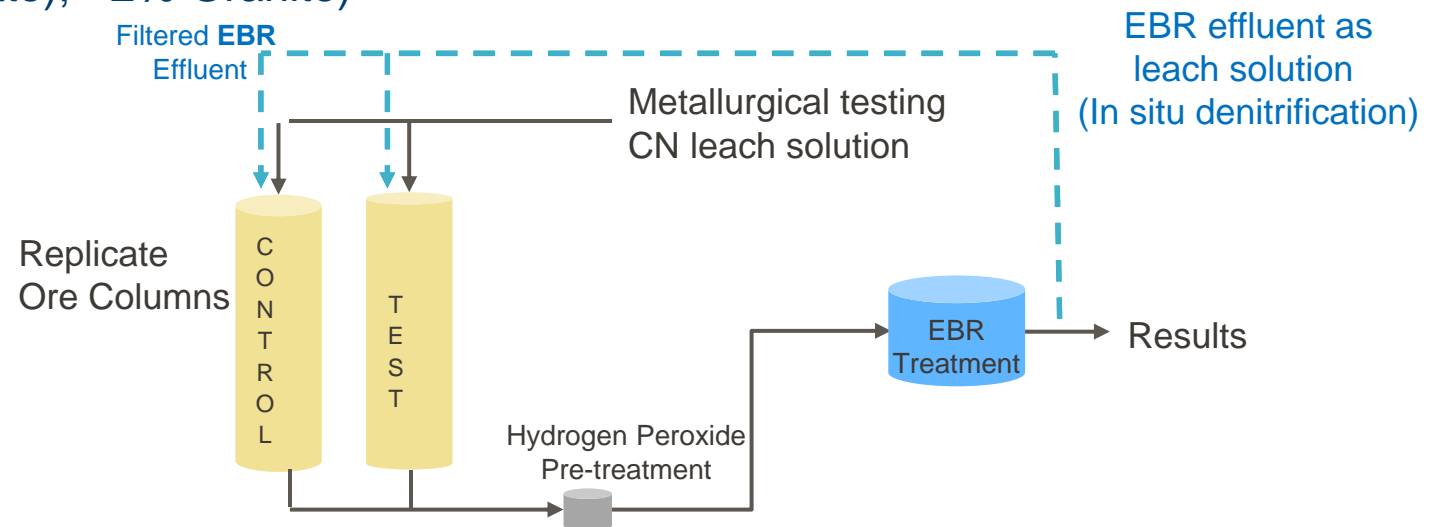
- Coffee Project HLF Treatment Approach**



# Coffee Project Treatability Study

48

- Performed bench-scale treatment testing of metallurgical cyanide leach solutions at INOTEC
- Duplicate columns each contained 100 kg of cyanide-leach ore in the proportions expected in the final heap (Supremo Gneiss ~80%; ~20% Schist (Latte); ~2% Granite)



# Coffee Column Water Leach Solution Results

49

- Initial Column Leach Data

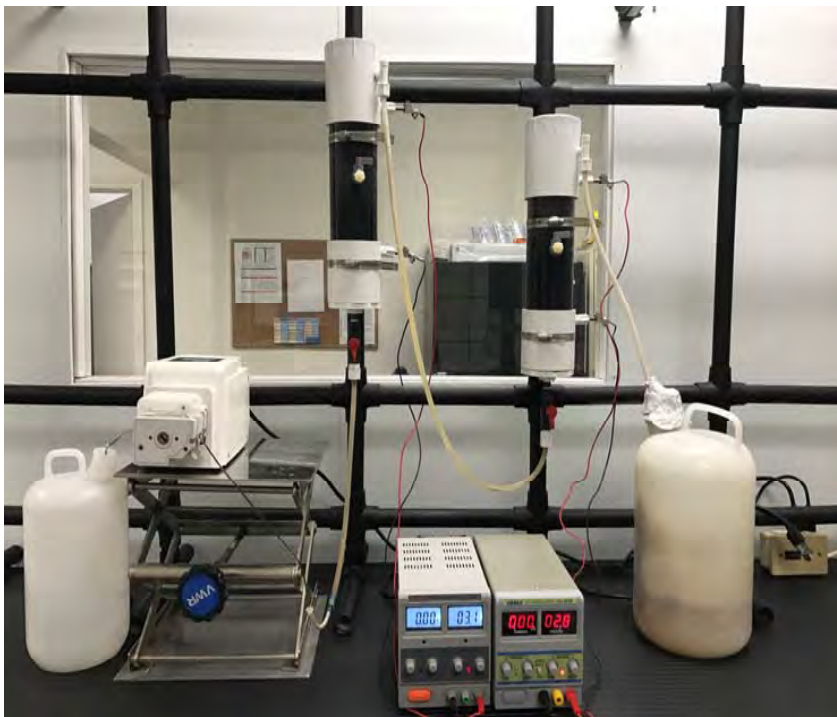


Parameter	Concentration
pH	8.0 - 9.0
CN(WAD) (mg/L)	0.5 - 5.0
Ammonia-N(mg/L)	5 - 20
Nitrate-N (mg/L)	100 - 300
Metals (µg/L)	
As	1.0 - 2.0
Cd	0.0005 - 0.001
Cu	0.01 - 1.0
Hg	0.0005 - 0.001
Se	0.001 - 0.005
U	0.05 - 0.300
Zn	0.1 - 0.5

# Coffee Column Leach Water EBR Treatment Results

50

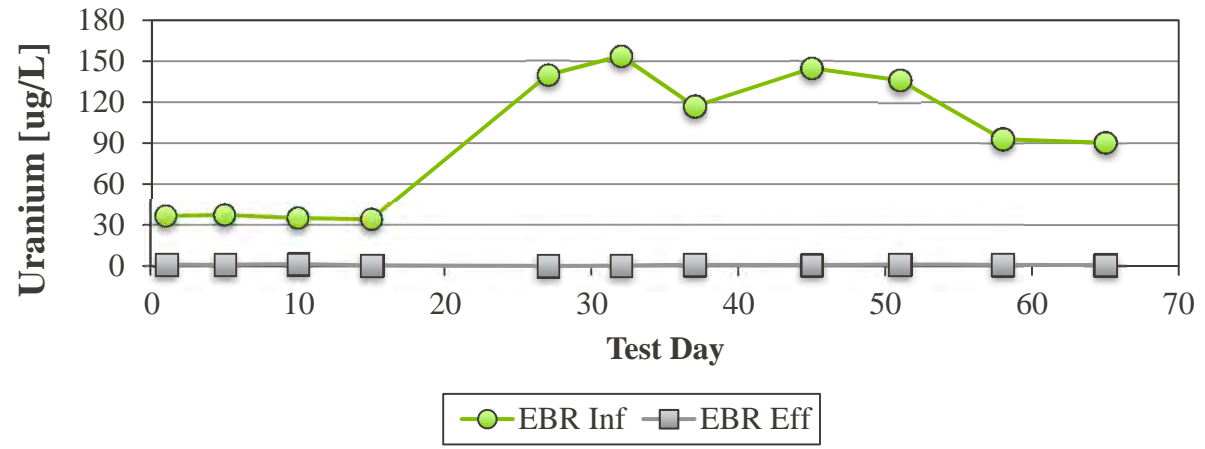
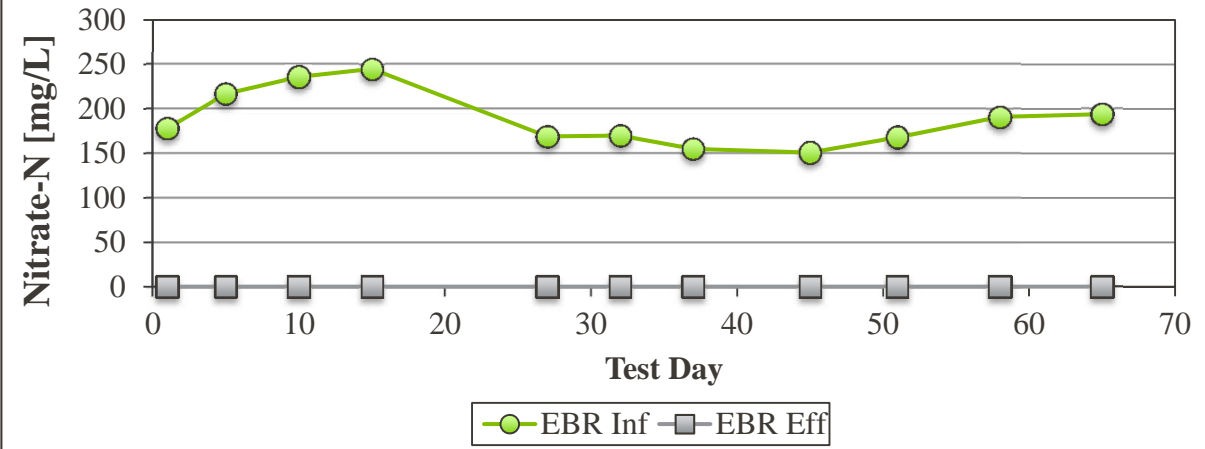
- EBR Results**



Parameter	EBR Influent	EBR Effluent	Ave EBR Effluent	% Removal
pH	8.0 - 9.0	7.0 - 8.0		
CN(WAD) (mg/L)	0.06 - 0.09	0.005 - 0.01	N/A	N/A
Sulphate (mg/L)	150 - 160	40 - 70		
Nitrate-N (mg/L)	150 - 190	0.1 - 0.2	<0.19	99.9
Metals (µg/L)				
As	900 - 2600	11 - 15	12.9	98.8
Cd	0.5 - 0.8	<0.01	<0.02	98.5
Cu	400 - 700	2.0 - 2.5	<2.4	99.1
Hg	1.0 - 13.0	0.03 - 0.04	0.03	98.1
Ni	50 - 120	1.0 - 2.0	<2.3	96.9
U	90 - 160	0.2 - 1.0	0.8	99.1
Zn	80 - 150	0.3 - 41.0	38.1	49.9

# Coffee Column Leach Water EBR Treatment Results

- EBR Effluent Results**

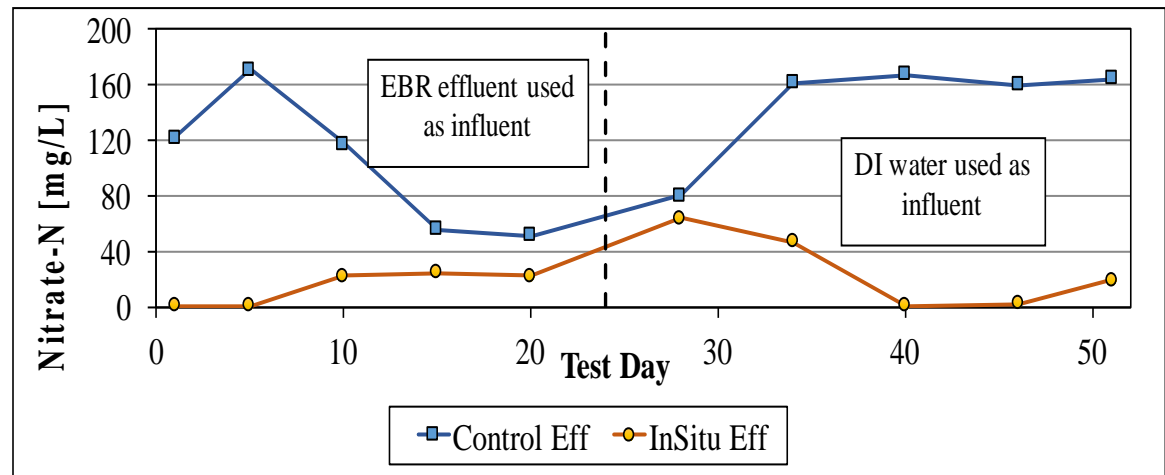




- **Column EBR Effluent Leach Solution Data**



- **TEST COLUMN:** Leach solution was EBR effluent
- **CONTROL COLUMN:** Leach solution was filtered EBR effluent (removed microbes – left nutrients)

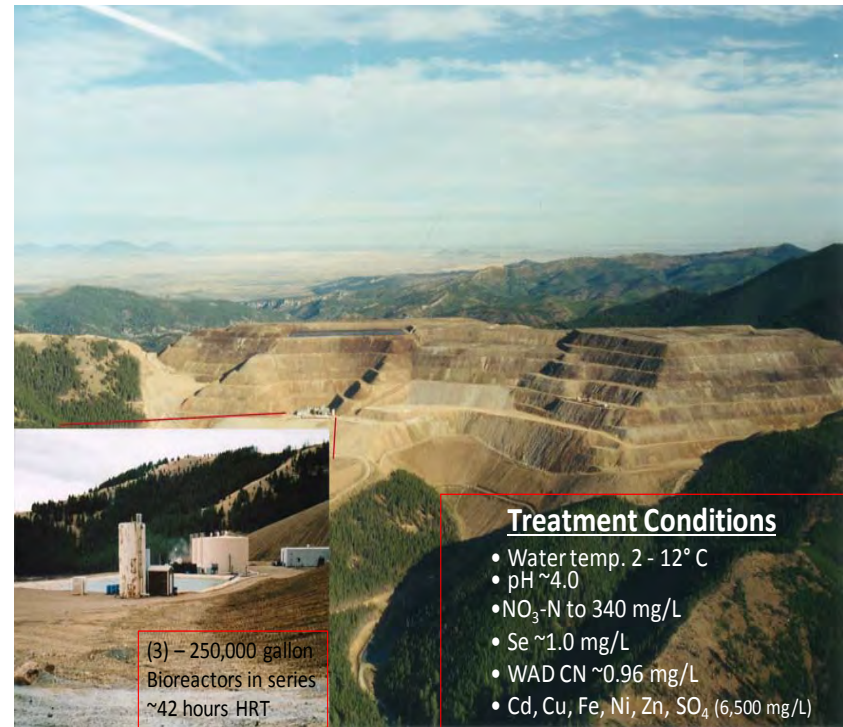


- **Case Studies Water Treatment**
  - Full Scale Water Treatment– Landusky Heap Leach EBR Treatment System
  - Pilot Scale Water Treatment – Wolverine Mine, Yukon
  - Pilot Scale Water Treatment – Power Industry (As and U treatment)
- **Case Studies In Situ Treatment**
  - Full Scale In situ treatment - Landusky Heap Leach CN
  - Full Scale In situ treatment for As – Goldcorp Wharf Mine

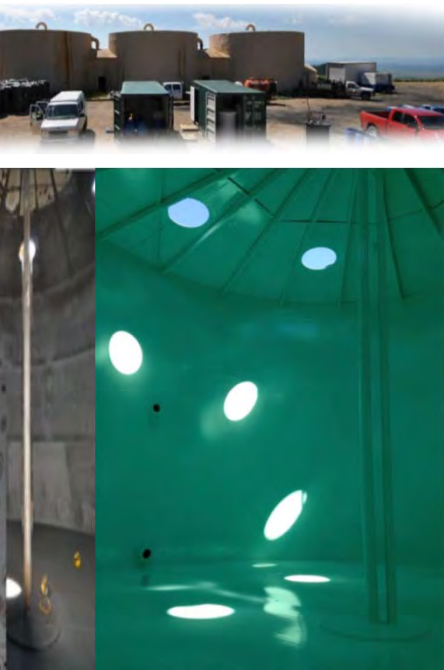
# Landusky Mine: Full-Scale EBR Application

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- The Landusky Mine is an abandoned gold mine, located in north-central Montana (Pads cover 119 hectares); it is a part of the Zortman-Landusky mine closed in 1998
- In 2002 the conventional Landusky Biotreatment System (LBS) was constructed to treat precipitation infiltration through the leach Pads and other site pump-back waters; system components include three 250,000-gallon (950 m<sup>3</sup>) bioreactors
- The LBS treated site waters for the removal of contaminants not effectively treated by chemical precipitation; average nitrate-N at 250 mg/L, total cyanide at 0.08 mg/L, and selenium at 0.9 mg/L



- EBR performance is summarized from October 2015 through May 2017

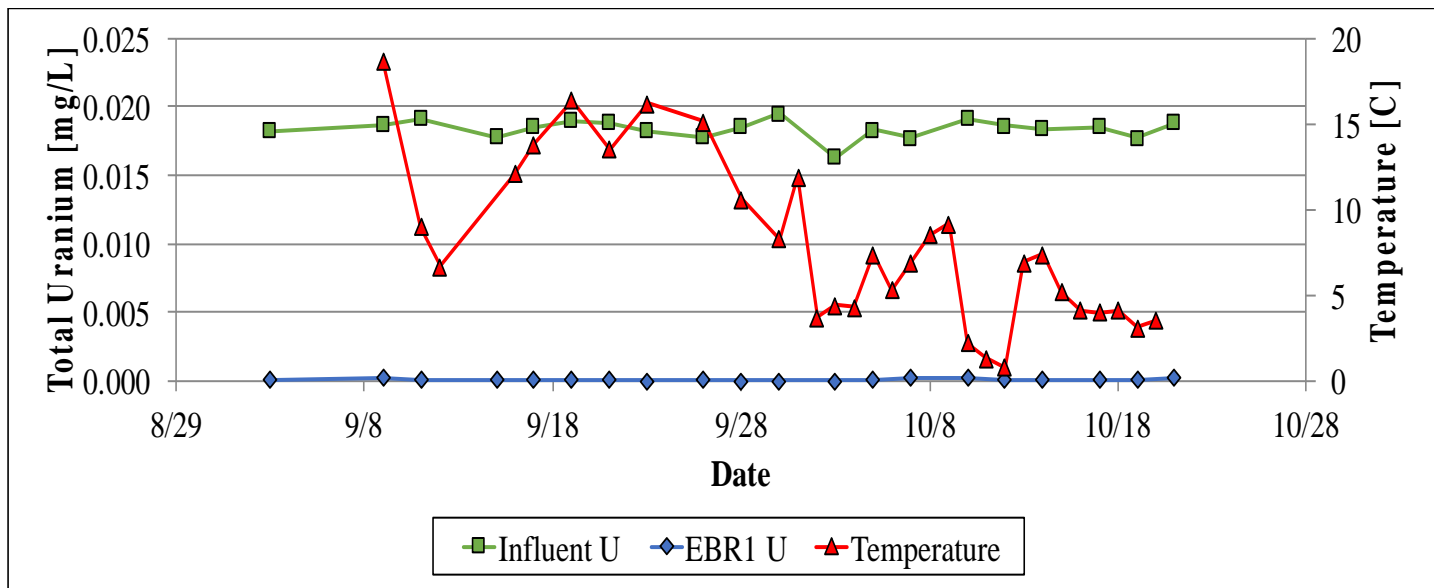


	Influent [mg/L] (2011-2014 Ave)	LBS Effluent [mg/L] (2011-2014 Ave)	EBR Effluent [mg/L] (2015-2017 Ave)	Discharge Limit [mg/L]
<b>CN<sup>1</sup></b>	0.084 *	NA	<0.005 *	0.005
(TOTAL) <b>CN<sup>1</sup></b>	0.012 *	0.072	<0.005 *	NA
(WAD) <b>Al</b>	0.34	1.99	0.04	NA
<b>Cd</b>	0.135	0.125	<0.001	0.005
<b>Cu</b>	0.061	0.122	0.014	0.031
<b>Ni</b>	0.832	0.893	0.007	NA
<b>Se</b>	0.858	0.417	0.039	0.050
<b>Zn</b>	2.26	2.94	0.04	0.388
<b>NO<sub>3</sub>-N</b>	250	25	<1	10.0

\* Single measurement

# Liverine Mine YT: Pilot-Scale EBR Selenium Removal (Uranium Removal with Temperature Data)

two-stage EBR system on-site pilot test; Uranium was a secondary contaminant, averaging 18 ug/L and removed to less than 0.1 ug/L in the first EBR stage





# Silverine Mine YT: EBR Pilot-scale Treatment of Base Metal in Flotation Waters

57

Selenium was the targeted contaminant in flotation-influenced waters containing a suite of other metals and inorganics that exceeded the site discharge standards

Chemical treatment methods did not meet the Se discharge goal of 0.02 mg/L

Side-by-side comparisons of the EBR and a leading fluidized bed bioreactor technology showed that the EBR was the only method able to meet discharge criteria

Parameter [mg/L]	Average Influent (mg/L)	Average EBR Effluent (mg/L)	% Removal
Antimony	0.15	<0.001	>99.3
Cadmium	0.014	<0.0002	>98.0
Copper	0.41	<0.005	>98.7
Lead	0.30	0.0008	99.7
Molybdenum	0.10	<0.0005	>99.5
Selenium	2.73	0.002	99.9
Silver	0.041	<0.0001	>99.8
Zinc	0.46	<0.03	>93.5
Nitrate-N	3.3	<0.1	>97.1
Nitrite-N	0.9	<0.02	>97.8
Cyanide <sub>WAD</sub>	0.26	<0.005	>98.1
Cyanide <sub>TOTAL</sub>	0.47	<0.005	>98.9

# EBR in the Power Industry: As & U Removal Data

58

On-site pilot-scale technology comparisons with 8 selenium removal technology providers

EBR technology was the only technology in all testing rounds to remove Se to discharge criteria

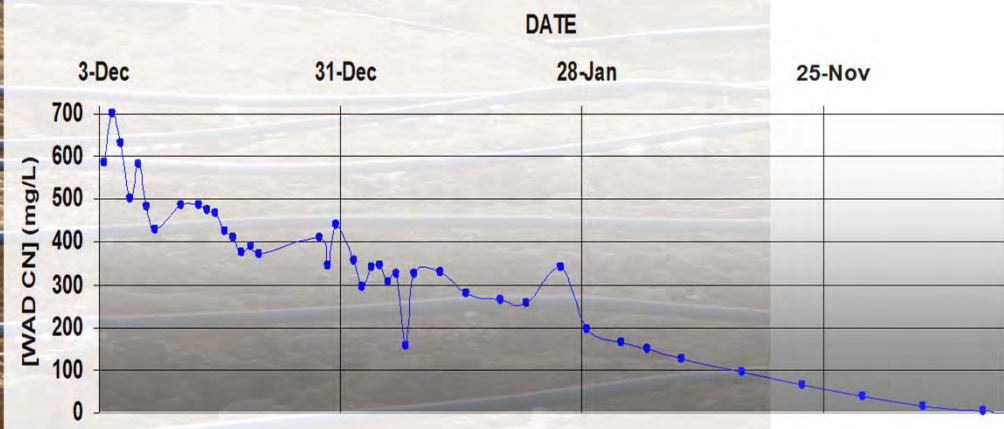
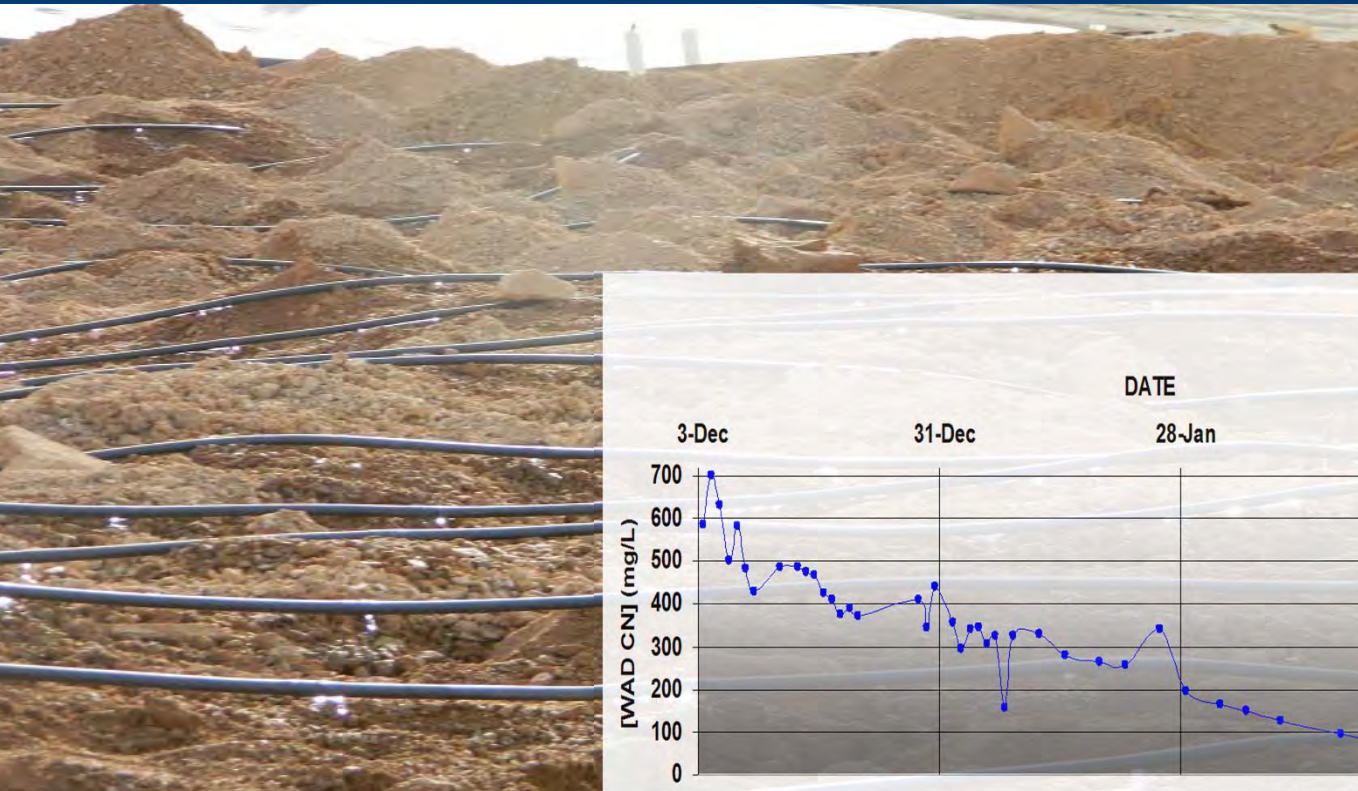
Arsenic and Uranium were not treatment targets. However, the EBR technology consistently removed As, U, and Hg to the lowest levels of all technologies compared



Parameter	Influent Range (µg/L)	Average Influent (µg/L)	Average EBR Effluent (µg/L)
As	16.0 – 28.0	21	4.0
U	15.05 – 44.42	30	2.8

# Situ Cyanide Degradation

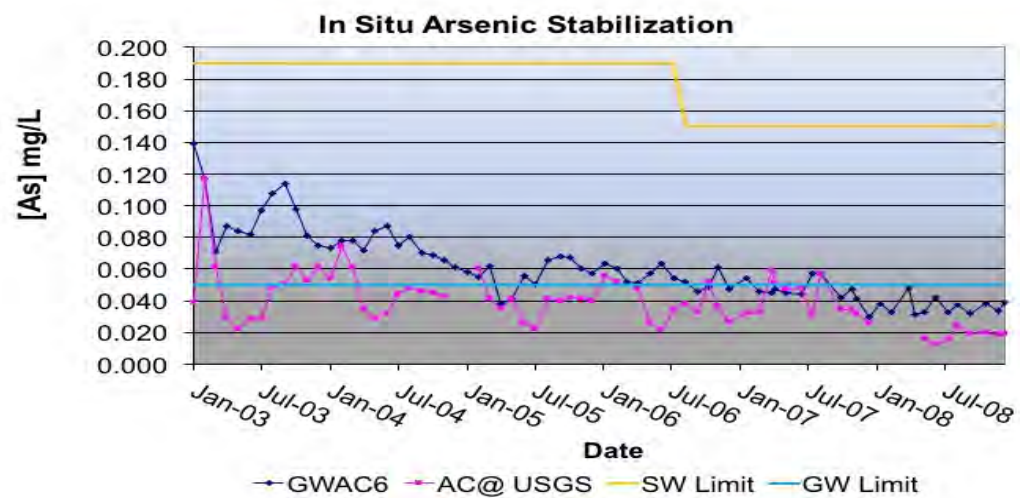
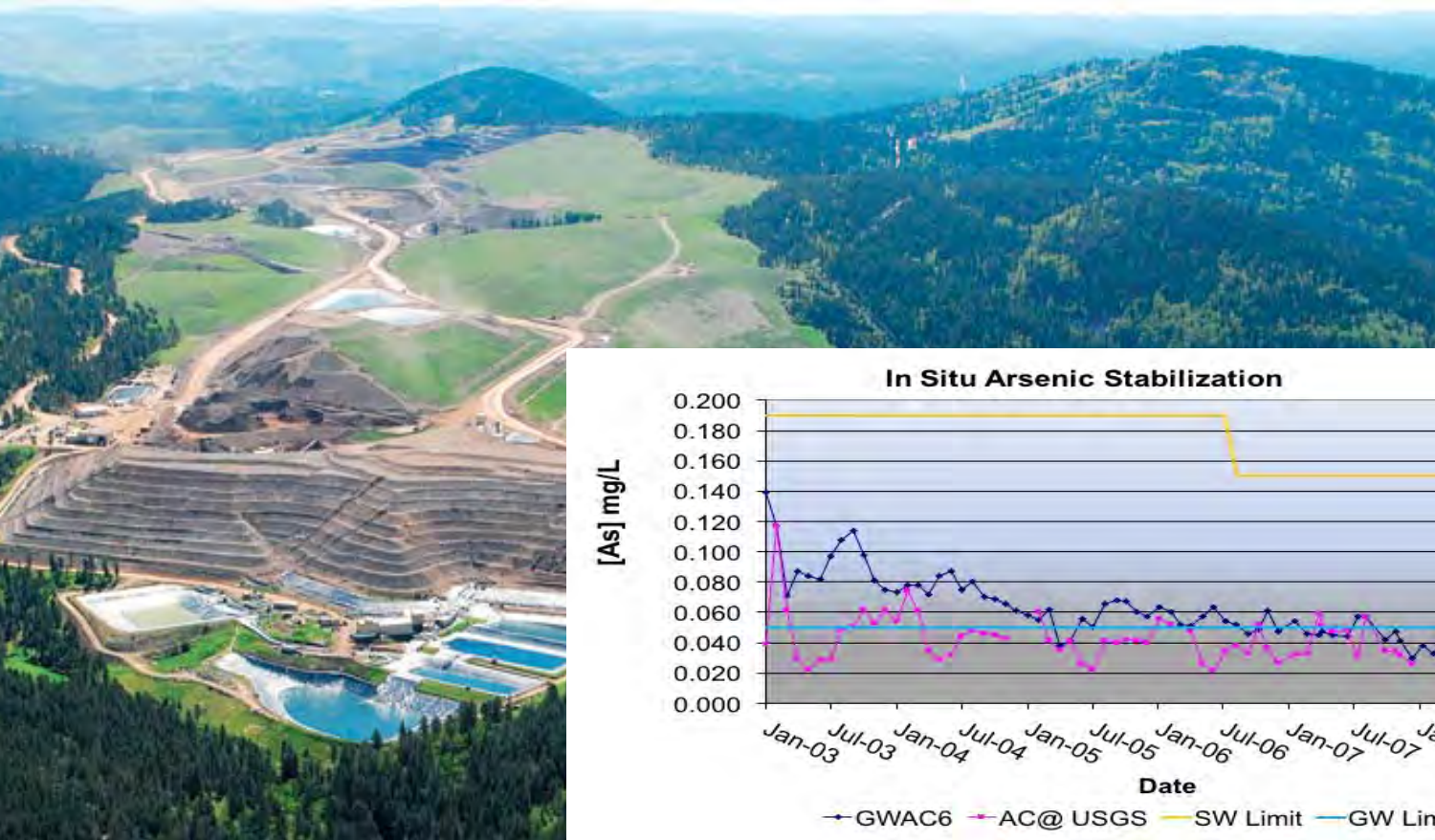
59



—●— WAD CN

# Harf Mine: In situ Arsenic Stabilization

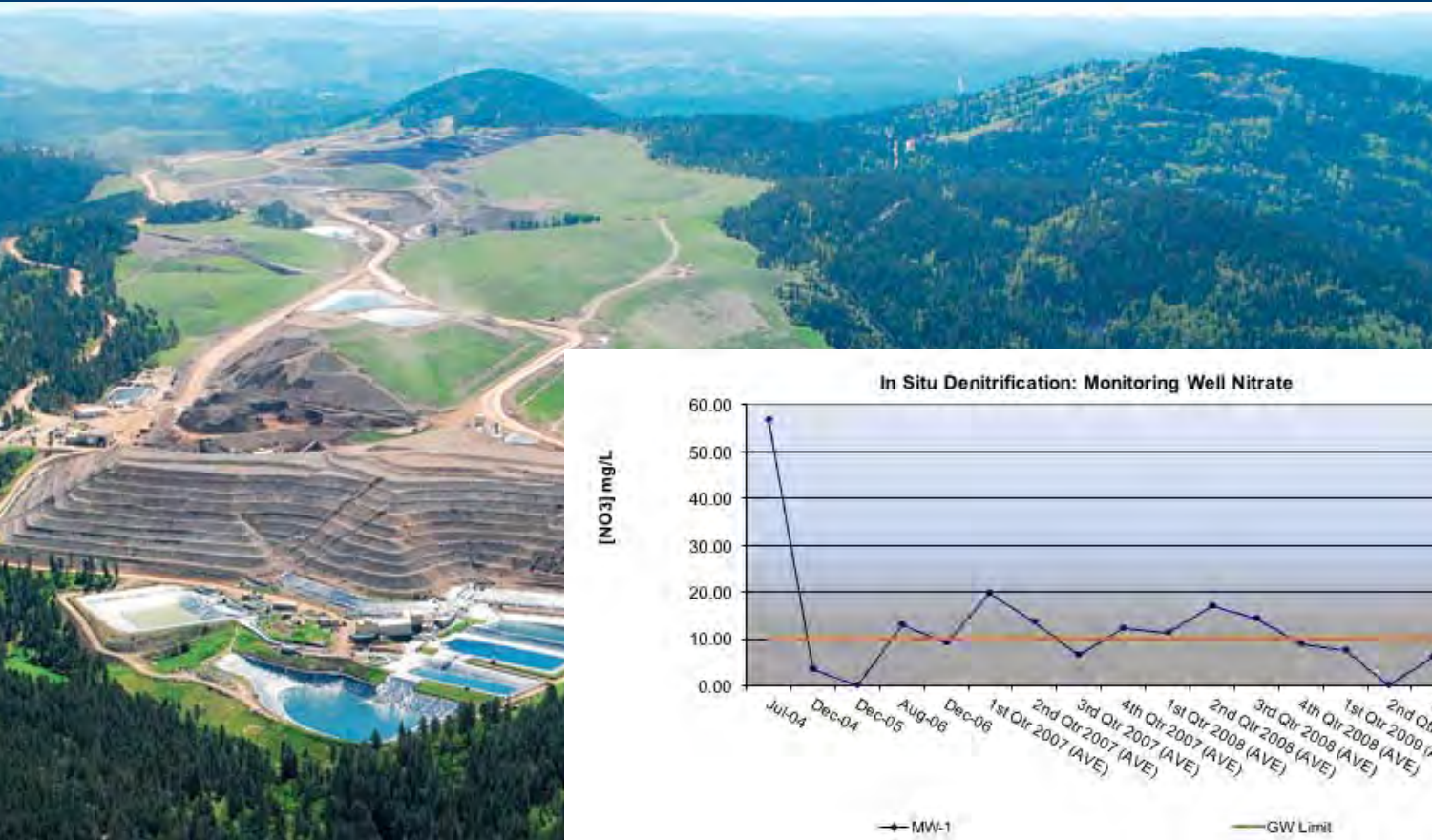
60



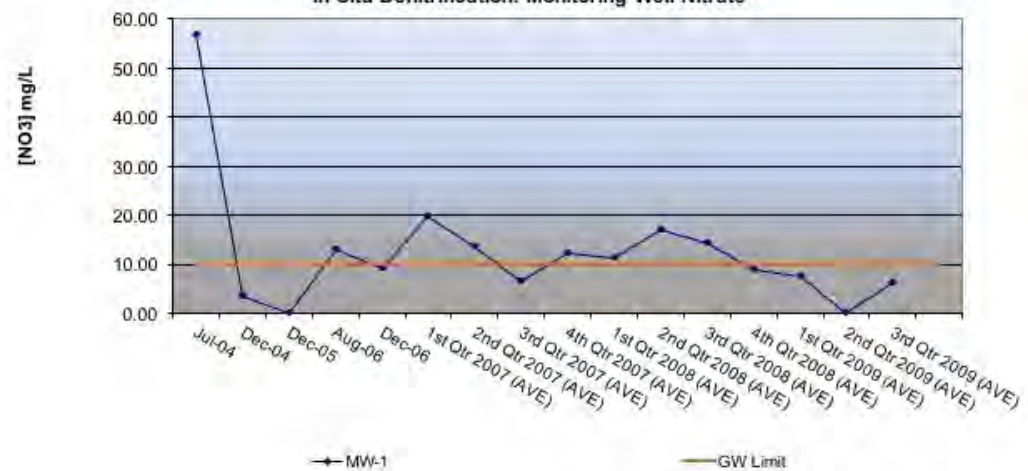


# arf Mine: In situ Denitrification

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In Situ Denitrification: Monitoring Well Nitrate







*C. dubia*



# Water Quality Objectives

Evaluation of Water Quality Objectives for key parameters of interest

Evaluation of Water Quality Objectives for uranium – a key parameter  
due to naturally elevated background concentrations in  
target streams

Proposed objectives for U are being evaluated and supported  
through detailed toxicity testing using site waters collected under  
different flow conditions (e.g. low flow – winter and open water - higher  
flow)

## Chemistry

Stream levels of uranium (U) are the highest in British Columbia and the Yukon (~100 µg/L) (CCME 2011)

Four valences are found in the aquatic environment U (III), U (IV),  $\text{UO}_2^+$ ,  $\text{UO}_2^{2+}$  (VI)

Hexavalent forms (U [VI]) are most common in the aquatic environment

Dissolved Organic Carbon (DOC) is known to form stable complexes with uranium in natural waters thus, decreasing its toxicity

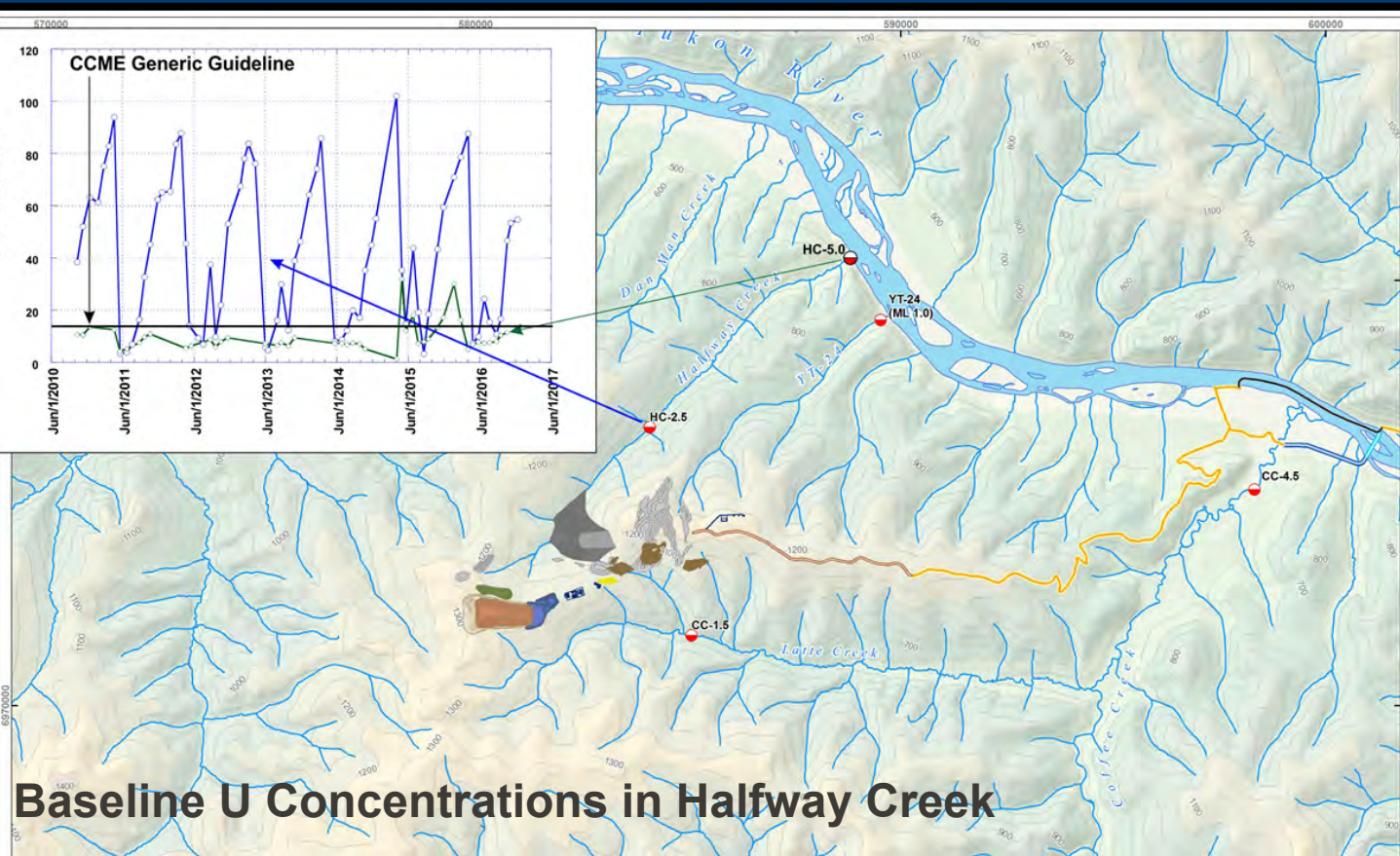
Salinity, hardness and pH may also decrease uranium toxicity

**Table Guidelines** – CCME (derived using Species Sensitivity Distributions)

Term = 15 µg U/L

Term = 33 µg U/L

# um Baseline Concentrations in the Project Area

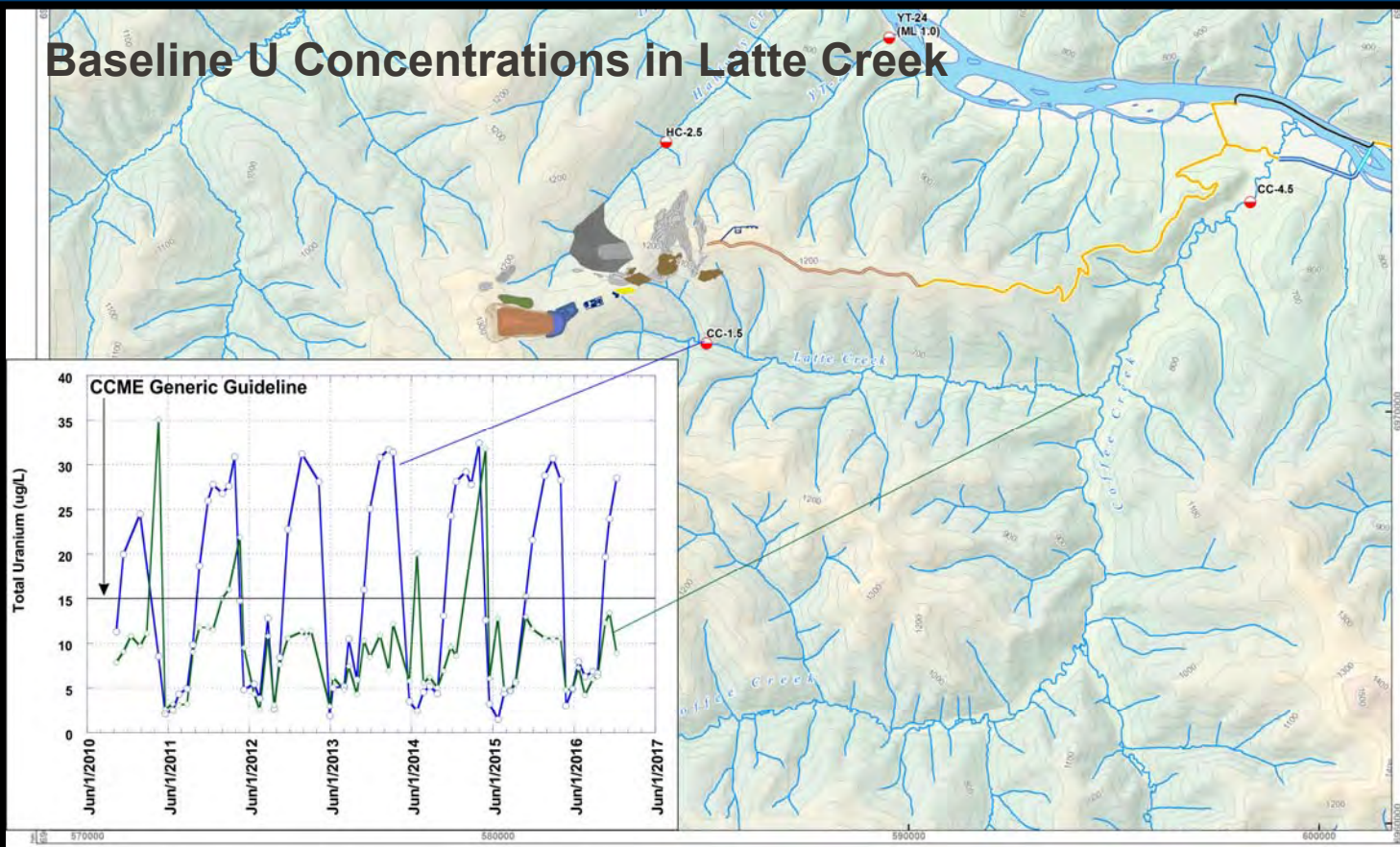


Baseline U Concentrations in Halfway Creek



# um Baseline Concentrations in the Project Area

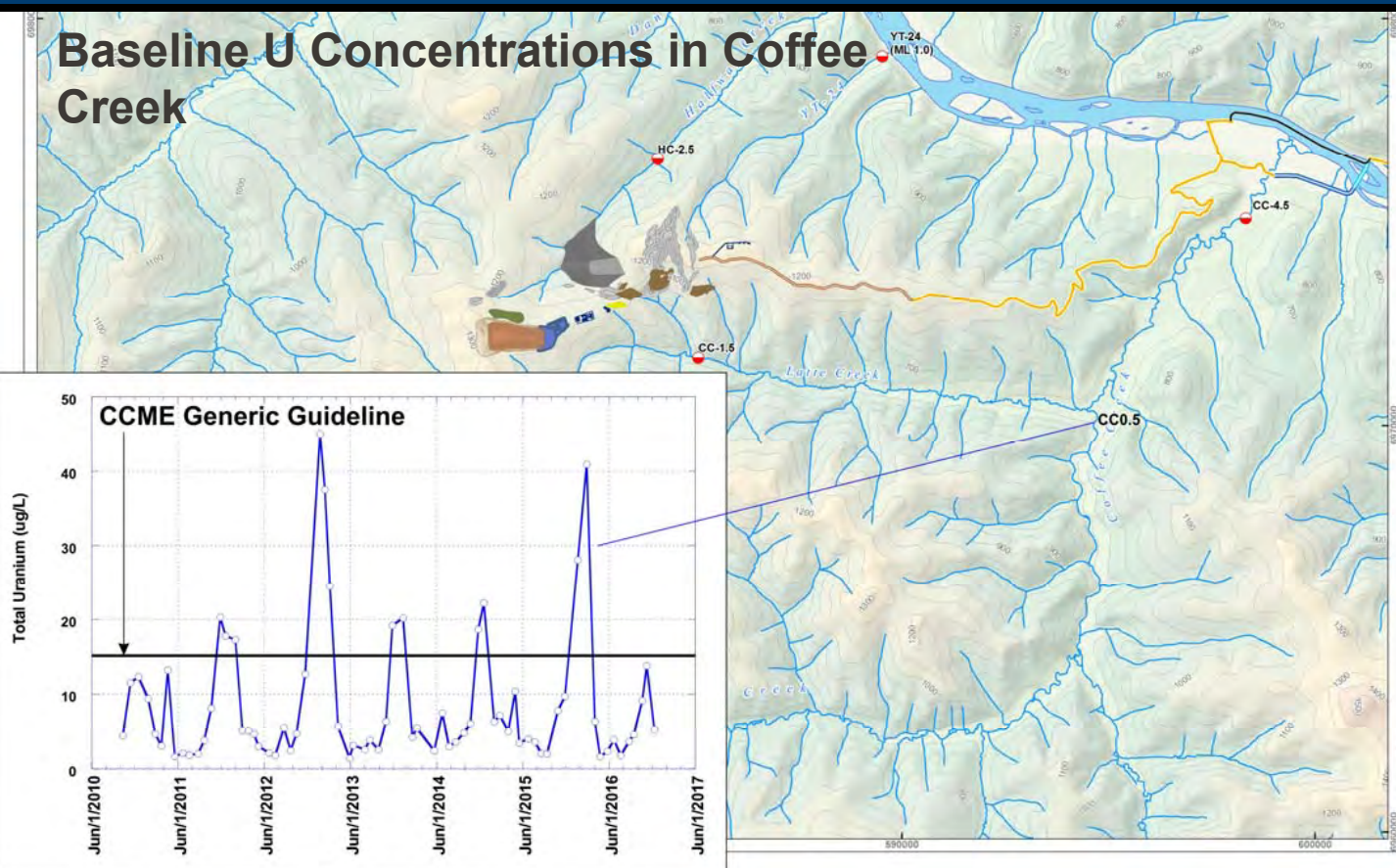
## Baseline U Concentrations in Latte Creek





# Uranium Baseline Concentrations in the Project Area

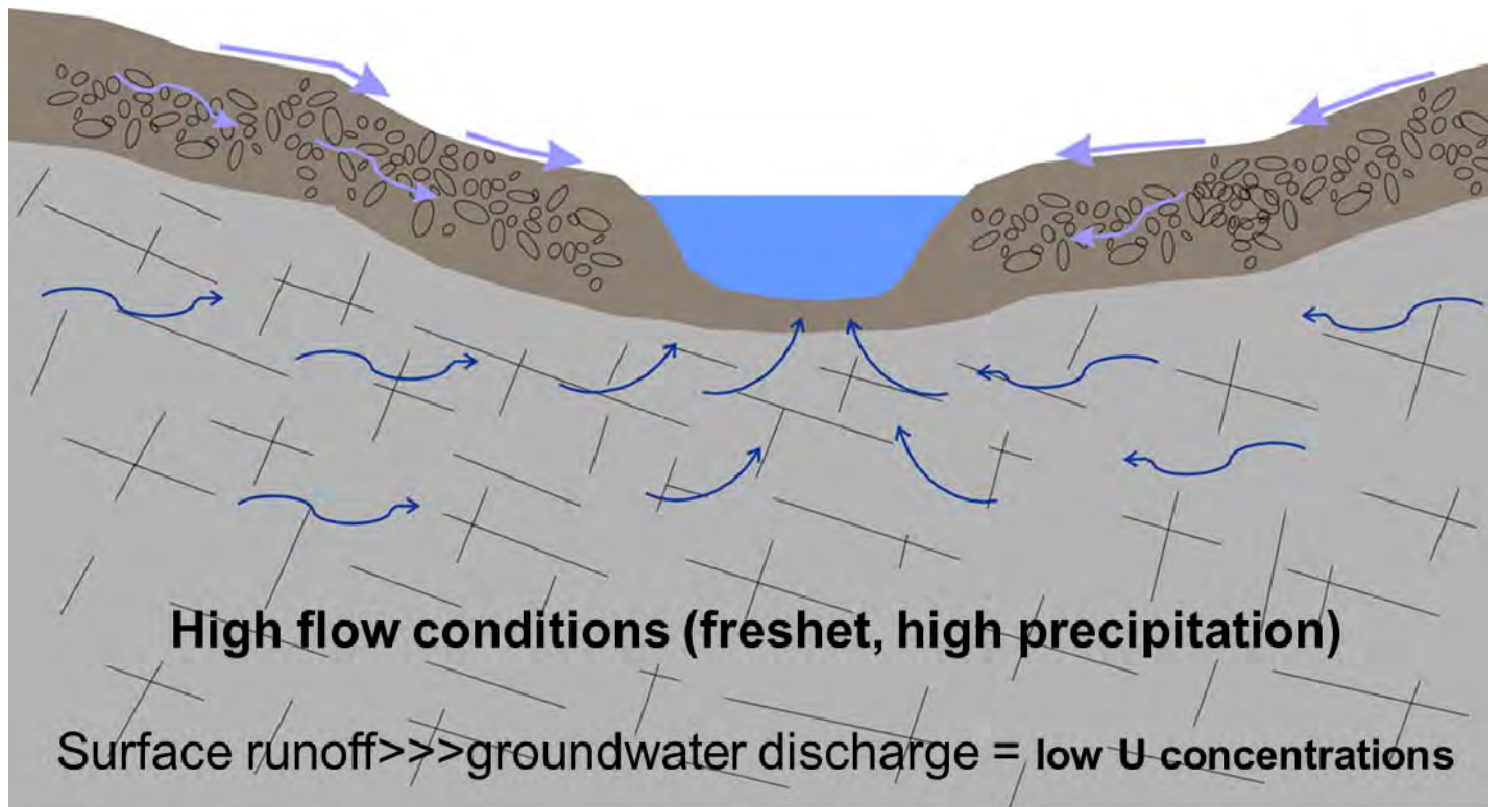
## Baseline U Concentrations in Coffee Creek



## What Causes Fluctuations in U Concentrations?

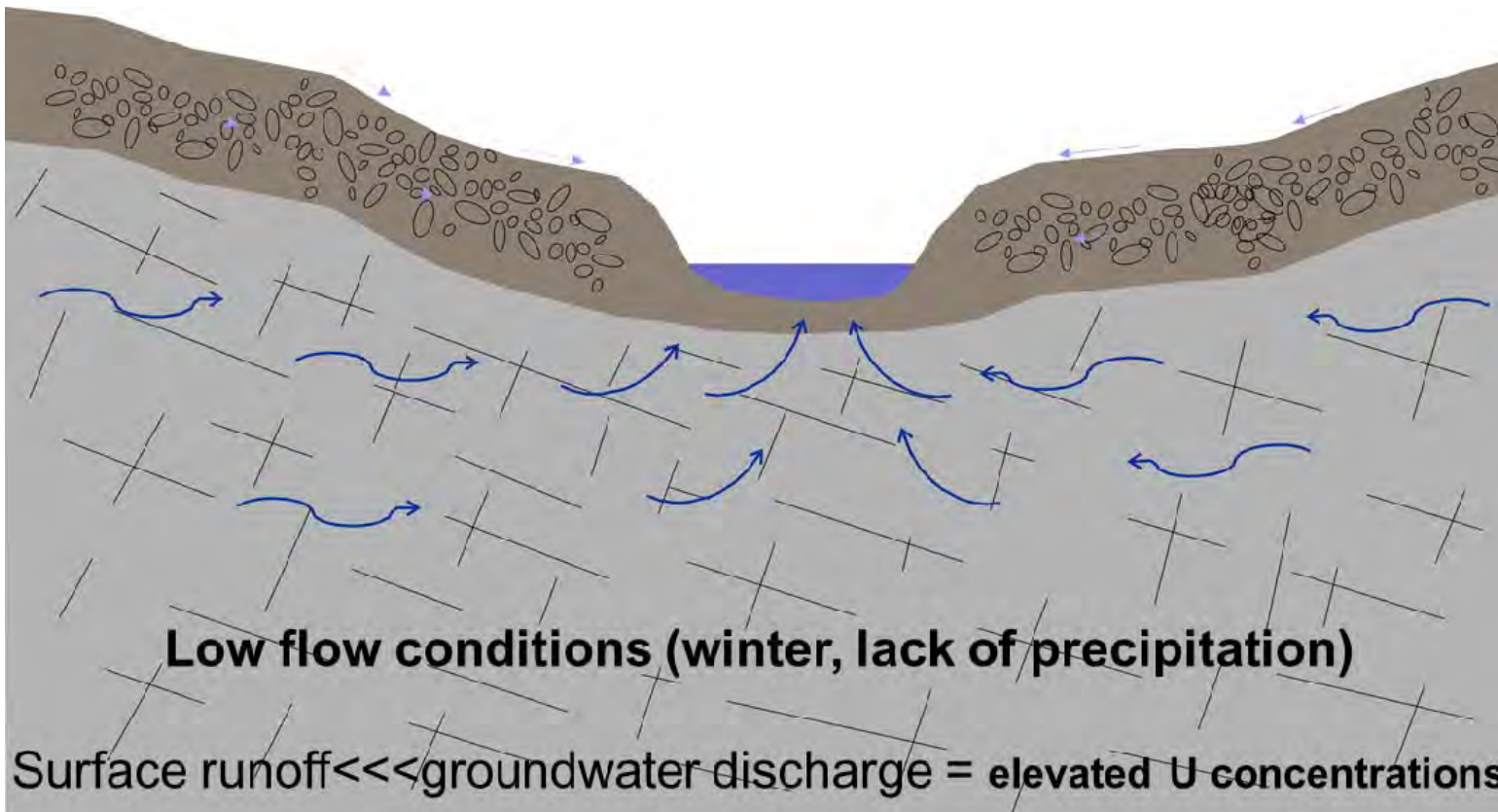
68

Changes in relative contributions of surface flow to groundwater discharge



## What Causes Fluctuations in U Concentrations?

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## Representative Stations - Baseline Data

70

Dewatering - intermittent

**Coffee Creek** – before  
confluence with Yukon River

**Creek** – downstream confluence  
of small tributary that receives  
intermittent pit dewatering. Before  
confluence with Coffee Creek

**Halfway Creek** – downstream of waste

**YT24**

0.6 to 2.8 µg/L

**Coffee Creek (CC4.5)**

1.2 to 3.8 µg/L

CCME; Non  
degradation

**Latte Creek (CC1.5)**

3 to 31 µg/L (25 of 54  
Samples above CCME)

**Halfway Creek (HC2.5)**

8 to 86 µg/L (38 of 57  
samples above CCME)

Water  
Quality  
Objectives

Approaches were used to develop water quality objectives as directed by CCME :

## Direct application of “generic” water quality guidelines

For those parameters with concentrations below generic water quality guidelines in the background

- *Examples include As, Cd, Hg, Se, Zn*

## Background Concentration Procedure

Number of parameters are present naturally at concentrations in excess of respective generic guideline. The CCME derivation protocol for water quality objectives is the use of the 95<sup>th</sup> percentile value

- Examples include U, Al, Cu, Fe



	Parameter List	Units	Halfway Creek	Latte Creek	YT-24	Regulatory Source
Dissolved Parameters	SO <sub>4</sub>	mg/L	218	309	218	BC WQO
	Nitrate-N	mg/L	3	3	3	BC WQO
	Nitrite-N	mg/L	0.02	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	1.91	1.63	1.91	BC WQO
	CN <sub>WAD</sub>	µg/L	5	5	5	BC WQO
	Al (diss)	µg/L	403	351	205	SSWQO
Total Metals	Sb	µg/L	9	9	9	BC WQO
	As	µg/L	5	5	5	CCME
	Cd	µg/L	0.11	0.13	0.1	CCME
	Cu	µg/L	3	3	3.4	SSWQO
	Fe	µg/L	1000	1000	1000	SSWQO
	Fe (dissolved)	µg/L	350	350	350	SSWQO
	Pb	µg/L	1.8	2.5	1.5	CCME
	Hg	µg/L	0.026	0.026	0.026	CCME
	Mo	µg/L	73	73	73	CCME
	Ni	µg/L	69	82	61	CCME
	Se	µg/L	2	2	2	BC WQO
	Ag	µg/L	0.25	0.25	0.25	SSWQO/CCME
	U	µg/L	86	31	15	SSWQO/CCME
Zn	µg/L	13	15	11	CCME (draft)	

Note: all metals and metalloids are as total unless otherwise noted

# Proposed Water Quality Objectives – Non Degradation

Parameter List	Units	Proposed Water Quality Objectives		CC-4.5 Generic Guideline (for comparison only)	YUK-5.0 Generic Guideline (for comparison only)	Regulatory Source for Generic Guideline	
		Coffee Creek CC-4.5	Yukon River YUK-5.0				
Dissolved Parameters	SO <sub>4</sub>	mg/L	77	25	218	309	BC WQO
	Nitrate-N	mg/L	0.6	0.2	3	3	BC WQO
	Nitrite-N	mg/L	0.05	0.05	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	0.04	0.03	1.91	1.02	BC WQO
CN <sub>WAD</sub>	µg/L	0.5 (DL)	0.5 (DL)	5	5	BC WQO	
Total Metals and Metalloids	Sb	µg/L	0.14	0.2	9	9	BC WQO
	As	µg/L	0.6	1.3	5	5	CCME
	Cd	µg/L	0.05	0.21	0.12	0.14	CCME
	Cu	µg/L	4.2 <sup>1</sup>	5.5 <sup>1</sup>	2.84	3.48	BC WQO
	Fe	µg/L	349	2066 <sup>1</sup>	1000	1000	BC WQO
	Pb	µg/L	0.21	1.1	2.06	2.66	CCME
	Hg	µg/L	0.01	0.01	0.026	0.026	CCME
	Mo	µg/L	0.74	1.3	73	73	CCME
	Ni	µg/L	1.5	4.6	73	86	CCME
	Se	µg/L	0.1	0.56	2	2	BC WQO
	Ag	µg/L	0.007	0.02	0.25	0.25	CCME
	U	µg/L	3.6	1	15	15	CCME
	Zn	µg/L	5.2	17 <sup>1</sup>	17	13.5	CCME (draft)
Dissolved Metals and Metalloids	Al	µg/L	263 <sup>1</sup>	45	50	50	BC WQO
	Sb	µg/L	0.12	0.12			
	As	µg/L	0.49	0.54			
	Cd	µg/L	0.031	0.06			
	Cu	µg/L	3.3 <sup>1</sup>	1.7			
	Fe	µg/L	203	59	350	350	BC WQO
	Pb	µg/L	0.055	0.06			
	Hg	µg/L	0.01	0.01			
	Mo	µg/L	0.68	1.25			
	Ni	µg/L	1.3	1.7			
	Se	µg/L	0.12	0.5			
	Ag	µg/L	0.005	0.005			
	U	µg/L	3.8	1			
Zn	µg/L	2.2	2.8				

Yukon River and Coffee  
Creek

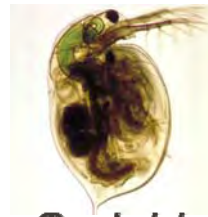
All values for CC-4.5 and YUK-5.0 are 90th percentile of data unless otherwise noted.  
1: based on 95th percentile of data  
DL = detection limit

## Toxicity to Aquatic Biota

Fish - Acute >1,600 µg/L; Chronic > 350 µg/L

Invertebrates - Acute and Chronic ~ 73 µg/L

Algae – Chronic (growth) > 40 µg/L



*C. dubia*

Most sensitive organism to U exposure (CCME 2011)

## Acute Toxicity Studies using *Ceriodaphnia dubia* (Water Flea)

Surface water exposure

CC1.5 - 31 µg/L no survival or reproductive effects

HC2.5 – 78 µg/L no survival or reproductive effects

Surface water collected during June period spiked with U (0 to 351 µg/L)

DOC – 9.8 mg/L

No survival threshold calculated due to lack of toxicity at exposure concentrations (up to 351 µg/L)

Reproductive threshold IC25 > 351 µg/L

**Toxicity Test Using 3 Aquatic Species**

Species: rainbow trout fry (*Oncorhynchus mykiss*)

Invertebrates: *C. dubia*

Algae: *Pseudokirchneriella subcapitata*

**Acute Toxicity Test**

Site water, invertebrate and algae were exposed to collected site water (winter conditions, low DOC) from CC1.5 and HC2.5 plus laboratory control. Endpoints included survival (acute) for all species; reproduction (chronic) for *C. dubia*; and growth (chronic) for algae and rainbow trout fry

Chromium spiked site water (Only for *C. dubia*) with concentrations up to 1,000 µg/L, in addition to laboratory control. Endpoints included: Survival (acute) and reproduction (chronic)



Rainbow trout



*C. dubia*



*P. subcapitata*

## Toxicity Test Results

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Water exposure - all species

CC1.5 - 32 µg/L no survival; no reproduction or growth effects

HC2.5 – 86 µg/L no survival; no reproduction or growth effects

Measured U in site water collected during winter period for *C. dubia*

DOC – 4.5 mg/L

Endpoint		CC1.5	HC2.5
<b>Survival</b>		U Concentration (ug/L)	
LC50	Lethal Concentration	> 1,066	> 1,115
NOEC	No Observed Effect Concentration	1,066	1,115
<b>Reproduction</b>		U Concentration (ug/L)	
IC25	Inhibitory Concentration	359.9	521.9
NOEC	No Observed Effect Concentration	381	446.5



**Proposed water quality objective of 31 and 86 µg/L is supported by:**

Naturally occurring conditions particularly when stream flows are low

Toxicity test using *C. dubia* indicates no acute or chronic effects at concentrations > 1,066 µg/L and 381µg/L, respectively

**Further testing to be conducted using site water during the open water period (high DOC) with *C. dubia***

**Toxicity test using metal mixtures for metals of interest**

## Discussion and TH presentation of views

- proposed SSWQOs
- effects assessment/water quality modelling predictions
- principles and methods for deriving SSWQOs for Halfway Creek, Latte Creek, YT-24, and Yukon River
- work plan for deriving SSWQOs



# QUESTIONS & DISCUSSION

Thank you

Contacts:

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General Manager

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**Merine Tegelberg**  
Superintendent, Corporate Social Responsibility

318-0528  
[Merine.Tegelberg@goldcorp.com](mailto:Merine.Tegelberg@goldcorp.com)



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We look forward to working  
with Yukon Communities

# MINUTES

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project  
June 13, 2017**

**Location:** Best Western Hotel, General Store Room, Whitehorse

**Time:** 9:00am – 10:30 am

**Participants:**

**Tr'ondëk Hwëch'in (TH)**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

**Chairperson:** Goldcorp

Meeting commenced at 10:00am  
[Name Redacted] recorded the minutes

## **Project Development**

1. Opening Prayer

[Name Redacted] said an opening prayer.

2. Introductions / Sustainability / Safety / Personal Shares

Aware of surroundings safety share.  
Water safety share.

3. Review of Today's Agenda and Approval of Project Engagement Minutes and Action Items of the May 2<sup>nd</sup>, 2017 Meeting

Agenda – move 5(c) to last item on the negotiation agenda tomorrow  
Minutes – no issues.



# MINUTES

## 4. Project Update [Buddy/Roger]

Goldcorp provided a project update. TH asked if there are options to extend the EPC beyond two years of construction. Goldcorp responded that it is not in the current draft of the contract.

Employees hired will be JDS employees during construction, they would then be let go at the end of the contract and re-hired by Goldcorp. TH noted that they don't know JDS and feel there will need to be more discussion on JDS moving forward. They don't know what the values of JDS are or what their reputation is. Goldcorp noted that they are a contractor of Goldcorp and they will have to work to Goldcorp's values and standards. Anything they do with respect to policies, procedures will have to follow Goldcorp's procedures and guidance.

## 5. Items for Discussion

### a. Northern Access Route Conversations with Yukon Government [Roger / Chief Joseph]

TH, Yukon Government (YG) and Goldcorp met a few weeks ago and discussed the necessity of having a group meeting to discuss the road. A meeting date has been proposed (June 22<sup>nd</sup>) as YG and Goldcorp will be in Dawson. In attendance will be the [Name Redacted]

ACTION – TH to inform Goldcorp of availability to meet in regards to the road on June 22<sup>nd</sup> in Dawson.

None of the direct TH/Goldcorp discussions on the road need to stop, but it is felt that now is the time to bring YG into the equation as well. TH noted that road to resource royalty application is what they are working with YG on at the moment. Goldcorp's does not want to engage in that discussion if possible and only discuss the Northern Access Route.

TH brought up the three potential options for management, does Goldcorp have a preference? Goldcorp doesn't want to manage the road. TH asked if the road options have been discussed with YG? Goldcorp noted that yes that conversation has happened and YG agrees that Goldcorp management is not the preferred option. Goldcorp will control the barges, but that is all.

The road memo last week addresses TH's current views and concerns around the assessment of the two routes. Goldcorp reaffirmed the fact that Black Hills is extremely difficult technically and it would be a challenge for Goldcorp to make that work in not only construction but also operationally.

ACTION – TH will provide a comparative analysis of the route. TH will provide this to Goldcorp tonight for review and discussion tomorrow.

ACTION - Goldcorp and TH will schedule an on the ground tour of the road.

### b. Batch 2 vs Final Application Comparison [Name Redacted]

Feedback has been provided on all information requests (IRs). [Name Redacted] has provided a number of resolved and unresolved IRs.

# MINUTES

ACTION – TH will follow up to see if any other unresolved IRs need addressing.

c. Upcoming Technical Meetings [Name Redacted]

Goldcorp asked for technical meeting feedback. TH noted that the workshops help provide understanding. There has been mixed feedback in terms of responding to IRs and that information may still be missing. TH noted that it was mentioned at the last workshop that feedback on ways to improve them could be addressed. TH mentioned that there has been a lot of talking at each other, mainly because TH needed to learn more about the information at the workshop. TH said we are at a point where we can begin engaging and moving forward collaboratively on key issues of concern.

Goldcorp suggested that there has been lots of good discussion in regards to water. A position needs to be provided on what can and can't be further engaged on. Goldcorp doesn't want the consultants to have all the discussions, they need to have Goldcorp and TH at the table as well as in the end that is where the relationship sits. Outstanding workshops include heap leach, permafrost and site design. Goldcorp and TH need to have a collaborative workshop on all things considered in regards to waste and water on site. TH wants to set objectives for the technical sessions so that they are less of an information exchange and more of a plan for a work product of each meeting. Management Plan and VCs still require discussion as well.

ACTION – Goldcorp to provide an outline document on next steps as it relates to technical discussions (e.g. water, road, reclamation and closure). As well, setting up workshops for heap leach, permafrost and site design. Discussions to take place on approach of management plans and valued components.

Goldcorp asked if they should be expecting IRs from last weeks' technical sessions and TH noted they would look into that.

ACTION – TH will send a timeline on information requests from last weeks' technical session.

ACTION – Goldcorp will send TH action items from the technical sessions.

TH asked what the plan B is if the water treatment approach isn't viable and is it scalable to deal with heap and waste water. Goldcorp noted that during operations it would work but it may not in closure.

d. Next Advisory Committee Meeting [Name Redacted]

TH provided information about the advisory committee meeting that took place last week. Pad building RFP was awarded to a Chief Isaac Inc. partner Back Country Resources. The next RFP will be for a drilling contract. Goldcorp would like to know who else should be sitting on the committee.

ACTION – TH will put a name forwards to be added to the Advisory Committee.

ACTION – Goldcorp will send dates to Pat for an Advisory Committee meeting at the end of August.

# MINUTES

ACTION – Goldcorp will send out notes from Advisory Committee Meeting to the negotiations team.

## 6. Upcoming Tr'ondëk Hwëch'in Citizens Meetings & Site Tour [[Name Redacted]]

Open house will include reclamation, project update, road and mine design. 5:30 pm on June 20<sup>th</sup>.

ACTION - Goldcorp will share the tour schedule include attire (close toed shoes, layers) today.

ACTION – TH will send the list of site tour attendees tomorrow.

TH commented on the letter to YESAA and felt it wasn't necessary to include that TH isn't allowing Goldcorp to meet with citizens in the letter. TH feels that isn't the case as they allow Goldcorp to do open houses and the opportunity to speak at the General Assembly. TH noted that there is a signed confidentiality agreement and they are not sure why Goldcorp included that consultation and implementation funding is being provided to TH in the letter. TH is either in consultation with other Governments or the other party at the table, they represent themselves and note that they are responsible for consulting with their citizens not the proponent.

Goldcorp would rather deal with issues face to face rather than sending letters into the public space. It was noted that the two groups can go back and forth in regards to points put in the letter but those issues should be dealt with at these meetings rather than through letters to YESAB.

TH felt it was important to raise this at the meeting for that very purpose. There isn't interest in a relationship where there is dialogue that is undiscussed. TH entered the letter into public space so they are on the record. TH is participating in all environments created (technical review, negotiations, etc...) and it is felt that the statement about not allowing engagement with the citizens is untrue. Information that TH citizens get about the mine is not just at meetings that Goldcorp is holding, but TH is also hosting meetings with the citizens and the TH technical consultants. TH was surprised to see that in the letter and that we were not aligned on that as they thought we were making progress.

Goldcorp feels pushback from TH every time a meeting is set-up with citizens. Goldcorp's perspective is that there isn't enough engagement with citizens and that issues may come up at the TH citizens meetings that isn't passed along as there are no Goldcorp representatives in the room. Goldcorp finds the open houses valuable on a relationship building level but a presentation style would be better for information sharing on the project and hearing citizen's issues and concerns directly.

TH said the consultation happens between the citizens and their technical team rather than Goldcorp and its technical team. The issue for TH around consultation is that Kaminak's citizens meetings that took place last year were referred to as consultation. TH doesn't feel that is consultation. There was no detailed information, everything was based on PowerPoints. If Goldcorp doesn't consider the presentations as consultation and rather as information sharing sessions TH is open to that but say they cannot be considered as legal consultation with community. Chief and Council took the project out of the TH staff's hands and established the new negotiation team and processes.

# MINUTES

7. Preparation of Next Project Engagement Meeting
  - a. Agenda – will be discussed tomorrow
  - b. Date (Vancouver)
  - c. Chairperson

Lunch break 12:22pm

# MINUTES

**White River First Nation – Goldcorp  
Coffee Project  
June 16, 2017**

**Location:** Vancouver Goldcorp Office, 31<sup>st</sup> Floor, Meeting Room J

**Time:** 10:00am – 2:00 pm

**Participants:**

**White River First Nation**

[Name Redacted]

**Coffee Project – Goldcorp Inc.**

[Name Redacted]

[Name Redacted]

The meeting commenced at 10:00 am  
Reesa Meltzer recorded the minutes

## **Project Development**

1. YESAB Submission – Goldcorp’s Perspective  
March 31<sup>st</sup> submission date.
2. Project Update  
Goldcorp gave a project update including safety rate, permitting timeline, exploration, demographics, EPC status.  
WRFN asked if it is 18 months to the decision date in the YESAB process and Goldcorp noted that yes, which is what is estimated.  
WRFN asked if there is a JV for drilling and who the drilling company is?  
Goldcorp mentioned that there will be a drilling RFP coming out later in the year for 2018 and that a pad building RFP was awarded to Back Country Resources.  
WRFN asked who is doing camp catering and will that be an RFP? Goldcorp noted that CII has that contract and that won’t be an RFP in the near future.
3. Technical Workshops  
Goldcorp is offering technical workshops in mine closure, permafrost, heap leach, water, and road if WRFN is interested in those. WRFN is currently working on their submission for adequacy and should have it by June 20<sup>th</sup> for review. The document is extensive and review has been a focus for WRFN. Goldcorp can send some dates for these meetings if



# MINUTES

there is an appetite for that. WRFN will finish reviewing and understand what the gaps are before they engage in the technical workshops. Down the road they will look at the need for more specific technical information.

4. Community Meeting

Goldcorp extends the offer to hold community meetings to present technical information or a project update. WRFN doesn't think a community meeting will happen any time soon. There is a General Assembly on September 9<sup>th</sup> which also falls on the date of an election.

5. Next Meeting Dates and Location

Not discussed.

6. Other

NA

# AGENDA

## Tr'ondëk Hwëch'in – Goldcorp Coffee Project Site Tour June 20, 2017

**Location:** Coffee Camp

**Participants:**

Tr'ondëk Hwëch'in (TH)  
[Name Redacted]

Coffee Project – Goldcorp Inc.  
[Name Redacted]

### Project Engagement

Time	Description	Participants
6:30 – 7:42am	Alkan Air Charter Flight   Whitehorse to Dawson City	[Name Redacted]
8:15 – 8:36 am	Alkan Air Charter Flight   Dawson City to Coffee Site	[Name Redacted]
9:45 – 10:06 am	Alkan Air Charter Flight   Dawson City to Coffee Site	TBC
10:20 – 11:00 am	Safety Orientation	All
11:00 am – 12:30 pm	Camp Tour & Lunch <ul style="list-style-type: none"><li>• Exploration overview</li><li>• Tour (core shack, camp facilities, barge landing)</li></ul>	All
1:00 – 3:30 pm	Helicopter Tour of Coffee Project area <ul style="list-style-type: none"><li>• Site layout (pits, heap leach, rock storage, camp, etc...)</li><li>• Time permitting fly-over of road portions close to site</li></ul>	All
3:30 – 3:55 pm	Alkan Air Charter Flight   Coffee Site to	TBC

# AGENDA

	Dawson City	
5:00 – 5:25 pm	Alkan Air Charter Flight   Coffee Site to Dawson City	[Name Redacted]
5:50 – 7:00 pm	Alkan Air Charter Flight   Dawson City to Whitehorse	[Name Redacted]

### Dress Code

Please note that temperatures at the sites during this time are forecasting to be between 5°C and 20°C. Layered clothing and a light winter jacket is recommended to accommodate the fluctuation in temperatures.

### PPE

Steel-toe boots and the Golden Guide are PPE items to be brought by each visitor, all other PPE required for the tour will be provided by the site.

# AGENDA

**Tr'ondëk Hwëch'in – Goldcorp  
TH Citizens Open House  
June 20, 2017**

**Location:** TH Hall, Dawson

**Time:** 5:30 pm doors open

**Tr'ondëk Hwëch'in (TH)**  
Citizens

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

**Agenda:**

1. **Dinner is served at 6:00 pm**
2. **Welcome and introductions**
3. **TH Citizens and Goldcorp representatives are free to mingle and discuss the Project, including information packages**

**Information Package Contents (Dawson Community Meeting Presentation):**

1. **Project Overview, including Project Description and Mine Design**
2. **Northern Access Route Design and Management**
3. **Reclamation and Closure**



# Dawson Community Meeting Northern Access Route, Water Quality, and Reclamation & Closure

June 19, 2017

 **GOLDCORP**



- **Introductions**
- **Northern Access Route**
  - Proposed Route
  - Access Route Management
- **Reclamation and Closure**
  - Reclamation and Closure Overview
- **Water Quality**
  - Surrounding Catchments
  - Water Quality Objectives

- [Name Redacted]

- **Goldcorp is a leading gold producer focused on responsible mining practices with safe, low-cost production throughout North and South America:**
- **Canadian company headquartered in Vancouver**
- **Over 15,000 employees worldwide**
- **Primary product is gold, with silver, copper, zinc and lead by-products**
- **Committed to responsible mining practices and well positioned to deliver long term value**

## Overview of Goldcorp Locations



# Goldcorp's Vision & Values





**Goldcorp subscribes to a number of industry initiatives to ensure we operate in accordance with industry best practice on environmental, safety, community and security issues.**

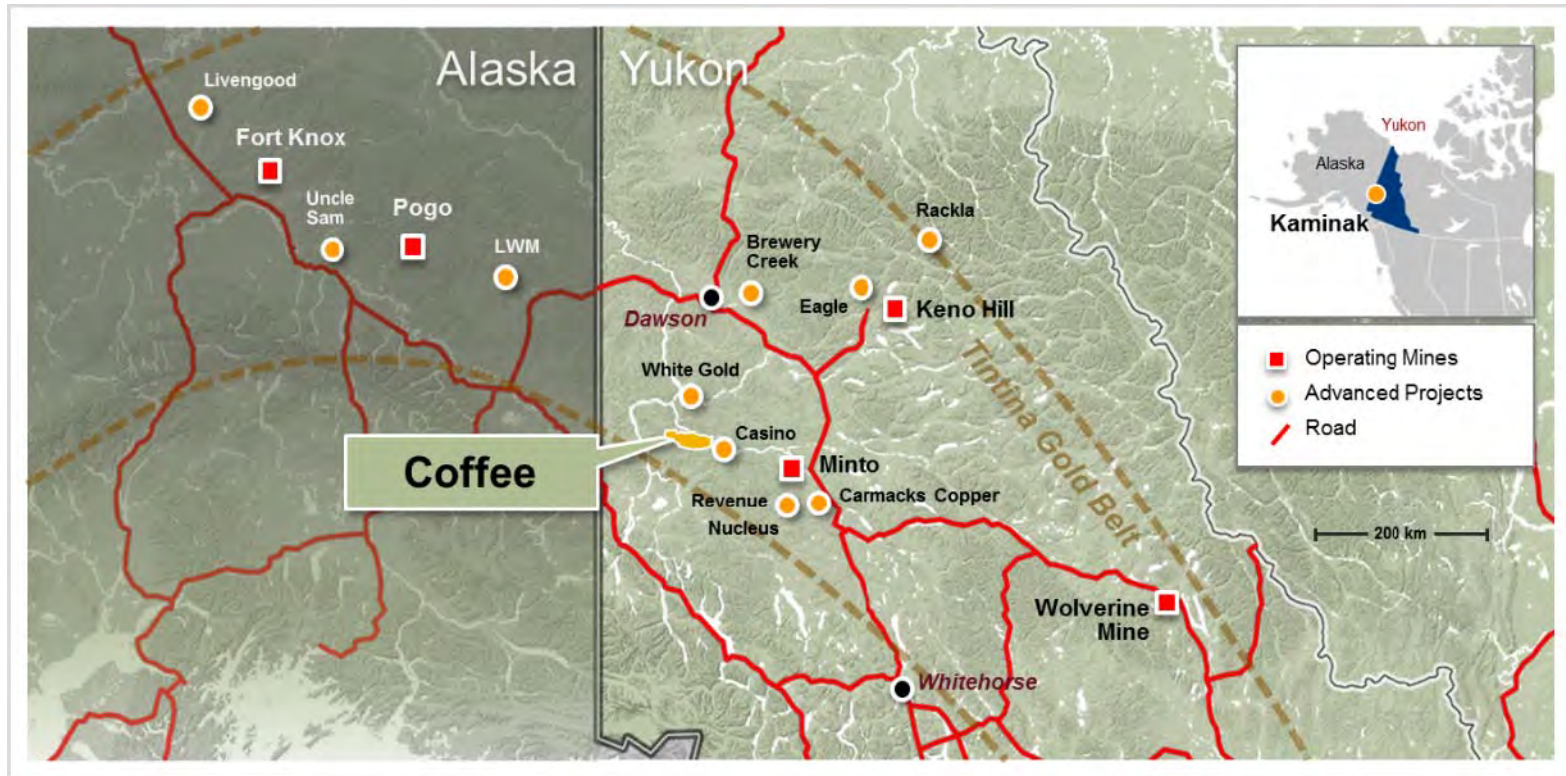




All Goldcorp sites (including Coffee) must implement the Sustainability Excellence Management System (SEMS):

- **Integrated approach to safety, environmental, social and security performance that adheres to best practice**
- **Covers topics such as:**
  - Water management
  - Tailings management
  - Local employment and procurement
  - Risk and impact management
  - Community investments
- **Follows the “Plan, Do, Check, Improve” formula to ensure continuous improvement**
- **Rigorous compliance and accountability process through audits, site self-assessments and internal and external reporting**

# Coffee Project Location



## Project Overview

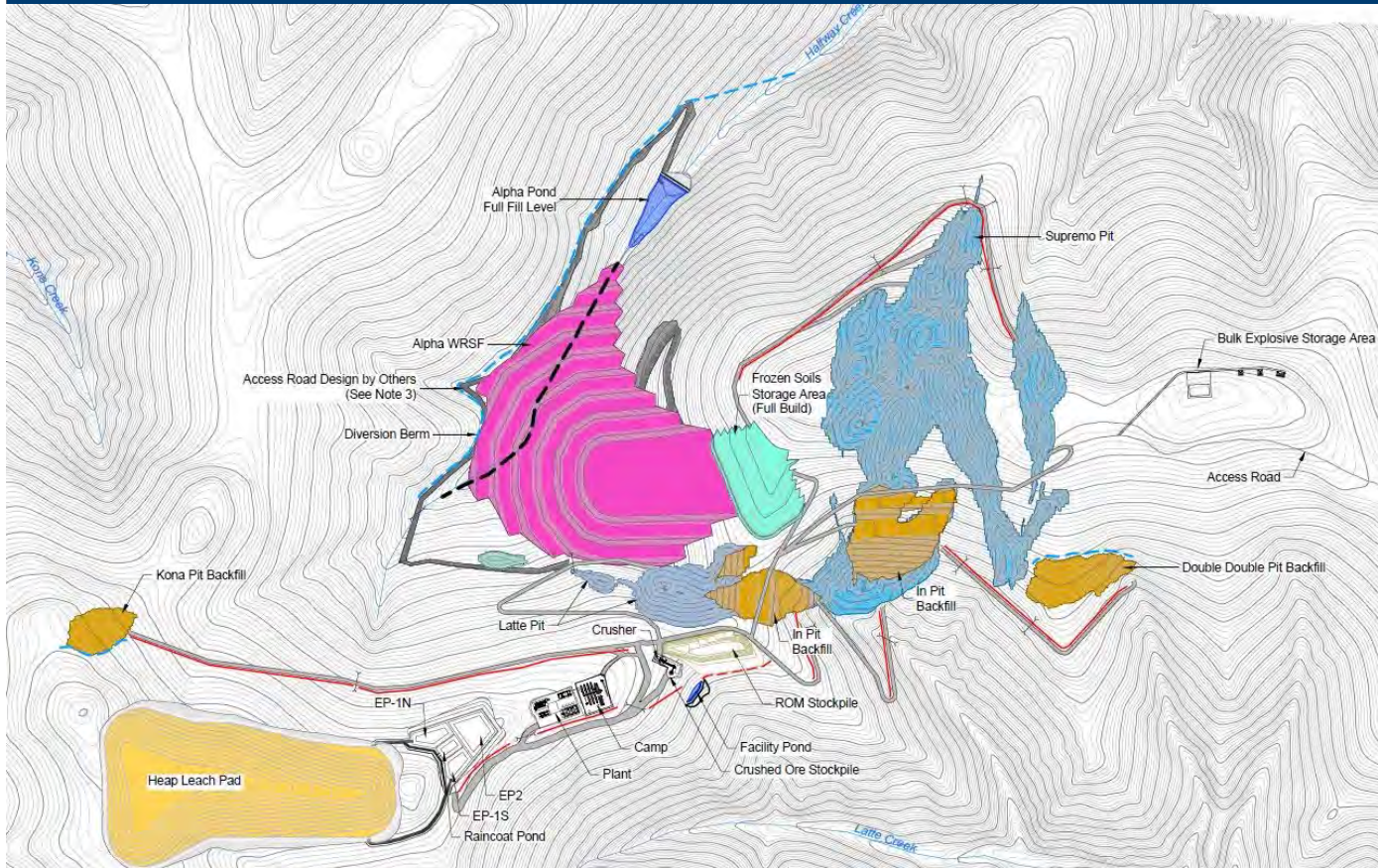
### **Mine Site:**

- Expected 10-12 year mine life with additional 11 year closure period
- Ore is processed by cyanide oxide heap leach process on a conventional pad
- Open pit, conventional truck-and-shovel operation, looking at fleet automation

### **Employment:**

- Over 400 people during construction, approximately 320 people during operations
- 2-weeks-on, 2-weeks-off, primarily transported via air from Whitehorse or Dawson

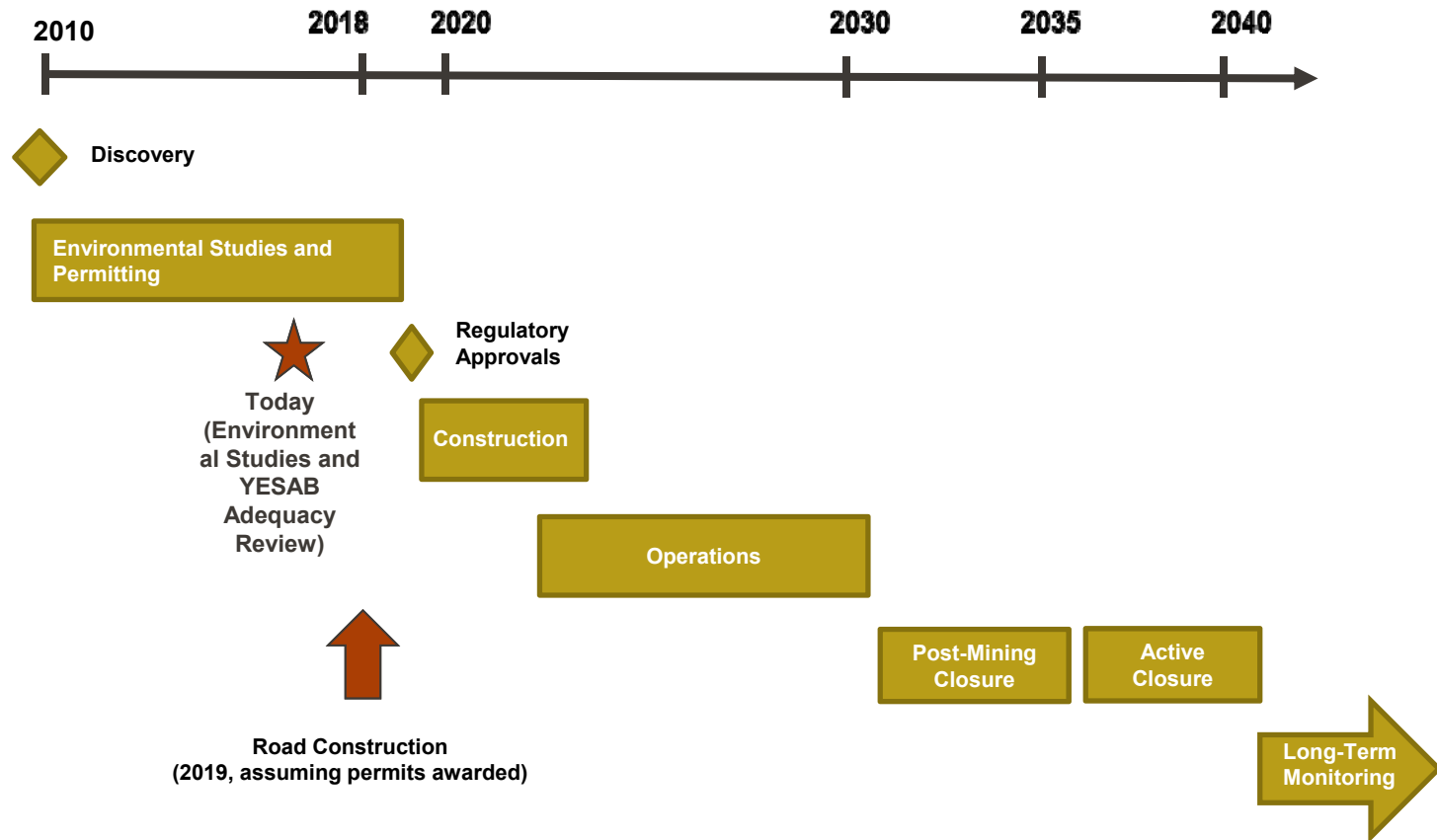




- 4 open pits
- Heap Leach Facility
- 1 Waste Rock Storage Facility
- 4 In-pit backfill areas
- Soil stockpiles for reclamation



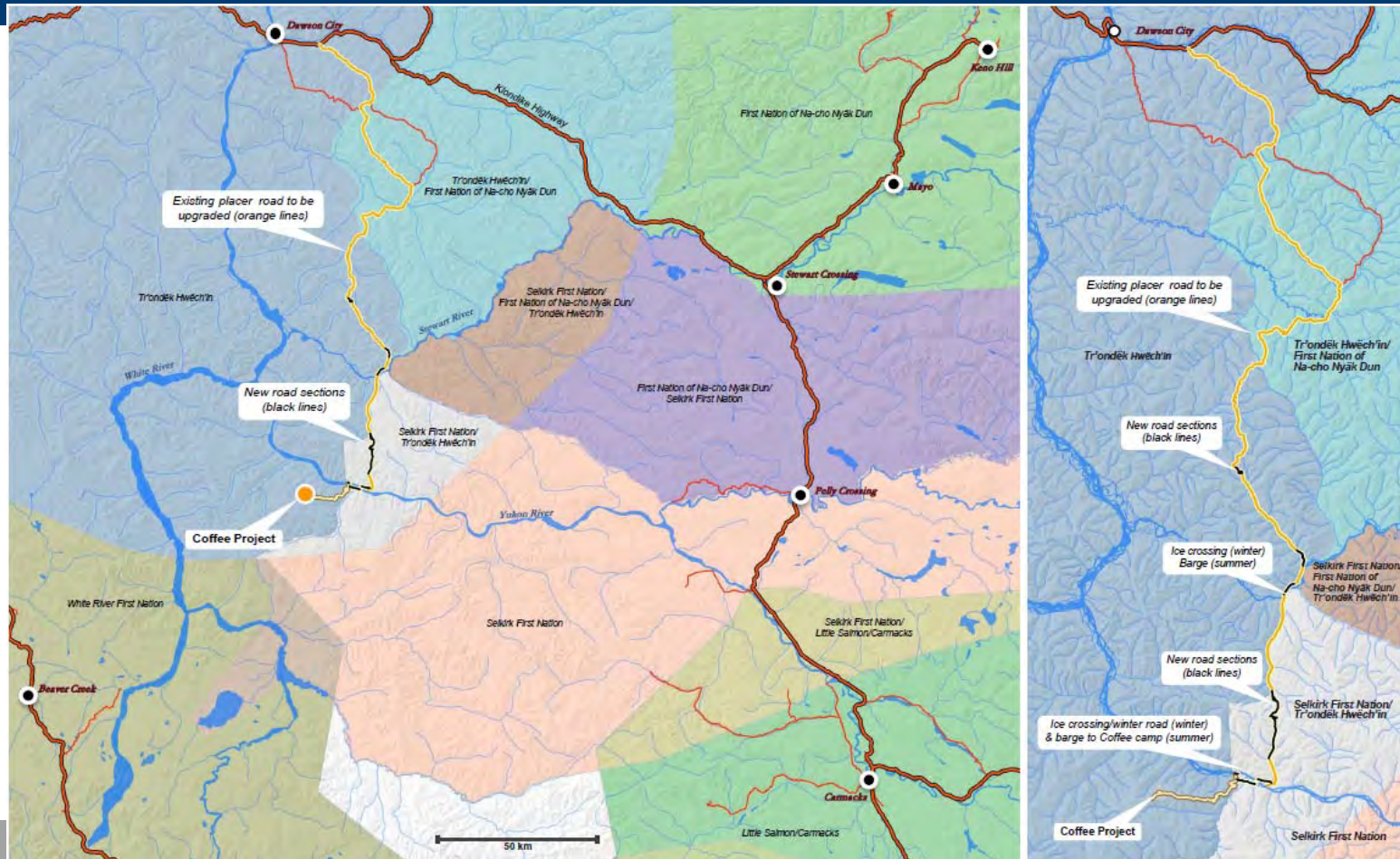
# Project Schedule





# Coffee Gold Project's Northern Access Route

# Northern Access Route - Context





- **Goldcorp's Coffee Gold Project proposes to use the 214 km Northern Access Route (NAR) originating 16 km outside of Dawson City to the Coffee property south of the Yukon River.**
- **The NAR will cross the Yukon & Stewart Rivers:**
  - During open flow, Goldcorp will utilize barges to cross; When frozen, ice roads will be constructed; no land access to site during freeze up and thaw periods.
- **Of the route, over 80% is existing road:**
  - The NAR follows the government-maintained Hunker Road to Sulphur Creek; Past Sulphur Creek is user-maintained road
  - New build is approximately 37 km; Majority of new build is located between the Stewart and Yukon Rivers (Ballarat/Barker areas) with additional portions to connect to Maisy May north of the Stewart.

# Road Route Design Objectives

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- **Follow existing roads**
- **Minimize disturbance, particularly to sensitive features**
  - Archaeological and cultural heritage sites
  - Wildlife, biological, habitat
  - Permafrost
- **Minimize road length**
- **Ensure safety for all users along the route**
  - Design parameters





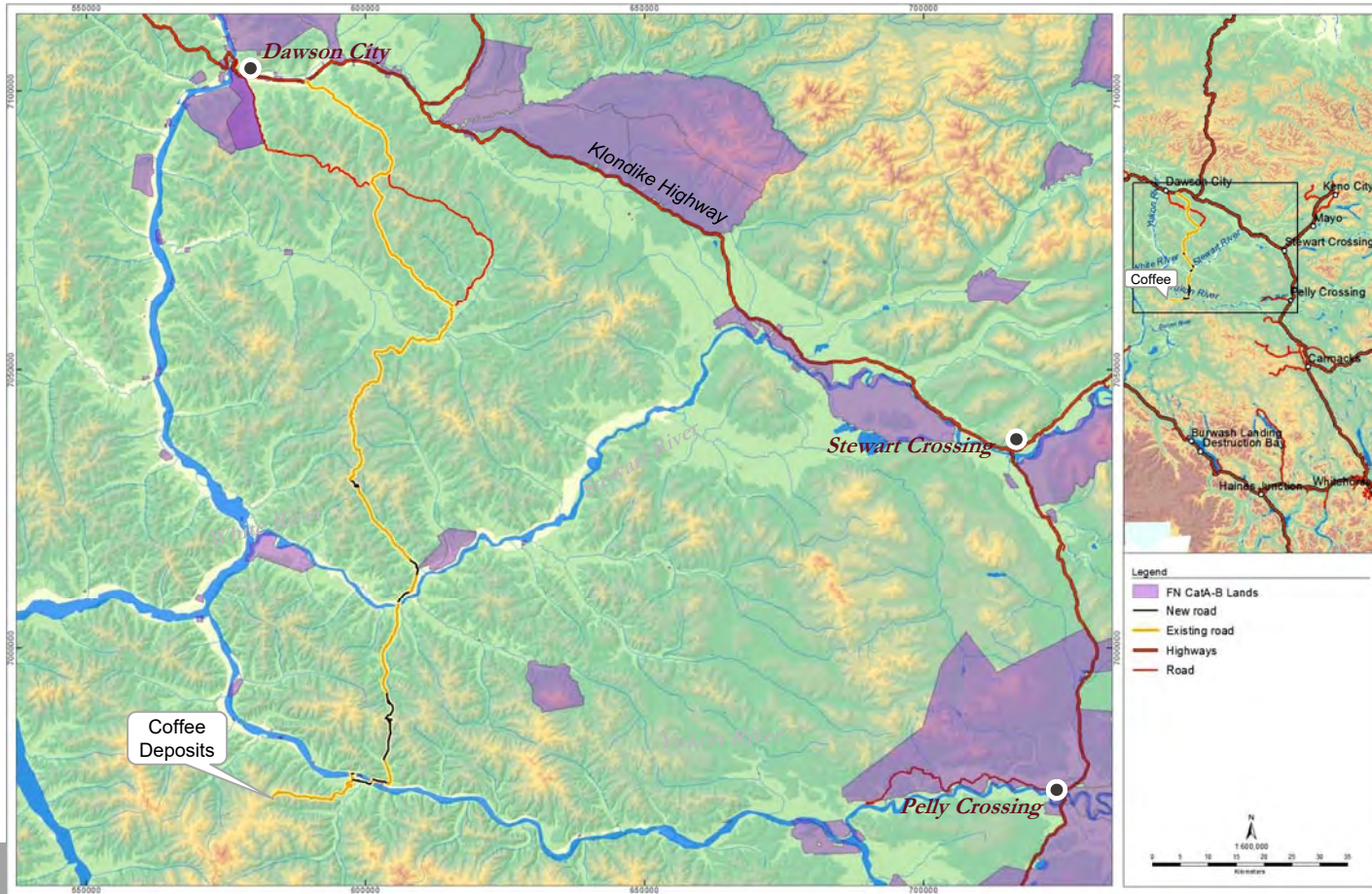
- **May 2015**
  - Initial site investigation.
- **June, August and September 2015**
  - Lidar flown.
- **August 2015**
  - Site data collected.
  - Cost comparison for both routes.
  - Henderson Dome connector.



# Design Criteria and Standards

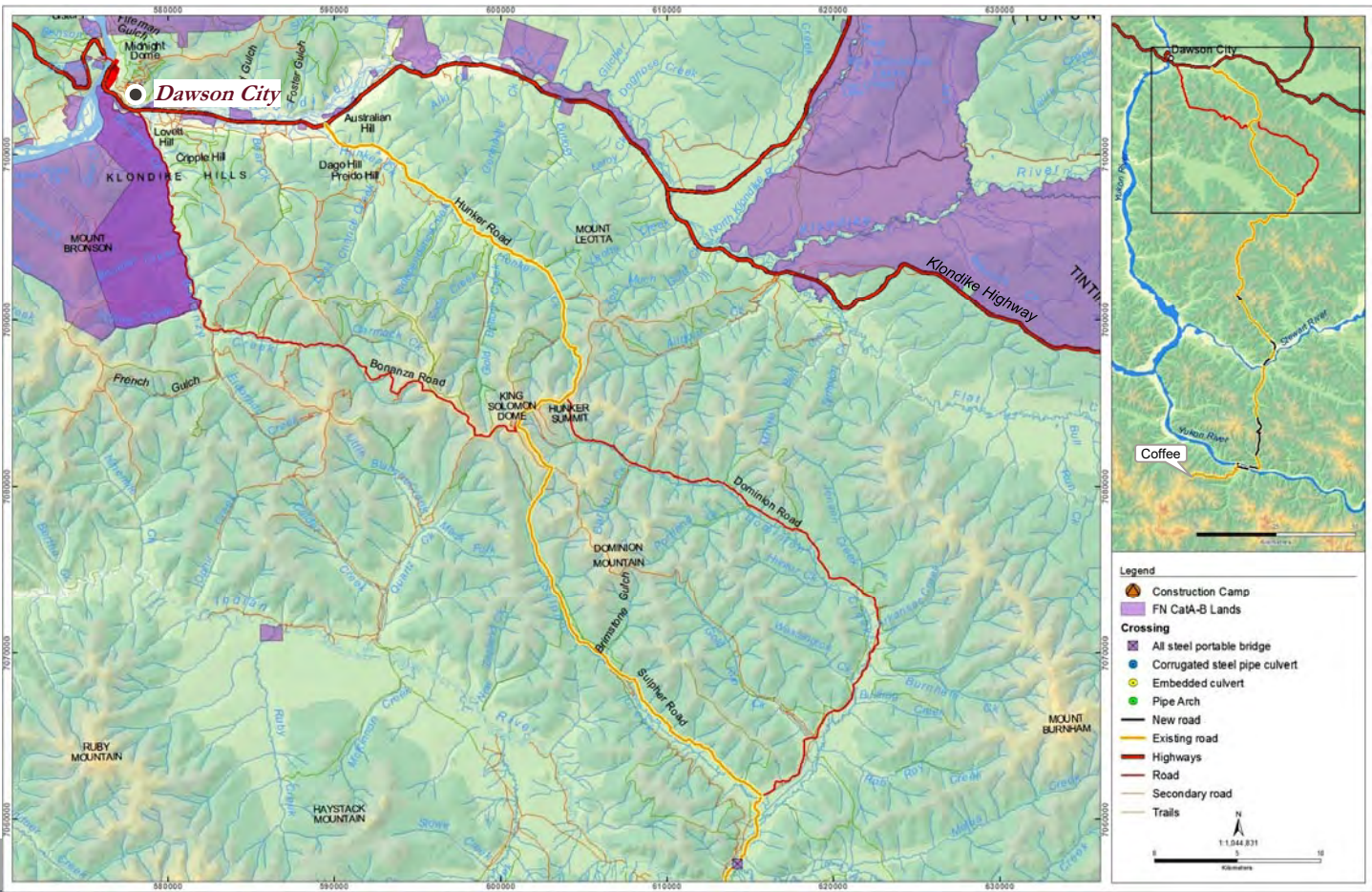
Components	Valley Bottom	Mountainous Terrain
Maximum Road Grade	8% (up to 10% on short pitches). Restricted to 5% on switchbacks	8% (up to 10% on short pitches). Restricted to 5% on switchbacks
Tightest Vertical Curve	1% grade change over 12 m (11 m for crest curves)	1% grade change over 4 m (3 m for crest curves)
Minimum Curve Length	50 m	30 m
Minimum Stopping Sight Distance	135 m	65 m
Minimum Horizontal Curve Radius	80 m (18 m for switchbacks)	35 m (18 m for switchbacks)
Minimum Cross Drain Culvert Diameter	450 mm	450 mm
Ditch Size	0.5 m deep with a 1-m-wide base	0.5 m deep with a 1-m-wide base
Road Width	5 m	5 m
Pullout Size	Additional 4 m width, 15 m long with a 7.5-m-long taper at each end	Additional 4 m width, 15 m long with a 7.5-m-long taper at each end

# Northern Access Route – Full Route

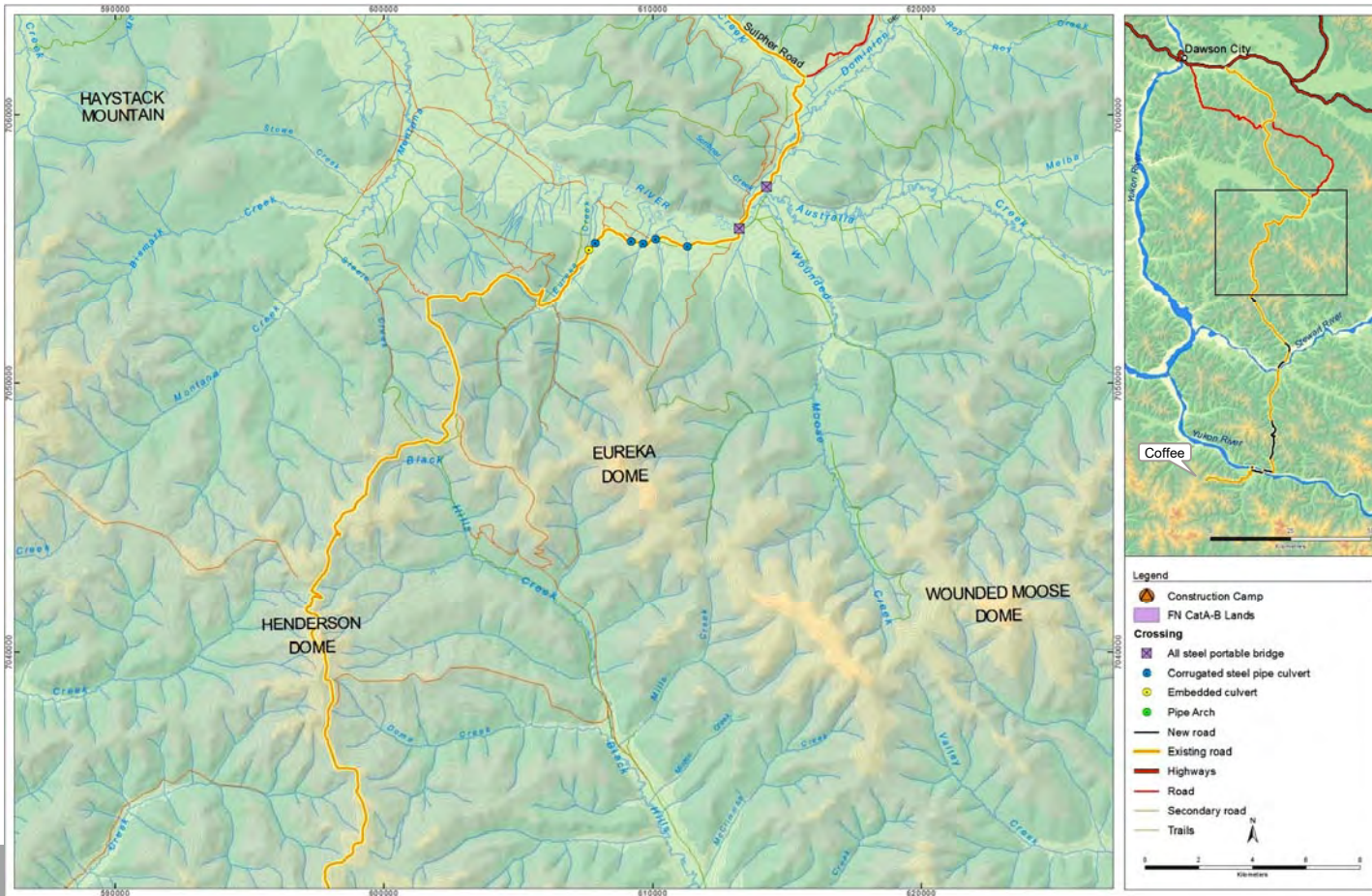




# Northern Access Route – Dawson City to Granville

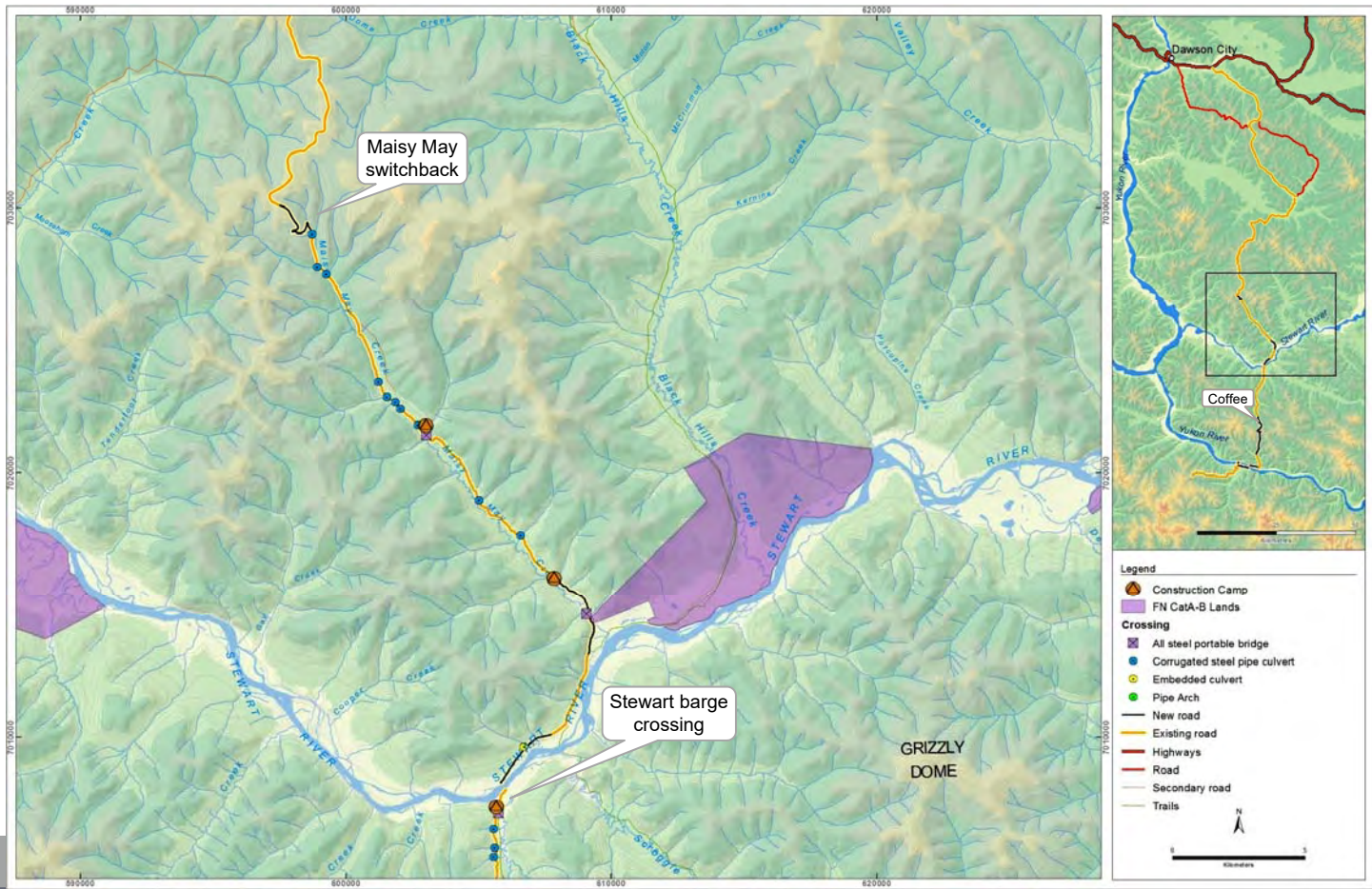


# Northern Access Route – Granville to Henderson

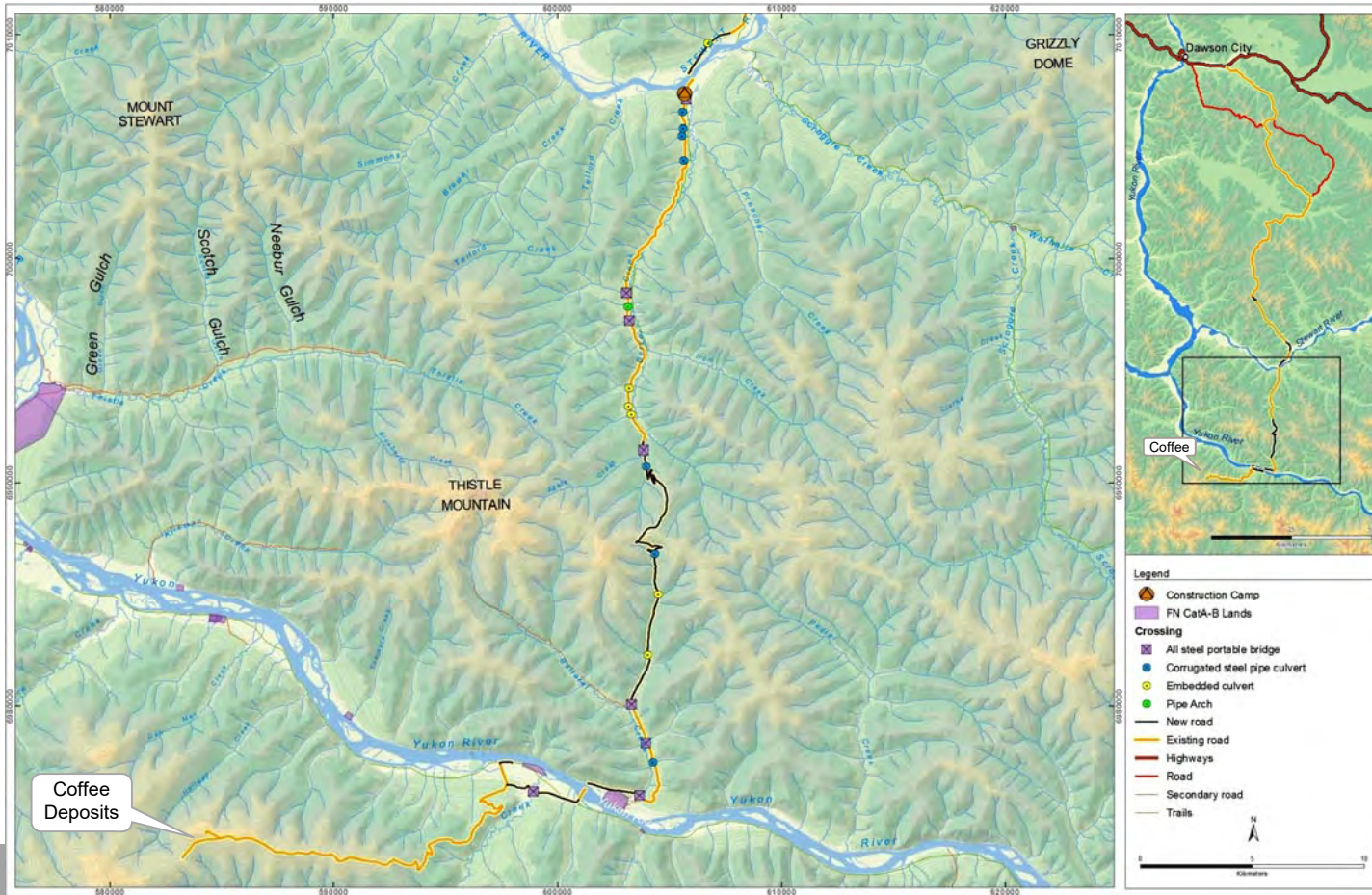




# Northern Access Route – Maisy May / Stewart River



# Northern Access Route – Stewart River to Coffee Creek





## Road Management

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- **Currently the road up to Sulphur creek is maintained by YG**
- **Beyond YG it is user-maintained public road on crown land with active placer claims**
- **Current users:**
  - Placer miners (during operation season Mar-Nov)
  - Trappers, hunters
  - First Nations (traditional uses such as harvesting)
  - Yukon Quest/River Quest/Yukon Ultra
- **Road maintenance has been conducted primarily by placers.**



## Environmental Stewardship:

- Protocols for how to manage wildlife interactions along the road
- Project vehicles will have spill response kits.
- Install and maintain erosion control structures
- Refuelling mobile equipment a minimum of 30 m from a watercourse (except barges or small gas engines for water pumps)

## Safety Considerations:

- Appropriate speed limits
- Mandatory use of seat belts by all drivers and passengers.
- Prohibited use of cell phones while driving.
- Employee and contractor driver training on the road safety rules.
- Regular vehicle maintenance program
- No parking on the travelling surface (pull into a safe location such as a pullout).
- Driving under the influence of alcohol or intoxicating drugs will be prohibited, and will result in immediate dismissal from the Project.

Supplies and consumables will be moved by northern access road originating in Dawson.

## Construction:

- Road mostly in place and being used; Some new construction and upgrades
- Use of barges and seasonal ice bridges, crossing the Stewart and Yukon rivers
- Construction estimated in 2018

## Operations & Management:

- Estimated 8 trucks per day average during operations
- Road Management Plan
- Access and monitoring
- Wildlife – concerns and mitigations
- Road Users Group – under development






## Next Steps: 3 Options for Management

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- **Given that the road is on crown land and well used by a number of other actors, Goldcorp proposed 3 potential strategic approaches to road management:**
  - YG management
  - Goldcorp Management
  - Public-Private Partnership
- **Goldcorp's recognizes that the road is a shared asset. Goldcorp underscores the need for open and transparent dialogue with first nations and stakeholders prior to making a decision.**





# RECLAMATION AND CLOSURE

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## Reclamation and Closure

- **Goldcorp Reclamation and Closure**
- **Yukon Closure Policy**
- **Regulatory Process**
- **Coffee Gold Mine - Conceptual Reclamation and Closure Plan**



## The Policy

- The Yukon Mine Site Reclamation and Closure Policy for New Mines consists of our Vision, Goals and our Implementation Principles.

## Vision

- Our vision is responsible and progressive mine reclamation and closure in the Yukon, conducted in a manner that fosters sustainable development and a healthy environment.

## Our Goals Our goals are to:

- ensure the development and viability of a sustainable, competitive and healthy quartz mining industry that operates in a manner that upholds the essential socio-economic and environmental values of the Yukon;
- ensure mine operators manage their mine sites in an environmentally sound manner and reclaim these sites to meet the principles stated in this policy;
- fully protect public and environmental health and safety and ensure that any potential discharges during mine

operation and following mine closure will be managed to prevent harm to the receiving environment or to the public;

- ensure a government-approved reclamation and closure plan, prepared by the mine operator, to return the mine site to a viable and, wherever practical, self sustaining ecosystem, is in place prior to mine development;
- ensure any approved reclamation and closure plan is updated by the mine operator periodically to reflect results of new information, such as ongoing environmental and technical studies, changes to operations, and progressive reclamation, and that this updated plan is approved by government and financial security requirements are adjusted accordingly; and
- ensure mine operators provide financial assurance in the form of security and that the cost of reclamation (including but not limited to shutdown, closure and post-closure, and related environmental monitoring in the approved reclamation and closure plan)



## Conceptual Reclamation and Closure Plan (CRCP) – Overall Closure Objective and Key Strategies

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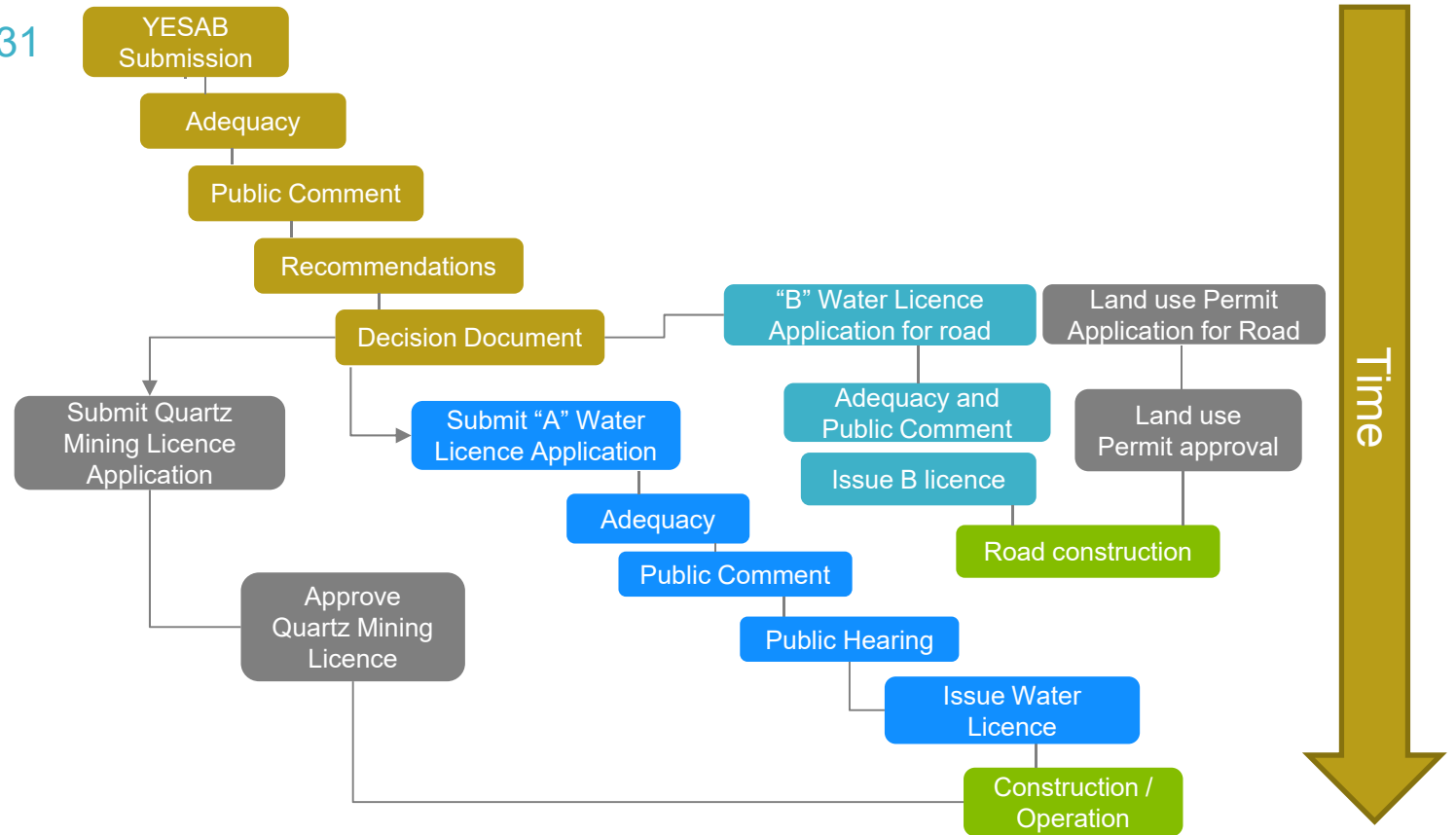
- **CRCP** - developed in accordance with industry best practice, and was informed by Yukon regulatory, policy, and guidance requirements.
- **Overall closure objective** - permanently close the mine with minimal long-term monitoring and maintenance by implementing a technically feasible plan.
- **Key strategies include:**
  - Early and ongoing community and regulatory engagement;
  - Designing for closure, including reclaiming disturbed areas progressively during the Operation Phase;
  - Reducing affected water and controlling contaminants at source; and
  - Planning for long-term monitoring and maintenance, while minimizing long-term operational activities.



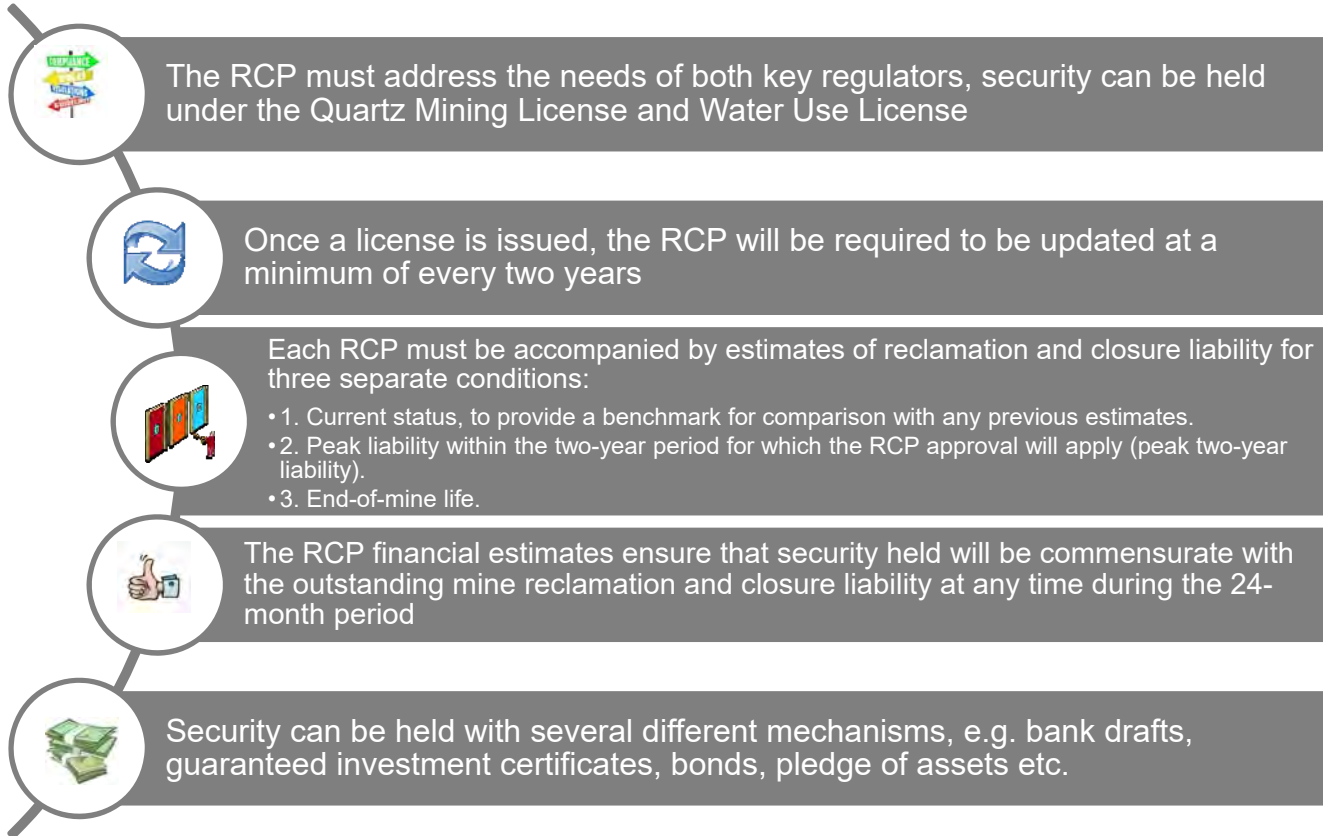


# Permitting from here

Submitted March 31



# Reclamation and Closure Plans and Security



# CRCP – Reclamation and Closure Objectives

Value	Coffee Gold Mine Reclamation and Closure (R&C) Objectives
<b>Physical Stability</b>	Structures and facilities perform in accordance with designs (including withstanding severe climatic and seismic events).
<b>Chemical Stability</b>	Release of contaminants do not cause unacceptable exposure in the receiving environment.
<b>Health and Safety</b>	Eliminate or minimize adverse health and safety effects on the public, workers and area wildlife.
<b>Ecological Conditions and Sustainability</b>	Protect the environment from degradation and restore a self-sustaining biological community to achieve land use objectives for the mine site.
<b>Land Use</b>	Lands are restored to pre-mining conditions typical of surrounding areas or provide for other land uses that meet community expectations. Site access is consistent with community land use expectations.
<b>Aesthetics</b>	Restoration outcomes are visually acceptable.
<b>Socio-economic Expectations</b>	Avoid or minimize adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits and achieving outcomes that meet community and regulatory expectations.
<b>Long-term Certainty</b>	Minimize the need for long-term operations, maintenance and monitoring after R&C activities are complete.
<b>Financial Considerations</b>	Minimize outstanding liability and risks after reclamation activities are complete.

# CRCP – Closure Stages and Schedule of Activities

Phase / Activity	Project Year																										
	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>CONSTRUCTION PHASE</b>																											
Northern Access Route Construction																											
Mine Site Construction																											
<b>OPERATION PHASE</b>																											
Mining (including pre-production)																											
Ore Processing (including pre-production)																											
Heap Leach Rinsing																											
Operational Closure																											
<b>RECLAMATION AND CLOSURE PHASE</b>																											
Water Treatment																											
Reclamation and Decommissioning																											
<b>POST-CLOSURE PHASE</b>																											
Ongoing Monitoring																											

## **Reclamation and Closure includes activities associated with closing the site as well as extensive monitoring**

### Reclamation and closure activities:

- Partial backfill of open pits - Double Double, Latte, Supremo
- Full backfill of Kona pit
- Progressive reclamation of the Heap Leach Facility (HLF)
- Reclamation of HLF and process ponds - event ponds and rainwater pond
- Waste rock storage facilities (Alpha, Beta), Temporary Organics Stockpile, Frozen Soil Storage Area
- Site Closure Water Management
- Reclaim roads - Northern Access Route (new build portions, barge landings), haul roads, mine site roads, exploration camp access road
- Reclaim airstrips - exploration airstrip, Project airstrip
- Remove crusher system and ore stockpiles
- Remove and reclaim plant site - process plant, reagent storage area, truck shop, warehouse building, power plant, bulk fuel storage area
- Remove and reclaim other infrastructure – camp, bulk explosive storage area, utilities, laydown and storage areas, waste management areas



- **Aquatic Environment Monitoring Program**

- Environmental effects monitoring as per Metal Mines Effluent Regulations to characterize effluent
- Water quality monitoring at the mine infrastructure as per regulatory requirements - flow monitoring from mine facilities, effluent monitoring in sediment control ponds and sumps, and at water treatment plant
- Water quality monitoring as per regulatory requirements – hydrology, surface water quality, ground water quality and quantity
- Biological monitoring in the receiving environment upstream and downstream of points of discharge to confirm compliance with regulatory requirements
- Annual reports and periodic comprehensive reports to present comparisons of data collected over time and describe trends



- **Fish and Aquatic Habitat Monitoring Program**

- Fish sampling to determine abundance and species diversity
- Detailed habitat assessment to evaluate pool frequency and average pool depth
- Fish sampling to assess fish species health and population age structure
- Quantify the extent of Chinook and Chum salmon spawning
- Collecting and analyzing benthic invertebrate communities, primary producers, and sediments

- **Terrestrial Environment Monitoring Program**

- Surveillance monitoring including routine, annual and event-driven inspections
- To be dictated by licenses and permit, but likely to include monitoring for the presence of invasive plants, trace metal uptake in soil and vegetation, effectiveness of reclamation activities, and wildlife protection



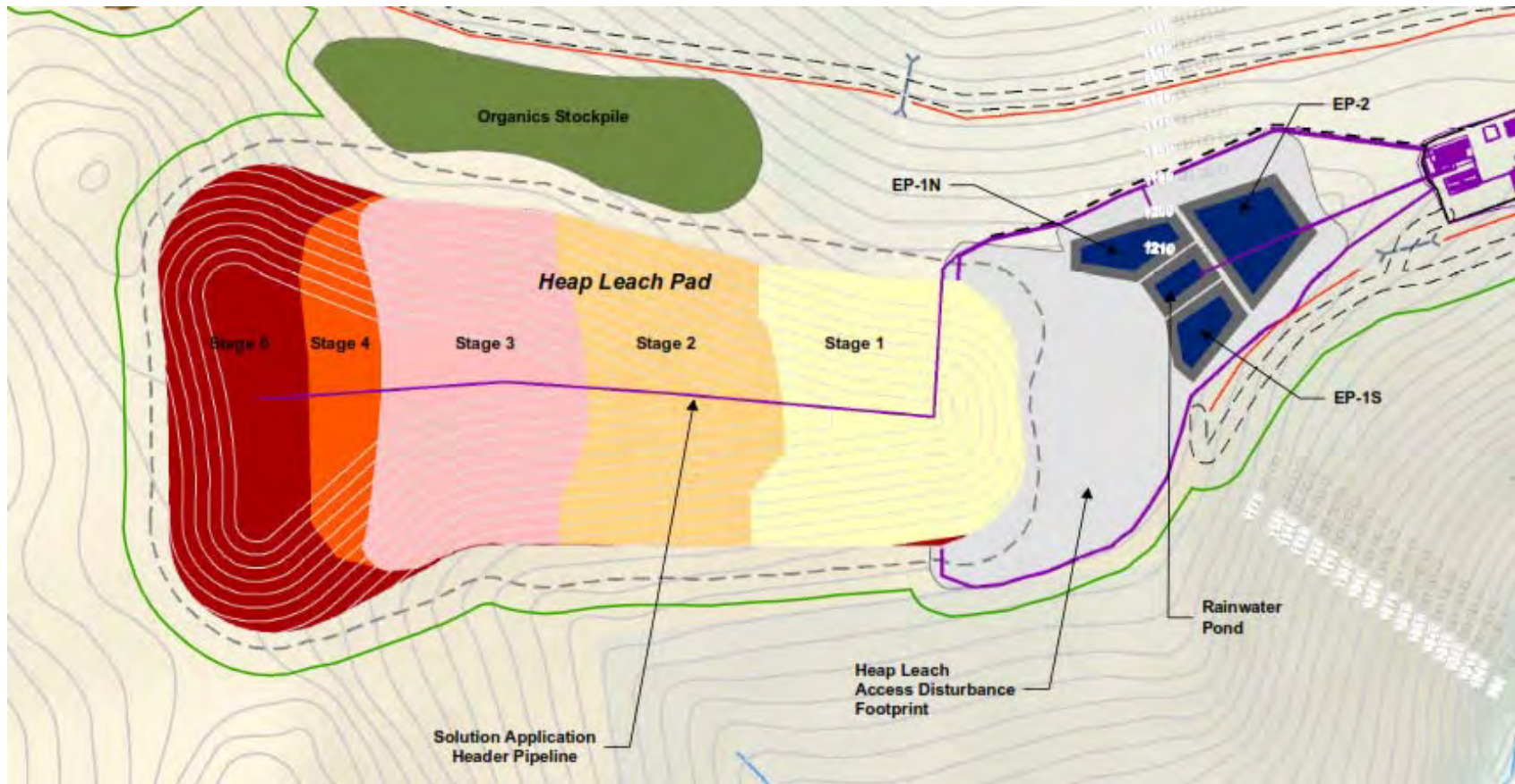
**Heap Leach Facility – Goldcorp will progressively rinse and close sections of the HLF to achieve suitable final heap quality conditions, and ensuring long-term physical stability.**

**Control of transitional solution management achieved through:**

1. Progressive rinsing of the heap and collection and treatment of rinse fluids:
  - Preliminary rinsing starting in Year 4 of leached ore using pH-adjusted barren solution for removal of cyanide
  - Final rinsing with fresh water and/or treated rinse solution to reduce contaminant concentrations to levels acceptable for direct discharge
  - Surplus water treated via water treatment plant from Year 9 to ~Year 15 (possibly to Year 20 depending on treatment circuit performance) with discharge to Halfway Creek drainage
2. Use of geomembrane covers (raincoats) and progressive grading the heap and capping to limit infiltration and reduce heap seepage volumes
3. Implement, if necessary, passive treatment using permeable reactive barriers for polishing of heap solutions within event ponds prior to release to the environment















# CRCP – Heap Leach Facility (HLF) and Process Ponds: Layout

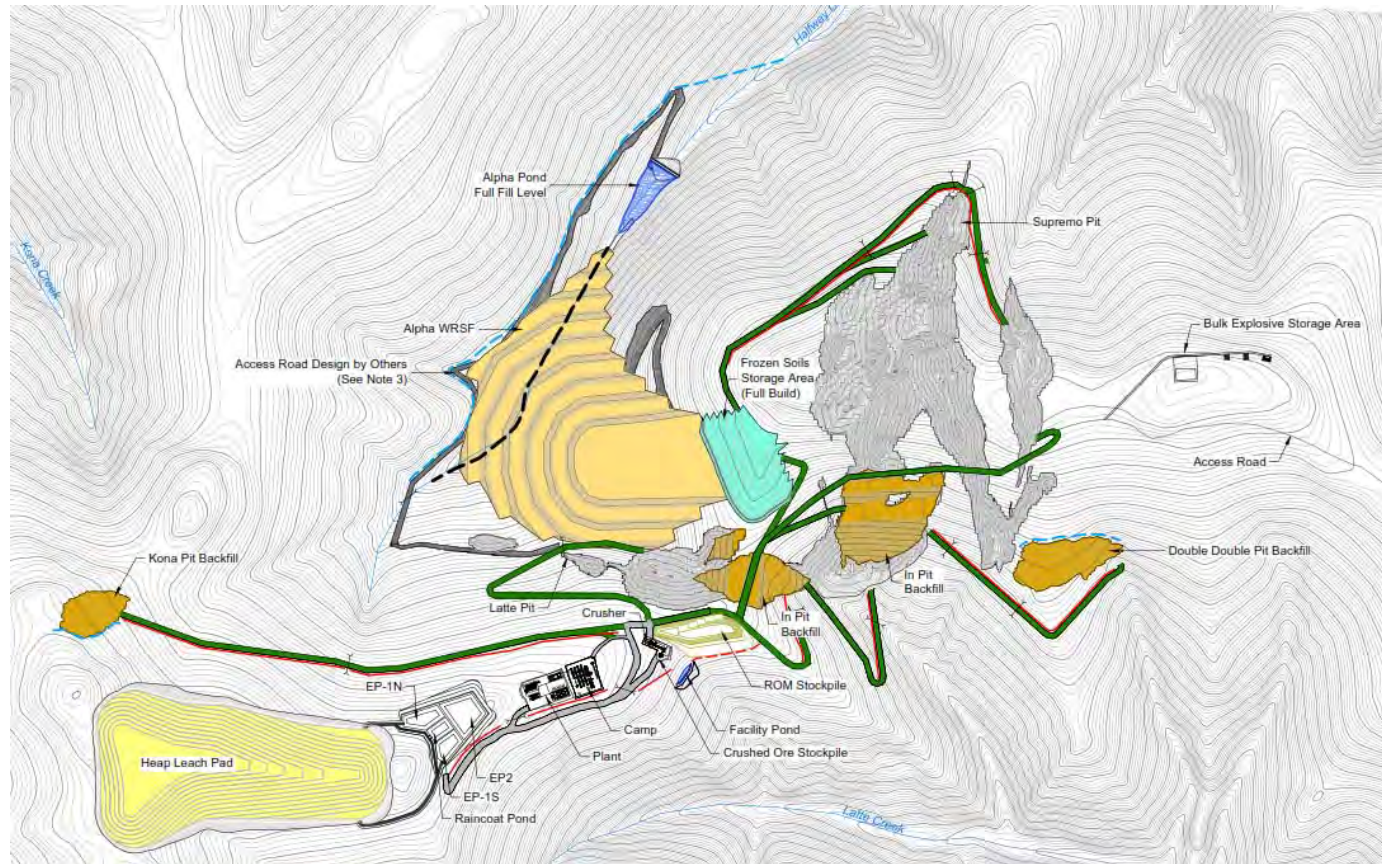
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# CRCP – End of Operation Phase in Year 12

- Legend**
-  Diversion Berm
  -  Rock Drain
  -  Road Drainage Ditch
  -  Waste Rock Collection Channel
  -  Active Pit
  -  Frozen Soils Storage Area
  -  Pit Backfill
  -  Pit Footprint
  -  Sedimentation Pond
  -  Waste Rock Storage Facility
  -  Heap Stack
  -  Access Road
  -  Haul Road
  -  Culvert





### Activities:

- Progressive reclamation of disturbed areas within the Mine Site footprint that are no longer required to support mine operations
- Partial backfill of Latte and Supremo pits and closure of disused haul roads
- Commence backfill of Kona and of complete backfill of Double Double pits and closure of disused haul roads
- Progressive reclamation and closure of early stages of HLF
- Installation of water treatment facility and commencement of water treatment of drain-down rinse water from closed HLF stages

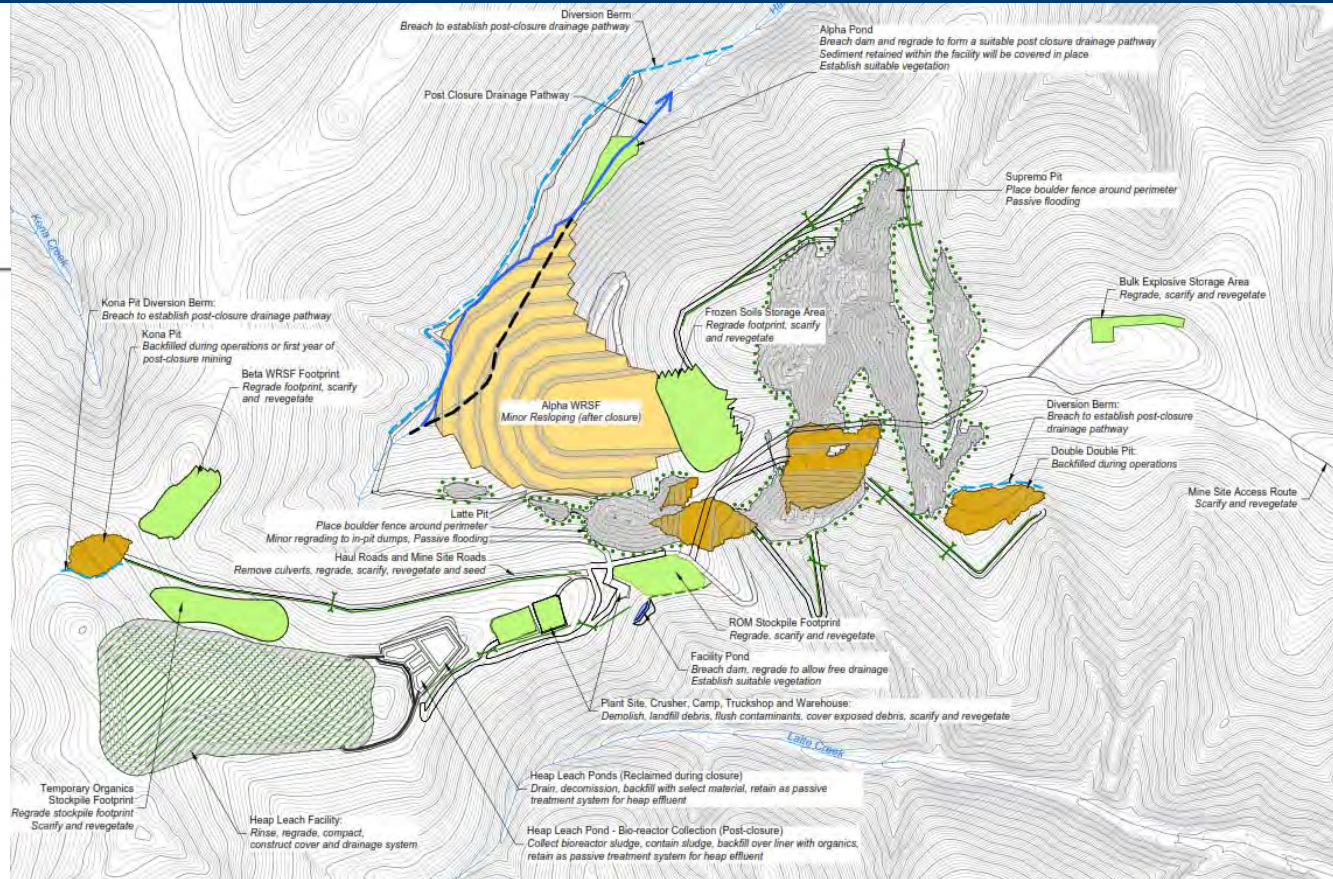
### Monitoring:

- Routine monitoring in accordance with mine operating licenses and permits



# CRCP – Post-mining Closure Stage R&C Activities (Year 13 to 18)

- Legend**
- Diversion Berm
  - Rock Drain
  - Reclaimed Road Diversion Ditch
  - - - Reclaimed Waste Rock Collection Channel
  - Reclaimed Footprint
  - Reclaimed Heap Leach Pad
  - Pit Backfill
  - Pit Footprint
  - Sedimentation Pond
  - Waste Rock Storage Facility (WRSF)
  - Removed Culvert Alignment
  - Boulder Fence



## Activities during the first stage of the Reclamation and Closure Phase:

- Complete backfill of Kona pit and closure of associated haul roads
- Reclamation of disturbed areas within the Mine Site footprint that are no longer required to support closure activities
- Equipment removed from service when no longer required to support closure activities
- Excavation of contaminated soil followed by on-site treatment or temporary storage and off-site disposal
- Reclamation of Latte Pit, Supremo Pit, Alpha WRSF (including frozen soil storage area), and Beta WRSF footprint area
- Reclamation of the temporary organic stockpile area once depleted and reclamation of the ROM stockpile area
- Continued water treatment of drain-down rinse water from closed HLF stages until heap rinsing is complete, then reclamation and closure of water management structures
- Dismantling and removal of Plant Site buildings, power plant, and bulk fuel storage tanks, explosives storage facility
- Dismantling and removal of Camp Site buildings, potable and fire water systems, sewage treatment plant, and waste management infrastructure at the end of this stage
- Decommissioning and reclamation of new sections along the NAR and the Project airstrip at the end of this stage

## Monitoring:

- Routine monitoring in accordance with mine operating licenses, and monitoring of reclaimed areas

## Activities during the final stage of the Reclamation and Closure Phase:

- Dismantling and/or removal of remaining infrastructure and equipment
- Reclamation of remaining disturbed areas within the Mine Site footprint
- Continued water treatment until HLF effluent is of suitable quality for discharge

## Monitoring:

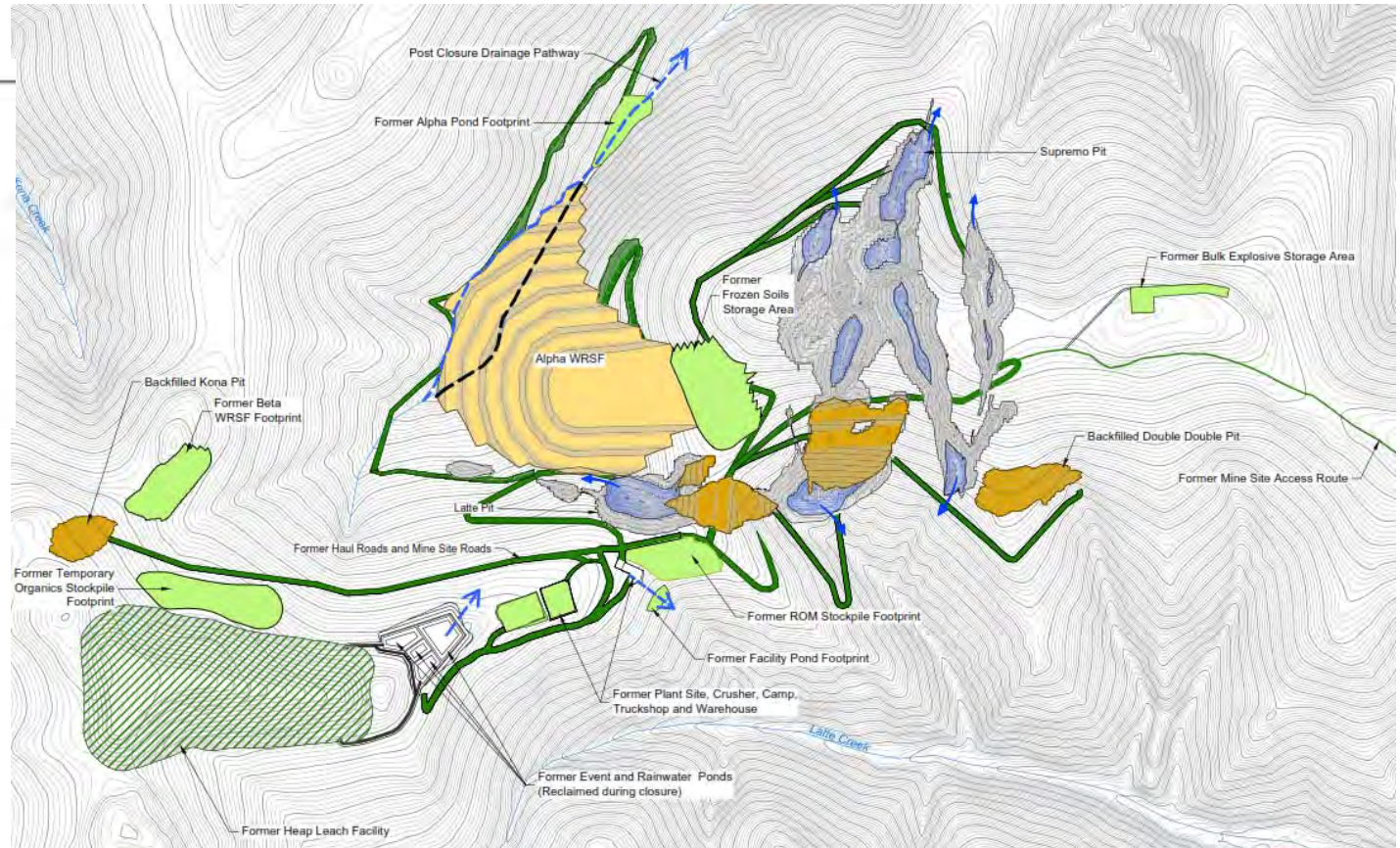
- Monitoring undertaken to observe progress towards closure objectives





# CRCP – Active Closure Stage (Year 23)

- Legend**
- Rock Drain
  - Reclaimed Footprint
  - Reclaimed Heap Leach Pad
  - Reclaimed Haul and Mine Site Roads
  - Pit Backfill
  - Pit Footprint
  - Pit Lake
  - Waste Rock Storage Facility (WRSF)
  - Pit Outflow Direction
  - Flow Direction





### Activities:

- None planned – reclamation and closure activities are complete

### Monitoring:

- Monitoring is reduced as performance criteria is met and reclamation and closure objectives are achieved



- **Salvage and stockpile organic material and topsoil**
  - Salvage from footprints of open pits, heap leach pad, infrastructure foundations (~1.5 Mm<sup>3</sup>)
  - Store in temporary organics stockpile near heap leach pad
- **Implement erosion and sediment control measures**
  - Minimize size of disturbed areas and retain vegetation cover and buffers where possible
  - Limit work on unstable areas, slopes, on permafrost where possible
  - Install perimeter sediment controls
- **Progressively reclaim and revegetate disturbed sites to minimize erosion and prevent establishment of invasive plants**
  - Implement prevention and control measures for invasive plant (e.g., surveys, equipment monitoring, removal and incineration, targeted herbicide application)
- **Dispose of waste materials properly and remediate contaminated areas (as necessary)**
- **Ongoing reclamation research programs**

**Objective – to inform and refine R&C plans to return the mine site to a state as near as possible to that in existence pre-mining.**

## 1. Revegetation Reclamation Research Program

- 2013 to current - investigating basic site prescriptions at demonstration sites and monitoring plots established in areas disturbed during exploration activities
- Seed Collection, Inventory and Mapping Program – to determine target plant species for site restoration
- Training program partnership with Tr’ondëk Hwëch’in and the Yukon College
  - Introduction to Environmental Monitoring Pilot Project
  - Northern Terrestrial Restoration (NTR)

## 2. Plant-soil Interaction Studies

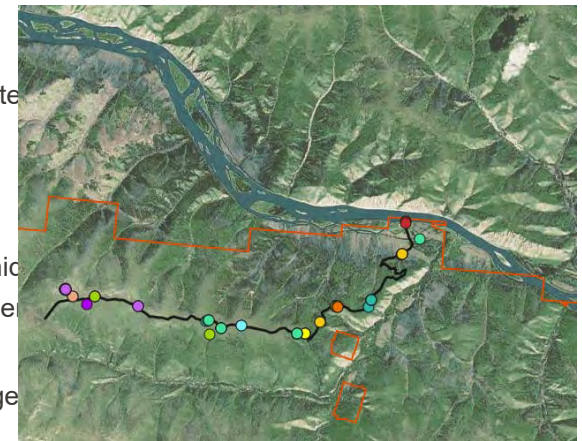
- Characterize the plant-root interface (rhizosphere) of native plants that are potential candidates for site restoration
- Examine use of local peat as a soil amendment
- Establish a three-year field trial at disturbed sites in subalpine areas

## 3. Heap Leach Facility – Water Treatment Plant Pilot Program

- Bench-scale treatment testing of chemical and biological processes using metallurgical cyanide
- During Operation Phase, conduct field-scale pilot program to refine plant operating requirements

## 4. Heap Leach Facility – Vegetation Cover Trials

- During latter half of Operation Phase, conduct field-based revegetation trial program on Stage 1 research programs



- Water management infrastructure components include:**

- Underdrains
- Diversion Channels
- Drainage Ditches
- Diversion Berms
- Sedimentation Ponds – Alpha Pond and Facility Pond
- Water Treatment Plant

- Sequence of activities:**

Stage/ Phase	Years	Active Water Management Features	Features Decommissioned	Water Treatment
<b>Post-Mining Closure</b>	13 to 18	All conveyance structures, Alpha Pond, Facility Pond, Water Treatment Plant	Culverts are removed when no longer necessary toward the end of stage.	Water Treatment Plant operational, and total suspended solids (TSS) settling in the existing ponds
<b>Active Closure</b>	19 to 23	All conveyances, Alpha Pond, Facility Pond, Water Treatment Plant (through Year 20).	At the end of Active Closure, all conveyances and sedimentation ponds. Water Treatment Plant decommissioned after Year 20	Water Treatment Plant (operational through Year 20), with TSS settling in the existing ponds
<b>Post-Closure</b>	24 onward	Passive treatment within the former footprint of the sedimentation ponds.	None (decommissioning complete by start of phase)	Passive TSS removal in vegetated swales and/or stilling pools constructed in reclaimed footprint of former sedimentation ponds.

- **Summary of activities during Post-Mining Closure Stage:**











- Mine surface water management system operational as per Operation Phase
- Monitoring of sedimentation ponds and conveyance structures during open water season weekly for 2 years, then monthly for 4 years
- Removal of pit sumps and dewatering systems from Supremo Pit
- Spillways constructed at pit pour points to direct overflow to natural drainage courses, underdrains, other

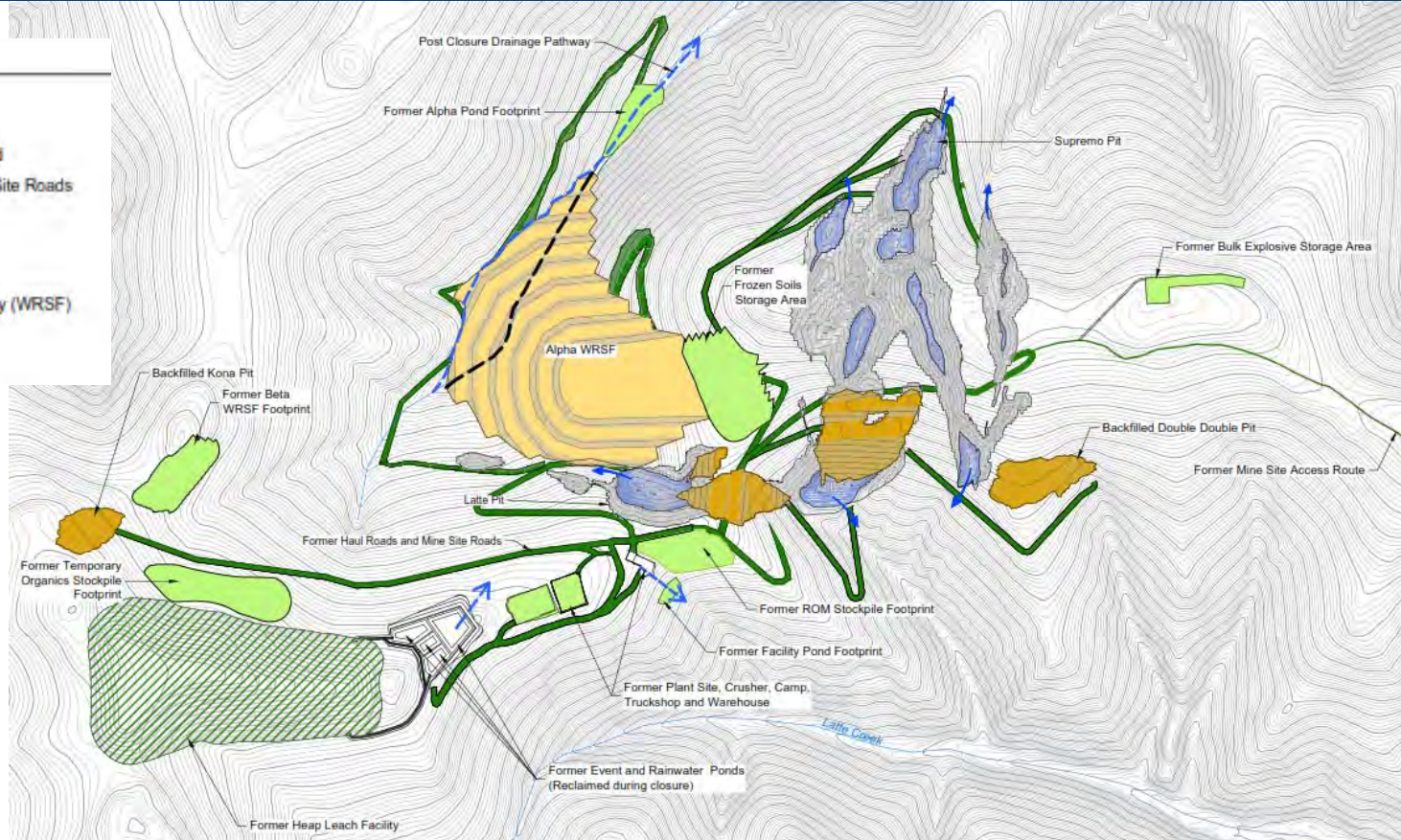
- **Summary of activities during Active Closure Stage:**

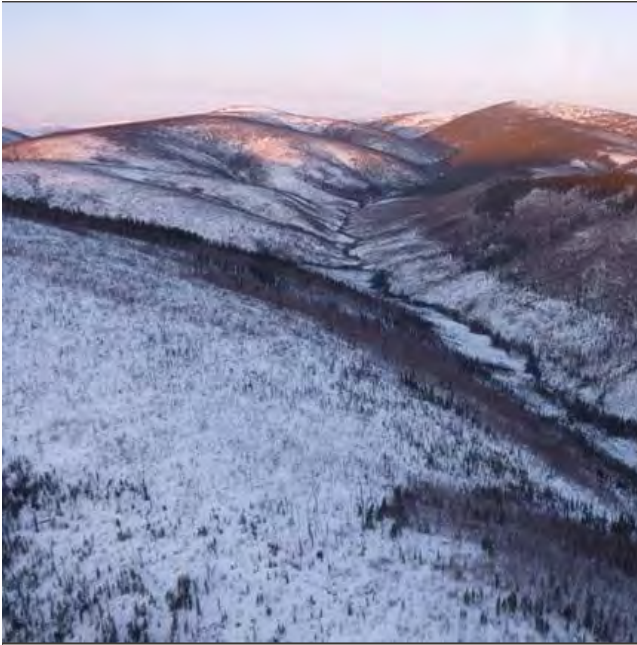
- Monitoring of sedimentation ponds and conveyance structures during open water season monthly
- Sediment ponds and conveyance structures will operate until water quality objectives are met
- Sediment ponds will be drained and accumulated sediment either covered in place or disposed of in pits or other designated site
- Sedimentation pond dams will be breached, with material used for backfilling pond excavations or in construction of drainage pathway, grading as necessary
- Conveyance structures will be graded to provide adequate drainage, and covered (to the extent possible) with soil or organics
- Seed or plant disturbed areas with native vegetation or allow to revegetate naturally



# CRCP – Site Water Management: Post-Closure Phase

- Legend**
-  Rock Drain
  -  Reclaimed Footprint
  -  Reclaimed Heap Leach Pad
  -  Reclaimed Haul and Mine Site Roads
  -  Pit Backfill
  -  Pit Footprint
  -  Pit Lake
  -  Waste Rock Storage Facility (WRSF)
  -  Pit Outflow Direction
  -  Flow Direction



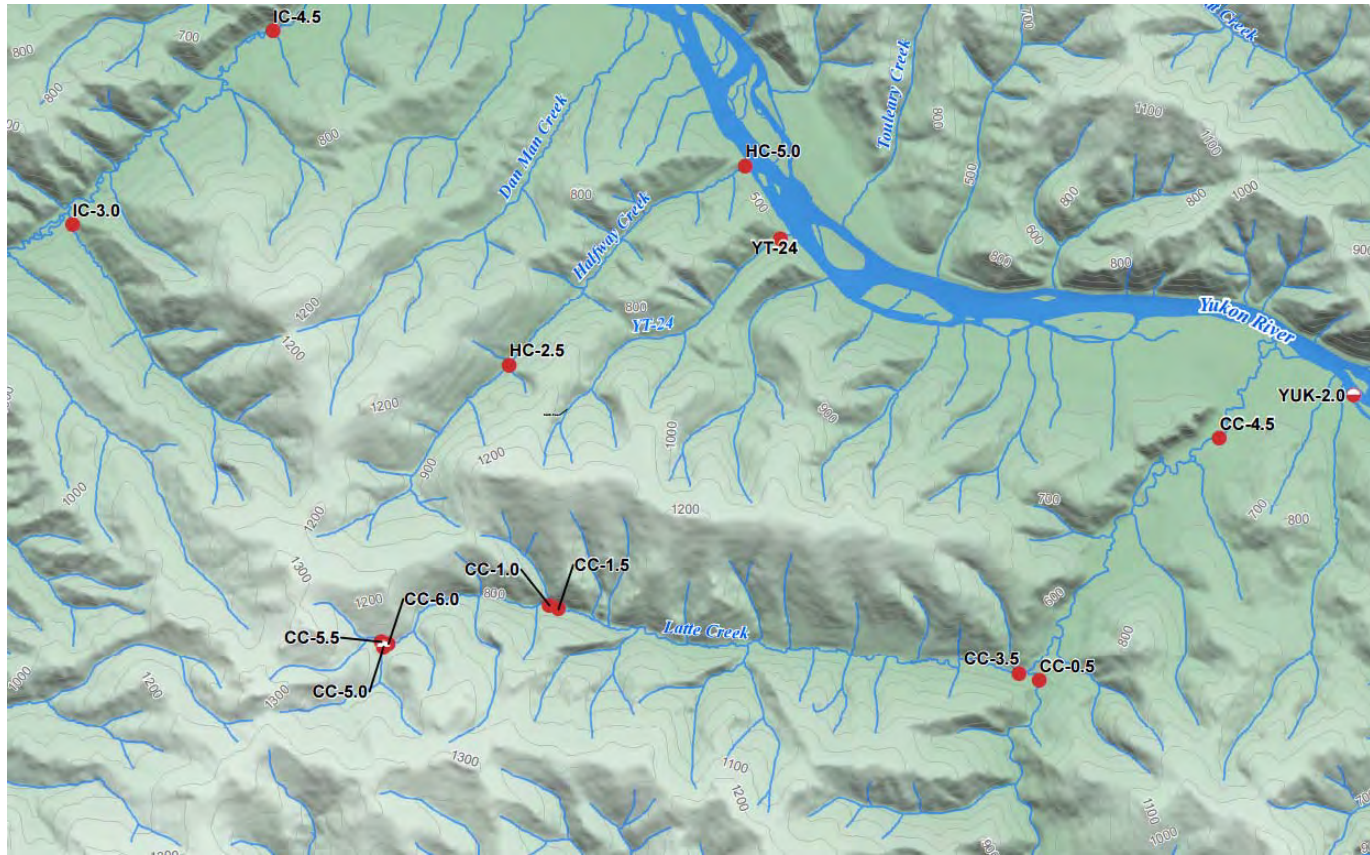


# Coffee Gold Project Water Quality

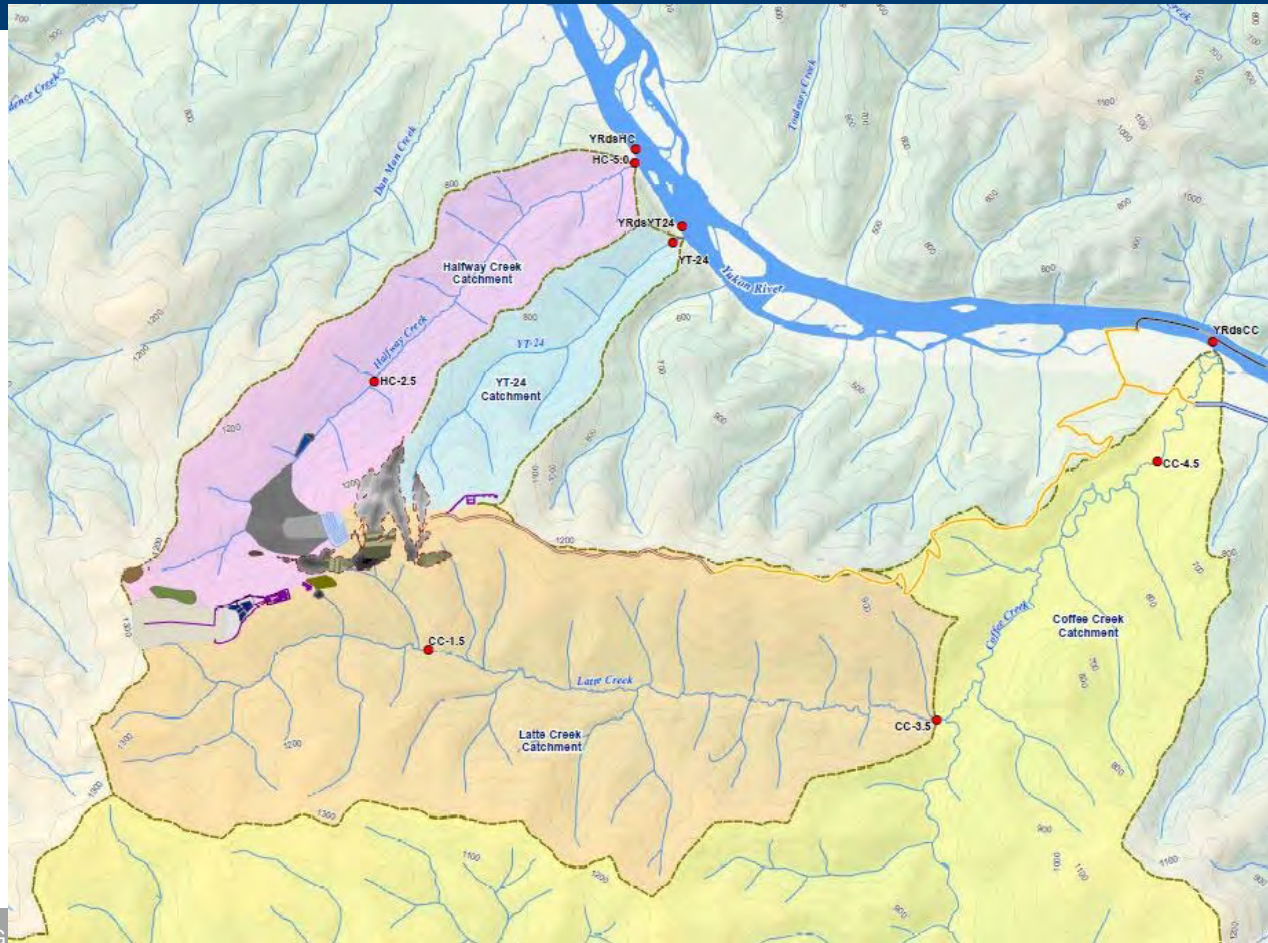




# Drainages



# Watersheds







- Fish Diversity Highest Near Overwintering Locations
- Arctic Grayling use other areas in summer

**Fish Sampling Sites**

- Fish Captured
- No Fish Captured

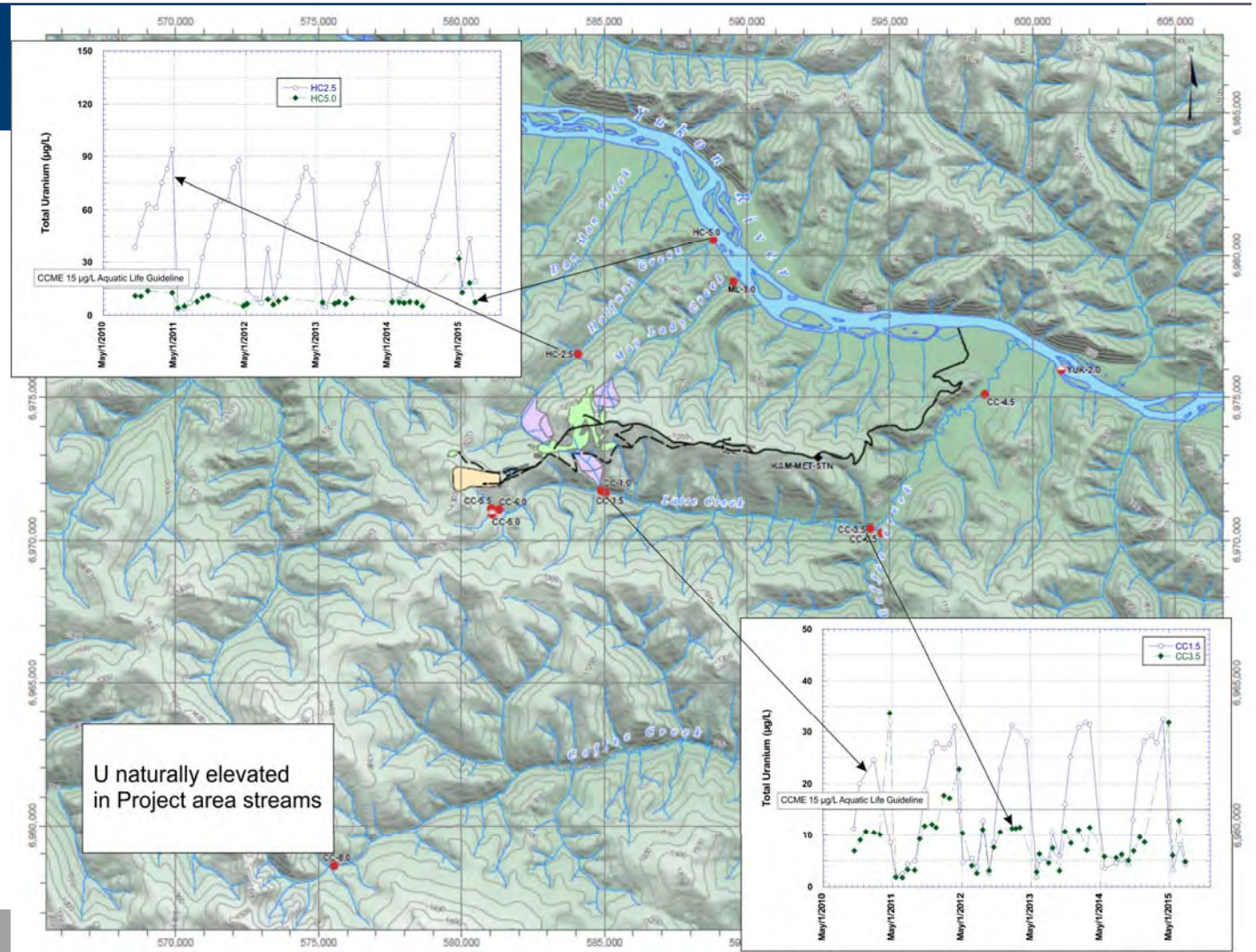
**Fish Sampling Codes**

- GR – Arctic Grayling
- CCG – Slimy Sculpin
- CH – Chinook Salmon

# Baseline Results

## SW Quality - Uranium

- Seasonal signature of U; highest concentrations during baseflow or low flow periods
- Lower concentrations during higher flow periods
- Concentrations in baseflow surface water very similar to groundwater
- Little to no attenuation for uranium along gw flowpaths







*C. dubia*



# Water Quality Objectives

Two approaches were used to develop water quality objectives as directed by CCME :

## 1. Direct application of “generic” water quality guidelines

For those parameters with concentrations below generic water quality guidelines in the background

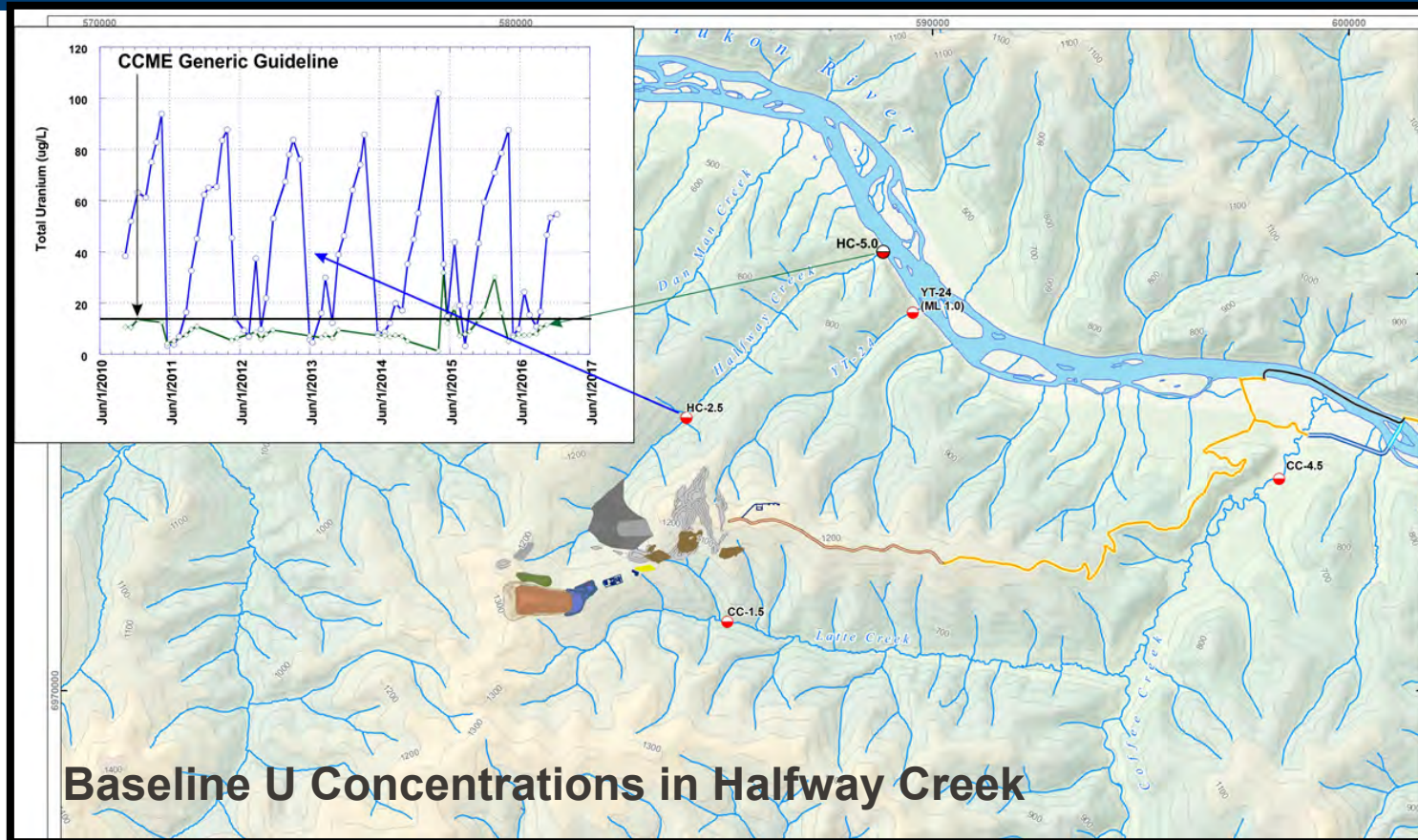
- *Examples include As, Cd, Hg, Se, Zn*

## 2. Background Concentration Procedure

A number of parameters are present naturally at concentrations in excess of respective generic guideline. The CCME derivation protocol for water quality objectives is the used of the 95<sup>th</sup> percentile value

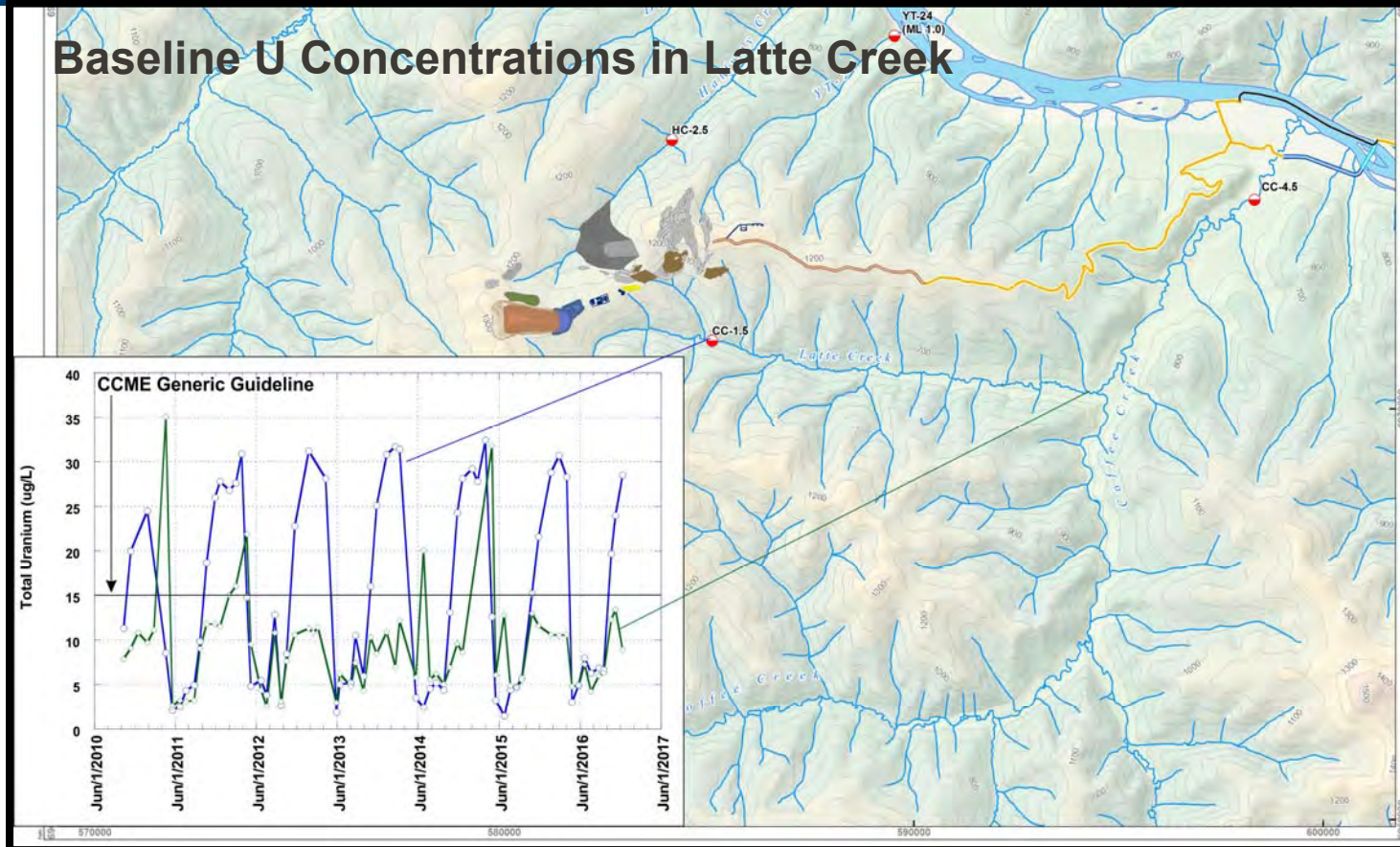
- *Examples include U, Al, Cu, Fe*
- Proposed objectives for U are being evaluated and supported through detailed toxicity testing using site waters collected under different flow conditions (e.g. low flow – winter and open water - higher flow)

# Uranium Baseline Concentrations in the Project Area

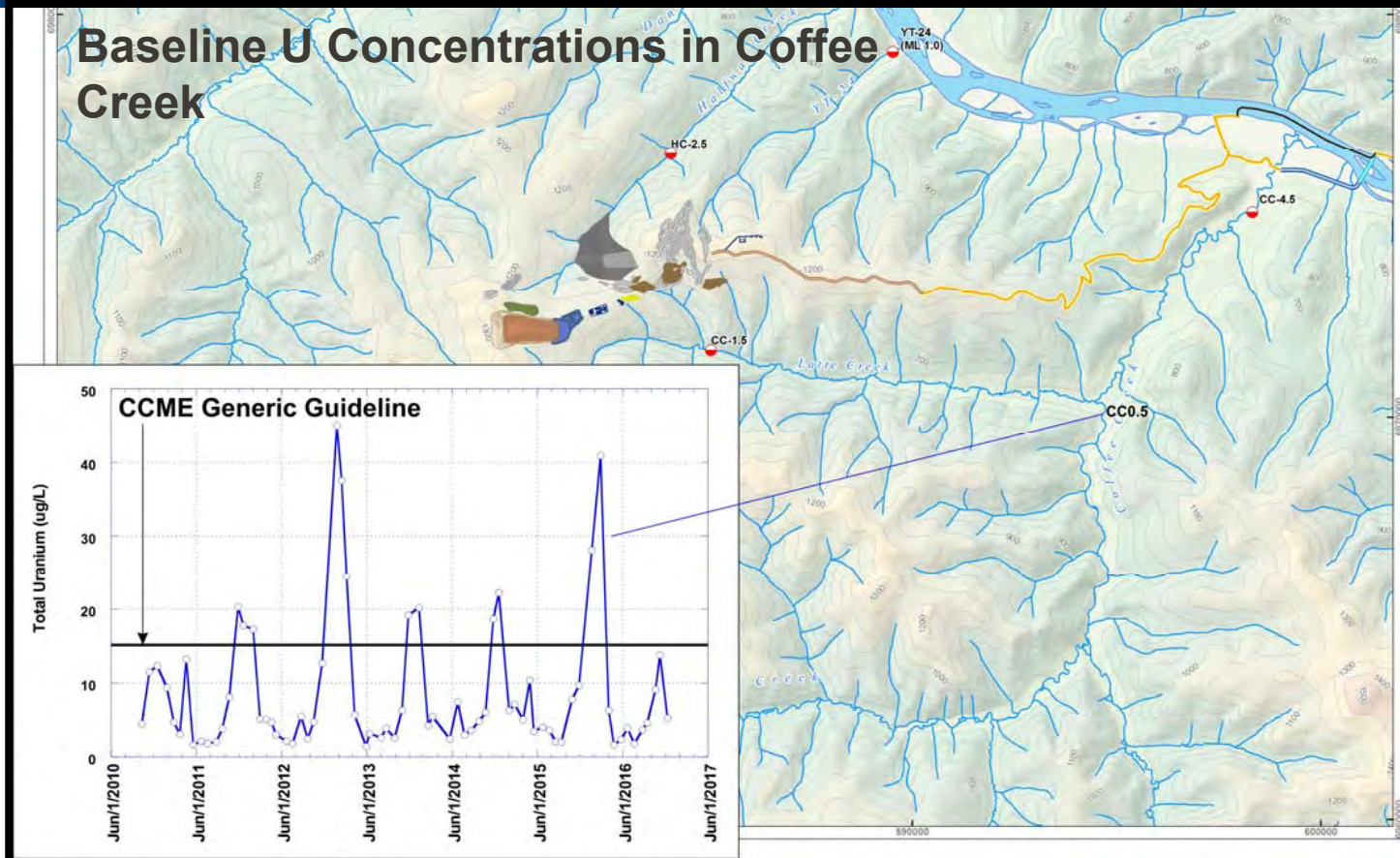




# Uranium Baseline Concentrations in the Project Area



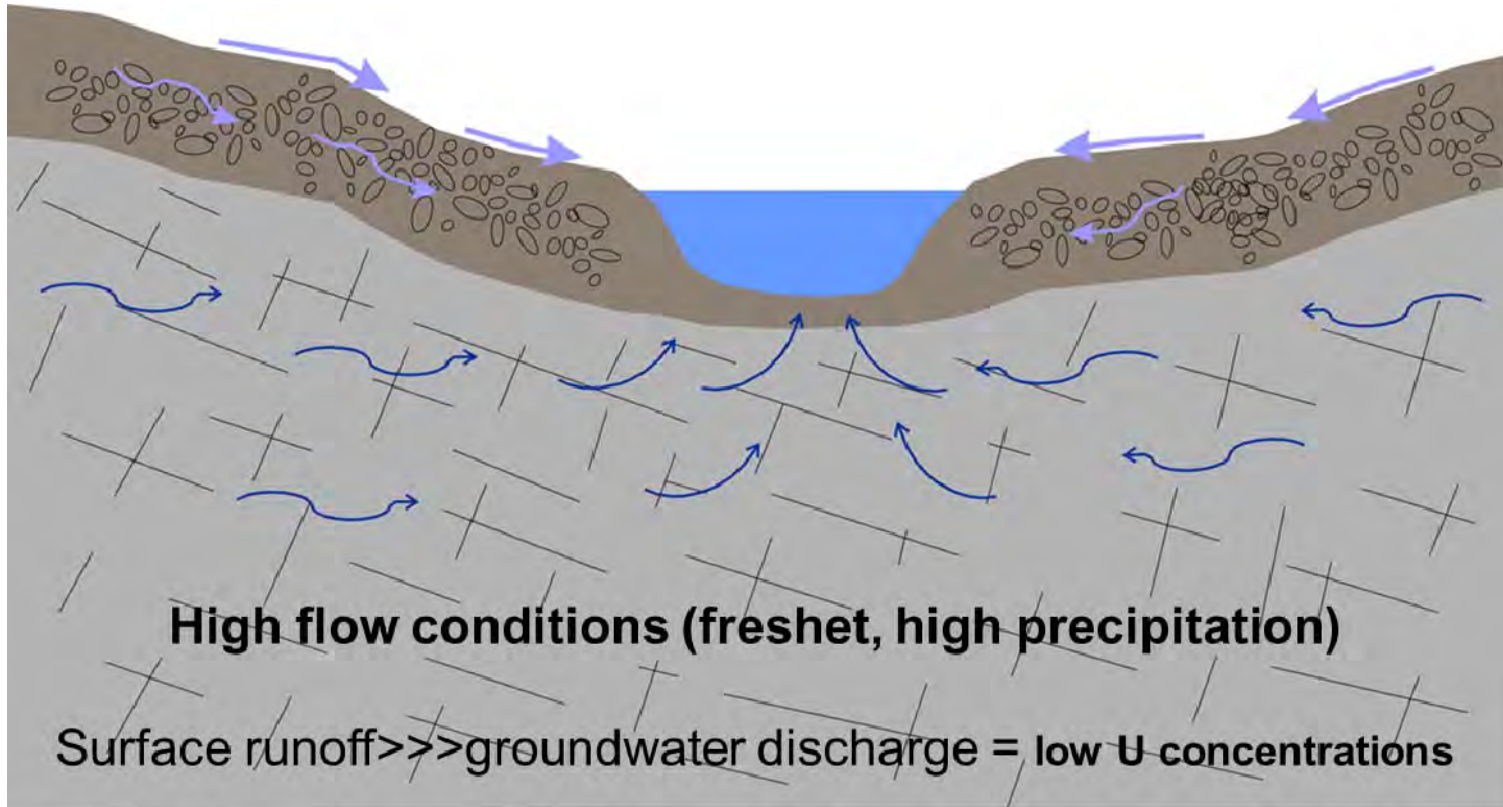
# Uranium Baseline Concentrations in the Project Area



## What Causes Fluctuations in U Concentrations?

64

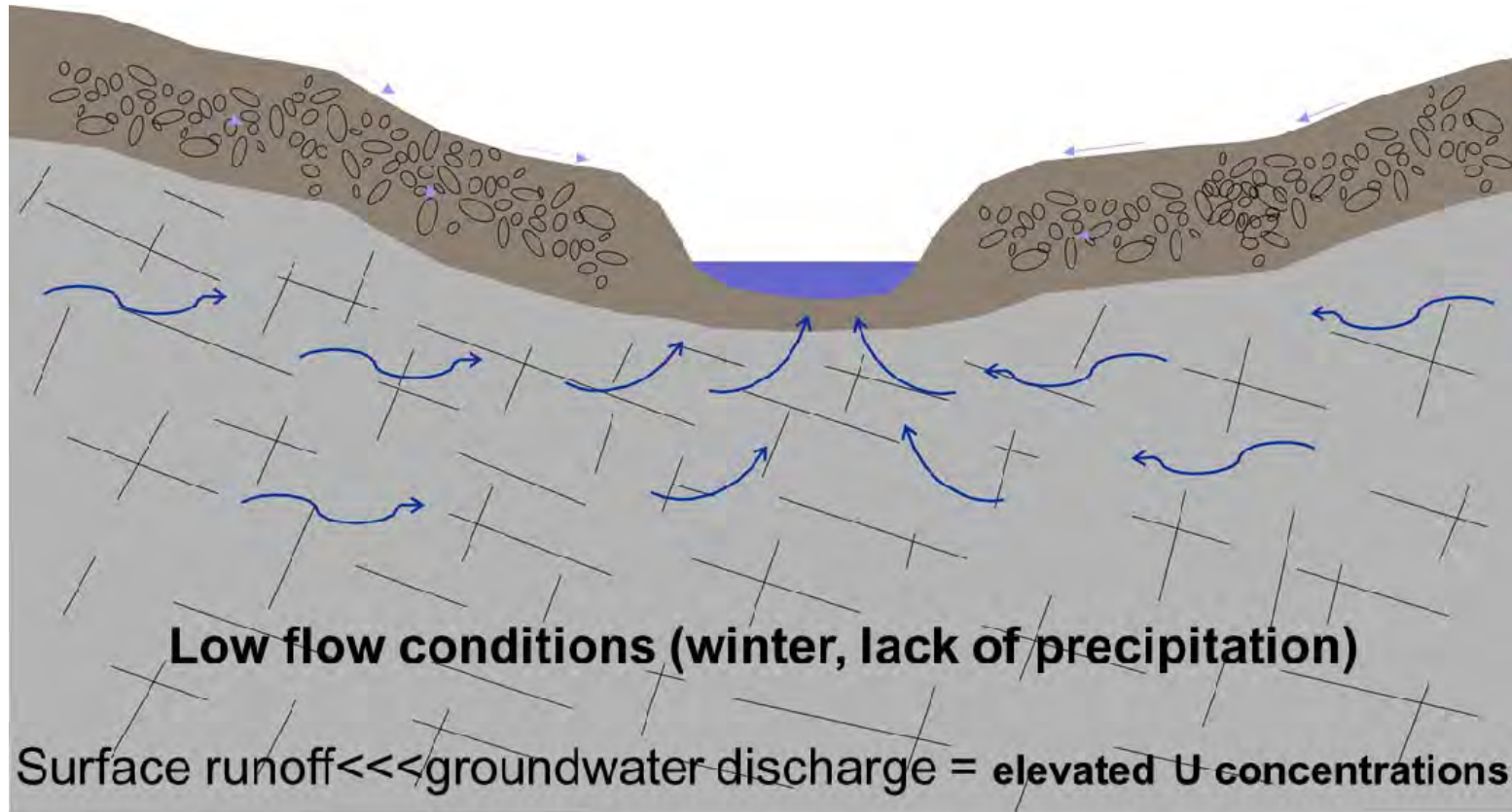
Changes in relative contributions of surface flow to groundwater discharge





## What Causes Fluctuations in U Concentrations?

65



## Representative Stations - Baseline Data

66

Pit dewatering - intermittent

**Lower Coffee Creek** – before confluence with Yukon River

**Latte Creek**– downstream confluence with small tributary that receives intermittent pit dewatering. Before confluence with Coffee Creek

**Halfway Creek**– downstream of waste rock

**YT24**

0.6 to 2.8 µg/L

**Coffee Creek (CC4.5)**

1.2 to 3.8 µg/L

CCME; Non degradation

**Latte Creek (CC1.5)**

3 to 31 µg/L (25 of 54 Samples above CCME)

**Halfway Creek (HC2.5)**

8 to 86 µg/L (38 of 57 samples above CCME)

Water Quality Objectives



# Proposed Water Quality Objectives – Protective

	Parameter List	Units	Halfway Creek	Latte Creek	YT-24	Regulatory Source
Dissolved Parameters	SO <sub>4</sub>	mg/L	218	309	218	BC WQO
	Nitrate-N	mg/L	3	3	3	BC WQO
	Nitrite-N	mg/L	0.02	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	1.91	1.63	1.91	BC WQO
	CN <sub>WAD</sub>	µg/L	5	5	5	BC WQO
	Al (diss)	µg/L	403	351	205	SSWQO
Total Metals	Sb	µg/L	9	9	9	BC WQO
	As	µg/L	5	5	5	CCME
	Cd	µg/L	0.11	0.13	0.1	CCME
	Cu	µg/L	3	3	3.4	SSWQO
	Fe	µg/L	1000	1000	1000	SSWQO
	Fe (dissolved)	µg/L	350	350	350	SSWQO
	Pb	µg/L	1.8	2.5	1.5	CCME
	Hg	µg/L	0.026	0.026	0.026	CCME
	Mo	µg/L	73	73	73	CCME
	Ni	µg/L	69	82	61	CCME
	Se	µg/L	2	2	2	BC WQO
	Ag	µg/L	0.25	0.25	0.25	SSWQO/CCME
	U	µg/L	86	31	15	SSWQO/CCME
	Zn	µg/L	13	15	11	CCME (draft)

Note: all metals and metalloids are as total unless otherwise noted

# Proposed Water Quality Objectives – Non Degradation

Parameter List	Units	Proposed Water Quality Objectives		CC-4.5 Generic Guideline (for comparison only)	YUK-5.0 Generic Guideline (for comparison only)	Regulatory Source for Generic Guideline	
		Coffee Creek CC-4.5	Yukon River YUK-5.0				
Dissolved Parameters	SO <sub>4</sub>	mg/L	77	25	218	309	BC WQO
	Nitrate-N	mg/L	0.6	0.2	3	3	BC WQO
	Nitrite-N	mg/L	0.05	0.05	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	0.04	0.03	1.91	1.02	BC WQO
CN <sub>WAD</sub>	µg/L	0.5 (DL)	0.5 (DL)	5	5	BC WQO	
Total Metals and Metalloids	Sb	µg/L	0.14	0.2	9	9	BC WQO
	As	µg/L	0.6	1.3	5	5	CCME
	Cd	µg/L	0.05	0.21	0.12	0.14	CCME
	Cu	µg/L	4.2 <sup>1</sup>	5.5 <sup>1</sup>	2.84	3.48	BC WQO
	Fe	µg/L	349	2066 <sup>1</sup>	1000	1000	BC WQO
	Pb	µg/L	0.21	1.1	2.06	2.66	CCME
	Hg	µg/L	0.01	0.01	0.026	0.026	CCME
	Mo	µg/L	0.74	1.3	73	73	CCME
	Ni	µg/L	1.5	4.6	73	86	CCME
	Se	µg/L	0.1	0.56	2	2	BC WQO
	Ag	µg/L	0.007	0.02	0.25	0.25	CCME
	U	µg/L	3.6	1	15	15	CCME
	Zn	µg/L	5.2	17 <sup>1</sup>	17	13.5	CCME (draft)
Dissolved Metals and Metalloids	Al	µg/L	263 <sup>1</sup>	45	50	50	BC WQO
	Sb	µg/L	0.12	0.12			
	As	µg/L	0.49	0.54			
	Cd	µg/L	0.031	0.06			
	Cu	µg/L	3.3 <sup>1</sup>	1.7			
	Fe	µg/L	203	59	350	350	BC WQO
	Pb	µg/L	0.055	0.06			
	Hg	µg/L	0.01	0.01			
	Mo	µg/L	0.68	1.25			
	Ni	µg/L	1.3	1.7			
	Se	µg/L	0.12	0.5			
	Ag	µg/L	0.005	0.005			
	U	µg/L	3.8	1			
Zn	µg/L	2.2	2.8				

Yukon River and Coffee  
Creek

All values for CC-4.5 and YUK-5.0 are 90th percentile of data unless otherwise noted.  
1: based on 95th percentile of data  
DL = detection limit

- **Toxicity studies performed using *Ceriodaphnia dubia* (water flea), the most sensitive organism to Uranium exposure (CCME, 2011)**
- **Previous studies included:**
  - Site water exposure:
  - Water from sample site CC1.5 - 31 µg/L no effects to survival or reproduction
  - Water from sample site HC2.5 – 78 µg/L no effects to survival or reproduction
- **Site water collected during June period spiked with additional Uranium (0 to 351 µg/L)**
  - DOC – 9.8 mg/L
  - No survival threshold calculated due to lack of toxicity at exposure concentrations (up to 351 µg/L)
  - Reproductive threshold IC25 > 351 µg/L



## New Toxicity Test Using 3 Aquatic Species

- Fish: rainbow trout fry (*Oncorhynchus mykiss*)
- Invertebrates: *C. dubia*
- Algae: *Pseudokirchneriella subcapitata*



Rainbow trout



*C. dubia*

## Toxicity Test

- Fish, invertebrate and algae were exposed to collected site water (winter conditions, low DOC) from CC1.5 and HC2.5 plus a laboratory control. Endpoints included survival (acute) for all species; reproduction (chronic) for *C. dubia*; and growth (chronic) for algae and rainbow trout fry
- Uranium spiked site water (Only for *C. dubia*) with concentrations up to 1,000 µg/L, in addition to laboratory control. Endpoints included: Survival (acute) and reproduction (chronic)



*P. subcapitata*

# Toxicity Test Results

- Site water exposure - all species
  - ✓ CC1.5 - 32 µg/L no effects to survival, reproduction, or growth
  - ✓ HC2.5 – 86 µg/L no effects to survival, reproduction, or growth
  
- Spiked U in site water collected during winter period for *C. dubia*
  - ✓ DOC – 4.5 mg/L

Endpoint		CC1.5	HC2.5
<b>Survival</b>		U Concentration (ug/L)	
LC50	Lethal Concentration	> 1,066	> 1,115
NOEC	No Observed Effect Concentration	1,066	1,115
<b>Reproduction</b>		U Concentration (ug/L)	
IC25	Inhibitory Concentration	359.9	521.9
NOEC	No Observed Effect Concentration	381	446.5



- **Proposed water quality objective of 31 and 86 µg/L is supported by:**
  - ✓ Naturally occurring conditions particularly when stream flows are low
  - ✓ Toxicity test using *C. dubia* indicates no acute or chronic effects at concentrations > 1,066 µg/L and 381µg/L, respectively
- **Further testing to be conducted using site water during the open water period (high DOC) with *C. dubia***
- **Toxicity test using metal mixtures for metals of interest**

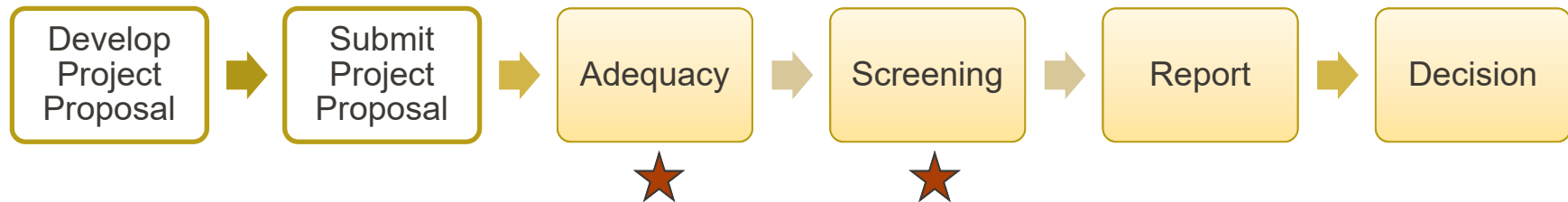


# ENGAGEMENT & CONSULTATION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## The Coffee Project requires an Executive Committee Screening Under YESAB:



- The Coffee Gold Mine Project Proposal is currently under adequacy review by the Yukon Environmental and Socio-Economic Assessment Board (YESAB).
- Feedback is heard and incorporated into the Project Proposal prior to submitting:
  - Community Meetings & Open Houses
  - Comment cards
  - Comments received via the Coffee Feedback Protocol
  - Interviews, dialogue and collaborations First Nations and stakeholders
- Your feedback is also heard and addressed while the Project Proposal is in the “Screening” stage of the process via the YESAB Online Registry.

- **Provides a transparent, replicable and confidential process for listening and responding to community ideas, questions and concerns.**
- **We commit to maintaining respect throughout the process will investigate all topics related to Coffee Gold activities.**
- **Contact us with your comments**
  - Toll-free Phone: 1-844-330-0277
  - Email: [coffee.feedback@Goldcorp.com](mailto:coffee.feedback@Goldcorp.com)
  - In person or writing at the Whitehorse office: Attn: Community Relations Dept. Suite 201-208 Main Street, Whitehorse, Yukon, Y1A 2A9





# QUESTIONS & DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



# Thank you

## Contacts:

[Name Redacted]

[Name Redacted] <sup>13</sup>  
[@goldcorp.com](mailto:[Name Redacted]@goldcorp.com)

[Name Redacted]

[Name Redacted] [@goldcorp.com](mailto:[Name Redacted]@goldcorp.com)



We look forward to working  
with Yukon Communities

**Tr'ondëk Hwëch'in and Goldcorp Teleconference – Northern Access Route Follow Up****June 22, 2017 9:00 am – 9:30 am**Attendees:

[Name Redacted]

**Discussion**

Objective for the call is to discuss the information sent by TH to Goldcorp on Maisey May vs Black Hills. LGL (hereafter TH) gives an overview of the reason behind the review of the analysis, used a method used by the Federal Government (multiple accounts analysis).

Goldcorp will be adding a few pieces under the engineering and road safety to capture this consideration more clearly.

Goldcorp asks about the categories, rating the categories rather than the sub-accounts, noting that rating the categories might make it more effective. TH replies that the indicators likely won't stay where there's overlap. This is to get an idea of what TH's interests are, so some might drop off due to overlap, some might drop off due to lack of information.

Goldcorp asks about the differences between the routes, TH replies that column E that informs this.

Goldcorp has feedback to provide, and will look to discuss internally the information gaps and what can be done about them. Then looking at the product at the end of the analysis. TH explains that TH didn't expect a workshop, looking for information and perhaps a call.

LGL did not budget for this work, this isn't something LGL knew they were going to be doing for Tr'ondëk Hwëch'in, it is something that has come up.

TH is looking for the total package of impacts and comparative analysis, and then look at what the information points to in terms of route.

The quality of information may not be ideal, but can probably come up with an approximation for the indicators TH is interested in. Goldcorp doesn't have a lot of capacity if something requires field studies. Goldcorp wants something robust that TH feels comfortable with, but want to be transparent on that. TH replies that if the results come back so divergent, then lack of information on one account won't sway the decision the other way.

TH notes that if Goldcorp needs information, ask TH. TH notes that coming up with the scale for scoring the indicators, might need some discussion.

## Next Steps:

- Goldcorp to provide a draft of the information to TH, then set up a call to discuss. Goldcorp looks at this as concluding the NAR route at the end of this discussion on this analysis.
- Goldcorp's engineering manager to prepare a memo on the safety and engineering pieces, then internally Goldcorp will review the other aspects of the indicators listed by TH.
- Goldcorp will get back to TH shortly with a timeline.

# AGENDA

**Selkirk First Nation – Goldcorp  
Coffee Project Site Tour  
June 23, 2017**

**Location:** Coffee Camp

**Participants:**

**Selkirk First Nation (SFN)**

**Chief and Council members**  
[Name Redacted]

**(2) SFN Elders**  
(names to be confirmed)

**SFN Support and Staff**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

Time	Activity	Participants
7 :00	Alkan Charter depart from Whitehorse	[Name Redacted]
8:30	Alkan Charter depart from Dawson	[Name Redacted]
10:00	Alkan Charter depart from Pelly Crossing	SFN Attendees
10:30 – 11:00	Safety Orientation	All
11:00 – 12:30	Tour of camp site facilities, barge landing, core shack	All
13:00 – 15:45	Helicopter Tour of Project Area,	All

# AGENDA

	including site layout	
16:00	Alkan Charter depart Coffee Site for Pelly Crossing	SFN Attendees
17:30	Alkan Charter depart Coffee Site for Whitehorse	[Name Redacted]

## Dress Code

Please note that temperatures at the sites during this time are forecasting to be between 5°C and 20°C. Layered clothing and a light winter jacket is recommended to accommodate the fluctuation in temperatures.

## PPE

Close toed shoes are to be worn by each visitor, all other PPE required for the tour will be provided by the site.





# Goldcorp Coffee Project

Q2 2017

 **GOLDCORP**

- **Introduction – About Goldcorp**
- **Project Overview**
- **Northern Access Route Overview**
- **2017 Activities**
- **Project Proposal Submission & YESAB Process**

- **Goldcorp is a leading gold producer focused on responsible mining practices with safe, low-cost production throughout North and South America:**
- **Canadian company headquartered in Vancouver**
- **Over 15,000 employees worldwide**
- **Primary product is gold, with silver, copper, zinc and lead by-products**
- **Committed to responsible mining practices and well positioned to deliver long term value**

# Goldcorp Locations - Overview of Goldcorp



[Name Redacted]



# Goldcorp's Vision & Values



**Goldcorp subscribes to a number of industry initiatives to ensure we operate in accordance with industry best practice on environmental, safety, community and security issues.**





All Goldcorp sites (including Coffee) must implement the Sustainability Excellence Management System (SEMS):

- **Integrated approach to safety, environmental, social and security performance that adheres to best practice**
- **Covers topics such as:**
  - Water management
  - Tailings management
  - Local employment and procurement
  - Risk and impact management
  - Community investments
- **Follows the “Plan, Do, Check, Improve” formula to ensure continuous improvement**
- **Rigorous compliance and accountability process through audits, site self-assessments and internal and external reporting**



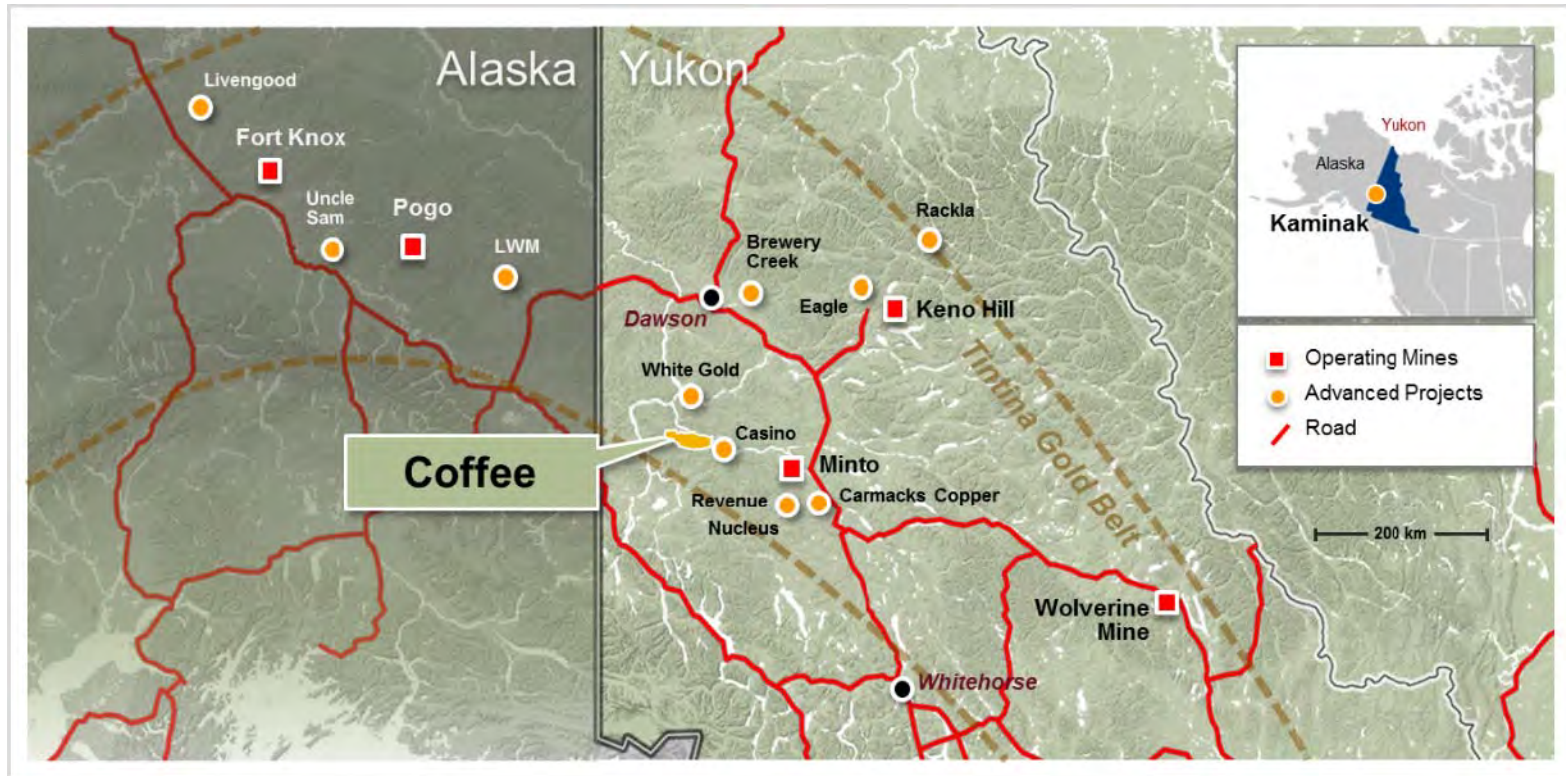


# COFFEE PROJECT OVERVIEW

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Coffee Project Location





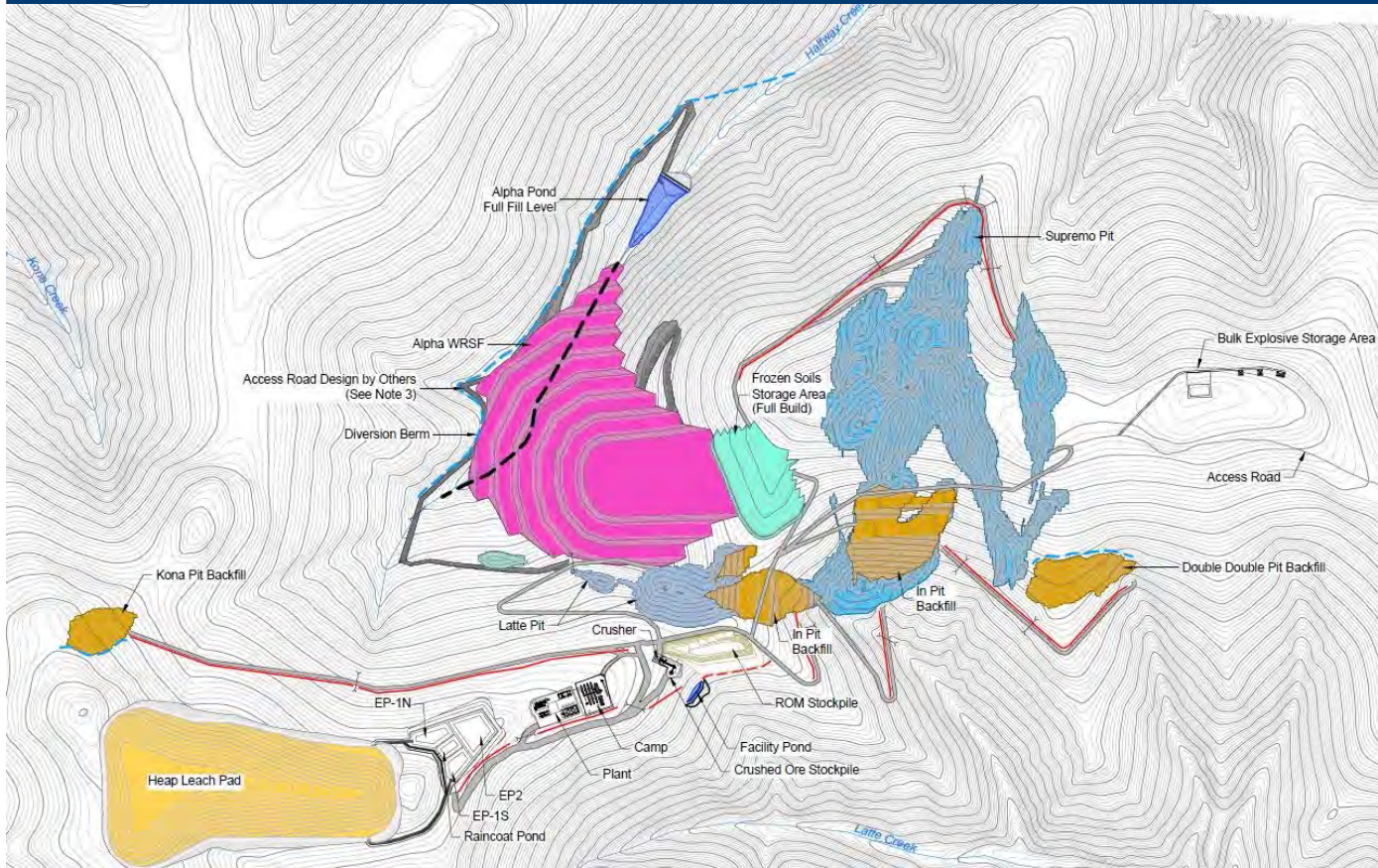
# Project Overview

## Mine Site:

- Expected 10-12 year mine life with additional 11 year closure period
- Ore is processed by cyanide oxide heap leach process on a conventional pad
- Open pit, conventional truck-and-shovel operation, looking at fleet automation

## Employment:

- Over 400 people during construction, approximately 320 people during operations
- 2-weeks-on, 2-weeks-off, primarily transported via air from Whitehorse or Dawson



- 4 open pits
- Heap Leach Facility
- 1 Waste Rock Storage Facility
- 4 In-pit backfill areas
- Soil stockpiles for reclamation





# Coffee Gold Project's Northern Access Route

Proposed Strategies for Management

 **GOLDCORP**

- **Goldcorp's Coffee Gold Project proposes to use the 214 km Northern Access Route (NAR) originating 16 km outside of Dawson City to the Coffee property south of the Yukon River.**
- **The NAR will cross the Yukon & Stewart Rivers:**
  - During open flow, Goldcorp will utilize barges to cross; When frozen, ice roads will be constructed; no land access to site during freeze up and thaw periods.
- **Of the route, over 80% is existing road:**
  - The NAR follows the government-maintained Hunker Road to Sulphur Creek; Past Sulphur Creek is user-maintained road
  - New build is approximately 37 km; Majority of new build is located between the Stewart and Yukon Rivers (Ballarat/Barker areas) with additional portions to connect to Maisy May north of the Stewart.
- **Construction and Operational Management Plans proposed with Project Proposal**
  - Estimate average of 8 trucks per day
- **Goldcorp's recognizes that the road is a shared asset. Goldcorp underscores the need for open and transparent dialogue with first nations and stakeholders prior to determine appropriate management strategies.**

# Road Route Design Objectives

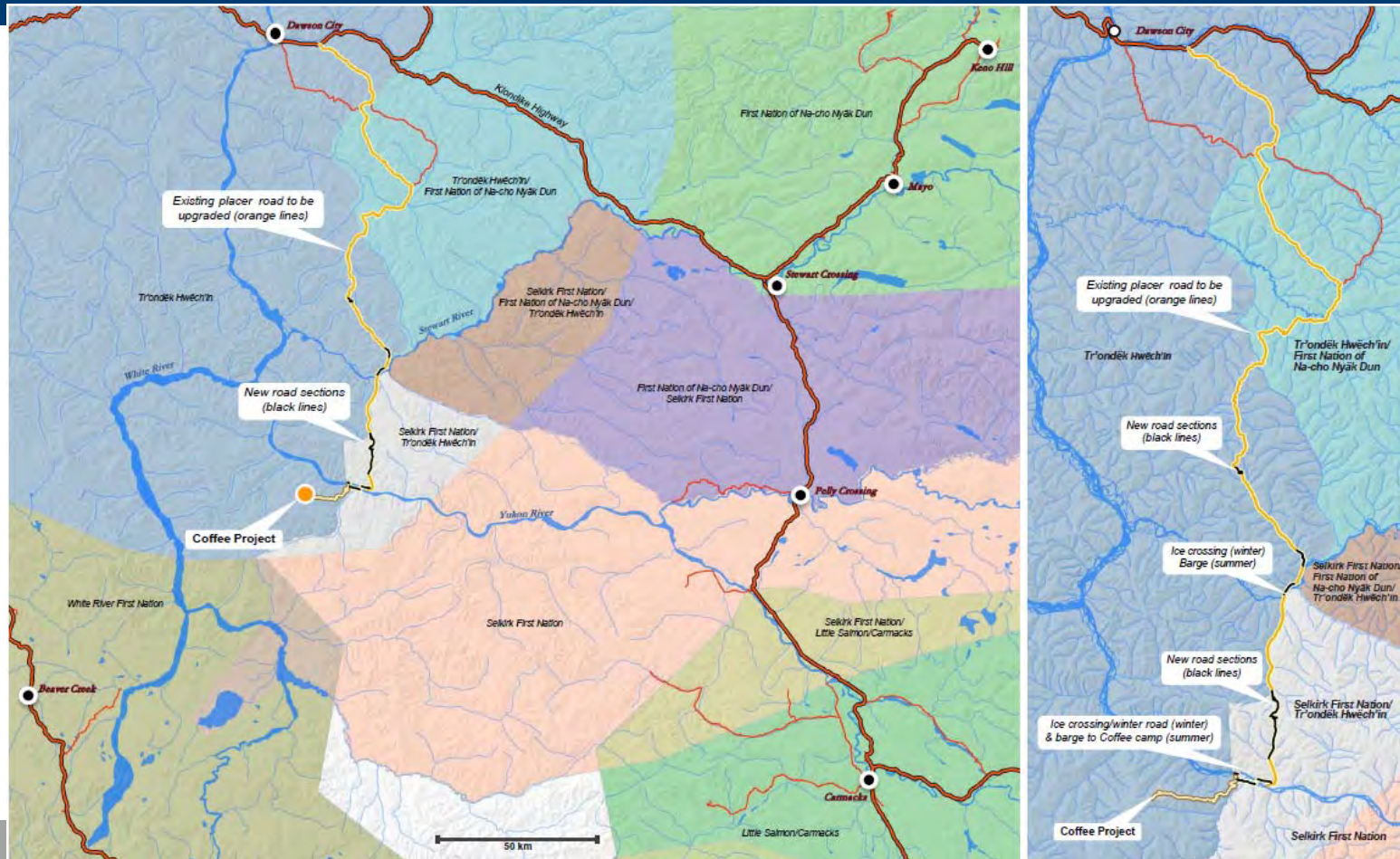
15

- **Follow existing roads**
- **Minimize disturbance, particularly to sensitive features**
  - Archaeological and cultural heritage sites
  - Wildlife, biological, habitat
  - Permafrost
- **Minimize road length**
- **Ensure safety for all users along the route**
  - Design parameters

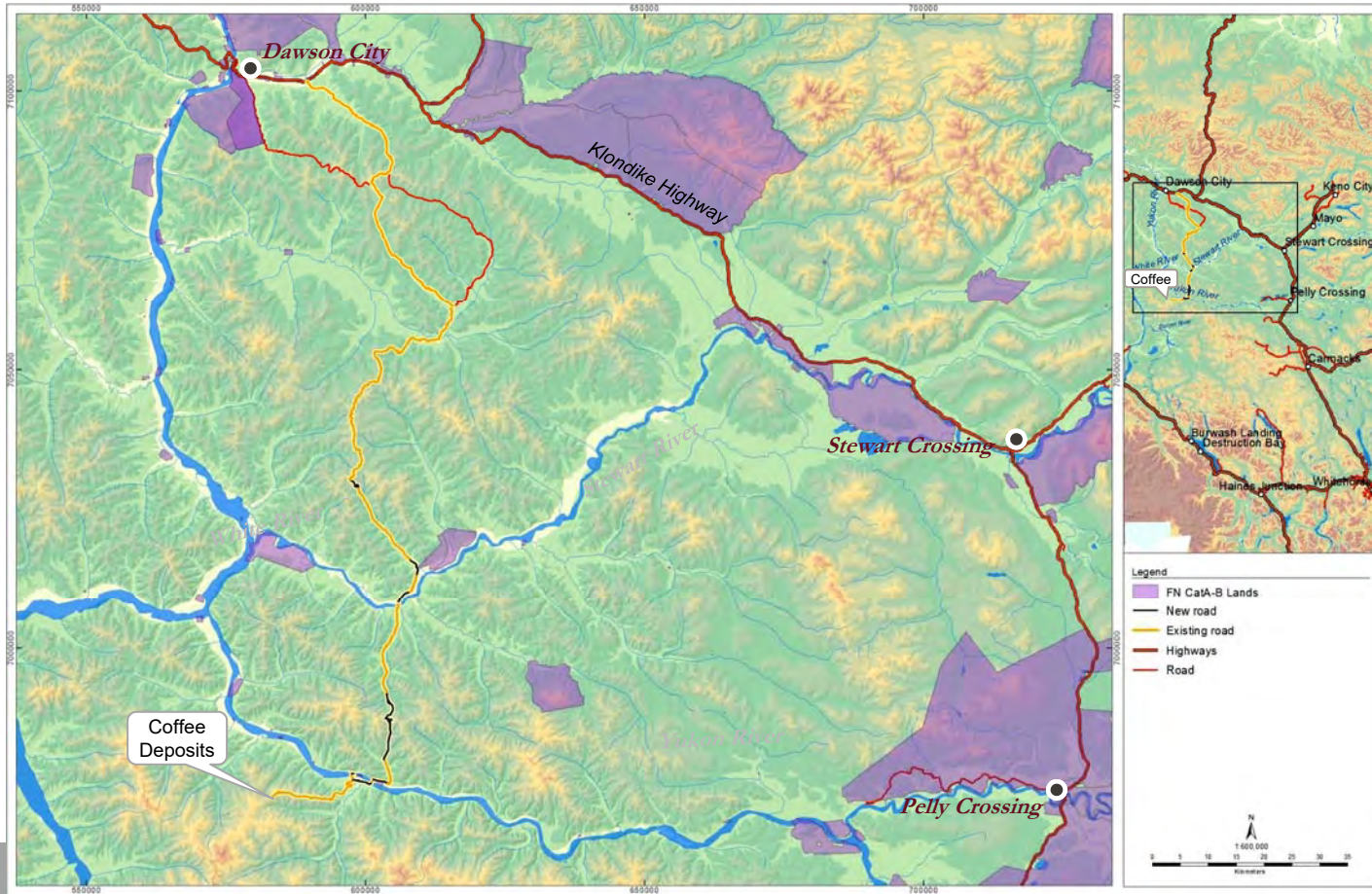




# Northern Access Route - Context

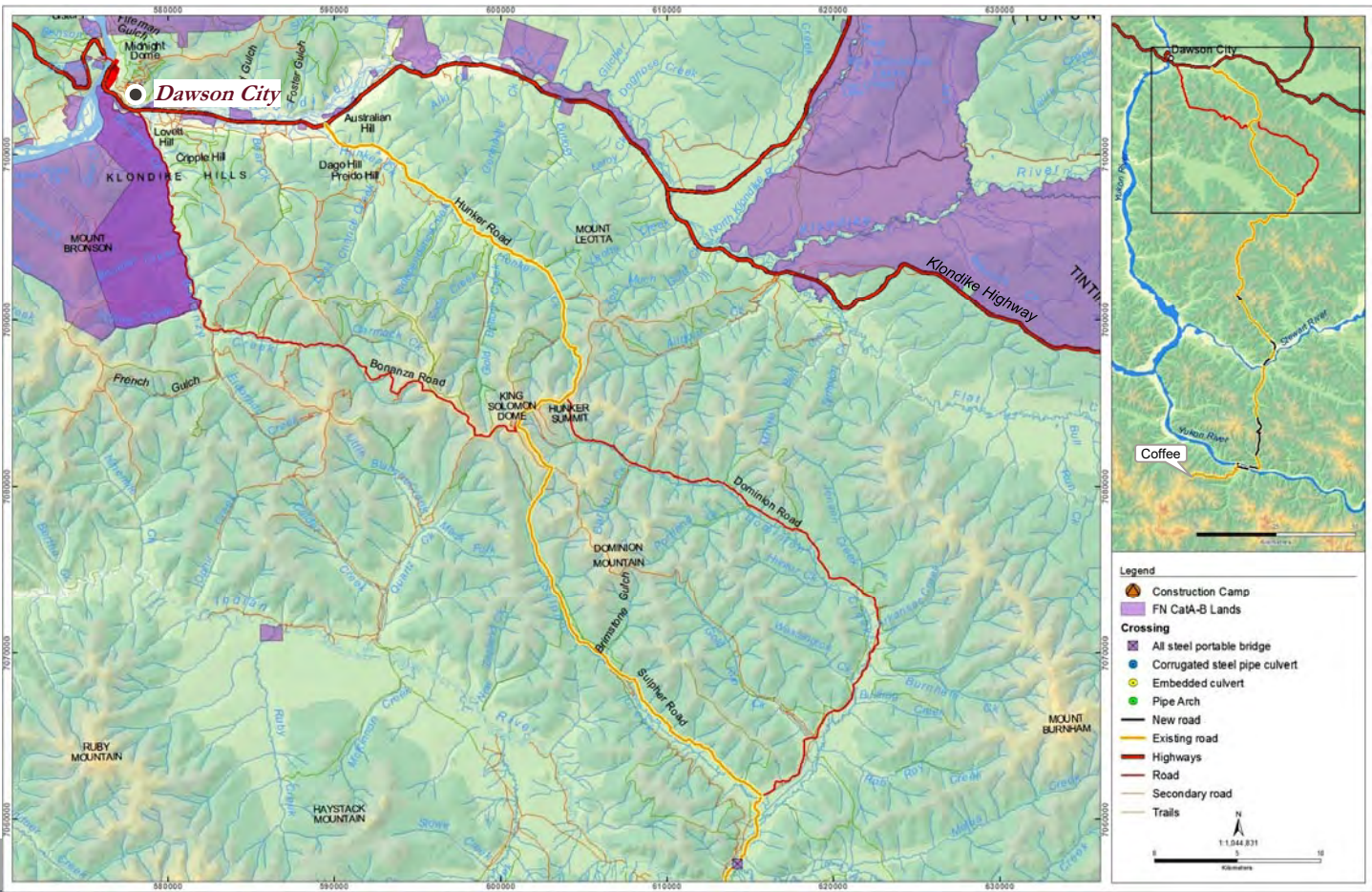


# Northern Access Route – Full Route

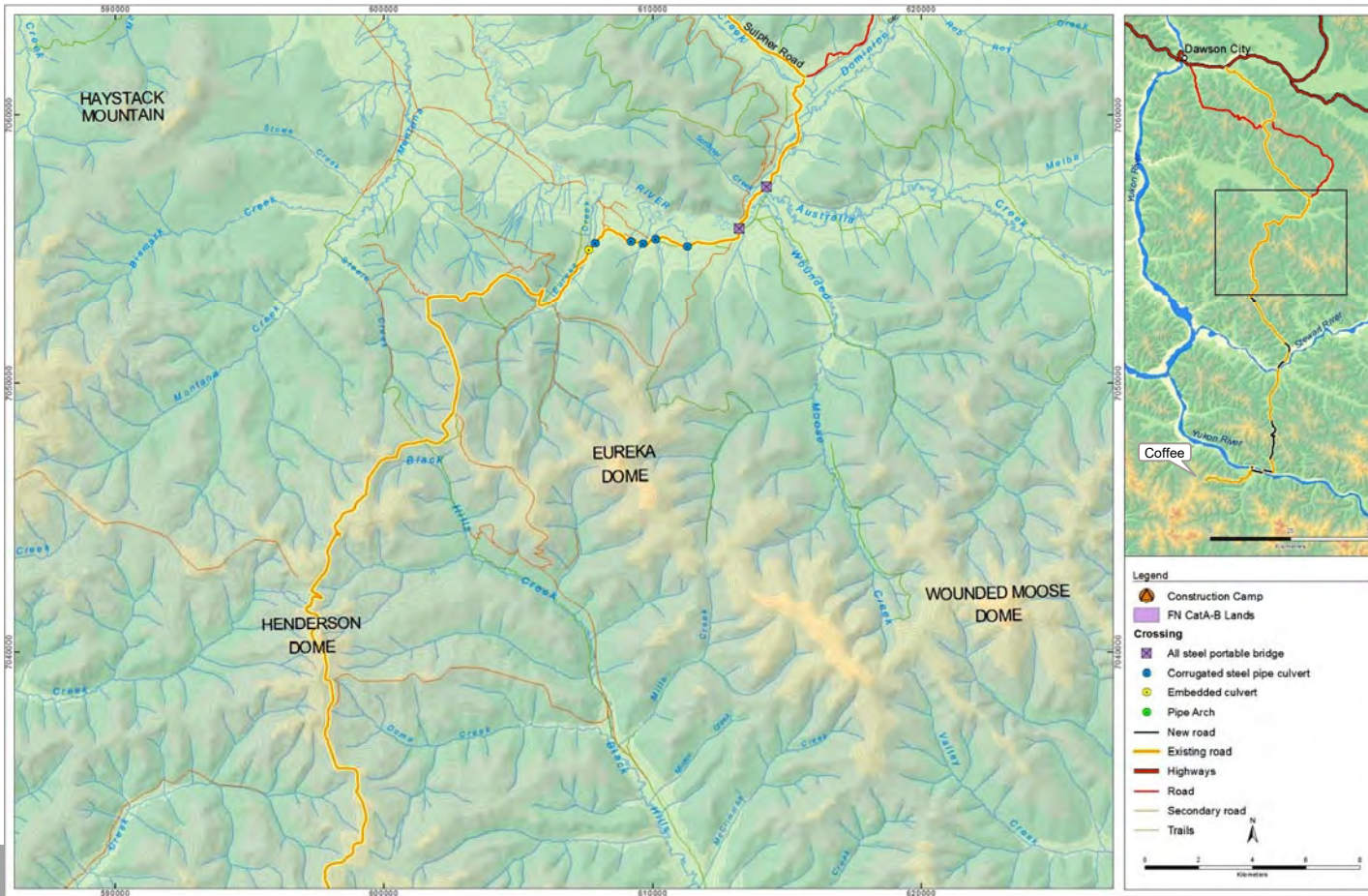




# Northern Access Route – Dawson City to Granville

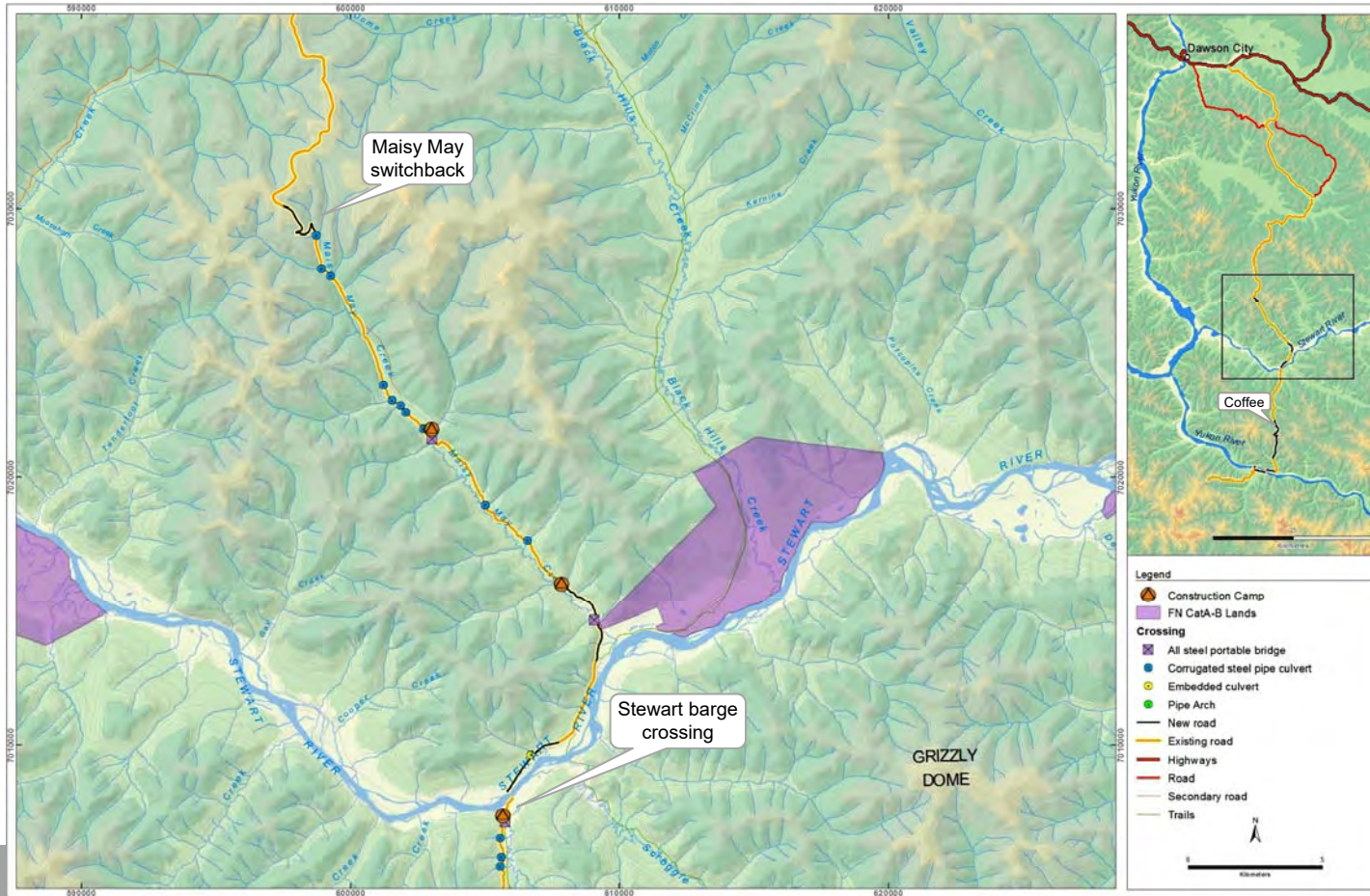


# Northern Access Route – Granville to Henderson



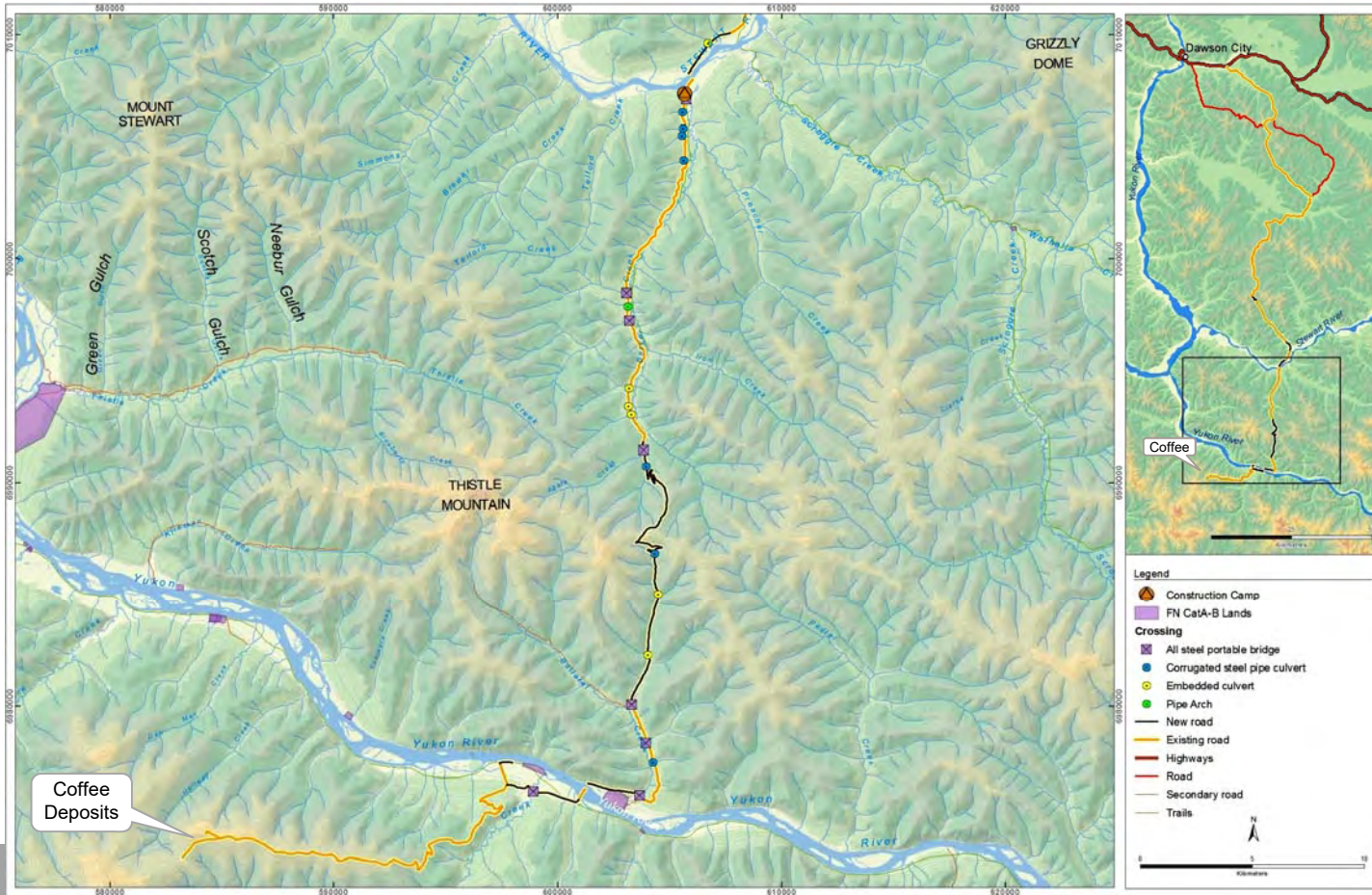


# Northern Access Route – Maisy May / Stewart River





# Northern Access Route – Stewart River to Coffee Creek



## Road Management

22

- **Currently the road up to Sulphur creek is maintained by YG**
- **Beyond YG it is user-maintained public road on crown land with active placer claims**
- **Current users:**
  - Placer miners (during operation season Mar-Nov)
  - Trappers, hunters
  - First Nations (traditional uses such as harvesting)
  - Yukon Quest/River Quest/Yukon Ultra
- **Road maintenance has been conducted primarily by placers.**



## Next Steps: Assessing Options for Management

- **Given that the road is on crown land and well used by a number of other actors, Goldcorp proposed 3 potential strategic approaches to road management:**
  - YG management
  - Goldcorp Management
  - Public-Private Partnership
- **Goldcorp's recognizes that the road is a shared asset. Goldcorp underscores the need for open and transparent dialogue with first nations and stakeholders prior to making a decision.**





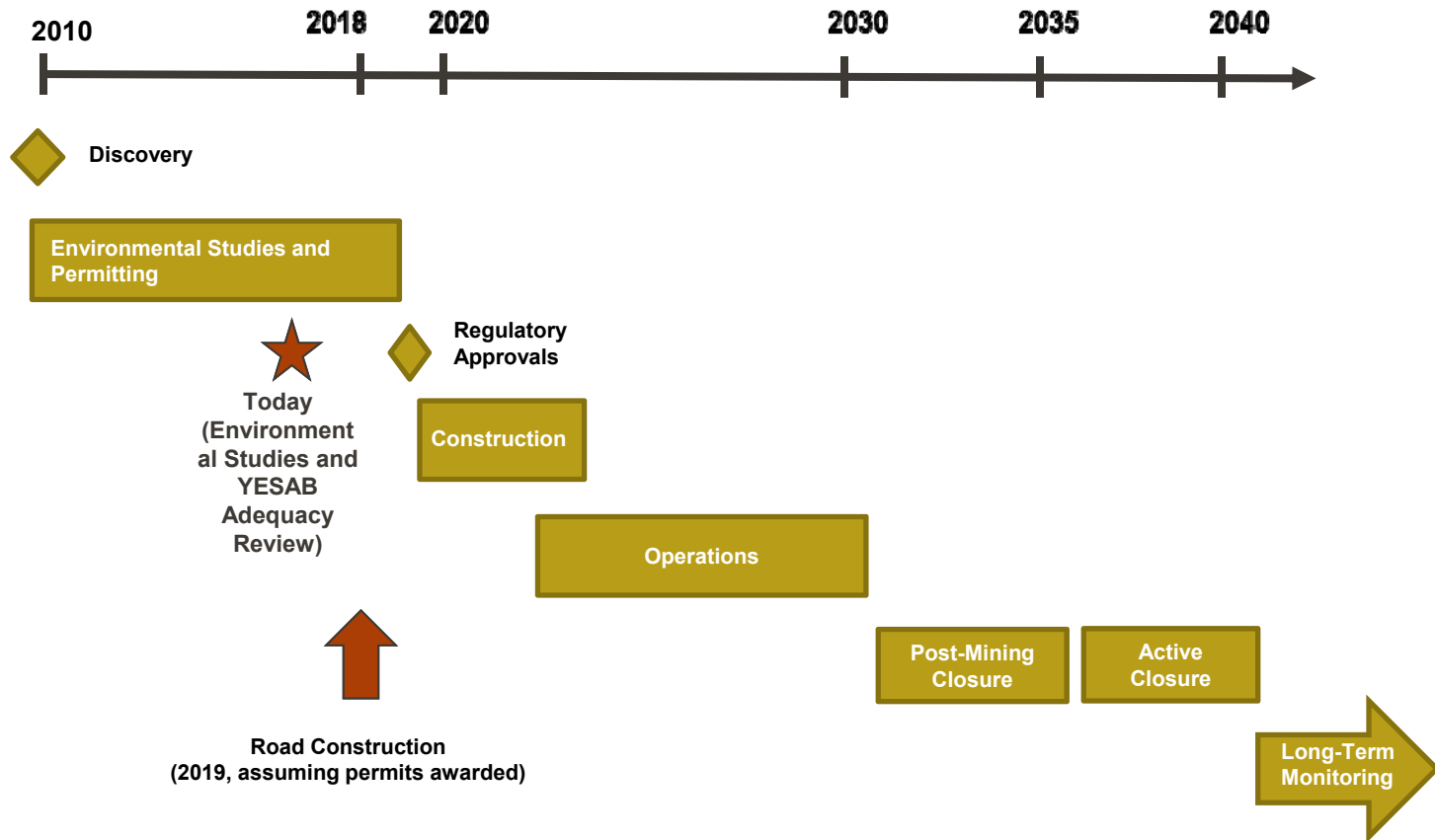


# PROJECT UPDATE

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Project Schedule



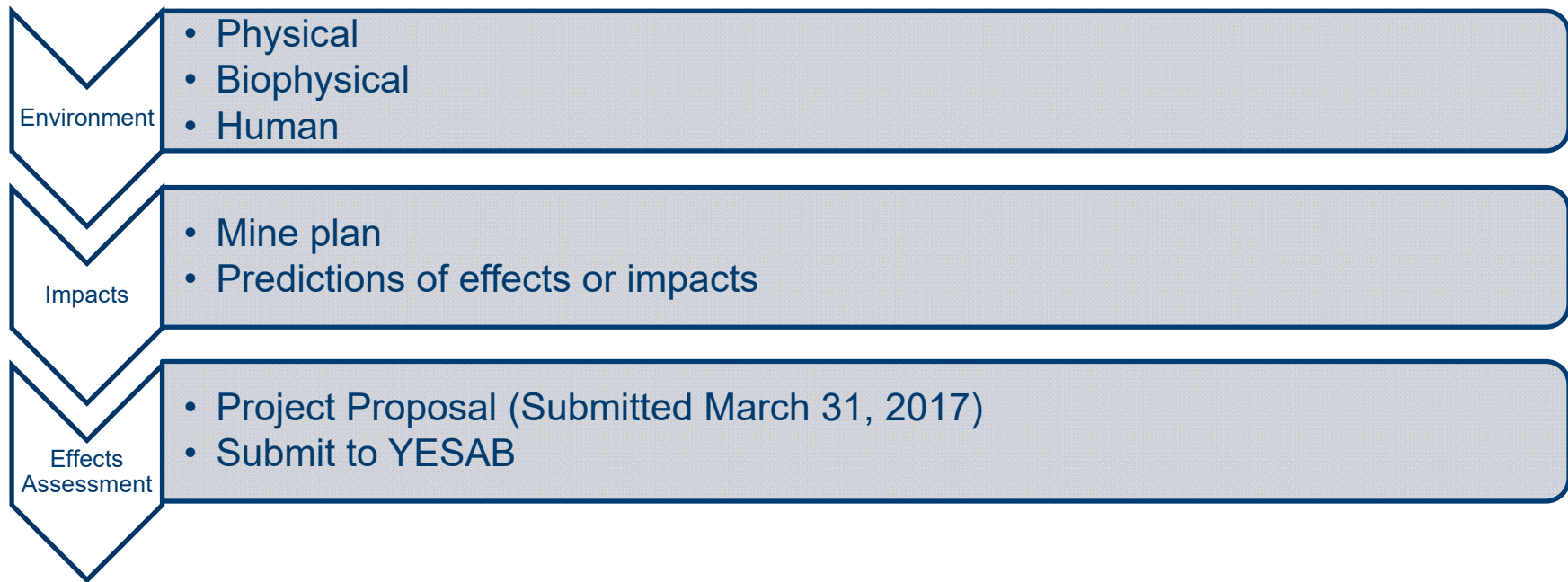




# YESAB APPLICATION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP



### Valued Components (VCs):

- Environmental, social, economic topics that could be potentially impacted by the project.
- tailored the selection of VCs to Yukon

Baseline  
Studies



Physical Environment

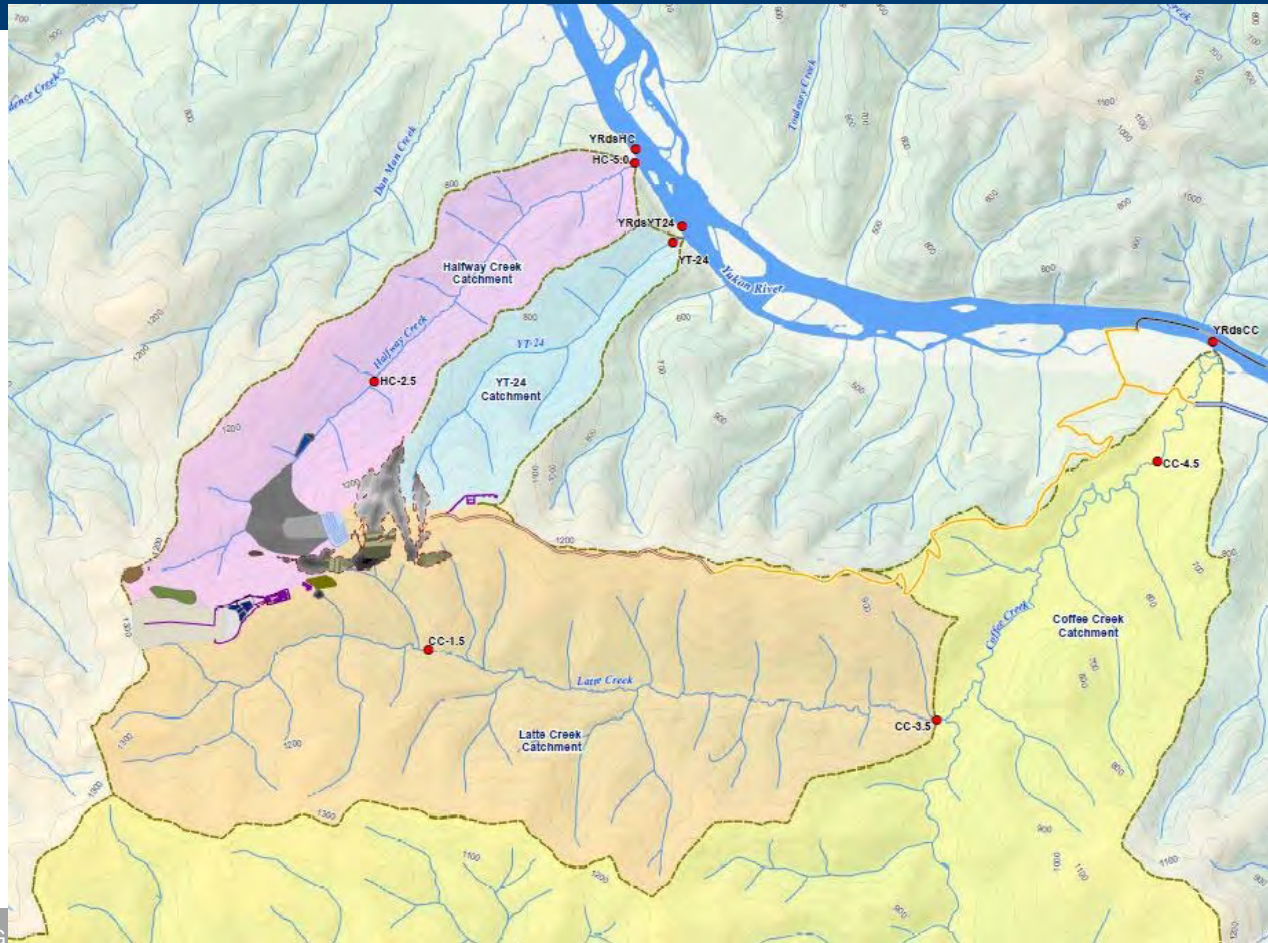
Biophysical Environment

Human Environment

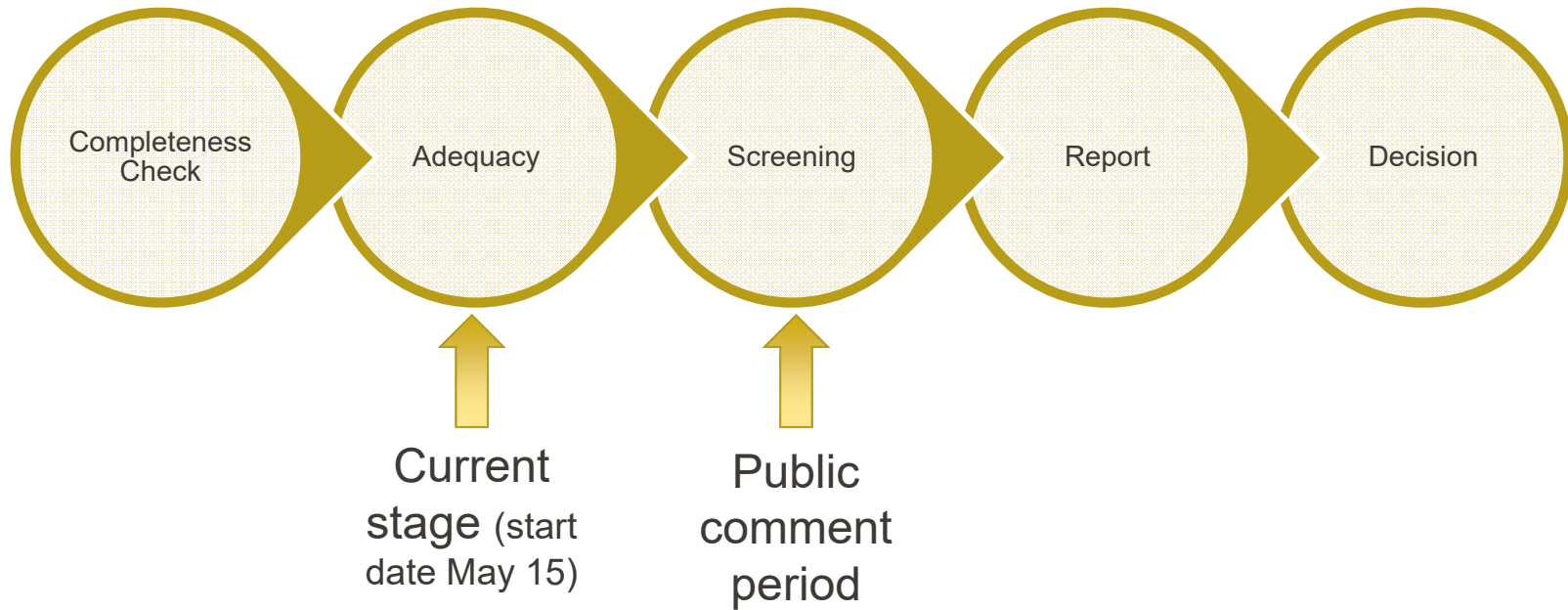
- **Fish & Fish Habitat**
- **Vegetation**
- **Wildlife & Wildlife Habitat**
- **Groundwater**
- **Hydrology**
- **Air Quality**
- **Noise**
- **Surficial Geology, Terrain & Soils**
- **Surface Water Quality**
- **Birds & Bird Habitat**
- **Demographics**
- **Economic Conditions**
- **Social Economy**
- **Community Infrastructure & Services**
- **Education Services Land & Resource Use**
- **Community Health & Wellbeing**
- **Heritage**



# Watersheds









# ENVIRONMENT & CSR 2017

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## Environmental Monitoring

- Ongoing Baseline covering: wildlife, vegetation, fish, water quality, hydrology, groundwater, meteorology
- 5 environmental monitors on site and road

## Reclamation Research

- Partnership with Yukon College & University of Saskatchewan
- Native seed collection

## Setting up Systems & Procedures

- Sustainability Management Plan
- Community Response Protocol
- Community Investment protocol



## Other Initiatives

### Orientation & Planning

- Site orientation on safety, environment, heritage chance find protocols

### Strategic Planning:

- Understanding Local economic development – procurement and hiring opportunities
- Community Contributions
- Consultation and Engagement







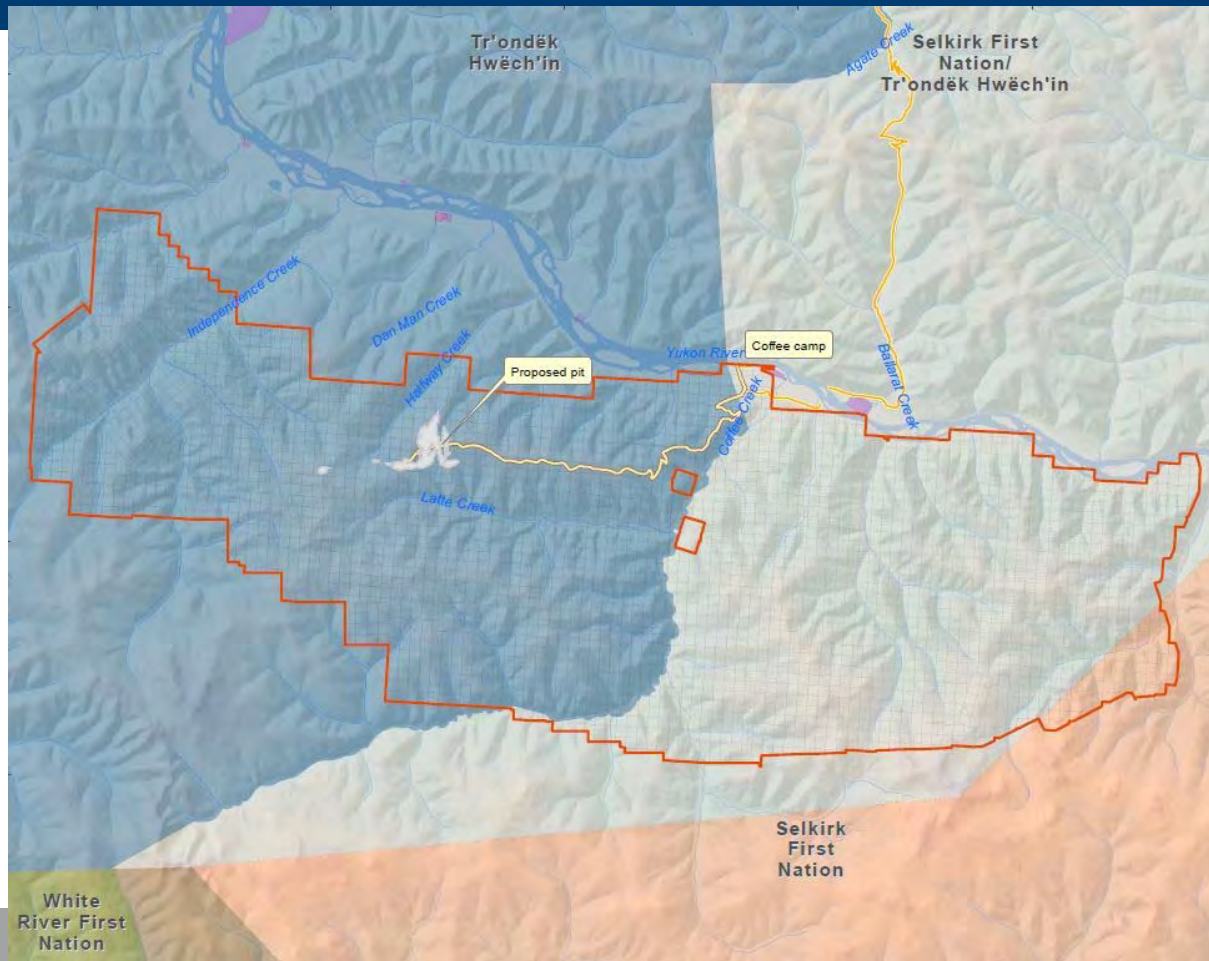
# COFFEE LAND PACKAGE AND EXPLORATION

TOGETHER, CREATING SUSTAINABLE VALUE

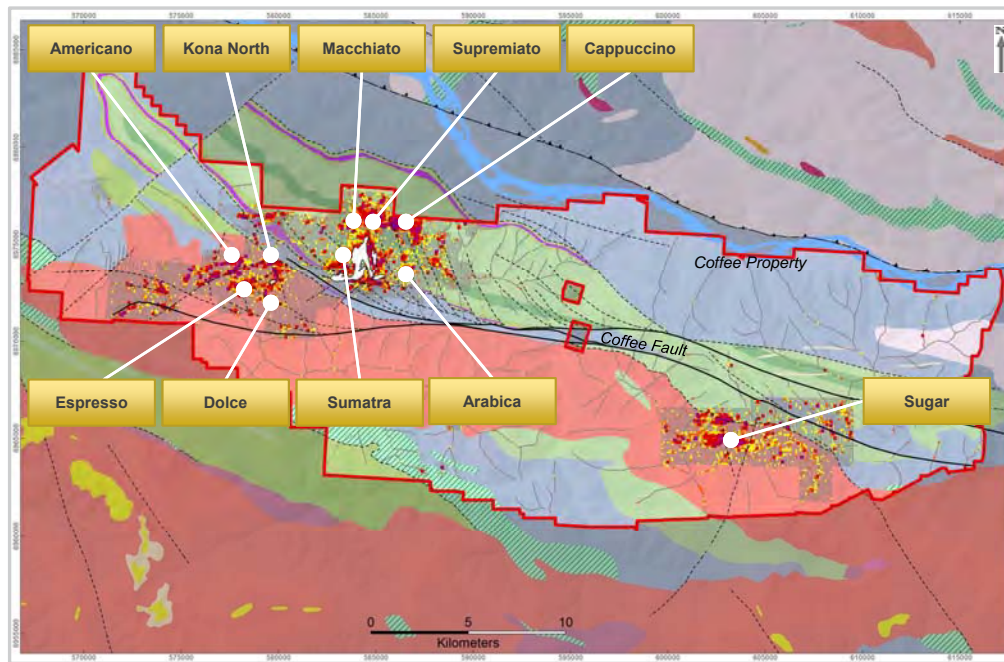
 GOLDCORP



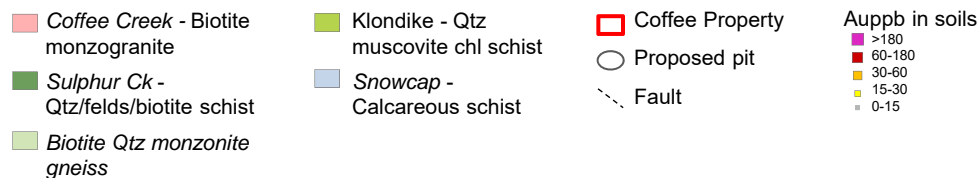
# Coffee Property



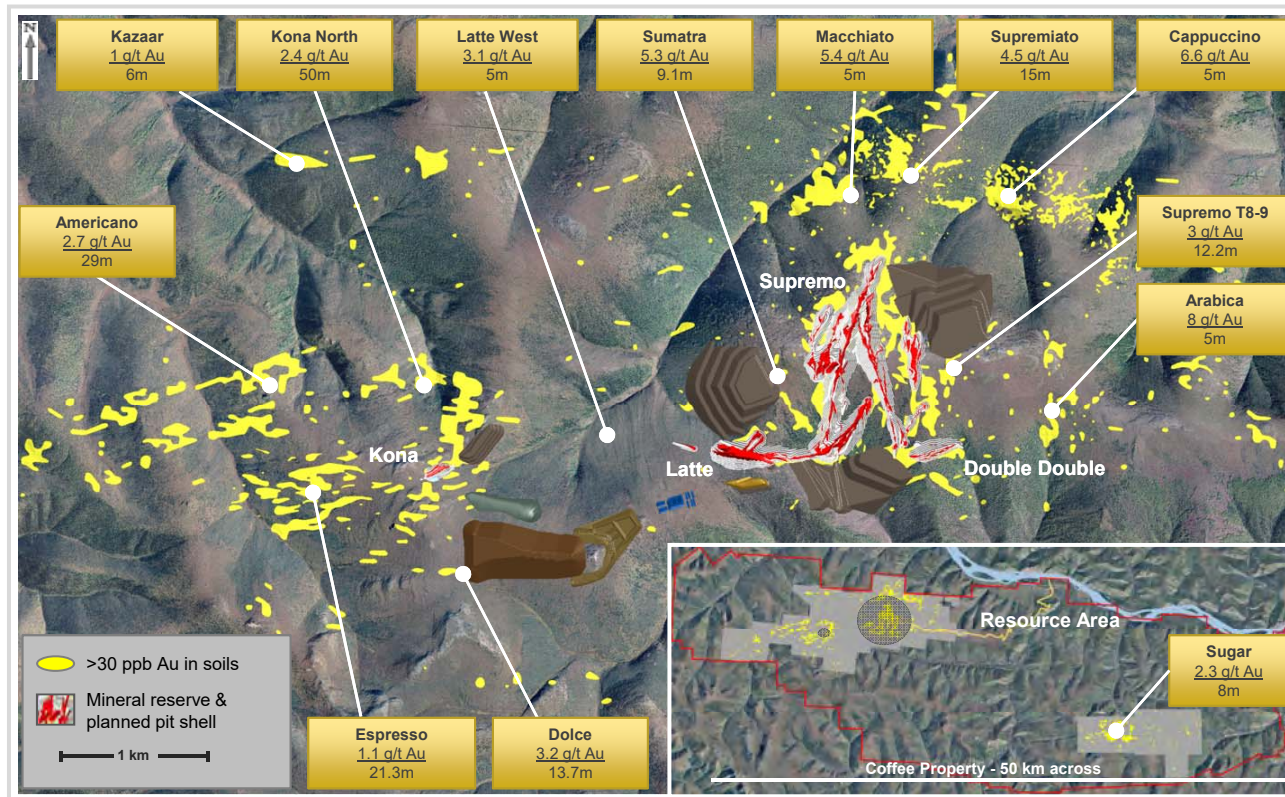
# Coffee Gold Project – Property Geology and Exploration



- District scale exploration potential within a 60,000 hectare land package
- Pipeline of soil anomalies to be drill tested
- Coffee property straddles the prospective Coffee Fault system which controls gold mineralization

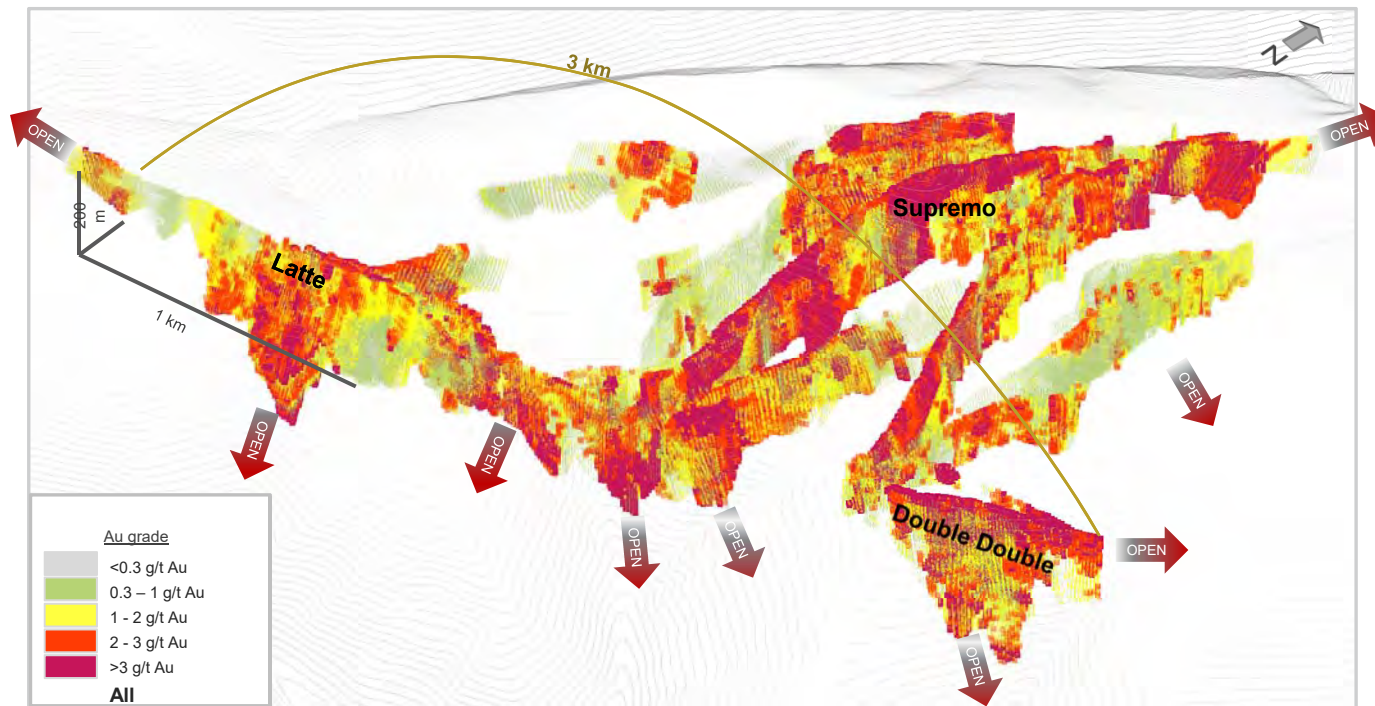


# Coffee Project – Exploration Drilling Highlights





# Coffee Deeper Potential



- All deposits remain open down dip
- Drilling rarely extends deeper than 200 metres below surface
- Metallurgical testwork is underway to investigate process path for sulphide mineralization

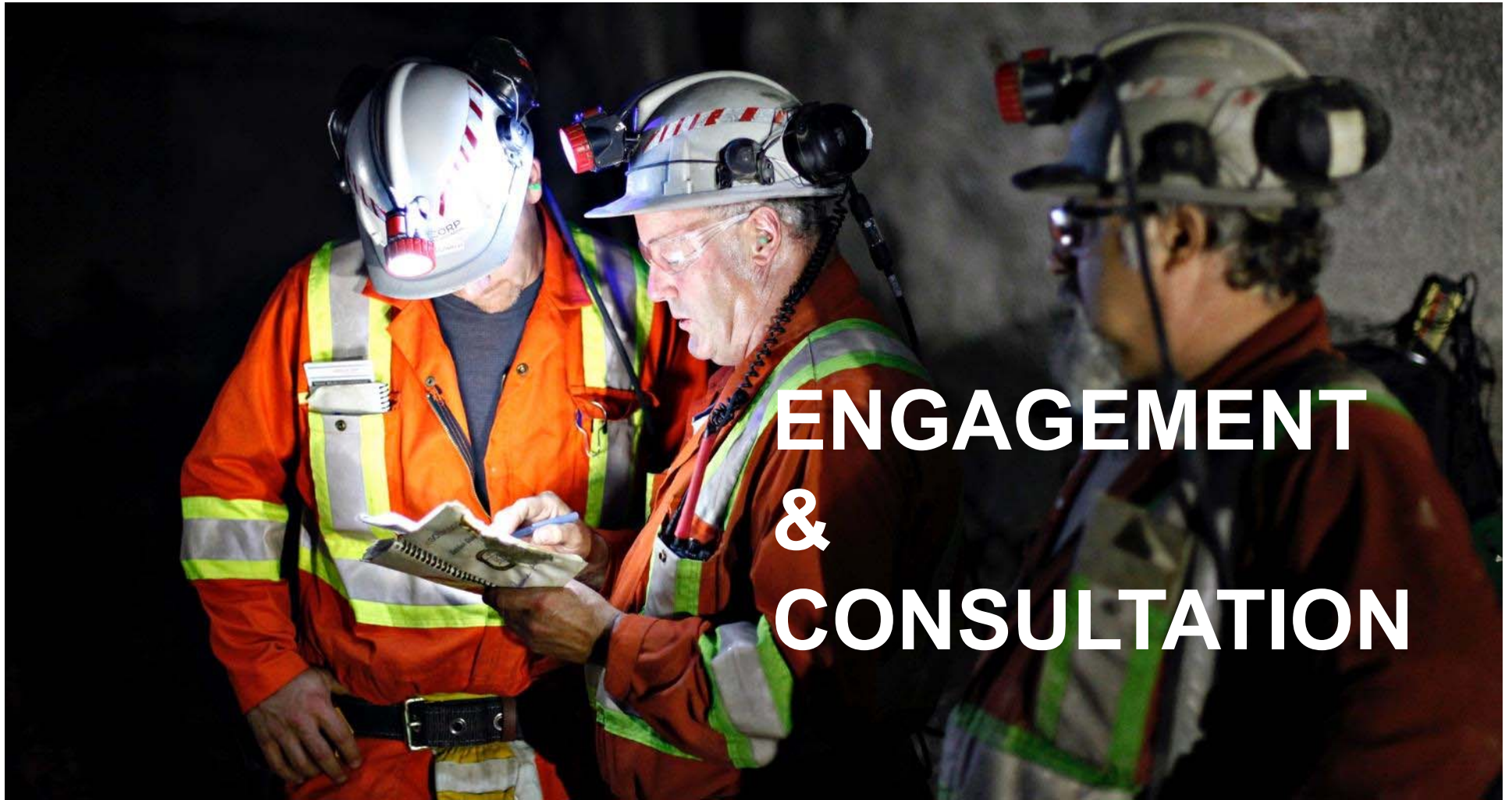
## 2017 Exploration

40

- **'Near Mine' Exploration adjacent to the proposed mine plan**
- **New exploration zones in the west and north**
- **Metallurgical testwork and deeper exploration to test beneath the proposed mine**
- **Exploration throughout the property to create a pipeline of new targets**







# ENGAGEMENT & CONSULTATION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

- **Provides a transparent, replicable and confidential process for listening and responding to community ideas, questions and concerns.**
- **We commit to maintaining respect throughout the process will investigate all topics related to Coffee Gold activities.**
- **Contact us with your comments**
  - Toll-free Phone: 1-844-330-0277
  - Email: [coffee.feedback@Goldcorp.com](mailto:coffee.feedback@Goldcorp.com)
  - In person or writing at the Whitehorse office: Attn: Community Relations Dept. Suite 201-208 Main Street, Whitehorse, Yukon, Y1A 2A9

## **Initiatives supported in 2016:**

- **Yukon Quest, Moosehide Gathering, Festival of Trees, Yukon Native Hockey Tournament, Adäka Festival and much more!**

## **Our objectives are:**

- Respond to local needs and opportunities
- Support initiatives that build economic, social and cultural capacity
- Create a positive social and economic legacy
- Build and support partnerships in the local community

## **Key areas for investment:**

- Arts & Culture
- Community Development
- Education
- Environment
- Health





# QUESTIONS & DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

Thank you

**Contacts:**

[Name Redacted]

[Name Redacted] <sup>13</sup>  
[@goldcorp.com](mailto:[Name Redacted]@goldcorp.com)

[Name Redacted]

[Name Redacted] [@goldcorp.com](mailto:[Name Redacted]@goldcorp.com)



**We look forward to working  
with Yukon Communities**



## July 14, 2017 – Tr'ondëk Hwëch'in and Goldcorp Closure Teleconference

### Attendees:

### Goldcorp Representatives:

[Name Redacted]

## Summary of Discussion

### Meeting Objective:

Objective of the meeting is to revisit soil discussions from closure session on June 5. TH representative adds that [Name Redacted] wanted GC and TH reps to discuss closure further today.

### Discussion Topics and Views Presented:

TH rep discusses their review of the Project Proposal, asks about Goldcorp's responses to the views presented in the TH memo.

Goldcorp discusses the closure plan and the need to add more information regarding soil available for closure. Goldcorp has reviewed the data, and there may be more soil available for cover than originally reported in Feasibility Study. The Closure Plan will be updated to better capture how Goldcorp is doing what they can to characterize soil and volumes available, as well as what can be done to generate more soil cover. Goldcorp will be investigating characteristics of the soil cover, such as infiltration information, through detailed design. The Closure Plan iterations will say more about cover of the WRSF and what Goldcorp is trying to achieve; more details will be available through detailed design and the licensing process.

Lorax (hereafter Goldcorp) notes that there is additional geotechnical work being done currently at site, and part of that will look closely at overburden volumes that could be available as part of the pre-stripping program. All soil cannot be salvaged from disturbed areas, as some soil must be left as a buffer to prevent permafrost degradation, and Goldcorp's teams are currently investigating this in further detail. There will be an update on those soil volumes available in the short-term. The numbers currently

do not include the availability of the frozen soil stockpile material, and that is an area to look at for additional material as well. These uncertainties are flagged in the Closure Plan. The frozen soil stockpile is recognized, and the capacity of the frozen soil stockpile can potentially accept additional organic matter such as peat potentially. Goldcorp's consultant adds that section 5 of the appendix to the Closure Plan (Appendix 31-C-A) discusses doing further work to analyze the potential for using the frozen soil. As things progress with the Project, reclamation research, and geotechnical program, Goldcorp will get a better sense of the availability of soil as the Project progresses.

TH rep presents views on soil quality and quantity based on information presented by Goldcorp:

- Notes that Goldcorp may want to consider that soil developed in situ is better quality than waste material, don't bother characterizing compared to waste material, unless you're planning to have 90% coarse fragment.
- Notes that they understand that Goldcorp is using the best information available for soil calculations, but they believe that the numbers can be more optimistic. TH rep acknowledges that Goldcorp is working to improve that.
- TH's team has questions around end land use planning and doing hydro ecological mapping, meaning incorporating what TH and others want the site to look like at the end of the Project to source reclamation materials needed to meet these objectives.

Goldcorp's considerations:

- As discussed in the June 5 meeting with TH, Goldcorp has engaged Justin Straker on the topic of hydro ecological mapping/modelling.
- Goldcorp has followed up recently with Justin, and have spoken to SRK about engaging Justin in their work.
- Goldcorp is open to something related to the topics presented by TH's consultants, but Goldcorp wants to ensure that whatever study is done is fit for purpose, and is not in a position today to say what the study should be.
- Goldcorp needs to consider end land use objectives and confirm what these are before performing long term planning.
- Goldcorp is open to advancing that area of planning in collaboration with TH and Goldcorp wants to make sure that what is done fits the site needs short term and long term.
- Goldcorp doesn't mean to be non-committal during this meeting, but wants to know what is needed and ensure that anything that is done suits the needs of the Project.

TH reps' responses to Goldcorp's considerations:

- Notes that it sounds like Goldcorp is working on this and that engaging Justin is the first step. This is a good opportunity for community engagement and what TH's end land use objectives are, and getting a plan for that engagement.

#### **Engagement on End Land Use Planning Discussion:**

Goldcorp notes that work on vegetation started with Kaminak, and this previous work in collaboration with Yukon College ties in nicely with the views TH's reps raised in the meeting. Engagement on land use objectives is the next step. Goldcorp's consultant notes that some of the views raised in the technical memo from TH to YESAB regarding the Project Proposal can be part of this.

TH's reps present views:

- TH rep agrees that developing prescriptions requires input from the studies being done, but notes that engagement and end land use objectives inform those studies that need to be done. End land use planning needs to be developed at this time, it is critical.
- TH rep would like to see a better closure plan moving forward.
- TH rep notes that the TH farm would possibly be able to be used from TH's perspective in closure
- TH rep asks when Goldcorp will know about being able to cover the Alpha WRSF in closure
- TH rep notes that it would be important for TH to see reclamation in a positive context, as the current perspective TH has on reclamation is of placer mining reclamation, and this is not a positive outlook for TH
- Next steps for TH are discussing a group within TH that could communicate this future closure engagement to a larger group within TH

Goldcorp considers and responds to TH's rep's views:

- Goldcorp replies that they want to see the next iterations of the Closure Plan include more engagement with Tr'ondëk Hwëch'in. Goldcorp will be engaging with TH on how they want this engagement to move forward.
- Related to covering the Alpha WRSF, Goldcorp is looking at this now, it appears that some cover will be available. There will be geotechnical information this fall that can help determine this a bit more. Goldcorp is looking at this in detail, and the commitment is to use the soil that Goldcorp currently knows we have, but the details aren't known now. Goldcorp will know more soil characteristics and volumes at the end of the year. Goldcorp commits to updating TH on the information from the current geotechnical program at the end of 2017.
- To help TH understand reclamation in Yukon, Goldcorp is considering bringing TH to the Brewery Creek mine to look at areas of success related to reclamation. There is active reclamation at Minto being done right now on the WRSF.
- Goldcorp wants TH integrated in the closure discussion, and will put this forward in an engagement proposal. To date, there has been a set technical group, but if there are others from government and community then Goldcorp is open to that.

Goldcorp and TH rep discuss ongoing consultation meetings and Goldcorp's plan for further technical engagement that will be proposed to TH shortly.

Goldcorp updates TH rep on the progress of the responses to TH's comments on the Project Proposal; Goldcorp is working on the responses currently.

### **Reclamation and Closure Plan Discussion**

TH's reps present views on the Reclamation and Closure Plan:

- TH rep asks about the uncertainty on overburden balance and asks when this will be resolved.
- TH rep wants to know when TH would see a revised closure plan.

Goldcorp considers and responds to TH's rep's views presented:

- Goldcorp is working on determining the overburden balance, it will take approx. 4 months in the near term, depends on drilling results. Goldcorp will have to do analysis once the information is received.
- Goldcorp will work with TH on updating the reclamation and closure plan. Goldcorp hasn't started revisiting the costing for reclamation and closure, so there is some internal planning to do on the closure plan prior to engagement with TH on the update.

### **Additional Discussion**

Goldcorp explains the discontinuation of the adequacy review of the Project. This is to allow for further consultation.

TH rep notes that after the positive experiences with the site visit and community meeting, TH would like to take a collaborative approach. TH ants to include Jen McConnachie and move forward in a collaborative way. Goldcorp agrees, needs to determine next steps in engagement.

Goldcorp's consultant notes a transcription error within the open pit areas, for example there's a line missing – Kona was 30.3 HA, that should've been Latte pit, however the header numbers in bold are correct and the areas for the categories are correct. 358 Ha is the area to be reclaimed, will re-issue the table so that calculations people do can be accurate. The table is total disturbance over life of mine.

TH asks if there's a compatible map with the disturbance areas, Goldcorp replies that this is in the Reclamation and Closure Plan and are tied to figures 2.11, 2.12, 2.13.

TH requests a new table and map that is annotated with disturbance areas, Goldcorp agrees.

End of meeting.

### **Action Items**

1. Goldcorp will update TH when the results of the current geotechnical program become available (approx. December 2017).
2. Goldcorp will provide a closure map that is annotated with disturbance areas.

# Minutes

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project  
July 25th, 2017**

***Project Engagement Meeting Minutes***

**Location:** Conference Call (dial-in info to be provided)

**Time:** 9:00am – 10:00 am

**Participants:**

**Tr'ondëk Hwëch'in (TH)**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

[Name Redacted] recorded minutes.

Meeting commenced at 9:06 am and ended at 9:48 am.

**Chairperson:** Goldcorp

1. Update from Goldcorp on plans and timing of next steps for environmental assessment of Project.
  - a. Goldcorp confirms today's agenda with TH.
  - b. TH begins the meeting, asks about the update on Coffee re-submission and what Kaminak will need to do to get to those next steps. TH is meeting with YESAB today regarding next steps on the Coffee Project. TH hopes the steps forward are smoother than before, TH doesn't see this as a big wall to get through.
  - c. Chief Joseph met with SFN Chief regarding the Coffee Project. TH and SFN did not finish their discussion, TH hopes that SFN will be more receptive to understanding the mining project in TH traditional territory. SFN has a large concern with respect to the Northern Access Route (NAR) proposed in the area of overlap with TH and SFN traditional territory. TH and SFN discussed the Klaza Caribou Herd, TH told SFN there have been no sightings of the Klaza Caribou Herd in TH traditional territory. TH hopes that this eases SFN's concerns about the Klaza.
  - d. Goldcorp asks if TH has talked to NND; TH has not had any discussions with NND, as NND did not send any comments on the Project to YESAB. Goldcorp notes that YESAB's letter was clear that Goldcorp needs to engage with NND. TH replies that NND is respecting that NND doesn't use any of that area [referring to the northern part of the NAR in the area of overlap between NND and TH



# Minutes

- traditional territories], TH will think about NND engagement and discuss internally, and will get back to Goldcorp about this. TH talked to NND some time ago, and NND has a lot of things to deal with in their own traditional territory, and they don't need to add more to their plates. TH states that the NAR isn't used by NND citizens. It is used by TH citizens and mining companies.
- e. Goldcorp provides an update on the progress on the re-submission, Goldcorp feels that it will take a few months to get to a good position with SFN and NND in engagement for the Project. Goldcorp has been reaching out consistently to both Nations for engagement, and needs to hear more back from SFN to keep engagement going. There have been a few meetings with NND. Goldcorp highlights that any support from TH in this engagement with SFN and NND is appreciated. YESAB has been clear that Goldcorp's attempts and meetings so far have not been enough with neither SFN nor NND.
  - f. TH will have further discussion internally about this and will see how TH can provide advice or be involved in engagement with the other First Nations for the Project.
  - g. TH looks forward to further technical workshops on waste management and water management. Goldcorp agrees, sees follow up and engagement on water management, closure and reclamation of the Waste Rock Storage Facility (WRSF), and the ongoing NAR discussion. Goldcorp hopes to have the *Maisy May vs Black Hills* information to TH early next week. Goldcorp notes that water management includes water quality discussions, and will also look to schedule a Heap Leach Facility (HLF) session as well.
  - h. TH wanted to reconnect on next steps. TH agrees that water quality and water management and Site Specific Water Quality Objectives, HLF and reclamation, and the NAR comparative analysis are key topics for engagement from TH's perspective. TH notes that they think that YESAB's letter was interesting and made statements on consultation, but didn't say much more.
  - i. TH asks where things were left between Goldcorp and YESAB, asks if more technical information is needed as well, or if it was just a consultation matter for Kaminak to overcome for resubmission. Goldcorp explains that it has to do with consultation. Goldcorp needs to get the consultation done and re-submit. There was no indication that any additional technical work needed to be done from YESAB. Goldcorp is meeting with YESAB later this week to understand more about what the re-submission will look like. The re-submission will have to show that adequate consultation has taken place and show where any changes in the proposal have taken place.
  - j. TH asks if YESAB gave any criteria or a checklist for consultation. Goldcorp explains that the initial conversation with YESAB was quite brief, and the meeting later this week will hopefully give Goldcorp more clarity. YESAB's letter to Goldcorp referenced s. 50(3) and the letters from SFN and TH as guidance for Goldcorp in closing the gaps in consultation. Goldcorp will hear what YESAB has to say about Goldcorp's plan to move forward in coming months with consultation.
  - k. Goldcorp doesn't want to submit something that won't get through the YESAB process. Goldcorp wants to take the time to get it right, currently Goldcorp sees the end of November for re-submission. Goldcorp acknowledges that this is pretty heavy engagement over the next few months.
  - l. TH confirms that Goldcorp is not looking to re-submit the whole proposal, unless something came up in consultation that required changes to the Proposal. Goldcorp confirms this.
    - i. ACTION: TH will provide feedback to Goldcorp next week regarding consultation and re-submission.
2. Next meeting of technical teams
- a. Goldcorp notes a road and a site tour may be the end of August. Goldcorp will send the NAR analysis to TH next week. Goldcorp and TH confirm August 22<sup>nd</sup> as the date for the road/site tour. TH has to check with their technical team before confirming.
  - b. Goldcorp suggests a water session on September 12 in Whitehorse, TH confirms September 12<sup>th</sup> works for the session.
  - c. Goldcorp proposes a WRSF and mine design session on September 26 in Whitehorse. TH asks if the 26 is on the HLF and closure as well, Goldcorp can look into this. TH and Goldcorp confirm that September 28<sup>th</sup> is the date for this technical session.

# Minutes

- d. Goldcorp proposes October 17 for a closure workshop and October 31 for socio-ec, but as dates are confirmed can work on the details of the topics. TH confirms that October 17<sup>th</sup> works for a closure workshop.
  - e. Goldcorp notes that these technical workshops can also be opportunities for TH and Goldcorp to discuss Goldcorp's responses to TH's IRs provided.
  - f. Goldcorp and TH can discuss the NAR review during the road tour, and can look to schedule a NAR discussion on September 12 if needed and depending on TH's feedback on the information provided by Goldcorp in the NAR analysis.
- 3. Workplan for negotiations
    - a. Goldcorp and TH discussed negotiations.
- 4. Update on Capacity Funding
    - a. Goldcorp and TH discussed capacity funding.
- 5. Other
    - a. Goldcorp looks forward to [Name Redacted] feedback regarding Goldcorp's next steps with YESAB.
    - b. TH wants to reconnect with Goldcorp after both parties meet with YESAB. Meeting at 9 am on Friday to debrief.
      - i. ACTION: Goldcorp will send a meeting invite for Friday, July 28 at 9:00 am (complete)

**MEMORANDUM**

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<b>Date:</b>	August 16, 2017
<b>To:</b>	Tr'ondëk Hwëch'in
<b>From:</b>	Goldcorp
<b>Re:</b>	Maisy May and Black Hills routes comparative analysis

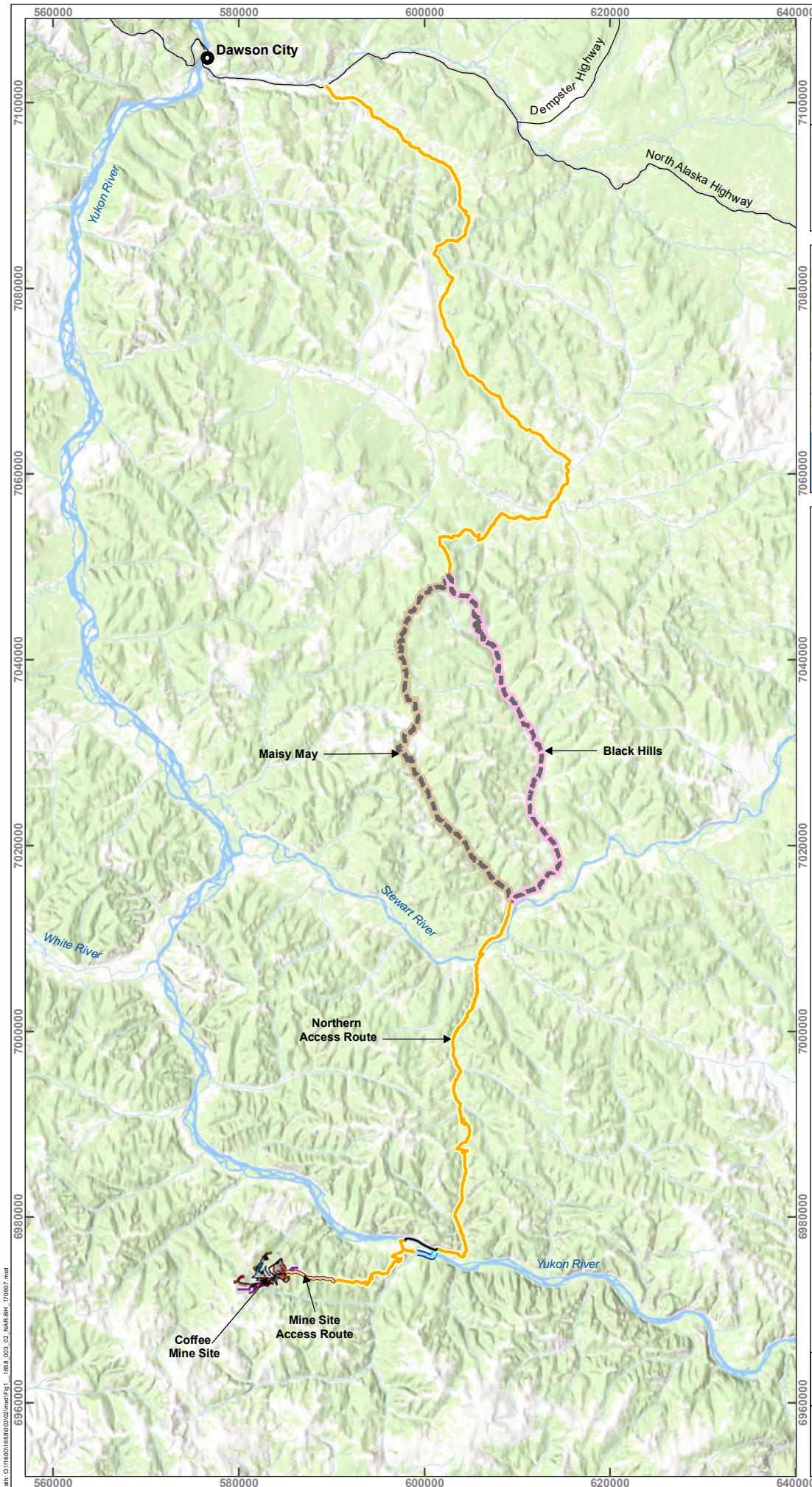
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**1.0 OVERVIEW AND PURPOSE**

This memo describes the results of an options analysis between the Maisy May and Black Hills portions for the Northern Access Route. On June 13, 2017, Tr'ondëk Hwëch'in (TH) provided a route analysis worksheet requesting a quantitative comparative analysis between Route 1 (Maisy May) and Route 2 (Black Hills) (See Figure 1) that considers the impacts of the construction and operation of these alternative portions on valued components that TH identified to be of interest. Both proposed route options are located entirely within TH's Traditional Territory.

Initially, Goldcorp provided a report to TH describing the engineering and technical constraints of each of the route options. This report is included in Appendix A.

To address this request, Goldcorp has worked with TH to provide a robust comparison between the two route options, where availability of data allows. At the request of TH, Goldcorp has conducted a multiple-criteria decision analysis (MCDA) between the two routes, following the format and methodology provided to Goldcorp by TH. This memo summarizes the methodology employed, the analytical results, and the conclusions of the MCDA.



**COFFEE GOLD MINE**

**Maisy May and Black Hills Route**

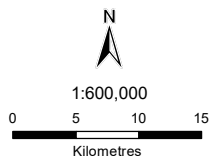


**Legend**

- Highway
- Black Hills Route
- Maisy May Route
- Stewart River Ice and Barge Crossings
- Yukon River Barge Route
- Yukon River Ice Road
- Winter Road
- Mine Site Access Route
- Northern Access Route

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.



NAD 1983 UTM Zone 7N  
Page Size: 8 1/2" x 11"

Figure 1	Date: Aug 7, 2017	Drawn by: JS	Reviewed: CPK
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## 2.0 METHODOLOGY

At the request of TH, Goldcorp conducted the MCDA using the methodology outlined in Environment Canada's (2016) Guidelines for the Assessment of Alternatives for Mine Waste Disposal (the Guidelines). The Guidelines provides a flexible and transparent methodology for evaluating multiple alternatives, and includes a mechanism for evaluating the sensitivity of results to potential bias.

Using the framework and accounts, sub-accounts and indicators provided by TH as a starting point, Goldcorp completed the MCDA by providing comparative data relevant to the two alternatives, where baseline or engineering data allowed. Goldcorp also added select additional accounts, sub-accounts and indicators where it was felt by Goldcorp that additional data points would lead to a more informed decision (e.g., engineering, safety and technical data). The MCDA was conducted for the following scenarios:

- Base case TH weightings
- Base case Goldcorp weightings
- For both TH and Goldcorp weightings, the following sensitivity analyses:
  - No engineering data (i.e., only environmental and socio-economic concerns considered)
  - All sub-accounts weighted equally
  - All sub-accounts and accounts weighted equally

## 3.0 RESULTS

Appendix B lists the accounts, sub-accounts, and indicators considered for inclusion in this analysis, as well as whether the sub-account or indicator was carried forward for formal evaluation and a rationale if not. Accounts, sub-accounts and indicators listed in Appendix B and Table 2-1 were provided by TH, unless otherwise noted in the appendix or table, respectively. The final multiple accounts ledger with associated scoring is provided in Table 2-1. The MCDA was then advanced using weightings provided by TH (Appendix C; Table 2-1), and those generated by Goldcorp (Appendix D; Table 2-1). Note that no weightings were provided by TH for individual accounts; the analysis has set all of these to a weighting value of '1'; other weightings shown in Table 2-1 were provided by TH or Goldcorp, as noted.

A description of accounts, sub-accounts, and indicators considered for the analysis but ultimately excluded is included in Appendix B, along with supporting rationale for exclusion. These data points include those that were both proposed and rejected by TH because, while they represented important values to TH, they were not thought to be sufficiently differentiating between the two routes and would add limited or no value to an options analysis. These data points include general heritage and way of life, traditional economy, trapping, thinhorn sheep, black bear, and wolverine. Analysis methodology for indicators (i.e., how the characterization data for each indicator was developed) is also provided in Appendix B.



**Table 2-1. Multiple Accounts Ledger, Weighting, and Scoring**

Account	Sub-Account	TH Weighting	Goldcorp Weighting	Indicator	Route 1 Score (Maisy May)	Route 2 Score (Black Hills)
Heritage	Heritage	4	4	# km of road in proximity to the river	6	1
Fish and Fish Habitat	Fish Habitat	3	3	Length of riparian area affected	6	1
		1*	1	# of stream crossings	6	1
		3	3	# of total fish bearing stream crossings	6	1
		5	5	# of stream crossings potential occupies by Chinook Salmon	6	1
Wildlife	Forty Mile Caribou Herd	5	5	# of km of road within high quality winter habitat	6	1
	Moose Harvest and Predation Risk	5	5	# of km of road within high quality fall/winter habitat	1	6
	Birds	3*	3	Bird diversity and abundance	6	1
Land and Resources	TH Settlement Land	5	5	Area (km <sup>2</sup> ) of settlement land within 500 m of a given route	6	1
	Invasive Plants	3	3	Area (km <sup>2</sup> ) of land sustaining native vegetation cover that is disturbed	6	1
	Wetlands	4	4	Area (km <sup>2</sup> ) of wetlands within 50m of the road	6	1
Cumulative Effects	Timber Harvest	3	3	Area (ha) of commercial timber stands within 5 km of a route	1	6
Road Attributes	New Road Construction	6*	4	# km of new road construction	6	1
	Ice-Rich Permafrost Affected	6*	5	# km of affected ice-rich permafrost	6	1
	Total number of bridges	5*	5	# of large stream crossings	6	1
	Area of new disturbance	4*	6	Total (ha) area of new disturbance	6	1
	Vegetated area cleared to	4*	4	Total area (ha) cleared	6	1

Account	Sub-Account	TH Weighting	Goldcorp Weighting	Indicator	Route 1 Score (Maisy May)	Route 2 Score (Black Hills)
	access borrow material					
	Construction cost	2*	6	Dollar value	6	1
Safety	Safety	6*	4	Number of switchbacks	6	1
		5*	6	Radius of switchbacks	6	1
		4*	6	Average road grade into valley bottom	6	1
		3*	5	Ice accumulation	6	1

\* indicator or sub-account was added by GC and, thus, no weighting was available from Tr'ondëk Hwëch'in. Weighting values were assigned to correspond to estimated Tr'ondëk Hwëch'in values. Note that the corresponding analysis spreadsheet will be provided to TH and these weightings can be changed to correspond to TH weightings.

The results of both the base case TH and Goldcorp scenarios provided in Table 2-1 indicate that the Maisy May option is the preferred option for both value systems (i.e., has the highest overall number; Table 2-2). Additionally, all sensitivity analyses indicate that the Maisy May option is preferred in all cases.

**Table 2-2. Multiple Accounts Analysis Results**

Account	Route 1 Final Result (Maisy May)		Route 2 Final Result (Black Hills)	
	TH	Goldcorp	TH	Goldcorp
Base case	5.0	5.0	2.0	2.0
No engineering included	4.6	4.6	2.4	2.4
All accounts weighted equally	5.0	5.0	2.0	2.0
All accounts and sub-accounts weighted equally	5.5*		1.5*	

\* when all accounts and sub-accounts are weighted equally, the value system of both TH and Goldcorp is removed; hence, results are shown for the route rather for TH/Goldcorp independently

## 4.0 CONCLUSION

The MCDA conducted to evaluate the difference between the Maisy May and Black Hills routing for the Northern Access Route indicates that the Maisy May route is the preferred option for all evaluated value scenarios. While the two routes are approximately the same length, the Maisy May option has the lowest overall potential for environmental, socio-economic, and cumulative impacts. The Maisy May route also involves lower overall construction efforts and cost, and is a safer route to operate than the Black Hills route.

## **Appendix A – OnSite Engineering Trade off study**

# **GOLDCORP**

## **COFFEE GOLD MINE**

Northern Access Route  
Black Hills versus Maisy May  
Route Selection Trade-Off Study

Prepared for:

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[Name Redacted]  
SIGN  
Date

[Name Redacted]  
MAY 8 201



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## 1. INTRODUCTION

At the request of [Name Redacted] of Goldcorp Inc. (Goldcorp), Onsite Engineering Ltd. (OEL) was retained to locate and complete a full geometric road design, stream crossing designs, and barge landing designs for the non-government maintained portion of the Northern Access Route (NAR) to the Coffee Gold Mine (the Project). This document serves to describe the route selection process for the specific portion of the NAR between the ridge top road after ascending out of Eureka Creek to the northern banks of the Stewart River just west of Maisy May. Please Refer to Figure 1-1 for an overview map of the area.

OEL has designed the non-government maintained portion of the NAR, a portion approximately 130 km long that begins approximately 58 km South-East of Dawson City at the Sulphur-Dominion Junction. The road from this junction north to Highway 2 is maintained by the Yukon Territory Department of Highways and Public Works. South of the Sulphur-Dominion junction, the NAR follows a series of roads currently maintained by various placer mine operations.

During the design process, many routes to the Coffee Gold Mine were considered. This included routes from the south, north, and west. The final overall route (the NAR) was selected based upon broad parameters including;

- Ensuring safety for all users along the route;
- Following existing roads wherever feasible;
- Minimizing disturbance, particularly to sensitive features such as archeological and cultural heritage sites, wildlife, biological and habitat, and shallow ice rich permafrost; and
- Minimizing road length.

The original, pre-fieldwork, NAR alignment followed the existing placer miner maintained roads down the Black Hills drainage and then along the north bank of the Stewart River. However, during the initial site investigation, it became clear that there were two potential routes from the hills above Eureka creek to the north bank of the Stewart River. This report describes the design process and decision matrix that was used to decide the selected route to the north bank of the Stewart River for the Coffee Project Proposal submitted to the Yukon Environmental and Socio-economic Assessment Board (YESAB) on March 31<sup>st</sup>, 2017.

Details on the design standards used and details regarding specific design decisions for various ground types, materials standards, and the current geometric can be found in the NAR road report prepared by OEL.

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# COFFEE GOLD MINE

## New Vs Existing Road For Black Hills and Maisy May Route Comparison



Black Hills Route

Maisy May Route

Stewart River

### Legend

#### Northern Access Route

#### Compared Routes

— Existing Road

— New Road

#### Required Bridges



### Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



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NAD 1983 UTM Zone 7N

Page Size: 8 1/2" x 11"

Figure 1.1.

Date:  
May 18, 2017

Drawn by:  
M. Dickie

Reviewed:  
J. Araki  
P.Eng.



## 1.1. DESIGN PROCESS GENERAL CHRONOLOGY

The following is a general timeline of the design process starting from the time that the NAR was chosen as the preferred route until the selection of the Maisy May drainage route.

- May 2015: The initial site investigation of the entire route was conducted by a senior engineering geologist and senior engineer from OEL. During this investigation the entire route was traversed either by truck, helicopter, or on foot (for the portions of proposed new construction). At the time the Black Hills route was proposed so the field work was completed first along that route. The route was traversed by truck to the southernmost active placer operation and then traversed on foot and in a helicopter. Where existing active placer operations terminate a historic winter road continued toward the Stewart River. This road traversed large sections of ice-rich permafrost and was overgrown. Following the preliminary assessment it was clear the Black Hills route would require many existing fords to be upgraded to bridges and would require significant construction effort to build an all season road through the long sections of permafrost.
- May 2015: Following the site assessment of the Black Hills route, the Maisy May route was assessed by truck and foot. This route followed the existing road down into the Black hills valley but then ascended back up on the existing roads up to Henderson Dome and then back down into Maisy May.
- June, August and September 2015: Due to the uncertainty of the optimal location for the road in this section, LiDAR was collected on both routes. Following the collection of these data, OEL field crews were launched and collected site data for all the major crossings along both routes.
- August 2015: With the general crossing sizes and types confirmed and overall construction categories identified on both routes, OEL compiled cost comparison data for the two route options. From this it was clear that the number of larger bridges required along the Maisy May route was less, the initial construction cost for the road was lower, and there was far less construction on shallow ice-rich permafrost. At this time, it was decided to select the Maisy May route for the Proposal.
- August 2015: During the detailed design process, and as part of consultation with the local placer miners, we became aware that one of the miners was planning to connect the road from just above Eureka Creek over to Henderson Dome without descending into Black Hills at all. This further solidified the decision to use the Maisy May route because it avoided the steep and dangerous descent through the switchbacks down into Black hills and avoided three difficult bridge crossings.

## **2. ROUTE TRADE-OFF STUDY**

### **2.1. NEW ROAD CONSTRUCTION**

The Maisy May valley is developed and has active placer operations to within approximately 2 km of the valley bottom of the Stewart River. Black hills is active to within approximately 7.5km of the Stewart River valley bottom. Further, the Black hills route must traverse the Stewart River Valley west from Black hills to Maisy May. In total, the Maisy May and Black Hills routes have approximately 12.0 km and 18.3 km of required of trail upgrade or new road construction, respectively.

### **2.2. SENSITIVE SITE DISTURBANCE**

The Maisy May route follows existing roads until it enters the Stewart River Valley. It briefly crosses the valley bottom at the toe of Maisy May where it traverses a short section of wetland and ice-rich permafrost. Because Maisy May is heavily and currently disturbed by placer operations, the proposed road will only decrease the impacts that the current road has on the watercourses. Current crossings on this route consist of fords and undersized culverts. During construction of the Northern Access Route, these crossing will be upgraded to structures that have been sized to accommodate 1 in 100 year peak flows and anticipated auffs issues. These upgrades will decrease sediment delivery to the surrounding watercourses. Cross drain culverts on the current road are non-existent; during construction cross drain culverts will be added to rehabilitate the passage of surface and subsurface flows to their natural paths.

The Black Hills route leaves the last active placer operation and then traverses 14.2 km of undisturbed ground or old inactive road and trail. Further, the Black Hills route stays in the Maisy May valley bottom and wetland for approximately twice the distance as the Maisy May route. In total, the Maisy May and Black Hills routes traverse 1.0 km and 7.9 km of shallow ice-rich permafrost, respectively.

Large stream crossings are another area of potential site disturbance. In total, the Maisy May and Black Hills routes have 3 and 12 bridge crossings, respectively.

The total disturbed area of undisturbed sites is another measure of the impact of a road in the two areas. The Maisy May route has 40% less disturbed area of undisturbed sites (16.6 ha. for Maisy May versus 27.4 ha. for Black Hills).

### **2.3. ROAD SAFETY**

Road safety is related to several factors including consistency of design speed, road grade, and road surface among other considerations.

Consistency of design speed is important because of risks related to vehicles changing travel speeds. For example, a tight corner at the end of a long straight stretch or areas with broad sweeping curves can



cause issues because drivers are not expecting to have to slow down. Switchbacks require the road user to reduce their speed in such a manner. When comparing the two routes, the primary location where this concern becomes evident is where each route descends into their respective valleys. Both alignments descending into the Maisy May and Black Hills valley require adjustments to the horizontal alignment to achieve a desirable vertical alignment. The descent into the Maisy May valley requires significantly less realignment and requires only 2 switchbacks to achieve a desirable grade. The descent into Black Hills requires extensive realignment and requires 6 switchbacks to achieve desirable grades with two additional hard turns at the bottom of the descent that have not been counted as switchbacks but will have a similar effect on travel speed.

Road grades along the Maisy May route are typically lower. The Maisy May route has a higher peak elevation of 1170m but descends into the valley bottom (an elevation of 676m) over 17.0 km. The Black Hills route peaks just before it descends into the valley bottom dropping from its 1130m peak to 650m in only 6.3 km.

The main difference in road surfacing along the two routes is related to winter road use and heavy ice accumulations at the crossings near the bottom of the switchbacks into Black Hills. Further, the existing road network has shown that the upland roads are more stable in the shoulder seasons and have fewer soft spots.

#### **2.4. ROAD LENGTH**

The overall road length affects all road considerations listed above. The overall road length for the Maisy May and Black Hills routes are 48.9 km and 48.8 km, respectively.

#### **2.5. IMPACT AND COST COMPARISONS**

This report is a summary of the analysis that was completed as part of the route selection in the design process. The quantities and totals shown herein reflect those at the time of the analysis. However, the costs have been updated to reflect the more detailed design work completed since that time. These have been applied to both routes to show a fair comparison. The Tables below present the details of the summary quantities presented in the sections above.

For road construction cost and impact comparison, the routes were split into the construction categories shown in Table 2.5.1. Table 2.5.2 summarizes the construction cost estimates by category.

**Table 2.5.1: Construction Categories**

Road Type	Terrain	Gradient	Description
Type 1 (a)	Flat	<4%	No rock or muskeg
Type 1 (b)	Flat	<4%	Ridge top, no clearing/grubbing, no rock or muskeg
Type 1 (c)	Flat	<4%	Muskeg with road fill (within 1km of borrow pit)
Type 2	Hillside	<4%	No rock or muskeg
Type 2 (r)	Hillside	<4%	Rock substrate
Switchback	Steep	8-12%	No rock or muskeg

**Table 2.5.2: Construction Category Unit Costs**

Road Type	OEL Single Lane
Type 1 (a)	\$150,000
Type 1 (b)	\$140,000
Type 1 (c)	\$886,000
Type 2	\$204,000
Type 2 (r)	\$229,000
Switchback	\$1,019,000

The construction categories are summarized by length for each route in Table 2.5.3 and are shown on the maps in Appendix 1. Note that Type 1 (c) is road in shallow ice-rich permafrost. Table 2.5.4 shows the estimated construction costs.

**Table 2.5.3: Construction Category Lengths**

Maisy May Route		Black Hills Route	
Road Type	Length (km)	Road Type	Length (km)
Type 1 (a)	0.2	Type 1 (a)	NA
Type 1 (b)	36.8	Type 1 (b)	30.6
<b>Type 1 (c)</b>	<b>1.0</b>	<b>Type 1 (c)</b>	<b>7.9</b>
Type 2	6.7	Type 2	9.7
Type 2 (r)	3.5	Type 2 (r)	NA
<b>Switchback</b>	<b>0.6</b>	Switchback	0.6
<b>Total</b>	<b>48.9</b>	<b>Total</b>	<b>48.8</b>

**Table 2.5.4: Estimated Construction Costs**

<b>Maisy May Route</b>		<b>Black Hills Route</b>	
<b>Road Type</b>	<b>Estimated Cost</b>	<b>Road Type</b>	<b>Estimated Cost</b>
Type 1 (a)	\$31,000	Type 1 (a)	\$NA
Type 1 (b)	\$5,159,000	Type 1 (b)	\$4,278,000
Type 1 (c)	\$925,000	Type 1 (c)	\$7,037,000
Type 2	\$1,362,000	Type 2	\$1,974,000
Type 2 (r)	\$791,000	Type 2 (r)	\$NA
Switchback	\$655,000	Switchback	\$645,000
<b>Total</b>	<b>\$8,924,000</b>	<b>Total</b>	<b>\$13,934,000</b>

Bridge crossings represent significant capital expenditures. These costs are summarized in Table 2.5.5. Further, with the types of streams in the area have significant aufeis issues which can push the crossings to larger structures and cause significant operating cost increases.

**Table 2.5.5: Estimated Bridge Construction Costs**

<b>Maisy May Route</b>		<b>Black Hills Route</b>	
<b>Chainage</b>	<b>Estimated Cost</b>	<b>Chainage</b>	<b>Estimated Cost</b>
58.5 km	\$165,000	39.7 km	\$250,000
65.3 km	\$150,000	42.1 km	\$135,000
75.2 km	\$165,000	44.2 km	\$165,000
		46.2 km	\$170,000
		46.8 km	\$180,000
		49.3 km	\$150,000
		53.2 km	\$135,000
		54.4 km	\$135,000
		56.1 km	\$165,000
		56.5 km	\$190,000
		60.3 km	\$135,000
		75.7 km	\$180,000
<b>Total</b>	<b>\$480,000</b>	<b>Total</b>	<b>\$1,990,000</b>

### 3. CONCLUSION

When the two routes are evaluated based on safety, disturbance area and the cost of construction, it is clear the Maisy May route is safer, causes less disturbance to the area it passes through and is cheaper to construct. The reader is referred to Table 2.6 for a summary of the trade-off comparison.

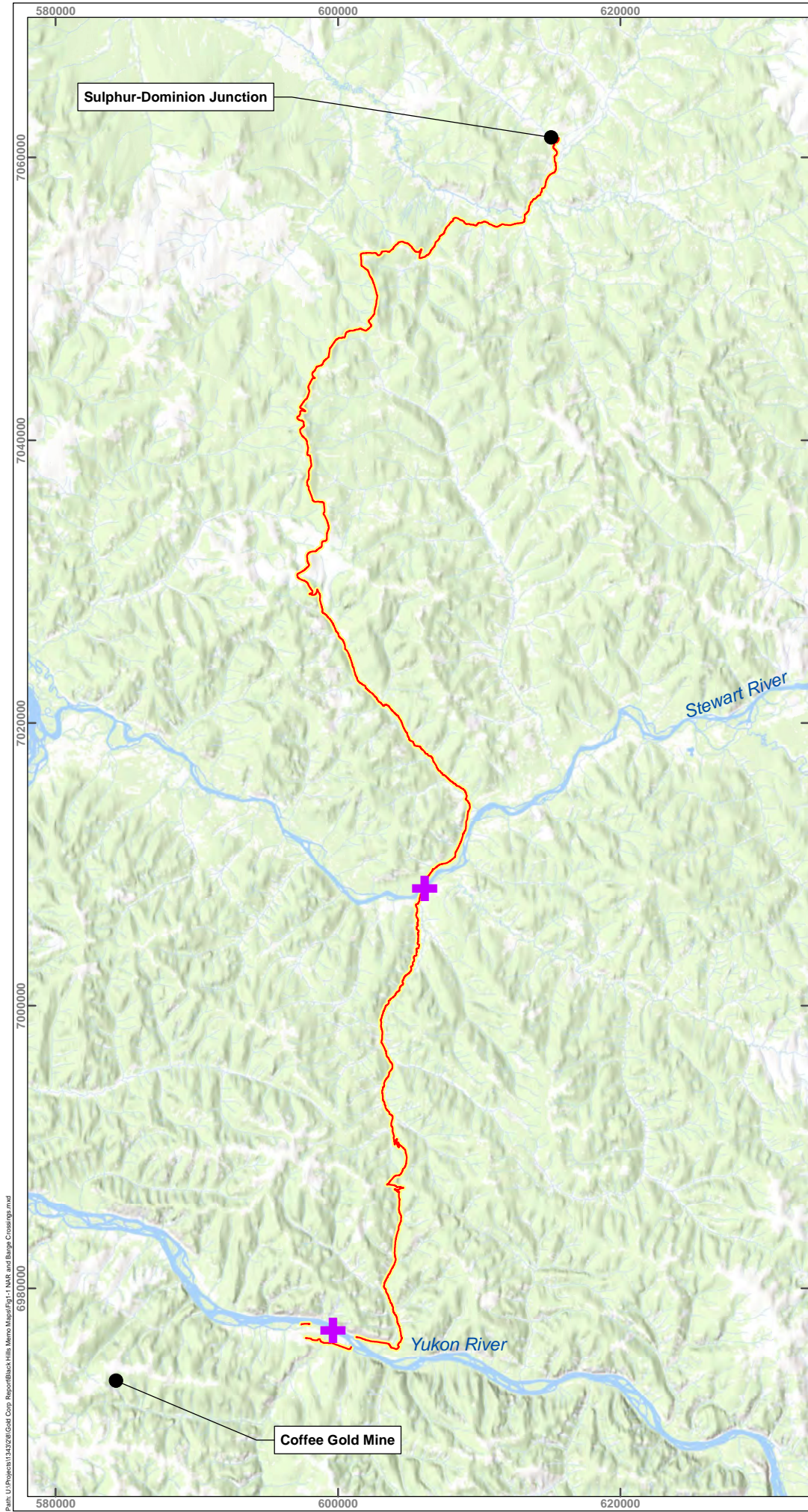
**Table 3.0.: Summary of Trade-Off Study**

<b>Attribute</b>	<b>Maisy May Route</b>	<b>Black Hills Route</b>
<b>Safety</b>	<ul style="list-style-type: none"> <li>• 4 switchbacks on route</li> <li>• Smaller average grade into valley bottom</li> <li>• Less ice accumulation</li> </ul>	<ul style="list-style-type: none"> <li>• 6 switchbacks on route</li> <li>• Higher average grade into valley bottom</li> <li>• Significant ice accumulation</li> </ul>
<b>New Road Construction</b>	12.0 km	18.3 km
<b>Ice-rich Permafrost</b>	1.0 km	7.9 km
<b>Large Stream Crossings</b>	3	12
<b>Disturbed Area in Undisturbed Sites</b>	16.6 ha	27.4 ha
<b>Road Length</b>	48.9km	48.8km
<b>Expected Construction Cost</b>	\$9,404,000	\$15,924,000

## APPENDIX 1

Road Route maps





**COFFEE GOLD MINE**

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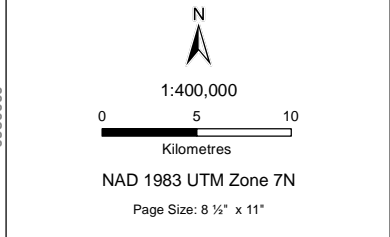
**Northern Access Route  
and Barge Crossing Locations**



- Legend**
- Northern Access Route
  - + Barge Crossing Locations

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



Appendix 1.1	Date: May 18, 2017	Drawn by: M. Lowe	Reviewed: J. Araki P.Eng.
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Path: U:\Projects\114326\Gold\_Corp\_Report\Black Hills Memo Maps\Fig.1-1 Map and Barge Crossings.mxd



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# COFFEE GOLD MINE

## Construction Categories For Black Hills and Maisy May Route Comparison

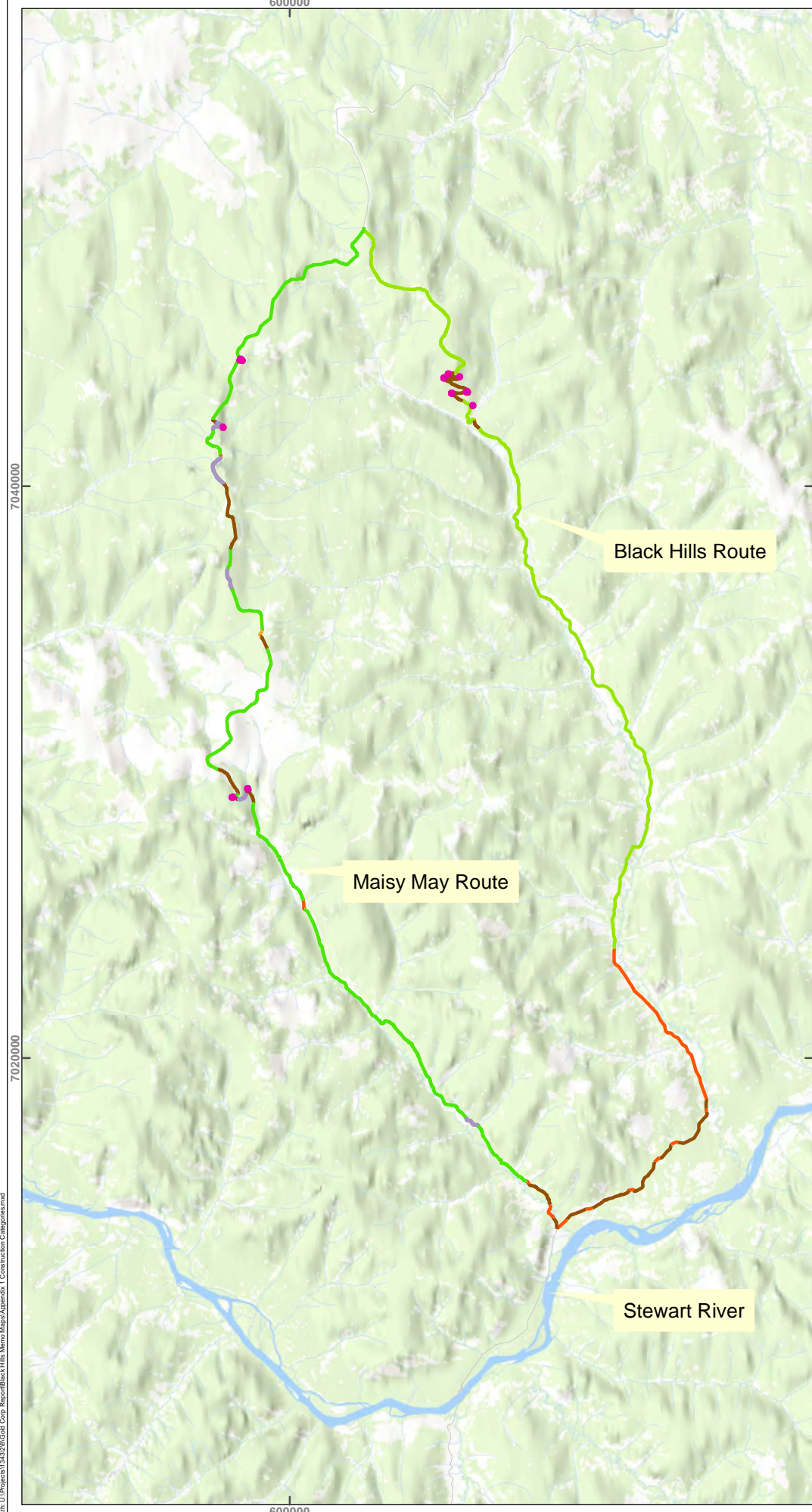


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Black Hills Route

Maisy May Route

Stewart River

### Legend

#### Construction Categories

- 1a
- 1b
- 1c
- 2
- 2r
- Switchback

#### Northern Access Route

### Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



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NAD 1983 UTM Zone 7N

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Appendix 1.2

Date:  
May 16, 2017

Drawn by:  
M. Dickie

Reviewed:  
J. Araki  
P.Eng.



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**Appendix B – accounts, sub-accounts, and indicators considered for inclusion in analysis**

Account	Sub-account	Indicator	Proposed By	Carried Forward?	Analysis Performed	Results - R1 Maisy May	Score R1 Maisy May	Results - R2 Black Hills	Score R2 Black Hills
<b>Heritage</b>									
	General Heritage and Way-of-Life	n/a	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Traditional Economy	n/a	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Trapping	Area (km*2) of traplines affected by access	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Archaeological/ Historic Sites (HRIA 16-13ASR)	Number and area of sites affected by the road	TH	no, insufficient data to compare between 2 routes. Further field work would be required	If necessary, further field work would be required	n/a	-	n/a	-
	Stewart River Crossing	# km of road within 1 km to the river	TH	yes	GIS analysis	934 m	6	2460 m	1
<b>Fish and Fish Habitat</b>									
	Fish Species	# of fish species present	TH	no, insufficient data to compare between 2 routes. Further field work would be required	Analysis not performed: there is limited sampling along Black Hills to support this analysis.	n/a	n/a	n/a	n/a
	Fish Habitat	Length of riparian area affected	TH	yes	Given the available data, length of riparian area affected was not calculated; however three other analyses were performed to help inform this issue: watershed area, total length of streams in watershed, and number of stream crossings along route. Watershed area and stream length within watershed was calculated using 1:50,000 watercourse layers along with contours and digital elevation model to digitize watersheds for Maisy May and Black Hills.	Watershed Area: 166.96 km <sup>2</sup> Length of streams in watershed: 159.83 km	6	Watershed Area: 418.24 km <sup>2</sup> Length of streams in watershed: 370.91 km	1
		# of stream crossings	TH	yes	GIS analysis based on 1:50,000 watercourse layers, the proposed route alignment and visual assessment of lidar.	16	6	24	1
		# of total fish bearing stream crossings	Goldcorp	yes	Data on fish-bearing status was pulled from Project sampling. Where Project sampling data was not available Fish Habitat Suitability data from the Yukon Placer Secretariat was used to assess assumed fish presence.	4	6	18	1
		# of total large stream fish bearing stream crossings	TH	no, insufficient data	Data on stream order and stream class was not available for all crossings; therefore the analysis did not differentiate between large and small fish bearing streams (see total # of fish bearing stream crossings above).	n/a	-	n/a	-
		# of total small stream fish bearing stream crossings	TH	no, insufficient data	Data on stream order and stream class was not available for all crossings; therefore the analysis did not differentiate between large and small fish bearing streams (see total # of fish bearing stream crossings above).	n/a	-	n/a	-
		# of existing stream fords at fish bearing stream crossings	TH	no, insufficient data	Analysis not completed — Data on existing crossing structures at stream crossings was not available for Black Hills.	n/a	-	n/a	-
		# stream crossings potentially occupied by Chinook Salmon	TH	yes	Data on fish-bearing status was pulled from Project sampling. Where Project sampling data was not available Fish Habitat Suitability data from the Yukon Placer Secretariat was used to assess assumed fish presence.	1	6	2	1
<b>Wildlife</b>									
	Forty Mile Caribou Herd	# of km of road within high quality winter habitat	TH	yes	GIS analysis of road length intersecting moderate- and high-value caribou habitat based on the caribou winter habitat RSF model (intersection was based on habitats within 500 m of the proposed road).	31.3 km (22.6 km mod, 8.5 km high)	6	39.4 km (18.6 km mod, 20.8 km high)	1
	Moose Harvest and Predation Risk	# of km of road within high quality fall/winter habitat	TH	yes	Late winter habitat — GIS analysis of road length intersecting moderate- and high-value moose habitat based on the moose late winter habitat HSI model (intersection was based on habitats within 500 m of the proposed road).  Fall/early winter distribution — GIS analysis of road length intersecting mod-high and high density areas based on 2015 early winter population census results (intersection was based on census blocks intersected).	Late winter: 29.7 km (11.5 km mod, 18.2 km high)  Fall/early winter: 20.8 km	1	Late winter: 14.7 km (13.9 km mod, 0.7 km high)  Fall/early winter: 14.4 km	6
	Thinhorn Sheep	Road proximity to Sheep Habitat	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Grizzly bear	Mortality Risk	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-

Black bear	Mortality Risk	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-	
Wolverine	Mortality Risk	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-	
Birds	Bird diversity and abundance	Goldcorp	yes	Review of bird baseline survey results along the routes	Sharp-tailed Grouse leks: 0 Cliff-nesting raptor nests: 0 Bank Swallow colonies: 0 Species at Risk: 3	6	Sharp-tailed Grouse leks: 2 Cliff-nesting raptor nests: 0 Bank Swallow colonies: 2 Species at Risk: 4	1	
<b>Land and Resources</b>									
TH Settlement Land	Area (km <sup>2</sup> ) of settlement land within 500m of a given route	TH	yes	GIS analysis of area (km <sup>2</sup> ) of settlement land within 500m of a given route	0.15 km <sup>2</sup>	6	8.39 km <sup>2</sup>	1	
Traditional Plants	Area of ecosystems containing key traditional plants intersected by a route	TH	no, not sufficiently differentiating	Ecosystem mapping (ELC and BEM) were not available for all of the Black Hills route, therefore analysis of areas containing traditional-plant-sustaining ecosystems was based on forest cover data. Ratings from ELC and BEM traditional plant analysis were extrapolated to forest cover data based on forest cover attributes (landscape position, soil moisture, stand age etc.). The intersection was based on habitats within 100 m of road routes.	2.44 km <sup>2</sup>	-	3.03 km <sup>2</sup>	-	
Invasive Plants	Area of land sustaining native vegetation cover that is disturbed	TH	yes	Area of native vegetation cover that will be disturbed is equivalent to the length of new road construction (see below). Alternative analysis calculated the length of road with existing invasive plant populations (based on the 2015 survey, note that the 2015 survey did not cover the entire Maisy May or Black Hills route).	Invasive plant extent as of 2015: 4 km (out of 26 km surveyed).	6	Invasive plant extent as of 2015: 16 km (out of 29 km surveyed).	1	
Wetlands	Area (km <sup>2</sup> ) of wetlands within 50 m of road	TH	yes	Wetlands were identified from ecosystem (ELC and BEM) mapping developed for the Project; for the sections of Black Hills not covered by ecosystem mapping, wetlands were digitized from a visual assessment of lidar. Analysis assessed total number of wetlands and area of wetlands within 50 m of road.	Number of wetlands: 8. Wetland area: 0.06 km <sup>2</sup>	6	Number of wetlands: 15. Wetland area: 0.15 km <sup>2</sup>	1	
Wildfire	Change to Fire Action Zone status	TH	no	n/a	n/a	-	n/a	-	
<b>Cumulative Effects</b>									
Exploration & Mining	Total area of lease/permit/claim within 5 km of a Route	TH	no, not appreciably different	GIS analysis completed	109,922 ha	-	106,223 ha	-	
Timber Harvest	Area of commercial timber stands within 5 km of a route	TH	yes	GIS analysis completed	8,921 ha	1	7,289 ha	6	
Residential development	Potential area near road to be developed	TH	no, neither route is expected to be identified as "preferred" as each has similar potential for adverse effects	n/a	n/a	-	n/a	-	
<b>Engineering</b>									
New Road Construction	# km of new road construction	TH	no, included under Road Attributes	n/a	n/a	-	n/a	-	
Construction Cost	Vegetated area cleared to access borrow material Dollar value	TH	no, included under Road Attributes	Compare each route and how borrow site disturbance effected	n/a	-	n/a	-	
<b>Socioeconomic</b>									
Road Safety	Accident rate (e.g., accidents per km driven)	TH	no, unable to directly describe accident rate at this time; have incorporated this consideration under the account "Safety"	n/a	n/a	-	n/a	-	
<b>Road Attributes</b>									
New Road Construction	# km of new road construction	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	12.0 km	6	18.3 km	1	
Ice-Rich Permafrost Affected	# km of affected ice-rich permafrost	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	1.0 km	6	7.9 km	1	
Total number of bridges	# of large stream crossings	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	3	6	12	1	
Area of new disturbance	Total area of new disturbance	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	16.6 ha	6	27.4 ha	1	
Road Length	Total Km either route	Goldcorp	no, not significantly different	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	48.9 km	n/a	48.8 km	n/a	
Vegetated area cleared to access borrow material	Area cleared	Goldcorp	yes	Maisy May route borrow sites have been mapped during field programs, whereas Black Hills borrow sites have been interpreted based upon GIS analysis of availability of appropriate surfacing media based on corroborating field observations. Subgrade deficits for each route where then calculated over areas of ice-rich permafrost, and the amount by was compared by volume. Average borrow rock densities were assumed and spatial areas were calculated for the necessary total aerial extent of potential borrow sources along each route.	8.3 ha	6	21.1 ha	1	



Construction Cost	Dollar value	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	\$ 9.404M	6	\$ 15.924 M	1
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**Safety**

Safety	Accident rate (e.g., accidents per km driven)	Goldcorp	no, not possible to directly estimate these data. Subsequent indicators provide proxies for this indicator	none	n/a	n/a	n/a	n/a
	Number of switchbacks	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	4	6	6	1
	Radius of switchbacks	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	lower radius	6	higher radius	1
	Average road grade into valley bottom	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	lower	6	higher	1
	Ice accumulation	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	lower potential	6	higher potential	1

## **Appendix C– Multiple Accounts Analysis – Tr'ondëk Hwëch'in weighting**

Accounts	Weighting	Sub-accounts	Weighting	Indicators	Scoring Maisy May	Scoring Black Hills
Heritage	1	Heritage	4	# km of road within 1 km to the river	6	1
				<b>SUMPRODUCT</b>	<b>24</b>	<b>4</b>
				<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>
Fish and Fish Habitat	1	Fish Habitat	3	Length of riparian area affected	6	1
				# of stream crossings	6	1
				# of total fish bearing stream crossings	6	1
				# stream crossings potentially occupied by Chinook Salmon	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>				
Wildlife	1	Forty Mile Caribou Herd Moose Harvest and Predation Risk Birds	5	# of km of road within high quality winter habitat	6	1
				# of km of road within high quality fall/winter habitat	1	6
				Bird diversity and abundance	6	1
				<b>SUMPRODUCT</b>	<b>53</b>	<b>38</b>
<b>Sub-account Weighted Average</b>	<b>4.1</b>	<b>2.9</b>				
Land and Resources	1	TH Settlement Land Invasive Plants Wetlands	5	Area (km <sup>2</sup> ) of settlement land within 500m of a given route	6	1
				Area of land sustaining native vegetation cover that is disturbed	6	1
				Area (km <sup>2</sup> ) of wetlands within 50 m of road	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Cumulative Effects	1	Timber Harvest	3	Area of commercial timber stands within 5 km of a route	1	6
				<b>SUMPRODUCT</b>	<b>3</b>	<b>18</b>
<b>Sub-account Weighted Average</b>	<b>1.0</b>	<b>6.0</b>				
Road Attributes	1	New Road Construction Ice-Rich Permafrost Affected Total number of bridges Area of new disturbance Vegetated area cleared to access borrow material Construction Cost	6	# km of new road construction	6	1
				# km of affected ice-rich permafrost	6	1
				# of large stream crossings	6	1
				Total area of new disturbance	6	1
				Area cleared (ha)	6	1
				Dollar value	6	1
				<b>SUMPRODUCT</b>	<b>162</b>	<b>27</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Safety	1	Safety	6	Number of switchbacks	6	1
				Radius of switchbacks	6	1
				Average road grade into valley bottom	6	1
				Ice accumulation	6	1
				<b>SUMPRODUCT</b>	<b>108</b>	<b>18</b>

<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>
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TOTAL

<b>SUMPRODUCT</b>	<b>35.1</b>	<b>13.9</b>
<b>Total Weighted Average</b>	<b>5.0</b>	<b>2.0</b>

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**Sensitivity Analysis**

No engineering	<b>SUMPRODUCT</b>	<b>23.1</b>	<b>11.9</b>
	<b>Weighted Average</b>	<b>4.6</b>	<b>2.4</b>

All accounts weighted equally	<b>SUMPRODUCT</b>	<b>35.1</b>	<b>13.9</b>
	<b>Weighted Average</b>	<b>5.0</b>	<b>2.0</b>

All subaccounts and accounts weighted equally	<b>SUMPRODUCT</b>	<b>122</b>	<b>32</b>
	<b>Weighted Average</b>	<b>5.5</b>	<b>1.5</b>

yellow cells indicate that subaccounts were created by Goldcorp, and no TH weightings were provided in the original spreadsheet.

## **Appendix D – Multiple Accounts Analysis – Goldcorp weighting**



Accounts	Weighting	Sub-accounts	Weighting	Indicators	Scoring Maisy May	Scoring Black Hills
Heritage	1	Heritage	4	# km of road within 1 km to the river	6	1
				<b>SUMPRODUCT</b>	<b>24</b>	<b>4</b>
				<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>
Fish and Fish H	1	Fish Habitat	3	Length of riparian area affected	6	1
				# of stream crossings	6	1
				# of total fish bearing stream crossings	6	1
				# stream crossings potentially occupied by Chinook Salmon	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>				
Wildlife	1	Forty Mile Caribou Herd Moose Harvest and Predation Risk Birds	5	# of km of road within high quality winter habitat	6	1
				# of km of road within high quality fall/winter habitat	1	6
				Bird diversity and abundance	6	1
				<b>SUMPRODUCT</b>	<b>53</b>	<b>38</b>
<b>Weighted Average</b>	<b>4.1</b>	<b>2.9</b>				
Land and Resc	1	TH Settlement Land Invasive Plants Wetlands	5	Area (km <sup>2</sup> ) of settlement land within 500m of a given route	6	1
				Area of land sustaining native vegetation cover that is disturbed	6	1
				Area (km <sup>2</sup> ) of wetlands within 50 m of road	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Cumulative Ef	1	Timber Harvest	3	Area of commercial timber stands within 5 km of a route	1	6
				<b>SUMPRODUCT</b>	<b>3</b>	<b>18</b>
				<b>Sub-account Weighted Average</b>	<b>1.0</b>	<b>6.0</b>
Road Attribute	1	New Road Construction Ice-Rich Permafrost Affected Total number of bridges Area of new disturbance Vegetated area cleared to access borrow material Construction Cost	4	# km of new road construction	6	1
				# km of affected ice-rich permafrost	6	1
				# of large stream crossings	6	1
				Total area of new disturbance	6	1
				Area cleared (ha)	6	1
				Dollar value	6	1
				<b>SUMPRODUCT</b>	<b>180</b>	<b>30</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Safety	1	Safety	4	Number of switchbacks	6	1
				Radius of switchbacks	6	1
				Average road grade into valley bottom	6	1
				Ice accumulation	6	1
				<b>SUMPRODUCT</b>	<b>126</b>	<b>21</b>
<b>Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
<b>Sub-account Weighted Average</b>						
<b>TOTAL</b>						
					<b>SUMPRODUCT</b>	<b>35.1 13.9</b>

FINAL Weighted Average 5.0 2.0

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Sensitivity Analysis

No engineering included	SUMPRODUCT	23.1	11.9
	Weighted Average	4.6	2.4
All accounts weighted equally	SUMPRODUCT	35.1	13.9
	Weighted Average	5.0	2.0
All subaccounts and accounts weighted equally	SUMPRODUCT	122	32
	Weighted Average	5.5	1.5

## Technical Engagement Plan for the Coffee Project

The following is an outline of proposed technical engagement between Goldcorp and SFN's Technical Team. The activities would be conducted in parallel with other engagements between Goldcorp and SFN Leadership and SFN citizens with respect to the Project.

### Technical Team

SFN has assembled an independent technical team to conduct a technical review of the proposed Coffee Gold mine. The Technical Team is identified in Table 1.

Table 1: Technical Team Members

Name	Company	Contact Information
Ms. Louis Craig	<i>Craig</i>	lois.craig@northwestel.net
Ms. Leslie Gomm	Gomm Environmental Engineering Consulting ( <i>GEEC</i> )	geec@northwestel.net
Mr. Cord Hamilton	Northland Earth & Water Consulting Inc. ( <i>Northland</i> )	chamilton@northlandconsulting.ca
Mr. Glenn Rudman	ELR Ecological & Research Ltd. ( <i>ELR</i> )	grudman@elr.ca
Mr. Chris Jastrebski	ELR Ecological & Research Ltd. ( <i>ELR</i> )	Chris@elr.ca
Mr. Bill Slater	Bill Slater Environmental Consulting ( <i>BSEC</i> )	bslater@bslater.ca
Mr. Lindsay Staples	North\West Resources Consulting Group ( <i>North/West</i> )	lindsaystaples@icloud.com
Mr. Don Toews	<i>Toews</i>	dontoews@northwestel.net

The subject matter areas associated with the Team members are presented in Table 2.

Table 2: Technical Team – General Subject Matter Areas

Organization	General Subject Matter Area
Craig	Socio-economic effects assessment and monitoring
GEEC	Water quality (prediction & modelling) and mine water management
Northland	Mine waste management and engineering design
ELR	Terrestrial Biology
BSEC	Environmental Assessment, mine water and mine waste management
North/West	Socio-economic effects assessment and monitoring

## Technical Team Coordination

[Name Redacted] will provide internal coordination of the Technical Team and SFN Land & Resources staff and provide interface directly with Goldcorp on logistical coordination of interactions between the Technical Team and Goldcorp.

## Independent Technical Review

The independent technical review will consider both the Northern Access Road (NAR) and the proposed mining activities that comprise the Project Proposal.

The first phase will have SFN's Technical Team complete independent technical reviews of the submitted Project Proposal, the submissions provided to YESAB by other parties and the comments provided by YESAB's technical consultants.

Most of the materials required for the review have been provided by Goldcorp or by other parties to YESAB and can be accessed by the SFN Team. It is expected that a small number of supporting documents that have been referenced by Goldcorp but not included in the Project Proposal will be identified and requested to be provided by Goldcorp to facilitate the independent review.

The goals of the first phase of the review are:

- To familiarize the Team with the technical and logistical aspects of the proposed Project;
- To confirm that baseline activities supporting the Project have been robust and appropriately executed;
- To examine the methodologies utilized by Goldcorp and its consultants in making predictions on potential effects of the Project;
- To examine the concerns and issues that have already been raised by other parties and submitted to YESAB;
- To identify any opportunities to:
  - Eliminate gaps in baseline data sets;
  - To improve the level of confidence in the prediction of impacts;
  - Improve the Project execution plans to reduce potential impacts; and
  - Improve the confidence in successful closure of the mine;
- To identify if further technical expertise is required to support SFN's participation in the Project.

This first phase of the review is proposed to be substantially complete by September 18<sup>th</sup>, 2017.

## Site Tour

To assist in review of the Project Technical Team members will participate in a tour of the mine site and NAR Route. Goldcorp has proposed a site tour for the week of September 11<sup>th</sup>, 2017. The Technical Team has identified that they are available during that week and Mr. Hamilton will coordinate fixing a firm date for that week.

## Technical Meetings

The second phase of the engagement will feature a series of meetings between Team members (and subsets there of) and Goldcorp and its technical consultants. It is envisioned that these meetings would be completed during September and October 2017.

Generally, these meetings should consider broader themes as opposed to single issue or subject matter agendas. The meetings should enable fulsome dialogue and exchange, rather than workshop presentations followed by a specified period for the delivery of written comments. This approach should allow for cross pollination of ideas between the various Team members and Goldcorp's Team.

The intent of the meetings in this phase would be to:

- Allow the Technical Team to become familiar with key members of the Goldcorp team;
- Obtain clarification on any matters of not clearly understood from review of the Project documents;
- Identify how Goldcorp intends to respond to issues and concerns raised by SFN and other parties and to review those proposed responses where they are available;
- Share potential concerns with aspects of the Project and its potential effects and with methodologies used to predict Project effects and seek Goldcorp's views on such matters; and
- Identify potential means of improving the Project and seek Goldcorp's views on those propositions.

Table 3 identifies four provisionally identified meetings that the Technical Team will seek with Goldcorp.

Table 3: Provisional Technical Meetings

Meeting Theme	Participants
Operational Wildlife Impacts and Management <sup>1</sup>	Northland, ELR, SFN Staff
Water Impacts and Operational Mine Waste Management <sup>2</sup>	BSEC, GEEC, Northland, Toews, SFN Staff
Mine Closure Planning	BSEC, GEEC, ELR, Northland, Toews, SFN Staff
Socio-economical Impacts, Monitoring, and Management	Craig, Northland, North/West, SFN Staff



This second phase of the review would start in the week of September 18<sup>th</sup> and continue on a schedule that is mutually agreeable with Goldcorp. Goldcorp has proposed some potential dates for meetings some of which appear to be workable and some that are not. Table 4 presents the current understanding of Goldcorp’s proposed meeting dates and the Technical Teams views on those dates. It is expected that further logistical coordination will be necessary to finalize mutually acceptable dates.

Table 4: Meeting Schedules

Meeting	Goldcorp Potential Dates	Technical Team Dates
Wildlife	None identified	Week of September 18 <sup>th</sup>
Water/Mine Waste	September 25 <sup>th</sup> or 26 <sup>th</sup>	Preferably Week of September 18 <sup>th</sup>
Mine Closure	October 16 <sup>th</sup> , 19 <sup>th</sup> , or 20 <sup>th</sup>	Potential dates are acceptable but earlier in October may be preferable.
Socio-Economic	October 30 <sup>th</sup> , November 1 <sup>st</sup> , or November 2 <sup>nd</sup>	Potential dates are considered too late in the process and should certainly occur prior to a final community meeting

Unless otherwise indicated by SFN Council or representatives authorized by Council to do so, the discussions and comments offered by the Technical Team will not represent firm positions of SFN. Technical Team discussions with Goldcorp will be a process of discovery intended to enable the Technical Team to develop its findings and recommendations to SFN and, through the discussion, to share with Goldcorp its expertise, its concerns, and the findings and recommendations it may provide to Selkirk.

If Goldcorp has some additional information or its planning for the Project is being further developed, it is expected that this would be shared with SFN and the Technical Team prior to it being brought forward as part of the YESAB process.

During and following the completion of the technical meetings, the Technical Team members will produce and provide briefings for SFN Leadership and staff both in person and in writing and will attend at SFN community information meetings when requested to do so. It is recommended that at least one of the community information events be scheduled after the primary Technical Team meetings have occurred.

It is expected that SFN will in due course formalize its submission(s) to Goldcorp with respect to the recommendations that it proposes Goldcorp incorporate into its further development of the Project Proposal and, if approved, its execution of the Project. Goldcorp’s proposed response to those recommendations, after full and fair consideration, should be provided to SFN and the Technical Team for final review and discussion, as the last phase of the engagement process, before Goldcorp seeks a resumption of the YESAB screening of the Project.

A record of the meetings should be produced by mutual arrangement and should be reviewed and verified by the Team participants before any inclusion in Goldcorp’s consultation record in respect of the Project Proposal.

## Adequacy Submissions

The technical engagement process should enable the Technical Team to provide its informed and considered advice to SFN on a timely basis with respect to the adequacy of the Project Proposal for assessment, as to technical matters, when the Executive Committee considers whether to resume its screening of the Proposal (likely in late November 2017).

SFN's submission will be informed by Goldcorp's response to the issues and concerns raised by the Technical Team and its demonstration that it has fully and fairly considered those matters.

- 
- 1.
  - 2.

# AGENDA

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project Site Tour  
August 23 & 25, 2017**

**Pick-up Location:** TH Government Building

**August 23<sup>rd</sup> Participants:**

**Tr'ondëk Hwëch'in (TH)**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

**August 25<sup>th</sup> Participants:**

**Tr'ondëk Hwëch'in (TH)**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project  
[Name Redacted]

<b>Time</b>	<b>Description</b>
8:00 am	Depart for tour at TH Government Building
9:30 am	First Stop: YG maintained portion of Hunker
12:00 pm	Second Stop North of Black Hills
1:30pm	Third Stop Maisy May
2:00 pm	Helicopter pick-up at Maisy May: August 23 <sup>rd</sup> <ul style="list-style-type: none"><li>• [Name Redacted]</li></ul> August 25 <sup>th</sup>

# AGENDA

	<ul style="list-style-type: none"><li>• [Name Redacted]</li></ul>
2:00 pm	Trucks drive back to Dawson <ul style="list-style-type: none"><li>• [Name Redacted]</li></ul>
2:30 pm	Helicopter stop at Stewart
3:30 pm	Helicopter arrives in Dawson
3:45 pm	Drop off at TH Government Building

### Dress Code

Please note that temperatures at the sites during this time are forecasting to be between 4°C and 16°C. Layered clothing and a light winter jacket is recommended to accommodate the fluctuation in temperatures.

### Food

Lunch, snacks and a water bottle will be provided for the trip. If you have any food restrictions please let <sup>[Name Redacted]</sup> [@goldcorp.com](mailto:[Name Redacted]@goldcorp.com) know prior to the trip.

# AGENDA

## Tr'ondëk Hwëch'in and Goldcorp Northern Access Route MCDA Discussion August 24, 2017

**Location:** Teleconference

**Time:** 10 am – 11:30 am

**Tr'ondëk Hwëch'in (TH)**

[Name Redacted]

**Coffee Project – Goldcorp Inc.**

[Name Redacted]

### **Agenda:**

1. **Introductions**
  - a. **Methodology used (Lisa)**
  - b. **Indicators used & alternatives (Lisa)**
2. **Overview of findings**
  - a. **Key findings (Catherine, Jennie, James)**
  - b. **Safety indicators (James)**
3. **Conclusion**
4. **Discussion**



**Meeting Title: TH and Goldcorp NAR MCDA**

**Date and Location: Teleconference, August 24, 2017**

**Introduction: Purpose and Objectives**

**Agenda:**

- 1. Introductions**
  - a. Methodology used (Lisa)**
  - b. Indicators used & alternatives (Lisa)**
- 2. Overview of findings**
  - a. Key findings (Catherine, Jennie, James)**
  - b. Safety indicators (James)**
- 3. Conclusion**
- 4. Discussion**

**Attendees:**

**Tr'ondëk Hwëch'in (TH)**

[Name Redacted]

**Coffee Project – Goldcorp Inc.**

[Name Redacted]

## Discussion of Key Topics:

Goldcorp gives an overview of methodology used – used methodology suggested by TH (environment Canada guidelines). This allows one to evaluate different value systems. Goldcorp discusses decisions regarding why some indicators were carried forward and some were not. Analysis is described, wetlands analysis is used as an example as work done specifically for this MCDA. The wetlands analysis was done using LIDAR data.

TH asks if Goldcorp looked at relative size of wetland, and asks if was a 50 m buffer of the road or from the ROW? Goldcorp will need their wildlife expert to answer these questions. TH notes that its not a critical question.

Goldcorp reviews the analysis done by TH, and explains that these are the indicators carried forward. Highlighted weightings are those that Goldcorp added, and estimated TH's weighting. TH is welcome to edit these as desired. Goldcorp reviews the TH analysis, including the three sensitivity analyses. All result in Maisy May scoring more highly.

Goldcorp reviews the Goldcorp weightings and analysis, and the same result occurs, where Maisy May is the preferred option.

TH provides some high-level comments:

1. TH appreciates the work that Goldcorp has done here. The methodology was performed consistent with TH's expectations, and the delay in receiving the spreadsheet from Goldcorp doesn't appear to have any effects.
2. TH appreciates being able to use the spreadsheet and test the results. It is clear that Maisy May is the preferred option, and it is clear that the information is robust.
3. Pending this information and outcomes of the site tour, the result is clear.
4. The transparency and quantified approach is what TH needed to help people understand the implications of each route and move ahead in an informed way.
5. Based on results, doesn't see the need to change some of the sub-accounts.
6. Some technical questions about interpretations, looking at indicators that didn't get carried forward, but in looking at and toggling the weightings, don't think that will change the outcome of the analysis.
7. Sees some need for additional mitigation work.

Goldcorp:

1. Notes that this was a good exercise for the team to go through, thanks TH for the template.
2. Next steps: is there a desire to take this away and discuss further with TH? Or is this the final stage of this analysis. Goldcorp would like some kind of feedback from TH acknowledging this outcome.

Following the site tour, LGL will put together a memo to TH describing conclusions of the MCDA, results of site visit, and recommendations for best steps forward. This will include that Goldcorp would like some feedback on the outcomes of this process, and get that back to Goldcorp.

LGL identified this as an item that needed further attention, it has received the further attention, and would like to close the loop.

**End of meeting 11:30 am.**

# MINUTES

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project  
August 29, 2017**

**Location:** Aldridge & Rosling Office, Vancouver

**Time:** 1:00pm – 2:30pm

**Participants:**

**Tr'ondëk Hwëch'in (TH)**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

[Name Redacted]

**Chairperson:** [Name Redacted]

Meeting commenced at 1:05pm  
[Name Redacted] recorded the minutes

## **Project Development**

1. Opening Prayer
2. Introductions / Sustainability / Safety / Personal Shares

The norovirus is being fought at camp so it is important to wash hands and beware of touching eyes. A discharge of water ceremony took place at site in Ontario. Youth and Elders shared stories and discussed the mines environmental initiatives. Forest fires were in the Dawson area and emergency plans are essential. Always report fires.

3. Review of Today's Agenda and Approval of Project Engagement Minutes and Action Items of the June 13<sup>th</sup>, 2017 Meeting

A caucus with key participants will take place at the end of this meeting to discuss capacity funding. The Action Tracker was reviewed and updated.

# MINUTES

ACTION: TH will confirm a timeline with their technical team on reclamation and closure information requests.

## 4. Project Update

The exploration program has been expanded with a goal of 400,000 ounces added to the companies reserves over the next few years. 6.1M USD for is budgeted for 28,000 additional meters of drilling and has been approved. Details of the program were discussed. TH asked if the resources being explored are in the current mine plan area. Goldcorp noted that the capitalized areas are. On the expense side are the targets which are outside of the mine plan area. Water trucks will be required at site to support expanded program. [Name Redacted] has attempted to reach CII but hasn't received a response. Two local companies have been identified and are able to provide trucks. One is an independent company and one is partnered with SFN. Updates to permits will take place to extend the program. Two new office trailers have been ordered. A funding request for construction of the 100 person camp at the Java site is being prepared. Geotech drilling completed in early August.

ACTION: Goldcorp will share the project update presentation with TH.

TH asked when the full results of drilling will be available. Goldcorp noted that the mineral reserves and mineral resources report company wide is made public in September every year.

ACTION: TH to share info on any companies who may have the water truck capacity.

TH asked if anyone has been contacted in regards to the 100 person camp. Goldcorp noted that nobody has been contacted at this point. Goldcorp requested the TH Business registry. TH asked if there was a plan design for the camp. Golcorp noted that there isn't, it would depend on the funding available for the camp items.

## 5. Items for Discussion

### a. Next Steps in YESAB Process

A Technical Engagement Status and Planning document was shared amongst the group. TH asked what the purpose of the document was and Goldcorp noted that we were asked at the last meeting to prepare this document to walk through the upcoming engagement plans. Mine Design would take place in first quarter 2018. The heap leach workshop may be broken up and discussed in the site design and the water workshops.

ACTION: TH would like to add human health to the socio-ec workshop. Goldcorp will ensure that takes place.

YESAB has expressed concern that additional consultation engaged in at this point may bring new issues and could change the project description. This could constitute a new project submission. Goldcorp is hoping that the two groups could communicate in a joint letter or individual letters that allow groups to say that between the two pre-submission consultation has been completed and that consultation will continue on from this point. TH will discuss this amongst themselves. TH relayed this message to YESAB that they are somewhat content with the pre-consultation and will address concerns through the next phase of the process. YESAB told Goldcorp that, before their decision to suspend the assessment, they couldn't take anything in to account that took place after March 31<sup>st</sup>.

TH asked what timeframe Goldcorp is planning to resubmit. Goldcorp noted that they would like to resubmit by the end of November. TH noted that they will be in touch in regards to timelines. Goldcorp would like to address timelines as early as possible with TH and are hoping to have the letters submitted by mid-September.



# MINUTES

ACTION: Goldcorp will add Human health to the project engagement document.

Workshops are being confirmed with SFN in order to allow for an earlier resubmission of the project proposal. Goldcorp continues to engage with WRFN as required. TH asked if the resubmission will be addendums to the current proposal? Goldcorp isn't sure at this point. The resubmission will be as simple as possible. It will be the resubmission of the consultation log but that is all and anything new will be submitted as an addendum.

ACTION: Goldcorp will send TH the adequacy letters provided by YESAB.

ACTION: Before mid-September TH and Goldcorp will discuss how they will communicate to YESAB in regards to pre-consultation. TH will use their review of the Goldcorp - TH Technical Engagement Status and Planning document to gain comfort with the content of these communications to YESAB.

ACTION: Goldcorp will send a digital version of the Goldcorp - TH Technical Engagement Status and Planning document.

Goldcorp has had two calls with YESAB. TH hasn't met with them as of yet. YESAB said that if we realigned the road to come from the east or build a new section, it would constitute a change to the proposal. If there was anything that invalidated the affects assessment in a negative way there would need to be a change to the proposal. Goldcorp's next call with YESAB will be at the end of September. TH asked that any time a First Nation is invited to look at the project that TH be invited as well. The message should be clear that they are being invited to TH traditional territory. Goldcorp is open to having TH at the table with SFN for any discussion.

## b. Update on Northern Access Route Analysis

TH will get back to Golcorp in regards to the NAR analysis in short order.

## c. Information Requests

Goldcorp of the view that all IRs have been answered. Any outstanding information requests will be communicated with Goldcorp in the near future.

## d. Upcoming Technical Meetings

The Socio-economic workshop can be scheduled in Vancouver. TH General Assembly is taking place on October 14<sup>th</sup>

## e. Next Advisory Committee Meeting

[Name Redacted] and [Name Redacted] (TH implementation director) will be added to the Advisory Committee. Potential dates for a meeting in Whitehorse is September 11<sup>th</sup> and 12<sup>th</sup>.

ACTION: TH will send Goldcorp Rea's contact information.

Goldcorp noted that a few TH employees have been off work for injuries. Goldcorp has reached out to the support systems available at TH and wants to ensure that the TH employees know that those support systems are available to them. This is an item that could be added to the upcoming meetings

# MINUTES

agenda. The Goldcorp HR Specialist can sit in for this discussion at the next meeting. TH thinks that planning ahead for this is a good idea. It's key to support the businesses of Dawson to ensure that there are resources available to support the project efficiently.

6. Upcoming Tr'ondëk Hwëch'in Citizens Meetings

No update at this point.

7. Preparation of Next Project Engagement Meeting

- a. Agenda
- b. Date (Vancouver)
- c. Chairperson

Meeting adjourned at 2:45pm

## Goldcorp – TH Technical Engagement Status and Planning

August 31, 2017

### Overview:

Following Goldcorp's acquisition of the Coffee Project and re-instatement of relations between the Tr'ondëk Hwëch'in government and the Coffee team, the two parties have engaged regularly on technical matters related to the YESAB Project Proposal. To date there have been eight workshops/meetings (see table 1) on technical matters and Goldcorp has received and responded to 445 information requests.

*Table 1 Technical Engagement*

Workshop	Date
Waste Rock Storage Facility (WRSF) alternatives assessment	February 3, 2017
Batch 1 documents	February 22, 2017
Water Quality Objectives Teleconference – February 9 <sup>th</sup> Letter from TH	February 27, 2017
Geochemistry and Groundwater Modeling Teleconference	February 28, 2017
Geochemistry Teleconference	March 7, 2017
Community health & well-being (including Human Health Risk Assessment and Health Impact Assessment)	March 8, 2017
Batch 2 documents	March 9, 2017
Northern Access Route	March 14, 2017
Heap Leach Facility Teleconference	May 25, 2017
Northern Access Route	June 5, 2017
Reclamation & Closure	June 5, 2017
Water Management and Water Quality	June 6, 2017
Geochemistry Teleconference	June 9, 2017
Project Update (day 1 of negotiation session)	June 13, 2017
Site visit	June 20, 2017
Teleconference on NAR multiple accounts analysis	June 22, 2017
Meetings with GC CEO	July 11-12, 2017
Closure teleconference	July 14, 2017
NAR MCDA Teleconference	August 24, 2017
NAR Site Tours	August 23 and 25, 2017
<b>Upcoming Technical Workshops</b>	
Water Management	September 28 and 29, 2017
Closure	October 17, 2017
Socio-economic Management Plan	October 31, 2017

### Key Items for Further Technical Review and Status of Discussion:

#### Northern Access Route (NAR)

The Northern Access Route (NAR) was selected in 2015 following an alternatives assessment, which is detailed in Section 2.10 of the Project Description in the Project Proposal. The alternatives assessment looked at 7 potential routes, which were general in nature (e.g. southern access, northern access, via barge). Once the NAR was selected, field studies were conducted in the summer of 2015 to determine the

specific routing. Field studies continued in 2016 and 2017. The result of that field work and comparative assessment for various sections of the route resulted in the proposed NAR alignment.

**Description of TH Concerns Raised in Engagement**

In the course of the three workshops on the NAR, TH has raised the concern that there is insufficient information on the effects on wildlife using the Maisy May portion of the route, in comparison to an alternative section that would go through the Black Hills. TH has identified additional valued components to be documented in a multiple accounts analysis that compares the Maisy May section and the Black Hills section of the NAR. TH has provided a matrix for determining which valued components are ranked highest for priority.

**Goldcorp Consideration & Response**

Goldcorp has conducted extensive field surveys to date, which led to the selection of the Maisy May section based on a number of considerations (minimization of new disturbance, safety, the relative absence of ice-rich permafrost, minimizing wetland disturbance and that differences in effects to wildlife will largely be negligible.) Goldcorp acknowledges TH’s desire to better understand effects to key valued components and as a result has undertaken a multiple accounts analysis. Goldcorp and TH have participated in field trips to the NAR with TH consultants and Goldcorp completed the analysis using existing data. The results of this analysis were provided to TH on August 16, 2017. A teleconference between Goldcorp and TH’s technical consultants was held on August 24, 2017 to discuss the results of this analysis. Both TH’s technical consultants and Goldcorp are aligned in accepting the results of the analysis of the Maisy May vs Black Hills sections of the NAR. TH’s technical consultants will provide recommendations to TH based on the outcomes of the analysis and NAR site tours and will look to provide Goldcorp with a final conclusions document from TH shortly.

Issue	Objective	Next Steps	Timeline
Maisy May vs. Black Hills section	Provide TH technical team with additional knowledge of ground conditions which contribute to the decision to route through Maisy May.	Set up site visit to Northern Access Route with TH.	Took place August 23 and 25, 2017
	Provide additional analysis and rationale so that TH may understand the potential effects on identified Valued Components with the proposed road route in comparison to Black Hills.	Complete multiple accounts analysis using existing data on value components	Complete and provided to TH on August 16; discussed with TH technical team on August 24, 2017
	Determine if there are any valued component effects using the Maisy May route that differ from the Black Hills route that need additional mitigation than those already proposed.	Goldcorp to complete assessment using template provided by TH on remaining valued components.	Complete and provided to TH on August 16; discussed with TH technical team on August 24, 2017

	Conclude Maisy May vs Black Hills multiple accounts analysis results.	TH consultants to provide memo to TH with recommendations to close-off of the Maisy May vs Black Hills analysis; TH to provide decision in written form to Goldcorp.	By early September 2017
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## Water Management

The proposed Coffee mine is situated in three creek catchments: Halfway creek, YT-24, and Latte Creek (which flows into Coffee Creek). One of the key drivers for determining appropriate site water management is the Contaminant of Potential Concern (COPC) Uranium, which is naturally elevated in surrounding water bodies, with the exception of YT-24. The natural topography of the site and fish presence in the creeks, are other key considerations when making water management decisions.

### **Description of TH Concerns Raised in Engagement**

TH provided a letter to Goldcorp on February 9 2017, which “recommends that the mine plan proposed and ultimately developed by Kaminak ensures that the Latte Creek, Coffee Creek and Halfway Creek drainages remain substantially unaltered in terms of water quality and flow (i.e. non-degradation) to protect rearing habitats for Chinook salmon which are a species of salmon that [TH has] a constitutionally protected right to harvest under the final Agreement and which are extremely important culturally.” Furthermore TH “requires that YT-24 will be afforded a level of protection consistent with typical waters in Yukon (protection of designated uses). The main water management goal should be to provide protection for aquatic life from exposure to COPCs resulting from the Project.”

### **Goldcorp Consideration & Response**

Goldcorp recognizes the importance that TH places on ensuring the viability of habitat for salmon for current and future generations, and agrees with the protection of all aquatic life and habitat. Goldcorp will not be able to meet the non-degradation threshold for Halfway Creek and Latte Creek. The use-protection approach for YT-24 can be met. Goldcorp needs to propose a strategy for water management and discharge that can be met in the Operations and the Closure period. Based upon discussion and this feedback from TH, Goldcorp has elected to reduce the amount of waste rock reporting to Latte Creek by eliminating the external-pit south WRSF. Goldcorp can meet a use-protection approach for all watersheds affected by the mine and commits to setting appropriate site-specific water quality objectives using that approach in partnership with TH. Furthermore, in recognition of TH’s objective to protect salmon habitat, Goldcorp is open to considering a biodiversity enhancement strategy to support meeting this objective.

Issue	Objective	Next steps	Timeline
Water management and site-specific Water Quality	Resolve outstanding action items from June 5/6 to ensure TH has adequate understanding of water flows, quality and modelling	Provide items requested at meeting: <ul style="list-style-type: none"> <li>• Pie graph of the water contributions</li> <li>• Conceptual diagram of pit leakage</li> <li>• Label approximate WQ station numbers by each on conceptual diagram</li> <li>• Pit lakes water quality included in water quality modelling</li> </ul>	July-Sept. 2017



objectives (SSWQOs)		<ul style="list-style-type: none"> <li>SEA requests a simple table to show average flows or summation of flows. Inflows = outflows +/- storage</li> <li>More information on passive water treatment in closure</li> </ul>	
	Meeting to confirm/resolve outstanding information requested and look for potential water management opportunities	Coordinate meeting to discuss water management for each mine facility in-depth and documents listed above	September 2017
	Determine appropriate use-protection SSWQOs to be included in submissions for Water Board Licensing	Workshop on water quality objective setting	September 2017

### Closure & Reclamation

Goldcorp's Sustainability Excellence Management System requires that all sites prepare a reclamation and closure plan that is sufficiently detailed for the stage of mine life, and that includes measures for both environmental and socio-economic closure. Goldcorp proposed a conceptual Reclamation and Closure Plan in the Project Proposal and a number of additional mitigation measures related to socio-economic effects were stated throughout the proposal.

#### **Description of TH Concerns Raised in Engagement**

Engagement specifically on the Conceptual Reclamation & Closure Plan has been high level to date. The initial salient issue of discussion has been related to proposed plan for the Alpha Waste Rock Storage Facility, and more generally long term waste rock storage. In addition, further information has been requested related to closure measures for the Heap Leach Facility, particularly in regard to water treatment for the closure phase, as discussed in the water management section.

It is noted that the discussions to date have not covered social aspects of closure.

#### **Goldcorp Consideration & Response**

Goldcorp believes that there is both opportunity and benefit to continuing the discussions on closure in a second formal workshop.

Issue	Objective	Next Steps	Timeline
Detailed discussion on closure plan	Determine aspects of the closure plan that require additional information for this stage of the mine life.	TH to review Conceptual Reclamation & Closure Plan and provide comments	September 2017
	Update Conceptual Closure & Reclamation Plan for Water Licensing	Workshop to review comments and elements of the plan in depth	Q4 2017

## Mine Design

Goldcorp has proposed a mine design plan that includes four open pits, two waste rock storage facilities, a heap leach facility, crusher system, plan facility, camp, mine site and haul roads, water management infrastructure and ancillary features. To date, the discussion of mine design has been focused on the waste rock storage facility alternatives assessment and a site tour. Goldcorp believes that there is further benefit to discussing the rest of the mine design in deeper detail.

Issue	Objective	Next Steps	Timeline
Site design	Ensure that the backfilling opportunities and challenges are understood.	Mine design workshop	Late September 2017
	Provide TH with sufficient detail on mine design and process (e.g. geology, crushing method/configuration, mining rate, equipment selection, stacking rate)_and effects of other installations (e.g. landfill, waste, plant, etc.) that will be on site.		

## Heap Leach

The Coffee mine proposes a Heap Leach Facility (HLF) to process oxide ore. This technology is not new to the Yukon nor the Tr'ondëk Hwëch'in, having been utilized by the Brewery Creek mine in the 90's and proposed for other mines in the territory, such as Victoria Gold's Eagle mine project. While the heap leach technology has been covered in a cursory manner related to water management in the June 6<sup>th</sup> workshop, there has been interest expressed on both sides in having a dedicated workshop to review the technology used in the HLF, particularly as it relates to environmental protection, water management, and reclamation and closure.

Issue	Objective	Next Steps	Timeline
Ensure TH has adequate understanding of the environmental aspects of HLF management	Convey design detail regarding heap leach facility design criteria, construction and operation methodology, controls and monitoring, and closure methodology	Hold HLF workshop	Q4-2017

## Socio-economic Management Plan

Prior to submission, Goldcorp held two workshops which covered the eight socio-economic valued components of the project (Batch 1 and Batch 2 workshops).

### ***Description of TH Concerns Raised in Engagement***

TH provided a number of information requests (IR) prior to submission of the Proposal to YESAB, for which responses were provided. A number of those IRs were also submitted to YESAB for consideration in the adequacy review. Key general concerns from Goldcorp’s understanding are:

- There is no specific TH socio-economic baseline capacity, impact assessment, mitigation and monitoring plan.

Management plans are identified but not yet complete and therefore TH cannot make a determination if the proposed mitigations are sufficient.

**Goldcorp Consideration & Response**

In Goldcorp’s view the project baseline and effects assessment methodology is appropriate to the YESAA process. However, Goldcorp acknowledges that there were certain components of the effects assessment that could not be adequately assessed due to lack of data. Goldcorp proposes that it work with TH to identify 3-6 core socio-economic valued components (VCs) that are of greatest importance to TH to monitor throughout the life of project and ensure that there is adequate baseline data to utilize in the management and monitoring of those VCs. Furthermore, since submitting the Project Proposal, Goldcorp has completed a Community Profile Study, which provides greater information on various aspects of the local economy, which may be of use to TH in its assessment of that component.

In addition to the review of TH-specific VC data, Goldcorp also proposes to work collaboratively with TH in the development of the Socio-economic Management Plan.

Issue	Objective	Next Steps	Timeline
Lack of TH specific assessment	Determine TH priority VCs and identify related data gaps to be closed.	Meeting to discuss current list of VCs and subcomponents and determine highest priority VCs for management planning purposes	Q4-2017 - Q1-2018
Absence of socio-economic management plan	Socio-economic Management plan reflects TH priority VCs and appropriate measures to manage VCs of concern	Determine document sharing and comment plan for Draft Socio-economic Management Plan	Q4-2017 - Q1-2018

**Human Health**

The Project Proposal includes a Community Health & Well-being Valued Component (VC) Effects Assessment. This VC encompasses two sub-components of Environmental Quality and Socio-economic Factors. The assessment of the former, Environmental Quality, was supported by a Human Health Risk Assessment (HHRA). The latter was supported by a Health Impact Assessment (HIA). Prior to submission, Goldcorp and Tr’ondëk Hwëch’in participated in a workshop on the HHRA and HIA as it relates to this VC. Through this discussion it was determined to integrate the HIA directly into the Community Health & Well-being VC Effects Assessment. The final version submitted to YESAB on March 31st included the concepts of the HIA integrated into the Assessment as discussed with the TH technical team and the stand-alone HHRA appendix.

**Description of TH Concerns Raised in Engagement**

TH provided a number of information requests (IR) prior to submission of the Proposal to YESAB, for which responses were provided. A number of those IRs were also submitted to YESAB for consideration in the adequacy review. Key general concerns from Goldcorp’s understanding are:

- Capacity of healthcare services and infrastructure in Dawson
- Lack of TH-specific effects and associated mitigations regarding health in the HHRA and HIA, and Community Health and Wellbeing VC.
- Additional data related to consumption of traditional food, particularly related to fish desired to support TH’s assessment of the proposal.
- Additional baseline data used for metal concentrations in air and soil desired to support TH’s assessment of the proposal.

**Goldcorp Consideration & Response**

In Goldcorp’s view the project baseline and effects assessment methodology is appropriate to the YESAA process. However, Goldcorp acknowledges that there were certain components of the effects assessment that could be further developed. Goldcorp proposes that it meet with TH to discuss concerns related to human health in more detail. Additionally, since submitting the Project Proposal, Goldcorp has continued air quality monitoring studies associated with the Northern Access Route to gather additional baseline data.

Issue	Objective	Next Steps	Timeline
Lack of TH specific assessment	Determine TH priority topics in effects assessment and identify related data gaps to be closed.	Meeting to discuss current list of VCs and subcomponents and determine highest priority VCs for management planning purposes	Q4-2017 - Q1-2018
Attaining additional information on traditional food and potential mitigations	Understand TH’s concerns related to potential effects on traditional foods and proposed mitigations.	Meeting to discuss traditional foods and effects assessment and identify potential mitigations for management planning	Q4-2017-Q1-2018
Attaining additional data for in Human Health-related effects assessments and mitigations in the Project Proposal	Understand and address concerns in Human Health related effects data and proposed mitigations	Meeting to discuss Human Health effects assessments and potential mitigations for management planning	Q4-2017-Q1-2018

## Technical Engagement Plan for the Coffee Project

The purpose of this document is to ensure alignment between Selkirk First Nation and Goldcorp on how to move forward on consultation through SFN’s technical review of the proposal and community engagement. The following outlines proposed technical engagement between Goldcorp and SFN’s Technical Team prior to the resumption of YESAB’s review of the Project Proposal. The activities would be conducted in parallel with other engagements between Goldcorp and SFN Leadership and SFN citizens with respect to the Project. Goldcorp and SFN have signed a Confidentiality and Capacity Funding agreement, which provides support to SFN to carry out activities identified in this plan as well as through the screening stage of the YESAB proposal review. This plan will complement the other streams of ongoing engagement, including negotiation of a benefits agreement, between Selkirk First Nation and Goldcorp.

### Technical Team

SFN has assembled an independent technical team to conduct a technical review of the proposed Coffee Gold mine. The Technical Team is identified in Table 1.

Table 1: Technical Team Members

Name	Company	Contact Information
[Name Redacted]		[Name Redacted] northwestel.net
[Name Redacted]		[Name Redacted] northwestel.net
[Name Redacted]		[Name Redacted] @northlandconsulting.ca
[Name Redacted]		[Name Redacted] elr.ca
[Name Redacted]		[Name Redacted] elr.ca
[Name Redacted]		[Name Redacted] @bslater.ca
[Name Redacted]		[Name Redacted] icloud.com
[Name Redacted]		[Name Redacted] @northwestel.net

The subject matter areas associated with the Team members are presented in Table 2.

Table 2: Technical Team – General Subject Matter Areas

Organization	General Subject Matter Area
[Name Redacted]	Socio-economic effects assessment and monitoring
GEEC	Water quality (prediction & modelling) and mine water management



Northland	Mine waste management and engineering design
ELR	Terrestrial Biology
BSEC	Environmental Assessment, mine water and mine waste management
North/West	Socio-economic effects assessment and monitoring
Toews	Aquatic Biology

## Technical Team Coordination

[Name Redacted] will provide internal coordination of the Technical Team and SFN Land & Resources staff and provide interface directly with Goldcorp on logistical coordination of interactions between the Technical Team and Goldcorp.

## Independent Technical Review

The independent technical review will consider both the Northern Access Road (NAR) and the proposed mining activities that comprise the Project Proposal.

The first phase will have SFN's Technical Team complete independent technical reviews of the submitted Project Proposal, the submissions provided to YESAB by other parties and the comments provided by YESAB's technical consultants.

Most of the materials required for the review have been provided by Goldcorp or by other parties to YESAB and can be accessed by the SFN Team. It is expected that a small number of supporting documents that have been referenced by Goldcorp but not included in the Project Proposal will be identified and requested to be provided by Goldcorp to facilitate the independent review.

The goals of the first phase of the review are:

- To familiarize the Team with the technical and logistical aspects of the proposed Project;
- To confirm that baseline activities supporting the Project have been robust and appropriately executed;
- To examine the methodologies utilized by Goldcorp and its consultants in making predictions on potential effects of the Project;
- To examine the concerns and issues that have already been raised by other parties and submitted to YESAB;
- To identify any opportunities to:
  - Eliminate gaps in baseline data sets;
  - To improve the level of confidence in the prediction of impacts;
  - Improve the Project execution plans to reduce potential impacts; and
  - Improve the confidence in successful closure of the mine;
- To identify if further technical expertise is required to support SFN's participation in the Project.

This first phase of the review is proposed to be substantially complete by September 18<sup>th</sup>, 2017.

## Site Tour

To assist in review of the Project Technical Team members will participate in a tour of the mine site and NAR Route. Goldcorp has proposed a site tour for the week of September 14<sup>th</sup>, 2017. The Technical Team has identified that they are available during that week and [Name Redacted] will coordinate fixing a firm date for that week.

## Technical Meetings

The second phase of the engagement will feature a series of meetings between Team members (and subsets thereof) and Goldcorp and its technical consultants. It is envisioned that these meetings would be completed during September or as soon as practical.

Generally, these meetings should consider broader themes as opposed to single issue or subject matter agendas. The meetings should enable fulsome dialogue and exchange, rather than workshop presentations followed by a specified period for the delivery of written comments. This approach should allow for cross pollination of ideas between the various Team members and Goldcorp's Team.

The intent of the meetings in this phase would be to:

- Allow the Technical Team to become familiar with key members of the Goldcorp team;
- Obtain clarification on any matters of not clearly understood from review of the Project documents;
- Identify how Goldcorp intends to respond to issues and concerns raised by SFN and other parties and to review those proposed responses where they are available;
- Share potential concerns and preliminary views with aspects of the Project and its potential effects and with methodologies used to predict Project effects and seek Goldcorp's views on such matters; and
- Identify potential means of improving the Project and seek Goldcorp's views on those propositions.

Table 3 identifies four provisionally identified meetings that the Technical Team will seek with Goldcorp.

Table 3: Provisional Technical Meetings

Meeting Theme	Participants
Operational Wildlife Impacts and Management <sup>1</sup>	Northland, ELR, SFN Staff
Water Impacts and Operational Mine Waste Management <sup>2</sup>	BSEC, GEEC, Northland, Toews, SFN Staff
Mine Closure Planning	BSEC, GEEC, ELR, Northland, Toews, SFN Staff

This second phase of the review would start in the week of September 18<sup>th</sup> and continue on a schedule that is mutually agreeable with Goldcorp. Goldcorp has proposed some potential dates for meetings some of which appear to be workable and some that are not. It is expected that further logistical coordination will be necessary to finalize mutually acceptable dates.

Unless otherwise indicated by SFN Council or representatives authorized by Council to do so, the discussions and comments offered by the Technical Team during workshops will present preliminary views and not represent final positions of SFN. Technical Team discussions with Goldcorp will be a process of discovery intended to enable the Technical Team to develop its findings and recommendations to SFN and, through the discussion, to share with Goldcorp its expertise, its concerns, and the findings and recommendations it may provide to Selkirk.

If Goldcorp has some additional information or its planning for the Project is being further developed, it is expected that this would be shared with SFN and the Technical Team prior to it being brought forward as part of the YESAB process.

During and following the completion of the technical meetings, the Technical Team members will produce and provide briefings for SFN Leadership and staff both in person and in writing and will attend at SFN community information meetings when requested to do so. It is recommended that at least one of the community information events be scheduled after the primary Technical Team meetings have occurred. 1-2 citizen's meetings will be held no later than mid-October with Goldcorp present to provide information and respond to questions that may have arisen.

It is expected that SFN will in due course formalize its submission(s) to Goldcorp with respect to the recommendations that it proposes Goldcorp incorporate into its further development of the Project Proposal and, if approved, its execution of the Project. The formal submissions will be delivered on a topic-by-topic basis within 14 days of completion of a technical workshop. Goldcorp will provide a response to those recommendations, after full and fair consideration, to SFN and the Technical Team within 14 days of receipt of SFN's formal comments and prior to Goldcorp seeking a resumption of the YESAB screening of the Project. Goldcorp and SFN Chief and Council shall meet within a week of Goldcorp's response and prior to resubmission to YESAB to review this dialogue and finalize any outstanding issues.

A record of the meetings will be produced by Goldcorp, which shall be shared with SFN. SFN is welcome to provide comments, however all records of consultation submitted in the Project proposal are proprietary to Goldcorp.

## Adequacy Submissions

The technical engagement process should enable the Technical Team to provide its informed and considered advice to SFN on a timely basis with respect to the adequacy of the Project Proposal for assessment, as to technical matters, when the Executive Committee considers whether to resume its screening of the Proposal.

SFN's submission will be informed by Goldcorp's response to the issues and concerns raised by the Technical Team and its demonstration that it has fully and fairly considered those matters.

**Table 4: Summary of Process for Consultation**

Phase	Activity	Responsible	Target completion date
1	SFN document review	SFN technical team	Sept. 18
2	Technical Workshops	SFN and Goldcorp technical team	Oct. 15
	Updates to Chief & Council	SFN Technical team	
	Formal presentation of views	SFN Chief & Council &/or Technical team	2 weeks following each workshop
	Consideration and response on views presented	Goldcorp	2 weeks following receipt of views
	Discussion on views and response	Goldcorp and Chief & Council	in the week following Goldcorp's response.
3	Re-submission of Proposal to YESAB	Goldcorp	Oct. 15- Nov. 30 <sup>th</sup>
3	Adequacy Submissions	SFN	Following resumption of YESAB review

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1.

2.

# MINUTES

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project  
September 13, 2017**

**Location:** Fasken Martineau Office, Vancouver

**Time:** 1:00pm – 2:30pm

**Participants:**

**Tr'ondëk Hwëch'in (TH)**  
[Name Redacted]

**Coffee Project – Goldcorp Inc.**  
[Name Redacted]

**Chairperson:** Goldcorp

Minutes recorded by [Name Redacted]

Meeting commenced at 1:00pm

## **Project Development**

1. Opening Prayer
2. Introductions / Sustainability / Safety / Personal Shares  
There was a fire in the underground mine at Porcupine Mine. It was noted that it is important to know the emergency exits and airflow at all times. The weather is changing, preparations should begin for vehicles and homes for the approaching winter.
3. Review of Today's Agenda and Approval of Project Development Minutes and Action Items of the August 29<sup>th</sup>, 2017 Meeting  
Action tracker items were discussed and updated.
4. Items for Discussion
  - a. Technical Engagement Status and Plan  
The TH technical team has reviewed the status and plan provided by Goldcorp to determine whether an accurate assessment had been completed by Goldcorp and whether the next steps were sufficient. TH will do a quality control of their results and share with Goldcorp tomorrow. This work will also inform the agendas for the upcoming technical sessions.



# MINUTES

A Scope of Work and budget has been prepared and will inform item number 5 on this agenda. TH would like to suggest a smaller group meeting to discuss capacity funding.

ACTION: TH will provide scope of work and budget tomorrow.

ACTION: Goldcorp will provide a draft agenda for the upcoming technical sessions. The sessions will be more interactive than they have been in the past.

b. YESAB Update and communication plan to YESAB

Goldcorp hasn't had further discussions with YESAB. The next meeting will be at the end of September or early October in regards to the resubmission date. Goldcorp asked if TH has had further discussion with YESAB and they noted that there hasn't been any further conversations. In regards to a joint letter to YESAB, TH will have a letter drafted by the end of the day today or tomorrow. It will be a separate letter addressing the consultation section and adequacy review. Similar to what had been sent in July. TH is considering the timing of when the letter should be sent. If it should go in when the proposal is resubmitted and what expectations there are on Goldcorp's part and the additional engagement plan. The letter can be sent in at any time and doesn't have to be sent in after the resubmission. Goldcorp would like to have the letter sent in as soon as possible and is still planning on a November resubmission. The parties discussed current planned engagement and discussions with other affected first nations.

c. Next Advisory Committee Meeting

An Advisory Committee meeting has been scheduled for October 16, 2017 at the TH office.

ACTION: TH will send some additional agenda items for next Advisory Committee Meeting.

5. Capacity Funding

- a. Updated workplan and budget
- b. Draft Addendum for extension

Both of the above items will take place at a small meeting tomorrow. [Note: this meeting did not take place and is to be scheduled for a teleconference in the coming week.]

ACTION: Goldcorp will initiate a conference call to discuss Capacity Funding.]

6. Preparation of Next Project Engagement Meeting

- a. Agenda
- b. Date
- c. Chairperson

7. Other

a. Citizen's Meeting

Goldcorp noticed there is a citizens meeting on October 2<sup>nd</sup>, Goldcorp would like to get a sense of the information that is being shared and requested the meeting minutes. TH has an obligation to keep the citizens updated. The meetings are not for the public and include the negotiation content, updates on the YESAA submittal and the Northern Access Route update. Goldcorp would like to help to make sure both sides are aligned. To the extent that there is any information received such as concerns or issues or more information needed by citizens which Goldcorp can help address those needs, Goldcorp would like to know that information. TH

# MINUTES

appreciates that, many of the items in our agreement are based on what TH is hearing from their citizens. The citizens have placed their confidence in the government to address their needs and concerns. TH will gather the concerns of citizens through direct engagement and will pass them on to Goldcorp at these meetings.

- b. Attendees to SFN Tour  
[Name Redacted] will be the TH representatives on the SFN tour tomorrow.

# AGENDA

Selkirk First Nation – Goldcorp  
Coffee Project Northern Access Route and Site Tour  
September 14, 2017

Location: Coffee Camp, Northern Access Route between the Stewart and Yukon Rivers

Time: 7:30 AM to 6:00 PM

Participants:

Selkirk First Nation (SFN)

[Name Redacted]

Coffee Project – Goldcorp Inc.

[Name Redacted]

Stops for Site Tour:

1. Fly up Coffee Creek, Latte Creek valley
2. Stop at HLF/knob, discuss site infrastructure
3. Go to Halfway Creek valley, set down at mouth

Stops for NAR Tour:

1. Fly over proposed NAR from Coffee Site to bottom of Maisy May
2. Stop at barge landing north side of Stewart
3. Stop at fish crossing in Barker drainage

Tour Groups:

# AGENDA

Each group will have one helicopter tour guide. Jeremy Araki, OnSite Engineering, will accompany each group on the tour of the NAR.

<i>Group</i>	<i>Group 1</i>	<i>Group 2</i>	<i>Group 3</i>
<i>Tour Guide</i>	[Name Redacted]		
<i>SFN</i>	[Name Redacted]		
<i>SFN</i>	[Name Redacted]		
<i>SFN</i>	[Name Redacted]		

Agenda :

Time	Location	Activity
7 :30 AM	Alkan Hanger, Whitehorse	Charter Flight to Coffee Site
8 :30 AM – 9 :30 AM	Coffee Site	Safety Orientation Helicopter Orientation
10 :00 AM – 5 :00 PM	NAR + Site	Group 1 – Camp Tour + Exploration Overview Group 2 – Project Site Tour Group 3 – NAR Tour  Lunch @ 11:30 am  Group 1 – Project Site Tour Group 2 – NAR Tour Group 3 – Camp Tour + Exploration Overview  Touch-down at site, rotate groups, bio break @ 2:30 pm  Group 1 – NAR Tour Group 2 – Camp Tour + Exploration Overview Group 3 – Project Site Tour
5:00 PM – 6:00 PM	Coffee Site to Alkan Hanger, Whitehorse	Charter flight to Whitehorse

# AGENDA

## Dress Code

Please note that temperatures at the sites during this time are forecasting to be between 0°C and 10°C. Layered clothing and a light winter jacket is recommended to accommodate the fluctuation in temperatures.

## PPE

Close toed shoes are to be worn by each visitor, all other PPE required for the tour will be provided by the site.



# AGENDA

Selkirk First Nation – Goldcorp  
Coffee Project Northern Access Route  
September 15, 2017

Location: Northern Access Route between the Stewart and Yukon Rivers

Time: 7:30 AM to 12:00 PM

Participants:

Selkirk First Nation (SFN)

[Name Redacted]

Coffee Project – Goldcorp Inc.

[Name Redacted]

Stops for NAR Tour:

1. Fly over proposed NAR from Coffee Site to bottom of Maisy May
2. Stop at barge landing north side of Stewart
3. Stop at fish crossing in Barker drainage

Agenda :

Time	Location	Activity
7 :30 AM	Trans North Helicopters, Whitehorse	Charter Flight to Pelly Crossing [Name Redacted]
9 :30 AM	Pelly Crossing Airport	Safety Orientation Helicopter Orientation Leave for NAR tour (All)
10 :00 AM – 12 :00 PM	NAR	NAR Tour (All)

# AGENDA

Time	Location	Activity
12:30 PM – 2:00 PM	Pelly Crossing to Trans North Helicopters, Whitehorse	Charter flight to Whitehorse

## Dress Code

Please note that temperatures at the sites during this time are forecasting to be between 0°C and 10°C. Layered clothing and a light winter jacket is recommended to accommodate the fluctuation in temperatures.

## PPE

Close toed shoes are to be worn by each attendee, water and snacks individuals require during the site tour should be provided by individual attendees.

# AGENDA

## **Selkirk First Nation and Goldcorp Water Impacts and Operational Mine Waste Management Workshop September 19, 2017**

**Location:** Kwanlin Dun Cultural Centre Classroom A Room

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

### **Selkirk First Nation (SFN)**

[Name Redacted]

### **Coffee Project – Goldcorp Inc.**

[Name Redacted]

### **Agenda:**

- 1. Introductions**
- 2. Workshop Format**
  - a. High level overview followed by discussion
  - b. Workshop tools (parking lot, etc.)
- 3. Fish and Fish Habitat** [Name Redacted]
- 4. HLF Overview + Water Management** ([Name Redacted])
- 5. Mine Waste** [Name Redacted] **and colleagues)**
  - a. Mine Development
  - b. Waste Rock Management
- 6. Water Management at Site** ([Name Redacted] **and colleagues)**
- 7. Water Quality** ([Name Redacted] **and colleagues)**

**Selkirk First Nation and Goldcorp Water Impacts and Operational Mine Waste Management Workshop**

September 19, 2017

Location: Kwanlin Dun Cultural Centre Classroom A Room

Time: 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

**Selkirk First Nation (SFN)**

[Name Redacted]

)

**Coffee Project – Goldcorp Inc.**

[Name Redacted]

**Action Items**

Action Item	Party Responsible	Date Due
Goldcorp and SFN to consider “Aquatic Stream Health” as a VC or sub-component.	Goldcorp + SFN	Oct. 20, 2017
Consider fish DNA work to ascertain source stocks and streams that could be potentially effected, for juvenile Chinook using project watershed. This is to support future monitoring of the project	Goldcorp	Oct. 20, 2017

and could be outside of the present effects assessments		
Need a good figure depicting conveyance of raincoat water versus process solution	Goldcorp	Oct. 31, 2017
Run stochastic simulation of both HLF and site wide water balance (provide models and timeline for development).	Goldcorp	Q1 2018
Run validation of Goldsim model against measured hydrology and water quality data for 2016-2017	Goldcorp	Q1 2018
Consider including WRSF geometry design rationale with Project Proposal	Goldcorp	Nov. 30, 2017
Consider WRSF additional diversion ditch as a backup for the rock drain.	Goldcorp	Q1-2018
Evaluate potential for overflow ditch if a head pond forms on the upslope side of the Alpha WRSF rock drain	Goldcorp	Q1-2018
Provide thermal modeling to support the conclusion that the Alpha rock drain will not freeze and become ineffective	Goldcorp	Under review
Provide an Annualized WQM from Year 1 to closure	Goldcorp	Q1-2018
Provide a reader version of the Goldsim site wide water balance and WQ model (Year 1 to Closure)	Goldcorp	
Add snow courses to Alpha WRSF area	Goldcorp	Complete.
Do toxicity testing in lower Coffee Creek	Goldcorp	Q3-2018
Consider planning to allow for access to schist waste rock materials for reclamation work	Goldcorp	Q1-2018 (Draft Waste Rock + Closure Plan updates)
Provide the list of management plans, including how the concept of adaptive management will be integrated, and target dates for sharing with SFN as a way to address uncertainty	Goldcorp	Q1-2018 (Draft plan for review)



**Parking Lot Items**

Item	Timeline to address
Conceptual adaptive management plan	
Alpha WRSF cover in closure	
Alpha Pond storage capacity – consider role of pond for contingency storage and potential for staged construction	

**Summary of Discussion**

**Fish and Fish Habitat:**

Goldcorp delivers an update on Fish and Fish habitat work done. Results of additional sampling are discussed:

- Overview of changes to YT-24 due to a 2017 storm event.
- Caught 1 grayling this year in YT-24 in the lower 100 m.
- Overview of Halfway Creek work done, caught juvenile Chinook in Halfway Creek again this year, confirmed again that there is no overwintering habitat. Data shows that fish only use lower portion of Halfway, due to impediments. Confirms that impediments aren't true barriers. Halfway Creek is a third order stream, Halfway 6.3 (Halfway 6.3 is 6.3 km from the mouth of the creek) is the mid-way point on the stream.
- Goldcorp confirms for SFN that HC 6.3 fish sampling site is equivalent to HC 2.5 water quality monitoring site.
- Goldcorp notes that at 900 m from the mouth of the creek, Halfway Creek has a considerable falls over a log jam, with similar impediments along the way up Halfway Creek.
- Goldcorp assessed water quality in the middle of the stream.

SFN advisor responds to the information presented:

- Notes that lots of streams are low productivity in Yukon, but when you add them up collectively they contribute a significant portion of total productivity.
- Streams will be used ephemerally by fish depending on environmental conditions which may vary over the medium to long term. Any overwintering habitat in the lower section of the stream is very important with the harsh Yukon winter climate, and effects are different in the winter when fish are stressed by environmental conditions than they are in the summer.

Goldcorp replies to SFN advisors:

- There is no surface water at the mouth of Halfway Creek over winter.

- There's flowing water at HC 2.5 water quality station, which results in lots of aufeis, but you can't measure it, as it's flowing between layers of ice (i.e. it does not provide for overwintering habitat).
- Goldcorp confirms having seen no slimy sculpin, except at the very mouth of Halfway Creek.

Goldcorp reviews the chinook spawning surveys done in 2017 in response to comments provided by TH:

- Traditional Knowledge notes salmon fishing in Coffee Creek, but Goldcorp has not seen spawning in Coffee Creek.
- Goldcorp will continue to investigate Coffee Creek for spawning.
- The March 2016 sampling event caught 47 juvenile Chinook in Coffee Creek, noting that 2016 was a mild winter.
- This (2017) winter had less Chinook salmon hits on eDNA work done.

SFN advisors responds to the information presented:

- SFN advisors notes that overwintering for Chinook is very important, and that those fish could have come from the Teslin or other watersheds, and it will affect people fishing those fish when they return.
- Chinook salmon populations have been depressed for the past 15 years; if populations were higher, tributary streams would be used more.
- SFN advisors describes the cultural importance of salmon to First Nations, noting that fish camps are culturally important to families as well as for subsistence, and First Nations have been making great efforts and sacrifices to conserve salmon in their territories.
- Because of depressed populations current stream utilization does not reflect the potential productivity or past productivity of the stream.
- Spending the first winter in freshwater in the Yukon results in high mortality for juvenile Chinook. Overwintering studies are not common, and there are more studies being done.
- Notes the work done by Goldcorp such as winter sampling for overwintering Chinook is important.

Goldcorp explains that the ecological and cultural importance of Coffee Creek drove the mine plan change that eliminated waste rock storage in Latte Creek and YT-24 Creek watersheds.

Goldcorp discusses ideas about working with TH and with placer miners on reclamation to help reduce impacts to fish. Salmon has been heard as a key area of focus from First Nations. It is noted that traditional land use will be discussed with SFN on Thursday, and that this will be a good time to look at efforts that have been started by First Nations and how Goldcorp could support those.

SFN advisors asked whether anything Goldcorp found this year in the ongoing baseline studies changes what Goldcorp is proposing. Goldcorp confirms that no changes will be proposed as a result of the continued baseline data collection.

SFN advisors discuss mitigations for effects to fish:

- notes that offsetting would be evaluated by DFO.
- advocates for compensation and offsetting to be done in a planned way where it counts, where it will have a positive effect on fish over the long term.
- promotes a First Nation and community-driven approach to fisheries offsetting and compensation projects, and for long-term.

Goldcorp replies to SFN advisor's points about mitigations:

- Goldcorp agrees with SFN advisor and notes that Goldcorp would like to support initiatives already grounded in the community and that are seeing a measure of success.
- Goldcorp indicated that it has considered the concepts of (1) building a barrier to fish at the mouth of Halfway Creek to keep fish out of the stream and (2) discharging water directly to Yukon River where there is additional dilution. However, it is not pursuing either of these concepts.
- Goldcorp highlights that the water quality in Halfway Creek is such that there will be no harmful effects on the fish that currently utilize the system during the summer and there is no need to prevent fish from going into that creek.
- Goldcorp doesn't want to put a barrier at Halfway Creek as it wouldn't be useful, and it's not required.

SFN advisor discusses considerations in the Project Proposal for stream health:

- Notes that TH's submission to YESAB discusses an "Aquatic Biota" VC which is similar conceptually to a proposed Aquatic Health VC, and this warrants further discussion.
- Notes that establishing a good index of aquatic health and monitoring it can help monitor whether a stream can be healthy for fish.
- asks Goldcorp to consider making aquatic stream health a VC, noting that slimy sculpin is an important species to include in this VC as it is the only fish that spends its entire life cycle in tributary streams in the Yukon. Also suggests looking at benthic and fish data and models from the placer industry aquatic health monitoring.
- Wants to know how uncertainties will be monitored, and how Goldcorp plans to respond to results. Adaptive management with action thresholds is critical to address project and effects uncertainties and recommends that this should be included as a conceptual level plan at the assessment stage.

Goldcorp replies to the points raised by SFN advisor:

- Goldcorp is currently working on adaptive management plans, and wants input from SFN on those plans prior to licensing. Questions about monitoring can be answered in the YESAB process. The plan is to begin consultation in January on management plans.
- Goldcorp notes that slimy sculpin aren't found in all streams, acknowledges that other indicator species, such as bugs, do exist in streams. This is being considered in the Fish and Fish habitat VC report.

- Goldcorp notes that there is no toxicology benchmark for sculpin, as they are hard to keep in a lab. This makes it difficult to use this species in assessment for stream health.

SFN advisor further discusses an “Aquatic Health” VC:

- Notes that looking at aquatic health is important and can be looked at with other species.
- Notes that to evaluate stream health, looking at abundance and diversity of benthic organisms is an important measurement. Looking at contaminants in sediments, benthic invertebrates, and water is also important.
- Notes the indicators from the fish and fish habitat VC report, some of the measurable parameters that the SFN advisor wants to see are in the VC report already, but some of the measurable parameters the advisor thinks are important are missing, such as:
  - Contaminant concentrations in benthic invertebrates
  - Contaminant concentrations in sediments
- Acknowledges that the much of the baseline data already collected could be used to support an aquatic health VC.
- Highlights that stream health as a VC would be good for First Nations to see. Chinook, sculpin are sub-components of stream health.
- Alternatively agrees that stream health could be a VC sub-component for the Fish and Fish habitat VC.
- Comments that when considering Chinook in a study area, the study area is really the Yukon River drainage, as these fish originate from different spawning areas and are fished by every community on the Yukon River. Notes that genetic work on the fish tissue from the Coffee Project baseline to determine stock origin would be interesting, suggests that this genetic work be done-. Notes the importance of this information is that there may be stressors on the fish stock from the source watershed.

Goldcorp replies to SFN advisor’s comments:

- Goldcorp agrees that looking at aquatic health is important, noting that aquatic health includes water quality, sediments, fish, and invertebrates.
- Goldcorp replies that looking at abundance of benthic organisms can be tricky due to controls. SFN advisor notes this is it is important to use multiple indicators.
- Goldcorp notes that aquatic health was considered in the Fish and Fish Habitat VC report.
- SFN Advisors responded that the consideration of aquatic health did not include all of the key factors and metrics that should be included.
- Goldcorp agrees that much of the relevant aquatic health information is in the baseline, and that the baseline studies are well set up for monitoring the aquatic health suggestions by SFN advisor.
- Goldcorp can consider SFN advisor’s suggested DNA origins work, and Goldcorp notes that for the EA, the origin is not as important as the resource itself.

Goldcorp describes work that is planned for monitoring and management related to fish and fish habitat:

- Goldcorp's technical experts are working on a plan that includes environmental management, adaptive management; this includes fish and aquatic monitoring and adaptive management plan.
- Goldcorp is going to be including environmental effects monitoring and adaptive management into the Project, and other parameters.
- Goldcorp notes that all VC reports touch on adaptive management, and that development of adaptive management plans aren't far along at this point. This means there is a good opportunity for input from First Nations.

SFN responds:

- In response to this information, SFN's advisors made it clear that having a AMP for licensing is too late. SFN's advisors need an understanding at least the framework of the AMP for the assessment including areas of uncertainty, thresholds for what constitutes failure/success, methods for response, etc.

### **Heap Leach Overview:**

Goldcorp gives an overview of the HLF design. It will be stacked using trucks, as conveyors aren't practical. Goldcorp describes tradeoff studies done for HLF, Goldcorp has chosen the lowest risk HLF design, as it is not impounding fluids within the heap. There has also been a generous approach taken to calculating the required volume for the event ponds, which have over 500,000 m<sup>3</sup> capacity. This provides large storage for emergencies, and puts the Coffee Project in top 10 percentile for contingency storage.

- Q: SFN advisor asks what the Mines Group did for the water balance analysis. He notes that the driver for Eagle Gold project was freshet over multiple seasons to determine if your sizing was appropriate. Asks why the deterministic as opposed to stochastic analysis was used?
- A: Goldcorp replies that the person who did the Eagle Project water balance did the Coffee Project water balance, and that deterministic modeling determined pond size for Eagle as well. Coffee has used a more conservative approach. (note: SFN adds post-meeting that deterministic modelling was used to set storage size for Eagle but this was then tested for being appropriate by using the stochastic modeling)

SFN advisor notes that by looking at the stochastic water balance for Eagle Gold, it was found there was too much risk of exceeding the proposed storage. SFN advisor notes that there was uncertainty with Eagle Gold that was addressed by using the stochastic approach. It was found that the freshet (that occurs over several weeks) was the primary risk driver. Freshet inflows were more of a risk than a large rainfall event.

Goldcorp agrees, freshet is a key consideration. Goldcorp describes the analysis done for Eagle Gold. Coffee's freshet consideration is smaller due to a smaller HLF, and it is designed to Probable Maximum Precipitation (PMP), which is still a freshet issue, but is using a 10,000 year event. Event Pond 2 is to handle maximum precipitation, and EP 1 south and north handle the rest. Goldcorp's treatment plant is



larger than Eagle's proposed treatment plant, and Goldcorp proposes raincoats whereas Eagle Gold Mine Project won't use rain coats. Both Coffee and Eagle Gold projects have similar weather patterns and temperature profiles.

- Q: SFN advisor asks about raincoats, asks if the conveyance of the rain coats to the rain coat ponds is for the 1 in 100 year events.
- A: Goldcorp replies that in the case of a 200 year event or greater, the excess raincoat flow would flow off of the heap to the receiving environment (not to the event ponds). The rainwater pond is meant for normal operations. The big events, +200 year events, are intended to spill into the environment. However, water that enters process circuit (i.e. contact water from the heap) will still go to event ponds. An action item for Goldcorp is to create and provide some detailed drawings for SFN to clearly show the segregation and separate conveyance of contact and non-contact (rain coat runoff) flows from the heap and specifically how large rain coat flows are kept separate.
- Q: SFN advisor was confused about the logistics of raincoats and progressive closure rinsing.
- A: Goldcorp has a HLF operating plan that is currently being drafted, and can share when further developed.
- Q: SFN advisor asks if re-sloping will happen before or after rain coats, and when HLF rinsing will occur?
- A: Goldcorp explains the schedule and plans for closing the HLF. Raincoats are applied as a method for control of the water balance for the heap facility while minimizing contact water. Raincoats are used throughout operation on an as-needed basis. When covered areas are ready for rinsing, raincoats will be removed and rinsing and re-grading will be completed prior to final closure capping.

Goldcorp describes raincoat use and deployment:

- Goldcorp can cover 10% of the HLF per week if needed.
- The HLF will have (up to) 40% coverage by year 4, so can respond to accumulations of water quickly.
- The plan is to put raincoats in place for freshet by December. In April and May, Goldcorp can start making changes to the raincoats on the HLF (if necessary due to water balance issues).
- HLF water balance is planned to have an annual external review as part of the operating plan after freshet, internally want to update water balance needed for management, some operations do it monthly, can do it quarterly in conjunction with raincoat plan. This will be monitored closely, as it is important for production.
- Goldcorp is thinking a quarterly update in terms of sharing externally. It is also important for forecasting the treatment plant use and raincoat application.
- Discussion of using the water in event and rainwater ponds.

SFN advisor wants Goldcorp to do stochastic water balances to address potential design and operational issues in advance. Goldcorp agrees to consider this.

- Q: SFN advisor asks about cold weather performance for raincoats?
- A: Goldcorp replies that HDPE maintains flexibility down to temperatures of -40C to -60C; but really don't want to do anything with raincoats below zero. Can put a heated tent over the HDPE spool if needed.
- Q: SFN advisor noted that the question about cold weather performance was related to their effectiveness when exposed to northern conditions (not placement limitations).
- A: Goldcorp noted it is not counting upon or requiring complete diversion with raincoats. Rain coats will leak a bit. It is typical to see less than 1% leakage with highest leakage seen being 3%. This means it's within the management of the water balance.
- Q: SFN advisor asks about examples of raincoats in the North.
- A: Goldcorp replies some in Russia, Kazakhstan, and in the Andes. There are about 30 projects using raincoats.
- Q: SFN advisor asks about lessons learned from Northern projects using raincoats?
- A: Goldcorp replies that the lesson is that you can use the raincoats, and that you get more heat retained in the HLF than modeled.
- Q: SFN advisor asks how concerned is Goldcorp about segregation of ore given its gradation and the proposed lift heights? SFN is concerned with segregation related to closure (i.e. presence of zones of fines and zones coarse material and impacts of such on rinsing).
- A: Goldcorp replies that this is really good ore, some of the early ore is dirty, but the vast majority of the ore is very stable. Even the dirty ore is good by industry standards. Dirty ore refers to fines content. Goldcorp notes that there will be some segregation. Goldcorp has a metallurgist on the Coffee Staff full time

Goldcorp reviews some approaches to avoid leaching and rinsing issues in the HLF:

- Test work done to date is extensive, and suggests that no permeability or channeling issues exist. No agglomeration was determined to be necessary based on this testwork. The Coffee metallurgist is doing some additional test columns to validate the work done and to refine the previous work.
- Standard practice in a truck-dumping heap leach operation includes ripping of the top material following placement, which further minimizes the effect of any potential segregation.
- As a worst-case scenario, if unexpected problems are encountered due to permeability or channelization, another option to address incomplete leaching or rinsing due to segregation or fines blinding is drilling closely spaced holes in the HLF and injecting leach solution or rinsing solution, depending on what is desired.
- Q: SFN advisor asks if these injection programs have been implemented in closure?
- A: Goldcorp replies that this has been implemented in operations and tested for closure. Goldcorp sees this as an adaptive management measure. By year 4 or 5, under the assumption that cells 1 through 4 are a good proxy for the other phases of the HLF, this will let Goldcorp know what to expect, can update reclamation and closure plan and using information from the HLF and the site. By year 4, all ore types have been represented in the HLF.

Comment: SFN advisors sees this (progressive reclamation especially rinsing) as a strong part of the Project to be able to close early and test closure early.

- Q: SFN advisor asks about the challenges of rinsing side slopes of heaps.
- A: Goldcorp replies that each meter down the slopes has a different thickness, and there are other factors as well. On flat areas it is easier to work; workers on a slope can't do as good of a job by nature. A good strategy is to rinse slopes until effluent chemistry is steady, then start re-grading process, then go back to rinsing. This turns over the top bit and breaks channels and this shows in the rinse chemistry as rinsing improves. Given its shelter aspect, the north slope requires appropriate scheduling.

SFN advisor notes the limitations of using sprinklers or surface emitters to irrigate a HLF in northern climates. Goldcorp notes that the plan is to have buried emitters on the slopes, even though it's more time consuming and expensive to install. Goldcorp notes that the north slope might have a bit of trouble, and plans to account for this in the budget. SFN advisor would like to see recognition of these rinsing challenges in the closure plan as it is developed. Goldcorp describes the rinsing schedule as proposed. The plan is to rinse a lot in the summer, and pulse rinsing in spring and fall. Likely very little rinsing will occur in the winter.

#### **WRSF Discussion:**

Goldcorp discusses WRSF design parameters, materials, and construction sequence. The plan is to place the first 3-5 m of waste rock in winter to preserve permafrost.

- Q: SFN advisor asks about the presence and treatment of unsuitable foundation materials underneath the WRSF?
- A: Goldcorp replies materials that have the potential to be unstable would be removed from critical areas. For example, ice rich permafrost around the toes where it could thaw quickly and there's enough ice to have excess pore pressures and cause a problem. This is expected to be a small amount of material. The rock drain will have permafrost and soils beneath it remain intact, the toes will have this material stripped.
- Q: SFN advisor asks about requirements for interim toes being built for the WRSF.
- A: Goldcorp replies this is being determined, but the thinking is that the lower lifts will have the toes that require removal of unsuitable material but as you go up slope you won't be concerned about foundation materials.
- Q: SFN advisor asks if the ice rich permafrost materials will be removed from only critical areas or throughout the footprint?
- A: Goldcorp is doing geotechnical work on the critical areas now, and the design is currently conceptual. On the west side of Halfway Creek by Alpha Pond, permafrost is 8-9 meters. There is less permafrost on the other side, more like 2-3 meters. The east side is more ice rich. Only removal from critical areas is presently proposed.

- Q: SFN advisor is interested in Goldcorp stripping overburden materials from below the WRSF to use this for WRSF cover material. Also asks why Goldcorp is leaving the top soil below the WRSF in areas without ice rich permafrost: if it is not needed to preserve permafrost, why not strip it for reclamation purposes?
- A: Goldcorp would need to do a lot of work to figure out where to strip and not strip. The “bad” permafrost can be impacted by stripping the other areas. Goldcorp thinks there are lots of opportunities to find more reclamation materials from pit areas that must be stripped of overburden during operations. Goldcorp doesn’t have the design detail yet to know the materials balance and commit to covering the WRSF. If the materials are available, Goldcorp will cover the WRSF. This will be made clearer in future iterations of the closure plan. Goldcorp has looked at stripping all permafrost, and the concern was about managing the muck as the stripped material thaws. This would have created a total suspended solids (TSS) issue for water quality at site.

SFN advisors and Goldcorp discuss the design and construction of the WRSF:

- SFN advisor notes there are workarounds for the concerns with stripping the whole WRSF footprint (i.e. timing of stripping to avoid the muck issue).
- Goldcorp describes the permafrost under the WRSF and the issues with the different materials in the area. The frozen soil stockpile has been relocated to above the Alpha WRSF where that material (once thawed) could be more useful for reclamation.
- SFN advisor notes that the proposed Alpha WRSF design geometry and footprint must have been based on a tradeoffs/alternatives study and would like to see this design study.
- Goldcorp will consider sharing the WRSF geometry tradeoff information in the Project Proposal re-submission and the rationale for the WRSF design.
- SFN advisor comments that he generally supports Goldcorp’s decision to move waste rock storage out of the Latte catchment.
- Q: SFN advisor has a concern with the Alpha rock drain potentially freezing, and asks Goldcorp what certainty they can provide regarding this?
- A: Goldcorp replies that the drain is not expected to act as an air conduit (i.e. to promote convective cooling in the drain) due to its design. Also the thermal load due to water flow is significant, and water is good at thawing, so it is unlikely that the rock drain will freeze up as any winter ice development would be thawed by spring flows. Additionally, the rock drain’s capacity is for 2x the sum of the 1:100 year 24 hour rainfall event plus average year snowmelt.

Goldcorp shows a cross-section and describes the WRSF design. The Alpha WRSF takes advantage of the natural geometry of the Halfway Creek valley. Goldcorp describes current work on further proving the stability of the design.

- Comment: SFN advisor notes the bench heights and the bench face steepness (angle of repose) leads to concerns about erosion.
- Reply: Goldcorp replies explaining the proposed slope angles (3:1 overall with benches) and noting that erosion is more of a concern if the WRSF is covered.

SFN advisor and Goldcorp discuss runoff versus infiltration of freshet water around/in to the WRSF:

- SFN advisor notes reducing infiltration, particularly during freshet, is the biggest concern with the WRSF, the more precipitation and snowmelt that can be made to runoff rather than infiltrate the better. SFN advisor wants Goldcorp to optimize runoff.
- SFN advisor wants to optimize stability and geometry to limit infiltration and erosion, particularly during freshet.
- SFN advisor wants to see the following aspects of the Alpha WRSF design re-evaluated:
  - Covering the WRSF in closure;
  - Maximize the WRSF design for shedding water in closure; and
  - Closure slopes for bench faces as angle of repose for bench faces as currently proposed is rarely acceptable in closure.

### **Permafrost and Terrain Discussion:**

Goldcorp gives an overview of work done to date, and the work that has fed into a terrain map. The terrain map was recently updated with latest borehole information, including thermally undisturbed samples; Goldcorp describes these results. Goldcorp's climate change and permafrost thaw modeling work is described. Goldcorp notes that for scenarios considered with massive ice lens at depth it will take the massive ice a long time to thaw completely at 8 m. This will give the ground time to drain. The Coffee Site has overburden soils that are relatively free-draining, so if the thaw happens slowly, this shouldn't lead to permafrost related slope failures. Goldcorp will do more work on this and also plans to release this information in a paper publicly. It was commented that

- Q: SFN advisor asks about the Alpha Pond dam site?
- A: Goldcorp replies that it has thicker overburden, and there's frozen ground on the both the east and west sides of Halfway Creek. Permafrost on the west side was not anticipated. It is a challenging place to build due to location and overburden, but Goldcorp doesn't have concerns about stability. It is noted that water storage in Alpha pond will promote permafrost thaw and that ice in bedrock fractures will prevent grouting of bedrock during initial construction.
- Q: SFN advisor asks about the east side of Halfway Creek?
- A: Goldcorp replies that it is a boulder field. The results of the geotechnical work haven't been analyzed yet, and that the update to the WRSF design report is anticipated to be in 8-12 months. The proposed Alpha dam was sited based on no geotechnical data. For now, the design is conceptual based on using the best information available.
- Q: SFN advisor asks what is the distance from the Alpha Pond to HC 2.5?
- A: Goldcorp replies it is 1.5 km from the Alpha Pond.
- Q: SFN advisor asks what Goldcorp expects to provide in the updated Project Proposal with respect to the WRSF?
- A: Goldcorp replies that there are no plans to add any information to the Project Proposal update on the WRSF as the effects assessment is complete on that.



- Q: SFN advisor asks about the process internally to come up with the geometry of the WRSF; encourages Goldcorp to consider that this information be included in Project Proposal. This will be important supplementary information in the Proposal regarding the WRSF.
- A: Goldcorp will consider SFN's feedback on this.

### **Water Management Discussion:**

Goldcorp gives an overview of the mine water management infrastructure. The rock drains designed for 2 x 100 year 24 hour storm event plus the addition of average snowmelt or freshet condition. Goldcorp discusses examples in BC of rock drains and studies done in the industry. Goldcorp explains how the rock drain would be built. Goldcorp summarizes the IRs received to date on the rock drain. Goldcorp thinks the rock drain will freeze in the winter and thaw in the spring. There are examples in Yukon and Alaska.

SFN advisors discuss concerns with freezing and thawing of the rock drain. Goldcorp explains the presence of aufeis in Halfway Creek and explains the discharge point and volume at HC 2.5. Goldcorp discusses the possibility of a few scenarios with freezing of the rock drain and permafrost settling.

SFN advisors and Goldcorp discuss water management related to the WRSF:

- SFN advisor doesn't understand why the WRSF doesn't fill flush to the valley bottom on the upstream side with a diversion around, notes Goldcorp doesn't need a headpond (which could be created in the upstream depression created by the WRSF) if they think the rock drain will work.
- Goldcorp describes options for the rock drain and diversions and why these options weren't used.
- SFN advisor is interested in seeing the tradeoff studies for the diversions/drains around/under WRSF. Describes some options should the rock drain not work, describes an additional diversion.
- Goldcorp will consider the idea. Goldcorp discusses a contingency spillway as suggested by SFN advisor.
- SFN advisor notes to look at the potential for a headpond on the upstream side of the WRSF for additional (and closer) storage and to reduce Alpha pond size.

Goldcorp discusses the rock drain and WRSF construction, water flow speeds, and the potential for freezing in the rock drain. Notes modeling done for places with colder conditions, it needs to be very flat conditions for it to freeze. Goldcorp notes thermal modeling would help, SFN advisor agrees. Goldcorp notes that the potential additional diversion berm could be part of adaptive management. Goldcorp also discusses modeling the water quality flows with a delay through the rock drain. Discharge effluent criteria haven't been determined at this stage in the Project, but useful exercise when Goldcorp reaches that point. Goldcorp clarifies for SFN advisors the roads at site and diversions associated with them, if there are diversions associated with the roads.

Goldcorp gives an overview of the Alpha Pond design. SFN advisor asks to clarify what is being held vs discharged in the pond. Goldcorp explains the plan to actively discharge to Halfway Creek, and how this would work at freshet. The dam is 30 meters, some Goldcorp team members are concerned that this is too large and is unnecessary infrastructure. SFN advisors would be concerned about discharging water that isn't compliant because the alpha pond does not have sufficient storage to hold it. Goldcorp and SFN advisors discuss the Alpha pond size and required contingency for storage of non-compliant discharge water. SFN advisors notes that if alpha pond is big it provides a beneficial level of contingency storage that would likely provide additional confidence to SFN. While Goldcorp's predictions show that water treatment is not required, Goldcorp will still incorporate adaptive management into the Project Proposal.

SFN advisors discusses concerns related to the information presented:

- SFN's advisor's concerns with the proposed water management strategy is that the Alpha Pond only provides for TSS removal and there is no discussion in the Project Proposal on contingencies should other parameters required treatment prior to discharge.
- SFN advisor's big concerns with Alpha pond operational period water quality are nitrates, but also concerns regarding unknowns, as the water quality model starts in year 7.
- SFN advisor notes that good storage capacity is going to be important for Goldcorp in Yukon.

Goldcorp replies to SFN advisor's concerns:

- Goldcorp discusses design parameters based on modeling predictions, and how contingency is still required as you cannot get past a certain level of uncertainty.

### **Geochemistry Discussion:**

Goldcorp gives an overview of the water management criteria and the geochemistry program. Kona pit, which is granitic, particularly ore, is the only potentially acid generating (PAG) rock. Waste rock has low sulphur associated with it, so it is not PAG. Goldcorp describes the geochemical considerations in management and how this fits into adaptive management, so pH management is difficult with the WRSF, but material placement can mitigate arsenic potential.

- Q: SFN advisor asks about dump design related to uranium leaching potential?
- A: Goldcorp is looking to dump waste rock in a way that reduces uranium leaching potential. To this end they recommend end dumping to promote segregation and gas transport through the dump.

Goldcorp provides a summary of waste rock geochemical properties that shows the schist waste rock has lowest potential for leaching of As and U. Development plans also show this rock is mined early in the mine life.

SFN advisors and Goldcorp discuss schist material at the site:

- SFN advisor notes that the schist is what Goldcorp would want to use for building infrastructure at site.
- Goldcorp notes that it is not a very geo-mechanically stable rock, so it cannot be used to build the rock drain, for example.
- SFN advisor notes that for lining ditches, schist would be good. Goldcorp agrees. SFN advisor asks what Goldcorp can do with the schist on site to take advantage of its better geochemical properties. Goldcorp notes that the ice rich soil stockpile can be a spot where stockpiling schist is possible. Goldcorp notes that it's important to be practical with management so that it is possible in operations and will consider it further
  
- Q: SFN advisor asks about the water quality model starting in year seven.
- A: Goldcorp replies this is because Goldcorp didn't have the annualized mine design at the time that the water quality model was updated. Goldcorp gives an overview of the water quality model.
  
- Q: SFN advisor asks if the water quality model will be built on an annualized basis?
- A: Goldcorp replies yes.
  
- Q: SFN advisor asks how Goldcorp is considering the source term of the underdrain.
- A: Goldcorp explains that the source term for the underdrain and the WRSF were developed separately. The underdrain is such coarse material that it doesn't have the surface area to have much of an effect in terms of leaching contaminants. The loading source term for the underdrain is explained.
  
- Q: SFN advisor asks about explosive residue as a source term calculation?
- A: Goldcorp explains how this is incorporated as a constant concentration into the WQM. This was created using information from analyzed mines. Goldcorp discusses the need to look at how to calculate the nitrogen loss rates looking at data from existing mines.
  
- Q: SFN advisor asks about the Beta WRSF when its sitting on the surface, are there water management structures associated with it and if there are any concerns associated with it?
- A: Goldcorp replies that the Kona waste rock isn't PAG, but has potentially high Arsenic and Uranium.
- The nitrate source term was derived from an analog site.
- The runoff from the HLF included passive treatment in the source term for the model. SFN and Goldcorp will discuss the treatment and its ability to deal with uranium at the Closure Workshop.

SFN advisors and Goldcorp discuss groundwater in Halfway Creek, and when and where aufeis is expected to form in Halfway. Goldcorp confirms what the plan with the water in the Alpha Pond is and notes ability to store water for months in the pond.

SFN advisors have had questions about sensitivities around higher infiltration rates depending on the slope aspect (i.e. impact of lower solar energy on north facing and sheltered slopes). Goldcorp is

working on that. SFN advisor suggests snow course data to be collected this winter on the north facing slope in the alpha WRSF footprint. Goldcorp agrees.

SFN advisor asks about using Mt. Nansen data as an analog for the Coffee Project. SFN advisor doesn't have a lot of confidence in the data, noting that he understands that Goldcorp used Mt. Nansen for scale up. Goldcorp explains the scaling factors developed from Mt. Nansen data are similar to scaling factors independently developed from differences in grain size distribution, which gives confidence in the scaling approach. It is also noted that the Nansen upscaling approach was not used for the As and U prediction.

### **Water Quality Objectives Discussion:**

Goldcorp gives an overview of the approach to setting site specific water quality objectives. Goldcorp chose the Background Concentration Procedure, using the 95<sup>th</sup> percentile of baseline data. Goldcorp describes toxicity testing done on Uranium.

- Q: SFN advisor asks how variable the dissolved organic carbon (DOC) is in creeks around the Project?
- A: Goldcorp explains how they see spikes up to 30, usually 10-20.
  
- Q: SFN advisor asks how long the toxicity tests were conducted?
- A: Goldcorp explains that tests are administered according to Environment Canada suggestions. 7 days for algae and trout, 48 hours on c. Dubia.
  
- Q: SFN advisor asks about Canadian Council of Ministers of the Environment (CCME) tests in soft versus hard water, asks about DOC.
- A: Goldcorp explains why soft water was used in the tests.
  
- Q: SFN advisor asks about the Project removing organics from the system (i.e. the Alpha WRSF footprint).
- A: Goldcorp explains that this is unlikely to have a notable effect. Goldcorp explains that hardness is protective in winter, DOC is protective in summer, and the two different seasons result in the need for two tests.
  
- Q: SFN advisor asks if temperature is a factor?
- A: Goldcorp replies that it isn't a factor for uranium, but can be a stressor in the natural environment.

SFN advisor notes that there is a concern that the juvenile chinook would be in 0 degree habitat and then exposed to uranium, and that would be cumulative effects. Goldcorp replies that juvenile Chinook will not be in a 0 degree habitat in Halfway Creek, as there is no overwintering habitat there. Coffee Creek is not being materially affected by the Project, and upper portions of Coffee Creek that have overwintering habitat have uranium signatures already. If Goldcorp is protecting the more sensitive c. Dubia in the WQOs, then that will be protective of Chinook.

Q: SFN advisor asks if uranium is calculated with species sensitivity distribution methodology.

A: Goldcorp says yes. Goldcorp thinks this is the best approach.

Q: SFN advisor asks where the dilution of the uranium loading is coming from in lower Coffee Creek?

A: There are uranium inputs upper Coffee Creek and from Latte Creek. Goldcorp provides possible theories for the lower concentration of uranium in lower Coffee Creek but acknowledges that there are discrepancies in the load balance.

SFN advisors and Goldcorp discuss the seasonal Uranium signature in lower Coffee Creek. Goldcorp takes the calculated load and carries it to Yukon River for modeling purposes. Goldcorp and SFN advisors discuss DOC in Coffee Creek vs Halfway Creek. Goldcorp discusses ongoing toxicity testing. SFN advisor notes that the focus is still on uranium. Goldcorp explains that there are other parameters that will be included at set upper and lower cases, with varying uranium.

SFN advisor notes that the lower Coffee Creek toxicity testing is of interest for SFN. Uranium is a challenge for First Nations, and this testing would be beneficial for SFN. Goldcorp agrees to consider this. Goldcorp suggests that SFN consider where SSWQOs get applied around the site as the Project heads into licensing.

- Q: SFN advisor asks if there is anything interesting found with the additional monitoring in Halfway Creek?
- A: Goldcorp explains what has been seen and how this aligns well with previous findings.
  
- Q: SFN advisor asks if Goldcorp considered seasonal water quality objectives.
- A: Goldcorp explains this is why summer and winter toxicity tests were done. Notes that the determined values for toxicity are so high in relation to proposed SSWQOs that having seasonal SSWQOs is pointless. Goldcorp has non degradation objectives for Coffee and Yukon River. SFN advisor notes that TH suggested seasonal SSWQOs as well.

Goldcorp discusses the approach to SSWQOs:

- Goldcorp doesn't want to get into a situation where the site's ability to manage water is restricted when it's protective.
- Until there's a very strong rationale presented to manage otherwise, Goldcorp will be working with the background concentration method.
- Goldcorp wants to continue the discussion on this as well. Goldcorp discusses the considerations for SSWQOs and multiple parameters, and two SSWQOs for one parameter makes it difficult to manage.

SFN advisors responds to the information presented by Goldcorp, Goldcorp provides some clarification:



- Notes that the 95<sup>th</sup> percentile of the whole data set is driven by the winter conditions, and giving the winter number, which is the opposite of the time that Goldcorp proposes to discharge.
- Doesn't think it would create an issue for winter discharging, it's more about summer discharging.
- Clarifies that the difference in the three watershed systems is based on baseline levels; Goldcorp says yes. The proposed SSWQOs are reflective of the baseline data set for the streams they are particular to, in the particular location in the stream.
- Notes that the organisms in those streams could be stressed already due to elevated natural background levels of contaminants of concern.
- Goldcorp explains that the organisms are likely tolerant to the elevated background levels.
- Goldcorp is continuing the discussion on SSWQOs, and appreciates SFN's feedback. Goldcorp notes that the same situation is at Eagle, where the data is skewed by May and June numbers.

SFN advisor summarizes that Goldcorp has identified that it has checked proposed SSWQOs based on toxicity, and that they believe the testing validates the SSWQO's. Goldcorp notes this is correct. Goldcorp encourages feedback.

End of workshop – 4:30 pm.



# Heap Leach Facility

September 19, 2017

 **GOLDCORP**

## HLF – Key Components

2

- **Heap leach pad built in stages and heap stacked using trucks\***
- **Free-draining, non-impounding, “Flat Pad” configuration\***
- **Event ponds to store solution in “upset” conditions**
- **Rainwater pond to store clean water**
- **No barren or pregnant ponds**



**\*Key trade off studies completed:**

- **Trucks vs. Conveyor stacking**
- **Pad Location & Type**

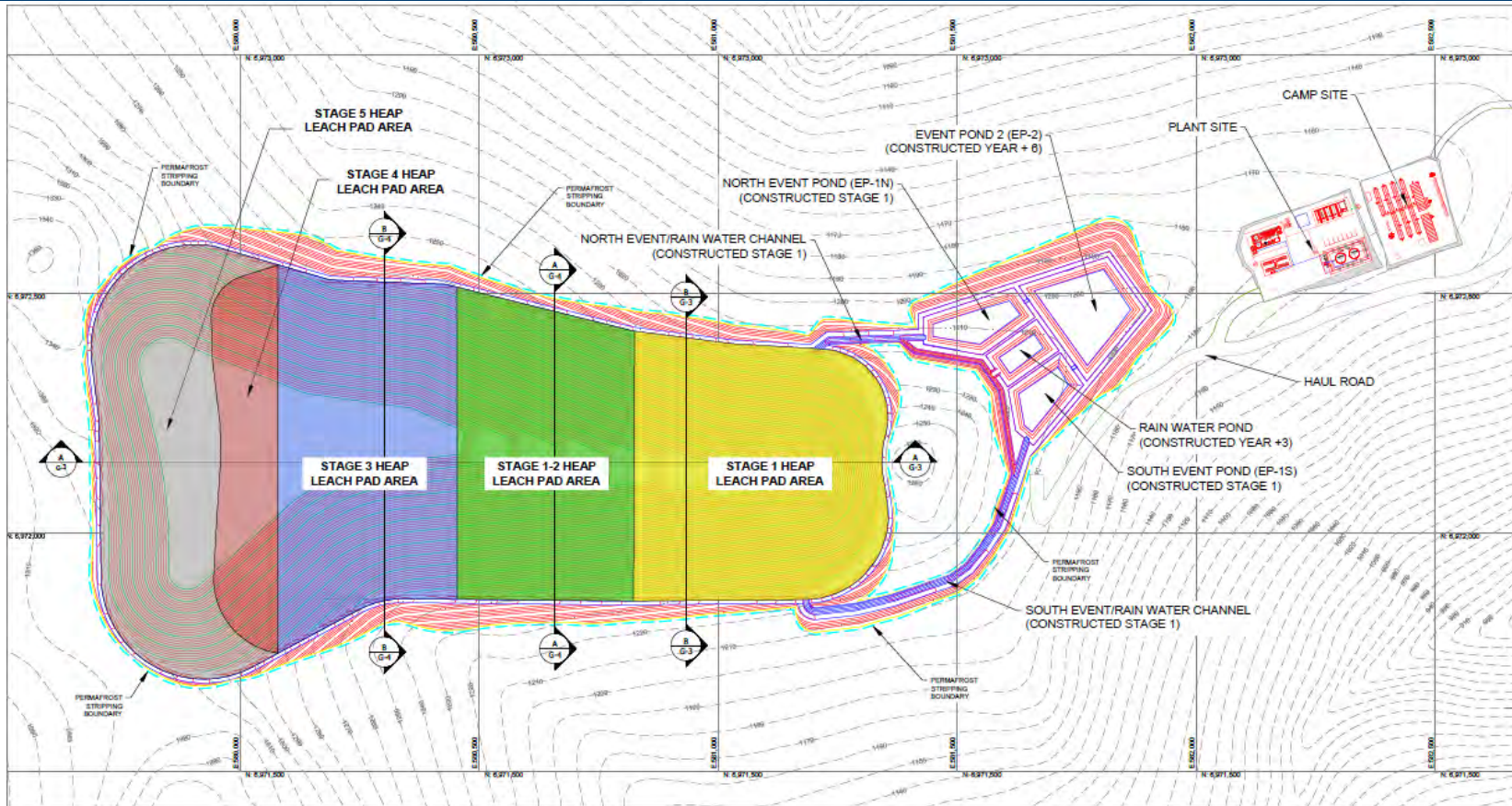


# Similar Leach Pad Configurations Used Elsewhere





# Layout





- **Water for processing is dominantly sourced from within the heap footprint**
- **System is water neutral or net demand until Year 9**
- **Rinse water to be recycled to next stage of rinsing, or used for make-up water in process circuit**
- **Treatment plant to be commissioned in Year 8**
- **Large events ponds, raincoats allow significant operator control over water balance**
  - Operators can change infiltration volumes quickly by changing the raincoat usage
  - Ponds allow flexibility in timing of decisions; sized for:
    - Wettest year on record, and
    - Probable maximum precipitation, and
    - Heap drainage, and
    - Freeboard
  - Required pond capacity declines as areas of heap are capped, taken off line
    - This capacity becomes available for seasonal storage of surplus water

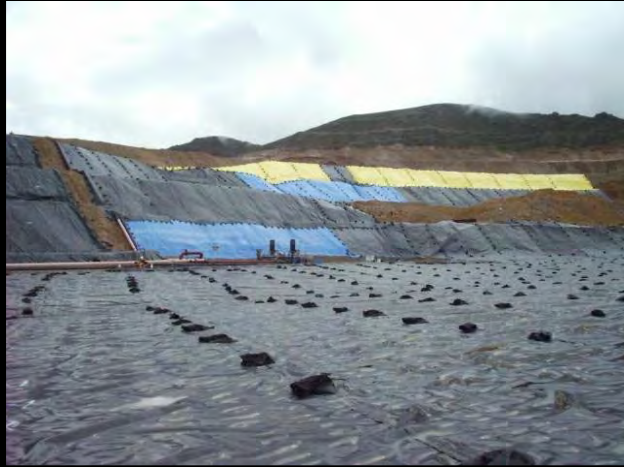
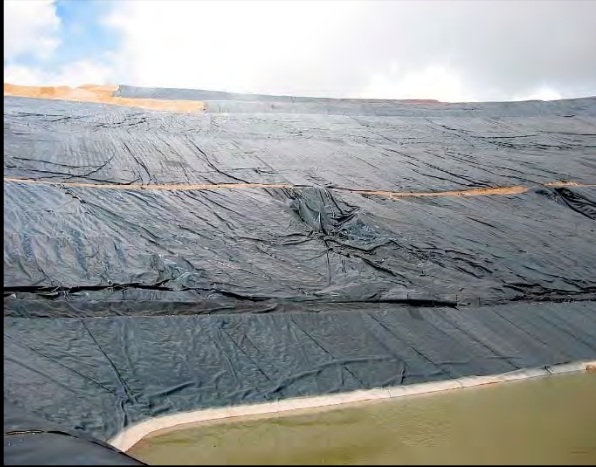
# Raincoats - Technology

6

- **Temporary exposed geomembrane covers, or “Raincoats,” have a long history in mining and other industries for reducing or eliminated rainwater and snowmelt from entering operating systems**
- **Raincoats add flexibility to the water management system as the area under coverage can be increased or decreased quickly**
- **Starting in Year 3 to reduce infiltration, avoid dilution of process solutions, and maintain a neutral water balance**
- **Raincoats will also serve to conserve heat and increase heap temperatures in the winter months**



# Raincoats – Examples





# Raincoats - Application



# Raincoats – Demonstrated Technology

9

Project/Owner	Location	Years
Three gold mines	Ghana	1997-06
Newmont Yanacocha Complex	Peru	1988-98, 2012-16
Santa Rosa	Panama	1994-96
Mindanao mine, Philex	Philippines	1999-05
Pierina mine, Barrick	Peru	1999-16
Lagunas Norte, Barrick	Peru	2008-16
Kyisintaung	Myanmar	2000s
Aktogay	Kazakhstan	2000s
Savkino	Siberia, Russia	1990s-2016
Bingham Canyon demo heap	Utah, USA	2012-14





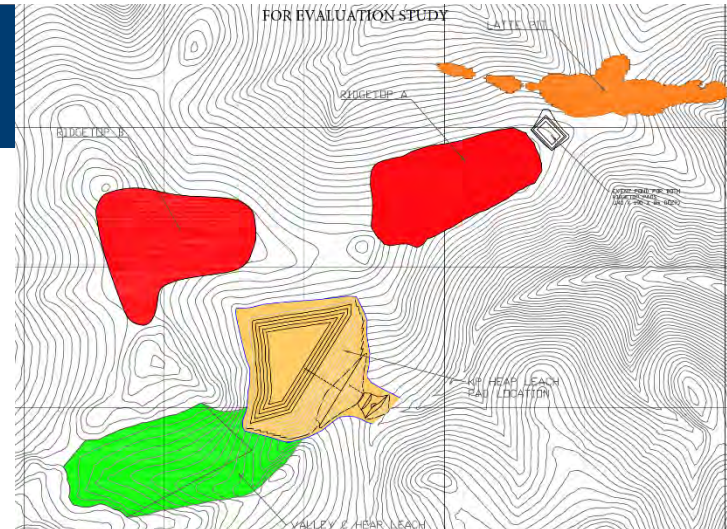


# APPENDIX SLIDES

## Pad Location & Configuration Trade-Off

11

- **Three main locations considered, one of each type (see sidebar)**
- **Rationale for selected option:**
  - Most commonly used technology, including for cold-climate
  - Most flexible design, allowing for adaptive management, staged construction, and staged closure
  - Fastest and simplest to build and simplest to operate
  - Lowest risk:
    - No dam or in-heap solution storage
    - Easiest and safest to close and reclaim
    - Design allows for progressive reclamation



### Pad Types:

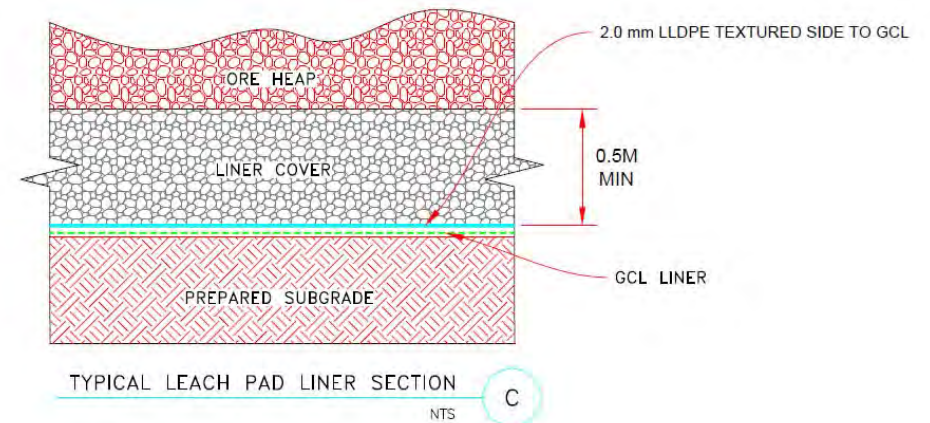
1. Valley fill with solution containment (impounding)
2. Valley fill, free-draining
3. Flat pad, free-draining



## Liner System – 6 Layers (from top down)

12

- **Overliner: 500mm crushed ore (P100 50mm)**
  - Contains drainage pipes
- **Geomembrane liner: 2.0 mm LLDPE (textured bottom)**
- **Reinforced GCL**
- **Wick drain for leak detection**
- **Prepared subgrade, stripped to bedrock**



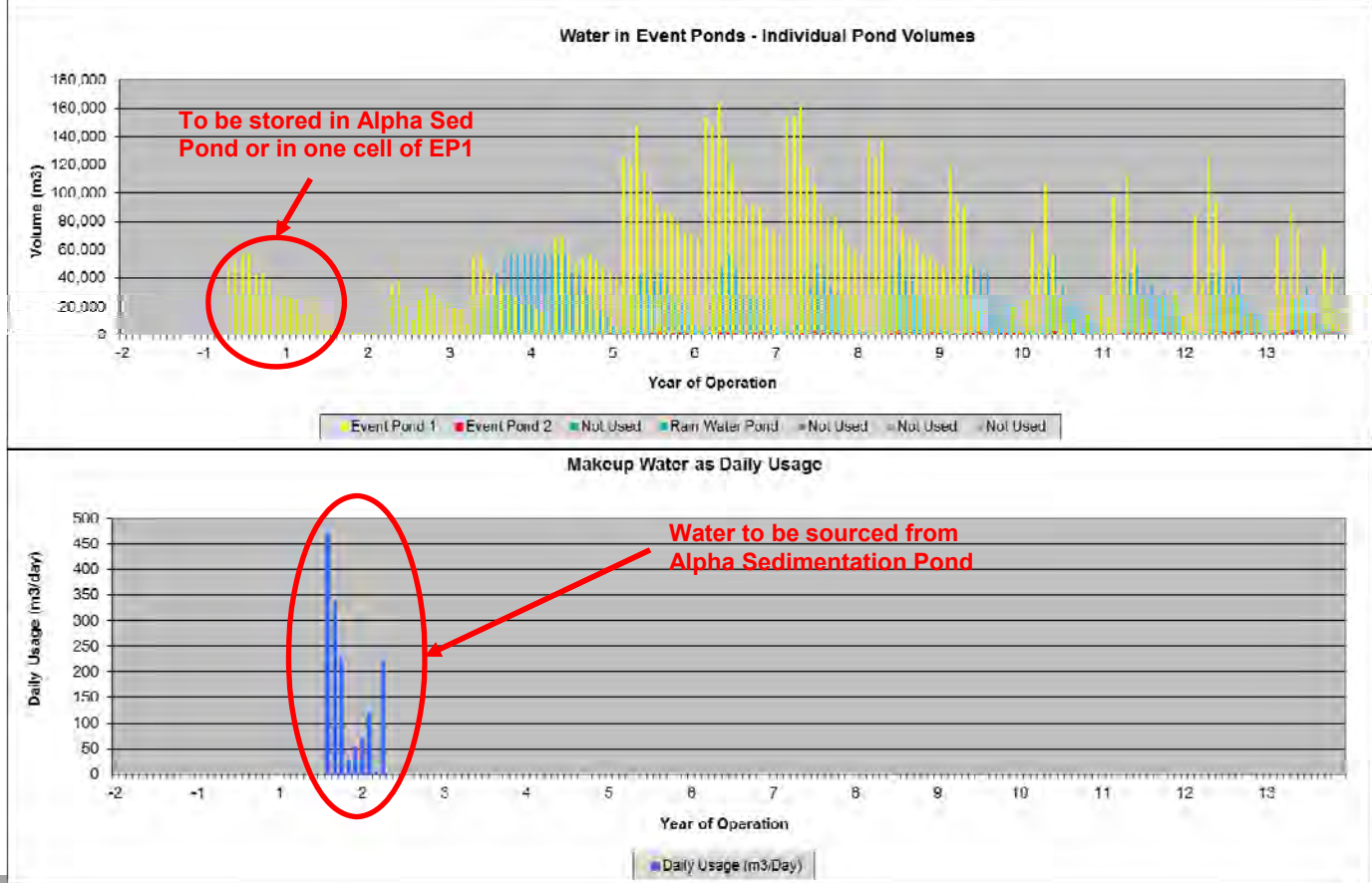
- **EP-1S and EP-1N: 5-layer system**

- Geomembrane: 2.5 mm HDPE (smooth)
- Drainage Layer (geonet)
- Geomembrane: 1.5 mm HDPE (smooth)
- GCL
- Prepared Subgrade

- **EP-2 and Rainwater Pond: 3-layer system**

- Geomembrane: 2.5 mm HDPE (smooth)
- GCL
- Prepared Subgrade
- Liner system simplified because:
  - EP-2 may never hold any solution, or will hold only highly diluted solution for short periods
  - Rainwater ponds only hold non-contact water

- **Make-up water is required throughout mine life**
- **External-to-heap water required for Make-up in Year 1 and 2**
- **Starting in Year 4, raincoats will be used to maintain optimal make-up water balance**





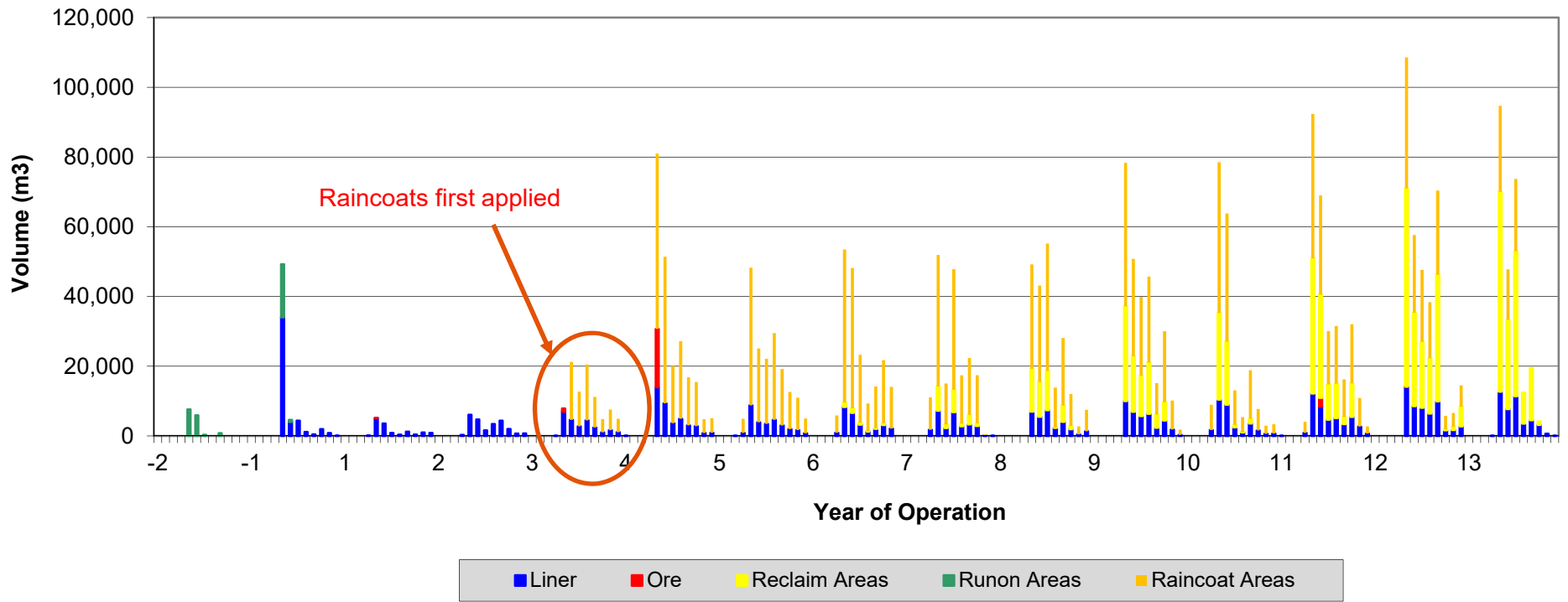
- **Fully isolated from environment**
  - Redundant system of liners, pipes, drainage layers, leak detection and monitoring systems
  - Every component that has contact with process solution has multiple, redundant containment layers plus monitoring
- **Event ponds sized for extreme events in excess of industry standards and regulatory requirements:**
  - “Probable Maximum Precipitation”, plus complete heap draindown, plus maximum seasonal water accumulation, plus freeboard
  - Additional contingency measures include: back up power, inventory of raincoats in excess of demands, rain water pond can be converted to events pond for extra containment



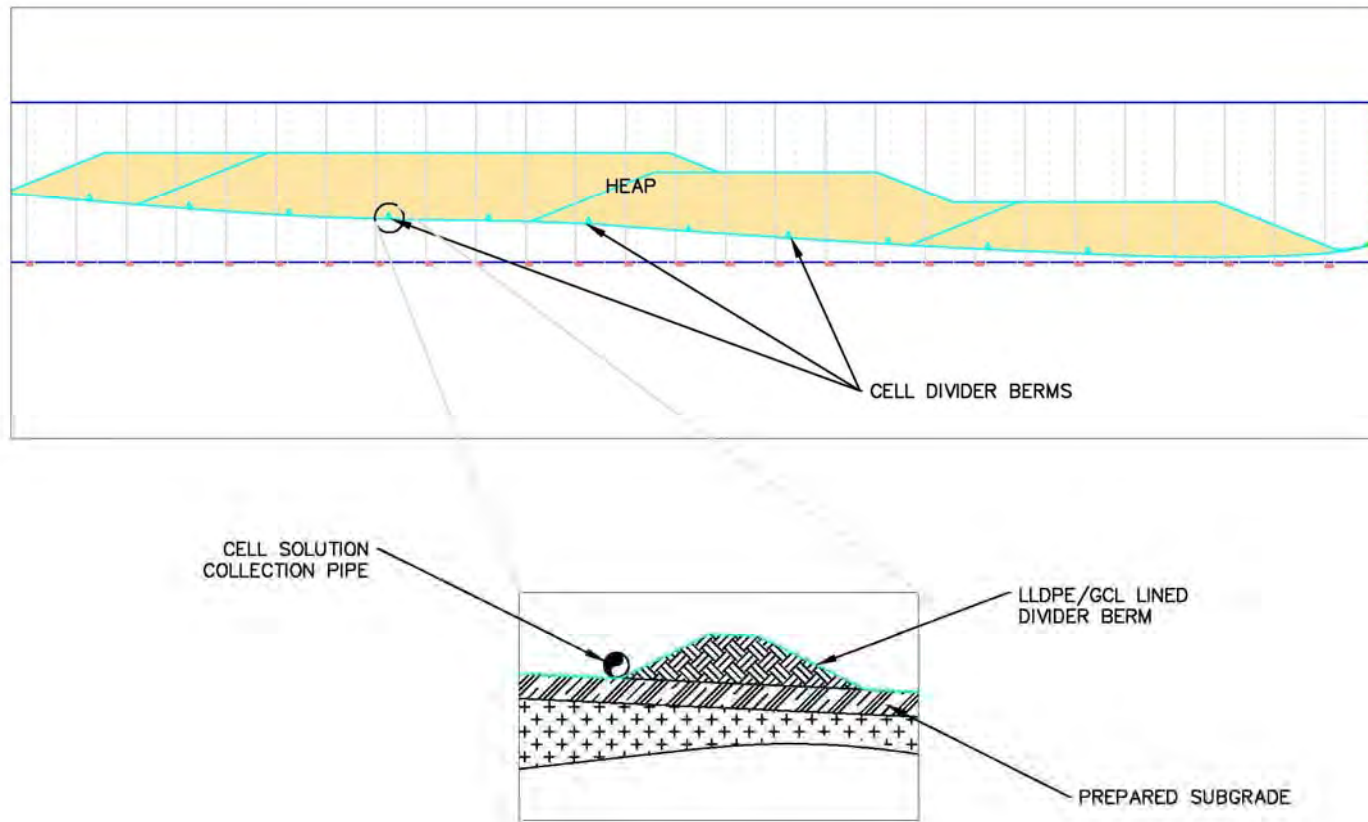
- **Freshwater and rainwater are kept away from the process circuit to the maximum extent practical**
- **Diversion ditches and berms around the leach pad**
- **Staged leach pad construction and heap stacking minimize contact water area**
- **Divider berms and ditches within leach pad between stages and cells**
- **Raincoats to divert precipitation from system**
- **Progressive closure to reduce maximum active footprint**



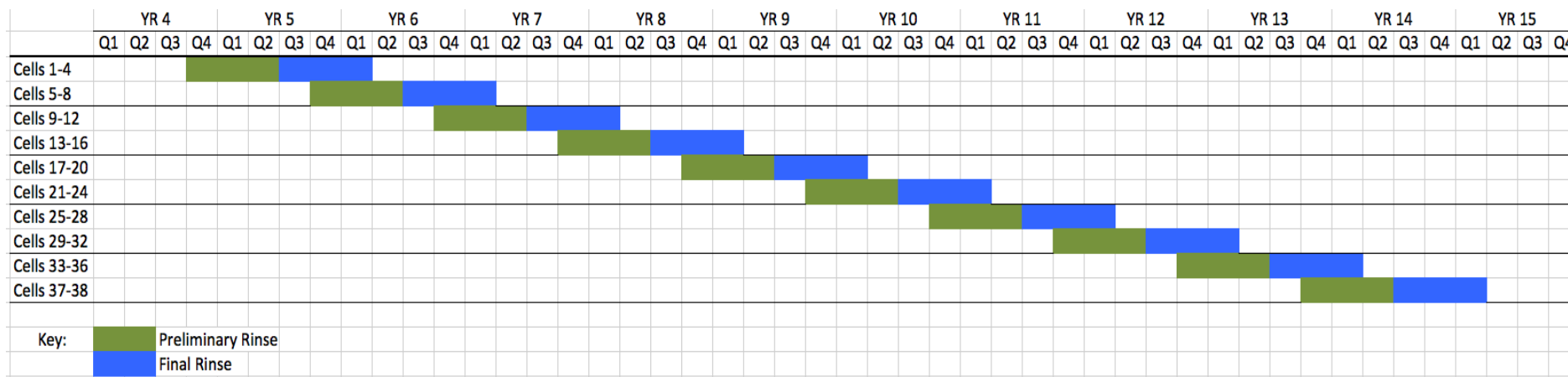
### Summary of Runoff Volumes



# Cell Separation Berms

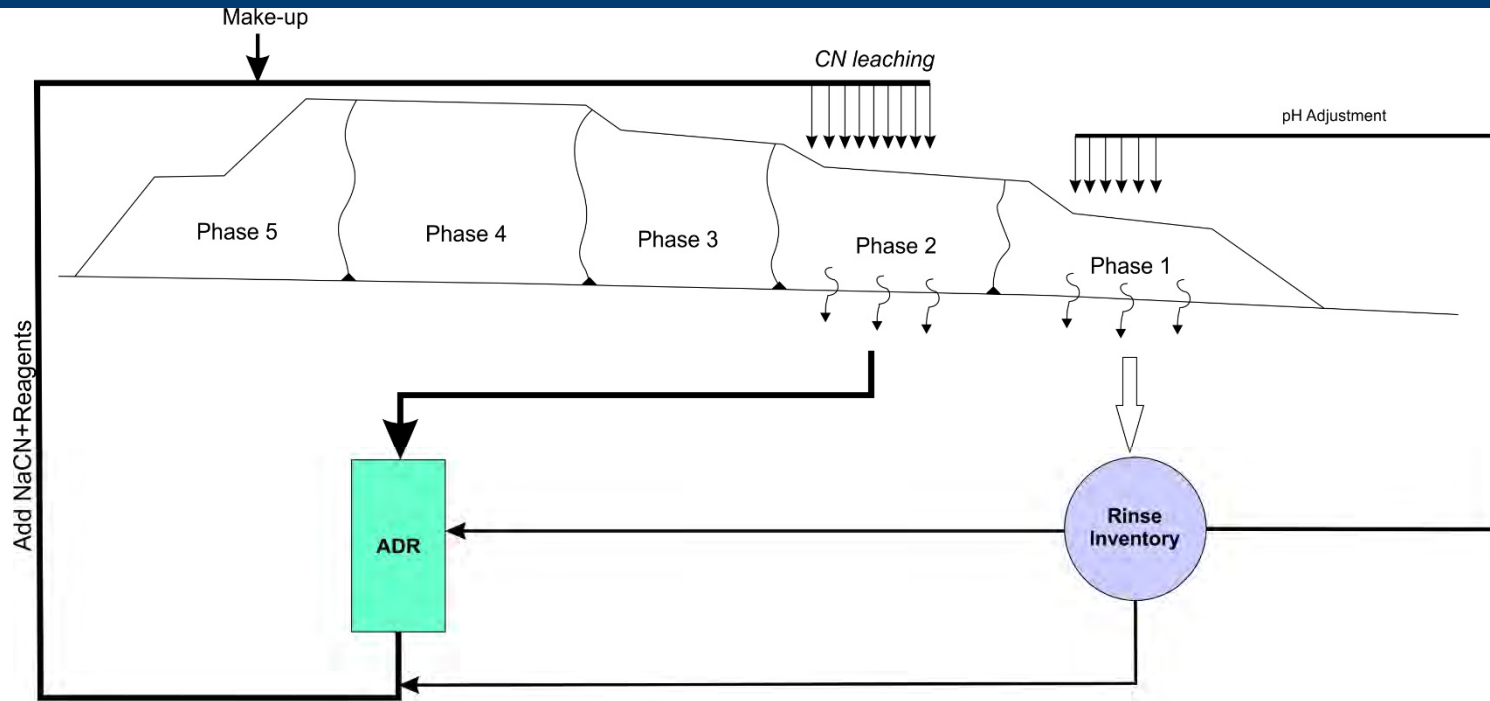


# Cells enable progressive rinsing



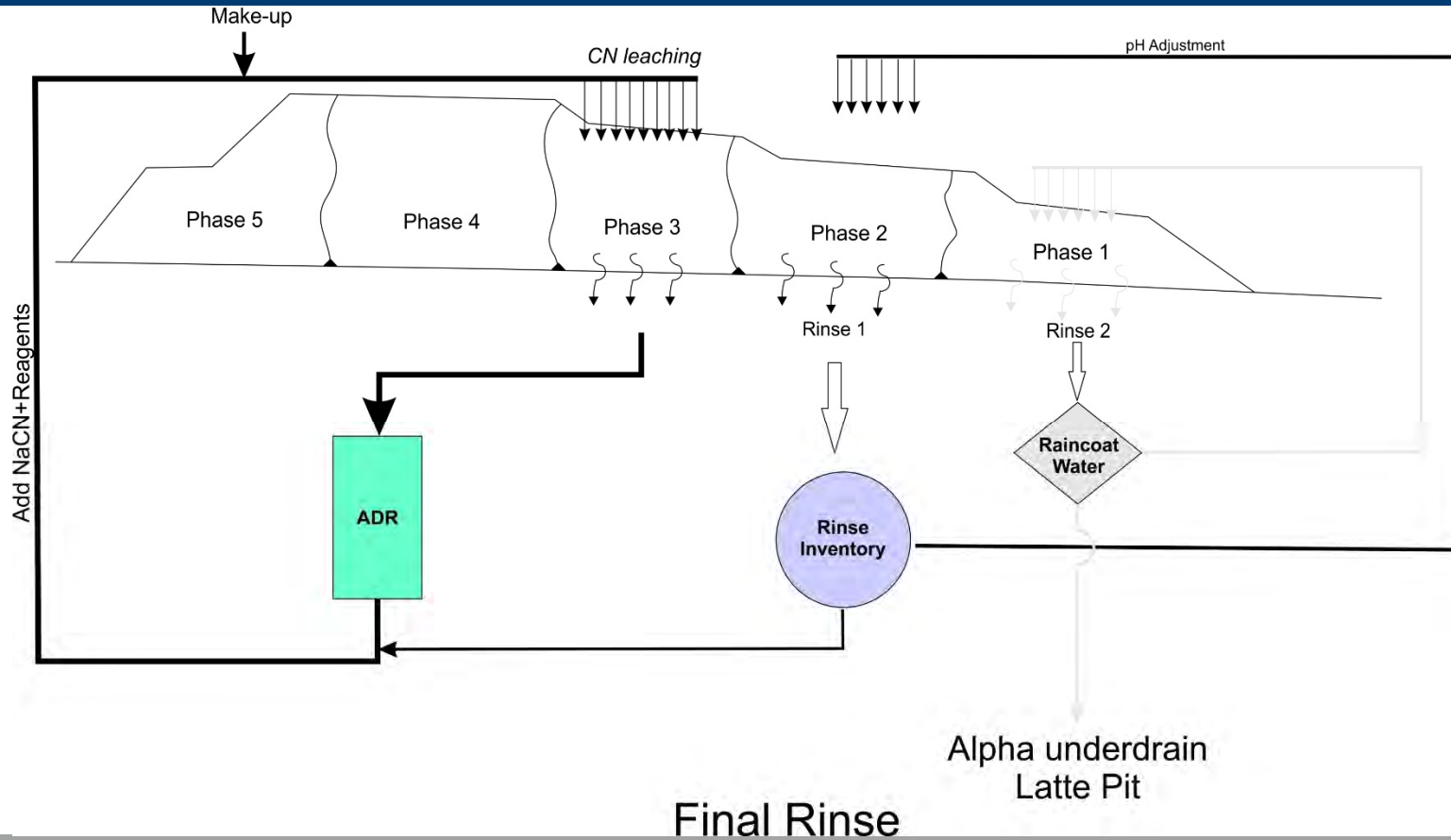
*\*Note: Graphic not updated to reflect revised 12-year mine plan*



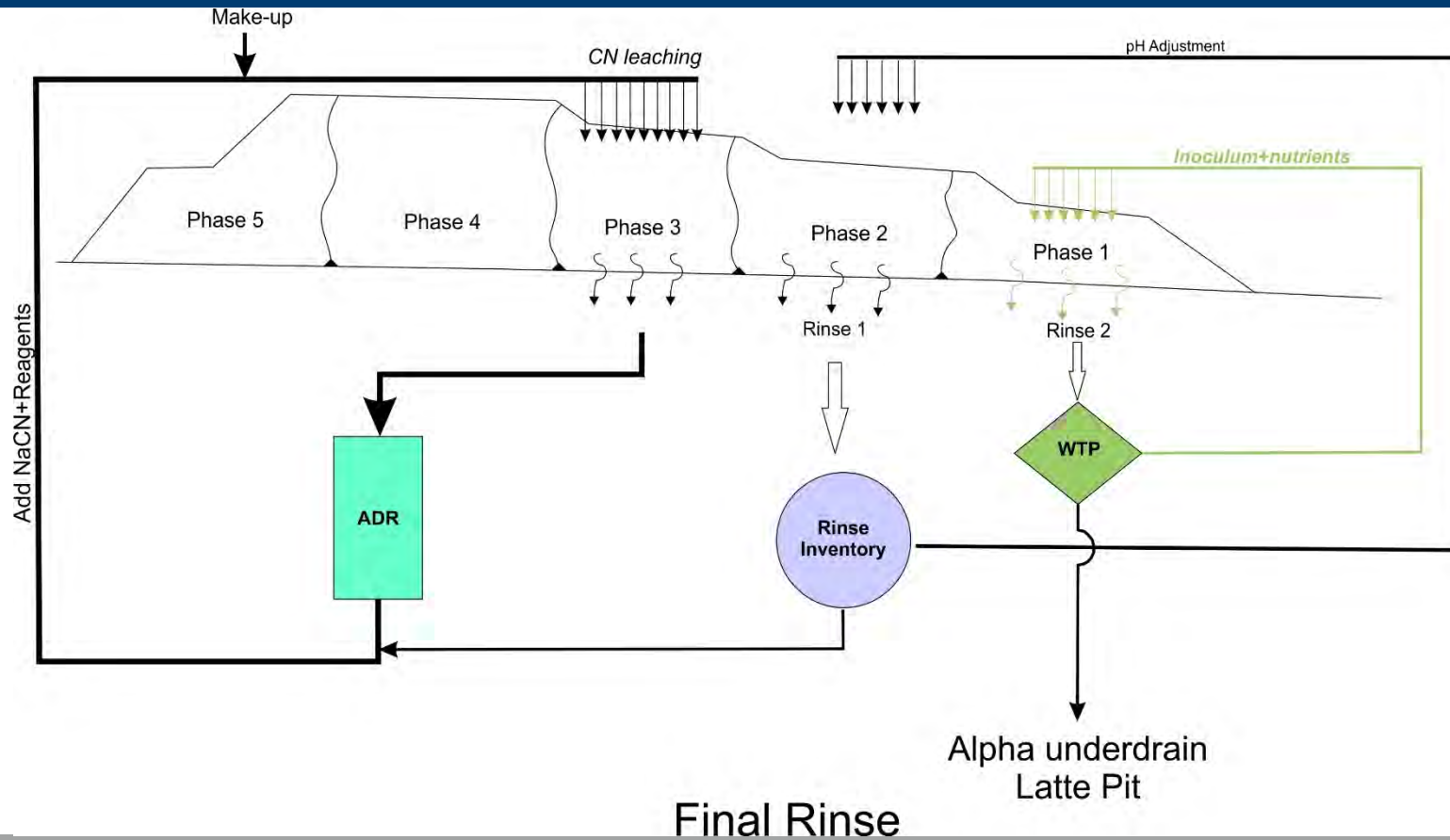


## Preliminary Rinse

# Rinsing



# Rinsing

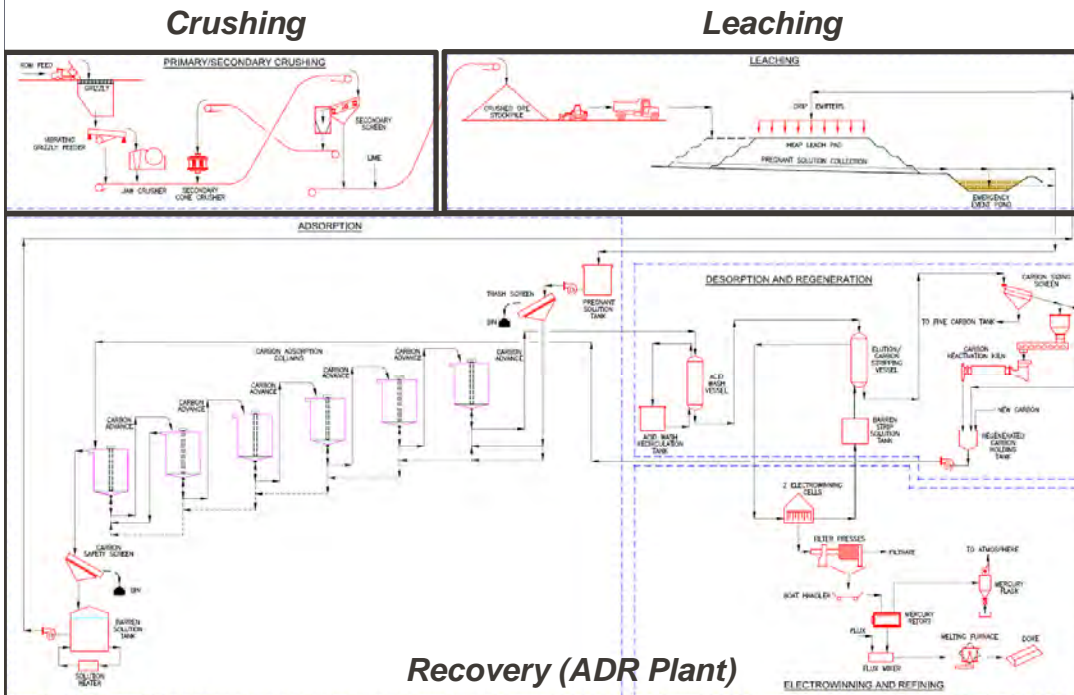


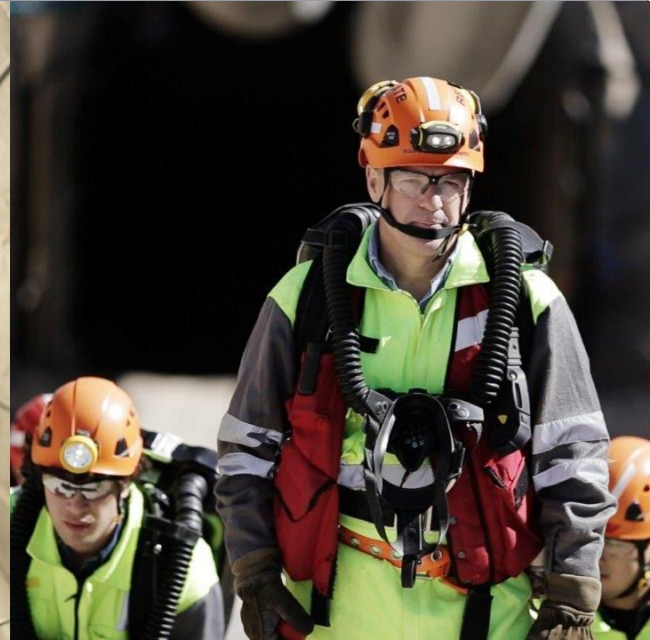
# Heap Leaching Operations

NaCN briquettes  
 Image from <http://info.noahitech.com/blog/turning-cyanide-into-gold-sodium-cyanide-applications-in-mining>



Extraction of gold from crushed rock using dilute CN solution.  
 Gold Doré poured on-site.  
 Cyanide shipped to site as NaCN briquettes, which are mixed in alkaline water (pH~10) to form the Barren Solution.

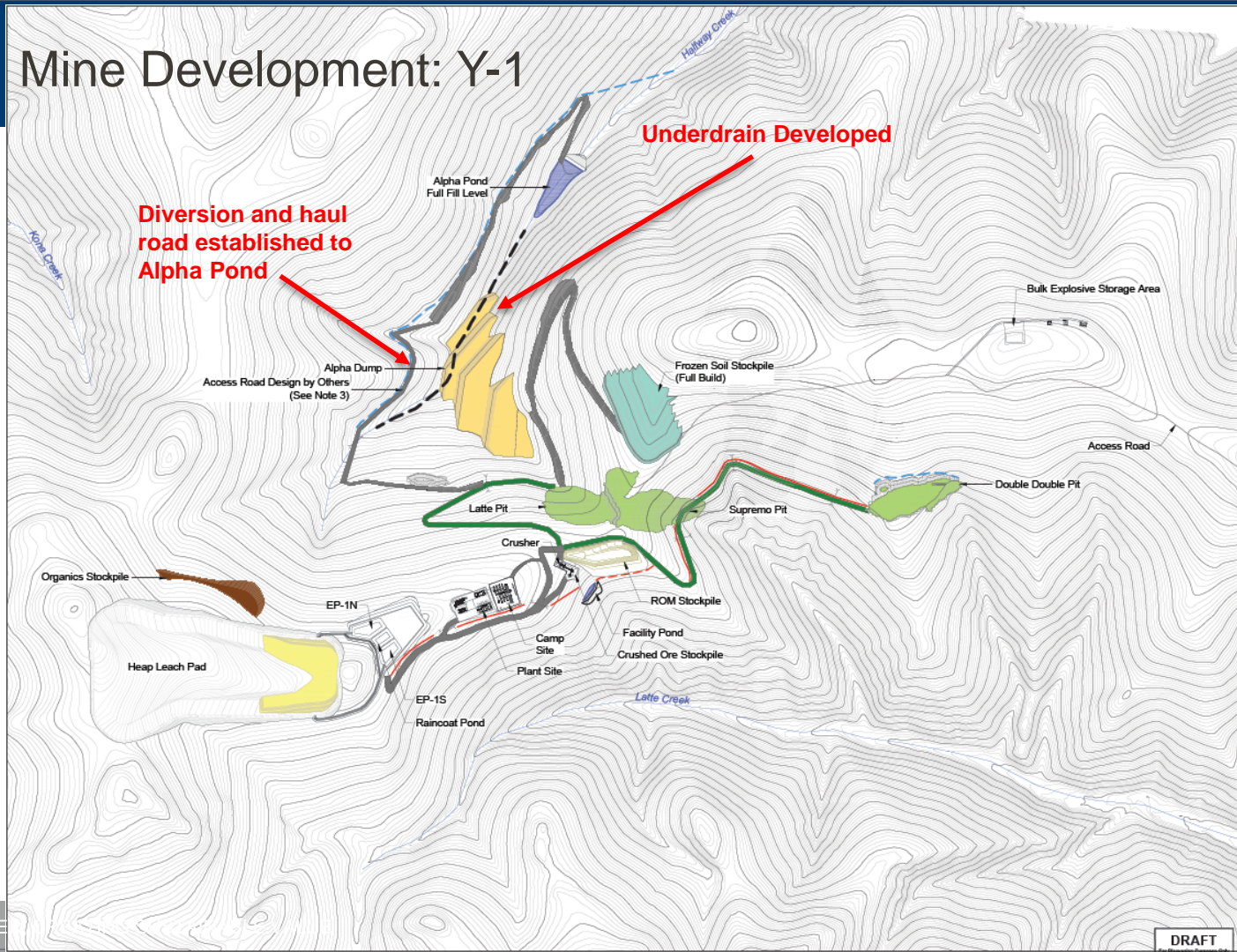




# Mine Development Schedule Y-1 to Y12

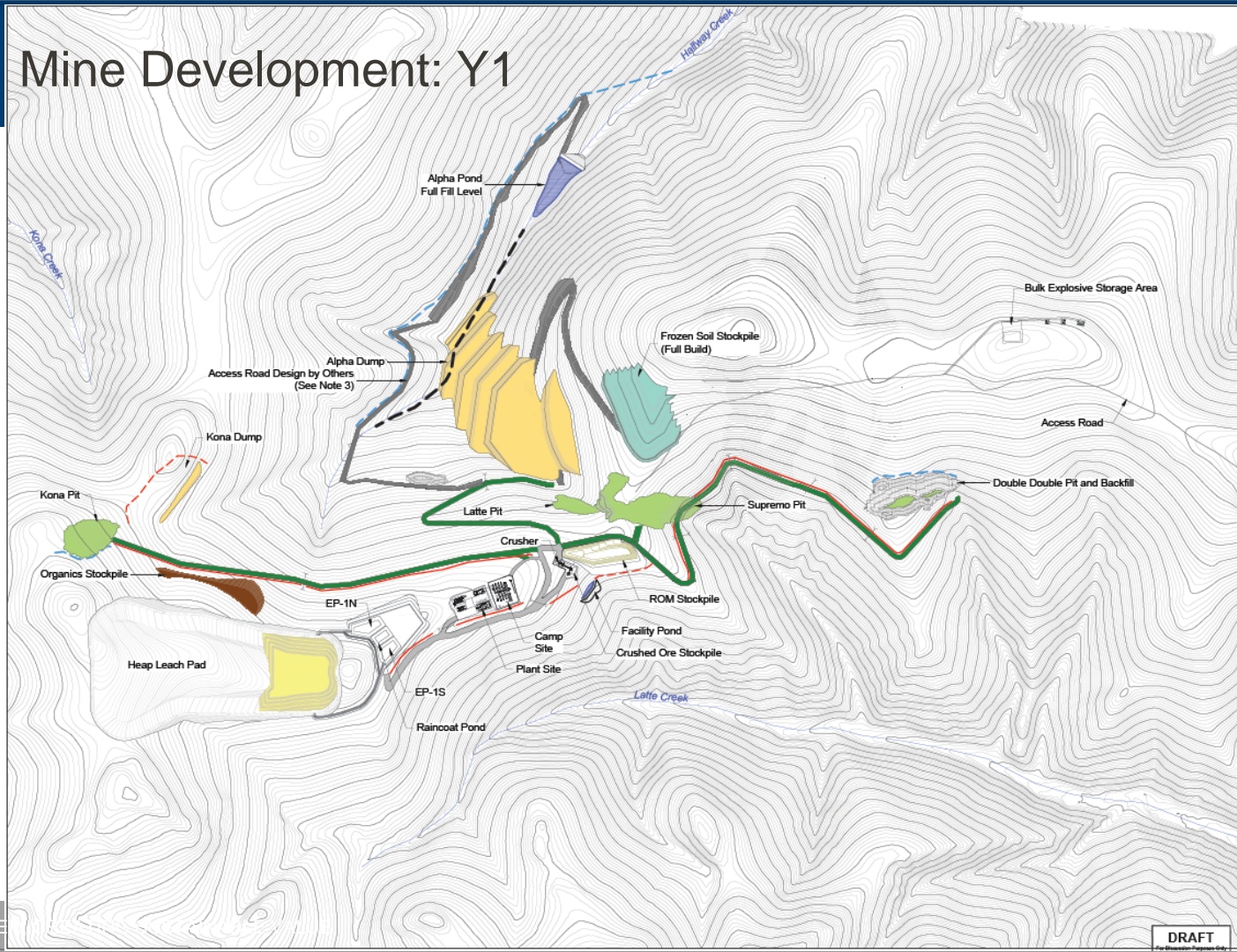


# Mine Development: Y-1



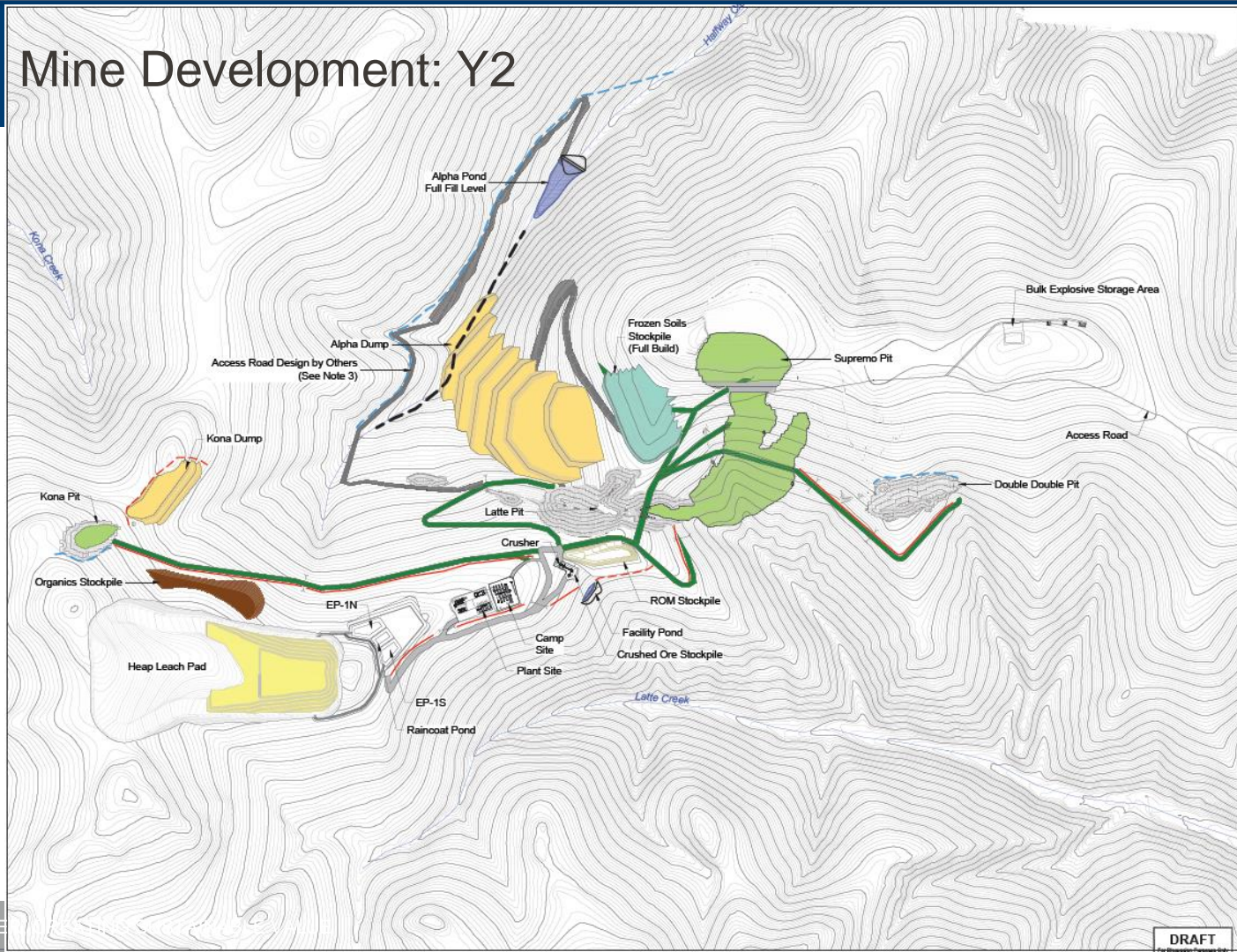


# Mine Development: Y1



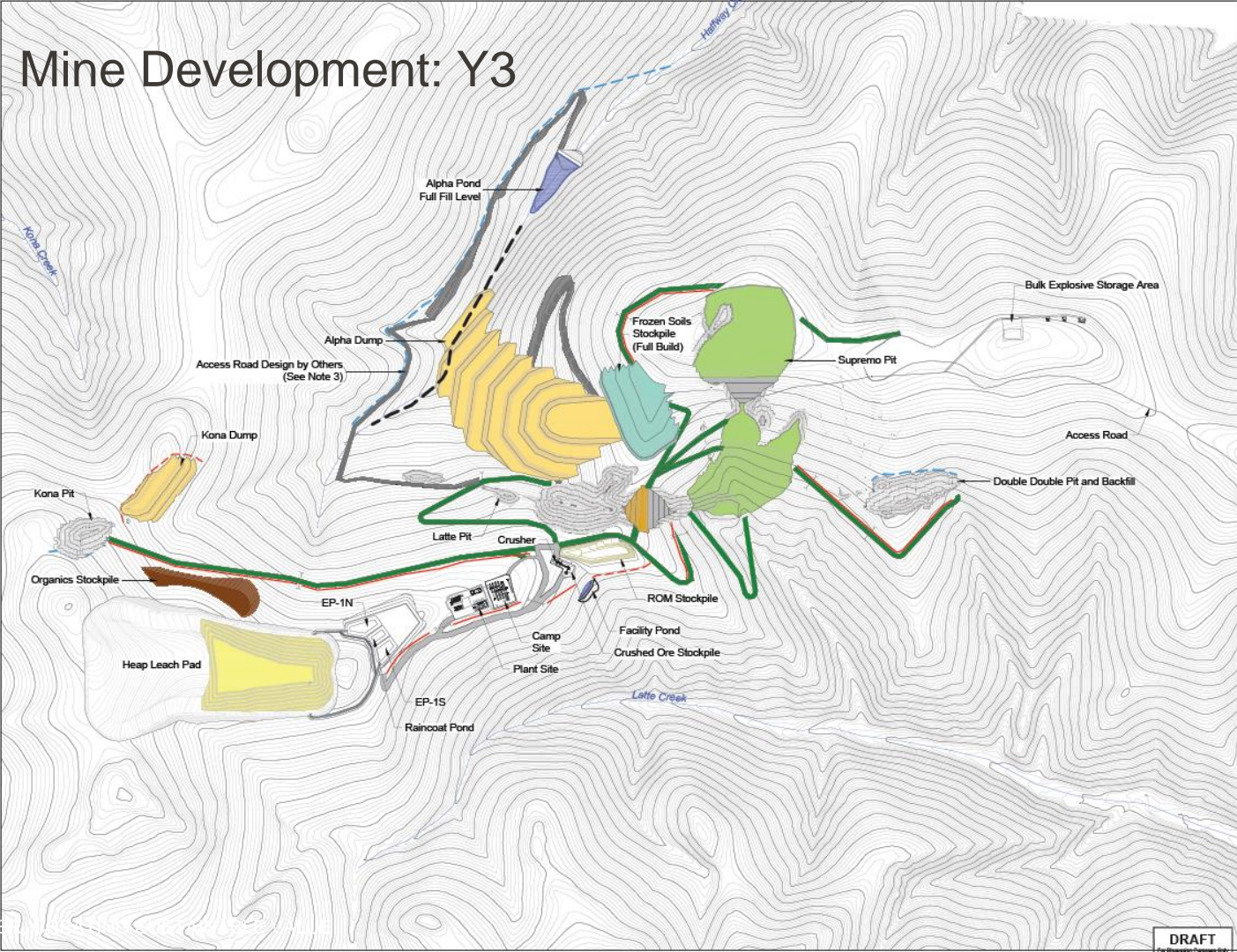


# Mine Development: Y2



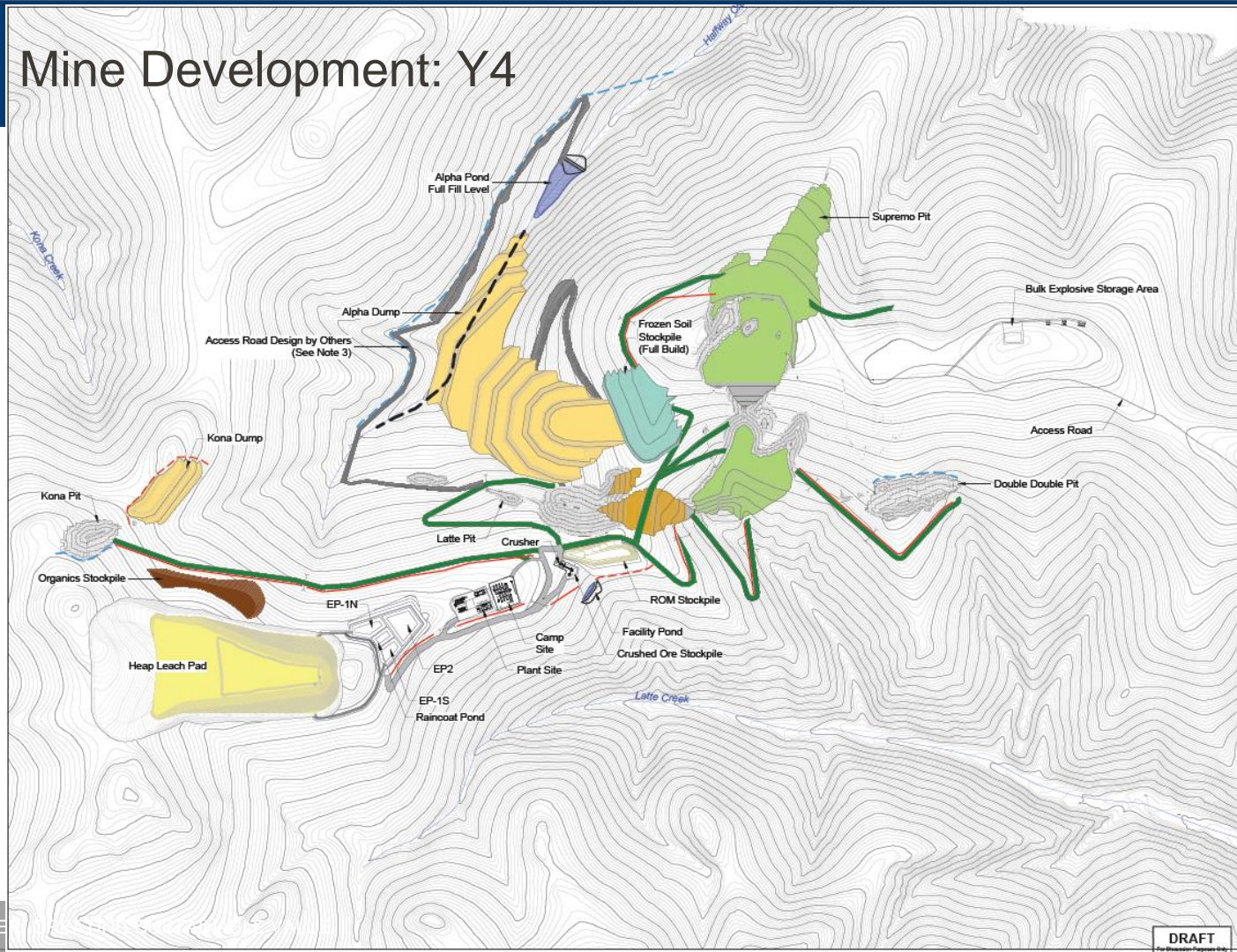


# Mine Development: Y3



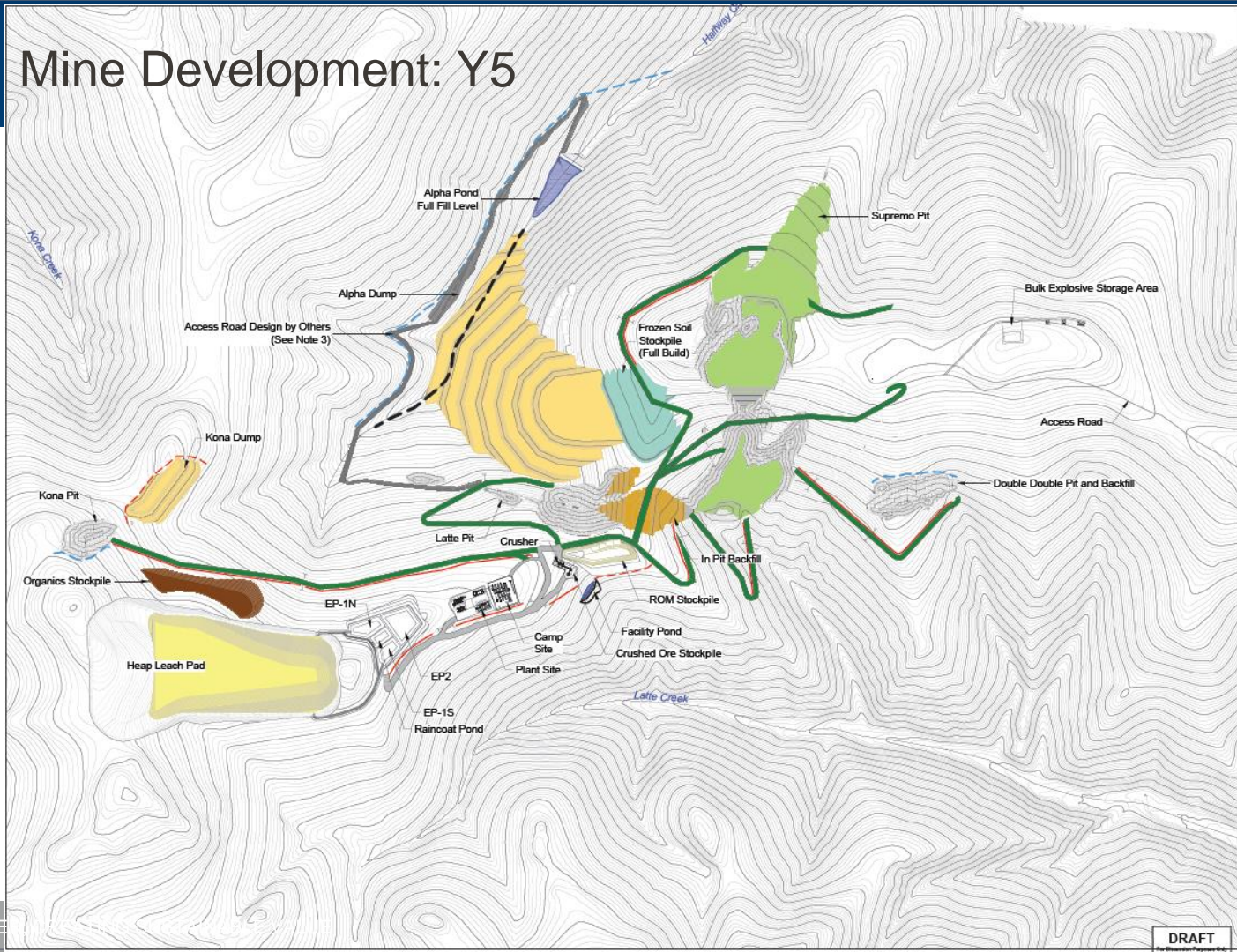


# Mine Development: Y4



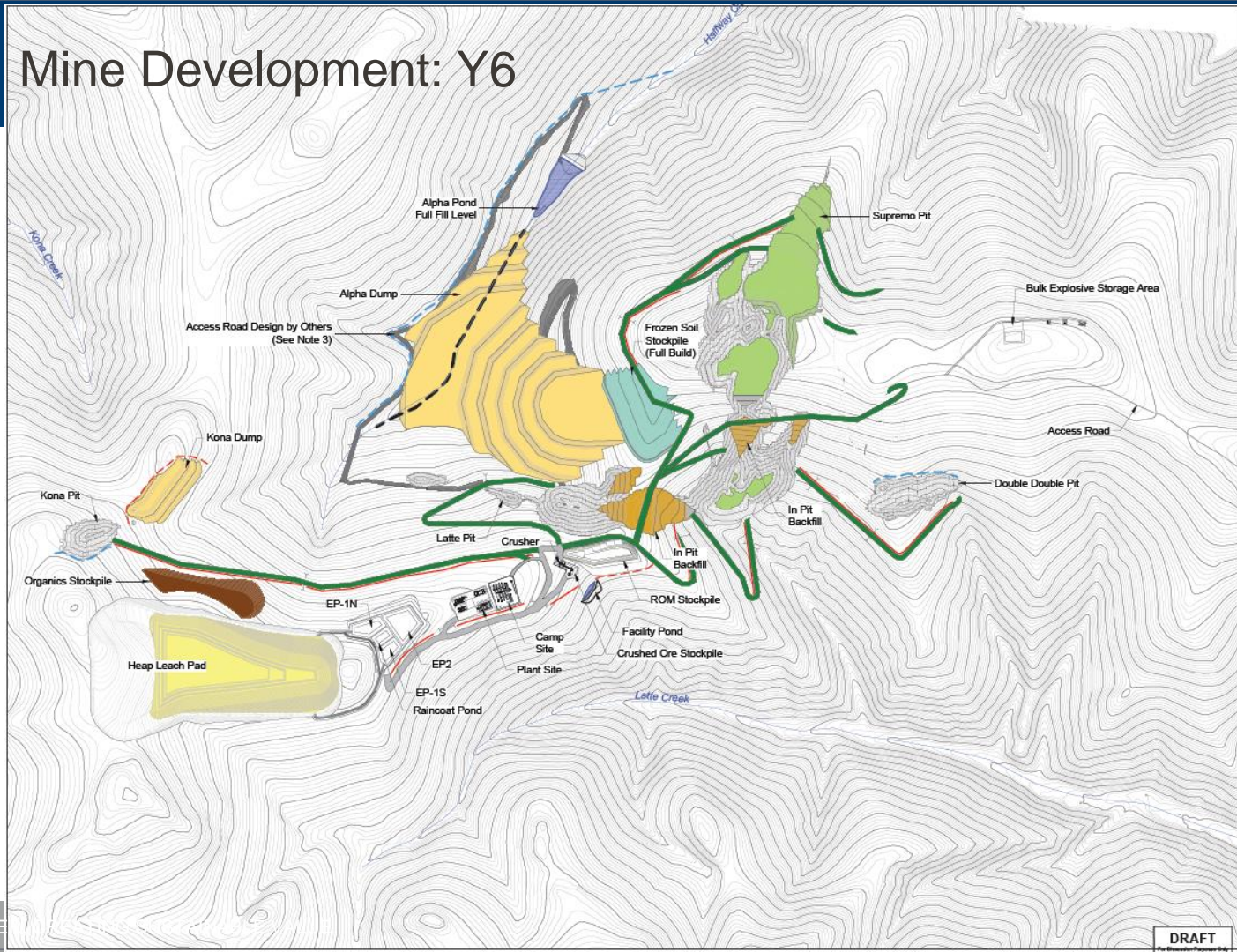


# Mine Development: Y5



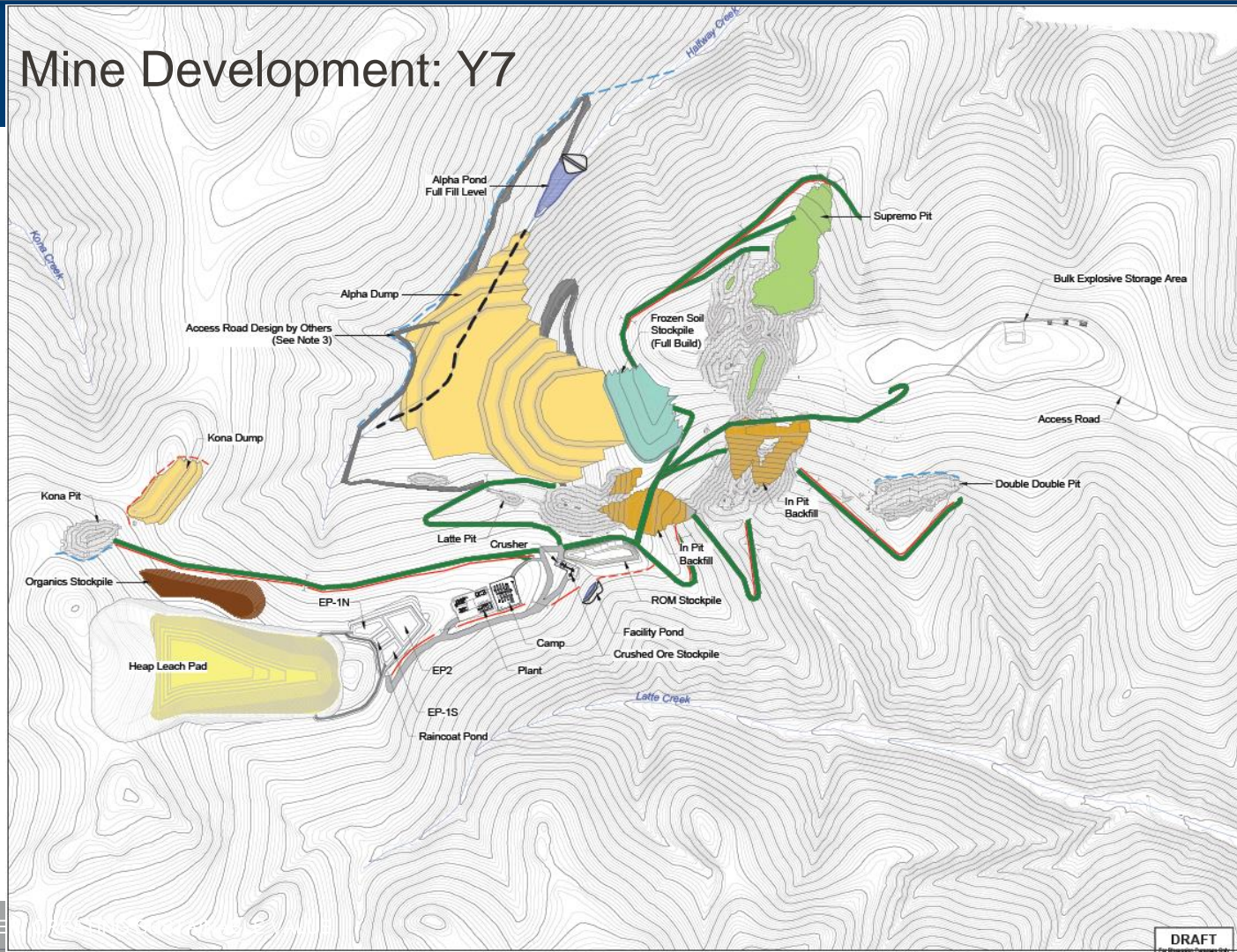


# Mine Development: Y6



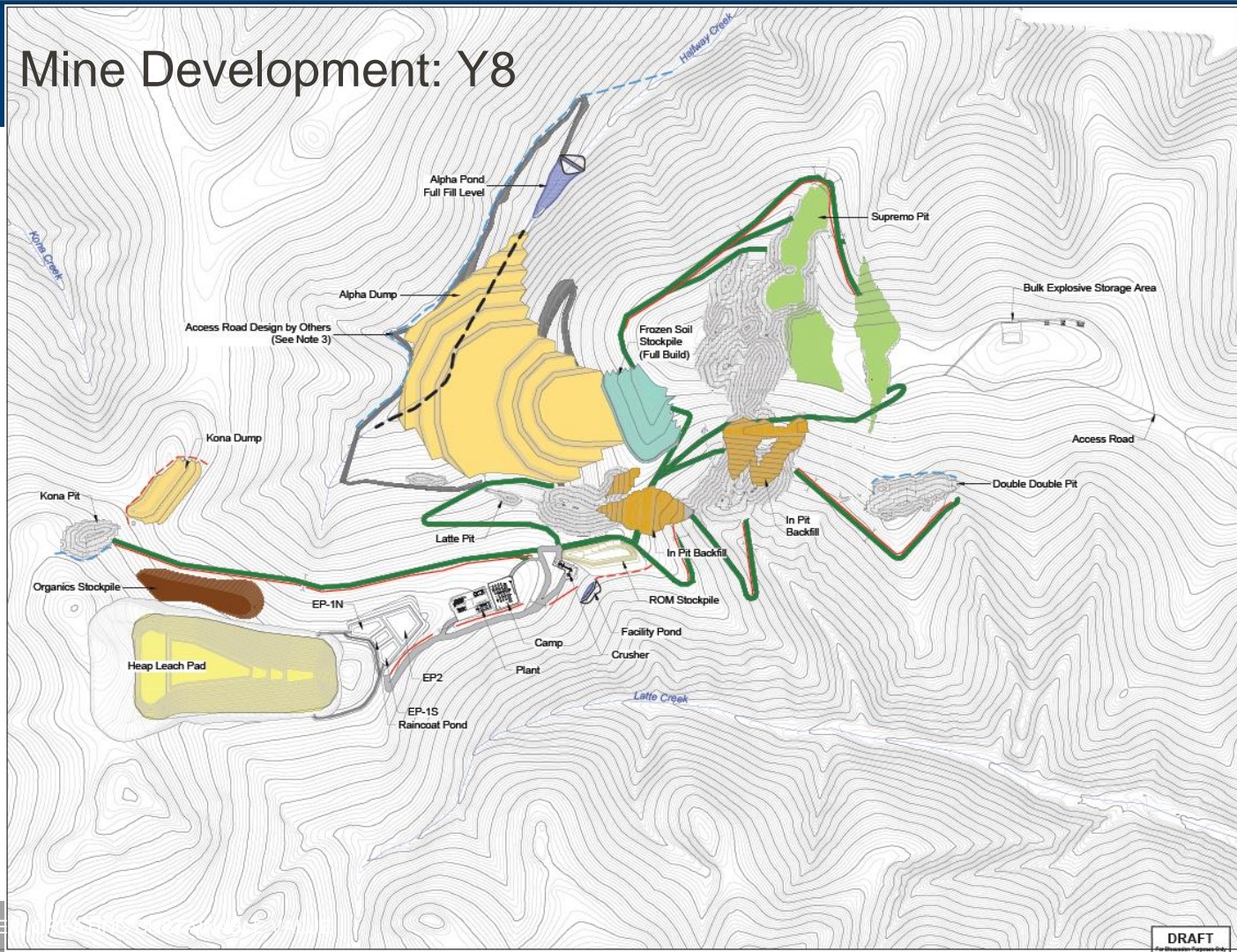


# Mine Development: Y7



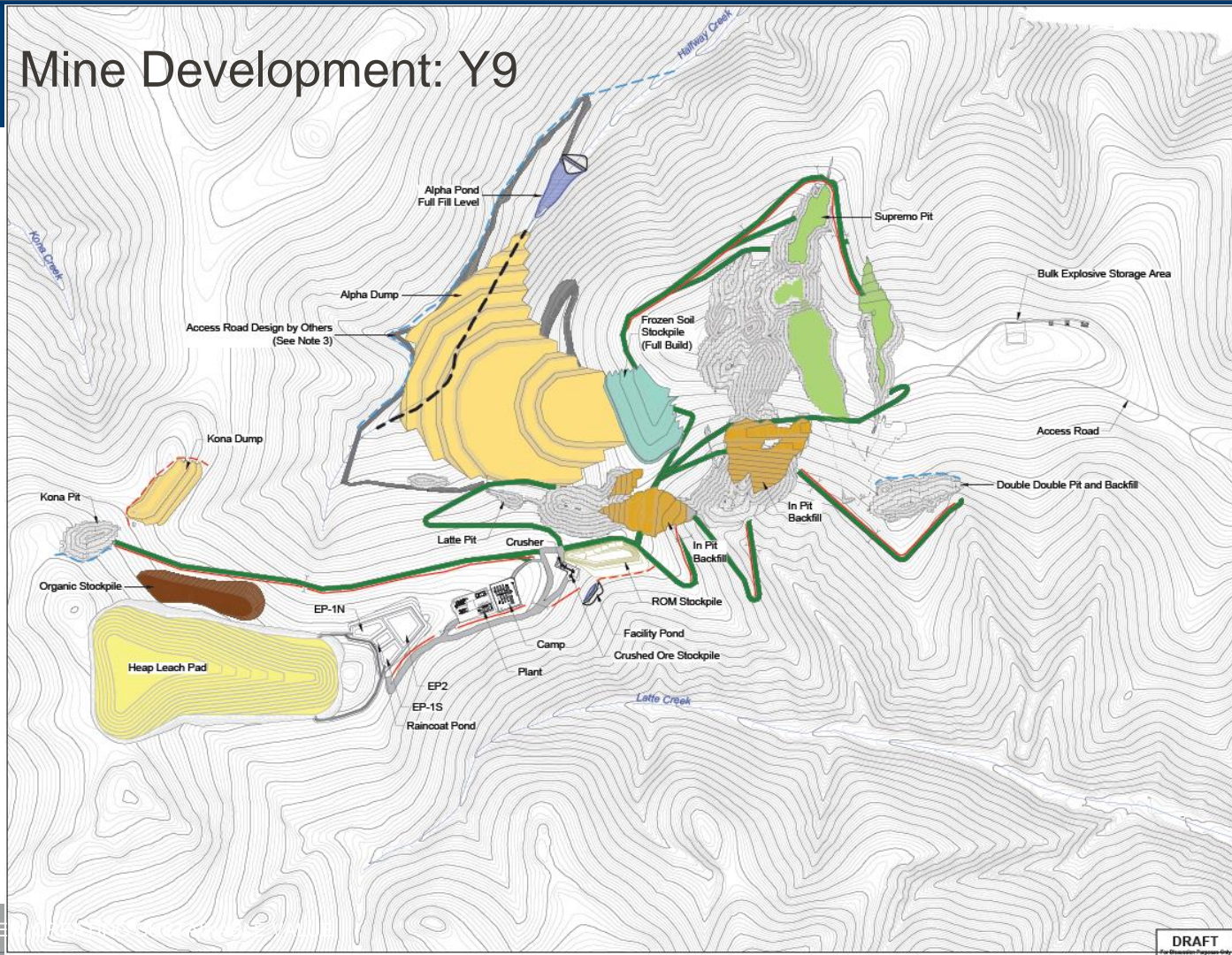


# Mine Development: Y8



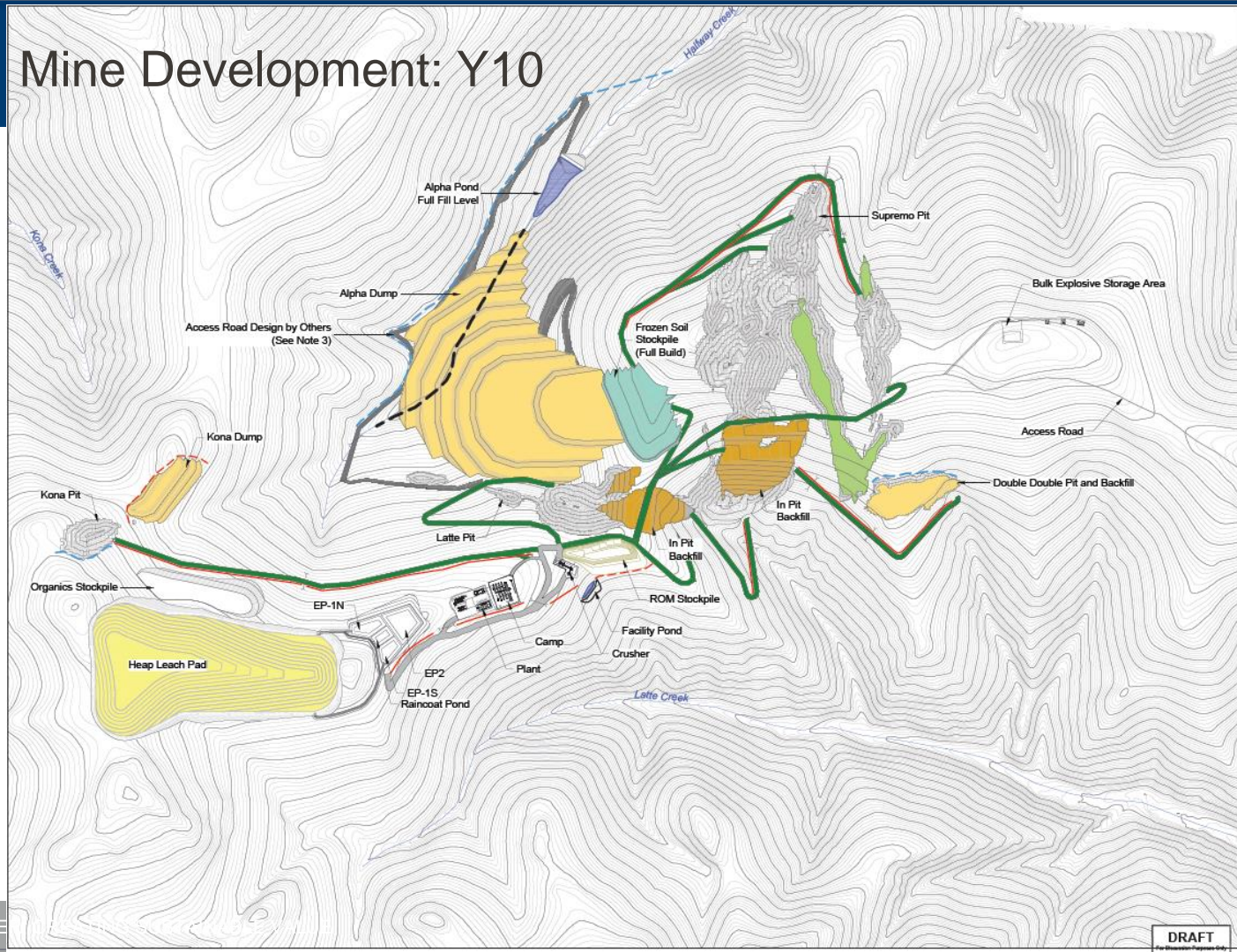


# Mine Development: Y9



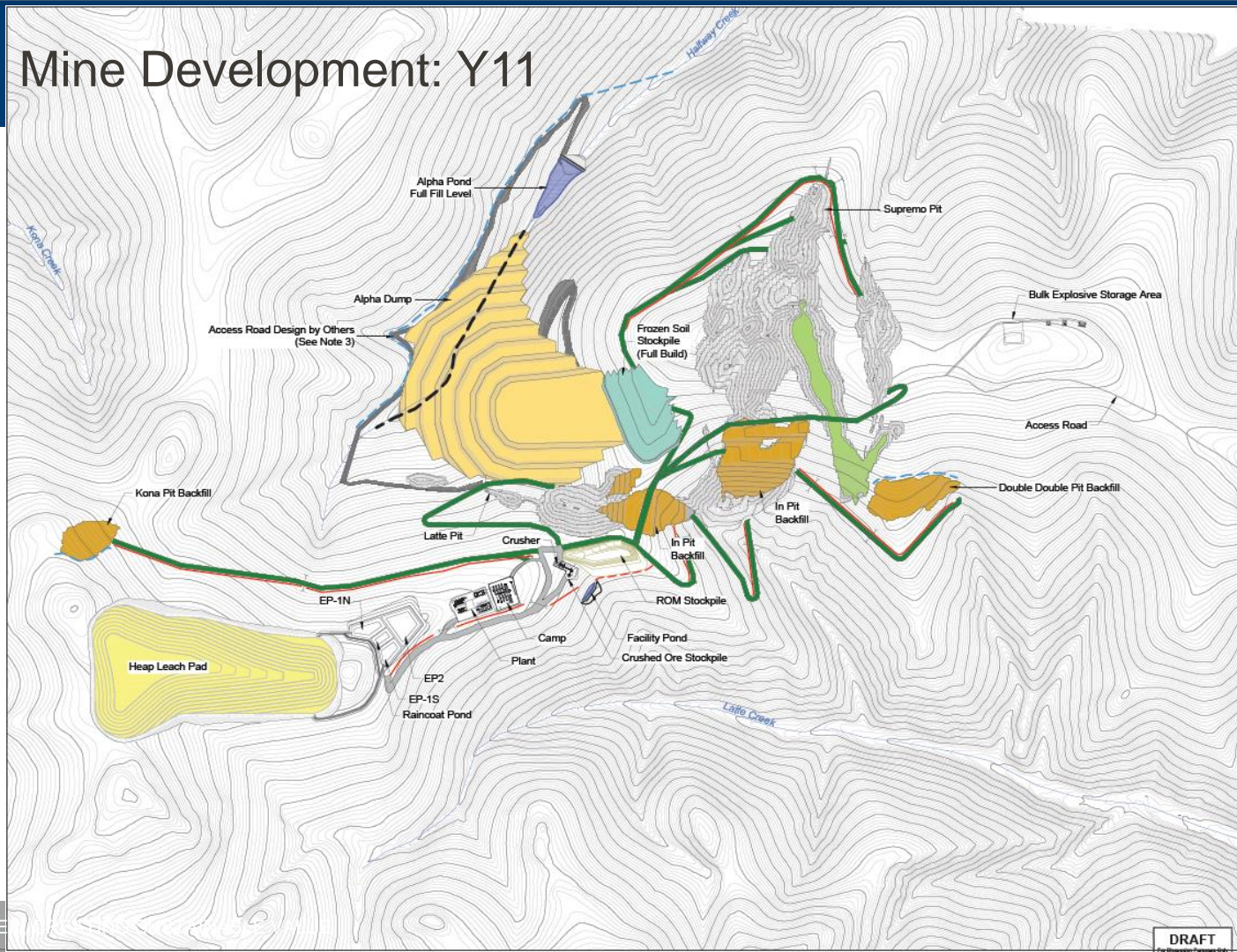


# Mine Development: Y10



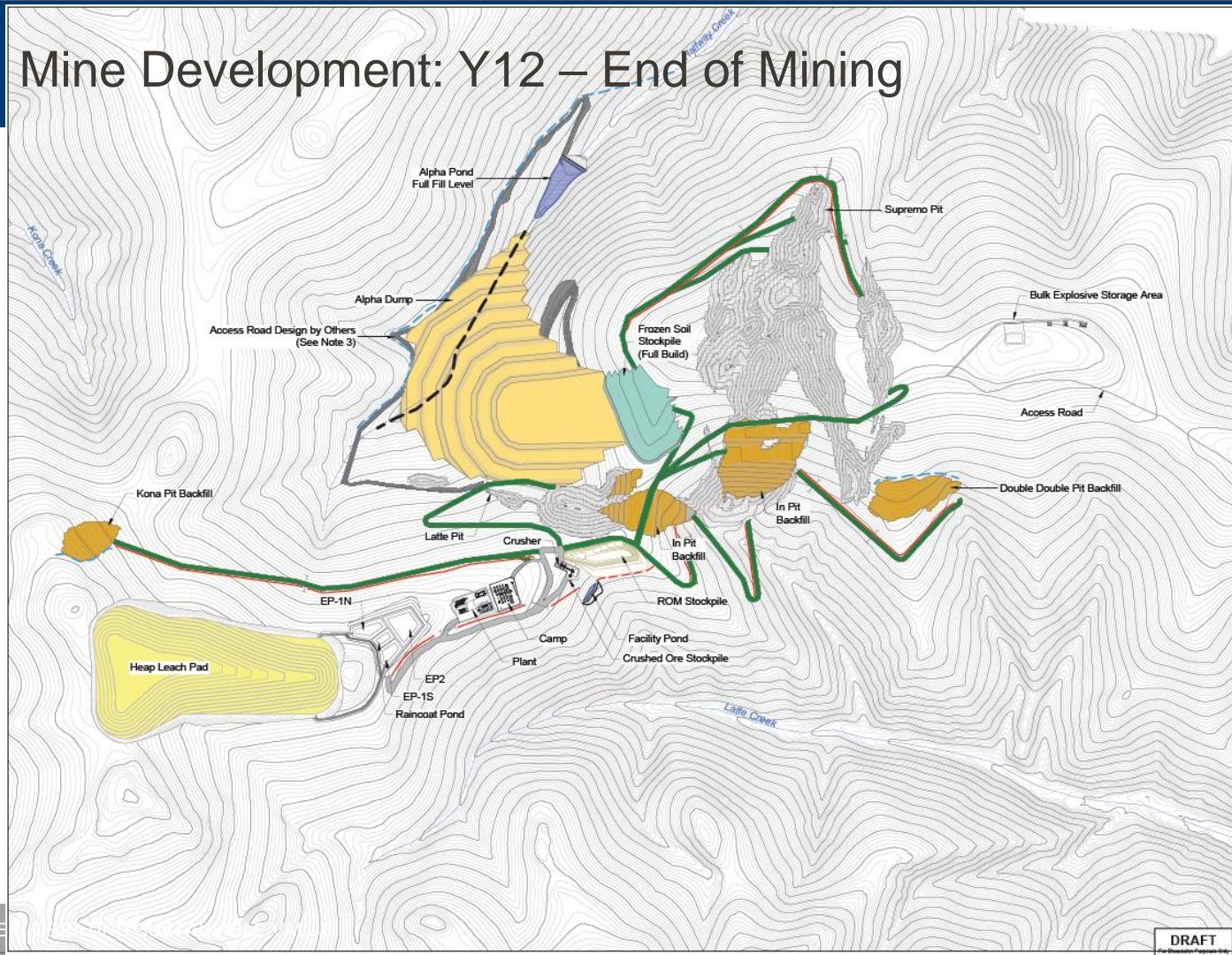


# Mine Development: Y11





# Mine Development: Y12 – End of Mining



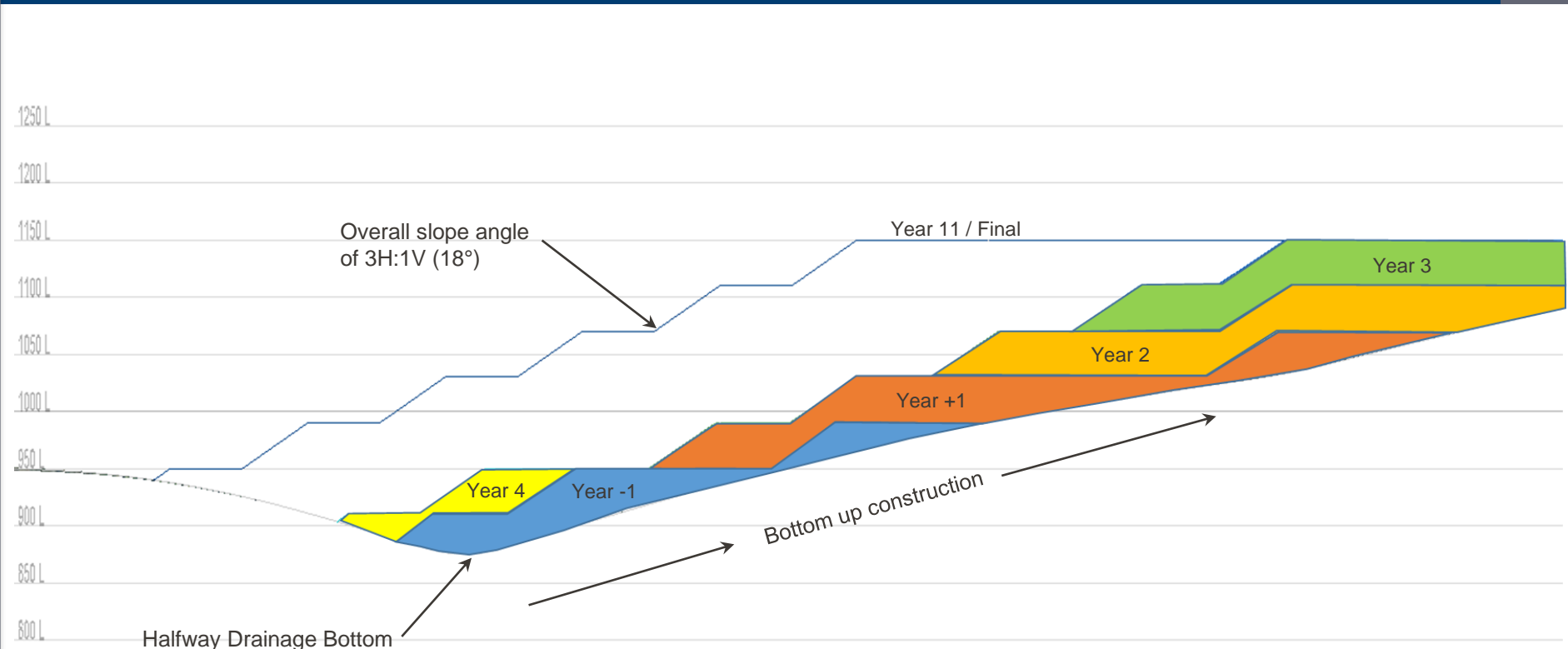


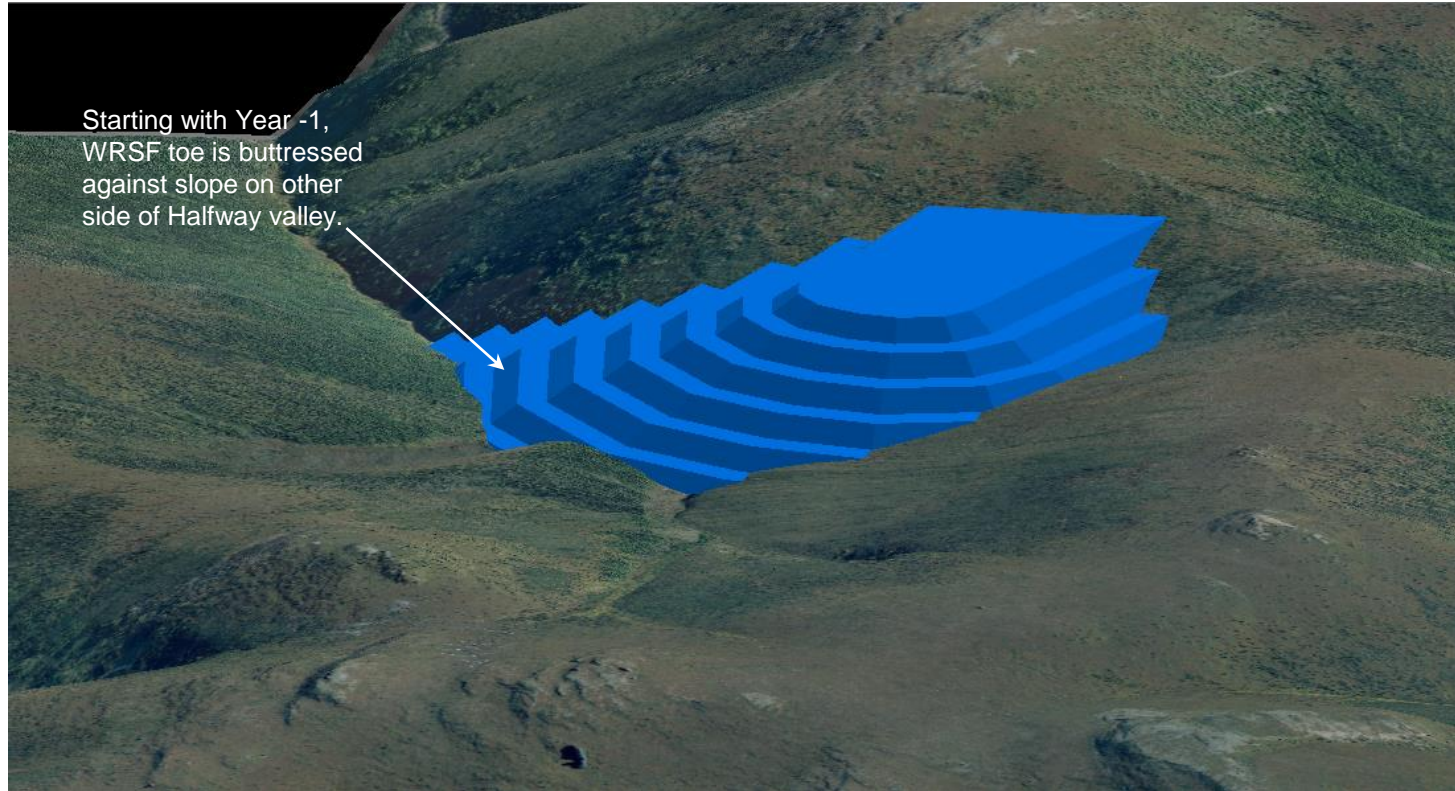
A wide-angle photograph of an open-pit mine. The scene is dominated by a massive, layered rock wall that has been excavated. At the top of this wall, an orange excavator is visible. The foreground and middle ground are filled with piles of grey and brown rock and debris, with some muddy water pools. The sky is overcast with grey clouds. The overall tone is industrial and somewhat somber.

**QUESTIONS?**

- **Constructed in a bottom-up sequence to increase stability;**
- **40m lift heights at angle of repose (35°) with 63 m bench between lifts. Conservative overall slope angle of 3:1 (H:V) or 18°;**
- **Foundation soils mostly granular and ice-poor but some areas of finer, ice-rich soils have been identified and are being investigated further;**
- **Unsuitable foundation soils will be removed from footprint and stored in IROSA;**
- **Rock drain is currently being considered beneath the dump to pass water from upstream of the facility.**







- **How do we know the design will be stable?**
- **What assumptions have been made for foundation materials and potential ice impacts?**

- Additional Fish/Aquatic Sampling
- Halfway Creek Investigations
- Chinook Spawning Surveys





- Additional Fish/Aquatic Sampling
  - low densities of fish
  - low productivity in upper watersheds
  - YT-24





- Halfway Creek Investigations



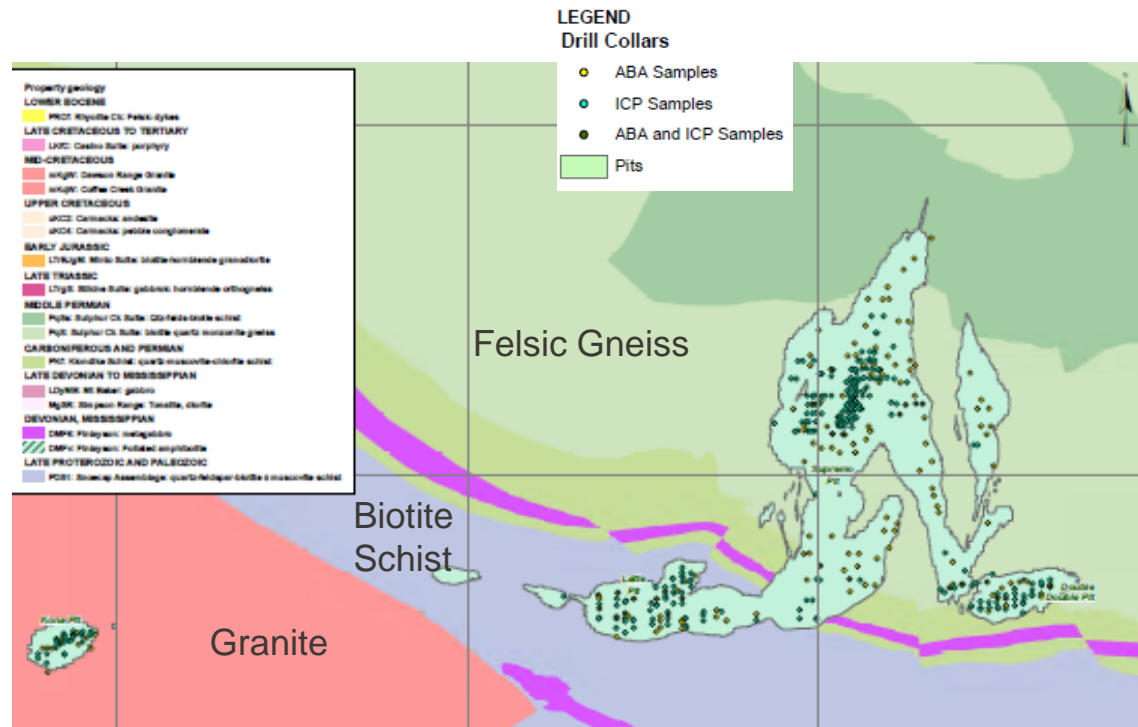
- Chinook Spawning Surveys



- **Purpose of geochemical program:**
  - Inform mine planning, waste management and water management
  - Ensure that construction material does not pose a ML/ARD risk
  - Produce geochemical source terms for input into water quality model
  
- **How should mine waste be managed?**
  - Identify location and volume of PAG rock types
  - Determine relative ML potential of PAG and NPAG rock types
  - Consider chemistry of metals of primary concern
  - Evaluate how storage conditions may influence metal release and mobility



# Waste rock and Ore Sample Distribution

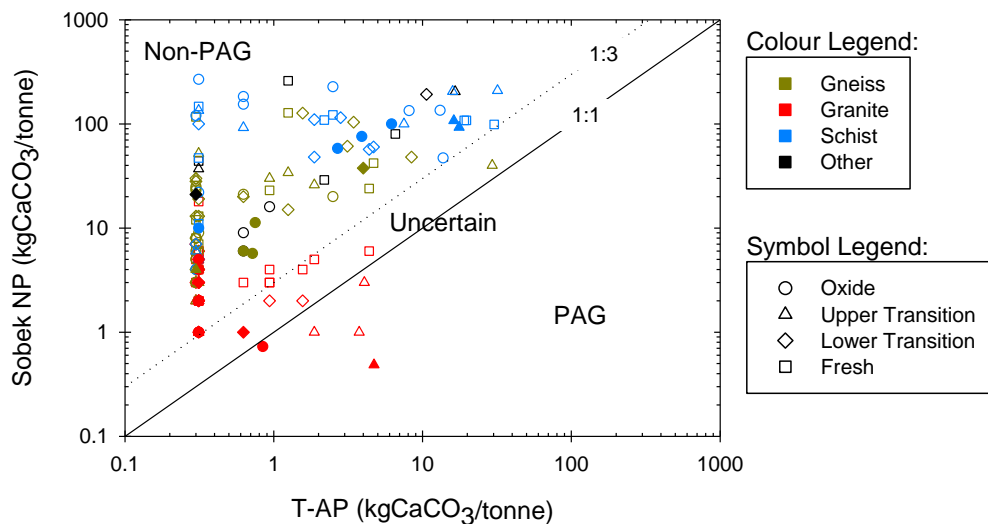


Source	Lithology	Waste (Mt)	Ore (Mt)
Double Double	Gneiss	16	1.5
Supremo	Gneiss	241	42
Kona	Granite	5.3	1.6
Latte	Schist	36	15
<b>Total</b>		<b>299</b>	<b>60</b>

- Over 400 ABA samples and 30,000 ICP-OES samples have been collected to characterize ML/ARD potential across the minesite

# Acid Rock Drainage Potential

- All waste rock and most ore is considered non-potentially acid generating (non-PAG) at Coffee
- Carbonate minerals dolomite and calcite are present in all weathering facies (including the oxide)
- Granite ore from the Kona pit is the only material which contains acid generating potential
  - Granite ore composes less than 2% of total ore





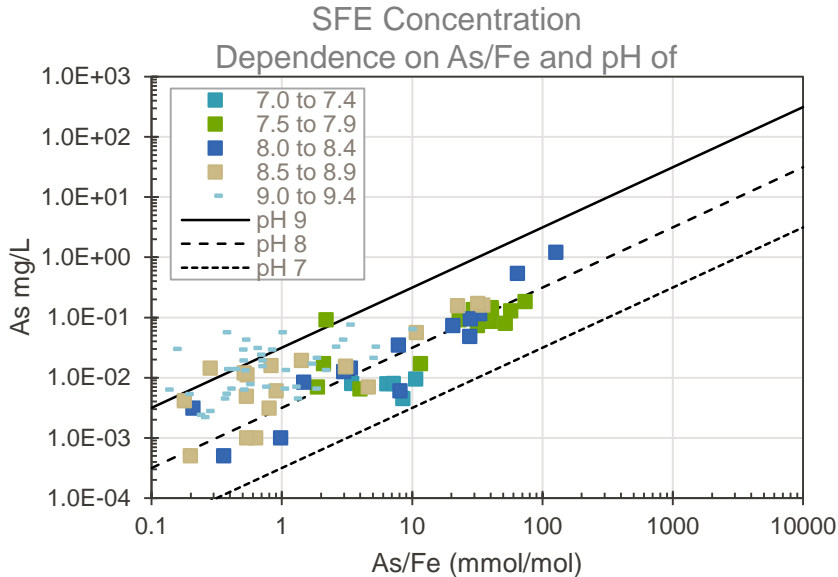
- **Uranium and arsenic are the two parameters of primary interest with respect to neutral metal leaching**

## **Arsenic**

- Elevated in all major rock types (>10x ACA)
- Present in site groundwater: 1.7 mg/L - ground water; 0.001 mg/L - surface water
- Relatively soluble under neutral pH conditions
- Redox sensitive

## **Uranium**

- Slightly elevated in Gneiss and Granite (2-3x ACA), not elevated in schist ( $\leq 1$ x ACA)
- Present in site groundwater and surface water: 0.6 mg/L – groundwater; 0.1 mg/L - surface water
- Relatively soluble under neutral pH conditions
- Redox sensitive



	Schist		Gneiss		Granite	
	As/Fe mmol/ mol	Rinse pH	As/Fe mmol/ mol	Rinse pH	As/Fe mmol/ mol	Rinse pH
Waste Rock						
75 <sup>th</sup> Percentile	2.5	8.6	7.3	9.2	38	8.7
Median	0.67	8.2	1.5	8.4	9.1	7.4
25 <sup>th</sup> percentile	0.2	7.3	0.4	7.4	1.5	6.8

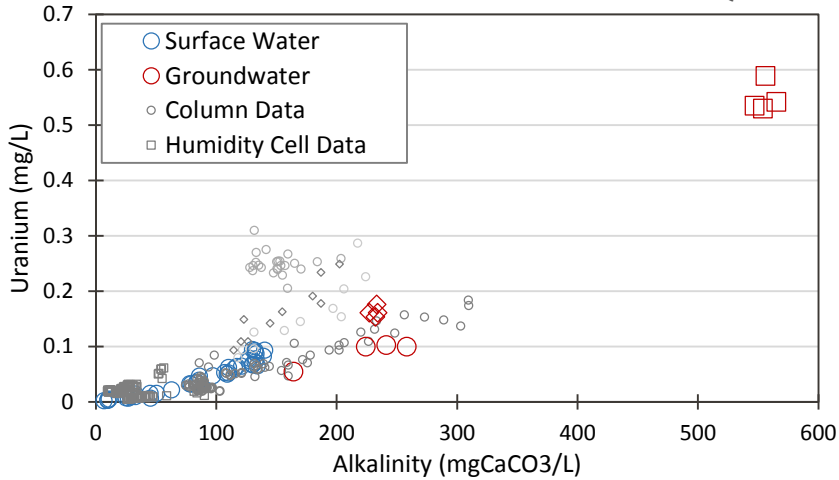
## • Factors Effecting As Leaching

- Relative abundance of As and Fe
- pH (minimum solubility at pH ≈ 6.5)
- Oxidation state [As(V) or As(III)]

## • Management Considerations

- Rock Type (Granite > Gneiss > Schist)
- Mineralization (Ore >> waste rock)
- Subaqueous/Subaerial Storage
- Pore water pH

Gneiss Kinetic Testwork and Site WQ



## • Factors Controlling Solubility

- Uranium abundance
- Redox conditions
- Complexation with dissolved CO<sub>3</sub><sup>2-</sup>

Waste Rock All Weathering Types	Schist		Gneiss		Granite	
	U ppm	%CO <sub>2</sub> %	U ppm	%CO <sub>2</sub> %	U ppm	%CO <sub>2</sub> %
75 <sup>th</sup> Percentile	2.6	<b>5.3</b>	6.4	<b>1.0</b>	7.9	<b>0.2</b>
Median	1.9	<b>2.9</b>	3.6	<b>0.2</b>	6.4	<b>&lt;0.2</b>
25 <sup>th</sup> percentile	1.1	<b>1.4</b>	2.3	<b>&lt;0.2</b>	5.3	<b>&lt;0.2</b>

## • Management Considerations

- Rock Type (Gneiss ≥ Granite > Schist)
- Mineralization (Ore ≈ waste rock)
- Pore water alkalinity (effected by carbonate availability)

Lithology	Waste/Ore	ARD Potential	As	U
Granite	Waste	NPAG/Neutral	High-Low	High-Low
Granite	Ore	PAG	High-Low	High-Low
Gneiss	Waste	NPAG/Neutral	Moderate	High
Gneiss	Ore	NPAG/Neutral	High	High
Schist	Waste	NPAG/Neutral	Low	Low
Schist	Ore	NPAG/Neutral	High	Low

- **Granite**

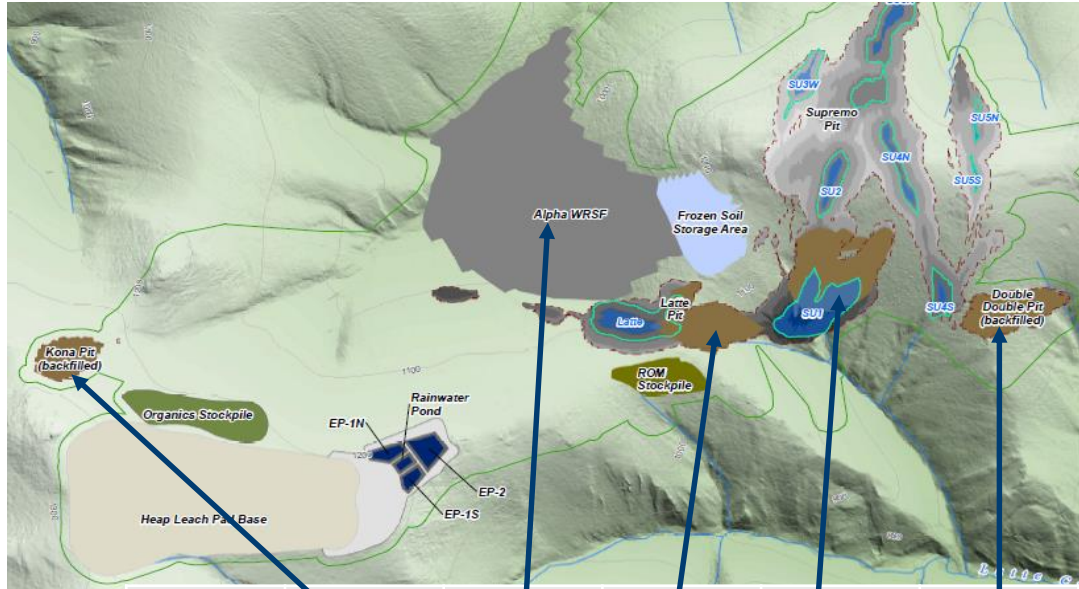
- Uranium and Arsenic are enriched
- Variable alkalinity and pH causes variability in As and U leaching potential

- **Gneiss**

- Uranium and Arsenic are enriched
- Presence of carbonate minerals causes persistently high pH and alkalinity.

- **Schist**

- Uranium is not enriched
- Arsenic is enriched, however, high Fe content limits As release.



- Alpha Dump**
  - Composed of Gneiss and Schist
  - Entirely subaerial
  - Underdrain promotes gas exchange
- In-pit Dumps (Latte, Supremo, DD)**
  - Composed entirely of Gneiss
  - Partially Submerged (6 Mt Supremo Backfill)
  - Reduces overall footprint of the mine
- Beta Dump/Kona Backfill**
  - Composed entirely of Granite
  - May be partially submerged when backfilled
  - Covers PAG wall rock exposures

	Beta Dump/ Kona Backfill (Mt)	Alpha WRSF (Mt)	In-Pit Latte (Mt)	In-Pit Supremo (Mt)	In-Pit Double Double (Mt)
Gneiss	-	210.55	6.91	29.79	8.66
Schist	-	33.88	-	-	-
Granite	5.3	-	-	-	-



## Uranium

### Alkalinity

- Uranium leaching potential will increase with alkalinity in any storage environment
- Lower U release is expected in surficial exposures (where  $p\text{CO}_2$  is at atmospheric levels) than in the interior of waste rock dumps (where  $p\text{CO}_2$  accumulates)

### Subaqueous Disposal

- Anaerobic conditions may reduce U leaching potential, by promoting conversion of U(VI) to insoluble U(IV)

### Non-Conservative Parameter

- Alkalinity will only accumulate in waste facilities until carbonate equilibrium is reached (effected by  $p\text{CO}_2$ ). Limiting dump infiltration will reduce uranium loading.

## Arsenic

### Pore water pH

- Arsenic leaching potential will increase as pH increases above 7. Minimum As solubility occurs at pH 7 to 6.5.

### Subaqueous disposal

- Anaerobic conditions may increase As leaching potential by promoting As(V) reduction to As(III)

### Non-conservative parameter

- Concentrations produced from a given rock type are a function of pH, therefore, loading from a given facility will be determined by runoff volume rather than waste mass.

- **Managed Subaqueous Disposal**

- Design mine schedule to avoid submergence high As leaching potential material, and maximize submergence of high U leaching potential material

- **Dump Design**

- Building dumps by end dumping rather than in lifts will encourage gas exchange, reducing pore gas pCO<sub>2</sub> and U leaching potential – may accelerate sulphide oxidation rates

- **Management of pH**

- Exclude any material that produces high pH from waste rock dumps (e.g., cement, sludge, lime, etc.)

- **Material Placement**

- Arsenic leaching potential may be reduced by co-disposing high As/Fe material with low As/Fe waste

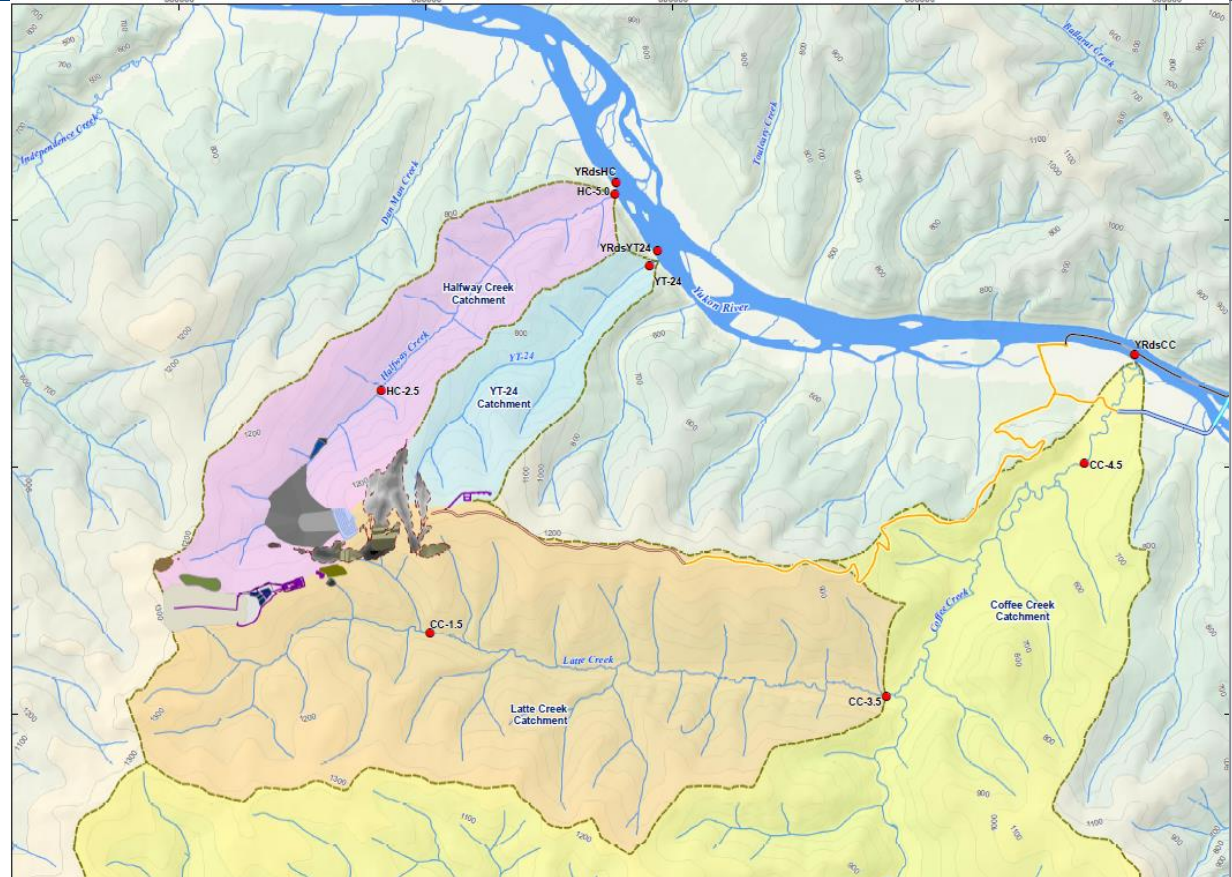
- **Reduce Contact water**

- Both U and As will have non-conservative behaviour. Minimizing contact water with material that has U and As leaching potential will reduce overall metal loads from the mine site
- Contact water may be reduced by covers and maximizing backfill opportunities if available



# Water Management

- **Mine infrastructure covers:**
  - 3% of Latte Creek drainage area
    - 70 km<sup>2</sup>
  - 0.4% of Coffee Creek drainage area
    - 500 km<sup>2</sup>
  - 3% of YT-24 drainage area
    - 12 km<sup>2</sup>
  - 11% of Halfway Creek drainage area
    - 28 km<sup>2</sup>





- **Halfway Creek**

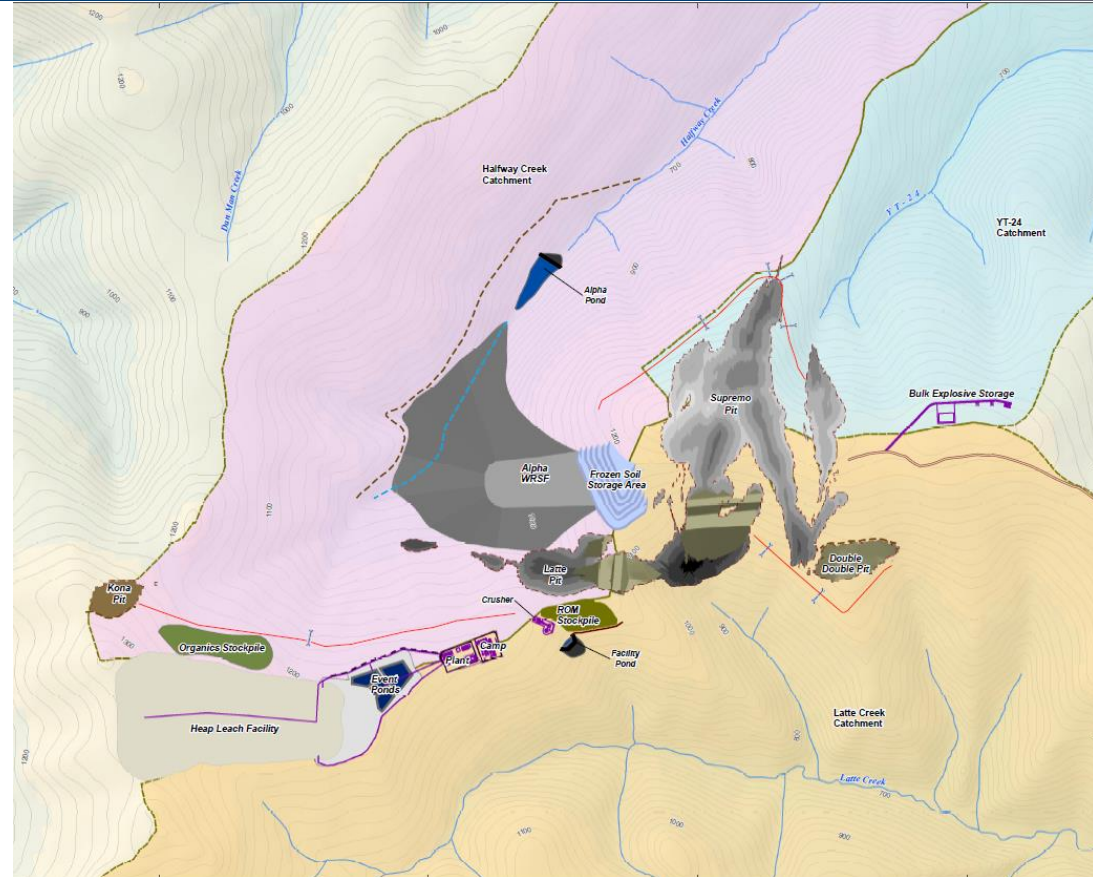
- Kona Pit and backfill
- Organics and frozen soil stockpiles
- Alpha WRSF, diversion and Alpha Pond
- Latte Pit
- ½ of HLF and camp/plant site

- **Latte Creek**

- ½ of HLF and camp/plant site
- Supremo South pit complex
- Double Double pit and backfill

- **YT-24 Creek**

- Supremo North pit complex



- **Limit contact water volumes to extent practical by reducing mine footprint, use of raincoats on HLF**

- Use contact water for HLF makeup where possible
- Backfill waste rock in pits
- Install flow-through rock drain beneath Alpha WRSF
- Surface diversion around Alpha WRSF

- **Limit disturbance in Latte/Coffee Creek and YT-24 watersheds**

- Place WRSFs and majority of site discharge in Halfway Creek drainage

- **Control discharge quantity and quality**

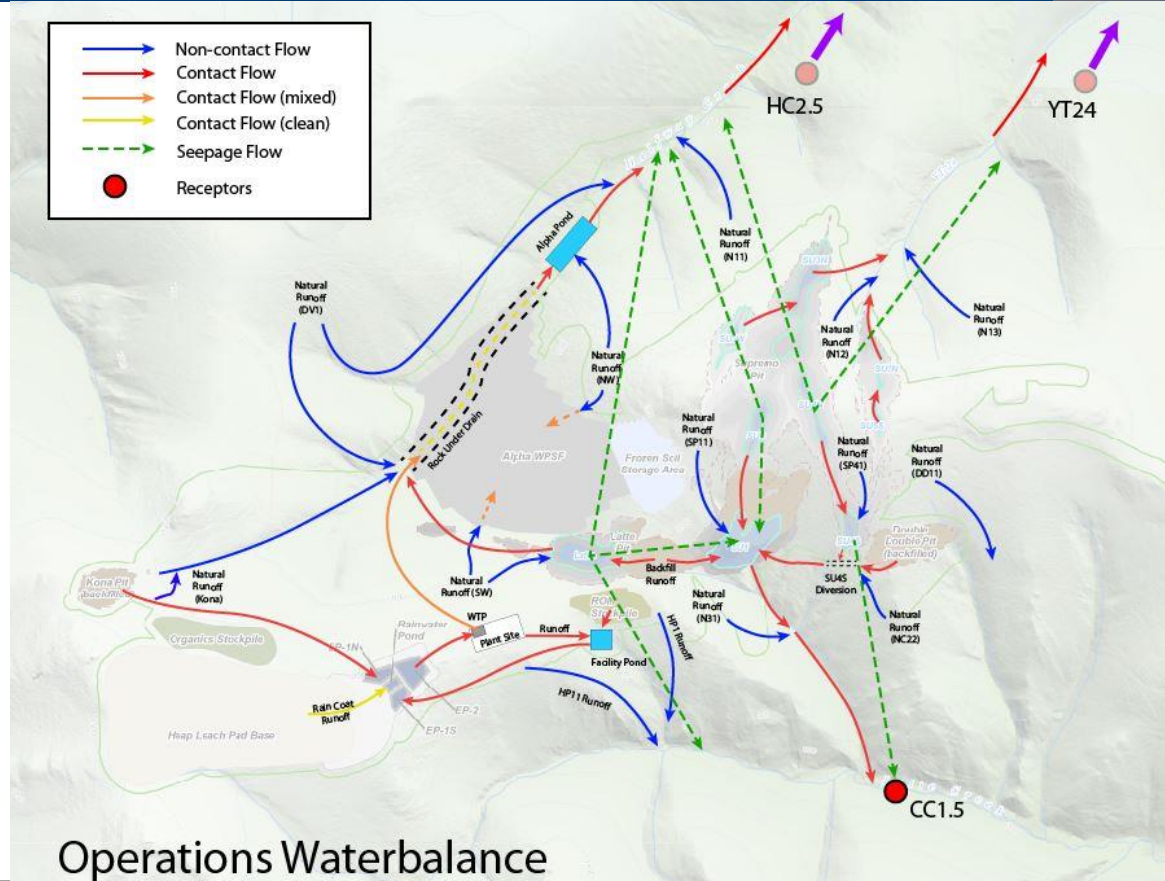
- Use of pit sumps, diversions, sediment ponds, raincoats and water treatment of HLF solutions



## Hydro-climatic regime:

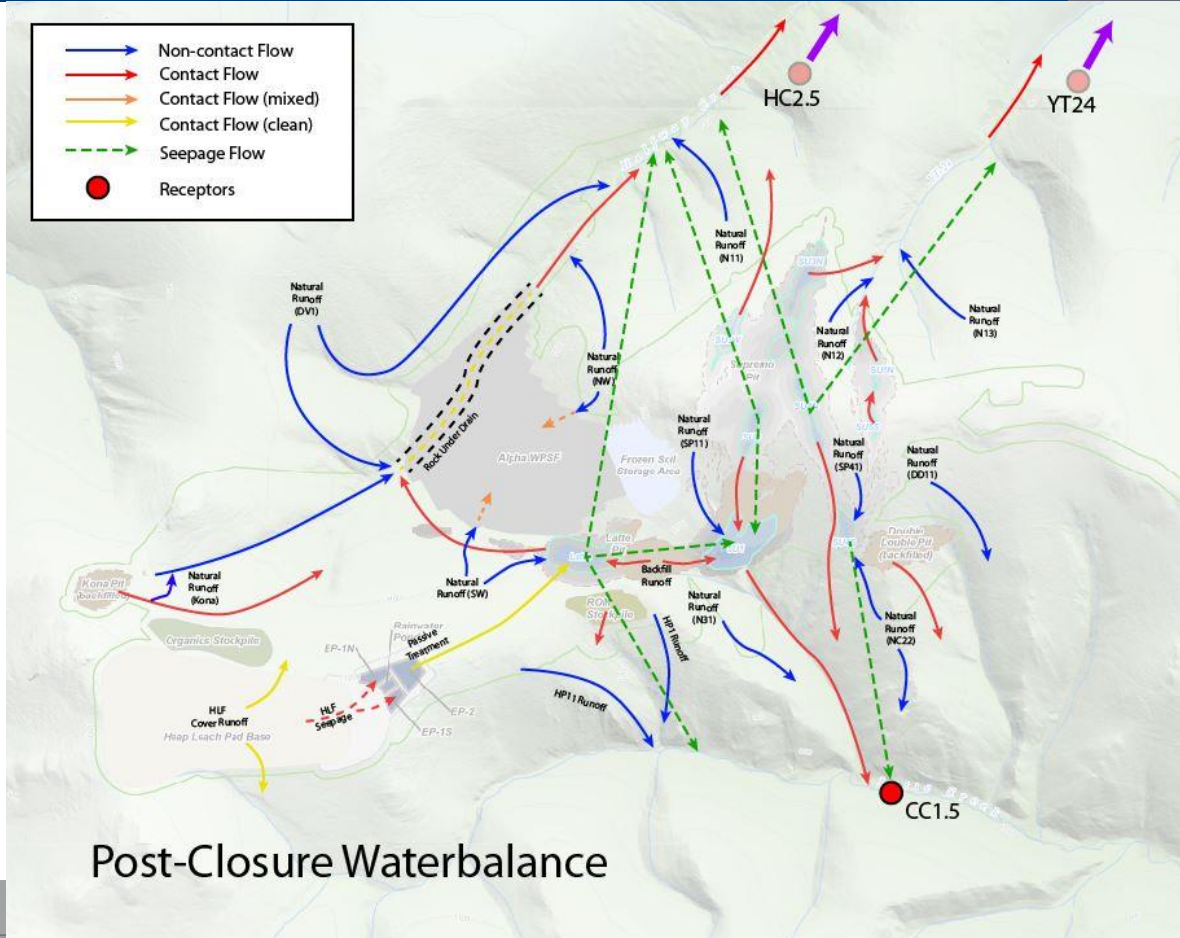
- **Rapid freshet**
- **MAP = 485 mm**
  - 65% rain / 35% snow
- **Multiple rainfall driven peaks during open-water season**
- **Extensive channel icing during winter**

- **Initial HLF makeup water sourced from HLF footprint**
- **Subsequent makeup water sourced from:**
  1. Kona pit sump
  2. Facility Pond – excess to Latte Creek
  3. Latte Pit – excess to Alpha Pond
  4. Raincoat Ponds – excess to Alpha drain
- **Kona backfill runoff reports passively to Alpha WRSF rockdrain**
- **HLF raincoat coverage generally 80-90%, but flexible based on operational requirements**
- **HLF treated draindown water routed to Alpha WRSF rockdrain**
- **Supremo South pit complex dewatered SU1 → Latte Creek**
- **Supremo North pit complex dewatered to YT-24**



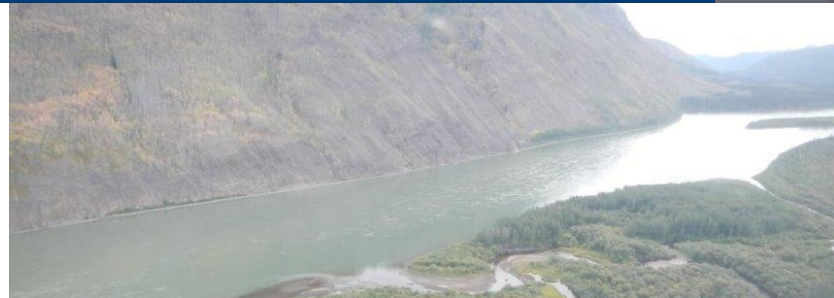


- **Alpha Pond decommissioned**
- **Alpha WRSF diversion remains in place**
- **Kona backfill runoff reports to Alpha WRSF rock drain**
- **Alpha WRSF WBM assumes no cover**
- **HLF seepage passively treated and routed to Latte Pit → Alpha WRSF rock drain**
  - Assumed covered with infiltration at 25% mean annual precipitation
- **All pits passively spill to receiving streams**



Post-Closure Waterbalance

- **HLF water management**
  - Strategies, timing, treatment
  - Makeup water sources
  - Use of event ponds
- **Alpha WRSF water management**
  - Diversions and Alpha Pond
  - Sources of water routed to Alpha WRSF drain
- **Pit water management**
  - Dewatering, filling and spilling
  - Use of Latte Pit for treated HLF discharge
  - Kona Pit backfill







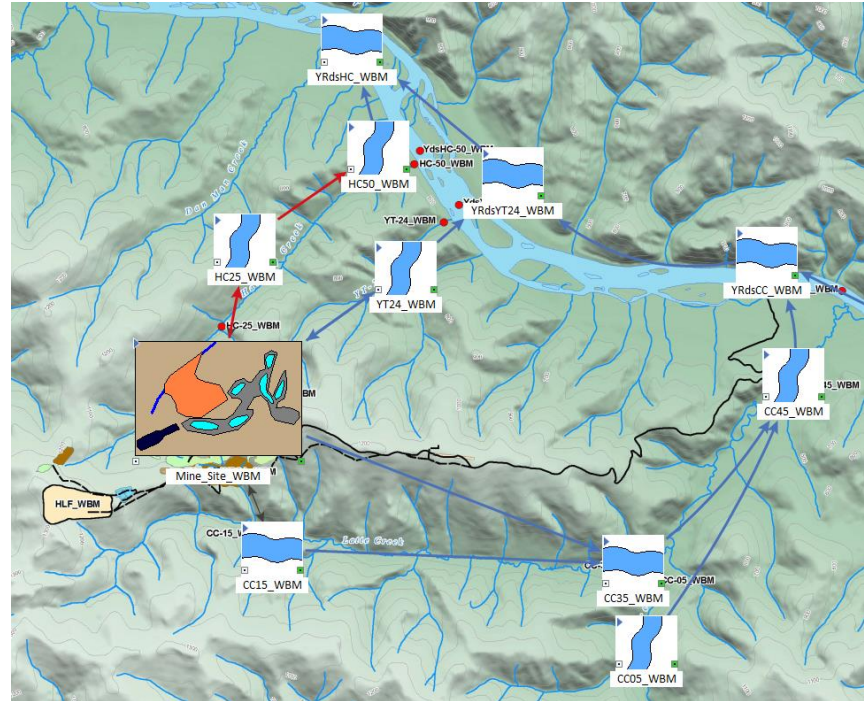
# Water Quality Model and Water Quality Predictions

- **WBM**

- Customized for each sub-catchment/facility
- Can implement detailed WMP
- Allows for integration of HLF model

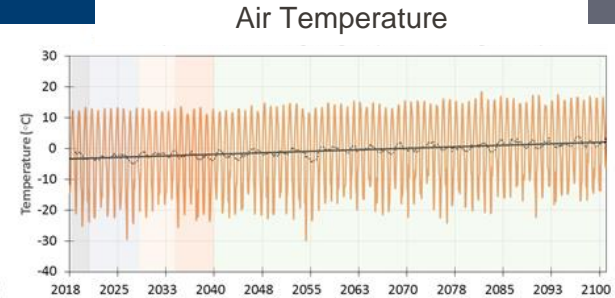
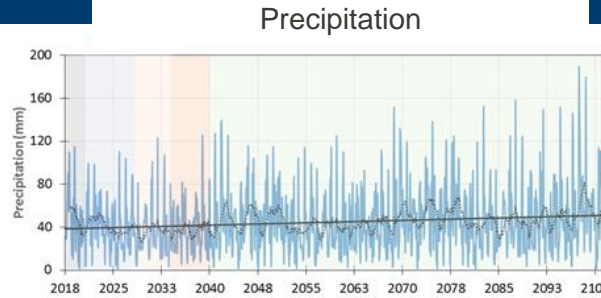
- **WQM designed in two phases**

1. Flow-based baseline background calibration
2. Predictive model using geochemical site characterization
  - WRSAs/backfill
  - Pit walls
  - HLF (treated)
  - Other (ore stockpile, plant site, etc.)



## WBM Assumptions

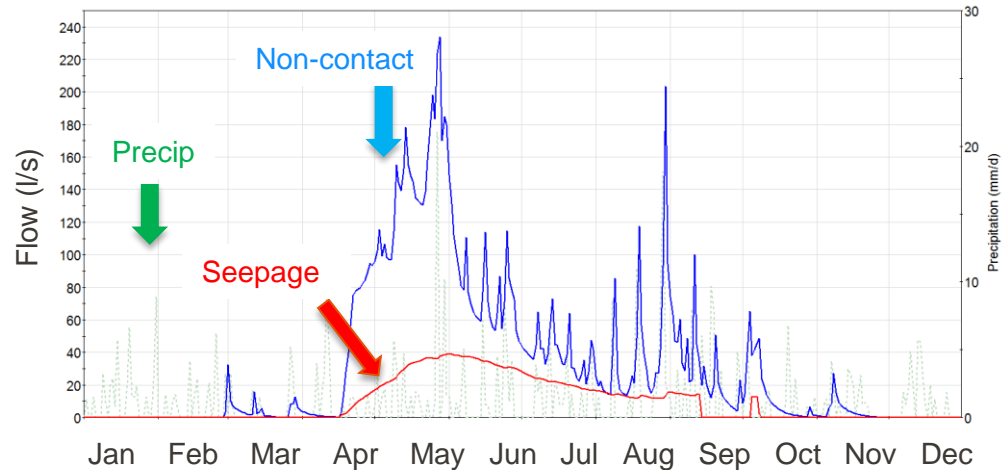
- Precipitation/Temperature driven
- Daily time-step
- EOM full footprint through operations



## Snowmelt-Runoff catchment models

- Individually calibrated in natural catchments
- Facilities customized to expected flow
- Flows are delineated:
  - Fast-reporting surface flow
  - Interflow
  - Baseflow
  - Aufeis generation

Diversion Flow vs Alpha WRSF Seepage

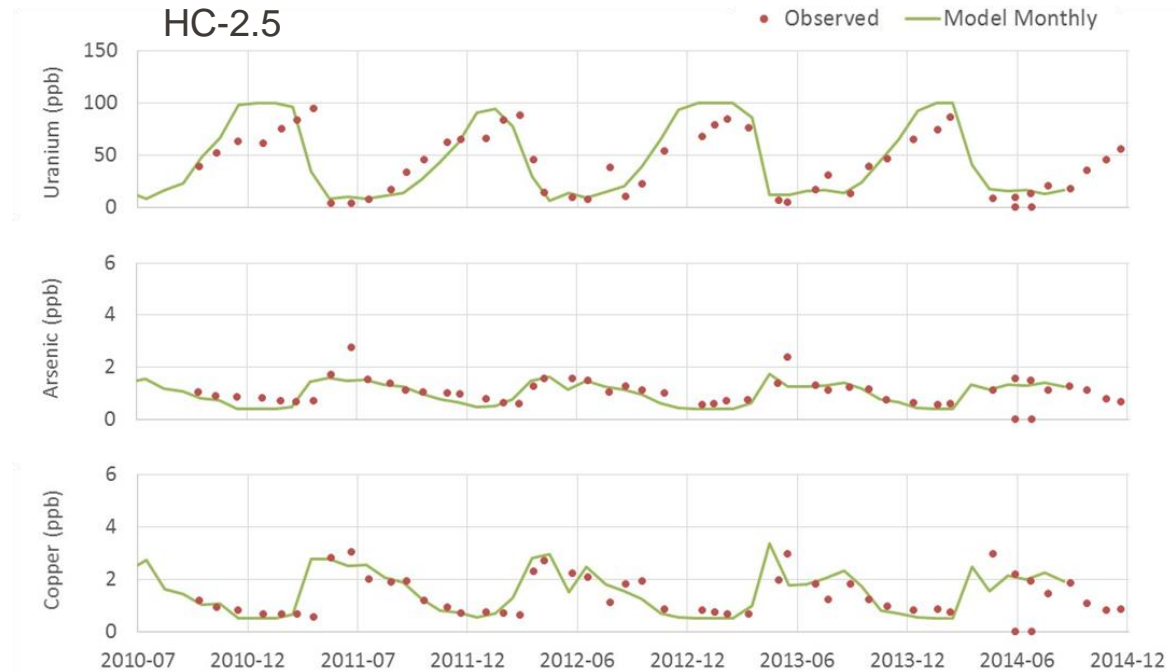


- **WQ Integrated into the background flow components**

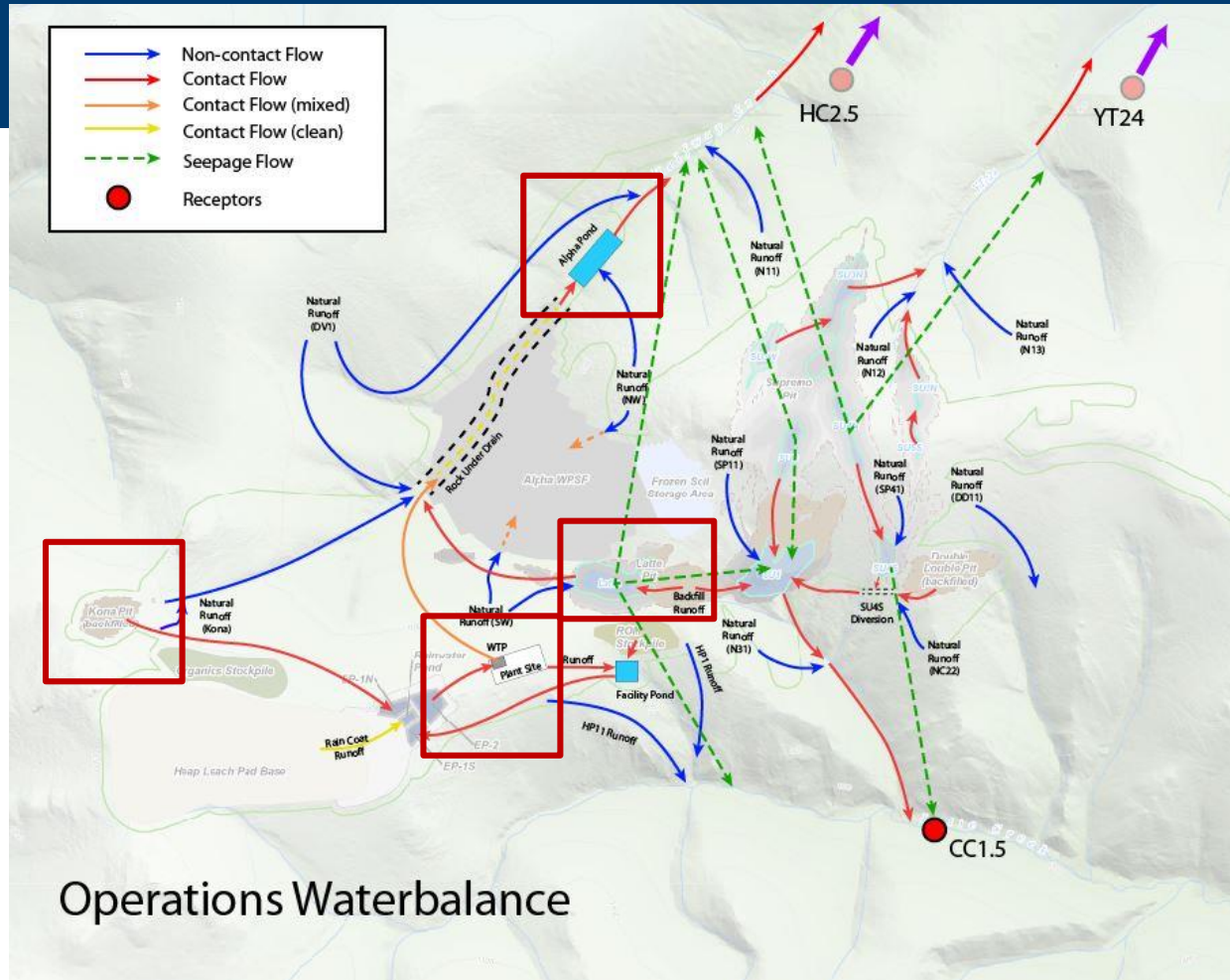
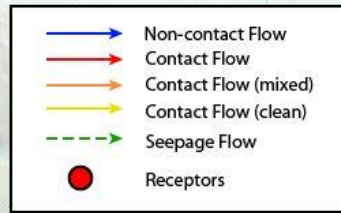
- Quick flow (fast runoff)
- Interflow
- Baseflow (winter/low-flow)

- **26 Parameters in each of 7 catchments**

- HC-2.5, HC-5.0
- CC-1.5, CC-3.5, CC-0.5, CC-4.5
- YT24

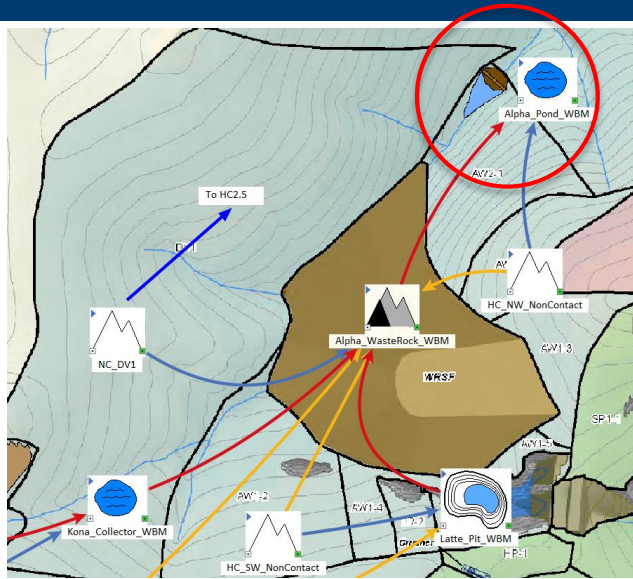






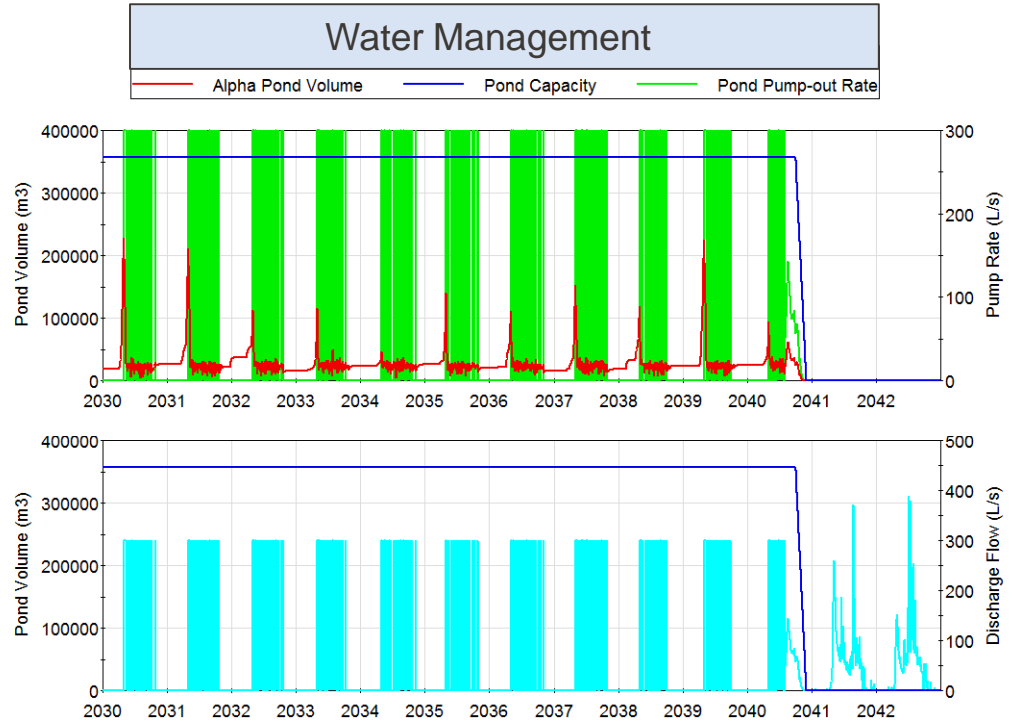
## Operations Waterbalance



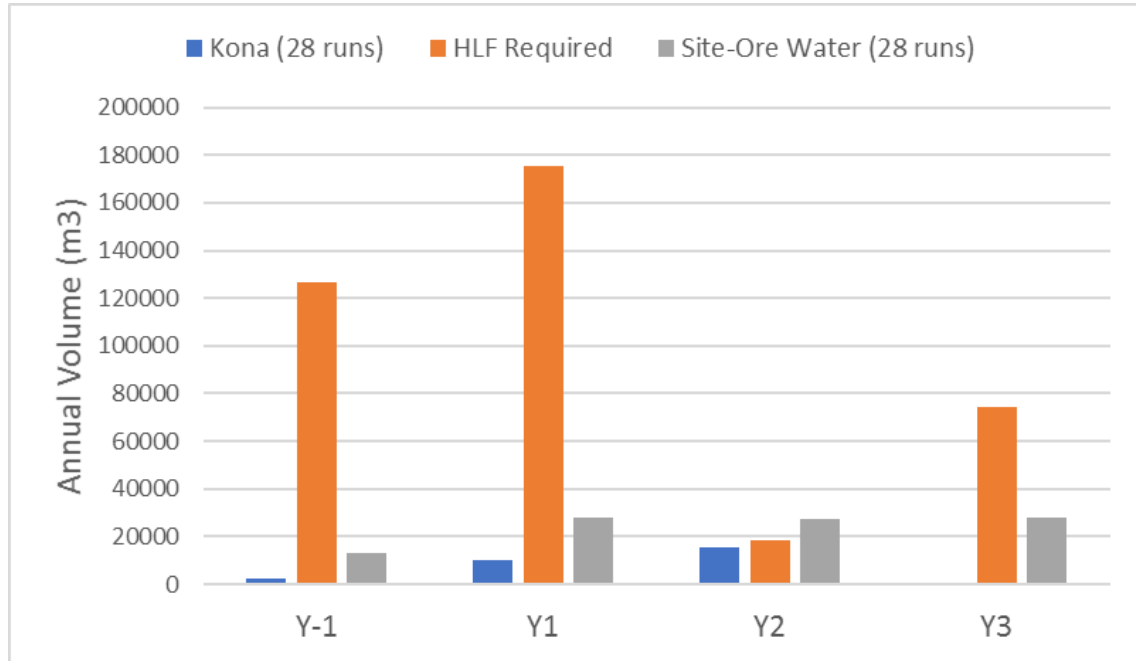


## • Alpha Pond

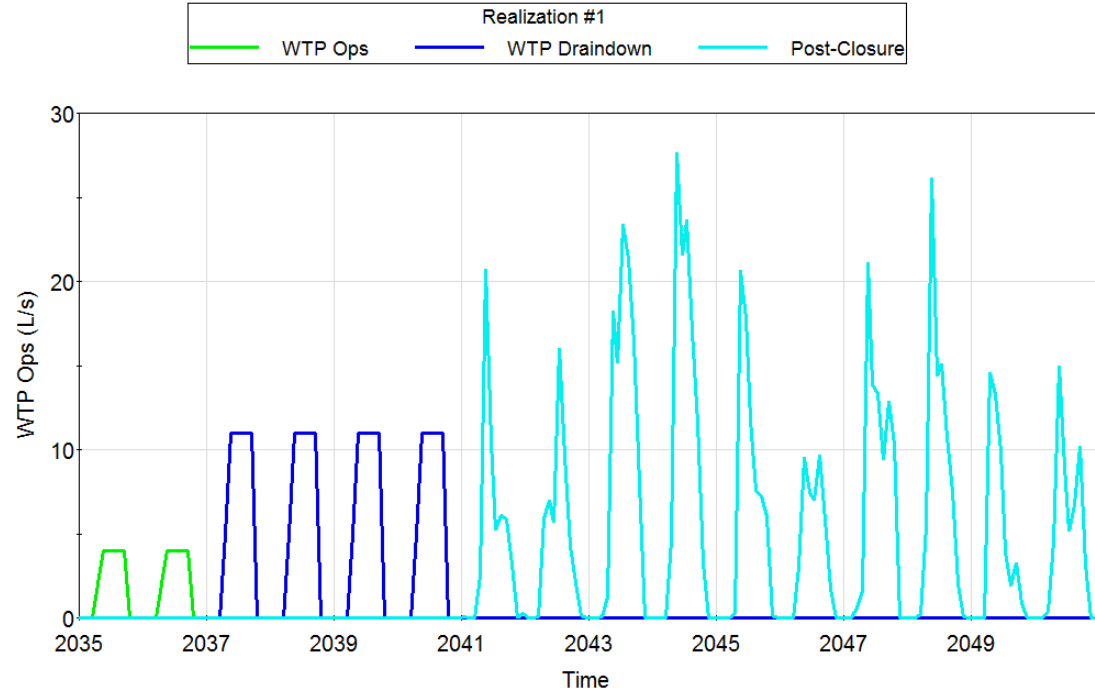
- Capacity 357,400 m<sup>3</sup>
- Max pump-out rate 300 L/s



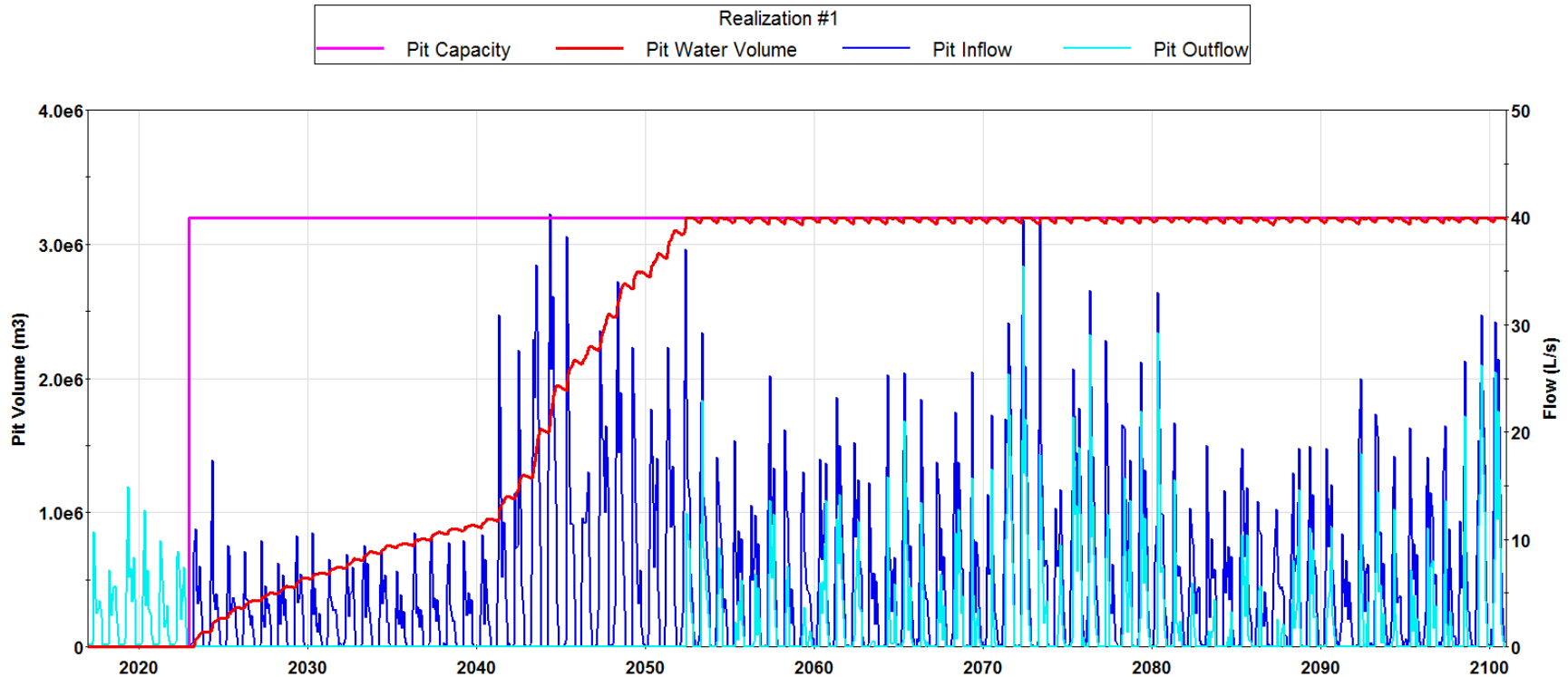
- **HLF Requires make-up water early**
- **Kona produces relatively little water during dewatering (Y-1 to Y2)**
- **Site water includes**
  - Runoff from Plant Site
  - Runoff from Ore Stockpile
- **Event Ponds hold ~460,000 m3**
- **Raincoats are needed around Y6 to begin limiting infiltration**
  - Raincoat pond ~57,000 m3
  - Excess RCP water tested and discharged to under-drain



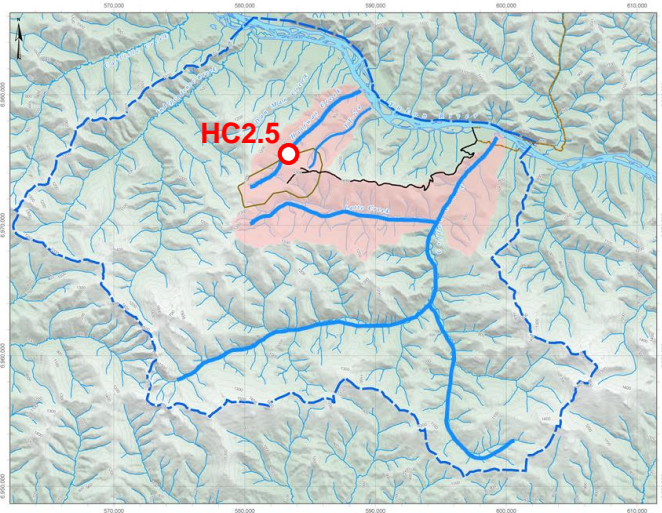
- **Treatment Rates**
  - Late Operations = 4 -11 L/s
  - Draindown = 11 L/s
- **Semi-Passive treatment discharge begins when active WTP no longer required**



### Latte Pit Volume and Inflow/Outflow

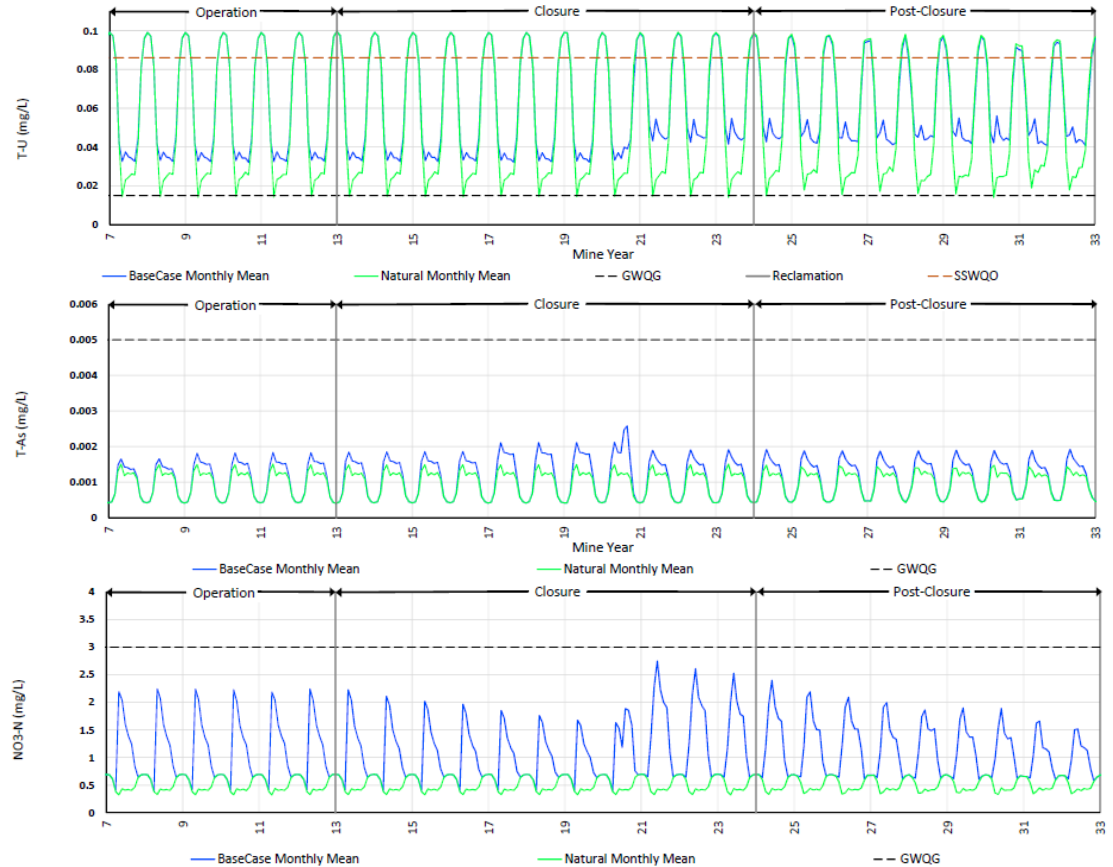


# HC-2.5 WQM Results: Base Case



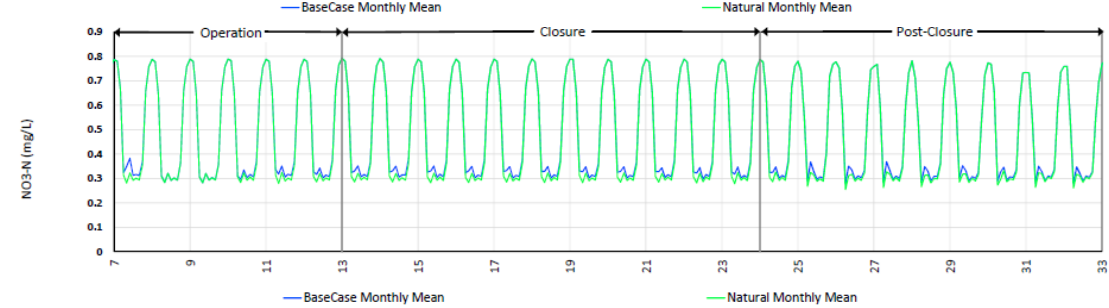
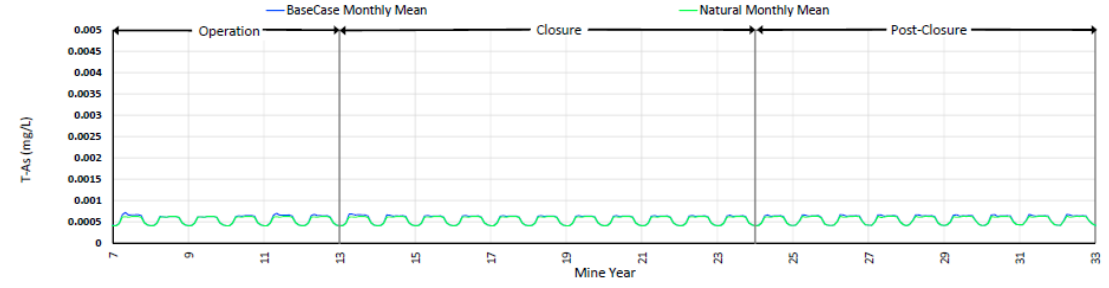
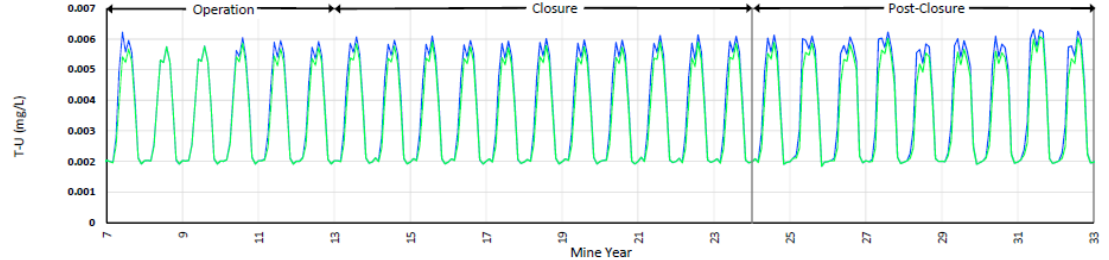
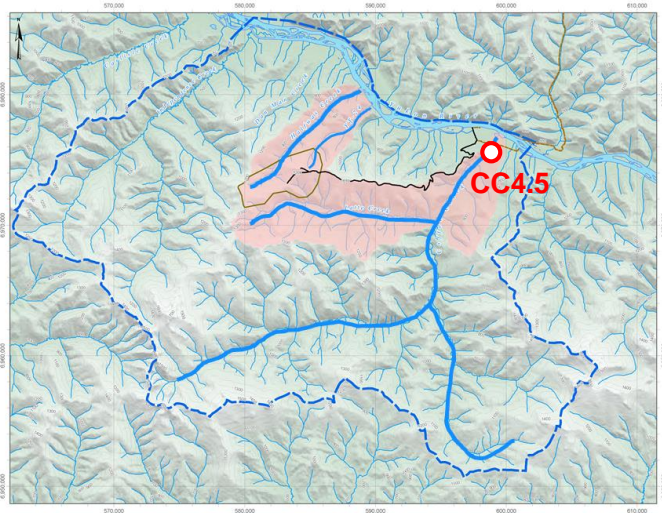
## WQO:

- **U = 0.086 mg/L (SSWQO)**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**





# CC-4.5 WQM Results: Base Case



- **Early Operations WBM**
  - HLF Start-up water
  - Kona Pit and Facility Pond de-watering
- **HLF Model Integration**
- **Alpha WRSF**
  - Infiltration – conceptual model
  - Infiltration- covers at closure
  - Seepage/Storage (implications for source terms)



Two approaches to assess potential adverse effects in aquatic systems:

**1. Direct application of “generic” water quality guidelines**

For those parameters with background concentrations below generic water quality guidelines

- *Examples include As, Cd, Hg, Se, Zn*

**2. Background Concentration Procedure (as directed by CCME)**

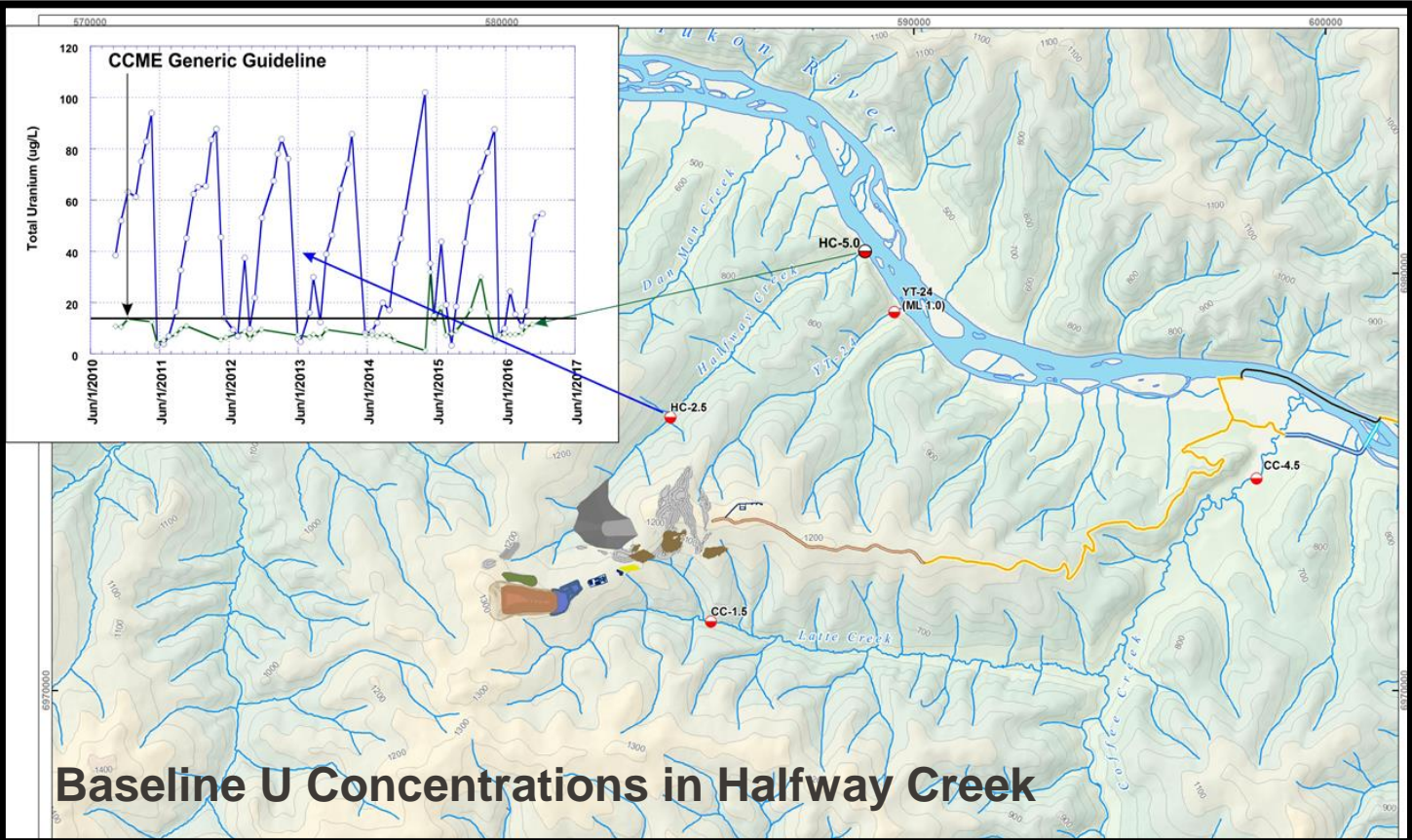
A number of parameters are present naturally at concentrations in excess of respective generic guideline. The CCME derivation protocol for site specific water quality objectives is the used of the 95<sup>th</sup> percentile value

- *Examples include U, Al, Cu, Fe*

**Water quality objectives** are derived values (or concentrations) that are above water quality guidelines but still have a highly conservative and protective nature aimed to protect aquatic environments. These objectives are typically based on generic water quality guidelines, which are modified to account for local environmental conditions or other modifying factors.

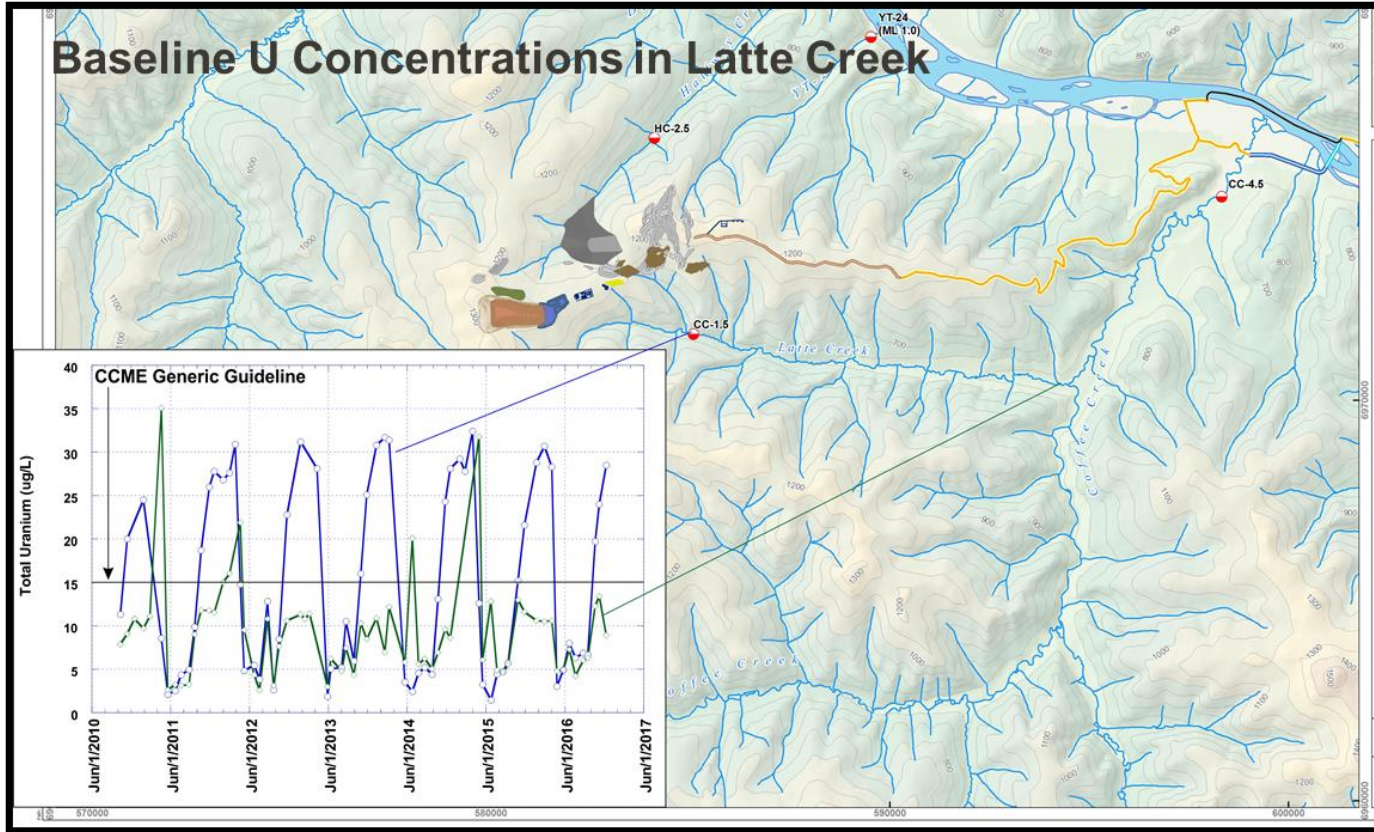


# Uranium Baseline Concentrations in the Project Area

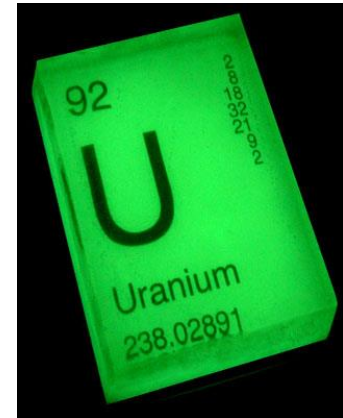




# Uranium Baseline Concentrations in the Project Area



- Derivation of water quality objectives for parameters of interest, including uranium (U)
- U is key parameter of interest for the Coffee Gold Mine Project due to naturally elevated background concentrations in aquatic systems within the project area
- For U, we have tested the protective nature of the proposed water quality objectives through detailed toxicity testing using site waters collected under different flow conditions (low flow (winter) and high flow (summer-open water))



# Proposed Water Quality Objectives

	Parameter List	Units	Halfway Creek	Latte Creek	YT-24	Regulatory Source
Dissolved Parameters	SO <sub>4</sub>	mg/L	218	309	218	BC WQO
	Nitrate-N	mg/L	3	3	3	BC WQO
	Nitrite-N	mg/L	0.02	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	1.91	1.63	1.91	BC WQO
	CN <sub>WAD</sub>	µg/L	5	5	5	BC WQO
	Al (diss)	µg/L	403	351	205	SSWQO
Total Metals	Sb	µg/L	9	9	9	BC WQO
	As	µg/L	5	5	5	CCME
	Cd	µg/L	0.11	0.13	0.1	CCME
	Cu	µg/L	3	3	3.4	SSWQO
	Fe	µg/L	1000	1000	1000	SSWQO
	Fe (dissolved)	µg/L	350	350	350	SSWQO
	Pb	µg/L	1.8	2.5	1.5	CCME
	Hg	µg/L	0.026	0.026	0.026	CCME
	Mo	µg/L	73	73	73	CCME
	Ni	µg/L	69	82	61	CCME
	Se	µg/L	2	2	2	BC WQO
	Ag	µg/L	0.25	0.25	0.25	SSWQO/CCME
	U	µg/L	86	31	15	SSWQO/CCME
Zn	µg/L	15	15	11	CCME (draft)	

Note: all metals and metalloids are as total unless otherwise noted

## U Toxicity to Aquatic Biota - Literature

- Fish- Acute >1,600 µg/L; Chronic > 350 µg/L
- Invertebrates - Acute and Chronic ~ 73 µg/L
- Algae – Chronic (growth) > 40 µg/L



Most sensitive organism to U exposure (CCME 2011)

*C. dubia*

## Performed Toxicity Test

### 1) Coffee Project Toxicity Studies Using *Ceriodaphnia dubia* (Water Flea)

- Site water exposure (winter-low flow) - Survival and reproductive endpoints
  - ✓ CC1.5 - 31 µg U/L: no adverse effects
  - ✓ HC2.5 – 78 µg U/L: no adverse effects
- Site water collected in June (summer-high flow) spiked with U (0 to 351µg U/L)
  - ✓ DOC – 9.8 mg/L
  - ✓ No adverse effects on survival and reproduction at concentrations > 351 µg U/L

## 2) Toxicity Test Using 3 Aquatic Species – Winter and Summer

- Fish: rainbow trout fry (*Oncorhynchus mykiss*)
- Invertebrates: *C. dubia*
- Algae: *Pseudokirchneriella subcapitata*



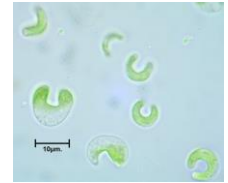
Rainbow trout



*C. dubia*

### 2a) Toxicity Test (Winter Conditions: low flow; low DOC)

- Fish, invertebrate and algae were exposed to collected site water from CC1.5 and HC2.5 plus laboratory control. Endpoints included survival (acute) for all species; reproduction (chronic) for *C. dubia*; and growth (chronic) for algae and rainbow trout fry
- Uranium spiked site water (Only for *C. dubia*) with concentrations up to 1,000 µg/L, in addition to laboratory control. Endpoints included: Survival (acute) and reproduction (chronic) endpoints



*P. subcapitata*



# Water Quality Objectives for U – Supporting Studies

- Site water exposure (3 species) – Survival and reproductive endpoints
  - ✓ DOC – 4.3 mg/L
  - ✓ CC1.5 - 32 µg U/L: no effects
  - ✓ HC2.5 – 84 µg U/L: no effects
- *Invertebrate (C. dubia)* exposed to site water spiked with U
  - ✓ Site water spiked with U (up to 1,000 µg/L)
  - ✓ DOC – 4.3 mg/L
  - ✓ No adverse effects on survival or reproductive endpoints

Endpoint	<i>Uranium (µg/L)</i>	
	CC1.5	HC2.5
<b><i>C. dubia</i></b>		
<i>Survival (No Observed Effect Concentration)</i>	1,065	1,115
<i>Reproduction (No Observed Effect Concentration)</i>	381	446.5

## 2) Toxicity Test Using 3 Aquatic Species (Con't)

### 2b) Toxicity Test (Summer Conditions: high flow, high DOC)

- Fish, invertebrate and algae were exposed to collected site water from CC1.5 and HC2.5 plus laboratory control. Endpoints included survival (acute) for all species; reproduction (chronic) for *C. dubia*; and growth (chronic) for algae and rainbow trout fry
- Uranium spiked site water (Only for *C. dubia*) with concentrations up to 1,000 µg/L, in addition to laboratory control. Endpoints included: Survival (acute) and reproduction (chronic) endpoints

- Site water exposure (3 species) – Survival and reproductive endpoints
  - ✓ DOC – 18.3 mg/L for HC2.5 and 9.97 mg/L for CC1.5
  - ✓ CC1.5 - 7.20 µg U/L: *no effects*
  - ✓ HC2.5 – 17.9 µg U/L: *confounding factor (upstream drilling)*
- *Invertebrate (C. dubia)* exposed to site water spiked with U
  - ✓ Site water spiked with U (up to 1,000 µg/L)
  - ✓ DOC – 18.3 mg/L for HC2.5 and 9.97 mg/L for CC1.5
  - ✓ CC1.5 - No adverse effects on survival (1,000 µg U/L) or reproductive endpoints ( > 650 µg U/L)
  - ✓ HC2.5 tests results inconclusive
  - ✓ Tests re-run will occur during summer 2018

- **Proposed water quality objectives for U are supported by:**
  - ✓ Naturally occurring conditions particularly when flows are low (winter)
  - ✓ Toxicity test using *C. dubia* (*most sensitive specie to U*) indicates no adverse chronic effects (long term) at concentrations > 381 µg U/L (winter) and 650 µg U/L (open water); no adverse acute effects (short term) at concentrations > 1,000 µg U/L (winter and summer)
- **Further testing to be conducted using site water during the summer 2018 - open water period to repeat exposure to HC2.5 water**

- **No U toxicity to aquatic biota – what’s does it all mean?**
  - X Can U at concentrations predicted for the Coffee Gold Mine cause adverse effects to receiving aquatic system?
  - ✓ Can U accumulate in aquatic animals?
  - X Can U increase its concentrations from small aquatic animals to big ones?
  - X Can U accumulate in fish tissue at concentrations of concern for human consumption?
  - X Can U concentrations have radioactive toxicity?
  - ✓ Can presence of other elements (e.g., metals) affect U toxicity and how?

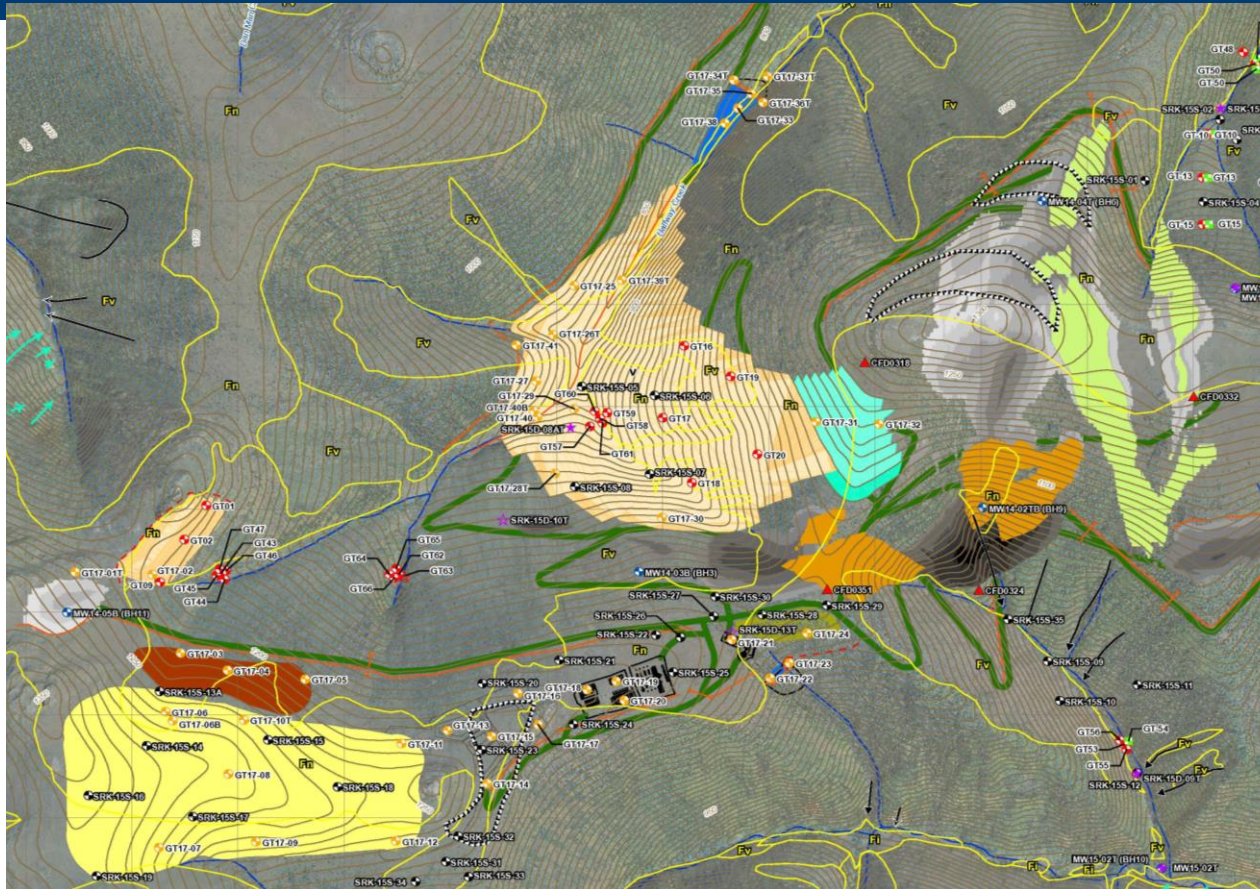




# Permafrost and Terrain Considerations – Coffee Project

Workshop, Selkirk First Nation – Whitehorse, September 19, 2017

 GOLDCORP

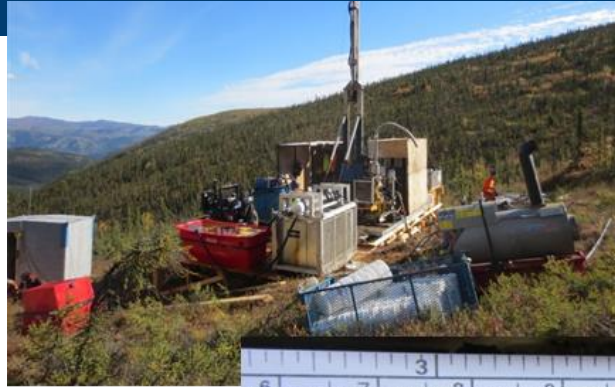


## LEGEND

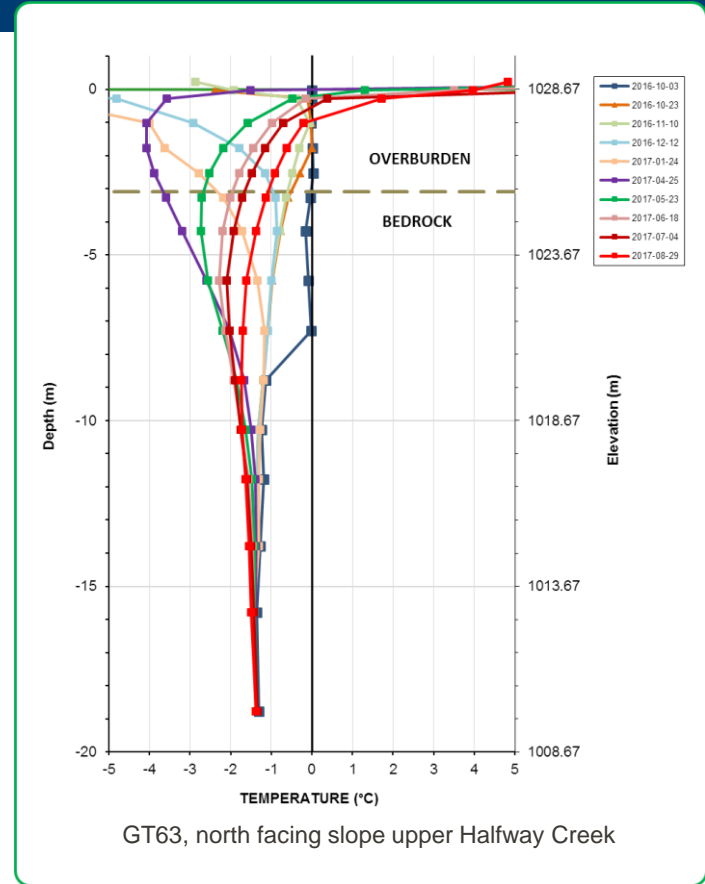
- Perennially Frozen Ground – ice-ch
- Perennially Frozen Ground – visible excess ice
- Perennially Frozen Ground – ice not visible
- Unfrozen
- Mapping Area
- Collapsed Pingo
- Thermal Erosion Feature
- Cryoplanation Terrace
- Gully
- Landslide Failure Scar (large)
- Landslide Headscarp (large)
- Recent Landslide Failure Scar
- Recent Landslide Headscarp (large)
- Retrogressive Thaw Flow Scar
- Retrogressive Thaw Flow Headscarp
- Active Layer Detachment Scar (skin flow)
- Active Layer Detachment Headscarp (skin flow)



- Detailed geotechnical investigations with chilled drilling fluids in 2016 & 2017 (78 boreholes)
- Successful in collecting thermally undisturbed overburden samples in 2016 & 17
- 112 geotechnical drill holes have now been drilled, approx. 100 test pits have been excavated.
- 21 multi sensor ground temperature cables installed and being monitored
- Generally confirmed permafrost distribution from terrain mapping but have found slightly wider distribution than previously estimated (e.g. Halfway Creek Valley). Terrain mapping is being updated to reflect this



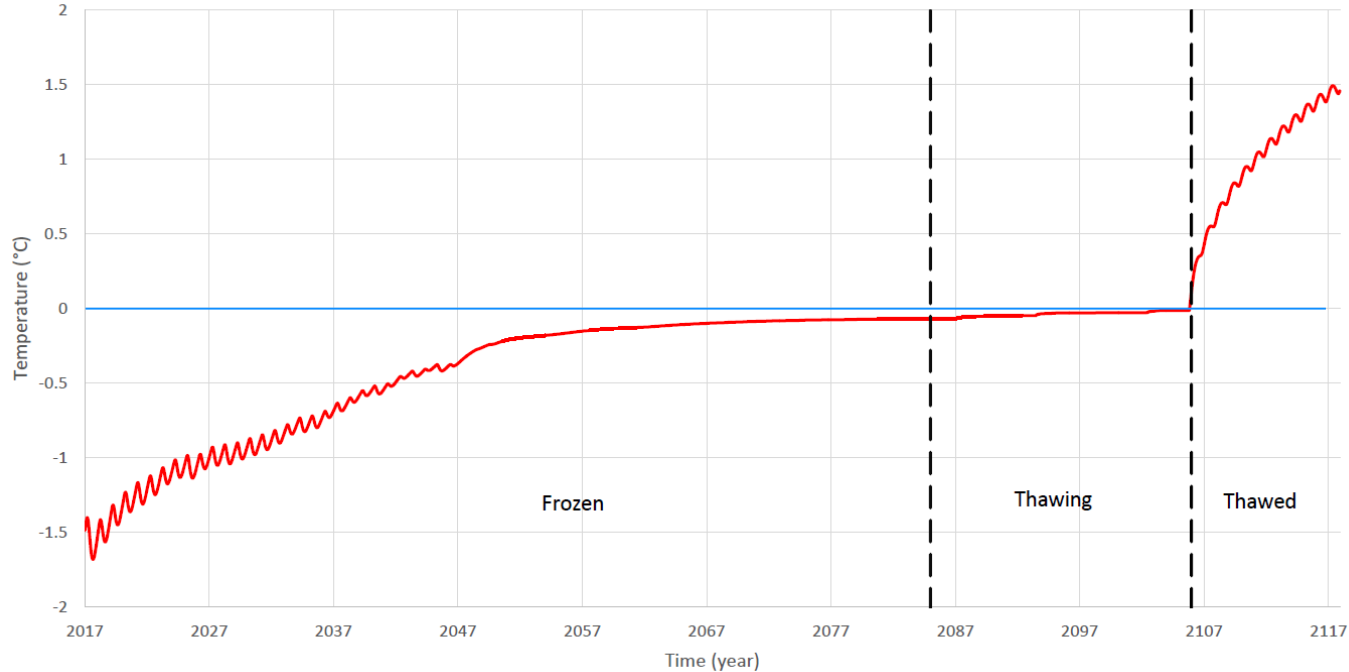
- **Discontinuous warm permafrost, typically -1.0°C to -1.5°C**
- **Permafrost at the mine site – 62% permafrost 38% unfrozen with areas as follows:**
  - Unfrozen – 38%
  - No visible ice “Fn” – 34%
  - Visible ice up to 30% “Fv” – 27%
  - “Fi” >30% – 1% (primarily in Latte Creek Valley bottom)
  - Permafrost depths of 30 to 165 m have been measured.
- **Active layer highly variable depending on thickness of organic layer and slope aspect (<0.5 to 5.0 m)**
- **Frozen overburden soils containing visible ice (higher content Fv) are therefore identified as being thaw sensitive or prone to creep deformation under applied loads**



- **Permafrost soils have an impact on waste rock stockpile stability**
- **Thermal impact of all infrastructure on permafrost is being considered. As much as possible, infrastructure has been located to avoid challenging permafrost terrain**
- **Waste rock stockpile underdrain – freezing of the underdrain or conversely thawing of underlying permafrost around the drain is being evaluated and will be monitored**
- **Permafrost impacts groundwater flow significantly, and therefore climate change and infrastructure impacts on permafrost are being considered.**
- **Permafrost bedrock has ice filled fractures therefore it is not initially groutable**
- **Impounding water will thermally impact permafrost (e.g. Alpha Pond)**
- **Higher ice content permafrost terrain can be significantly impacted by disturbance during construction or placement of waste rock**



- Modelled air temperature increase by 2100 – Winter 4.3, Spring 2.8, Summer 2.4, Autumn 2.9
- Degradation modelled – thick organic layer over 16.8 m gravelly sand overburden, massive ice at 8.8, 10.0, and 11.9 m depths



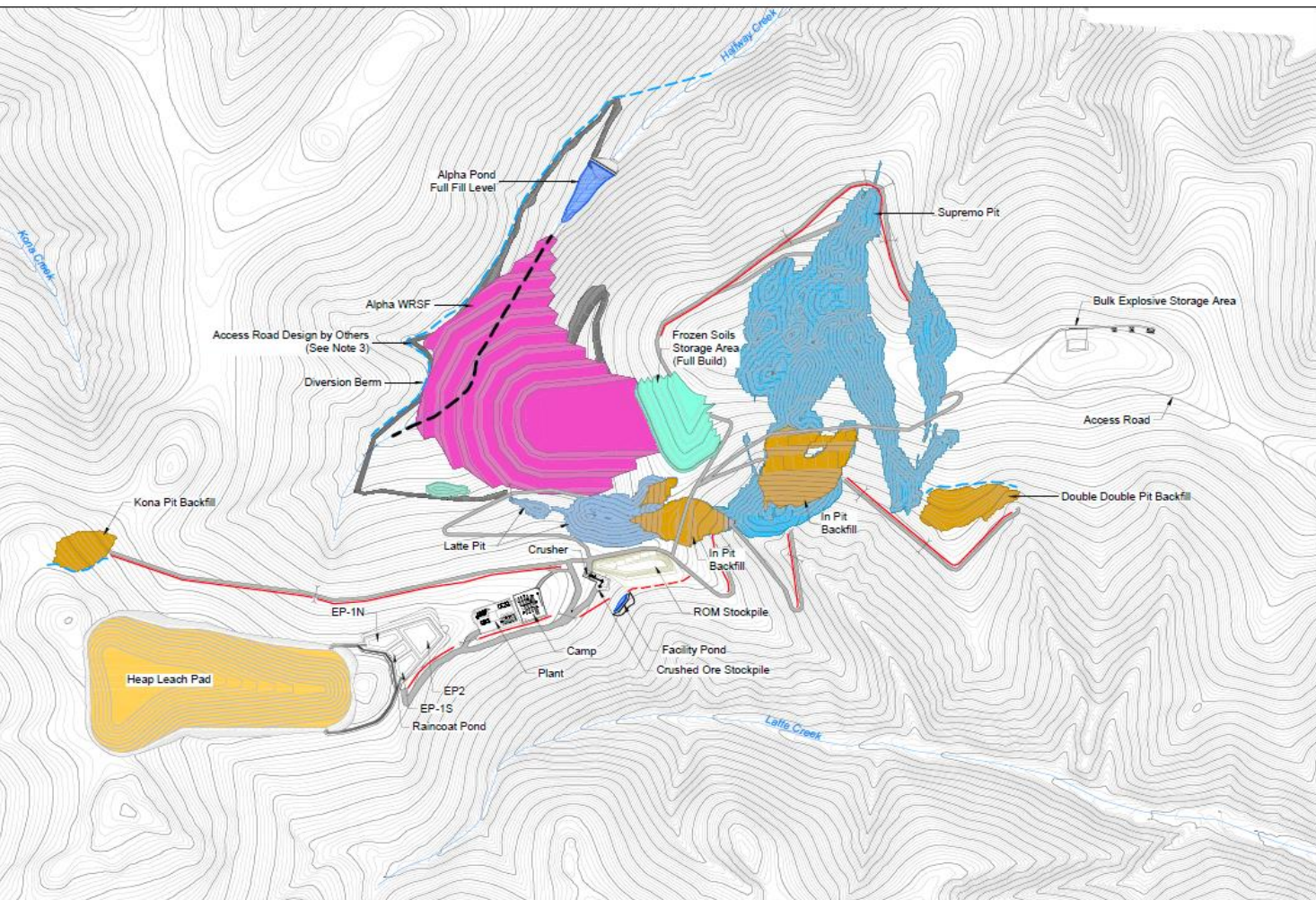


# Coffee Project Water Management

### Mine Site General Arrangement at End of Year 12

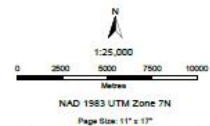
#### Legend

- Diversion Berm
- Rock Drain
- Road Drainage Ditch
- - - Waste Rock Collection Channel
- Active Pit
- Frozen Solids Storage Area
- Pit Backfill
- Pit Footprint
- Sedimentation Pond
- Waste Rock Storage Facility
- Heap Stack
- Access Road
- Haul Road
- Culvert



#### Notes

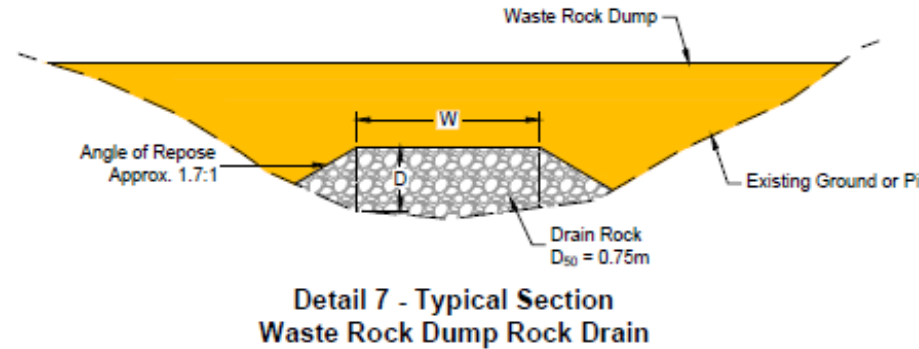
1. This figure is not intended to be a "stand-alone" document, but a visual aid to the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.
2. Contours shown as a 5 meter contour interval.
3. Access Road design to be finalized in next phase.



# Rock Drain Cross-Section

Name	Storm "Q" (m <sup>3</sup> /s)	Minimum Bottom Width (m)	Minimum Height (m)	Drain Rock D <sub>50</sub> (m)	Approximate Volume (m <sup>3</sup> )
Alpha Rock Drain	17.9	30	8	0.3	985,000

- The drains have the capacity for 2x the 100-year 24-hour storm event and average snow melt
- For large peak flows water may back up at the entrance of the drain
- If a portion rock drain becomes obstructed, water will flow through the coarse waste rock



# Rock Drain Information Requests

- Sort and place rock rather than allow for the segregation of rock by end dumping over a 20 m slope
- Include geotextile to prevent migration of fines into drains
- Freezing and melting of the drain
  - Will the drain freeze (e.g. aufeis formation, permafrost aggradation)
  - Will permafrost under the rock drain melt, cause the drain to settle



# Existing Rock Drain in Yukon



# Alpha Pond Design

- Originally designed for TSS settling
  - 1:10 yr 24 hour storm with snowmelt
- Currently design criteria for sizing is to retain a 1:100 yr freshet flow
  - Includes discharge of 300 L/s
- For this event the residence time in the pond is 12 days
  - Adequate for TSS settling
- A relatively large dam
  - Water may have to be pumped from pond at most times rather than overflow the spillway
- Reevaluating the design criteria



# Proposed Alpha Pond Dam Location



# AGENDA

## Selkirk First Nation and Goldcorp Mine Closure Planning Workshop September 20, 2017

**Location:** Kwanlin Dun Cultural Centre – Elders Lounge Room

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

### **Selkirk First Nation (SFN)**

SFN Staff TBA

Names Redacted

### **Coffee Project – Goldcorp Inc.**

Jennie Gjertsen, Manager, Environment and Permitting

James Scott, Manager, Engineering

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Names Redacted

Lorax

Kelly Constable, Hemmera

### **Agenda:**

- 1. Introductions**
- 2. Workshop Format**
  - a. High level overview followed by discussion
  - b. Workshop tools (parking lot, etc.)
- 3. Goldcorp's Closure Management Approach (CT)**
- 4. Process of Closure Plan Development Over Life of Mine (CT+JG)**
  - a. Closure plan engagement and steps forward (CT)
  - b. Small Group Discussion
- 5. Closure Objectives**
  - a. Small Group Discussion
- 6. Closure Plan**
  - a. Areas of clarification
  - b. Small Group Discussion
- 7. Main Topics of Interest for Selkirk First Nation**
- 8. Reclamation Research**

**Selkirk First Nation and Goldcorp Mine Closure Planning Workshop  
 September 20, 2017**

Location: Kwanlin Dun Cultural Centre – Elders Lounge Room

Time: 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

**Selkirk First Nation (SFN)**

Dean Gill (SFN Councilor)  
 Cord Hamilton (Technical Advisor)  
 Bill Slater (Technical Advisor)  
 Leslie Gomm (Technical Advisor)  
 Don Toews (Technical Advisor)

**Coffee Project – Goldcorp Inc.**

Jennie Gjertsen, Manager, Environment and Permitting  
 James Scott, Manager, Engineering  
 Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project  
 Pamela O’Hara, Ecowest/Lorax  
 David Flather, Lorax  
 Scott Jackson, Lorax  
 Scott Tinis, Lorax  
 Jorgelina Muscatello, Lorax  
 Kelly Constable, Hemmera

**Action Items**

Action Item	Responsible Party	Due Date
Discuss results of new WQ sampling	Goldcorp	Oct. 4, 2017
Load pie charts – send to SFN	Goldcorp	Oct. 4, 2017
Look at dissolved metals (Cu, Fe) with respect to Water Quality Objectives in all streams	Goldcorp	Q2-2018
Share a “player” version of the WQM/WBM when ready	Goldcorp	Q1-2018
Clarify justification for not re-grading the HLF in closure; Consider a 3:1 closure slope option of the HLF with a full cover.	Goldcorp	Under review
Alpha WRSF actions workplan (Jennie to provide). Includes cover evaluation, sensitivity analysis, and evaluation of site	Goldcorp	Oct. 4, 2017



wide materials balance. Goldcorp to provide a timeline on the work to SFN		
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**Parking Lot Items**

Item	Timeline to Address
Discuss rainwater rinse on HLF and how this is considered in the water balance – discussion with Mark Smith.	

**Summary of Discussion**

**Water Balance Model Discussion:**

Goldcorp reviews water balance model design. SFN and Goldcorp discuss seepage assumptions in the model. Goldcorp might move beyond the bulk approach to the model when there’s more data in operations. SFN and Goldcorp discuss how the water balance model will be updated with the year-by-year configuration, and discuss the design of the model with respect to lag and seepage. The group discusses the sensitivity of the system to the lag in seepage, and need to determine key drivers. This involves modeling the sensitivity around seepage lag and the effects of this on peak summer concentrations. Goldcorp describes what is seen in the field and how groundwater is built into the model already. The same principles are applied to antimony and nitrates. Attenuation has been applied only to arsenic, antimony, and nitrates. Uranium does not have attenuation applied.

- Q: SFN advisor notes that attenuation is assumed for arsenic, as a 75% reduction in arsenic is seen. Asks what this is driven by?
- A: Goldcorp replies that it has to do with the groundwater chemistry and the difference in chemistry of the recharge area and the discharge area.
- Q: SFN advisor asks if Goldcorp was applying attenuation to the three types of flow (runoff, interflow, and deep groundwater) in the model?
- A: Goldcorp explains that it is based on concentration, the groundwater story is clear as there is good data. With catchments like YT-24 that don’t see groundwater, that data cannot be used.
- Q: SFN advisor asks about the interflow component?
- A: Goldcorp explains that the comparison is in between groundwater and surface water concentrations, but isn’t a perfect dilution. It is based on a final calibration to the measured monthly water quality data.

Goldcorp reviews the conceptual water balance model for operations, explains Alpha Pond closure and water management, and reviews the HLF water requirements in early operations. Goldcorp discusses how an IR asked about the implications of using groundwater on the HLF, and timing of raincoats on the

HLF. Raincoats are going to be applied to the HLF to balance the water properly. There is ample capacity to use Kona water on the HLF.

Goldcorp reviews water balance model results for HLF draindown and passive closure and the pit water in closure. The leakage rate from Latte is dependent on the pit lake level, and Goldcorp explains how calibration of the groundwater model and the geology of the area generate these results. Goldcorp reviews the water quality predictions for the Project at HC 2.5 and CC 4.5 in operations, closure, and post-closure. Goldcorp describes the predictions for nitrate coming out of the passive treatment system.

- Q: SFN advisor asks what mining year Latte pit overflows, notes that the water quality model predictions don't include the Latte pit overflow.
- A: Goldcorp has carried out this modeling, but just doesn't show it in the powerpoint figure.
  
- Q: SFN advisor asks about the water quality objectives that are generic vs. the Site Specific Water Quality Objectives (SSWQOs).
- A: Goldcorp explains the parameters with generic WQOs.
  
- Q: SFN advisor asks about copper levels and if there is a relationship between copper and total suspended solids (TSS) concentrations?
- A: Goldcorp replies that there is a relationship in the Yukon River, like aluminum, but it is not TSS related. There is not a lot of TSS in Coffee Creek, and it's more related to dissolved organic carbon (DOC). There is a TSS and DOC influence on copper.

SFN advisor notes that copper, chromium, and iron are of contaminants of interest and under consideration for site specific water quality objectives. SFN advisor suggests also using dissolved concentrations to establish site specific water quality objectives. Goldcorp has had some discussions around this, and wants to continue these discussions. Goldcorp explains the dissolved and total ions are considered in the non-degradation streams. Goldcorp is considering the WQOs in terms of applicability, enforceability, and how they will work in operations and be protective. SFN advisor notes that dissolved copper should have a WQO; Goldcorp has one for Coffee Creek and Yukon River, but SFN advisor wants to see it considered for the other streams.

Goldcorp and SFN advisor discuss stochastic water quality modeling by year. SFN advisor recommends Goldcorp consider a truly stochastic sampling as opposed to repeating the set pattern of hydrology.

- Q: SFN advisor asks about TH's questions regarding solubility controls for certain parameters.
- A: Goldcorp explains that TH is looking to understand if Goldcorp is double counting solubility, and explains solubility controls in the model. TH asked for Goldcorp to run the simulation without attenuation, and Goldcorp did that.
  
- Q: SFN advisor asks about looking at the sensitivities of the system and the predicted receiving environment concentrations to the assumed solubility controls.
- A: Goldcorp replies that they can look at varying pH.

- Comment: SFN advisor suggests looking at sensitivity of the source term to the solubility controls in the model.
- Reply: Goldcorp agrees that this is a good idea.

### **Closure at Goldcorp Discussion:**

Goldcorp gives an overview of closure case studies within the company, and has a dedicated closure team. SEMS overview is delivered. Goldcorp describes the Coniaurum mine closure story, highlighting the ecosystem stability that was achieved, and had a lot of input from First Nations regarding plant species to use in reclamation. Marlin mine is discussed as an example of progressive reclamation. Goldcorp discusses the importance of discussing closure and the closure plan with SFN, other First Nations, and communities to identify gaps and improve the plan as time goes on. Social closure is an important aspect of the overall closure approach. Integral to this is First Nations involvement in development and throughout the Project in terms of the closure plan and approach.

- Q: SFN advisor asks about closure of San Martin mine, and if the intent is for the created foundation (organization) to be financially self-sufficient.
- A: Goldcorp explains that this is the intent, but haven't achieved that yet. Goldcorp will not walk away until it is self-sustaining.

Goldcorp and SFN advisors discuss closure planning:

- Goldcorp notes that integration of the social side into the closure plan is the next step after reviewing closure objectives.
- Goldcorp hopes to share the updated reclamation and closure plan in Q1-2018 in draft form for review and input before water licensing, but not for YESAB. This draft aims to include SFN's input received during consultation as well. The closure plan will be updated throughout the life of mine based on learnings from the site and through licensing. There will be much more detail in the upcoming version of the RCP.
- Goldcorp encourages SFN to take this request for input this back to Chief and Council to discuss how to have these discussions on closure.
- SFN advisors describes their experience in closure planning. SFN's experience has been varied, recently the experience has been relatively good. Minto has recently moved from a conceptual plan to something that is more solid. Water quality objectives for closure have been an aspect of this.
- SFN notes that recently they have noted that conversations at the table with SFN have been incorporated into the closure plan at Minto, and decisions in operations and operations costing that benefit closure are being made.
- SFN wants to see progressive reclamation.
- Goldcorp discusses the importance of hearing from the community about the closure plan and objectives.

- SFN notes that the changes with Minto weren't communicated to the community, and that caused problems. Proposed changes need to reach the community, and Citizens need that opportunity to say what they think.
- SFN notes that it is important to say what you are going to do in closure and describe closure actions. This is what Citizens will understand and be able to provide feedback on.
- Goldcorp agrees, and provides an example of wildlife, in terms of: asking the community if people want wildlife to use the area or to not use the area.
- Goldcorp notes that SFN advisors suggested an additional VC related to aquatic health in the previous workshop, that understanding and prioritizing VCs for closure will be an important part of engagement with SFN on closure. Goldcorp discusses the lack of clarity in Yukon regarding end land use responsibilities.
- SFN advisors emphasizes the need for plain language when discussing closure with the community, and concerns with the proponent asking leading questions of the community to get the answers the proponent wants. Goldcorp acknowledges the importance of communicating clearly.

Goldcorp discusses the regional TLUS being done with SFN for the area that includes Coffee:

- Goldcorp explains that the TLUS can inform the Project's closure plan and discussions to come.
- Goldcorp notes the importance of having conversations now, and working together with SFN's technical team to build trust in the community.
- SFN highlights how trust is required to have conversations about contaminants, and how First Nations are frightened by the contaminants at the site.
- SFN Citizens are concerned about the health of the people and people's food. This is very important. Environmental integrity is non-negotiable.

### **Closure Discussion:**

SFN advisors and Goldcorp discuss the definitions of active closure and post mining closure. Goldcorp will make the phases clearer in the next iteration of the closure plan. Goldcorp reviews the figures that show the reclamation and closure activities and describes the closure activities across the site.

SFN advisors relay to Goldcorp their concerns regarding leaving a large WR facility uncovered at closure.

Goldcorp and SFN advisors discuss the material types at site related to closure, specifically in relation to material that could potentially be used to cover the Alpha waste rock dump:

- Notes that there's a difference between available organic material and cover material.
- Goldcorp confirms this and discusses the different material types at site. Each rock type has a different soil type above it and Goldcorp describes these soil types. Schist produces the most promising soil type for stockpiling.
- SFN advisor notes that the most promising area for salvaging material is from the Alpha WRSF footprint.

- SFN advisor notes that there is a difference between the topsoil and the overburden material that can be used for cover.
- Goldcorp notes the biggest areas for salvaging cover materials comes from pre-stripping for Supremo Pit, then the Latte Pit, and the HLF footprint.
- Goldcorp notes that it is not ideal to move material if it isn't needed. There needs to be an evaluation of cost-benefit for covering the WRSF – if covering it doesn't achieve less infiltration, then the only benefit of covering the WRSF is aesthetic. If Goldcorp has the material to cover it, then that will happen. The level of the design of the WRSF is at a point where the amount of cover required and benefits are unknown.
- Goldcorp and SFN need to discuss and agree on closure objectives and closure criteria that both parties are comfortable with.
- Goldcorp commits to providing more clarity in the closure plan regarding the possibility of covering the WRSF. For example, overburden hasn't been characterized to the point where it is known if it can be used for cover.
  
- Comment: SFN advisor notes that it would be a waste to bury organic material under Alpha WRSF.
- Reply: Goldcorp replies that it depends on the cost and the competency of that organic material to determine if there will be any benefit to excavating under Alpha WRSF. Work is being done currently to determine what that organic material looks like within the Alpha WRSF footprint.
  
- Comment: SFN advisor highlights that once the material is covered by the WRSF, it's gone.
- Reply: Goldcorp agrees, and describes how considerations of cost, closure objectives, and other factors need to be considered. For example, if the organic material only reduced infiltration by 5%, it will not be practical.
  
- SFN advisor states that Goldcorp will have to evaluate the potential of the organic material below the WRSF, Goldcorp agrees. SFN advisor outlines that cumulative effects, uncertainty, and ongoing leaching from the WRSF are concerns for SFN.
- Goldcorp discusses that the closure scenarios will be assessed. SFN advisor states that if Goldcorp is going to bury organic material under WRSF, there needs to be very good justification.

Goldcorp discusses reclamation research going on at site and for the Project:

- There is a lot of research to be done regarding revegetation at site, and this is in collaboration with University of Saskatchewan. Goldcorp has plans to be more strategic about the upcoming reclamation research.
- Goldcorp describes upcoming research, notes that post mining site prescriptions for revegetation haven't been determined yet because it is premature at this point.
- SFN advisor notes that if a First Nation wants to see the site returned to what it is now, then it's not premature. Goldcorp acknowledges the point being made, and outlines that further research needs to be undertaken to inform such prescriptions.



- Q: SFN advisor asks if the goal is to revegetate the site directly?
- A: Goldcorp replies that revegetation trials have been conducted in disturbed areas and areas of exploration. Nothing done specifically on core cuttings or bulk samples that would emulate waste rock. Goldcorp notes that there are lots of opportunities to try to grow vegetation on waste rock, once waste rock is available.

Goldcorp discusses cumulative disturbance areas for the Project, and notes that areas that overlap have been double counted to provide a conservative estimate. The estimates also include buffers around infrastructure and facilities to allow for some flexibility in the design or location of mine components, thereby incorporating additional conservatism. These estimates will be refined over time as the mine plan progresses. SFN is happy to hear that this is how it is reported.

SFN and Goldcorp discuss rinsing the HLF for closure:

- SFN advisor notes that there is a wording discrepancy in the Project Proposal saying that the HLF solution has been detoxified for use during the initial rinsing phase. This is not the case.
- Goldcorp clarifies the wording that should be used, which is pH adjusted water.
- Goldcorp clarifies the rinsing schedule and approach for the HLF. SFN advisor is not sure how this fits into the water balance.
- Goldcorp notes that the Mines Group completed the HLF balance and that Lorax completed the site wide water balance.
- Goldcorp explains the water treatment plant distinction (water treatment for rinsing and water treatment for discharge) and the plans for discharging treated water.
- SFN advisor notes that they assume that Goldcorp is going to take the water from the rainwater ponds for rinsing, and summarizes concerns with availability of clean water for rinsing.
- Goldcorp notes that this has been accounted for, as some of the rainwater rinse water goes back to makeup. Goldcorp is not adding two additional sources of water.
- SFN advisor thinks Goldcorp will have not enough rainwater and too much “used once rinse water”.
- Goldcorp replies that there is expected to be too much rainwater and explains the pumping rate and raincoat deployment options. Goldcorp highlights that the water balance model is being updated and will include more HLF details for the next iteration. The points SFN has brought up are the same reason why Goldcorp proposes to build the water treatment plant before it is expected to be needed, to handle these uncertainties.
- SFN advisor notes that there’s a rest period required for the rinse, and that there’s times of year that rinsing can’t occur, adding to the complicating factors.
- Goldcorp notes that the water balance for the HLF isn’t at the point where it incorporates that kind of detail.
- SFN advisor notes that the progressive phasing of HLF closure will be a challenge.
- Goldcorp agrees, and notes that the significant amount of storage is one potential way to handle that uncertainty.

SFN and Goldcorp discuss the water quality coming from the HLF and the passive treatment proposed:

- Goldcorp summarizes water quality from the HLF, noting that the key elements of concern are nitrate and arsenic in HLF draindown. Goldcorp describes the semi-passive treatment system to be used in conjunction with in situ treatment.
- Goldcorp describes the research program that will be required to advance the design of semi-passive treatment. This would involve column testing in the laboratory and evaluating different organic carbon sources and matrices to be used in treatment.
- Goldcorp discusses zero-valent iron permeable reactive barriers as an option. It works as a reduction system. Zero-valent iron is quick to remove nitrate as well, but it converts it to ammonium, which is more toxic. There is a lot of work to be done on researching this, and it needs to look at it at a site-specific level. Goldcorp also needs to look at availability of material, such as organic carbon, and discusses some opportunities at site to acquire organic carbon.
- Q: SFN advisor comments that nitrate is likely to be finite as a post-closure source term (e.g. eventually it will be exhausted out of the system)
- A: Goldcorp agrees.
- Q: SFN advisor asks about Arsenic.
- A: Goldcorp replies that the arsenic will be retained on the zero-valent iron.
- Comment: SFN advisor notes that the arsenic source could continue in to perpetuity; hence it has implications on maintenance of passive treatment system.
- Reply: Goldcorp replies yes.

#### **HLF Closure Discussion:**

Goldcorp describes the HLF reclamation and closure activities. Goldcorp notes that the cover over the GCL is required to route water off of the GCL-covered heap.

- Q: SFN advisor asks why Goldcorp is not lining the slopes of the HLF in closure?
- A: Goldcorp replies that it has to do with the slope angle and difficulty with maintaining a stable cover on the slopes. Potential for the cover to be unstable due to low friction angles. Goldcorp also notes that regrading and making shallower slopes to allow for cover placement would mean that some material would be pushed off of the current lined area of the HLF.

SFN advisors and Goldcorp discuss the potential for reducing infiltration of water into the HLF with a cover:

- Goldcorp and SFN advisors further discuss re-sloping of the HLF. SFN advisor notes that regrading would need to coincide with the rinsing schedule.
- With respect to some rinsed heap material being graded to outside of the current lined area, SFN advisor notes if the material was well rinsed and the grading allowed for placement of a

cover over the full heap this might be an appropriate trade off to consider to reduce long term infiltration through the slopes.

- Goldcorp and SFN advisors discuss progressive reclamation as it relates to rinsing. Final closure would include regrading and capping.
- SFN advisor notes that covering more of the HLF with GCL or other low permeability cover material provides the opportunity to better manage the water and greatly limit the amount of seepage potentially needing polishing treatment.
- Goldcorp notes an action item to look at the potential for 3:1 slopes on the HLF as a closure configuration.
- SFN advisor and Goldcorp discuss using a GCL cap instead of using an HDPE liner. Goldcorp wants to use GCL as it is a natural material; does not degrade with UV light and there is little risk of frost/freezing damage or penetration by tree or plant roots. If the cover soil over the GCL is coarse and there is a lack of trees (due to elevation of the HLF) this further support the idea that a GCL is a good cover option.
- Goldcorp describes the capping plan for the HLF, and the drainage design. Goldcorp indicates that considerable thought will need to be given to ensuring proper drainage off the covered HLF.
- SFN advisor notes that this is also an area of opportunity to design the drainage network into the cover design (landform design) rather than the current perpendicular drainage system as currently proposed.
  
- Q: SFN advisor asks about experience using GCL as a cover?
- A: Goldcorp notes that there are several successful applications. GCL can handle facility settlement as well.

### **WRSF Closure:**

Goldcorp and SFN note the discussions from the previous day regarding WRSF closure:

- SFN advisor reiterates the request for a study on the WRSF geometry.
- SFN advisor is also looking for a quantitative analysis of the improvement of infiltration reduction with cover vs no cover.
- Goldcorp notes that material characterization is a key part, then will be able to look at infiltration rate and changes to model, and then be able to consider a detailed energy balance model after the physical characteristics of the cover are better defined.
- SFN advisor suggests looking at geotechnical work to date to look at this information.
- Goldcorp can look at a “what if” analysis.
- SFN advisor notes that there are alternatives for the WRSF configuration design, and SFN wants to see the analysis that supports what Goldcorp presents in the Project Proposal.
- Goldcorp will create a work plan to address multiple points raised by SFN. Goldcorp is looking at the WRSF from a conservative effects assessment approach in the Project Proposal; Goldcorp is happy to look collectively at ways to reduce the effects of the Project, but that for the Project Proposal, the analysis on the conservative scenario is appropriate.

- SFN advisors understands Goldcorp's approach on this, but it is an issue with every project proposal with respect to significance.
- Goldcorp agrees with SFN advisor that there are opportunities to do better than what is proposed in the Project Proposal in regards to closure, but notes that it is irresponsible to propose something that Goldcorp cannot guarantee at this point.
- Goldcorp will evaluate the potential for cover material as discussed in this meeting. Goldcorp will include detail in the YESAB submission about the approach to covers.
- SFN advisors notes to add in information about reclamation research.

Goldcorp asks SFN to think about how SFN will want to get updates from the Project, SFN suggests through the Fish and Wildlife officer and SFN Lands Committee.

Goldcorp discusses monitoring programs for closure:

- Q: SFN advisor asks if there is an air quality and dust monitoring program as well?
- A: Goldcorp notes that this is in operations and wasn't planned for closure at this point. If there is a need for this in closure, Goldcorp will do it. Goldcorp will also be doing physical monitoring of facilities in closure.

Goldcorp discusses the closure adaptive management plan for the Project, noting that Goldcorp is considering modeling Minto's adaptive management plan to a certain extent, and asks SFN for feedback:

- SFN advisors do not have substantial concerns with the approach taken, but concerns with the response to changing conditions – and the delay in getting to real responses.
- SFN advisor also notes that the Minto plan is complicated with the tiers, it needs to be able to be implemented. The idea is to identify things proactively.
- Goldcorp's other approach is to focus on areas that adaptive management matters most. Goldcorp asks for good examples to be passed along from SFN.
- SFN advisors notes that the closure adaptive management plan for Minto was better than the operational one.
- Goldcorp agrees that adaptive management is for areas of uncertainty.
- SFN advisors thinks the staged approach (in the AMP) is fine, but that there are too many stages with Minto's. SFN advisors notes that the monitoring plan needs to be able to detect the changes that the adaptive management plan is associated with.
- SFN advisors states that there must be an organizational commitment to doing something, rather than just reporting on it.
- SFN advisors states that the baseline data needs to meet the needs as well for management.
  
- Q: SFN advisor asks about the closure pit water system, noting that there have been comments about the complex system with discharges, and need for simplification.
- A: Goldcorp replies that the topography of the site makes it challenging. The Coffee Mine is unusual with its pit orientation, and how the pits are draped over the ridges. This creates local bottoms that need to be managed. The pit shapes are created by where the ore is, so simplifying

pit shapes is difficult. Goldcorp tried to simplify the Project design in terms of water quality by consolidating waste material in one WRSF. Goldcorp notes that there are ways to consider water management and monitoring.

- Q: SFN advisor asks about backfilling?
- A: Goldcorp is completely backfilling Double Double and Kona, and parts of Supremo and Latte. Goldcorp is also looking at the geochemical aspect of backfilling all pits. As mining progresses, Goldcorp will look for additional opportunities for backfilling, but this cannot be committed to in the Project Proposal at this stage.

Goldcorp asks if there are any particular questions about the NAR, and SFN notes that this will be discussed during the wildlife workshop. SFN advisors note that during the NAR tour, Goldcorp's engineer for the NAR appeared to have a good handle on engineering the road for water management and effects for water. SFN's big issue on the NAR is wildlife management.

SFN advisors summarize their short-term topics of interest:

- SFN technical people are interested in water management
- SFN would like to see consultation notes in draft form for comment
- SFN advisors suggest that Goldcorp considers water quality objectives for operations that are different from closure, and consider discussing the possibilities if there are two different sets of objectives applied
- SFN advisor asks that Goldcorp consider an Aquatic Health VC, name to be determined, ensuring that Goldcorp has the baseline data needed to monitor and evaluate this as part of the AMP during all phases of the project. SFN notes that an example is Halfway Creek sampling numbers where fish populations were dominated by Slimy sculpin, Arctic grayling and juvenile Chinook respectively in different sampling years. SFN notes that Goldcorp needs to develop the aquatic health indicator and consider if Goldcorp has the necessary baseline data for the appropriate baseline sites and stations and control streams.

### **Feedback Discussion:**

Goldcorp asks SFN to provide specific recommendations on the baseline and best way to move forward. Goldcorp explains that this can be in written form, or however SFN wishes to communicate this to Goldcorp:

- SFN advisor thinks aquatic invertebrates are a key factor in determining aquatic health including abundance and diversity overall and for key fish food organisms. There is some fish data in the Project Proposal that SFN advisor has reviewed but this needs to be assessed for adequacy as baseline data for the monitoring and AMP.
- SFN advisor wants to look at how to make the proposed VC functional in terms of adaptive management. Goldcorp notes that this will come into play in the draft of the aquatic monitoring and associated adaptive management plan.



- Goldcorp states that the benthic invertebrate data and periphyton information has gotten better in the past year. This can improve, and Goldcorp looked at reference sites this year. This is ongoing work, setting up good reference sites.
- Goldcorp is also looking at ways to collaborate with Casino on reference sites. Goldcorp encourages SFN to raise points about the baseline now.
- SFN advisor notes that if there are gaps in the baseline, there is still time to do the relevant data collection.
  
- Q: SFN advisor asks about high intensity water sampling events which were previously recommended (5 in 30 day sampling events), did these happen?
- A: Goldcorp replies that the original thought was to have this in the spring freshet. Goldcorp is committed to doing it, and suggests doing it in July/August, as peak flows are not the key time to do it. Goldcorp suggests other methods of reference systems over time.

Goldcorp and SFN advisor discuss the DFO database for finding similar habitats for reference sites. SFN advisor adds that there was baseline collected at the bottom of Halfway Creek, but not sure about higher up. It is important to have this for reference.

#### **Conceptual Water Management Discussion:**

One SFN advisor had missed that operational discharges (pit dewatering) to Latte Creek were proposed (it was assumed that these would be directed to Halfway Creek). Goldcorp displays the conceptual water management graphic and explains where water goes in operations and closure. Pit dewatering will happen in operations only. Where appropriate, there will be diversions to keep water from going into pits during operations as well.

Goldcorp is re-evaluating the routing of non-contact water that is approaching the WRSF; and is looking for ways to guide it away from the WRSF. The current assumption is that it all passes through the underdrain. Goldcorp and SFN advisors discuss the potential for infiltration into the WRSF, and SFN advisor suggests considering additional surface diversions, notes it's better to go through the rock drain than through the WRSF. Goldcorp notes that there are challenges with going around the WRSF due to the topography and the locations where water can flow by gravity

Goldcorp highlights for SFN that they are open to ongoing discussions around water management.

A SFN advisor notes that with the GCL cover over the entire HLF it could be fine with a rock cover over it, rather than being re-vegetated. This is a trade-off (reducing infiltration but giving up revegetation). It would also allow Goldcorp to use the finer cover soils that are proposed for the heap for re-vegetation on WRSF. Goldcorp will consider this.

End of meeting 4:30 pm.



# Coffee Gold Mine Closure Workshop

Selkirk First Nation and  
Goldcorp

September 20, 2017



# Conceptual Reclamation and Closure Plan

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Plan developed in accordance with industry best practice, and was informed by Yukon regulatory, policy, and guidance requirements.

- **Overall closure objective** – by implementing a technically feasible plan, to permanently close the mine with minimal long-term monitoring and maintenance.
- **Key strategies for successful closure include:**
  - Early and ongoing community and regulatory engagement;
  - Designing for closure, including reclaiming disturbed areas progressively during the Operation Phase;
  - Reducing affected water and controlling contaminants at source; and
  - Planning for long-term monitoring and maintenance, while minimizing long-term operational activities.

# Reclamation and Closure Objectives

Value	Coffee Gold Mine Reclamation and Closure (R&C) Objectives
Physical Stability	Structures and facilities perform in accordance with designs (including withstanding severe climatic and seismic events).
Chemical Stability	Release of contaminants do not cause unacceptable exposure in the receiving environment.
Health and Safety	Eliminate or minimize adverse health and safety effects on the public, workers and area wildlife.
Ecological Conditions and Sustainability	Protect the environment from degradation and restore a self-sustaining biological community to achieve land use objectives for the mine site.
Land Use	Lands are restored to pre-mining conditions typical of surrounding areas or provide for other land uses that meet community expectations. Site access is consistent with community land use expectations.
Aesthetics	Restoration outcomes are visually acceptable.
Socio-economic Expectations	Avoid or minimize adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits and achieving outcomes that meet community and regulatory expectations.
Long-term Certainty	Minimize the need for long-term operations, maintenance and monitoring after R&C activities are complete.
Financial Considerations	Minimize outstanding liability and risks after reclamation activities are complete.

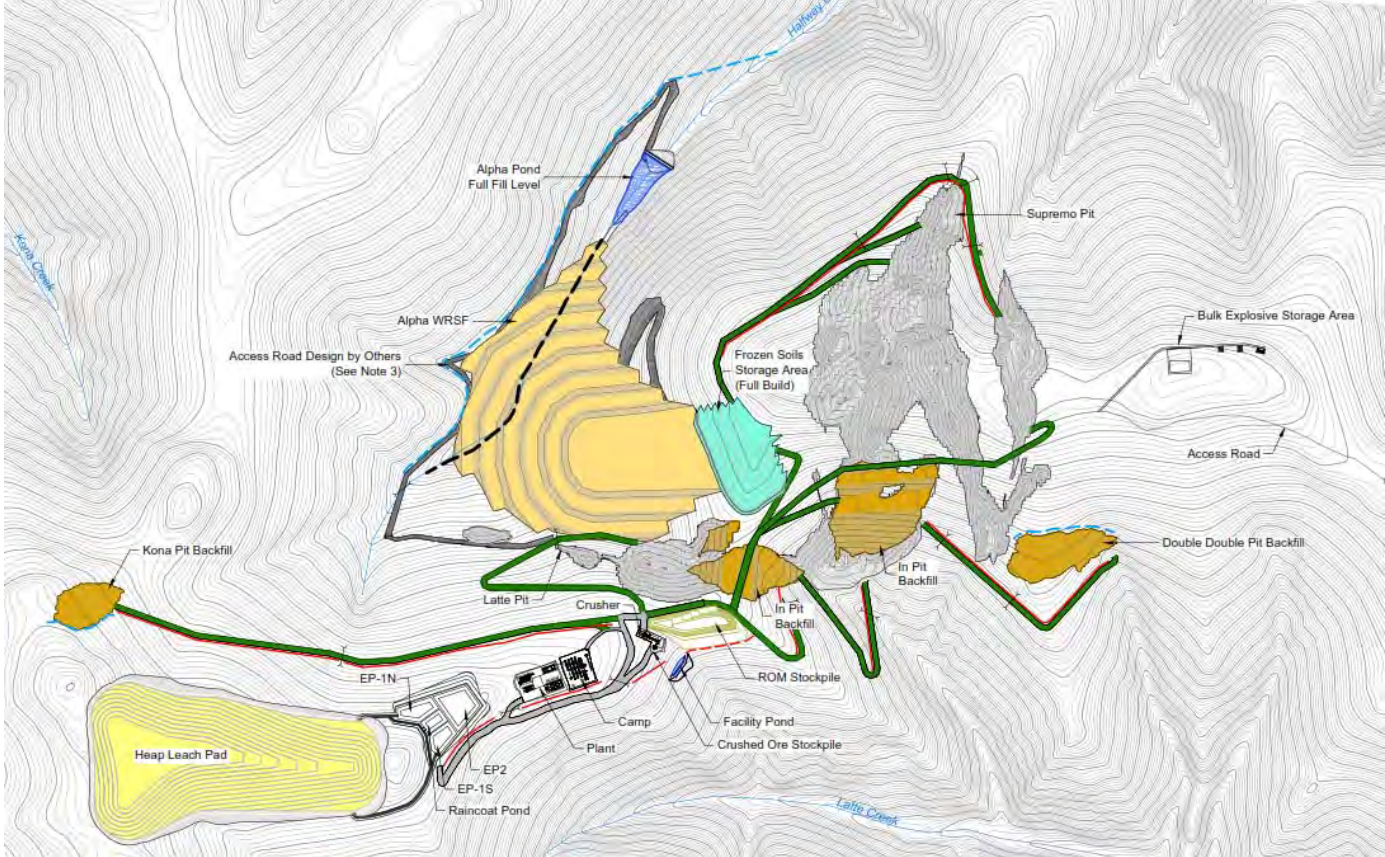
# Closure Stages and Schedule of Activities

Phase / Activity	Project Year																										
	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>CONSTRUCTION PHASE</b>																											
Northern Access Route Construction																											
Mine Site Construction																											
<b>OPERATION PHASE</b>																											
Mining (including pre-production)																											
Ore Processing (including pre-production)																											
Heap Leach Rinsing																											
Operational Closure																											
<b>RECLAMATION AND CLOSURE PHASE</b>																											
Water Treatment																											
Reclamation and Decommissioning																											
<b>POST-CLOSURE PHASE</b>																											
Ongoing Monitoring																											



# End of Operation Phase in Year 12

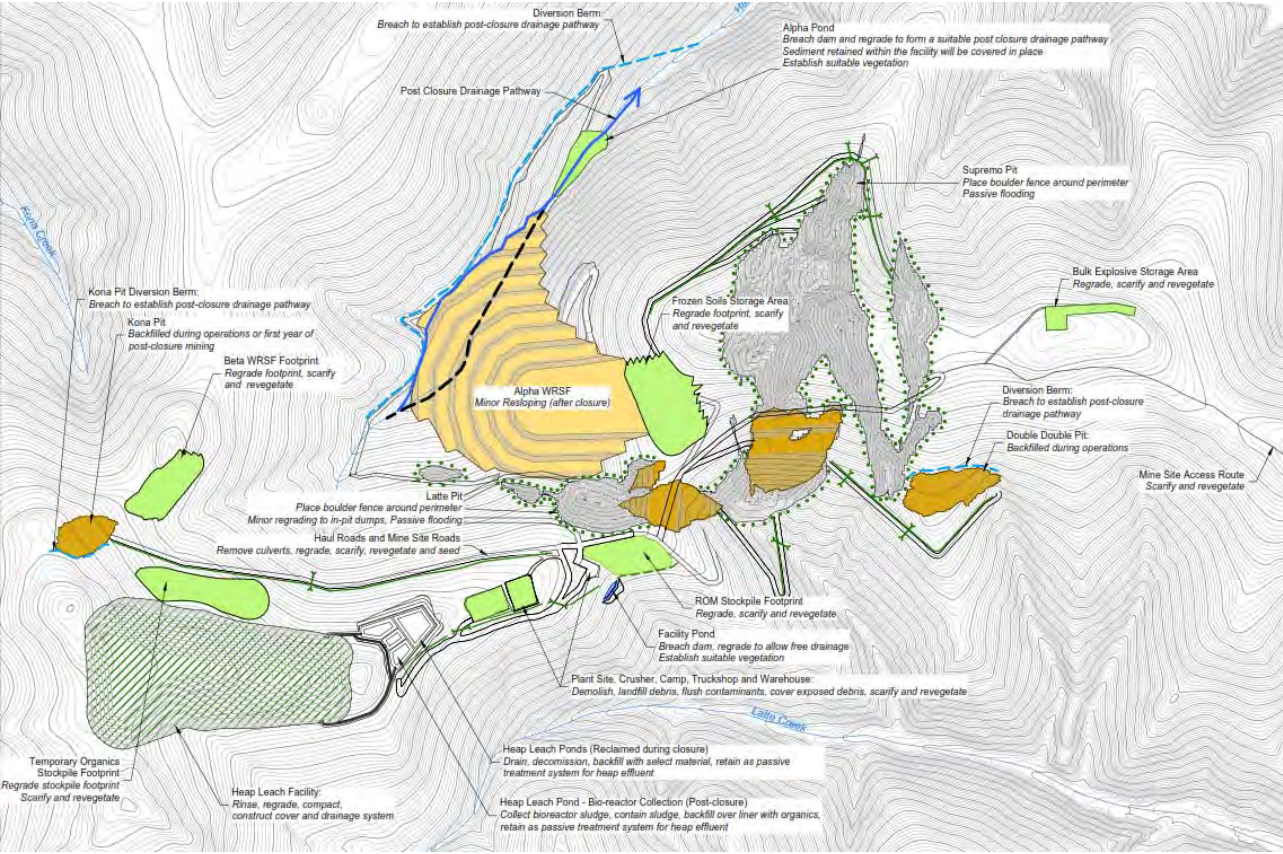
- Legend**
- Diversion Berm
  - Rock Drain
  - Road Drainage Ditch
  - - - Waste Rock Collection Channel
  - Active Pit
  - Frozen Soils Storage Area
  - Pit Backfill
  - Pit Footprint
  - Sedimentation Pond
  - Waste Rock Storage Facility
  - Heap Stack
  - Access Road
  - Haul Road
  - Culvert





# Post-mining Closure Stage R&C Activities (Year 13 to 18)

- Legend**
- Diversion Berm
  - Rock Drain
  - Reclaimed Road Diversion Ditch
  - Reclaimed Waste Rock Collection Channel
  - Reclaimed Footprint
  - Reclaimed Heap Leach Pad
  - Pit Backfill
  - Pit Footprint
  - Sedimentation Pond
  - Waste Rock Storage Facility (WRSF)
  - Removed Culvert Alignment
  - Boulder Fence



## Post-mining Closure Stage R&C Activities (Year 13 to 18)

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### Activities during the first stage of the Reclamation and Closure Phase:

- Complete backfill of Kona pit and closure of associated haul roads
- Reclamation of disturbed areas no longer required to support closure activities
- Equipment removed from service when no longer needed
- Excavation/management of contaminated soil
- Reclamation of Latte Pit, Supremo Pit, Alpha WRSF (including frozen soil storage area), and Beta WRSF footprint area
- Reclamation of the temporary organic stockpile area once depleted and reclamation of the ROM stockpile area
- Continued water treatment of drain-down rinse water from closed HLF stages until heap rinsing is complete, then reclamation and closure of water management structures
- Dismantling and removal of Plant Site and Camp Site buildings, and supporting infrastructure
- Decommissioning and reclamation of new sections along the NAR and the Project airstrip at the end of this stage

### Monitoring:

- Routine monitoring in accordance with mine operating licenses, and monitoring of reclaimed areas

## Active Closure Stage R&C Activities – (Year 19 to 23)

8

Activities during the final stage of the Reclamation and Closure Phase:

- Dismantling and/or removal of remaining infrastructure and equipment
- Reclamation of remaining disturbed areas within the Mine Site footprint
- Continued water treatment until HLF effluent is of suitable quality for discharge











Monitoring:

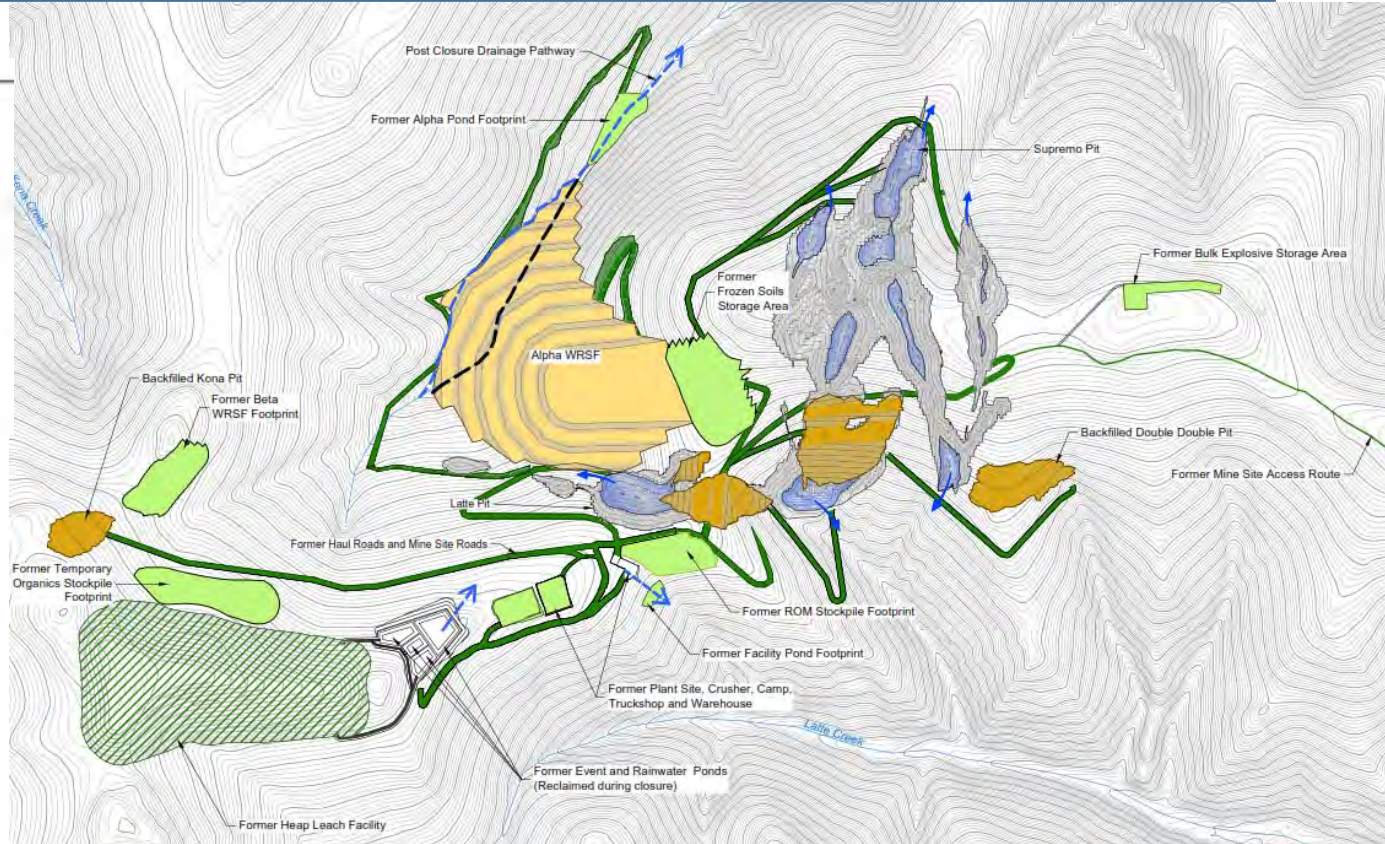
- Monitoring undertaken to observe progress towards closure objectives





# Active Closure Stage (Year 23)

- Legend**
-  Rock Drain
  -  Reclaimed Footprint
  -  Reclaimed Heap Leach Pad
  -  Reclaimed Haul and Mine Site Roads
  -  Pit Backfill
  -  Pit Footprint
  -  Pit Lake
  -  Waste Rock Storage Facility (WRSF)
  -  Pit Outflow Direction
  -  Flow Direction





## Post-closure Phase (Year 24 onward)

10

### Activities:

- None planned – reclamation and closure activities are complete

### Monitoring:

- Monitoring will be reduced as performance criteria are met and reclamation and closure objectives are achieved



# General Reclamation Measures and Practices

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- **Salvage and stockpile organic material and topsoil**
  - Salvage from footprints of open pits, heap leach pad, infrastructure foundations (~1.5 Mm<sup>3</sup>)
  - Store in temporary organics stockpile near heap leach pad
- **Implement erosion and sediment control measures**
  - Minimize size of disturbed areas and retain vegetation cover and buffers where possible
  - Limit work on unstable areas, slopes, on permafrost where possible
  - Install perimeter sediment controls
- **Progressively reclaim and revegetate disturbed sites to minimize erosion and prevent establishment of invasive plants**
  - Implement prevention and control measures for invasive plant (e.g., surveys, equipment monitoring, removal and incineration, targeted herbicide application)
- **Dispose of waste materials properly and remediate contaminated areas (as necessary)**
- **Ongoing reclamation research programs**

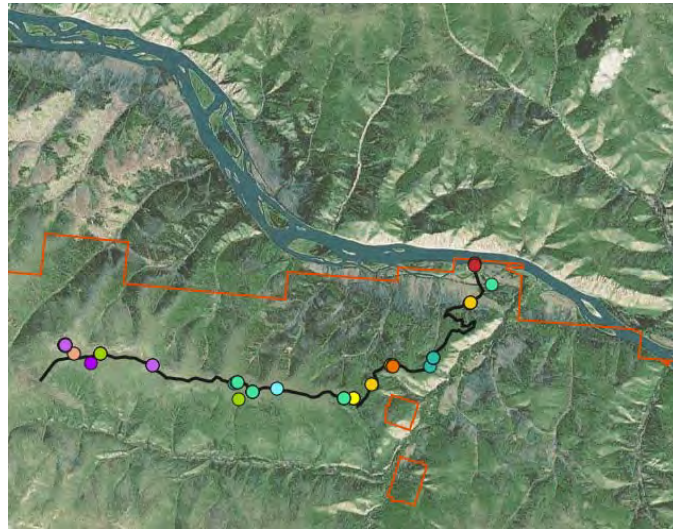
# Ongoing Reclamation Research Programs

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**Objective** – to inform and refine R&C plans to return the mine site to a state as near as possible to that in existence pre-mining.

## 1. Revegetation Reclamation Research Program

- 2013 to current - investigating basic site prescriptions at demonstration sites and monitoring plots established in areas disturbed during exploration activities
- Seed Collection, Inventory and Mapping Program – to determine target plant species for site restoration
- Training program partnership with Tr'ondëk Hwëch'in and the Yukon College
  - Introduction to Environmental Monitoring Pilot Project
  - Northern Terrestrial Restoration (NTR)
- Yukon Research Centre (and NTR) – 2 trials:
  - Revegetation and soil amendment trials
  - Greenhouse trials
- Establish/support a nursery to grow native species



## 2. Proposed Plant-soil Interaction Studies

- Characterize the plant-root interface (rhizosphere) of native plants that are potential candidates for restoration
- Examine use of local peat as a soil amendment
- Establish a three-year field trial at disturbed sites in subalpine areas

## Heap Leach Facility (HLF)



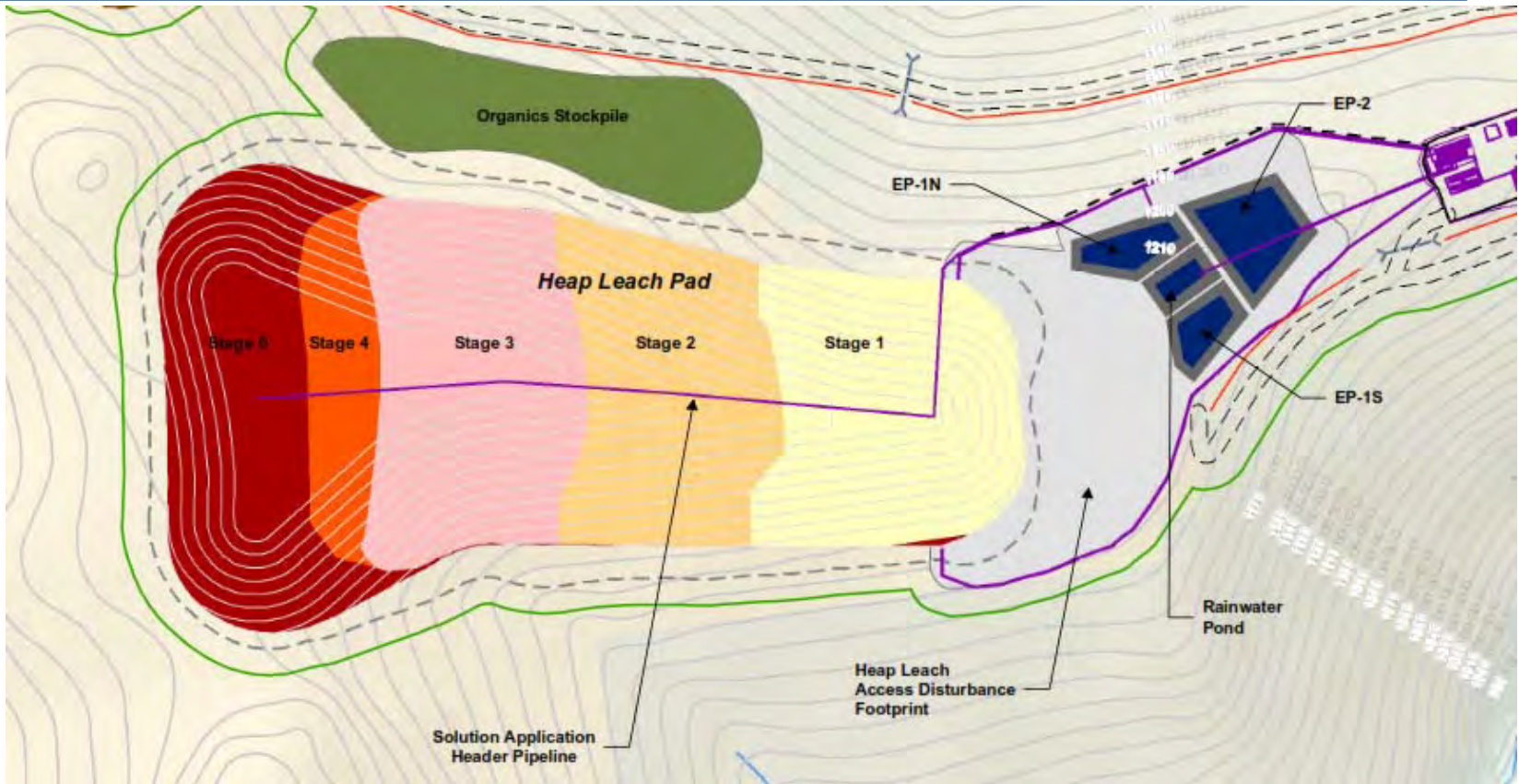
### Goals:

1. Effectively manage transitional solutions and draindown to achieve suitable final heap leach conditions
2. Ensure long-term physical stability





# Heap Leach Facility and Process Ponds: Layout



### 1. **Control of transitional solution management** achieved through:

#### a) **Progressive rinsing** of the heap and collection and treatment of rinse fluids:

- I. Preliminary rinsing starting in Year 4 of leached ore using pH-adjusted barren solution for removal of cyanide
  - i. Final rinsing with fresh water and/or treated rinse solution to reduce contaminant concentrations to levels acceptable for direct discharge
  - ii. Surplus water treated via water treatment plant from Year 9 to ~Year 15 (possibly to Year 20 depending on treatment circuit performance) with discharge to Halfway Creek drainage

b) Use of **geomembrane covers** (raincoats) and **progressive grading** the heap and capping to limit infiltration and reduce heap seepage volumes

c) Implement, if necessary, passive treatment using **permeable reactive barriers** for polishing of heap solutions within event ponds prior to release to the environment

# HLF: Specific Reclamation and Closure Activities

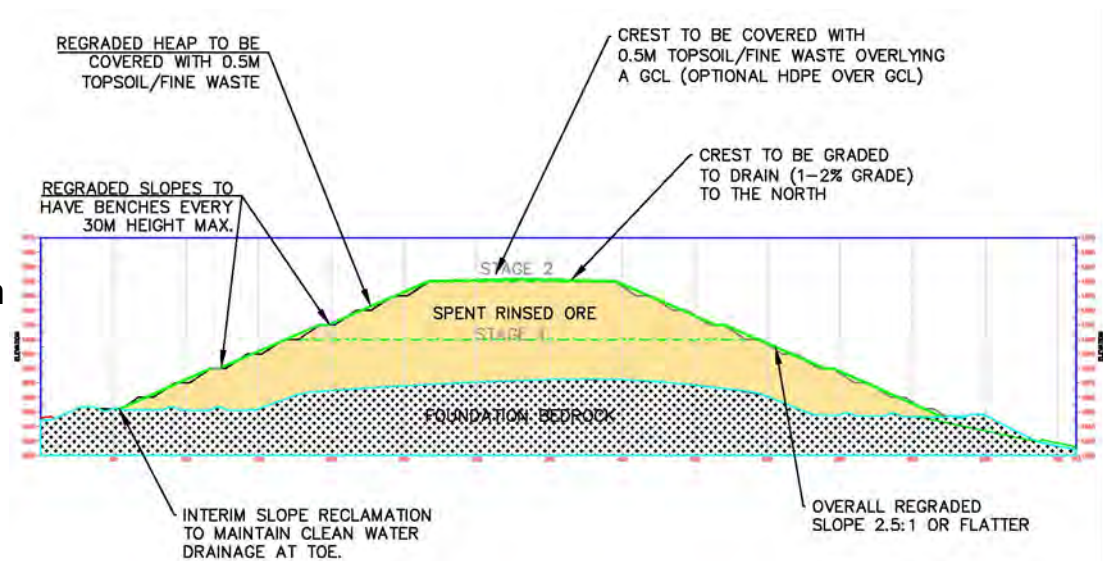
2. **Long-term physical stability** achieved through stable foundation and pad construction according to geotechnically-stable design

## Grading the heap

- Grading and rinsing can be done concurrently
- Capping completed progressively after rinsing and grading are complete

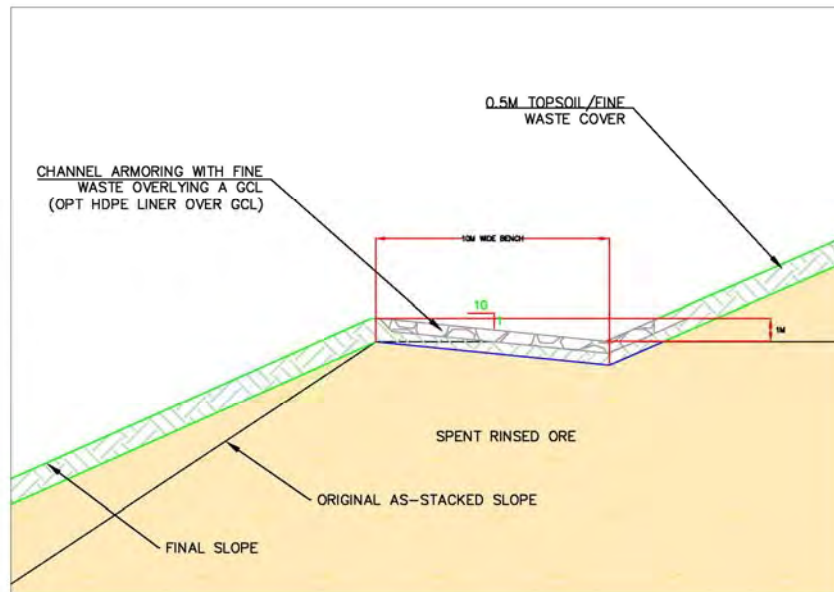
## Capping the heap - engineered cover design for:

- Ensuring physical stability
- Reducing infiltration and minimizing creation of saturated zones
- Routing runoff away from heap



# HLF: Grading of Heap

- Grading to consistent 2.5:1 slope with armored channels to control run-off

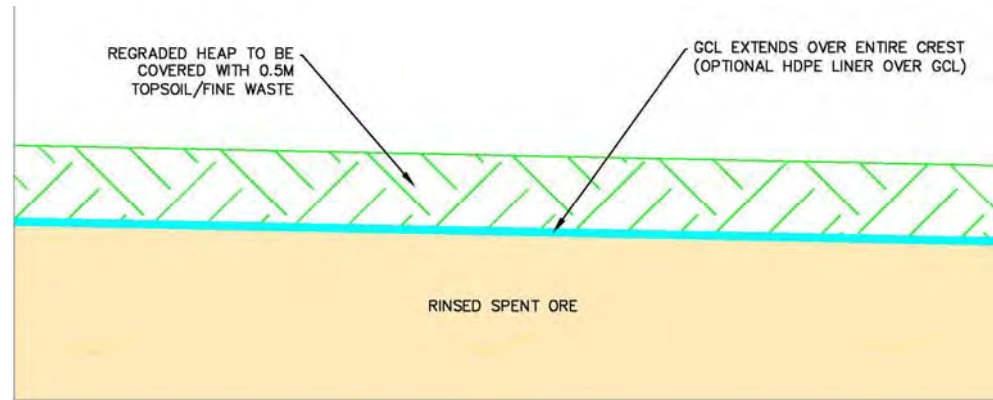




# HLF – Heap Capping System

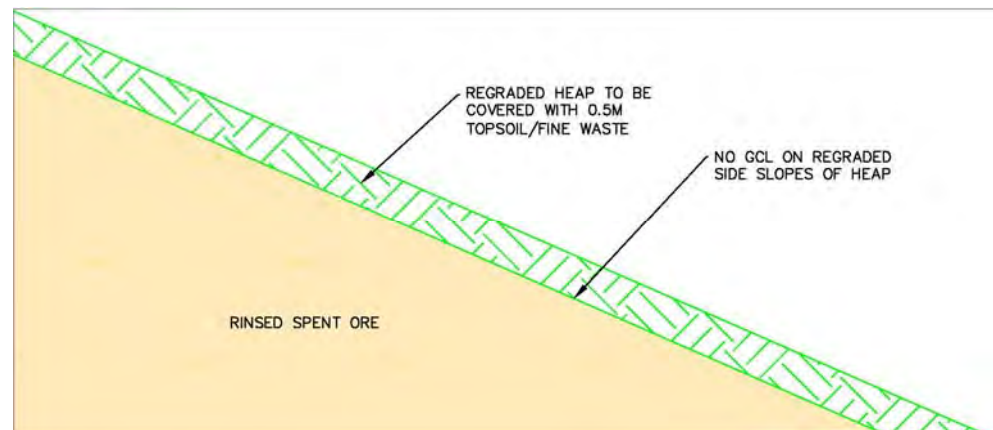
## Crest & Benches:

- Slope to drain
- Compact upper 1 m of ore
- Geosynthetic clay liner (GCL) – optional HDPE liner over GCL
- Cover with 0.5 m topsoil/fine waste rock



## Slopes

- Benches every 20-30 m vertically
- Compact upper 1 m of ore
- Cover with 0.5 m topsoil/fine waste rock





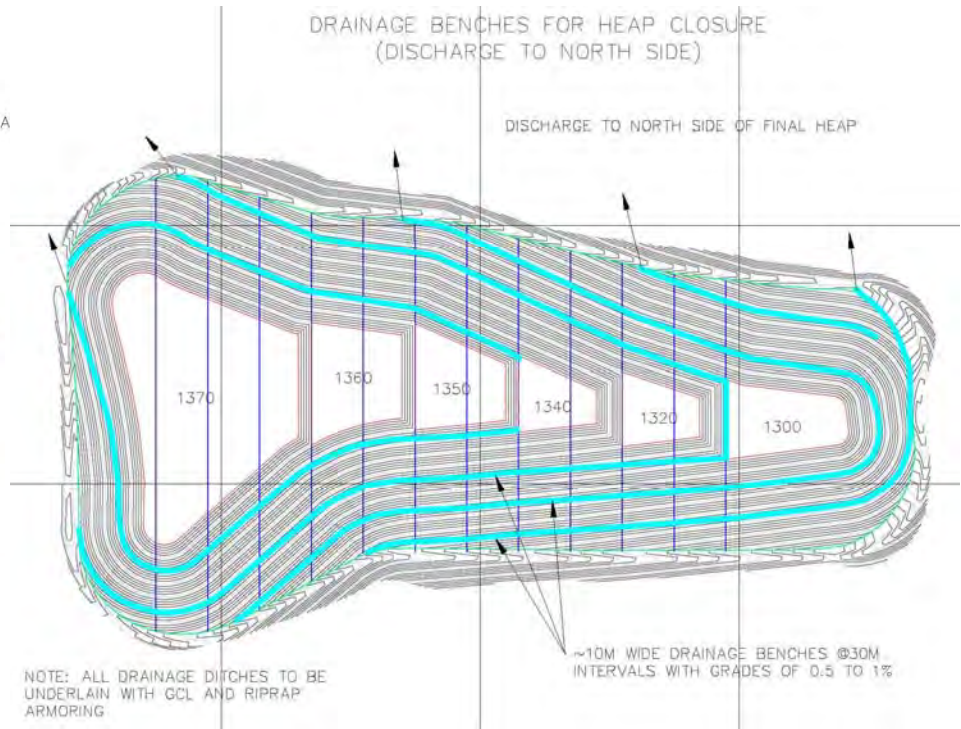
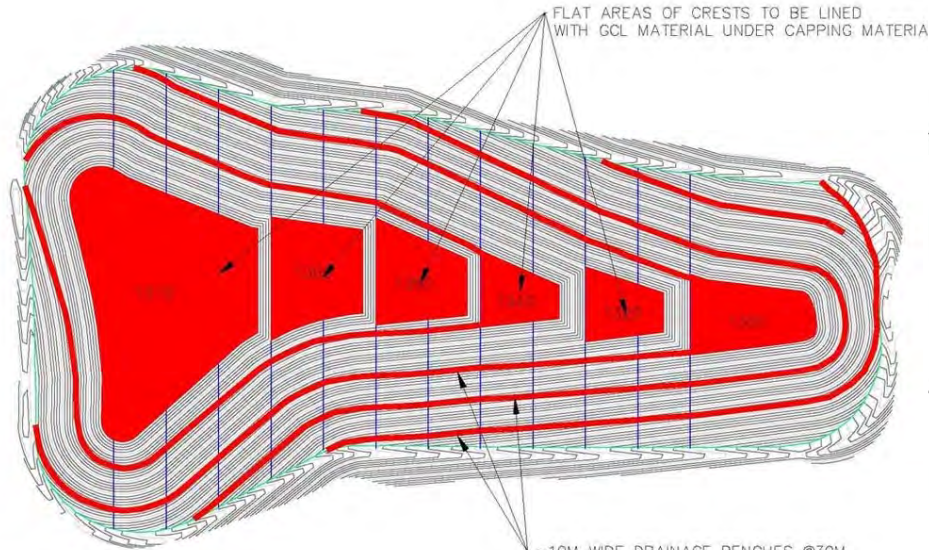
# HLF – Capping of Heap

GCL cover (red) installed on crests and drainage benches

Surface drainage ditches (blue) drain north

GCL INSTALLATION FOR CRESTS AND DRAINAGE BENCHES

DRAINAGE BENCHES FOR HEAP CLOSURE (DISCHARGE TO NORTH SIDE)



NOTE: ALL DRAINAGE DITCHES TO BE UNDERLAIN WITH GCL AND RIPRAP ARMORING

~10M WIDE DRAINAGE BENCHES @30M INTERVALS WITH GRADES OF 0.5 TO 1%

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~10M WIDE DRAINAGE BENCHES @30M INTERVALS WITH GRADES OF 0.5 TO 1%

## HLF - Process Ponds R&C Activities

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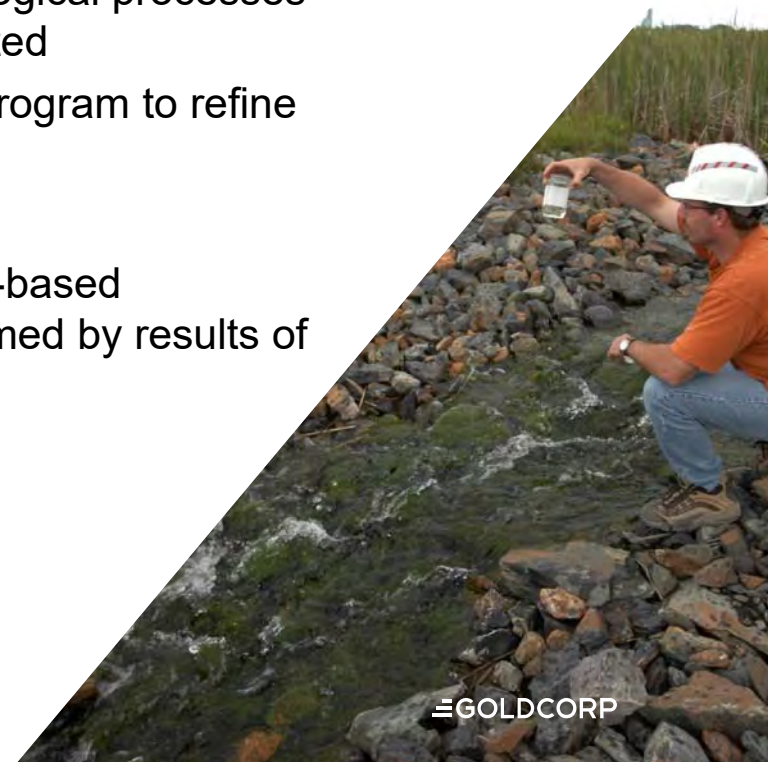
- For two or three of the four process ponds, the closure activities will include:
  - Drain the pond and wash the pond liner, with wash water recycled for preliminary heap rinsing
  - Perforate the liner at the bottom of the pond
  - Fold the liner from the slope and anchorage into the pond, and,
    - Fill the empty pond with selected material (e.g. zero valent iron, coarse organic composted wood chips from tree clearing, suitable geologic materials) to serve as contingency **final polishing and passive treatment** of heap seepage waters following completion of active treatment.
- One pond - used for the duration of the water treatment period for **disposal of water treatment plant sludge**
  - Subsequent closure of this pond will involve folding the liner over the sludge and welding to produce water-tight seams.
- A second pond may also remain open during the water treatment period, and may be used as part of **passive treatment polishing system**

## Water Treatment Plant Pilot Program

- Bench-scale treatment testing of chemical and biological processes using metallurgical cyanide leach solutions completed
- During Operation Phase, conduct field-scale pilot program to refine plant operating requirements

## Vegetation Cover Trials

- During latter half of Operation Phase, conduct field-based revegetation trial program on Stage 1 of HLF, informed by results of other research programs



- **Why are we considering and advancing semi-passive treatment strategies?**
  - Uncertainty around the final discharge water quality following rinsing and *in situ* stabilization of heap solutions at this stage of the project
  - Potential for elevated nitrate, As and U in final draindown solutions that may need additional polishing
  - At closure, availability of events ponds to be converted to semi-passive treatment cells to improve closure water quality from the HLF
  - Review comments have indicated a need for more information as to how this system may be employed at Coffee
    - Provide some case examples demonstrating treatment of parameters of interest

- **Parameters of concern (nitrate, As and U) have been successfully treated using anaerobic “Permeable Reactive Barrier” (PRB) treatment systems**
  - Some systems (Fry Canyon Utah) has been in continuous operation since 1997 treating U(VI) contaminated groundwater
- **Conceptual treatment system considers a sub-surface, anaerobic system in converted ponds using combined media of organic material (wood chips from WRSF clearing) and zero valent iron (ZVI) for removal of NO<sub>3</sub>, U and As**



- **Nitrate**

- Could be present following rinsing at elevated concentrations (>100 mg/L)
- Nitrate readily denitrified to N<sub>2</sub> gas under sub-oxic/anoxic conditions
- Because of the low redox potential generated at the Fe<sup>0</sup> surface, need to ensure that design does not “transfer” the problem from nitrate to ammonia



- Design may need to consider an initial denitrification cell (e.g. matrix with only organic carbon source) to remove nitrate prior to use of ZVI for other contaminants

- **Uranium**

- At circumneutral pH (7.0 to 8.5), uranium exists in two primary oxidation states  $U^{4+}$  and  $U^{6+}$
- $U^{6+}$  is highly soluble (expected speciation in HLF draindown solutions)
- $U^{4+}$  has very low solubility

Reducing conditions generated from organic carbon decomposition or ZVI has been demonstrated to successfully reduce  $U^{6+}$  to  $U^{4+}$  (as amorphous uraninite):



- **Arsenic**

- At circumneutral pH, As exists as As(V) and As(III)
- Treatment using ZVI is attributed to adsorption of As species onto iron corrosion products (Fe oxides and hydroxides) and subsequent occlusion under successive layers of corrosion products

- **Monticello Superfund Site (Utah USA)**
- **Contaminants As, U and Nitrate**
  - Groundwater contaminated with 10 mg/L As; 396 mg/L U and 60 mg/L NO<sub>3</sub>
  - PRB containing approximately 2 m thick ZVI zone
  - HRT in PRB of ~ 5 hours
  - As and U in effluent >0.2 mg/L
  - NO<sub>3</sub> in effluent >0.065 mg/L

- **Mecsak Uranium Ore Site (Southern Hungary)**

- **Contaminants U**

- Employed a PRB containing ZVI to treat groundwater contaminated with >1,000 µg/L U

- Uranium treated using ZVI by reducing soluble U(VI) to insoluble U(IV) by elemental Fe:



- Effluent exiting PRB contained <10 µg/L U



- **ASARCO Site – Smelter Superfund Site (East Helena Montana USA )**
- **Contaminants As**
  - Employs a PRB containing ZVI to treat groundwater contaminated with >25,000 µg/L As
  - Effluent exiting PRB contained <10 µg/L As

- **Rocky Flats Environmental Technology Site – Nuclear Weapons Site (Golden Colorado USA)**
- **Contaminants U and Nitrate**
  - Two-cell PRB using mixture of sawdust and 10% ZVI
  - Nitrate reduced from ~150 mg/L to > 10 mg/L
  - U reduced from 40 µg/L to > 1 µg/L

- **Column Leaching Studies using Expected HLF Draindown Solutions**
  - Assess matrix and matrix mixtures to achieve objectives – plan for availability of these materials
    - Potential organic material source from wood wastes from clearing for infrastructure in Halfway Creek drainage
  - Need to determine potentially viable flow through rates or hydraulic residence times (HRT) that achieve treatment targets
- **Conduct on-site pilot-scale testing during Phase I rinsing of HLF when “actual” HLF draindown solutions are available**

## Waste Rock Storage Facilities and Stockpiles



### Goals:

1. Ensure long-term physical stability
2. Avoid unacceptable release of contaminants to receiving environment
3. Avoid risks to humans and wildlife



## Waste Rock Storage Facilities and Stockpiles

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- Reclamation and closure goals achieved through:
  - **Alpha WRSF** - Adhering to facility designs, and construction and maintenance practices to avoid re-sloping at the end of active waste dumping
  - **Beta WRSF** – during Post-mining Closure, removal of waste rock for backfilling of Kona Pit; grade footprint of WRSF for appropriate surface runoff, scarify surface, and revegetate.
  - **Temporary Organics Stockpile** – use material in reclamation activities; after material is depleted, grade base of stockpile, scarify surface, and revegetate.
  - **Frozen Soil Stockpile Area** - use material in reclamation activities, or if unsuitable for reclamation, reclaim material in place.



## Water Management Infrastructure Components



1. Underdrains
2. Diversion channels
3. Drainage ditches
4. Diversion berms
5. Sedimentation ponds
6. Water treatment plant













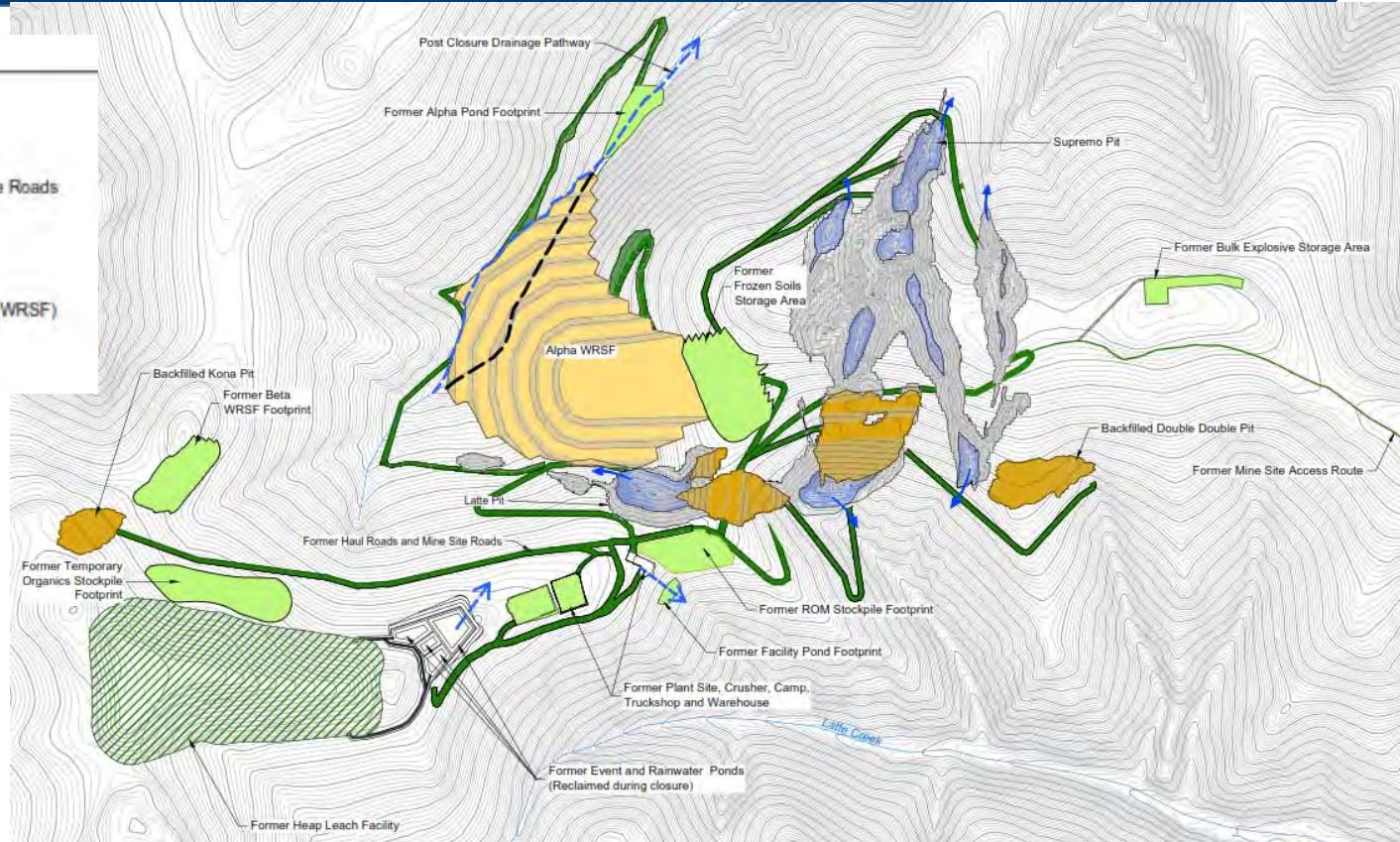
# Site Water Management

- Sequence of activities for water management infrastructure:

Stage/ Phase	Years	Active Water Management Features	Features Decommissioned	Water Treatment
<b>Post-Mining Closure</b>	13 to 18	All conveyance structures, Alpha Pond, Facility Pond, Water Treatment Plant	Culverts are removed when no longer necessary toward the end of stage.	Water Treatment Plant operational, and total suspended solids (TSS) settling in the existing ponds
<b>Active Closure</b>	19 to 23	All conveyances, Alpha Pond, Facility Pond, Water Treatment Plant (through Year 20).	At the end of Active Closure, all conveyances and sedimentation ponds. Water Treatment Plant decommissioned after Year 20	Water Treatment Plant (operational through Year 20), with TSS settling in the existing ponds
<b>Post-Closure</b>	24 onward	Passive treatment within the former footprint of the sedimentation ponds.	None (decommissioning complete by start of phase)	Passive TSS removal in vegetated swales and/or stilling pools constructed in reclaimed footprint of former sedimentation ponds.

# Site Water Management: Post-Closure Phase

- Legend**
-  Rock Drain
  -  Reclaimed Footprint
  -  Reclaimed Heap Leach Pad
  -  Reclaimed Haul and Mine Site Roads
  -  Pit Backfill
  -  Pit Footprint
  -  Pit Lake
  -  Waste Rock Storage Facility (WRSF)
  -  Pit Outflow Direction
  -  Flow Direction





## Objectives of monitoring, surveillance and reporting



1. Track effects of the Project on the environment
2. Assess the effectiveness of mitigation and closure measures
3. Inform reclamation and closure plan adjustments



- Meteorological Monitoring Program
- Aquatic Environment Monitoring Program
- Fish and Aquatic Habitat Monitoring Program
- Terrestrial Environment Monitoring Program



# Meteorological Monitoring Program

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- **Collection of climate data** via central and HLF weather stations, monthly downloading
- Inspection of instrumentation monthly, seasonal maintenance activities
- **Snow depth measurements** to estimate relative magnitude of runoff that must be managed at spring
- **Annual interpretive report**
- No requirements following Active Closure Stage

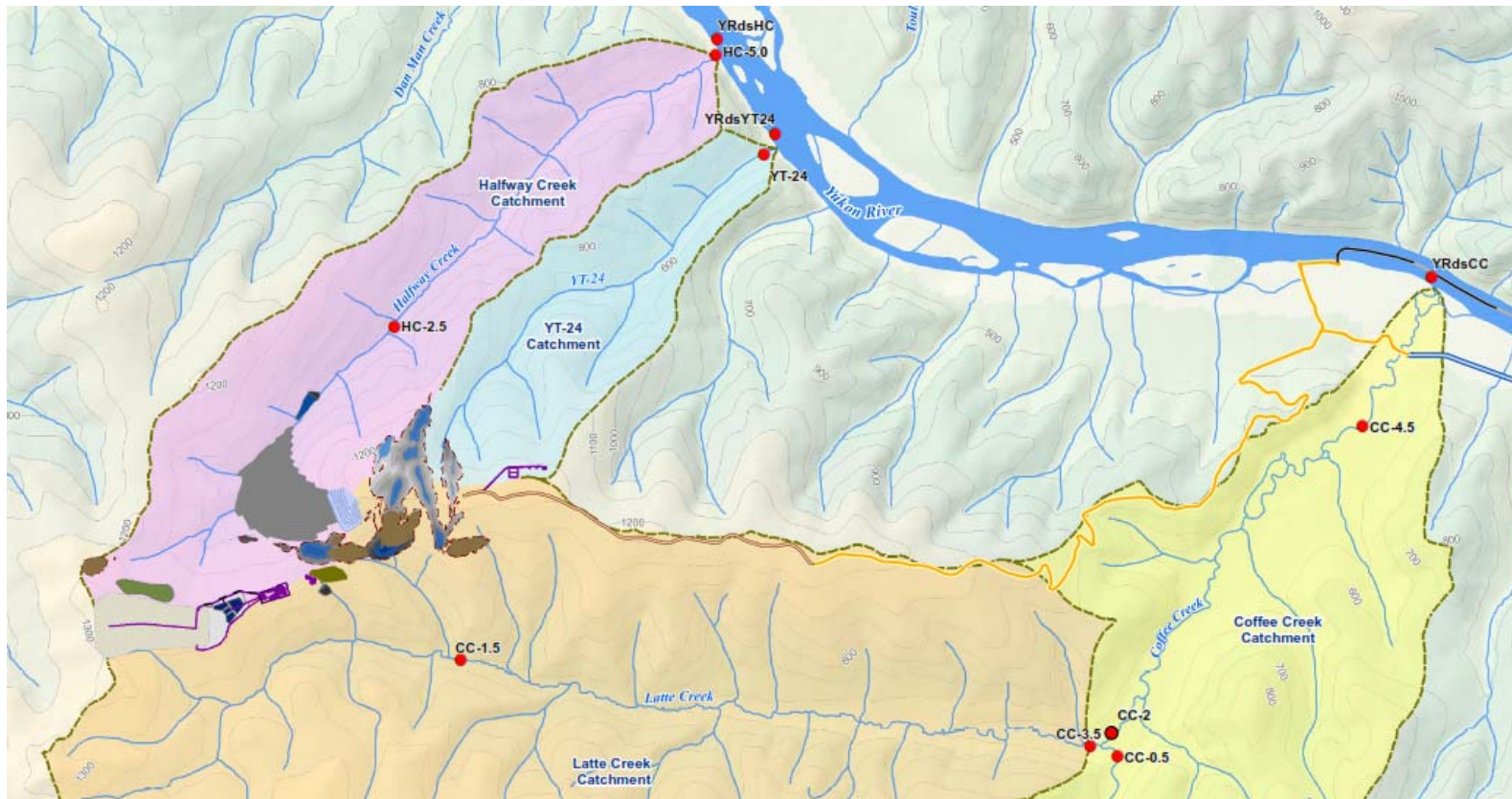
# Aquatic Environment Monitoring Program

41

- **Environmental effects monitoring** as per Metal Mines Effluent Regulations to characterize effluent
- **Water quality monitoring as per regulatory requirements:**
  - At mine infrastructure - flow monitoring from mine facilities, effluent monitoring in sediment control ponds and sumps, and at water treatment plant
  - Receiving environment– hydrology, surface water quality, ground water quality and quantity
- **Biological monitoring** in the receiving environment upstream and downstream of points of discharge to confirm compliance with regulatory requirements
- **Annual reports** and periodic **comprehensive reports** to present comparisons of data collected over time and describe trends



# Hydrology and Surface Water Monitoring Locations



# CRCP – Groundwater Monitoring Locations

## Legend

- Approximate Location of Additional GW Monitoring
  - Monitoring Well
  - SWD Monitoring Station
  - Thermistor/VMP (BRK 2015)
  - Mine Site Access Route
  - Northern Access Route
- WB = Westbay**  
**T = Thermistor String**  
**AZ = Active Zone**  
**WB = Westbay**  
**A = Deep Conventional (200+m)**  
**B = Shallow Conventional (150+m)**  
**T = Thermistor String**





# Fish and Aquatic Habitat Monitoring Program

44

- Fish sampling to determine **abundance and species diversity**
- Detailed **habitat assessment** to evaluate pool frequency and average pool depth
- Fish sampling to assess **fish species** health and population age structure
- Quantify the extent of Chinook and Chum **salmon spawning**
- Collecting and analyzing **benthic invertebrate communities, primary producers, and sediments**





# Terrestrial Environment Monitoring Program

45

- **Surveillance monitoring** including routine, annual and event-driven inspections
- To be dictated by licenses and permits, but likely to include **monitoring** for:
  - Presence of invasive plants
  - Trace metal uptake in soil and vegetation
  - Effectiveness of reclamation activities
  - Wildlife protection



# Adaptive Management Plan

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- AMP refined through Project phases to identify, evaluate, and address performance uncertainties to **ensure long-term performance** of closure measures
- Detailed AMP to be developed during Project licensing that describes **monitoring programs** and a range of **management responses to changing conditions**
- Key issues include:
  - **Chemical stability** - water quality of HLF, the pit lakes, and creeks draining the Mine Site
  - **Physical stability** – physical stability in varied site conditions for WRSF, open pits, and water management infrastructure
  - **Revegetation** – e.g., colonization by invasive plant species, vegetation coverage low, natural colonization slow



# QUESTIONS & DISCUSSION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP





# Goldcorp Reclamation Operations

Selkirk First Nation - September 20, 2017

 **GOLDCORP**







## SUSTAINABILITY EXCELLENCE MANGEMENT SYSTEM (SEMS)

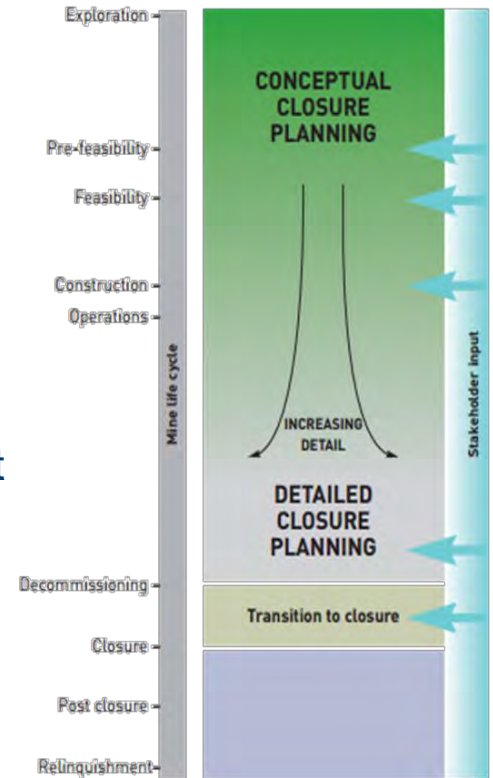
### Reclamation & Closure Planning at sites and projects;

- Will be integrated
- Will be prepared and maintained in LOM plan
- Will include terms of reference
- Will address chemical stability
- Will address physical restoration and stability
- Will include concurrent reclamation activities & costs
- Will develop and maintain a current “Best Estimate” of the total actual costs for the life-of-mine or project.



Reclamation and Closure Planning, including cost estimating, is a fundamental aspect of meeting Goldcorp's regulatory and social and financial responsibilities.

- Goldcorp will leave sites in a condition that is safe and stable, that minimizes environmental impacts, and considers long term social benefits.
- Reasonable and accurate financial assurance is an important aspect of our social license to operate and must be updated annually.
- The closure standard identifies the requirements of responsible closure planning, cost estimating and financial assurance.







Dec 2011



Jan 2016



Mar 2017



- **Marlin Mine's final production was last week after 12 years in operation**
- **Progressive reclamation occurred concurrently with operations**
- **Goldcorp committed to closure and post closure monitoring 2017 – 2026**
- **Development of a foundation for productive projects on the land ongoing**



- **Mine closed in Jan 2015**
- **Goldcorp completed the reclamation of El Sauzal in Oct 2016**
- **Working with the Ejido to monitor and re-vegetate in post closure**



- **San Martin closed ~10 years ago**
- **Foundation established to manage the land and productive projects**
- **Goldcorp is finalizing design of a passive water treatment system**
- **Working to make foundation self sufficient by 2019 (business eggs & tilapia)**

1998

2007

2010

2017



- **Why are we considering and advancing semi-passive treatment strategies?**
  - Uncertainty around the final discharge water quality following rinsing and *in situ* stabilization of heap solutions at this stage of the project
  - Potential for elevated nitrate, As and U in final draindown solutions that may need additional polishing
  - At closure, availability of events ponds to be converted to semi-passive treatment cells to improve closure water quality from the HLF
  - Review comments have indicated a need for more information as to how this system may be employed at Coffee
    - Provide some case examples demonstrating treatment of parameters of interest

- **Parameters of concern (nitrate, As and U) have been successfully treated using anaerobic “Permeable Reactive Barrier” (PRB) treatment systems**
  - Some systems (Fry Canyon Utah) has been in continuous operation since 1997 treating U(VI) contaminated groundwater
- **Conceptual treatment system considers a sub-surface, anaerobic system in converted ponds using combined media of organic material (wood chips from WRSF clearing) and zero valent iron (ZVI) for removal of NO<sub>3</sub>, U and As**

- **Nitrate**

- Could be present following rinsing at elevated concentrations (>100 mg/L)
- Nitrate readily denitrified to N<sub>2</sub> gas under sub-oxic/anoxic conditions
- Because of the low redox potential generated at the Fe<sup>0</sup> surface, need to ensure that design does not “transfer” the problem from nitrate to ammonia



- Design may need to consider an initial denitrification cell (e.g. matrix with only organic carbon source) to remove nitrate prior to use of ZVI for other contaminants

- **Uranium**

- At circumneutral pH (7.0 to 8.5), uranium exists in two primary oxidation states  $U^{4+}$  and  $U^{6+}$
- $U^{6+}$  is highly soluble (expected speciation in HLF draindown solutions)
- $U^{4+}$  has very low solubility

Reducing conditions generated from organic carbon decomposition or ZVI has been demonstrated to successfully reduce  $U^{6+}$  to  $U^{4+}$  (as amorphous uraninite):





- **Arsenic**
  - At circumneutral pH, As exists as As(V) and As(III)
  - Treatment using ZVI is attributed to adsorption of As species onto iron corrosion products (Fe oxides and hydroxides) and subsequent occlusion under successive layers of corrosion products

- **Monticello Superfund Site (Utah USA)**
- **Contaminants As, U and Nitrate**
  - Groundwater contaminated with 10 mg/L As; 396 mg/L U and 60 mg/L NO<sub>3</sub>
  - PRB containing approximately 2 m thick ZVI zone
  - HRT in PRB of ~ 5 hours
  - As and U in effluent >0.2 mg/L
  - NO<sub>3</sub> in effluent >0.065 mg/L

- **Mecsak Uranium Ore Site (Southern Hungary)**

- **Contaminants U**

- Employed a PRB containing ZVI to treat groundwater contaminated with >1,000 µg/L U
- Uranium treated using ZVI by reducing soluble U(VI) to insoluble U(IV) by elemental Fe:



- Effluent exiting PRB contained <10 µg/L U

- **ASARCO Site – Smelter Superfund Site (East Helena Montana USA )**
- **Contaminants As**
  - Employs a PRB containing ZVI to treat groundwater contaminated with >25,000 µg/L As
  - Effluent exiting PRB contained <10 µg/L As

- **Rocky Flats Environmental Technology Site – Nuclear Weapons Site (Golden Colorado USA)**
- **Contaminants U and Nitrate**
  - Two-cell PRB using mixture of sawdust and 10% ZVI
  - Nitrate reduced from ~150 mg/L to > 10 mg/L
  - U reduced from 40 µg/L to > 1 µg/L



- **Column Leaching Studies using Expected HLF Draindown Solutions**
  - Assess matrix and matrix mixtures to achieve objectives – plan for availability of these materials
    - Potential organic material source from wood wastes from clearing for infrastructure in Halfway Creek drainage
  - Need to determine potentially viable flow through rates or hydraulic residence times (HRT) that achieve treatment targets
- **Conduct on-site pilot-scale testing during Phase I rinsing of HLF when “actual” HLF draindown solutions are available**

# AGENDA

## **Selkirk First Nation and Goldcorp Socio-economical Impacts, Monitoring, and Management Workshop September 21, 2017**

**Location:** Kwanlin Dun Cultural Centre Elders Lounge Room

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

### **Selkirk First Nation (SFN)**

SFN Representatives TBD

Names Redacted

### **Coffee Project – Goldcorp Inc.**

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Jennie Gjertsen, Environment and Permitting Manager

Erin Prelypchan, Hemmera

Names Redacted, Hemmera

Name Redacted Hemmera

Kelly Constable, Hemmera

### **Agenda:**

- 1. Introductions**
- 2. Workshop Format**
  - a. High level overview followed by discussion
  - b. Workshop tools (parking lot, etc.)
- 3. Assessment Methodology**
  - a. Attention to sustainability criteria, spatial/temporal boundaries, significance judgments
- 4. Alignment between current affects assessment and SFN Values and data sources**
- 5. Socio-economic Effects Assessment + Mitigations**
  - a. Discussion Topics:
    - i. Traditional Land Use
    - ii. Social Economy
    - iii. Economic Conditions
    - iv. Community Health and Well Being
    - v. Education Services
    - vi. Community Infrastructure and Services
- 6. Cumulative effects assessment, management and monitoring**
- 7. Goldcorp Case Studies – Socio-economic Successes**
- 8. Comparative Case Studies – Mine Impacts on northern aboriginal communities**
- 9. Socio-economic Monitoring + Engagement Plan**

**Selkirk First Nation and Goldcorp Socio-economic Effects, Monitoring, and Management Workshop  
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Name Redacted, Hemmera

Name Redacted Hemmera

Name Redacted Hemmera

Kelly Constable, Hemmera

**Action Items**

Item	Responsible Party	Date Due
How can enhancements be included in the PP/SEMP? Consider “sustainability criteria”, SFN primary data on legacy/futures, potential addendum to PP	Goldcorp +SFN	For Discussion by Oct. 20, 2017
SFN and GC to discuss “Fate Control” as additional topic for socio-ec management. Consider engagement with YG as a mitigation measure in Cumulative Effects assessment and SEMP	Goldcorp	Oct. 20, 2017
Consider how SEMS can be better understood externally, as it includes many enhancements; consider this practically in the Project Proposal	Goldcorp	Oct. 20, 2017
Goldcorp to consider 2016 census data, how that can be	Goldcorp	Dec. 31, 2017

considered specific to SFN related topics		
Scenario analysis for cumulative effects related to road, send to SFN. Consider using Yukon Energy 20 Year Resource Plan as a resource	Goldcorp	Dec. 31, 2017
Send SFN the synthesis of chosen indicators to Valued Conditions (VCs) in Project Proposal	Goldcorp	October 13, 2017
Look at HRIA map #28 (and afterward); review what was assessed and what was looked at for potential. Follow up with SFN.	Goldcorp	Oct. 4, 2017
Schedule meeting with SFN and Ecofor before October 31, if possible.	Goldcorp	Oct. 31, 2017
Send SFN the TK study that references interviews with SFN citizens.	Goldcorp	Sent September 22, 2017
SFN to send 1987 SFN Cultural Land Use Study	SFN	Sent September 22, 2017.
Consider the 2014 Minto Annual Report.	Goldcorp	Oct. 20, 2017
SFN to send Goldcorp the "Knowing Ourselves" survey questions, if possible.	SFN	Complete – Sept. 22, 2017
Confirm if grave site is still intact at airstrip, is it marked?	Goldcorp	Oct. 4, 2017

**Parking Lot Items**

Item	Timeline to address
Yukon Government Engagement – develop process.	Oct. 20, 2017 – discussion item

**Summary of Discussion**

**SFN Engagement and SFN Primary Data Discussion:**

- SFN advisor notes that there was information from the 2014 Annual Report Minto Mine Socio-economic Monitoring Program that would have been good to incorporate into the Project Proposal released in November 2016. Goldcorp discusses that mitigations about the Project are key discussions today.

- Goldcorp discusses the relationship with SFN at the time that the VCs were scoped.
- SFN advisor notes that it is not productive to dwell on the past. SFN wants to move forward and help provide information to include in the Project moving forward.
- SFN advisor is not concerned with the process for generating the VCs, but is concerned with the selected VCs. There is room for improvement on the VCs and on the detail in the VCs. Information on SFN's VCs were publicly available prior to Project Proposal submission, and are validated by the Nation. These represent core VCs for SFN. SFN advisor to evaluate to what extent those SFN VCs incorporated into the Project Proposal.
- SFN advisor notes the importance of linking identified issues to the VCs. SFN advisor discusses previous experience with VC selection and mitigation, and would like to make sure that VCs are being monitored with the appropriate indicators.
- Goldcorp and SFN advisor discuss Goldcorp's analysis of the Minto VCs and how they align with the current Project Proposal; the meeting today is to discuss this and identify gaps. Goldcorp needs to have this discussion today, and then take this information away and see if any gaps identified today may be relevant to other First Nations.
- Goldcorp notes that there might be VCs that are more key to SFN, such as Land and Resource Use, rather than Community Infrastructure, and discusses using time strategically when looking at the Minto VCs, and being strategic and effective about incorporating SFN's information into the Project Proposal.
- SFN advisor notes that many SFN VCs do line up with those in the Project Proposal, but that there are some details that are missing. SFN advisor thinks there are steps to correct for missing SFN primary data in the Project Proposal. SFN advisor hopes that Goldcorp would consider doing an addendum or supplementary report to address SFN's specific concerns. The supplementary report would not be a rewrite of what is in the Project Proposal but would include new primary data from SFN.
- Goldcorp is open to considering this, but the issue is access to primary data. If primary data is made available, then that is great. Goldcorp notes that SFN recently told them that they cannot have primary data. Today is about looking at the key issues and steps forward.
- SFN advisor notes that the primary data under discussion has not been reviewed by SFN citizens and this must take place before the data can be made available. There are issues of sensitivity and sharing. The data must be taken back to the community to discuss the sensitivities before sharing. SFN advisor knows this information would be helpful for the Project.
- Goldcorp is sensitive to survey fatigue, so it's a question for SFN to consider internally.

Goldcorp asks about data sets that were referenced by SFN advisors; SFN advisors and Goldcorp discuss potential data sources:

- SFN advisors noted that the decision documents for the Minto mine required a socio-economic monitoring program, and that led to developing VCs and monitoring program. A number of indicators for VCs had no existing information, so in 2015 a community survey occurred that targeted SFN citizens 16 years old and older in Yukon. By mid-2015, there were new data sets available for SFN Citizens in Yukon. The socio-ec and demographic information is excellent. This survey addresses the fact that Stats Canada doesn't collect information on the living conditions that are of interest to SFN.



- SFN advisor discusses the report that is about to come out that analyzes the data set after the information is reviewed with the community.
- SFN advisors highlight the spatial analysis that was done by Pearse/Weinstein for LSCFN and SFN in 1988 in response to the Casino Mine proposal. SFN advisors discuss the TLUS information being done currently for Coffee and Casino, and this will be completed in November prior to review by SFN. SFN primary data is the SFN household survey data from 2015 and the 2017 traditional use study spatial data. SFN advisor notes the 2014 monitoring program report from Minto is also available publicly. It does not include information from the 2015 household survey, but it is good information.
- Goldcorp notes that the Minto Mine monitoring information was used after the Project Proposal was drafted, in an analysis of SFN VCs and the Project Proposal. Publicly available information on the Minto socio-economic monitoring framework was included in the Project Proposal, but the results of the socio-economic Minto monitoring came out in November 2016 and it wasn't good timing to include the results of the report in the Project Proposal.

SFN advisor comments generally on the Project Proposal:

- SFN advisor read through the Proposal, and some of the socio-economic information included seemed to reflect some of SFN's earlier comments on the Coffee Project or on the Casino Project.
- SFN advisor notes that overall, the Proposal is more sensitive to First Nations socio-economic conditions than other Proposals, but the problem is the lack of empirical data.

Goldcorp asks about the next rounds of the SFN community survey and how this will be conducted:

- SFN advisor notes that the methodology needs to be worked out with the community and Yukon Bureau of Statistics, as some questions can use tweaking.
- SFN advisor discusses the available data in the monitoring report, and discusses the 2015 data that is coming out shortly.
- SFN advisor is aware that if the data can get out soon, it will be beneficial to projects like Coffee.
- Goldcorp is sensitive to the fact that SFN wasn't comfortable with sharing primary data before, and wants to be respectful of what SFN wants.
- Goldcorp discusses the need for good monitoring and how that is set up with good information. Goldcorp is also in the early stages of setting up the SEMP, and wants to learn from SFN regarding making sure the monitoring program is manageable.
- Goldcorp also notes importance of including information from both SFN and TH into the same monitoring program to have the full picture.
- SFN advisor references examples with diamond mines in the North.

### **Sustainability Criteria and Spatial Temporal Boundaries, Significance:**

SFN advisor discusses sustainability in the context of looking at project effects more broadly by looking at the net effects in consideration of both the negative and positive impacts associated with a project. This includes considering enhancement of positive effects from the Project, how benefits can flow to the community and how tradeoffs of positive and negative effects from the Project can be more transparent.

Sustainable development is an Objective of chapter 12 of the Umbrella Final Agreement and is a General Purpose of YESAA as well. SFN noted Goldcorp's commitments to sustainability in the Project Proposal, and suggests giving some attention in the Project Proposal to what could be done to discuss legacy effects/benefits of the Project. Notes that Legacy is a VC for Minto.

Goldcorp and SFN advisors discuss legacy and fate control:

- Goldcorp discusses how legacy initiatives like community investment and training programs aren't at a point where the detail has been worked out yet.
- Q: Goldcorp asks about fate control and preparedness, how SFN advisor defines this?
- A: SFN advisor replies that Fate Control is about understanding the capacity and the performance of responsible parties to deliver on jurisdictional responsibilities. The difficult part is that Goldcorp has to make assumptions in the assessment about YG's role and ability. The parties discuss management of the NAR as an example of a project component with multiple parties with various responsibilities.
- Goldcorp notes that the feedback can be incorporated into the SEMP; for example, intensity and frequency of engagement with YG could be part of this.
- SFN advisor notes that some proponents produce a Venn diagram and show various socio-ec matters where there's overlapping responsibility with YG and the Proponent. This is a good way to show the responsibility to YG.
- Goldcorp clarifies that Goldcorp is only proposing the NAR, and the distinctions between the NAR and the Yukon Resource Gateway Project.

SFN advisor discusses the legacy from the Project:

- Q: SFN advisor asks Goldcorp about what will be left in the community, aside from royalties and portable skills? SFN advisor notes that this is a consideration for the Project and this is a conversation to have with the community.
- A: Goldcorp discusses legacies in other communities.
- SFN advisor explains the legacy VC as a narrative.
- Goldcorp notes that the legacy and the fate control concepts are something that need to be assessed, and suggests that it is added to the cumulative effects assessment.
- Goldcorp discusses the Project in the context of ensuring that the scale of benefits and effects are understood by communities, and that promises are delivered on. Goldcorp discusses enhancement measures included in the Project Proposal and encourages SFN's feedback on enhancements. Goldcorp suggests including SEMS information in more detail in the Project Proposal to provide information on legacy and sustainability and enhancements.
- SFN advisor finds the sustainability commitments that Goldcorp adheres to refreshing and good thing to highlight operationally and in assessing overall project impacts against GC's sustainability commitments.

Goldcorp and SFN advisors discuss potential ways to incorporate SEMS into the Project Proposal and Management Plans, such as: incorporation of specific items in commitments table. The parties also discuss how SFN can have comfort around commitments in SEMS being tracked for compliance.

### **Spatial and Temporal Boundaries Discussion:**

SFN advisors and Goldcorp discuss the spatial boundaries for the Project Proposal:

- SFN advisor notes concern that by adding Whitehorse into the LAA the results on smaller communities will be skewed. SFN advisor's concern is that the significance determination is affected by including Whitehorse.
- Goldcorp explains that Whitehorse was included as part of appropriate due diligence because there are Project activities in Whitehorse. Assessment of effects can be defined by the specific geographic area affected, so including the larger community of Whitehorse doesn't dilute the assessment of smaller communities.
- Goldcorp discusses why Dawson was considered in more detail in the Project Proposal. Goldcorp encourages discussion about where more information on Pelly might need to be included.
- Goldcorp discusses the rationale for effects assessment related to population and the Demographics IC. Goldcorp explains that the fly-in/fly-out locations are Dawson and Whitehorse, and they are therefore the most likely communities to which people would move to for the Project. Goldcorp noted that these assumptions needed to be made for the assessment, recognizing that they could manage and monitor and adjust where necessary when the mine is operating.

SFN advisor discusses the data available to update the Project Proposal:

- Q: SFN advisor asks if Goldcorp included new Stats Canada Census data in the Project Proposal?
- A: Goldcorp included 2016 population data. SFN advisor suggests including more of the available data from 2016 now, as the 2011 data is problematic SFN advisors ask if 2016 census data becomes available and SFN advisor thinks it bears on the proposal, then SFN could bring that to the table.
- Reply: Goldcorp agrees. Goldcorp discusses making potential for doing supplemental assessments as information comes available while in the YESAB process.
- 

SFN advisors and Goldcorp discuss Goldcorp's resubmission approach. Goldcorp notes that if there is information that SFN requires to present views, then that will be provided.

Goldcorp and SFN advisors discuss temporal boundaries, data available, and data gaps in the Project Proposal:

- Goldcorp notes that if it is information that would change the assessment, then Goldcorp needs to know as soon as possible from SFN what that information is.
- SFN advisors indicate that the temporal boundaries for each VC seem generally reasonable for assessing impacts on current conditions, but overly narrow and lacking in data points that could establish trend lines to better understand the current relative state (improving, declining or stable) of a number of VCs. As appropriate SFN advisor recommends using 2016 stats data to add more data points.

- SFN advisor discusses cumulative effects assessments and the role of the government. Goldcorp's approach to the Yukon Resource Gateway Project in the cumulative effects assessment might be a gap.
- Goldcorp explains that at the time the Project Proposal was scoped, Goldcorp cut off the "reasonably foreseeable" with what had been in YESAB at the time; YG's Resource Gateway Project was not in YESAB at the time. The Gateway Project had a funding proposal, but not a Project Proposal.
- Goldcorp and YG meet regularly to discuss the road. Goldcorp understands that YG will be submitting Gateway in a piecemeal fashion, not all at once. Even if the Gateway Project were included in cumulative effects, there's no information on implementation, management, or construction of the Gateway Project, so it is difficult to assess.
- Goldcorp notes that YESAB's role is to do the cumulative effects assessment. Proponents put the information forward to assist YESAB in the assessment. If the proponent misses something, it is YESAB's responsibility to include that information.
- SFN advisor discusses the cumulative effects assessment and the lack of scenarios (i.e., the number and combination of reasonably foreseeable projects) in the Proposal for cumulative effects.
- Goldcorp asks how SFN advisor would make assumptions for the scenarios that could be envisioned. SFN advisor notes that they suggest 4-5 scenarios be envisioned, and work through the scenarios.
- SFN advisors note that Yukon Government's Gateway Project carries with it longstanding SFN concerns with past proposals (dating back to the 1980s) for extension of the Freegold (Casino) Road. SFN advisor notes scenarios would be a stress test for planning tool.
- SFN advisors recognize the effort that Goldcorp put into the cumulative effects assessment and agree that it is a YESAB responsibility to ultimately determine the significance of that assessment
- Goldcorp did the assessment as best practice.
- SFN advisor discusses the need for Goldcorp and YG to discuss and understand the role of YG, and for SFN to understand the government's role. Goldcorp discusses the importance of coming together with the affected First Nations and talking to YG about the salient issues.
- SFN advisor suggests Goldcorp review Yukon Energy's 20-year Resource Plan that incorporates mining projects.

### **Significance Judgements Discussion:**

SFN advisors and Goldcorp discuss significance:

- SFN advisors indicated that the opening up of the northwestern portion of the SFN traditional territory represents a further encroachment via the NAR on the landscape SFN has relied upon for its traditional use. Roads like the NAR contribute to long history of displacement as evidenced in places like Minto Landing, Fort Selkirk, etc.
- Goldcorp discusses the existing access for development that already exists. The road that exists now is considered a public, user maintained road. Anyone with a claim down the road is provided access to the miners below. This rule doesn't apply to the barges or ice roads. While there is placer

mining south of the Stewart River, Goldcorp does not have to nor does it intend to provide access to the area south of the Stewart River.

- Q: SFN notes that YG is taking a piecemeal approach to the Resource Gateway Project, and asks if YG will fund the NAR?
- A: Goldcorp doesn't have any indication that YG will fund it.
  
- Comment: SFN is concerned that the NAR will be a public road.
- Reply: Goldcorp notes that the road is public no matter what. Goldcorp is responsible for managing the barge landings.
  
- Comment: SFN is concerned that placer miners can build their own barge landing.
- Reply: Goldcorp notes that this already happens now. Placer miners are already south of the Stewart, and there is a process through which SFN can engage the placer mining growth in that area, referring to placer mining licensing.
  
- SFN advisors suggested the Goldcorp review the available literature on the effectiveness of various control structures and management approaches for limiting public access (eg. on forestry roads).
- Goldcorp notes that they have to reclaim the areas of new build on the road too. Goldcorp encourages SFN to talk to YG, and that YG is looking at control measures they can put into place.
- Goldcorp notes that some people view the road as positive and some view it as an adverse effect.
- SFN's main concern is placer miners and effects to wildlife, especially moose. SFN highlights that this is already happening, people are going down the NAR route currently to hunt, due to a world record moose being shot in that area.
- Goldcorp describes the effects assessment in the Project Proposal regarding effects to wildlife mortality associated with increased access.
- Goldcorp describes the current opinions on the NAR, how it is already built within 2 km of the Stewart River. Both parties notes the importance of monitoring the situation.
- Goldcorp notes that based on the feedback from SFN in this workshop, it is clear that the suggestion is to formalize the engagement process to deal with these kinds of issues.

SFN discusses significance judgements:

- SFN advisors noted the importance of incorporating important community values into the assessment of project impacts on various VCs relevant to SFN. For example, people stated in community survey that they want to live in Pelly Crossing due to the strong sense of community and family and being able to be out on the land. Strength of community and attachment to land and water are so important for SFN citizens in Pelly Crossing. Access to high quality country foods is also highly important.

**Alignment of SFN Values with Goldcorp VCs Discussion:**



SFN advisor discusses the differences in the number of VCs in the Minto Socio-economic Monitoring Plan, of which there are 16, compared to Goldcorp's 7 Socio-ec VCs in the Project Proposal. SFN advisor notes that it is not that they don't align, but SFN advisor needs to understand where the key aspects of these VCs match up.

SFN and Goldcorp discuss the socio-economic VCs in the Project Proposal:

- SFN advisor notes that Economic Conditions VC is so large that it is not informative. The indicators associated with the VC aren't necessarily associated with the issues identified in the VC. SFN advisors noted that Goldcorp needs to clarify where VCs and Indicators in the project proposal align with SFN VCs and Indicators, where they diverge how any gaps will be addressed. Goldcorp notes that if the indicators are right, the VC they fall under may not be as important. SFN advisor agrees.
- Goldcorp notes that the purpose of monitoring is to see if the predictions of effects were correct, meaning that one is not monitoring the VC, one is monitoring the effects. The key is to look at the effect and ensure that you have the right indicators to monitor the effect.
- Goldcorp notes that the Minto socio-ec indicators are more specific than the Goldcorp indicators. Goldcorp understands that SFN advisor wants to make sure that Goldcorp is adequately capturing the things that matter to the SFN community in the management plan.
- SFN advisor notes that the data is being generated for Minto right now, so it's about information sharing across proponents. For example, social assistance cases in Pelly Crossing is something to monitor in terms of whether the mine has an effect on it. The effects pathway may not be clear, but it is a socio-economic condition that can be evaluated against the commitments and asserted benefits of the project.
- Goldcorp agrees, and needs to know if this model is going to work for other communities that Goldcorp is monitoring. Goldcorp needs to consider how monitor indicators in other communities in cases where there are other models, even if the indicators are the same.
- Q: SFN advisor asks what WRFN and NND want for VCs?
- A: Goldcorp replies that NND didn't participate much, and describes the Tr'ondëk Hwëch'in Technical Working Group (TWG) and review with WRFN. Goldcorp discusses the terminology issue, and that Goldcorp covers off very many of SFN VCs, but under different terminology. Goldcorp acknowledges that a few VCs, such as fate control and legacy, weren't touched on in the Project Proposal.

Goldcorp and SFN discuss the Socio-economic Monitoring Plan (SEMP) for the Project. An operational SEMP is being developed in parallel with the YESAB process and will be detailed for the permitting phase.:

- Goldcorp discusses steps for moving forward and the engagement plan for SEMP.
- SFN advisors indicated that data in the SFN household survey was only collected every 5 years – midpoint between national census five-year surveys. Minto Mine related operational data is collected annually. Some other administrative government data is periodic.

- Q: Goldcorp asks SFN advisor to comment on the budget for the monitoring program for Minto, asks if things fell within budget?
- A: SFN advisor notes that it did fall in within budget for collection and analysis. Lots of resources were put toward this as well, from YG, SFN. SFN advisor notes that there was a 3<sup>rd</sup> party that did the analysis, and that was improved the most recent time around. SFN advisor notes the program has required far more effort than what SFN would have wanted, but it's the first of its kind in Yukon and now that there's the model and the framework it will be easier in the future.
  
- Q: Goldcorp asks if the effort is expected to be less in coming years?
- A: SFN advisors indicated that in the future, Minto Mine Monitoring Program annual data requirements would be greatly reduced (75% less effort) as data reporting requirements are established. SFN advisors noted that a community level survey is costly, and Goldcorp's challenge will be finding a way to do that with each community.
  
- Q: Goldcorp also wants to know how to effectively report out monitoring information to communities.
- A: SFN advisor replies that an SFN and YBS representatives designed the questions and the information was good that came out of the survey. Some of the questions were too complex, but in all the survey was good because SFN found out what the community does need. The information that SFN got from the survey also helped SFN work with YG. Different families were represented as surveyors, and people weren't paid for information, but there were incentives such as there were \$25 Canadian Tire gift cards for each participant and a draw for either a generator or a return flight to Vancouver.
- SFN citizens did the interviews at the Yukon Bureau of Statistics Office, and that was a good approach in Whitehorse. It was successful because it told SFN about themselves, and it was not mining specific.

### **Archaeology Discussion:**

Goldcorp gives an overview of heritage considerations for the Project, noting that there will be pre-clearing heritage work done at site, and that there will be a heritage protection plan. The planned mitigations are in the Project Proposal already, and currently there is cultural resource training and a chance find protocol implemented for the exploration team.

SFN advisor comments on the HRIA work summary delivered by Goldcorp:

- SFN notes that up Ballarat Creek there's a traditional SFN trail that way, and other areas around Yukon River.
- SFN advisor notes that it is good that there's additional HRIA work being done on the NAR.
- SFN advisor will need to see the report in October to make any comments, but Goldcorp's heritage consultants being out on the NAR and spending time in the field is reassuring.
- Goldcorp notes that none of the findings would require a route realignment on the NAR.

- SFN advisor notes that keeping the communication going to contractors and construction people is key during construction, and important to ensure that those people adhere to the heritage management plan.
- SFN advisor notes that heritage resources are more exposed with increased access, so management planning is key, proactively planning for paleontological resources as well.
- Goldcorp discusses heritage training and chance find protocols.
- SFN advisor notes that monitoring for heritage is important, and training TH and SFN and whomever to participate in heritage monitoring. Discussion of how workers who are not trained are not able to recognize the less obvious resources. This is why a heritage monitor is key.
- Goldcorp notes very little disturbance planned by the rivers.
- SFN advisor confirms that the grave site is still intact at the air strip at coffee, asks if they are marked.
- Goldcorp notes that they are there, but not sure if they are marked and will follow up on that.

Goldcorp notes that draft management plans are expected to be ready in Q1-2018, and will look to share those and look for feedback. Goldcorp will circulate the report.

SFN advisor and Goldcorp discuss the HRIA and the assessed area vs. the area of potential. The river crossings are the areas of concern for SFN. SFN notes only three shovel tests between Yukon and Stewart Rivers have been done previously on the proposed Northern Access Route (NAR) between the mouth of Ballarat Creek and the Yukon River. SFN advisor notes a meeting with Goldcorp's heritage consultant would be good when they're back from the field. Goldcorp agrees.

### **Traditional Land Use Discussion:**

Goldcorp and SFN discuss information included in the Project Proposal regarding traditional land use:

- SFN notes that not a lot of SFN specific information was presented in the report although some information does exist that could have been used (R. Gotthardt 1987 SFN Culture and Land Use Study and 1988 mapping by Pearse and Weinstein containing valued information for both cumulative effects and road assessments): it was also noted that SFN elders were not happy with the traditional land use section as it was not properly presented and some SFN elders comments were attributed to TH in the 2012 Coffee Creek TK Study
- SFN notes an SFN elder living in Dawson was interviewed.
- SFN will get back to Goldcorp on the study of interest regarding who the elders were in a Traditional Knowledge (TK) survey.
- SFN discusses the interest here is with where the source of the information is, and where the representation is. SFN is concerned by lack of SFN TK.
- SFN advisor suggests that Goldcorp reference the Yukon Heritage Branch SFN Cultural Land Use Study (1987). Includes travel routes map and traditional use areas (Gotthardt).
- SFN advisor discusses the spatial data set and non-spatial data sets for SFN traditional use.
- SFN advisor references sources for looking at First Nations in Yukon economic reports.
- Goldcorp notes the ongoing TLUS work that SFN advisor is doing for Goldcorp. The parties discuss potential ways for Goldcorp to consider TLUS data for the Project.

SFN advisor summarizes key socio-ec areas of discussion for SFN:

- At certain times of year SFN Citizens need to get time away to do certain activities. The “2 weeks on, 2 weeks off” model doesn’t work for this.
- SFN advisors commented that project-specific commitments by Goldcorp to YESAB are not a substitute for entering into bilateral socio-economic and /or impact and benefits agreement with SFN.
- Goldcorp states that Goldcorp needs to hear from SFN what the effects are and what the mitigation could be; reading sources is one aspect but the information needs to come from the community.
- SFN advisor notes that the effects described in the report are generally the type of the effects that SFN advisor would identify, but the significance is something that needs to be evaluated from an SFN perspective.
- SFN advisor highlights that there are comments in the Project Proposal regarding being able to purchase more nutritious food with higher wages from working at the Project; SFN advisor notes country foods are the most nutritious.
- Goldcorp discusses making commitments in the Project Proposal regarding mitigations and indicators, and sorting out the details in the SEMP and management plans.
- Q: Goldcorp asks if SFN sees an assessment carried through focusing on traditional land use, social economy, and community health and wellbeing, or if there are other aspects that need to be focused on.
- A: SFN notes this seems reasonable, and mentions that in terms of community infrastructure, particularly housing, that Stantec is doing a plan for SFN now on a community land use and infrastructure plan, SFN will look to see if this can be shared.
- Goldcorp asks SFN to share the questions asked in the survey, SFN agrees.

SFN and Goldcorp discuss training and social closure:

- SFN advisor notes that there was very little in the socio-economic VCs discussing community-related interests and concerns for the reclamation and closure phase.
- SFN discusses that jobs and training are important for Citizens. SFN states that Goldcorp can work with YG, Yukon College, and other mining companies to work on portable skills and on-the-job training.
- SFN notes there is a capacity- building training window now so that by project start-up opportunities can be realized.
- Goldcorp agrees that timing is important. Goldcorp explains that the current strategy is to build up skills for operations, not for construction. Construction is a short time frame, with some specific skills. Goldcorp wants to put the bulk of resources to prepare people for a long term operational role. This is up for discussion as well.
- SFN advisor notes that there are important aspects that need to be addressed during the YESAB process. Training, capacity building, socio-economic monitoring plan, are all critical to be committed to now.

SFN advisors indicated that the SEMP is required prior to permitting and a complete draft should be provided as a part of the Project Proposal in the same tranche of management plans that include, for instance, a wildlife protection plan and water management plan.

**SEMP Development Discussion:**

Goldcorp discusses the tentative plan to engage SFN on the SEMP. This starts with understanding how SFN wants to be engaged on the SEMP:

- Goldcorp would like to have the opportunity to meet with Citizens more, as well as meeting with other groups like the Elders' council, youth council, RRC, etc, as well as Chief and Council. For the SEMP, Goldcorp would like to meet with SFN to discuss this, hoping for Q1 to meet and discuss the SEMP. Part of this is also the reporting mechanisms, and discussing options for receiving information.
- SFN advisor wants to know the level of content that Goldcorp is coming in with.
- Goldcorp clarifies that there's management and monitoring, and monitoring is very specific and detailed. Monitoring is about setting up indicators, and the objective is to set them up by the plans that are proposed for activities for management for the Project.
- Goldcorp notes that the SEMP will not be just bullet points, it will have content to look at and analyze.
- SFN advisor asks what actions would come out of the SEMP.
- Goldcorp replies that the actions are around adaptive management, and this will be discussed further in 2018. Goldcorp agrees that there needs to be threshold to trigger actions. SFN advisor and Goldcorp discuss the difficulties quantifying socio-economic issues.
- SFN advisors noted that the Minto socio-economic monitoring program is useful because it has a SFN specific agreed- upon tri-partite socio-economic monitoring framework that resulted in an agreed- upon monitoring program, which in turn is being implemented to both track predicted socio-economic effects and identify areas of concern associated with the project, necessitating socio economic adaptive measures due to identified adverse effects or gaps arising from the project.
- Goldcorp discusses the engagement plan, and how it's important to be talking on a regular basis with SFN as a whole, not just one representative.
- SFN advisor discusses looking at VCs like Economic Conditions (such as employment and unemployment), and then discuss that at a round table. This can ensure that resources are being used effectively.
- Goldcorp asks if there is an appetite to discuss this with SFN citizens in collaboration with SFN consultants.
- Goldcorp asks about the primary data sources that SFN has suggests and how this can be analyzed in time to meet with SFN.
- SFN advisor replies that this involves sitting down with SFN leadership to discuss this.
- SFN advisor notes that the mapping work that has been done is nearly complete, and Goldcorp and SFN advisor discuss access to the information will help inform SEMP planning.

Goldcorp and SFN discuss Goldcorp's wish to meet with SFN Chief and Council in October 2017.

End of meeting at 4:45 pm.





# Coffee Project – Project Proposal Socio-economics Briefing

Selkirk First Nation – Whitehorse, Yukon Territory  
September 21, 2017

21/9/2017

HEMMERA – Coffee Project – Socio-  
economic Debrief – Selkirk First Nation





# Introductions



# Meeting Purpose and Format

1. Why are we here? What do we hope to achieve today?
2. Revising today's agenda (Handouts)
3. Parking lot, minutes, etc



# Where we are in the YESAB process...

...and what does our discussion today contribute to?

- **Project Proposal** – includes high-level mitigation. Goldcorp aiming to resubmit to YESAB before end 2017 (approx.?)
- **Socio-economic Management Plan (SEMP)** – Includes detailed mitigation. Operational SEMP to be developed in parallel with permitting process (after submission of PP to YESAB – 2018 and beyond)

Your feedback will be gathered and considered in project plans, procedures and communications, including the SEMP





# Methodology and Overview



# Discussion

- Sustainability criteria
- Assessment areas
- Significance definitions





# Alignment between Current Effects Assessment and SFN Values and Data Sources



# Alignment with Minto Monitoring VCs

- Minto monitoring program began during Operations phase – some types of data not available for Coffee
- Minto's program relies on primary data collection – time-consuming for citizens
- Some indicators and SFN values are challenging to measure – key learnings are most welcome

*What did you learn from the Minto monitoring program?*

*How could Goldcorp learn?*





# Data on SFN included in the Coffee Project Proposal





# Overall data limitations

- No primary data on Selkirk FN
- Small communities have data suppressed due to privacy concerns
- Many FNs dispute Census findings

# Sources of information on SFN in the Coffee PP

Valued Component in Coffee PP	Sources of Data on SFN and Pelly Crossing Used in the Assessment
Traditional Land Use	<p>No primary data available</p> <p>Project's TK database (35 TK and traditional land use-related references)</p> <p>Secondary data sources (Table 8-2 in baseline report)</p> <p>Klohn Crippen Berger 2013 for Minto Mine</p> <p>Information available on Selkirk First Nation website</p>
Social Economy	<p>Secondary data (Table 5-3 in Baseline report)</p> <p>Project's TK database (35 TK and traditional land use-related references)</p> <p>Social Economy Research Network of Northern Canada</p>

# Sources of information on SFN in the Coffee PP

Valued Component in Coffee PP	Sources of Data on SFN and Pelly Crossing Used in the Assessment
Economic Conditions	<p>Secondary data sources: data and reports from Statistics Canada, Yukon Bureau of Statistics, Government of Yukon Socio-Economic Web Portal, Input-Output model by YGED</p> <p>Inukshuk Planning &amp; Development 2007 Sustainability Plan</p> <p>SFN Development Corporation website</p>
Community Health and Well-being	<p>Secondary sources: Statistics Canada, Yukon Bureau of Statistics, Government of Yukon Socio-Economic Web Portal</p>

# Sources of information on SFN in the Coffee PP

<b>Valued Component in Coffee PP</b>	<b>Sources of Data on SFN and Pelly Crossing Used in the Assessment</b>
Education Services	YESNet, SFN Government Website
Infrastructure and Services	National Household Survey, SFN website





# Land and Resource Use





# Key Themes from Research – Land and Resource Use

Potential effects for traditional land use:

- Decrease in availability of land and resources (footprint) for traditional uses
- Effects from increase in access to lands and resources
- Effects to sensory conditions
- Decrease in quality of land and resources from changes in environmental resources
- Effects to the quality of intangible cultural and spiritual resources.

With mitigation, no significant residual effects

(Significance: recognize subjective nature for characterizing; generally a significant residual effect is high magnitude, LAA or greater geographic extent, long term, in a context of low resiliency.)



# Proposed Mitigations Already in the PP – Land and Resource Use

- Project design measures to limit the size of the Project footprint and utilize the existing access routes as components of the NAR. Such measures reduce the effects of changes in land availability, and reduce changes in access for various land and resource users
- Access route construction and operation management plans
- Engagement plan
- Current traditional land and resource use enhancement measures and traditional economy enhancement measures
- Mitigation measures for air quality, sound, visual resources, water quality, vegetation, aquatics and wildlife



# Discussion on Mitigations – Land and Resource Use

What additional mitigation measures would you like Goldcorp to consider?

In particular:

- access to lands and resources
- effects to the quality of intangible cultural and spiritual resources – additional enhancement measures?



# Additional Discussion Topics – Land and Resource Use

- Unknowns
- How unknowns will be managed proactively
  - Engagement
  - Socio-Economic Management Plan (SEMP)
  - Ongoing Monitoring
- Potential Project challenges and improvements
  - Northern Access Road
- Next steps (short, medium and long term)
  - SFN input into SEMF preparation process in 2017 and 2018

*How is the SFN TLU study going?*





# Social Economy





# Key Themes from Research – Social Economy

Two subcomponents:

- Non-wage economy
  - Non-profit and non-governmental organizations
  - Volunteer sector
  - Informal social economy activities (including bartering and cooperative buying)
  - Subsistence activities
- Traditional economy
  - “Traditional Economy” generally refers to the subsistence-based economy, which is intrinsically linked to the culture, traditions, language, values, and land and resource use of First Nations.
  - Considers:
    - Traditional economic activities
    - Engagement in the traditional economy
    - Value of the traditional economy



# Non-Wage Economy

- Potential effects: Complex interactions between access, time, income, affecting subsistence activities (i.e., hunting, trapping, fishing, plant gathering, etc.) - depending on preferences and values
  - adverse and positive effects due to improved access on portion of the NAR
  - increased employment may reduce time available for subsistence activities
- Not significant residual effects were assessed

(A significant effect is generally characterized as high magnitude, any geographic extent, continuous frequency, long-term duration, with low or moderate resiliency)



# Traditional Economy

## Potential effects:

- Change in the traditional economic activities (quantity and diversity) due to changes in environmental and sensory conditions
- changes to employment and business opportunities may compete with or provide people with additional income for subsistence activities.
- Level of engagement in the traditional economy (considers access, availability of time, changes in income)

## Not significant residual effects:

- both adverse and positive access-related effects to level of engagement
- both adverse and positive income-related residual effects to level of engagement

(A significant effect is generally characterized as high magnitude, any geographic extent, long term, with low or moderate resiliency.)



# Proposed Mitigations Already in the PP – Social Economy

- Project design measures related to siting, minimizing traffic on the NAR, utilizing the existing access routes as components of the NAR.
- Traditional economy enhancement measures
- Northern Access Route mitigation – including access control at rivers for barges and ice crossings access
- Cultural awareness training
- Engagement plan





# Discussion on Mitigations – Social Economy

What additional mitigation measures would you like Goldcorp to consider?

In particular:

- additional enhancement measures?





# Additional Discussion Topics – Social Economy

- Unknowns
- How unknowns will be managed proactively
  - Engagement
  - Socio-Economic Management Plan (SEMP)
  - Ongoing Monitoring
- Potential Project challenges and improvements
- Next steps (short, medium and long term)
  - SFN input into SEMF preparation process in 2017 and 2018



# Economic Conditions





# Key Themes from Research – Economic Conditions

Potential effects for economic conditions:

- Increased employment opportunities
- Increased income and changes in income patterns
- Effects on the labour market
- Increased contracting and procurement
- Change in local economies
- Beneficial territorial economic growth
- Change in government fiscal flows

Significant positive residual effects

With mitigation, no significant adverse residual effects



# Proposed Mitigations – Economic Conditions

- Local hiring practices
- Local contracting and procurement practices
- Education and training activities
- Engagement plan
- Workforce transition strategy
- Goldcorp's Sustainability Excellence Management System (SEMS) requires the Proponent to follow standards on local employment, local procurement, training, closure and reclamation, and community contributions



# Discussion on Mitigations – Economic Conditions

- What additional mitigation measures would you like Goldcorp to consider for economic effects?





# Additional Discussion Topics – Economic Conditions

- Unknowns
- How unknowns will be managed proactively
  - Engagement
  - Socio-Economic Management Plan (SEMP)
  - Ongoing Monitoring
- Potential Project challenges and improvements
- Next steps (short, medium and long term)
  - SFN input into SEMF preparation process in 2017 and 2018



# Community Health and Wellbeing





# Key Themes from Research – Community Health and Wellbeing

Potential health effects related to:

- Changes in air quality, noise and country foods quality (from HHRA)
- Social health determinants (children and youth, and increased crime)
- Health related behaviours (increased smoking, increased substance use, changes to nutrition and reduced physical activity)
- Food security
- Accidental injuries
- Increase in infectious and non-infectious disease
- Mental health and wellness
- Health services structure and capacity

With mitigation, no significant adverse residual effects on community health and well-being



# Proposed Mitigations Already in the PP for Community Health and Wellbeing include:

- Employee and Family Assistance Program
- Visiting Elders Program
- Drug and alcohol policy
- Workplace wellness strategy, measures specific to mental health
- On-site fitness centre, healthy food choices in cafeteria
- Policies to prevent/address behavioural issues
- Potential NAR improvements
- Workplace safety program, adherence to industry safety standards
- On-site health clinic for general health concerns
- Development and sharing of Emergency Response Plan

A close-up photograph of vibrant green leaves, likely from a coffee plant, with numerous clear water droplets resting on their surfaces. The background is a dark, textured surface, possibly soil or a rock.

# Discussion on Mitigations – Community Health and Wellbeing

What additional mitigation measures would you like Goldcorp to consider?





# Additional Discussion Topics – Community Health and Wellbeing

- Unknowns and how those will be managed proactively
  - Engagement
  - Socio-Economic Management Plan (SEMP)
  - Ongoing Monitoring
- Potential Project challenges and improvements
- Next steps (short, medium and long term)
  - SFN input into SEMF preparation process in 2017 and 2018



# Education Services





# Key Themes from Research – Education Services

- Potential effects include:
  - Larger class sizes due to larger population
  - Increased demand for community-based training (could be positive or negative effect)
- With mitigation, potential adverse effects to primary/secondary enrollment in Dawson. Beaver Creek, Pelly Crossing, and Mayo have favourable student-teacher ratios and are believed able to adapt
- Potential positive effects from Goldcorp's increased demand for skilled jobs (plus voluntary contributions to training institutions such as Yukon College)



# Proposed Mitigations – Education Services

- Local hiring practices – reduce population increases that could increase demand for classroom space
- Education and Training Activities – reduce population increases that could increase demand for classroom space
- First Nations Mentoring Program – increase hiring and retention of FN employees
- Engagement Plan – working with Yukon College and others on community-based training



# Discussion on Mitigations – Education Services

What additional mitigation measures would you like Goldcorp to consider?





# Additional Discussion Topics – Education Services

- Unknowns:
  - Reliable population size baseline for smaller communities
  - Where will population-driven changes occur? Personal choice
- How unknowns will be managed proactively
  - Ongoing Monitoring: especially smaller communities on population size. SFN input on reliable data sources?
  - Engagement
  - Socio-Economic Management Plan (SEMP)
- Potential Project challenges and improvements
- Next steps (short, medium and long term)
  - SFN input into SEMF preparation process in 2017 and 2018



# Infrastructure and Services





# Key Themes from Research – Infrastructure and Services

- Includes housing, municipal services, public services, and transport (most information available in baseline report)
- Potential negative effects to infrastructure and services would be a result of population growth (more demand on existing supply)
- Potential population growth as a result of the Project likely to centre in Dawson and Whitehorse (fly-in, fly-out pickup points + significant existing population base)
- Personal choice to relocate to smaller communities such as Pelly very difficult to predict
- With mitigation, no significant adverse residual effects on infrastructure and services



# Proposed Mitigations – Infrastructure and Services


- Project design measures to minimize vehicle traffic, Project siting measures and incorporation of on-and off-site mine infrastructure
- Local hiring practices to reduce potential population increases
- Education and training activities to increase local hiring and reduce potential population increases
- Engagement Plan – coordinate with community service providers on priorities
- Emergency Response Plan – coordination with local service providers



# Discussion on Mitigations – Infrastructure and Services

What additional mitigation measures would you like Goldcorp to consider?





# Additional Discussion Topics – Infrastructure and Services

- Unknowns:
  - Reliable population size baseline for smaller communities
  - Where will population-driven changes occur? Personal choice
- How unknowns will be managed proactively
  - Ongoing Monitoring: especially smaller communities on population size. SFN input on reliable data sources?
  - Engagement
  - Socio-Economic Management Plan (SEMP)
- Potential Project challenges and improvements
- Next steps (short, medium and long term)
  - SFN input into SEMF preparation process in 2017 and 2018



# Cumulative Effects, Management & Monitoring





# Cumulative Effects - Overview

Note: Under YESAA, Cumulative Effects Assessment is the responsibility of YESAB. Proponent contributes data.

- Assessed the combination of adverse residual effects from the project with estimated adverse residual effects of other projects
- Overview of the Projects YESAB provided for inclusion
- Uncertainties in the assessment related to the other project information, including employment numbers, timeframe, and where employees will choose to live
- Completed at a level for which there is information
- Recognize that there may be community specific effects
- Assessments are based on a population driver, or a spatial assessment related to the linked biophysical VCs

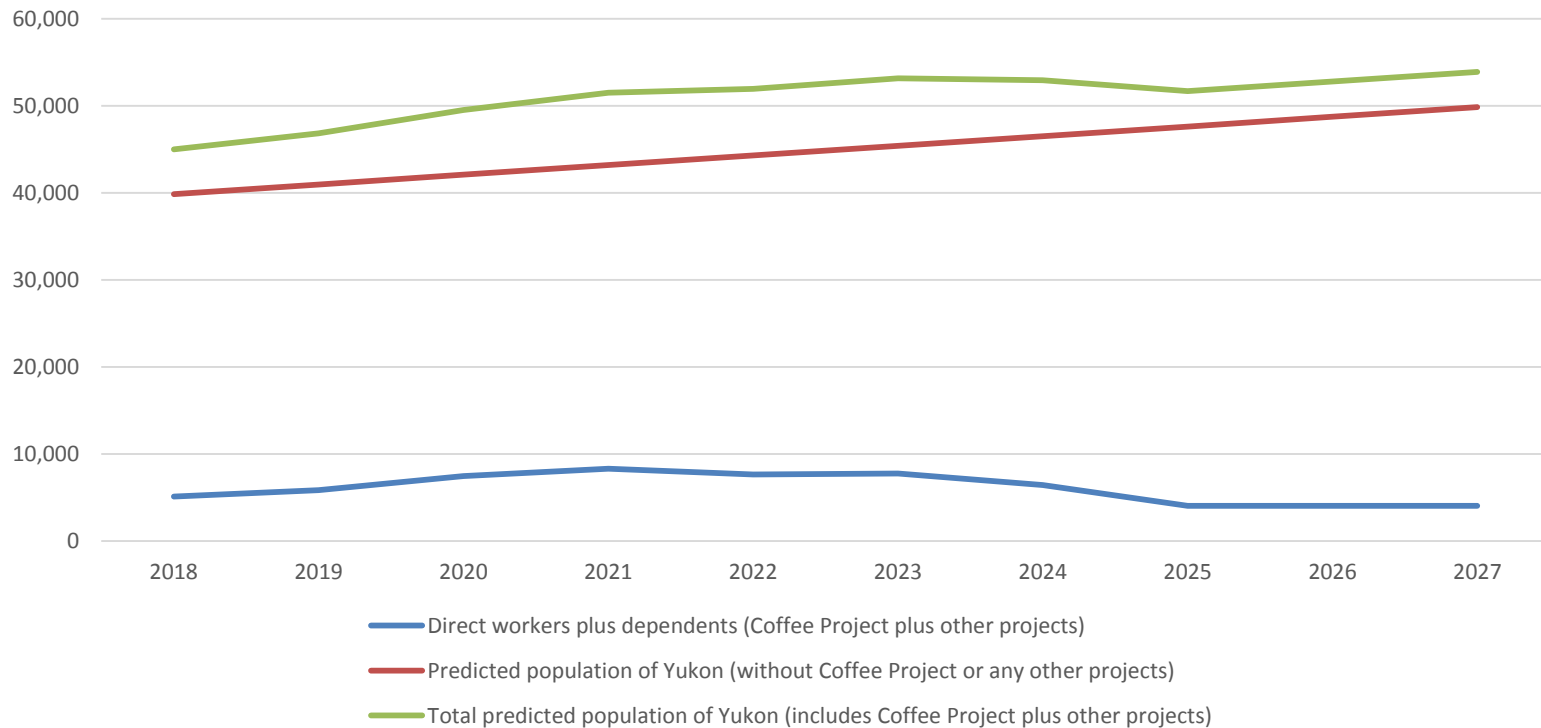


# Population Driver

- Population driver: Reviewed the following future mines:
  - Bellekeno (Alexco Keno Hill Mining Corp.);
  - Brewery Creek (Golden Predator Canada Corp.);
  - Carmacks Copper (Carmacks Mining Corp.);
  - Casino (Casino Mine Corporation).
  - Eagle Gold (Stratagold Corporation);
  - Kudz Ze Kayah (BMC Minerals)
  - MacTung Tungsten Mine (North American Tungsten Corporation Ltd. )
  - Minto (Minto Explorations Ltd.); and
  - Wolverine (Yukon Zinc Corporation)
- Adverse cumulative residual effects identified in social economy, infrastructure, education services
- Contribution of the Project is low (approximately 2 % of the driving population increase)

# Population Driver (continued)

Coffee Project + Other Projects +  
Natural Predicted Population Growth

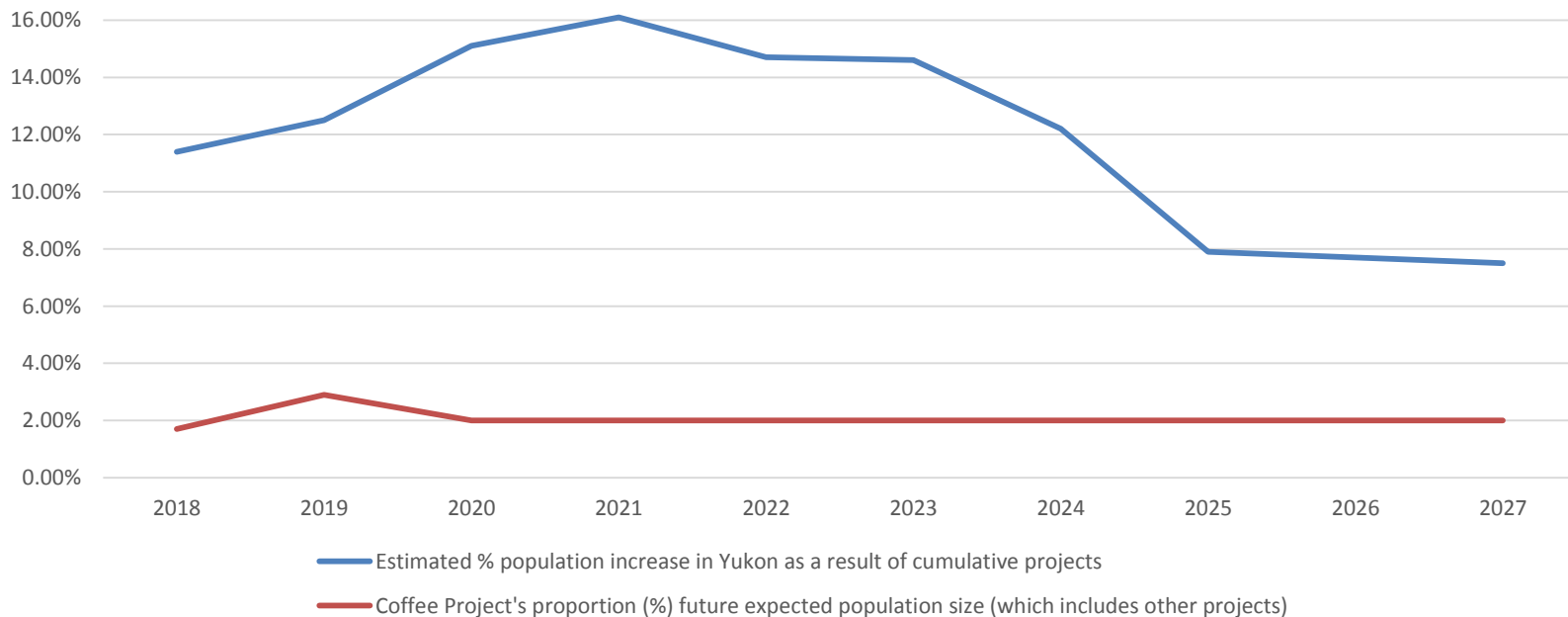


Sources: YBS Projections, publicly available information on other Projects, Goldcorp data



# Population Driver (continued)

Predicted % Change in Yukon Population from Future Projects, including Coffee Project



Sources: YBS Projections, publicly available information on other Projects, Goldcorp data



## CFX – Land and Resource Use

- Consistent with **Appendix 16-B Wildlife and Wildlife Habitat VC Assessment Report**
- Identified interactions with quartz mining, placer mining, and existing road network
- Considered cumulative effects for changes in access, sensory conditions, availability of land (footprint), quality of resources
- Based on analysis for the vegetation section, the cumulative disturbance is 9.5 % of the RAA, and the Project contributes 0.4 % of the disturbance: expected to be similar for LRU
- Not significant cumulative adverse effects to access





# GOLDCORP CASE STUDIES





# COMPARATIVE CASE STUDIES – NORTHERN COMMUNITIES





# Socio-economic Management Plan and Next Steps for Engagement



# Engagement and the SEMP Process



## Engagement

- Before end of 2017: Provide a Project update to citizens. Understand how SFN wants to be engaged on socioeconomic topics.

## SEMP Process

- Early 2018: Meet with citizens to discuss Project effects, community priorities related to VCs
- Later in 2018: Meet with citizens to discuss how community priorities are reflected in management plans, plus discuss ongoing monitoring and reporting

*How could these meetings be most successful?*

# Questions?

Contact details here







# Annex Slides

# Assessment methodology

- Issues scoping:
  - VCs selected based on consultation/identification of concerns AND relevance to the Project's potential activities
  - Spatial boundaries delineated to encompass Project activities
  - Indicators – representative, available, measurable (data is collectible)
  - Boundaries and indicators individualized for VC
- Establishing baseline conditions:
  - Reliance on secondary data, primary data limited
- Assessing potential effects:
  - Interaction table between Project activities & socio ec environment
  - Mitigation – Project design and VC-related
  - Assessment of significance of residual effects,
    - effects characteristics & significance defined for each VC



# Assessment methodology (cont.)

- Assessing cumulative effects:
  - Same process as for Project-related effects
- Monitoring and adaptive management:



# Alignment with Minto Monitoring VCs

<b>SFN Valued Component</b>	<b>Corresponding Coffee VC(s) or Other Documentation</b>
Community Stability & Well-Being	Demographics
	Community Health and Well-being
Family Stability & Well-Being	Community Health and Well-being
Health	Community Health and Wellbeing
	Human Health Risk Assessment (HHRA)
Housing	Infrastructure and Services

# Alignment with Minto Monitoring VCs

SFN Valued Component	Corresponding Coffee VC(s) or Other Documentation
Income & Income Distribution	Economic Conditions
Employment	Economic Conditions
Business	Project description
	Input/output model and Economic Conditions
	Certain info only available during Operations
SFN Traditional Economy	Land and Resource Use
	Social Economy

# Alignment with Minto Monitoring VCs

<b>SFN Valued Component</b>	<b>Corresponding Coffee VC(s) or Other Documentation</b>
Employment & Workforce Development	Project description
	Will be available in detailed management plans
Education & Training	Education Services
	Would require primary data collection
Connection to Land & Water	Would require primary data collection
Cultural Vitality	Would require primary data collection
Social Cohesion	Would require primary data collection

# Alignment with Minto Monitoring VCs

<b>SFN Valued Component</b>	<b>Corresponding Coffee VC(s) or Other Documentation</b>
Fate Control & Preparedness	Not explicitly included in the PP
	Throughout the socioeconomic VCs
Boom & Bust Management	Closure and Reclamation Plan
	Economic Conditions
Cost & Benefits for Future Generations	Not explicitly included in the PP
	Economic Conditions
Fate Control & Preparedness	Not explicitly included in the PP

# Cumulative Population

- Estimated number of direct workers and dependents

Cumulative Effects (Yukon)	Estimated Number of Workers by Year									
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Direct workers plus dependents (Coffee Project plus other projects)	5,132	5,860	7,456	8,316	7,640	7,760	6,436	4,068	4,068	4,068
Predicted population of Yukon (without Coffee Project or any other projects)	39,861	40,970	42,079	43,188	44,297	45,406	46,515	47,624	48,733	49,842
Total predicted population of Yukon (includes Coffee Project plus other projects)	44,993	46,830	49,535	51,504	51,937	53,166	52,951	51,692	52,801	53,910
% population increase as a result of cumulative projects	11.4%	12.5%	15.1%	16.1%	14.7%	14.6%	12.2%	7.9%	7.7%	7.5%
Coffee Project's contribution to future expected population size (which includes other projects)	1.7%	2.9%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%



# AGENDA

## **Selkirk First Nation and Goldcorp Operational Wildlife Impacts and Management Workshop September 22, 2017**

**Location:** Kwanlin Dun Cultural Centre, Elders Lounge Room

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

### **Selkirk First Nation (SFN)**

SFN Representatives TBA

Name Redacted

### **Coffee Project – Goldcorp Inc.**

Jennie Gjertsen, Manager, Environment and Permitting

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Name Redacted

Kelly Constable, Hemmera

### **Agenda:**

- 1. Introductions**
- 2. Workshop Format**
  - a. High level overview followed by discussion
  - b. Workshop tools (parking lot, etc.)
- 3. Terrestrial Biology Project Site**
  - a. Baseline
  - b. Effects
- 4. Terrestrial Biology NAR**
  - a. Baseline
  - b. Effects

**Selkirk First Nation and Goldcorp Operational Wildlife Impacts and Management Workshop  
 September 22, 2017**

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**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

**Selkirk First Nation (SFN)**

Dean Gill (SFN Councilor)

Cord Hamilton (Technical Advisor)

Glenn Rudman (Technical Advisor)

Chris Jastrebski (Technical Advisor)

**Coffee Project – Goldcorp Inc.**

Jennie Gjertsen, Manager, Environment and Permitting

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Anne MacLeod, EDI

Kelly Constable, Hemmera

**Action Items**

Item	Responsible Party	Due Date
Provide clarity on road management sections and consider additional classifications in the Project Proposal	Goldcorp	November 30, 2017
Clarify upgrade description and how it was used in the assessment. Include expected footprint of disturbance vs assessed.	Goldcorp	November 30, 2017
Confirm new air strip location is on a map in the Project Proposal, as well as air traffic information.	Goldcorp	Oct. 4, 2017
Commitment to additional bat baseline at the mine site with study design reflective of potential interference.	Goldcorp	Q3-2018
Provide ecosite plot visitation summary	Goldcorp	October 31, 2017
Rare plant surveys, explain process for developing study design and for selecting effort areas; include summary of efforts including locations.	Goldcorp	October 31, 2017

Provide detail for reference site selection – consideration in monitoring program for vegetation metal uptake.	Goldcorp	Q1-2018
Send SFN the ELC files	Goldcorp	Oct. 4, 2017
Consider other guidelines to compare vegetation baseline information to help provide context for vegetation metals uptake; consider for monitoring. Use agricultural and parkland CCME standards for soil in addition to industrial standards.	Goldcorp	Q1-2018
Provide rationale for truck average on the NAR.	Goldcorp	November 30, 2017
Adaptive management and monitoring plan	Goldcorp	Q1-2018

### Parking Lot Items

Item	Timeline to Address
Road governance	To be discussed with SFN leadership by Oct. 20, 2017
Mineral licks	To be discussed with SFN leadership by Oct. 20, 2017

### Summary of Discussion

#### SFN Wildlife Issues Discussion:

SFN notes that there is good hunting down the river corridors, and a lot of people went down river this year. People are really worried about caribou and sheep that go down to Fort Selkirk. They're worried about traffic with wildlife (e.g. if a moose gets hit by a vehicle). SFN suggests having people salvage if a moose does get hit. SFN also notes concerns about hunting pressure by non-First Nations people. Goldcorp discusses the current access to the Stewart River. SFN notes that a serious area for the community is the Stewart River to the Yukon River. The parties discuss what topics are of concern to other interested parties, and particularly past and potential future engagement with YG on managing moose population. Goldcorp notes that it is not certain that harvest will increase with the Project. There will be a change, but the difference the road makes is not expected to create a rush into the area for hunting. SFN notes that you can measure changes, even if the cause of the change isn't the mine, and work together on them. Goldcorp agrees.

SFN advisor asks Goldcorp to clarify road governance:

- Goldcorp explains where the YG seasonal maintenance begins and ends, and where the road is user-maintained road.
- Goldcorp is proposing that any upgrade and maintenance for the road for Goldcorp will be done and funded by Goldcorp.
- SFN advisor notes 37 km of new road is mentioned in the Proposal, but the numbers on the map don't add up to 37 km.
- Goldcorp explains that 37 is the maximum extent of build. This number is not static due to placer miner work on the road each season.
- Goldcorp explains that the Maisy May switchback for example exists, but the grades are too high, so Goldcorp has to make changes in certain areas. Upgrades are different wherever they are happening, for example culverts and re-surfacing on placer tailings will be very expensive, but not new disturbance. Also, the numbers for new road south of Yukon to the site aren't labelled on the map.
- SFN advisor notes that the discussions of closing the road in the Project Proposal are confusing; for example seasonally where it won't be maintained.
- Goldcorp explains that the new build of the road is proposed to be reclaimed. In regard to short term closure, Goldcorp provided the example where there are caribou on the road, Goldcorp hopes that other users will cooperate with Goldcorp on closing the road for a few hours if that is determined to be necessary.
- Goldcorp explains that they presented 3 potential options for road management to YG in April, and to SFN in May. Goldcorp management, YG management or a Public-Private Partnership (3<sup>rd</sup> party). Goldcorp has presented the operational management practices that Goldcorp knows they can control. YG hasn't provided any information back to Goldcorp yet, other than to express less interest in it being fully Goldcorp managed. Governance structure is not described in the Project Proposal because Goldcorp doesn't want to put something in there that Goldcorp can't deliver on; SFN understands.
- Goldcorp has control of the crossings, including barges and ice bridges.
- SFN advisor asks if the ice road is part of the road, Goldcorp replies no. There is a legal liability for Goldcorp if other people to use the ice bridge, so Goldcorp will not permit non-project vehicles on the barges or ice-bridges.
- SFN advisor discusses possibility of others building an ice bridge, and Goldcorp notes that anyone can build an ice bridge right now.
- Goldcorp notes that additional clarity around road sections and management is something Goldcorp can consider providing in the re-submission.
- SFN advisor notes that governance of the road will be of key interest for SFN
- The parties discuss various aspects of construction and road management in relation to placer miners or groups undertaking maintenance.
- SFN advisor asks about upgrades, Goldcorp explains the kinds of upgrades that will take place, noting that water management, pullouts, and surfacing are key upgrades, as well as some brushing for safety.
- SFN advisor notes that from a road upgrade perspective, the upgrades are complex. It would be good to see a breakdown of visuals where the upgrades are happening, such as vegetation clearing and widening. Goldcorp notes that's why the assessment was done on a wider footprint. Goldcorp explains how the assessment was done based on an assumption that clearing is required

for all upgraded areas. In reality, some of these areas are already cleared, so the assessment overestimates the extent of vegetation loss. However, Goldcorp explains that mapping each and every upgrade activity may be a lot of work and not change the assessment; also, this level of detail is not available at this time. SFN advisor states that the assumption needs to be clear up front, also considerations for habitat loss need to be clearer.

- SFN advisor notes the two air strips, can't find the new air strip on any maps in the Project Proposal. SFN advisor notes that the new air strip also isn't clearly discussed in terms of wildlife effects. SFN advisor wants a table of estimates of aircraft use for the mine site.

SFN advisors discusses the management plans:

- Goldcorp notes that the road management plan and wildlife management plans were included in the Project Proposal, and the company is planning to have all management plans for licensing in draft in Q1 to be reviewed by First Nation partners.
- Dust monitoring will have monitoring and adaptive management components to it, how to respond if the management isn't working.
- SFN advisor notes that having conceptual plans are helpful in assessment.
- SFN advisor and Goldcorp discuss the future dust management plan and vegetation monitoring.
- SFN advisor discusses how effects to vegetation from metals in dust are discussed in the PP, and asks about this being carried through to effects on wildlife.
- SFN advisor and Goldcorp discuss potential use of Calcium Chloride and how it may attract wildlife. Goldcorp notes that it hasn't been a major attractant in other scenarios.

Goldcorp encourages SFN to discuss road governance issues with YG and that a broader tri-partite discussion would be valuable.

**Closure Discussion:**

- SFN advisor asks about the pit backfilling components of the Proposal, and asks about pit lakes and leakage at closure.
- Goldcorp explains the pit filling and spilling in closure, including schedule. The parties discuss channeling and potential measures to avoid trapping wildlife around and in pits in closure. Goldcorp describes how closure is an ongoing discussion with First Nations over the life of mine depending on the concerns. Goldcorp has committed to putting boulder fences around the pits where there are steep areas. Goldcorp notes that there might be more backfill as well, which will change the closure plan.

Goldcorp clarifies that the vegetation management plan will be developed for licensing:

- Goldcorp describes how there will be a monitoring and adaptive management plan for all plans that require monitoring and adaptive management where appropriate. SFN advisor states that they are currently looking at ways to make sure that the appropriate things are monitored. Goldcorp encourages suggestions at this stage of plan development.

**2017 Baseline Work to date Discussion:**



Goldcorp gives an overview of the wildlife studies done in 2017 and findings.

- Goldcorp describes the cliff-nesting raptor survey findings for 2017.
- Q: SFN advisor asks about the peregrine falcon surveys on the Stewart River, asks if the nest was near the barge landing.
- A: Goldcorp explains where the nest is, noting it is down river of the barge landing. SFN advisor notes there will be blasting on the north side Stewart River barge landing (which is relatively close to the nesting site), Goldcorp explains mitigations and restrictions in place for nesting raptors.
- Goldcorp will review the wildlife/traffic camera program, including the wolf use of NAR corridor study.
- Goldcorp describes the Ballarat sheep surveys conducted in the late winter, lambing and summer seasons, and noted that there have been 4 ewes each time.
- Q: SFN advisor asks if the surveys include the sheep at Pelly\Minto.
- A: Goldcorp explains that only one of the baseline surveys went from the Pelly confluence to the White River confluence. The Pelly population is well monitored, so Goldcorp only did it one time. It is noted that this population is monitored by YG.
  
- Goldcorp describes the late winter moose and caribou survey completed.
- Q: SFN advisor asks how YG moose survey data compares to Goldcorp's.
- A: Goldcorp explains that YG hasn't done a late winter survey since Goldcorp/Kaminak started. Goldcorp works closely with YG on the surveys, follows similar protocols to YG, and collaborated on a few surveys. Goldcorp has been working with YG Dawson Region Biologist since 2014, collaborated on baseline program development. For example, Goldcorp and YG did sharp tailed grouse studies at the same time and worked together closely on this.
- Goldcorp describes NAR studies conducted this summer in response to comments received from YESAB.
- Q: SFN advisor asks what they were looking for?
- A: Goldcorp replies wildlife features like mineral licks, large stick nests. Also documented wildlife and habitat observed. Goldcorp found a mineral lick along the Barker Creek section of the road, and are now looking at the road alignment to see if adjustments can be made to avoid the mineral lick.
- Q: SFN advisor asks about the location information sharing and putting wildlife cameras up at the lick.
- A: Goldcorp notes that the location of the lick is considered confidential in order to protect the site and the wildlife that use it. The location will be shared in confidence with reviewers as required. Goldcorp explains that remote cameras have been set up at the lick and will be revisited later this fall to get photos. No animals were seen at the lick, but it was heavily tracked by moose.
  
- Q: SFN advisor asks if there are any additional surveys planned for 2017.
- A: Goldcorp responds that the remote camera program is ongoing. Additionally, Goldcorp is planning a fall grizzly bear den survey, pending further discussion with YG. Goldcorp notes
- the challenges to date with spring den surveys for grizzly bear dens due to the issues with snow coming off the slopes too quickly so you can't back track the tracks to the den. The plan is to try

to do a survey for when bears are digging their dens. SFN advisor notes high potential in Ballarat and Yukon River areas, and recognizes the challenges.

Goldcorp discusses the construction management plan updates and how the details from the EA will be brought into that, particularly related to wildlife procedures.

### **Bat Surveys:**

SFN advisor brings up the methodology, and notes that more work could have been done at different times of year to allow for local variability in survey conditions:

- Goldcorp explains that the surveys were for presence / absence. At the lower elevations, Goldcorp found presence, but at the mine site bats were not detected, which was to be expected.
- SFN advisor notes the noise in the recording system, so there was interference.
- Goldcorp agrees that there was some interference, but believes that there is enough data to say if bats regularly used the area.
- SFN advisor and Goldcorp discuss additional bat surveys and what this information would mean for management purposes.
- SFN advisor notes it was inconclusive due to methods and some interference for the mine site location. SFN advisor suggests that this will be an issue that comes up.
- Goldcorp notes that methods could have been better described. SFN advisor requests additional bat baseline at the mine site, Goldcorp agrees.
- Goldcorp and SFN advisors discuss ways to reduce interference with helicopter noise and other exploration activities, such as timing of surveys.

### **Fur Bearers and Trapped Species:**

SFN advisor notes that a specific assessment was not done. Goldcorp is looking at a habitat model and effects assessment for American marten to address concerns raised by First Nations.

### **Vegetation Baseline Discussion:**

SFN advisor asks about Ecological Land Classification (ELC) vs broad ecosystem mapping, and why there were two types of mapping done:

- Goldcorp explains that two types were done because one is more detailed. ELC provides more detail but requires more time and resources to complete, broad ecosystem mapping provides a similar product but with less detail. ELC was completed at the proposed mine site and along the new sections of road – the higher level of detail is required there to feed into closure and reclamation. Broad ecosystem mapping was completed along the existing sections of road – because Goldcorp will not be reclaiming these sites, the mapping was only required to help support the project effects assessment, the broad ecosystem mapping provides a sufficient level of detail to support this.

- SFN advisor notes that with two types of mapping, you're being more conservative when you're looking at habitat loss of a single habitat type because they are repeated across the two types.
- Goldcorp explains that the broad ecosystem mapping for wetlands collected almost ELC level mapping due to the high interest of wetland habitat.
- Q: SFN advisor asks if the use of ELC vs broad ecosystem mapping was partially due to the available imagery?
- A: Goldcorp explains that both ELC and broad ecosystem mapping were based on ortho and LiDAR collected for the whole NAR; same imagery used for the entire Project.
  
- Q: SFN advisor asks if there would be a benefit to expanding the ELC to cover the areas currently mapped using broad ecosystem mapping?
- A: Goldcorp replies that it wouldn't change the effects assessment, mitigation, or management. Acknowledges that having two types of mapping makes it slightly harder to decipher, but does not change the assessment. SFN understands.
  
- Q: SFN advisor asks for a summary table of plot distribution for visits to ecosite types. Looking for over/under visitation of sampling by ecosite type.
- A: Goldcorp agrees.
  
- Q: SFN advisor asks how rare plant surveys were set up and how decisions around total extent of the survey area were made, and how target areas for rare plant potential were established.
- A: Goldcorp replies that the efforts were not limited to just the footprint, they were targeted to the LSA, which was within 1 km of the NAR. Sites were selected based on vegetation communities that existed in the area from Ortho data and information on the region, and later ELC data, and an assessment of stratification of the rare plant potential in the area. There was an aerial overview of the pre-field stratification of the area to verify it, then followed by ground surveys. Targeted surveys for a few sites took place in 2016 that came up in ecosystem mapping. Goldcorp describes how tors and pingos were targeted at the site and along the new sections of NAR.
  
- SFN advisor suggests describing this story more in the Project Proposal — from an assessment perspective want to know that the effort was put in.
  
- Q: SFN advisor asks if the rare plant survey efforts were extended to new portions of the road?
- A: Goldcorp explains the timing of this and confirms it happened.
- Q: SFN advisor asked to have detail on the location of rare plant survey efforts (discrete and in the context of vegetation types), including points and/or track lines, which was agreed by Goldcorp.

### **Vegetation Metals Uptake Discussion:**

SFN advisors and Goldcorp discuss reference sites:

- SFN advisor asks about reference sites at Moose and Thistle Mountain, notes Moose Mountain doesn't have access but Thistle Mountain could. Asks if Thistle Mountain is a valid reference point.

Notes that it could have influence from placer or other mining, but not from the Project, and SFN advisor just needs to understand the rationale for the reference sites.

- Goldcorp explains how areas of mineralization have metals content in plants, and that exploration teams use metal levels in plants to find mineralization. Goldcorp will review and possibly refine reference sites as the monitoring programs are being developed.
- SFN advisor explains that both reference sites are likely of value, but that clear objectives for their use in the context of current land use need to be made (i.e., influences from the project or from other anthropogenic activity).

SFN advisor asks about what other site information was collected at the trace metal sample sites, specifically referencing site soil moisture regime and willow species. Concerned about the ability to detect project change if there is too much variability in the data.

- Goldcorp explains ELC has the soil moisture regime information, and has the trace metals information. Where trace metals were done not in conjunction with ELC, then the soil moisture data isn't available.
- Goldcorp can look at additional data collection for future monitoring opportunities and notes that additional data collection may also be useful for closure planning.
- SFN advisor notes the variance in results for the metals uptake in plants, and wants to be comfortable with the data, and looking to see if there's additional data that can be used to look into this further, SFN advisor wants to know if there could be a residual effect of metals contamination. SFN advisor wants to know if the information is there to effectively monitor and manage.
- SFN advisor notes that it's also about the monitoring species, maybe willow is too variable and maybe stick with lichen.
- Goldcorp can share the plot data.

SFN advisors and Goldcorp discuss metals uptake in plants:

- Q: SFN advisor asks about comparing metal levels to the Canadian Council of Ministers of the Environment (CCME) industrial standards rather than the parkland or agricultural standards.
- A: Goldcorp explains that this is consistent with what is done elsewhere, is happy to look at different reference points if SFN wants. It's a reference for comparative purposes, not a standard that Goldcorp is trying to achieve, as the standards are for contaminated soil and not for plants
- SFN advisor suggests comparing where the industrial standard and agricultural standard deviate.
- Goldcorp explains that this will not change the effects assessment, but would potentially be useful in monitoring and setting thresholds for adaptive management.
- Q: SFN advisor asks if there were considerations for the agricultural consumption guidelines in presenting the baseline results.
- A: Goldcorp replies that this wasn't considered too far in the baseline, but can be looked at much more closely in monitoring and setting thresholds.

- SFN advisor notes that for people to understand, these standards would provide context. Goldcorp agrees.
- Goldcorp and SFN advisors discuss monitoring thresholds for metals uptake in plants. Goldcorp expects the dust management plan to handle immediate dust-vegetation related issues.
- Goldcorp describes the uses for metals uptake in plants studies. Goldcorp notes that it is important to know about metals uptake in plants in closure, as this would be related to metals in soil.

### **Baseline Discussion:**

SFN advisor and Goldcorp discuss air quality monitoring:

- Goldcorp explains that there is additional modeling being done to reflect the changes to the mine plan.
- Q: SFN advisor asks about NAR air quality modeling?
- A: Goldcorp explains that there are more dustfall monitoring being done along the NAR. This is being done because it was somewhat smokey when information was collected the first time. There is also noise information being collected along the NAR. The noise/air quality information will likely go in the PP resubmission.

Goldcorp explains the resubmission plans for the PP. Goldcorp explains that if there are errors in the conclusions, then Goldcorp will open the PP back up. Commitments can be made in the re-submission as well regarding mitigations and future work.

- SFN advisor notes that looking at the PP and the NAR, SFN advisor has a pretty good understanding of the Project.
- SFN advisor understands the moose population in the area, and the fluctuations in the caribou presence in the area, SFN advisor notes there's not enough information on the Klaza caribou herd to know if it's expanding.
- SFN advisor notes there are low numbers of sheep, good raptor numbers in the Ballarat area.
- SFN advisor and Goldcorp discuss sheep crossing the NAR.
- SFN advisor notes that there is good information on most wildlife, but more information is needed on Grizzly bears.
- SFN advisor notes that one of their biggest issues is with the NAR, SFN advisor doesn't feel that the effects assessment went far enough.
- SFN advisor thinks the number of mine related vehicles is underestimated at 8 trucks per day. SFN advisor doesn't think this includes all of the other trucks and vehicles on the NAR, e.g., consultants, road maintenance trucks, that are mine related. SFN advisor notes that there will then be other people who will use the road, especially as more people learn about the NAR and the improved access it allows to wilderness areas.
- Goldcorp replies that there is rationale for the 8 trucks per day and will provide that to SFN.
- SFN advisor notes that their concerns along the road include sensory disturbance, wildlife injury and fatality. SFN advisor also notes cumulative effects as a concern.



- SFN advisor notes that a sensitivity analysis on traffic levels might not change the effects assessment, but it might change the commitment to mitigations. Goldcorp has committed to monitor and enforce speed limits for any mine-related vehicle.
- Goldcorp can make this clearer in the PP, as this is a full commitment. SFN advisor notes that the road may allow current users to drive faster. Goldcorp notes that conditions aren't going to change significantly on Hunker and Sulphur. Sulphur south to the Stewart River is the specific section where SFN's issues are being raised.
- Q: Goldcorp asks for SFN's suggestions?
- A: SFN advisor states that the road governance issue is the piece that needs to be worked out first. SFN agrees that the Stewart to Yukon River section of the NAR will have a lesser effect. SFN advisor also believes that people will put their own barge landing in due to the upgraded and improved access to the Stewart River.
- Goldcorp and SFN discuss how people access hunting in the area, which is both by boat and vehicle.
- Goldcorp discusses ways to look at monitoring the road, such as characterizing the traffic on the NAR. While this may be more reactive, it's still monitoring and looking to manage.
- SFN states that this is upgrading a public road and making it easier to get to areas that are currently not accessed. When you improve access, it's going to have an effect and there's not much you can do about it.
- SFN advisor states that vehicle numbers, vehicle speeds can be sorted out, but need to talk more about monitoring. SFN advisor notes that there's an expectation that when you put in a resource road, that hunting will increase in the area.
- Goldcorp notes that the road does mostly exist now. Goldcorp clarifies that some game management sub zones in the Dawson area are close to sustainable harvest.
- SFN advisor thinks that the effects were underestimated. SFN advisor notes that people will drive a long way to hunt a moose.
- SFN advisor wants Goldcorp and SFN to talk to YG about controlling moose harvest in the area; Goldcorp wants to promote a healthy moose population in the area and look for ways to do this.
- Goldcorp acknowledges that this effect may exist and wants that to be very clear to SFN. It's about monitoring it to see the magnitude of this effect.
- Goldcorp asks SFN for feedback on future studies on the road, as this will be an effective step forward. Goldcorp needs to find ways to work together on management of the NAR.
- SFN advisor notes that Casino was choosing to go through Settlement Land to give the First Nation control over the area.
- Goldcorp replies that the only place that could happen is in the Black Hills area, and that area is not suitable for a road. Furthermore, it is understood by Goldcorp that TH doesn't want a road through their settlement land.
- SFN advisor and Goldcorp look at the traffic camera data, and SFN advisor states that there is currently a clear trend north to south with more traffic in the north.

- SFN advisor wants to see the new airstrip location and information on the number of flights expected. There are mitigations for the flights and flight areas, but it's not clear how you got there without the numbers. SFN notes that this may require an effects assessment for aircraft.
- SFN advisor doesn't see effects to caribou being a big issue, aside from possible collision mortality.
- SFN advisor notes that the effects assessment is based on current caribou populations and range, but doesn't account for future population size.

### **Wildlife Protection Plan Discussion:**

SFN advisor notes that some of the monitoring and adaptive management don't seem to end up in an actionable item, and makes some suggestions:

- Regarding the late winter aerial survey monitoring for moose and caribou, SFN advisor suggests splitting caribou and moose out, as they are two species that behave differently. SFN advisor notes that the monitoring provides useful data, but few meaningful mitigation actions exist based on the monitoring results.
- SFN advisor suggests revisiting the bigger surveys and determining what you get out of the surveys. SFN advisor notes for example, sheep surveys every year might be more damaging than the mine, and Goldcorp should consider year 1, 7, 12 data, not years 1, 2, 3.
- Goldcorp explains that some monitoring is to make other parties feel comfortable that the monitoring is going on, and may not actually indicate mine impacts
- SFN advisor notes that the monitoring plans start well, but don't result in clear actions.
- Goldcorp thanks SFN for the feedback, and notes that engagement on this is important for the monitoring programs in the management plans.
  
- Q: Goldcorp asks what can be done today to help with the monitoring program?
- A: SFN advisor notes that the connection of the monitoring program to adaptive management needs to be clearer. SFN advisor notes caribou monitoring and the action that Goldcorp will take, what will the action be. More monitoring by itself is not a mitigation measure.
  
- Goldcorp and SFN advisor discuss caribou on site, and Goldcorp explains that if caribou end up hanging around site, Goldcorp will engage YG and First Nation partners to figure out a solution.
- SFN advisor would like to see consideration that there are options for action on the ground if there are caribou on site.
- Goldcorp and SFN advisor discuss the phased response levels for certain wildlife mitigations, and Goldcorp will make it clearer how the phases are triggered and how it's thought through. Goldcorp and SFN advisor agree that the best place for this is in the management plan.
  
- SFN advisor notes the minimum buffer for a mineral lick in the forestry regulations is 200 m which Goldcorp follows.
- SFN advisor discusses best practices, notes that 2 km has been suggested on other Projects.

- Goldcorp is looking to push the road as far away as possible from the mineral lick, noting that there's not 2 km to work with in the valley.
- SFN advisor notes that the construction timing might be more of an issue for the raptors and sheep than effects during operations.
- SFN advisor is not overly worried about the bird aspect at this point, but is doing further review. SFN advisor notes that the events ponds are small compared to lakes and other water bodies, and there are ways to keep waterfowl from landing on the ponds. SFN advisor and Goldcorp also note that the alpha pond water is not expected to have any kind of toxicity, so not a concern really for birds landing in the pond.

### **EA Discussion:**

SFN advisor wants to see a good commitment to mitigations that are selected and that the mitigations make sense and will get carried through to the decision document. In some cases, there is language that doesn't have a commitment to doing something, such as "where possible" language. SFN advisors and Goldcorp discuss the commitments in the EA.

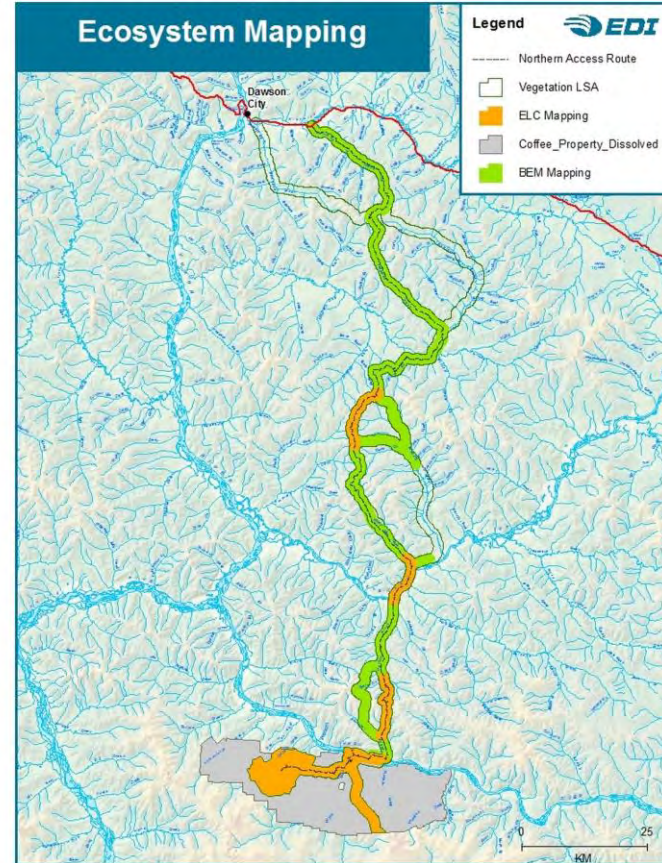
SFN advisor and Goldcorp discuss challenges with assessment of traditional and medicinal plants. It is noted that traditional and medicinal plants encompass a wide range of species. Goldcorp explains the rationale for selecting berry-producing plants as a surrogate. SFN advisor suggests that rare species could be used as a surrogate but notes that rare habitats are considered in the ELC as well, and look at proportionate effects, notes this looks like this has been captured in the VC.

- Q: SFN advisor asks about the index that was developed for assessing berry production for the plots and where there may be a lack of data in some plots.
- A: Goldcorp will address this with the ecosite plot visitation summary.
  
- Q: Goldcorp asks SFN advisor what parameters and species that would be the greatest importance to SFN? Example of a pathway is arsenic to moose. Asks if there's a specific pathway and contaminant with an animal that raises the biggest question?
- A: SFN advisor replies that larger ungulates move around and that given the scale of the Project the effect on such wildlife may be smaller.
- SFN advisor notes that it didn't talk about small mammals and how trace metals move up the trophic scale.
- Goldcorp explains that this is part of the adaptive management and monitoring program, but there aren't plans to add another baseline sampling event for small mammals.
- Goldcorp notes that if it is of interest to have more studies done on this, Goldcorp can do this.
- SFN advisor would like to avoid going out every few years to kill small mammals for these data, Goldcorp agrees and would like to keep this as an adaptive management measure.
- SFN advisor would look to define more mitigation and recommendations on management to be comfortable with the Project.

SFN advisors will review with SFN government and might need to follow up on some aspects if they were missed.

End of meeting at 4:25 pm.

- Ecosystem mapping
- Rare plants
- Invasive plants
- Trace metals analysis
- Traditional/medicinal plants
- Reclamation research



- Assessment of effects based on:
  - **Ecological communities** — loss of ecological communities (based on ELC/BEM mapping)
  - **Wetland habitats** — loss of wetland habitat
  - **Traditional and medicinal plants** — loss of berry-producing communities
  - **Rare plants** — loss of potential rare plant habitats
  - **Vegetation health** — qualitative assessment of risk of increased concentration of trace metals



- Point count surveys
- Cliff-nesting raptor surveys
- Waterfowl surveys
- Targeted surveys for potential species at risk: common nighthawk, short-eared owl, horned grebe, rusty blackbird, sharp-tailed grouse



- Assessment of effects based on:
  - **Sharp-tailed grouse** — loss of known lek sites
  - **Cliff-nesting raptors** — loss of known nest sites
  - **Passerine species** — loss of high suitability habitat
  - **Upland-associated species at risk** — loss of high suitability habitat for common nighthawk, olive-sided flycatcher, and short-eared owl
  - **Wetland-associated species at risk** — loss of high suitability habitat for horned grebe, red-necked phalarope, and rusty blackbird
  - **Bank swallow** – loss of known nesting colonies

# Wildlife Baseline Studies

Survey Type	Target Species	Dates Conducted
Early Winter Moose Surveys	Moose	November 2015
Late Winter Ungulate Surveys	Moose and caribou	February 2014, March 2015, March 2016
Aerial Thinhorn Sheep Surveys	Thinhorn sheep	November 2015 (early winter) February 2016 (late winter)
Ground-based Sheep Investigations	Thinhorn sheep	May – August, 2015
Ballarat Creek Sheep Trail Investigations	Thinhorn sheep	May 2015- Ongoing
Grizzly Bear Den Surveys	Grizzly bear	March – April 2016
Snow Tracking Surveys	Caribou, moose, wolves, wolverine , furbearers	February 2015, February 2016
Remote Camera Studies	Thinhorn sheep, moose, caribou and wolves. Traffic use.	May 2015 - Ongoing
Mineral Lick Investigation	Ungulates	August 2015
Acoustic Bat Surveys	Bats	August 2014
Collared Pika Surveys	Collared pika	August 2014, August 2015
Small Mammal Trapping & Baseline Contaminants Program	Mice and voles	August 2015
Pellet Removal Plots	Caribou	Summers of 2014 and 2015
Caribou Pellet Collection and Dietary Analysis	Caribou	Summer of 2014
Java Road Wildlife Trail Investigations	All species	Summer of 2014
Incidental Wildlife Log	All species	Ongoing

- Assessment of effects based on:
  - **Caribou** — habitat loss (Fortymile Caribou: winter habitat, Klaza Caribou: year-round range), mortality risk (Fortymile), alteration to movement (Fortymile)
  - **Moose** — habitat loss (late winter habitat), mortality risk
  - **Thinhorn sheep** — habitat loss (year-round habitat), alteration to movement
  - **Grizzly bear** — habitat loss (denning, security, linkage and foraging habitat), mortality risk
  - **Wolverine** — habitat loss (denning habitat), mortality risk
  - **Little brown myotis** — habitat loss (roost habitat)

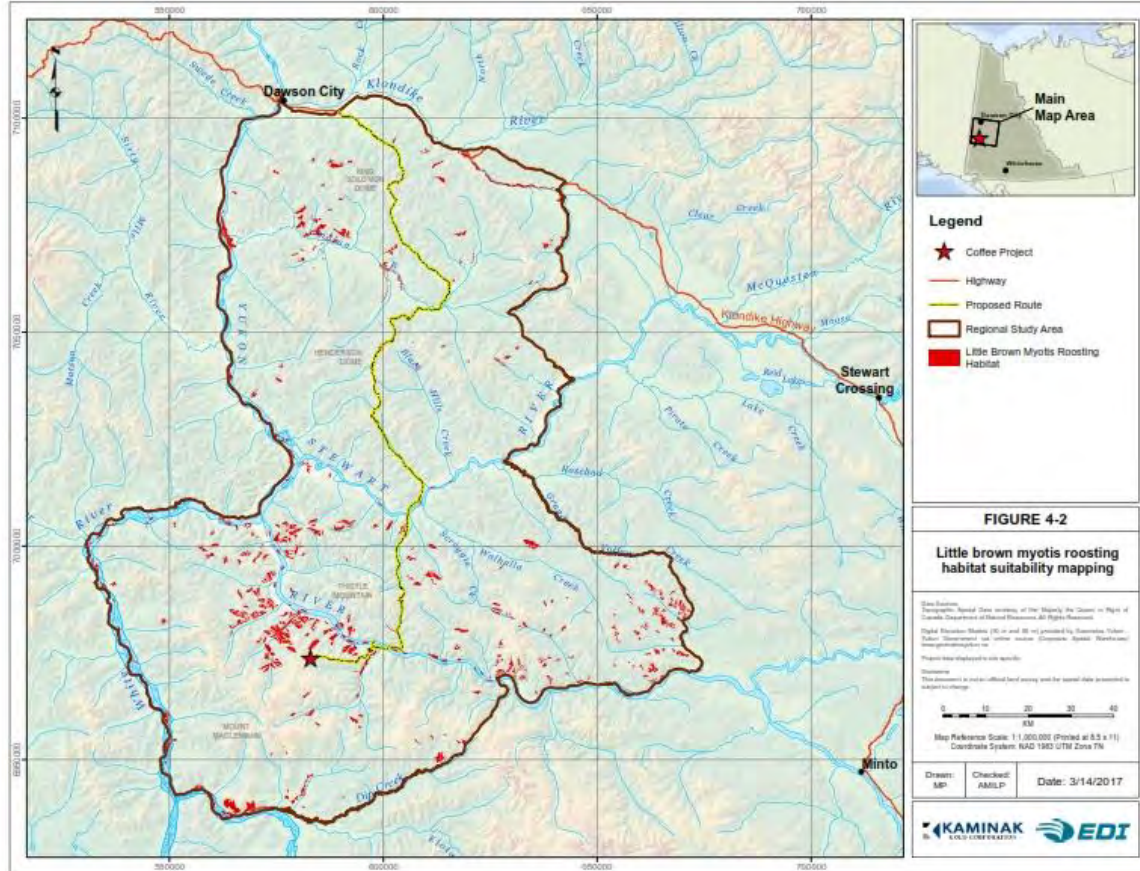
- Ongoing remote camera studies
- Aerial late winter moose/caribou survey
- Aerial sheep surveys: late winter, lambing, summer
- Cliff-nesting raptor survey
- Mineral lick surveys
- Survey of new sections of NAR





# Key Topics: Bat Surveys

- 2014 surveys confirmed presence in Yukon River Valley, not at mine site
- Habitat suitability mapping based on forest age and elevation



## Key Topics: Grizzly Bear Den Surveys

9

- Spring survey conducted March/April 2016
- Planning a fall survey in 2017 pending further discussion with Yukon Environment



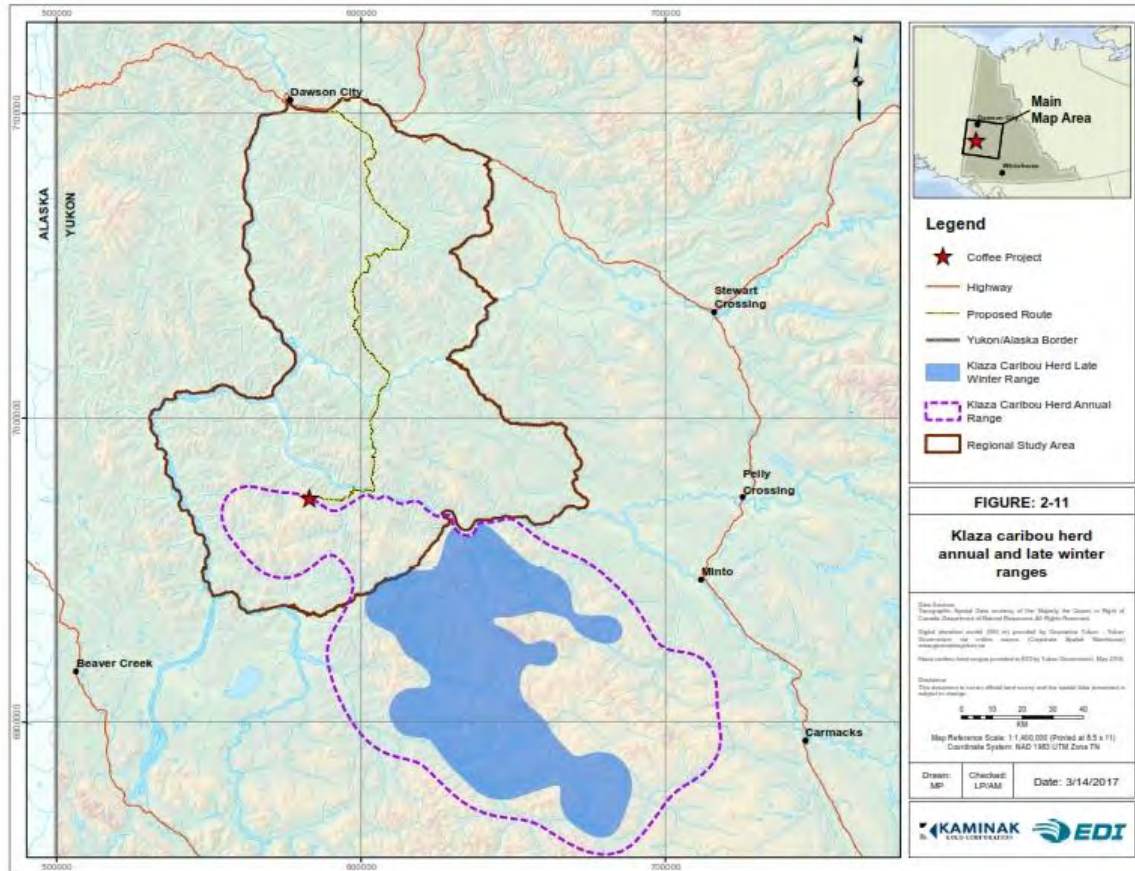
- 2017 surveys to follow up on Maisy May lick failed to locate a lick
- Survey of new sections of the proposed Northern Access Route located a mineral lick in Barker Creek drainage

# Key Topics: Trapped Species & Effects Assessment

**Table 3-6. Furbearer harvest statistics from registered trapline concessions that interact with the RSA north and south of the Stewart River.**

Animal	Mean annual harvest (2004-2013)		Minimum annual harvest (2004–2013)		Maximum annual harvest (2004–2013)		Total Harvest (2004–2013)	
	North	South	North	South	North	South	North	South
Beaver	19.3	9.8	0	0	45	55	193	98
Coyote	0.5	2.3	0	0	2	7	5	23
Arctic fox	0.4	0	0	0	3	0	4	0
Red fox	9.3	2.8	0	0	23	5	93	28
Lynx	78.1	22.5	18	5	157	64	781	225
American marten	182.4	75.6	77	4	440	170	1,824	756
Mink	3.5	1.5	0	0	14	4	35	15
Otter	0.3	0.2	0	0	2	2	3	2
Red squirrel	14.1	10.6	0	0	52	86	141	106
Weasel	12.7	1.2	3	0	40	5	127	12
Wolf	10.1	5.7	1	3	24	8	101	57
Wolverine	6.3	3.9	2	0	12	8	63	39



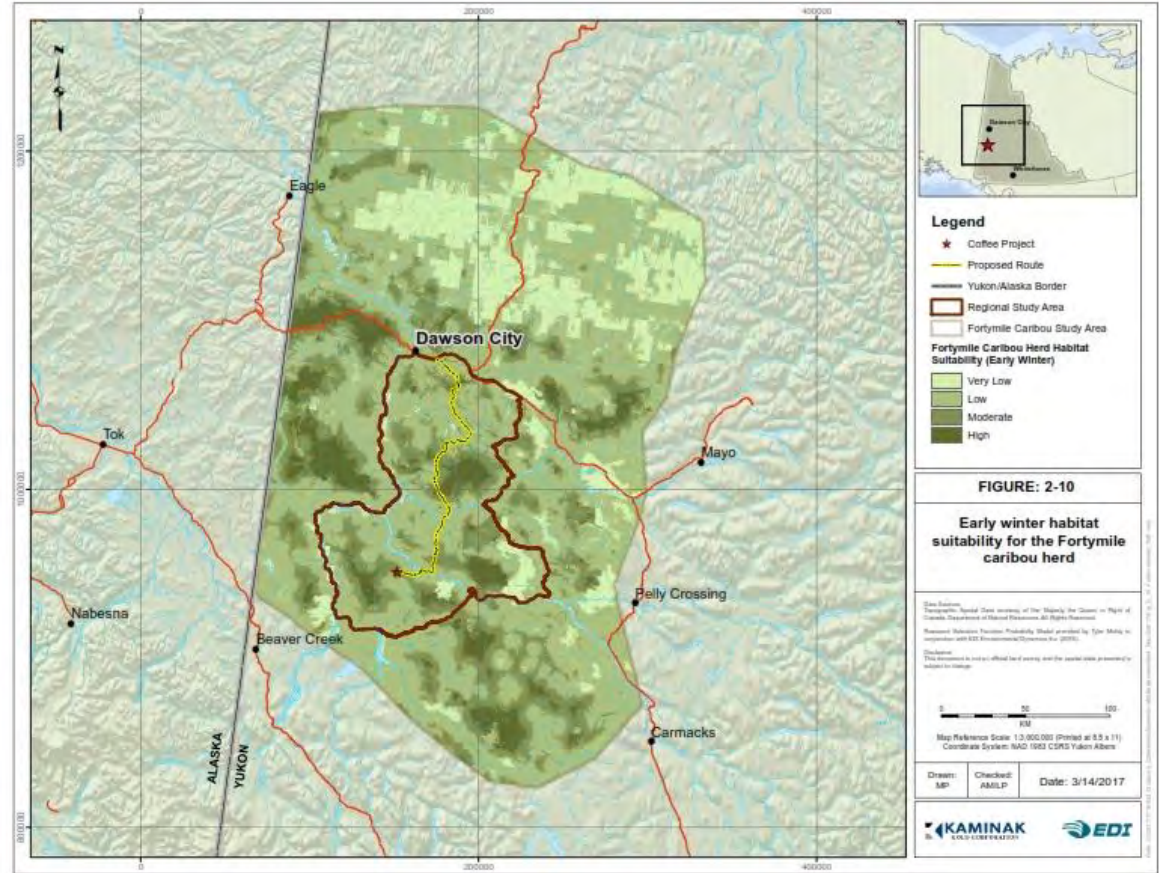
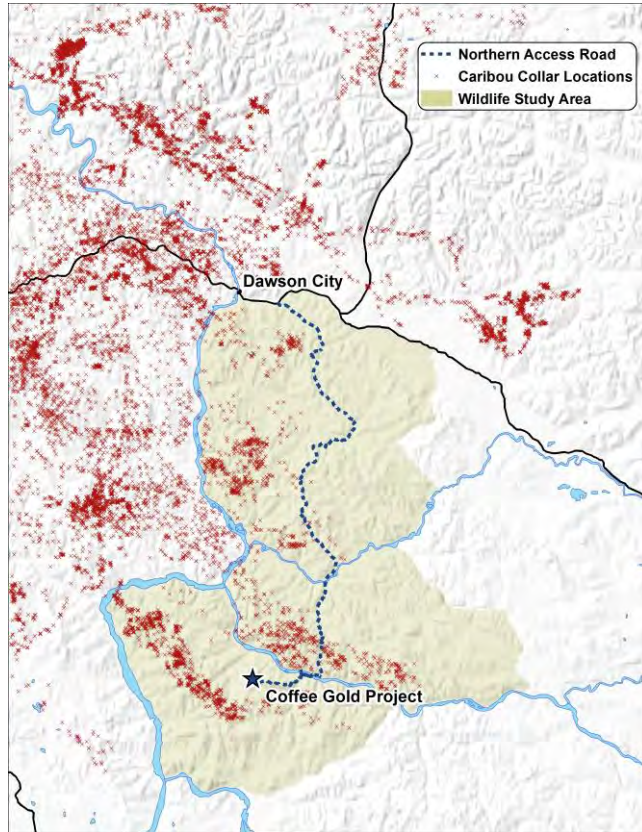




## Project observations of suspected Klaza caribou in the Project RSA

Date	Number	Description	Location	Source
8 Sept 2010	2	Female caribou with calf seen near the south Kona zone	Near Kona deposit	Camp wildlife log
20 Sept 2010	17	Group of 17 caribou near the “B52 Saddle”	Headwaters of Halfway Creek; between Latte and Kona deposits	Camp wildlife log
11 Sept 2011	5	... resting on west side of Supremo hill: 3 adults, possibly 2 sub-adults.	Near Supremo deposit	Camp wildlife log
Late summer 2012	Unknown	Helicopter pilot reported that he saw caribou in small groups on the ridges ...	Coffee Property	Access 2014
4 Aug 2013	1	Caribou at km 13 on Java Road. Possibly a yearling.	Km 13 on Java Road <sup>2</sup>	Camp wildlife log
18 May 2014	1	Caribou at km 9.5 on Java Road. Possibly a yearling.	Km 9.5 on Java Road <sup>2</sup>	Camp wildlife log
22-24 June 2014	12	Group of 4 bulls, 6 cows and 2 calves observed in alpine area along alternate road alignment between Coffee and Casino	In southeast section of Coffee Property (~ 20 km southeast of proposed mine site)	Bbreeding bird surveys
28 July 2014	2	2 adult male caribou between km 9 and km 12 on Java Road.	Km 9 and km 12 on Java Road <sup>2</sup>	Camp wildlife log
7 July 2015	2	2 caribou crossed the road near exploration laydown area.	Laydown area near Supremo deposit	Camp wildlife log
8 July 2015	1	Caribou at km 17 on Java Road	Km 17 on Java Road <sup>2</sup>	Camp wildlife log
20 July 2015	1	Caribou along road between Latte and Supremo	Road between Latte and Supremo deposits	Camp wildlife log
11 Aug 2015	1	1 male caribou along Java Road at km 16.5.	Km 16.5 on Java Road <sup>2</sup>	Camp wildlife log
13 Aug 2015	1	1 male caribou along Java Road at km 17.4	Km 17.4 on Java Road <sup>2</sup>	Camp wildlife log
12 May 2016	1	Caribou observed along Java Road at km 16	Km 16 on Java Road <sup>2</sup>	Camp wildlife log
13 May 2016	1	Caribou along Java Road at km 17, possibly a yearling.	Km 17 on Java Road <sup>2</sup>	Camp wildlife log
8 June 2016	1	Caribou at Latte deposit	Near Latte deposit	Camp wildlife log
18 June 2016	3	Caribou observed along Java Road at km 17.9	Km 17.9 on Java Road <sup>2</sup>	Camp wildlife log
6 July 2016	1	Caribou observed along Java Road at km 13.5.	Km 13.5 on Java Road <sup>2</sup>	Camp wildlife log
19 July 2016	1	Caribou observed along Java Road at km 12.	Km 12 on Java Road <sup>2</sup>	Camp wildlife log
28 July 2016	1	Caribou at Supremo Hill	Near Supremo deposit	Camp wildlife log
7 Aug 2016	2	Caribou observed near core farm gravel pit.	Coffee Property – near exploration airstrip	Camp wildlife log
28 Aug 2016	15	Caribou at Kona deposit.	Near Kona deposit.	Camp wildlife log
27 Sept 2016	2	Caribou seen at WB15-05	Headwaters of Latte Creek...	Camp wildlife log

Fortymile Collar Distribution (2013 – 2016)



- Potential effects include habitat loss, increased mortality risk, alteration of movement
- Mitigation outlined in Wildlife Protection Plan and the Access Route Construction and Operation Plans



**DRAFT Tr'ondëk Hwëch'in and Goldcorp  
Water Management Workshop**

**September 28 and 29, 2017**

**Location:** High Country Inn, Room A

**Tr'ondëk Hwëch'in (TH)**  
Name Redacted

**Coffee Project – Goldcorp Inc.**

Jennie Gjertsen, Manager, Environment and Permitting

James Scott, Manager, Engineering

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Names Redacted

Kelly Constable, Hemmera

**Agenda:**

**September 28<sup>th</sup>, 2017**

1. **08:30 – 9:00** Introductions and Objectives
2. **09:00 – 9:30** Work completed in response to action items from June 5 and 6, IRs
  - a. Incorporation of suggested additional water quality monitoring stations for baseline program (presentation material)
  - b. Site Conceptual Model – two approaches prepared (presentation material)
  - c. Water quality model loadings – pie charts of sources and loadings (presentation material)
  - d. Water balance model verification – does the water balance, balance? (presentation material)
  - e. Active water treatment concerns (presentation material)
  - f. Development of Water Quality Objectives (memorandum to be issued September 27)
  - g. HLF Semi-passive treatment system description (memorandum to be issued September 27)
3. **09:30 – 10:00** Conceptual Water Balance Model – Interactive Session
4. **10:00 – 10:15** Break
5. **10:15 – 12:15** Discuss development of SSWQOs for each of the waterbodies
  - a. Identify areas of agreement and disagreement



- b. Discuss methodologies for developing use-protection and non-degradation based SSWQOs
  - c. Goldcorp to give brief overview of the toxicity testing program to date
  - d. Discussion between Goldcorp and Tr'ondëk Hwëch'in on additional toxicity testing to support the development of use-protection SSWQOs (e.g., COPC mixtures, additional species, validation of mixtures)
6. **12:15 – 13:00** Lunch
7. **13:00 – 15:30** - Further discussion of development of SSWQOs
8. **15:30 – 17:30** Water Quality Model Predictions may not be Conservative
  - a. Review concerns with submission by SEA
  - b. Goldcorp to provide update on status and work plan
  - c. Discussion to work towards resolution of the issue

**Note:** today extended to **17:30pm** or later in order to fit in all discussions.

## **Background Information – Day 1 - Water Quality Model Predictions may not be Conservative**

Based on the material reviewed, it is unclear if all potential sources of contaminants at the site have been included in the water quality model such as:

- Beta Waste Rock Facility, Kona Pit Walls, ROM Material
- Flushing of Waste Rock / Pit Walls Submerged During Closure
- Overburden Material. Frozen Soil Stockpile, Active treatment residue
- Construction Material / Roads, Adequate Loadings Through Rock Drain
- Dams, Discharge from the HLF during Post- Closure

The omission of several and/or significant source(s) of contaminant loadings from the model might result in an underestimation of predicted contaminant concentrations in the receiving environment. This is particularly important for contaminant concentrations approaching or exceeding water quality guidelines.



## September 29<sup>th</sup>, 2017

1. **08:00 – 08:15** Introductions and Objectives
2. **08:15 – 09:45** HLF Construction, Operations, Rinsing, and Active Treatment
3. **09:45 - 10:45** Parameters Found in Active Water Treatment Effluent Not Considered
  - a. Review concerns with submission by SEA
  - b. Goldcorp to provide update on status and work plan
  - c. Discussion to work towards resolution of the issue
4. **10:45 - 11:00** Break
5. **11:00 - 12:00** Long-Term Performance of the Active Treatment System is Uncertain
  - a. Review concerns with submission by SEA
  - b. Goldcorp to provide update on status and work plan
  - c. Discussion to work towards resolution of the issue
6. **12:00 - 12:15** Discuss Goldcorp's willingness to consider biodiversity enhancement strategy
  - a. Discussion between Goldcorp and Tr'ondëk Hwëch'in
7. **12:15 - 13:00** Lunch
8. **13:00 - 14:00** Additional topics from 81 items if possible
  - a. What is GC prepared to discuss from the list below?
  - b. Review concerns with submission by SEA
  - c. Goldcorp to provide update on status and work plan
  - d. Discussion to work towards resolution of the issue
9. **14:00 - 15:00** Wrap Up Discussion
  - a. Summary of consensus, outstanding issues, plan of action.
  - b. Agenda for October 17 Closure Workshop:
    - i. Passive Treatment System - do we need additional time?

## Wrap up by 3pm

## Background Information – Day 2

### Parameters Found in Active Water Treatment Effluent Not Considered

The test work for the biological treatment proposed (EBR) shows a very significant increase in phosphate, ammonia and chloride across the treatment system. These increases are not accounted for in the WQ model. These will be ecologically significant because of the low nutrient levels in northern water courses. The increase in chloride across the system is relevant both because of the direct toxicity of salinity on freshwater species and the corrosive impact for metal release in the rock drain.

### Long-Term Performance of the Active Treatment System is Uncertain

The long-term performance of the active treatment system may not perform as expected because of variable influent chemistry. Nitrate loads entering the system are expected to decline over time, providing less feed for the biologically active microbes. This will make the removal of metals of interest from the water more difficult.

## Passive Treatment System Not Described in Sufficient Detail

The permeable reactive barrier system proposed for post-closure treatment of the Heap Leach Facility (HLF) effluent is poorly described. Virtually no detail is provided about how the proposed system would be implemented. Additional data is required to support the passive treatment results incorporated into the water quality model. Effluent from the HLF is a major source of contaminants during the post-closure period and the water quality associated with this source term must be supported.

## Additional topics for Consideration for Agenda Item 6:

#1 SEA submission – addressed

#2 “ – park

#3 “ – action item

General Review Issues – to be addressed in a follow-up closure workshop.

3	Reduce the Complexity of Water Management at Closure - Adequacy	KJ and RF
4	Pit Lakes in the Closure Landscape and Backfill of Mine Waste - Adequacy	KJ and RF

## Water Balance and Water Quality Model Report

15	Heap Leach Facility Water Balance – Adequacy (Addressed)	KJ and RF
20	Potential Impact of Kona Pit on Independence Creek – Adequacy (To address at a later date)	KJ and RF
26	Large Reduction in Key CoCs Along the Groundwater Flow Path – Technical (Addressed)	KJ and RF

## Geochemical Characterization Report

35	Additional Flow to Alpha WRSF – Adequacy (To address at a later date during water management discussions)	KJ
37	Waste Rock Source Term Scaling Technique – Technical (TH Technical team to discuss and get back to Goldcorp)	KJ
38	Arsenic Solubility Control – Technical (Addressed)	KJ
41	Rock Drain Loading – Technical (Addressed)	KJ

## Water Management Memo

52	Long-Term Performance of Rock Drain – Technical (To address with SRK present, to be discussed during water management meeting/workshop)	KJ and RF
53	Facility Pond- Technical	KJ and RF
54	Unlined Heap Leach Facility Slopes – Technical	KJ and RF
55	Retention Time for Suspended Solids – Technical (to discuss at a water management meeting/workshop)	KJ and RF

## Water Treatment

66	Residual Ammonia and Orthophosphate across Active Treatment – Adequacy (Addressed)	PL
67	Active Treatment Residue Characterization and Management – Adequacy (Addressed)	PL
68	Active Treatment Adaptability – Adequacy (Addressed)	PL
69	Residual Chloride from Active Treatment – Adequacy (Addressed)	PL
70	Sulphur Department across Active Treatment – Adequacy (Addressed)	PL
71	Bioavailability of Metals across Active Treatment – Adequacy (Addressed)	PL
72	Department of Cyanide Residue across Active Treatment – Technical (Addressed)	PL
73	Active Treatment Startup/Shutdown – Technical (Addressed)	PL
74	Active Treatment Variability with Flow – Technical (Addressed)	PL
75	Variability of Influent Nitrate across Project Life – Technical	PL
76	Pit Lake Water Quality Guidance – Technical	PL
77	Lack of Detail of Passive System – Adequacy	PL
78	Nitrogen Department across Passive Treatment – Adequacy	PL
79	Performance of Passive Treatment with Variable Flow Rate – Adequacy	PL
80	Ongoing Management Requirements of Passive Treatment – Adequacy (to address in a closure workshop)	PL

# Tr'ondëk Hwëch'in and Goldcorp Water Workshop Day 1 September 28, 2017

## Attendees:

### Tr'ondëk Hwëch'in Attendees:

Names Redacted

Telephone:

Names Redacted

### Goldcorp Attendees:

Buddy Crill

Jennie Gjertsen

Names Redacted

James Scott

Names Redacted

Telephone:

Name Redacted, Minnow Env.

## Action Items

Action Item	Party Responsible	Date Due
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Schedule separate HLF/passive treatment session on closure	Goldcorp	Discussed September 29; tentative for October 18
Send conceptual model to TH, TH to provide feedback	Goldcorp	
TH to send a template or example of the conceptual site model	TH (SEA and LGL to provide)	SEA displayed example from Kemess
TH to send their interest in the information to come from the output model. The model currently has flow numbers, GC to consider [COPCs]	TH	
Graphical presentation of non-degradation objective	Goldcorp	
AMP – engage with TH on development	Goldcorp	
TH to provide the data requirements for the resident species approach calculations, and to send calculations of non-degradation objectives	TH	
Summer and winter toxicity testing report to be sent to TH when it is ready. TH will provide comment.	Goldcorp	
Add haul roads to surface water model	Goldcorp	
WBM/WQM inflow vs outflow table per Katie Jones' email.	Goldcorp	
Address tables in SEA comments pg 9 for accuracy	Goldcorp (Lorax)	

**Parking Lot Items**

Item	Timeline to address
Load pie chart timing	
Total vs dissolved discussion	Park until attainment discussion

Summary of Discussion

TH and Goldcorp discuss technical session purpose and practices:

- TH wants meeting materials earlier in advance when possible.
- TH wants technicians to work in collaboration.



- TH wants Goldcorp to work on an environmental workplan together – develop and work through issues more effectively and efficiently.
- Goldcorp has the same desires, workshops are a better forum to work through things on. Apologizes for late supply of materials for this particular workshop.
- Goldcorp explains that the workshop is about discussion of items that are action items from previous sessions, a key one being the conceptual site model. Goldcorp has taken two approaches to put something together that is meaningful and useful for TH to clarify water management.
- Goldcorp hopes to discuss water treatment on September 29.

#### Water quality action items status update:

- Goldcorp reviews the water quality monitoring stations that have been added based on feedback from TH.
- Goldcorp will eventually be re-labeling the water quality monitoring stations, as Goldcorp understands the feedback from TH and others that the nomenclature is hard to understand.
- Goldcorp established mixing zone stations and accretion sites as a result of feedback from TH as well.
- Goldcorp reviews these stations on a map to provide context. At TH's request, Goldcorp highlights the accretion sites.
- TH would like to discuss the WQ stations in more detail later regarding attainment of water quality objectives. TH has some ideas about the development of WQOs as it relates to compliance stations, and wants to discuss that today. Goldcorp agrees.
- TH has a strong interest in an Adaptive Management Plan and a response framework.
- Goldcorp notes that 5 and 30 monitoring will take place on Latte Creek this season, and in more locations next season. This is in response to feedback from TH previously.
- TH notes to do this sampling at the right time to capture the variability.

#### Site conceptual model update:

- Goldcorp has developed an interactive model that uses the 3-D site model and WQM/WBM and developed an Excel-based model to address TH's questions and requests for a conceptual model at site.
- Goldcorp has created a presentation on the water quality model loadings in pie-chart format based on TH's feedback. Goldcorp asks TH what window of time TH wants to see pie charts for, due to the flow dependencies for load concentrations.

#### Action Items and IRs:

- Active water treatment will be discussed September 29, and this is conceptual at this time.
- TH notes that the closure workshop on October 17 is focused on re-vegetation and cover. Wants to have a separate water/HLF discussion for closure. Goldcorp asks if TH is willing to do these back-to-back. TH discusses potential for some items to be discussed between consultants in Vancouver. Goldcorp agrees, noting that it is important to have TH representation there too.
- Goldcorp and TH will discuss TH and Goldcorp representation at technical meetings offline.

#### Conceptual Water Model demonstration:

- Goldcorp gives a demonstration of the conceptual water balance model (3-D online).
- TH notes that this is a very useful tool. Goldcorp is planning to incorporate the GoldSim model and the temporal aspect of the information as well.
- The 3-D model is at year 11 currently.
- Goldcorp will provide the current version and get feedback from TH on it.
- Goldcorp will work on modeling the flow magnitude for the next iteration.
- TH asks if there's any biological data in the conceptual model, Goldcorp replies that it could be added easily. TH notes salmonid habitat information would be good to include.
- TH asks if there will be a response to the key questions about the water balance, as the 3-D model doesn't address all of the questions.
- Goldcorp replies that there is the Excel file to help address those questions.
- Goldcorp reviews the conceptual site model excel flow tracking diagnostic tool Excel file to address the "does the water balance actually balance" question. Goldcorp describes the assumptions made for the model. The units are m<sup>3</sup>/h. Goldcorp explains the pathways for the model. Goldcorp explains that the yellow line is for treated contact water or water that didn't start out as contact water. The conceptual model also gives you relative magnitudes.
- Q: TH notes that there is a high proportion of non-contact flow going through the underdrain rather than being diverted, asks why this is
- A: Goldcorp replies that this is due to a topography issue. Goldcorp generally wants to divert as much as possible.
- TH replies that they wanted a table of inputs and outputs and these two versions of the site conceptual model that Goldcorp showed weren't exactly what TH wanted. Goldcorp asks TH to send an example or template (SEA). TH sends an example.
- TH wants to understand exposure pathways and the potential receptor groups, so that they can see the complete or partially complete exposure. This will be useful for assessment end points and building a robust monitoring program. TH will send an example (LGL to do).
- TH asks Goldcorp to add concentrations of COPCs to the excel model, Goldcorp agrees to try that as an option.

#### Site Specific Water Quality Objectives:

- TH notes that the collaboration memo with 7 topic areas is very useful. TH highlights the need to include water management and water protection goals.
- Goldcorp agrees, notes that the last bullet on the collaboration memo somewhat looks at that. Goldcorp notes that there may be a different way of thinking about this.
- TH notes a continuous improvement goal rather than non-degradation may be a solution.
- Goldcorp describes common concerns regarding WQOs that have been heard in the past, notes one concern is that proponents will do minimum efforts to meet WQOs once they receive license limits for discharge. Not the intention here.
- Goldcorp highlights that water management goals and adaptive management will be very important.

- TH wants to discuss water management goals and TH needs to take away the environmental protection goals idea and come back to Goldcorp with feedback. General feedback from TH currently is:
  - Evaluating WQ at a reach level rather than water body level may be a solution to come to agreement on WQOs. TH wants to discuss Halfway Creek in particular, and knows that WQOs need to be achievable for the site.
  - TH discusses the ideas behind the triggering framework for non-degradation thresholds.
  - Goldcorp notes that this needs to tie into monitoring framework that is practical for the Project as well. TH agrees, that an appropriate monitoring framework for specific stations is needed.
  - TH wants to work through the 7 points in Lorax’s memo, adding “Water Management Goals” first. Goldcorp agrees.

Goldcorp gives an overview of the memo of suggested components for additional collaboration with TH on Water Quality Objectives:

- Goldcorp describes the reason for the memo; the memo is in response to TH’s updated agenda for the meeting and is to make sure that Goldcorp demonstrates commitment to collaboration with TH on SSWQOs. The areas of collaboration allow Goldcorp and TH to bridge the gap on the differing positions on SSWQOs.
- Goldcorp reviews the points in the memo. Gives an example of continuous improvement goals with a parameter like nitrates. Goldcorp wants to develop a framework with TH to strive towards non-degradation in cases where Goldcorp can’t commit to it.
- TH asks if there will be a proposal on continuous improvement. Goldcorp is not looking at a proposal right now, but wants to use this as a potential tool for TH and Goldcorp to get to resolution on some items.
- Goldcorp highlights that this is currently at an EA level, so the detail isn’t there for detailed water management discussions. Goldcorp and TH agree on 3 catchments out of 5 in terms of SSWQOs and water management goals. The other catchments (Halfway Creek and Latte Creek) need discussions on options such as water management goals to address. Goldcorp wants to know TH’s ideas on water quality objectives for reach levels, and Goldcorp needs to look at what the model suggests as well.
- TH would like to understand other mitigation options better before licensing, like staged discharge or improved water management.
- TH hears that Goldcorp indicates that under the current mine plan, they will not be able to meet non-degradation in Halfway Creek. TH wants this to be clearly demonstrated and wants to see that Goldcorp has thought of everything from a water management perspective, and wants to see that before licensing.
- Goldcorp wants to talk about water management today with TH and look at options for things like diversions and look at opportunities for water management. Goldcorp very much wants to discuss opportunities in water management to improve water quality at site with TH.
- Goldcorp explains why they think it will be very challenging to meet non-degradation in Halfway Creek. For example, if you look at parameters such as sulphate, nitrate which are both very low in concentration in Halfway Creek but present in mine waste, as well as uranium, this will be very difficult recognizing that the mine plan has all waste material in one catchment:

- Baseline water quality shows that in high flow periods, the concentrations are at the lowest concentration.
- With WRSF in catchment, during snowmelt, contact water will be elevated in these concentrations but the background – the measure of non-degradation – will have low concentrations. As such, the metal concentrations become out of phase with baseline concentrations.
- TH notes that when the discharge period happens under the current water management regime, the parameters are out of phase with the baseline story for operations and closure. TH highlights that the question is if Goldcorp can shrink the gap between baseline and proposed WQ to meet non-degradation.
- Goldcorp doesn't think so. Goldcorp can work toward making that gap smaller. This could be done with diverting water in other locations. There is a need to be conservative so that the Project is not setting the standard too optimistically, as well as for the effects assessment.
- TH agrees and wants water quality objectives to be achievable. TH asks about Halfway Creek water management goals, and notes that Yukon River and Coffee Creek water management are agreed upon. Asks about Halfway Creek and Latte Creek. TH has recommended non-degradation for Latte Creek to protect Chinook salmon habitats downstream, and the small portion of chinook habitat in Halfway Creek.
- TH suggests looking at the following:
  - Evaluate or classify Halfway Creek on a reach level
  - At HC 2.5, set a use protection WQO
  - At HC 5 set it at non-degradation WQO, or demonstrate why that is not achievable;
  - Asks Goldcorp to show why they can't meet non-degradation.
  - TH notes that HC 5 may be too far down the creek to be used as a compliance location, as chinook have moved up the creek a bit.
  - TH willing to reconsider non-degradation where Goldcorp can demonstrate that it is not achievable.
- Goldcorp has a point where they are confident that fish cannot get past on Halfway Creek.
- Goldcorp gives an update on fish baseline monitoring this year. Goldcorp describes losses of flow in Halfway Creek, and where the impediments that start at 900 m and up to the middle water quality site. Effects assessment came from middle water quality site to be conservative. The habitat is used in the lower few hundred meters, this year up to 600m.
- TH would want non-degradation in that area of use, and would want to look at a new WQ station perhaps (roughly 1 km from mouth). TH also wants to understand flow, as that can alter available habitat.
- TH wants to get together to discuss mitigation options/scenarios for Halfway Creek to try to reach non-degradation for fish habitat in Halfway Creek. TH wants to look at HC 5; doesn't want WQ at HC 2.5 to be applied to HC 5.
- Q: Goldcorp asks if after the review it is determined that non-degradation is unachievable, what is TH expecting to do next?
- A: TH replies that it comes back to the water management goals. This conversation needs to happen.

- Goldcorp notes that placer miners have staked the creeks surrounding the Project, including Halfway Creek, and that's not something that Goldcorp can control. TH understands this.
- Goldcorp asks:
  - Goldcorp understands that TH's view is that CCME is not sufficiently conservative even though it is designed to be protective; that non-degradation needs to be achieved.
    - TH confirms this. This is why there's use protection, and then there's objectives that are from a different point of view for non-degradation. Non-degradation is to minimize or remove alteration to aquatic habitats where there is ecological or cultural significance. Believe this for Halfway Creek and lower Coffee Creek because of chinook salmon. Use protection benchmarks open up concern for TH. TH notes that the toxicity work being done by Goldcorp is very important for this.
  - Goldcorp confirms that there is no desire from TH to limit use of Halfway Creek with a fish barrier or an effluent pipeline to Yukon River; that TH wants to maintain habitat in Halfway Creek.
    - TH confirms this is correct.
- TH explains that non-degradation narrative is to avoid substantial alteration of water quality and flow. The numerical component of the non-degradation approach is an approach where upper limits reflect the average water quality conditions on a seasonal basis in cases where the baseline data show there is a seasonal fluctuation in concentrations of parameters of interest. The upper limit is set using the 95<sup>th</sup> percentile, and this upper limit allows for movement. For example, this has been 10% in the past. TH wants an evidence-based approach. Upper confidence limit of the mean is one way to do it, or distribution of annual medians. It's about trying to mimic the natural distribution of data that is seen.
- Q: Goldcorp asks how those limits look compared to water quality guidelines?
- A: TH replies that it depends on the data. It's about understanding the natural water quality guidelines; not considering standard water quality guidelines.
- Goldcorp notes this is essentially the background concentration procedure, which is the method Goldcorp uses.
- TH notes that this is mostly true, but the background concentration procedure doesn't get to seasonal variability.
- Goldcorp notes that they are going to be introducing contaminants that are not naturally present, like nitrates and sulphate. There's almost nothing to do about those. Goldcorp is also changing the natural flow in these catchments with the presence of a pond below the WRSF.
- Q: Goldcorp asks TH how they see a proponent practically incorporating seasonality in these situations? If we are considering seasonality, how is it operable?
- A: TH replies that they want to understand discharge schedules, and diversions, things like that.
- Goldcorp also wants to understand TH's goal of non-degradation in Latte Creek, as there are no chinook in Latte Creek.



- Goldcorp summarizes their understanding that TH wants to know/confirm that Goldcorp did their best to try to achieve non-degradation here because of the chinook in Coffee Creek.
- TH wants to see on a graph the non-degradation case and compare to what Goldcorp is proposing.
  - TH and Goldcorp will calculate this and exchange.
- TH wants to work with Goldcorp on a work plan to look at opportunities for options for water management for WQOs in Halfway Creek and Latte Creek.
  - This includes the issue, pathway to resolution, timeline to resolution.
  - Timeline for working through a work plan.
  - TH to send Goldcorp a draft work plan.

TH discusses their concerns with Latte Creek:

- TH wants non-degradation in Latte Creek to remove or reduce degradation of Coffee Creek. TH is of the understanding that Latte Creek contributes significantly to Coffee Creek catchment.
- Goldcorp explains that Coffee Creek catchment is about 400 km<sup>2</sup> or more, Latte Creek catchment is about 70 km<sup>2</sup>. As such, there is not a tremendous flow to Coffee Creek from Latte Creek.
- Goldcorp notes that in lower Coffee Creek at CC4.5, the winter has interesting data, and there might be inputs from the Yukon River flow in the Coffee Creek catchment.
- TH needs the high level of confidence that Goldcorp is achieving non-degradation at Latte Mix WQ station which is located immediately downstream of the confluence of Latte Creek with Coffee Creek. Asks Goldcorp to model that.
- Goldcorp can do that.
- TH notes that if Goldcorp can't show meeting non-degradation at Latte Mix, then Goldcorp needs to show non-degradation in Latte Creek. However, if Goldcorp could show that it could meet non-degradation at Latte Mix, then TH would reconsider non-degradation for Latte Creek.
  
- Q: Goldcorp as for clarification that if Latte Creek can't meet non-degradation at all times of year, but Coffee Creek can, is that ok for TH?
- A: TH needs to see the data on that. Urges Goldcorp to continue collecting the data for the new locations for licensing.
- Goldcorp agrees, this is the plan.
- TH's concern is that non-degradation in Coffee Creek is a must, and there is not enough confidence that the changes in Latte Creek won't translate into changes in Coffee Creek, so TH wants non-degradation in Latte Creek until demonstrated otherwise.
- Goldcorp highlights that it will proceed on this premise at this time and for this mine plan, and that if there was another mine plan in the future, the goals may not be the same.
- TH wants to leave the environmental protection goals for later discussion.

Water Quality Stations for Water Quality Objectives discussion:

- TH notes there are 5 catchments and 5 attainment stations listed in the Project Proposal. TH wants to walk through the catchments and discuss areas of agreement and disagreement.
  - Yukon River – attainment YUK 5.0; TH wants an attainment station closer to Halfway mix. Goldcorp agrees.

- Goldcorp agrees to non-degradation in Yukon River. Setting an objective where the company is responsible for an objective in Yukon River is not a good idea recognizing multiple upstream users that could affect water quality in the Yukon River that has nothing to do with Goldcorp.
- TH suggests that info collected at YUK 2.0 and 5.0 both contribute to determining whether there is a change to the WQ in Yukon River.
- Goldcorp understands this. Suggests a station upstream of YT-24 as the “background” prior to the Yukon River receiving inputs from YT-24 and Halfway Creek.
- TH and Goldcorp discuss to the following attainment stations to monitor water quality in Yukon River:
  - 1 station upstream of YT-24
  - 1 station upstream of Halfway Creek
  - 1 station downstream of Halfway Creek
- Goldcorp explains that this is how the model is set up, so these stations are good.
- Goldcorp and TH discuss the cost-benefit of additional water quality stations, and ensuring monitoring is appropriate.
- TH suggests a different framework for monitoring on Yukon River with respect to seasonality. Goldcorp and TH agree that YUK 5.0 is not the spot to monitor attainment for non-degradation of Yukon River.
- TH and Goldcorp agree to the following attainment stations:
  - 1 station downstream of the Halfway Creek mixing zone
  - 1 station in an upstream location that is not necessarily YUK 2.0
- Compliance will be a station closer to Halfway Creek.
- TH discusses wanting to meet non-degradation at HC 5.0, wants to consider a compliance point at HC 2.5.
- Goldcorp is concerned about having too many attainment stations. Alpha pond overflow points will be for the MMER compliance point, as it is downstream of discharge. TH notes these can be the same station with respect to the receiving environment attainment station. Goldcorp will need to meet requirements at end of dilution zone.
- TH and Goldcorp agree that there will need to be a discharge point and an MMER point, so HC 2.5 might disappear.
- TH and Goldcorp agree two stations in the receiving environment are required. Higher up in Halfway Creek Goldcorp will apply use protection WQOs, and lower down in Halfway Creek TH would like to see non-degradation WQOs if necessary. TH suggests that the station up higher is for MMER, as the MMER point for downstream of Alpha discharge.
- Two attainment points required on Halfway Creek; also will need the MMER point at the end of pipe. TH is ok with an MMER station and 2.5; or making the MMER station and the attainment station the same.
- Goldcorp notes that the closure attainment points might be different.
- TH agrees that the YT-24 sample location is appropriate for attainment
  - MMER will be at where pit sump discharge occurs into YT-24
  - TH suggests to add an attainment station beyond mixing of sump discharge
- Latte Creek
  - TH agrees that CC1.5 is an appropriate place for monitoring attainment

- Coffee Creek
  - Goldcorp notes that the attainment station is near Latte mix station.
  - TH and Goldcorp agree that the CC-x attainment station is logical. TH is comfortable with CC-4.5 as an attainment station, due to Yukon River effects to CC-x.
  
  - Q: Goldcorp asks if it is non-degradation at the Latte mix station, can Goldcorp drop CC-4.5 as an attainment station
  - A: TH just needs to see this proven in numbers.
  
  - TH notes there may need to be different stations as well for biological monitoring.
  
- Goldcorp notes that activities need to tie into locations and timing for monitoring.

#### Monitoring requirements at proposed WQO locations:

- TH wants to look at various receptors of interest, and look at the endpoints at the right locations. Goldcorp and TH need a framework for next steps, and TH will pass along CSM to Goldcorp.
- TH and Goldcorp discuss assessment endpoints, measurement endpoints.
- TH thinks next step is a small technical meeting to work through the AMP design.
- Goldcorp describes internal work on management plans and monitoring plans. Goldcorp is looking for TH's input into the development of these plans.
- TH notes that if additional baseline data need to be collected to support a BACI type analysis, Goldcorp needs to collect this data.
- Goldcorp explains that the streams around the site have poor conditions for stream sediment quality. Goldcorp notes that it is good timing now to work out monitoring other potential data sources.
- TH will work this out in their path forward document.

#### Effluent Discharge Locations and Standards:

- TH and Goldcorp recognize this can't go into further detail for now.

#### Adaptive Management Plan:

- Goldcorp is trying to have adaptive management tied into each management and monitoring plan. Goldcorp is considering modeling the adaptive management plan (AMP) after the Minto framework.
- TH sees this as a response plan. Goldcorp and TH discuss adaptive management.
- TH suggests having things like chronic toxicity as triggers for adaptive management. Goldcorp agrees.
- TH notes that the key endpoints are going to be part of adaptive management, and discusses developing early warning triggers for adaptive management. TH notes that whatever is needed to bolster current baseline data to understand early warning triggers is important to consider now.
- TH and Goldcorp agree that further engagement on management plans and reclamation and closure plans will occur.

- TH notes that there may be different water quality objectives in closure than in operations; that will be important for TH.

#### Calculating non-degradation WQOs:

- TH will put something forward for non-degradation WQOs to Goldcorp.
- Goldcorp is trying to figure out the window for the water quality objective seasonality. Operationally, one objective is best. Goldcorp needs to figure out how to consider multiple WQOs.
- TH notes that it's about trying to have a fairly good understanding between low flow and high flow periods and a robust data set. This helps determine where the break between high and low-flow periods is.
- Goldcorp notes that it's also about trying to make sure that the site doesn't accumulate water because the WQOs are too stringent.
- Goldcorp isn't opposed to TH's suggestions, it just has to be figured out in terms of operational achievement.
- TH urges Goldcorp to consider seasonality when looking at WQOs.
- TH will send their version of SSWQOs and how they were calculated.

#### Use Protection-Based WQO Discussion:

- TH discusses where background procedure was used for places of natural exceedance, encourages Goldcorp to consider seasonality.
- Goldcorp summarizes that the proposed objective is protective.
- TH understands, notes using the resident species approach or WER; suggests resident species approach more to see what a safe level of toxicity is.
- Goldcorp summarizes the data from toxicity testing, noting that the most sensitive species has been tested for the metals levels and it is not a concern.
- TH notes that CMME and BC MOE have guidelines for use protection water quality objective calculation. There are 3 approaches to Use Protection.
- TH and Goldcorp agree that the resident species approach is best.
- TH needs to understand if Goldcorp is meeting the minimum data requirements for the resident species approach.
- TH will write up what TH is looking for in terms of minimum data requirements for resident species approach, as well as toxicity testing approach.
- TH notes that there's dissolved vs total metal questions that TH has, and suggests monitoring attainment based on dissolved metal concentrations. If there is naturally high TSS, then that will show it is above WQOs.
- Goldcorp notes that TSS is an important consideration when reviewing the water quality data. Goldcorp notes that both total and dissolved are calculated for non-degradation WQOs. Total = dissolved for uranium. Total measurements are for the model. Could look at running the model under the dissolved and total scenarios.

#### Toxicity Testing Results Discussion:

- Goldcorp gives an overview of the toxicity testing results related to toxicity tests that TH had input on.

- TH notes that the tests done so far are showing that there is a protective factor; TH and Goldcorp discuss TH setting out the minimum data requirements. TH and Goldcorp agree to run all of the tests in tandem to avoid confounding factors.
- Goldcorp describes the mixture toxicology testing done as suggested by TH. Goldcorp explains the methodology for the tests.
- Goldcorp will repeat the summer tests for HC 2.5 and will conduct winter water tests.
- TH asks about tests with nitrates; Goldcorp wanted to test the upper case with metals first. Goldcorp will test with nitrates next. TH confirms that the winter water tests will just be with metals as well.
- TH notes that the toxicity tests are progressing very well.
- TH adds that the information on the minimum data requirements will come separate from the comments on the toxicity testing.

#### Water Quality Model Predictions Discussion:

- Goldcorp gives an overview of the Kona conceptual site model and confirms the event pond locations for TH. The facility pond currently accepts water from the plant site and the ROM stockpile.
- TH confirms that the next update to the WQM will now include the Kona (Beta) WRSF. Goldcorp is proceeding with year by year build out of the Project.
- Goldcorp discusses the source loading from the beta dump and why it is a relatively insignificant load source in the WQM.
- Goldcorp gives an overview of Kona pit water production in the early years of mine life, noting that it is relatively very little water.
- Goldcorp notes that as the HLF progresses, it will need less external water. This is when other water management will kick in.
  
- Q: TH asks what happens after the first two years
- A: Goldcorp replies that Goldcorp will begin actively managing water in the HLF using raincoats. Goldcorp will be incorporating the HLF water balance into the overall site wide water balance.
- TH confirms that Goldcorp is working out what happens with Kona pit water after year 3, Goldcorp confirms
  
- Goldcorp notes that there is very little water accumulating in the Kona pit. The objective all along is to backfill Kona pit with frozen waste rock to re-establish permafrost. Lots of geotechnical work done at Kona this year, Kona definitely has permafrost. The initial management strategy stands for Kona.
- Goldcorp confirms that Kona water will be used for makeup in the HLF.
  
- Q: TH asks what the contingency is for Kona water to be discharged?
- A: Goldcorp is going to look at that when the models are integrated. Goldcorp could always put Kona water into Latte pit. Goldcorp is also considering a larger water treatment facility than



required for contingency. Depending on chemistry, it could also be discharged to the underdrain to the Alpha pond.

- Q: TH asks about timing for knowing this management situation?
- A: Goldcorp replies that this will be worked out in Q1 2018.
- Goldcorp describes the plan to progress water management planning, and how this depends on the model being built and tested on different climate conditions.
- Goldcorp notes the earlier discussion about opportunities to work on water management plan.

Goldcorp reviews the geochemical source term work for the Project related to IRs:

- Goldcorp discusses the flushing load for the Project. There are a series of saturated columns initiated right now to look at metal leaching under saturated conditions. There are 6 saturated columns right now, these tests are to look at the long-term metal leaching from submerged waste rock.
- Q: TH confirms that attenuating uranium and arsenic only?
- A: Goldcorp notes its mostly just uranium due to the potential for uranium to be reduced from soluble  $U^{6+}$  to  $U^{4+}$  which is insoluble. Goldcorp describes the column tests with a small amount of dissolved organic carbon to see if this results in attenuation (or precipitation) of uranium.
- Q: TH asks about model sensitivity runs, asks if the results will be part of the base case?
- A: Goldcorp replies yes.
- Goldcorp notes that there have been IRs regarding backfill opportunities; and this is about having a geochemical answer to the question about more backfill relative to potential water quality from backfilled pits.
- Goldcorp reviews the frozen soil stockpile source term work being done. An overburden source term will be assigned to the frozen soil stockpile. The geochemical variability at site wasn't completely clear in the original YESAB submission; Goldcorp provides an overview of the overburden source term.
- Goldcorp summarizes how overburden at site will be segregated based on where it comes from, and any overburden that will be a problem will be treated as waste rock.
- Rock drain source term is discussed by Goldcorp; noting that the rock drains will be too coarse to be geochemically significant.
- Q: TH asks if the studies reference look at possible infilling of rock drains, such as 2 millimeter sediments filtering in.
- A: Goldcorp replies that SRK will have to answer this regarding the permeability and effectiveness of a rock drain. No one has dug up a rock drain to see if it is filling with sediments. Notes that the exercises in geochemical characterization report for the rock drain show that there is no significant geochemical load from it.

- Q: TH asks about sizing, asks if there is potential for the pre-flowing river to infiltrate the rock drain
- A: Goldcorp replies that the rock drain is massively oversized. Depth is 80 m by width 30. Sized for 1 in 100 year rainfall time 2 plus average freshet flow.
- Goldcorp's site has arsenic minerals and uranium minerals. Uranium solubility is affected by the pore gas in the WRSF, and can allow for elevated uranium solubility. At this site, increased air flow could be good in the WRSF. End dumping of waste rock is the best way to build the WRSF in terms of water quality.
- Goldcorp notes that there were no source terms for the dams in the Project Proposal. Each dam will be ROM waste rock. These will be incorporated into future models, but expect a minor impact on WQ.
- Goldcorp has a post-closure source term for the HLF now, and describes how this was determined.
- Goldcorp notes that the strategy for rinsing the HLF includes the direct application of microbes and nutrients to the HLF for in-situ degradation and denitrification in the HLF. Goldcorp describes the advantages to be able to close the HLF in operations in stages and through progressive reclamation.
- Q: TH asks why selenium and sulphate are high at Brewery Creek and not Coffee.
- A: Goldcorp replies that the geology is different at each site.
- Goldcorp discusses the arsenic solubility control at site, shows kinetic test data compared to shake flask extractions.

#### ROM Material Discussion:

- Goldcorp summarizes how the source term will be developed similar to waste rock stockpile source term, but using the ore. ROM and Beta dump will be included in future WQM.
- Active treatment to be touched on tomorrow. It is currently an analogue, as there isn't any sludge information now
- Construction material/road loadings source terms need to be added to the WQM, but Goldcorp doesn't have the information for that yet. Goldcorp will need the water management and reporting information to determine this. Materials used to construct the roads will need to be determined as well.
- Goldcorp reiterates the commitment to providing IR responses once in the YESAB process.

#### Additional issues identified by TH:

- Q: Percolation of fines a concern in plugging the rock drain. What would happen if it was blocked or clogged?
- A: Goldcorp will review this with the appropriate technical consultants at a later date.
- Goldcorp and TH discuss the model checks and balances, Goldcorp can fill a table like this as part of the WQM/WBM check.
- TH needs a more complete conceptual model; notes table one in the submission. TH wants a simplified set of diagrams and displays an example.

- Goldcorp notes there's no numerical value associated with the example conceptual model. The whole mine site will be on one diagram. Goldcorp will provide a new version of the conceptual site model based on TH's example.
- TH confirms that the majority of their issues regarding additions to the WQM have been addressed, with the issue of the fines in the rock drains being the only outstanding issue.

#### HLF Site Selection Overview:

- Goldcorp discusses the HLF tradeoff studies done.
- Goldcorp gives an overview of the HLF construction.
- Goldcorp describes the staged construction of the HLF and the plan to do earthworks in advance, and the edge of each stage includes a berm. Hydraulic dividers are described and will help control processing and rinsing/progressive closure of the HLF. Goldcorp clarifies for TH that the HLF gets stripped to competent rock before constructing it.
- Q: TH asks if there is permafrost above or below the frozen bedrock?
- A: Goldcorp explains where the thaw stable and unstable materials are around the HLF.
- TH and Goldcorp discuss cyanide safety, International Cyanide Management Code.

Meeting concludes at 5:00 pm.

# Goldcorp and Tr'ondëk Hwëch'in Water Workshop Meeting Notes Day 2:

## Attendees:

### **Tr'ondëk Hwëch'in Attendees:**

Name Redacted

Telephone:

Names Redacted

### **Goldcorp Attendees:**

Buddy Crill

Jennie Gjertsen

Name Redacted

James Scott

Names Redacted

Telephone:

Name Redacted, Minnow Env.

## Action Items

Action Item	Party Responsible	Date Due
Management plans – be clear about responsibilities on site and need for Qualified Professionals, including who is responsible for water balance.	Goldcorp	
Ensure RCP is updated to include detailed raincoat placement in temporary closure	Goldcorp	
Staged drawings of the raincoat deployment, including the HLF piping and ditch cross section. Consider colour-coding the drawing for the more “long-standing” raincoats vs the “temporary” raincoats. Include these drawings in the HLF management plan.	Goldcorp	
Provide workplan for EBR testing and for passive treatment testing. These workplans will include:  A) Tests to be done B) Desired outcomes of tests C) Certainties that will result from these tests D) Timeline for tests.	Goldcorp	October 31, 2017
Water quality model sensitivity analysis on effluent from EBR	Goldcorp	Q1-2018
Estimate mass of solid produced by EBR and disposal method detail.	Goldcorp	After bench scale testing is complete
Ensure thiocyanate is looked at in future EBR testwork	Goldcorp	
TH to produce list of biodiversity enhancement priorities for TH	Goldcorp	
Look at increased recharge in groundwater in the absence of permafrost	Goldcorp	This is a TH IR currently.



**Parking Lot Items**

Item	Timeline to address
Covers for HLF discussion	At closure meeting (Oct 18?)
TH’s current biodiversity enhancement work; discuss and explore enhancement opportunities and Goldcorp’s potential contribution.	

**Discussion Summary**

TH and Goldcorp discuss some general interests of TH’s technical team for future meetings (e.g. permafrost).

Goldcorp finishes the review of the Heap Leach Facility (HLF) for TH that was started the previous day:

- Goldcorp describes the construction of the HLF.
- TH requests a simple image of any one time that shows stages when the HLF is covered by raincoats. Goldcorp to review and propose an image.
- Goldcorp discusses raincoat use, the HLF will be covered about 60% at any given time. Goldcorp describes the process solution being contained in pipes within the HLF; discusses the raincoat berm design for the 100 year flow with freeboard. Goldcorp describes how it is unlikely that the raincoat water will ever be contaminated.
- Goldcorp can cover 12% of the HLF every 2 weeks; about 6% a week. The HLF will have about a base case of 40%, so it will take about 6-7 weeks to get the HLF fully covered if needed.
- Goldcorp will look at the performance of the WBM in operations, update the model, and look at the upcoming weather pattern predictions, and deploy the raincoats in the fall.
- Once Goldcorp is stacking and leaching HLF stage 3, there will be raincoats on stages 1 and 2 and they will stay there.
  
- Q: TH asks if Goldcorp is using raincoats to push out water treatment.
- A: Goldcorp’s biggest reason for using raincoats is to minimize dilution. This has a big effect on metallurgy and gold recovery. Raincoats don’t let rain contact the ore unless Goldcorp wants it to.
  
- Q: TH asks where the raincoat pond water goes?
  
- A: Goldcorp explains that the water will be used for dust control, and is currently planned to go to Alpha rock drain.
  
- Goldcorp describes raincoat use, noting that evaporation is wanted in the summer/fall. Deploying raincoats is expensive, and you don’t want to cover the driplines in the summer. Goldcorp describes the drip emitters.

- Q: TH asks for a HLF management/operation plan, if this plan will include these details?
- A: Goldcorp will be creating a plan. Goldcorp is coupling the two water balance models, summarizes the key considerations of the HLF plan.
  
- Goldcorp notes that the requirements under the Quartz Mining License QML to be very detailed when creating the plan for the HLF.
  
- Q: TH asks if this gets updated?
- A: Goldcorp explains that the closure plan is the only one that has to be updated per the license, but the HLF plan will be updated quarterly with the water balance model updates. There will be fulsome updates yearly.
  
- Q: TH asks about the training required to be an operator at site related to managing the waterbalance related to the HLP. TH asks about training and qualification requirements for personnel managing this, the auditing procedure, and the failsafe for the environment.
- A: Goldcorp explains that the HLF is the money making facility for the Project. There will be more attention paid to the HLF than any other facility. Goldcorp will have qualified professionals in the necessary roles at site.  
Regarding general management practices: Goldcorp will have a dispatch system, and this will to tell the operators where to go and track the materials. There will be good records of material movement. With respect to training, in order to do a job, the person has to be certified to do the task.
  
- Regarding audits: Goldcorp replies that there's a water balance review, geotechnical review, and other audits performed at least yearly.
  
- Regarding deployment of rain coats and Water balance management: Goldcorp explains that this isn't done until year 3, and this is more of a training exercise as raincoats aren't needed until year 4. The need for raincoats to be deployed very well is in year 6 and 7. This allows for lessons learned from previous years to be applied by the time the raincoats are needed.
- Goldcorp discusses risk management and considerations for failures. If the design accounts for failures, then that should bring confidence. Goldcorp describes how critical tasks have checks and balances to make sure that more than one person is verifying that things are happening according to the plans.
- Goldcorp and TH discuss responsibilities on site, and ensuring that there are qualified professionals on site to ensure plans are implemented. Goldcorp describes environmental audits that are required, and the regulatory inspections required in Yukon. Goldcorp will be clear in management plans about commitments to qualified professionals and clear responsibilities at site. Goldcorp discusses Mine Licensing Improvement Initiative (MLII), and Waste Rock Storage Facility WRSF audits. Goldcorp describes the ways that HLF design accounts for people doing their job imperfectly.

- TH discusses inspections. YG EMR staff's niche is the placer industry; this is an issue that TH needs to raise with YG to ensure that they have adequate staff to inspect HLF. This could be a potential problem.
- Goldcorp notes how technology can help with this, example of drone footage to help with this.
- Goldcorp notes their experience with YG inspections for mine sites. Monthly water license reports require reporting on inspections around the site, and these are inspections of facilities as well. Monthly inspections force operators to look for things more often.
- Goldcorp suggests that TH review the water license reporting online for examples of requirements.
- TH wants to make sure that someone is a qualified professional and looking at the water balance from an environmental perspective.
- Goldcorp explains that safety and compliance are priorities above ounce production at Goldcorp. Environmental responsibility is the role of the operators, not the environment team. This ensures that it happens.
- Goldcorp notes the action item to make clear in the management plan who is responsible for reviewing Water Balance from an environmental perspective.
  
- Q: TH asks about the overlap with the raincoats, how raincoats are held together.
- A: Goldcorp explains that the raincoats are welded, and you cut them to move them. The proposal allows for 25% replacement every year, which is very conservative.
  
- Q: TH asks about the process for welding the liner.
- A: Goldcorp explains the practice for the environmental liner (meaning below the HLF). Goldcorp explains that it's not an environmental liner for the raincoats, so the process is less strict.
  
- Q: TH asks when the raincoats are stationary.
- A: Goldcorp explains that the slopes will remain for quite a while, but the top will need to be moved for stacking. When transitioning for closure, the raincoats have to come off for re-grading the slopes.
  
- Q: TH asks what raincoats will look like if the mine is in care and maintenance?
- A: Goldcorp explains that in temporary shutdown Goldcorp can cover the entire heap in 2.5 months. Gives an example of a very big heap at a Barrick operation where the HLF is covered 100% seasonally.
  
- TH is looking for a condition where Goldcorp commits to covering the HLF in temporary closure.
- Goldcorp explains that there are regulations surrounding this. Goldcorp will be very explicit in the temporary closure plan about how the HLF will be dealt with. By not covering the HLF in temporary closure, Goldcorp would find themselves in a potential problematic situation. It is beneficial to cover the HLF in temporary closure. Goldcorp will update the reclamation and closure plan to include detailed raincoat placement in temporary closure.
- Goldcorp describes the raincoat berm design compared to the solution berm design. Goldcorp has noted that a figure would be useful to portray this, and will produce said figure.

- TH wants a conceptual figure of raincoat coverage in multiple years, and that details the more permanent vs temporary liners.
- Goldcorp describes raincoat deployment practices.
- Q: TH asks about the durability of the raincoat materials, how long they last,
- A: Goldcorp explains HDPE liners and how they have a warranty for 20 years for UV exposure. HDPE liners are good until -40 centigrade. HDPE liners could get some freeze cracking at the Project but Goldcorp doesn't anticipate that to be a huge problem. Goldcorp explains that 25% replacement is good contingency, and the Project can move raincoats if necessary in January, but it is much easier to damage them at that point. Raincoat movement will be limited in colder months.

#### HLF Rinsing Overview and Discussion:

- Goldcorp describes the preliminary rinsing process for the HLF, including the phased approach. Goldcorp describes the cell separation berm design.
- Goldcorp explains a scenario where they would stop rinsing and start leaching again.
- Goldcorp explains the primary rinsing circuit compared to the secondary rinsing is to reduce pH and reduce cyanide concentrations. Bringing the HLF pH down in the primary circuit helps with cyanide destruction, shifting it to volatile cyanide.
- Goldcorp explains progressive reclamation of the HLF and when the water treatment plant would come on line. The water treatment plant would likely come online before year 8. The reason is to use effluent from the biological treatment system with high quality water and microbes to inoculate the heap. Before year 9, the idea is to advance rinsing goals. After year 9, you are trying to meet discharge criteria. It is a good opportunity to pilot test the water treatment facility.
- Goldcorp highlights that this information will be included in the HLF management plan.
- Goldcorp explains the plan to cap and cover the HLF with rock and soil, and revegetating it, and explains current evaluations of different cover options. This includes potentially flattening the HLF more.
- Q: TH asks about the lined parts of the HLF in closure.
- A: Goldcorp explains the current closure plan for the HLF, and notes that HLF closure is on the agenda for October 17 meeting on closure.
- Q: TH asks if there are source terms and pH for all stages of the HLF?
- A: Goldcorp explains what is currently known from the metallurgical test columns, and describes the pH changes over the life of mine in rinsing.
- Q: TH asks about semi-passive treatment system?
- A: Goldcorp explains that there was a memo issued about this in response to TH's questions previously about it. This will be discussed at the closure workshop.

#### Water Treatment discussion:

- TH notes that there's leftover ingredients in the water treatment that could be problematic:
  - Ammonia
  - Nitrogen
  - Phosphate
  - Chloride
  - Sulphide
- TH read that this will be dealt with in other aspects of design, TH wants to hear more proof associated with where the system has been applied with metals removal and where the whole treatment system is integrated and removes those other constituents that are there.
- Goldcorp reviews how a bioreactor works and summarizes the testing done on leached solution from anticipated ore compositions. Goldcorp describes how the tests would be scaled up. The test shows the Electobioreactor EBR's capability in a non-limiting environment.
- Q: TH asks about different microbe communities being used at a larger scale and do the communities change over time?
- A: Goldcorp indicates that microbe communities will change over time and describes how the microbe population would improve, and the degradation rates would improve as well. The genetic ability to remove contaminants is transferable material to other microbes present in the system – improved adaptability over time.
- Q: TH asks about sodium chloride NaCl?
- A: Goldcorp explains it is a limiting ion that the microbes need. Chloride was added to ensure the system was non-limiting from the perspective of nutrients. Non-limiting doesn't mean the microbes were not performing optimally. By having it non-limiting, excess Cl was present that was not used and therefore increased the concentration of Cl in treated water.
- Goldcorp describes the upcoming test for water treatment, including bench scale testing.
- Q: TH asks when the pilot test will be done?
- A: Goldcorp explains that this will be done on site. Goldcorp acknowledges the uncertainty associated with the system, and detailing the expected date for the development of the water treatment system, including the pilot testing. Bench testing needs to be completed for water licensing. Goldcorp will look at different microbial media that are amenable to full scale solution treatment, and describes examples of these media. The 2 stage EBR is for metals and nitrate, this is not always a stand-alone treatment. Goldcorp will use a pre-treatment, and a pre-treatment was used in the test. In bench-scale testing, will look at post-treatment. Post treatment can remove things like ammonia and phosphate if these are present and treatment systems for these parameters are readily available.
- TH understands where Goldcorp is at in terms of testing. TH notes the post-treatments have risk associated with them, noting the Teck Westline creek facility had a fish mortality incident due to sulphite, sulphide, and carbohydrates in the water. Off the shelf treatments need to be demonstrated to be effective. TH notes their experience in Elk Valley with Teck, and that fish still died. This is a concern.



- Goldcorp describes examples of effective treatment and different types of treatments. EBR is not claimed to be a complete treatment, and pre-and post- treatment is common. Goldcorp has the ability to retain treated water as the plant is piloted, and there is time in the Project and resources available to react to the uncertainty. Goldcorp notes the contingency built into the system.
- Q: TH asks if the bench-scale testing phase will remove uncertainty.
- A: Goldcorp replies that bench-scale testing provides a 90% certainty for on-site testing. Pilot-scale testing deals with real-time water and fluctuations at site. Bench scale will include pre and post treatment if needed.
- Goldcorp and TH discuss a workplan for active and passive treatment that describes tests to be done, scale, desired outcomes, and certainties resulting from the tests, as well as test timelines.
- Goldcorp agrees to do sensitivity analysis with WQM on effluent from EBR.
- Goldcorp reviews Ammonia and orthophosphate pilot performance from other projects: The EBR was able to bring discharge ammonia down below influent ammonia. Microbes were selected specifically bring down ammonia. Information presented to show that with optimization of the nutrients provided to the EBR, ammonia is not anticipated to be a problem
- Q: TH asks if there's a change in the microbial community throughout the use of the EBR where it would require fine tuning throughout the life of the EBR?
- A: Goldcorp replies that the population shifts over time, but do initial screenings to minimize the shift. The microbe community will adapt to consume the key parameters as well. Goldcorp can also re-inoculate the system as well.
- Q: TH asks about the goal of the treatment for the example provided?
- A: Goldcorp explains that the goal is to fine-tune the EBR system to achieve contaminant removal.
- TH suggests to show the discharge criteria on the graph for context.
- Goldcorp discusses how EBR and EBR with additional treatment has been able to meet all discharge criteria. Goldcorp has already committed to doing the WQM sensitivity analysis as well.
- Goldcorp provides an overview of the active treatment residue characterization and management. The EBR system is effective at removing the microbes that have precipitated the metals of interest from the water.
- TH notes that they appreciate it is a small mass of metal being removed. There is still a mass at the end of the treatment, what does Goldcorp plan to do with the removed contaminants?
- Goldcorp notes that the metals are trapped within the matrix, and that pilot scale tests show that the bacterial matrix can be stored on site as non-hazardous waste.
- Goldcorp explains that for the tests, not enough sludge was created to investigate TH's question. This hasn't been done yet. Goldcorp provides an example from a different mine in Utah about the sludge being able to be stored on site.

- Goldcorp describes EBR system adaptability in varying temperature and varying influent contaminant level; the system is successful in varying conditions.
- Q: TH asks how variable nitrates were for the example?
- A: Goldcorp replies nitrates were very low, and selenium variability is even more difficult to address but that the EBR has demonstrated high success with variable influent concentrations at meeting target criteria.
- Goldcorp discusses residual chloride removal. The system can be tuned to remove chloride from the system. Chloride can be added by pre-treatment processes, this is to optimize removing the target contaminant.
- Q: TH asks if chloride will have to be added for the Project EBR?
- A: Goldcorp replies yes, this will need to be added for the EBR for the Project as part of the nutrient mixture. Agricultural molasses can have chloride in it, or other parameters.
- TH and Goldcorp discuss the concentrations of parameters like chloride, and how the volumes in the effluent will be incredibly small due to dilution. The action items capture regarding water quality model sensitivity analysis will address TH's questions about these other parameters.
- Goldcorp discusses Sulphur department across active treatment. TH asks about the sulphate levels reported for the Project, and asks if this is an artifact of bench scale testing?
- Goldcorp confirms that it is an artifact of bench-scale testing. There were low levels of sulphide produced.
- TH notes that the mass balance of Sulphur is important to consider. Sulphide generated in the system will report to the water, so it's important to consider where it is going.
- Goldcorp notes that EBR will normally produce sulphide, and its standard practice to use an iron sponge to absorb that, or to off-gas it. Sulphide can be handled in numerous ways.
- Goldcorp gives an overview of pilot vs full scale EBR performance, the example is from a site that has a similar climate to Coffee. Notes that there's good nitrate removal in variable temperature conditions. Nitrate loss is due to denitrification, and its related to the reduction potential of the redox system.
- Goldcorp discusses bioavailability of metals across active treatment.
- Goldcorp reviews removal of cyanide in the EBR system. Cyanide is more effectively removed by aerobic treatment.
- Q: TH asks about thiocyanate
- A: Goldcorp has taken a preliminary look at thiocyanate, and will be looking at that more closely in the future.
- Goldcorp describes the Landusky EBR treatment system that is similar to the proposed full-scale operation for Coffee. System is insulated and can be operated year round. Goldcorp describes the EBR startup and shutdown processes, noting that it can be shutdown for short periods of time and result in better water quality.

- Goldcorp describes how active treatment is designed for a variability of flow, but if flow is outside of the design criteria range, it will not perform optimally. Goldcorp discusses including pre-and post- treatment systems if required. Flow is not expected to be a problem.

#### **Biodiversity Enhancement Strategy Discussion:**

- Goldcorp summarizes that the biodiversity enhancement strategy is an idea that Goldcorp would like to discuss with TH. Planning hasn't advanced and Goldcorp understands that there are initiatives that TH and other First Nations are already doing that Goldcorp could support (e.g. salmon enhancement). This is about enhancement, rather than mitigation.
- TH is not a big fan of habitat replacement and would rather maintain the current habitat that is there. Offsets are utilized for many other projects, but you can't replicate natural levels. If someone can replicate pH levels in a creek, then that would be different. TH is in discussions about fisheries act changes, will see what happens there.
- TH notes a rearing program would be more meaningful than offsetting.
- TH to pull together a list of priorities for biodiversity enhancement.

#### **Geochemistry Discussion:**

- Q: TH asks about the attenuation factor, notes the concern that Goldcorp attenuating things twice.
- A: Goldcorp replies that the attenuation factor for groundwater was only applied to redox sensitive species (arsenic, nitrate, antimony). High arsenic concentrations are present in the natural groundwater system at the ridgetop or areas of groundwater recharge. In the valley bottoms, arsenic doesn't show up anymore. The theory is that the groundwater is reducing in the upper portions of the catchment, know this because small quantities of H<sub>2</sub>S and other redox sensitive species such as iron that are soluble under reducing conditions are not present in groundwater in the valley bottoms where groundwater is discharging and closer to surface. Arsenic is present in very low concentrations in surface waters which are oxidic. In winter, when only groundwater is in surface water flows we see very low concentrations, indicating that removal is happening along the flow path. In IRs, TH asked for upper case geochemistry to be run with and without attenuation, and this work has been completed and it shows that including attenuation has only a minor reduction in predicted concentrations. The groundwater contribution is a small load. Attenuation is only applied as a groundwater seepage component to surface water. Seepage through WRSF doesn't report to groundwater and additional attenuation is not applied to WRSF seepage source term.
- Q: TH asks if there's an aquifer that doesn't act like Kona?
- A: Goldcorp explains that some of the Kona water reports to Independence Creek side, there's a WQ station at IC-3.0. Very low arsenic concentrations are found at that station as well.
- Q: TH assumes that the attenuation occurs more in the Kona area, asks if this is correct?
- A: Goldcorp replies that this is not correct. Kona was just an example.

- TH notes that Goldcorp provided good information, but the topic of attenuation isn't quite closed yet.
- Goldcorp notes that on the Halfway Creek side with the North Slope that has permafrost, and the latte creek south slope with no permafrost have the same scenario occurring. Goldcorp doesn't think that the permafrost is an issue here.
  
- Q: TH brings up their IR regarding permafrost degradation and how this affects groundwater?
- A: Goldcorp explains that the groundwater model is calibrated to the current condition, which has permafrost. Not sure how to calibrate the model in the absence of permafrost scenario.
  
- Q: TH asks if there's water in the rock if there's permafrost?
- A: Goldcorp explains that right now, its ice-poor permafrost. Goldcorp asks if the concern is in areas where there's ice-rich permafrost. Goldcorp explains that the water table is below permafrost now. The absence of frozen ground over top of the groundwater doesn't really affect it. It doesn't really interact with the permafrost now. Goldcorp discusses potential effects to the recharge rate, there could be an increase in groundwater levels due to higher recharge. There is groundwater chemistry with and without permafrost. The uranium chemistry in both Halfway Creek and Latte Creek is driven by geology, not by permafrost. Might look at the increased recharge as a result of permafrost degradation.
- TH notes Permafrost may impact the seepage rate from the pits.
- Q: TH asks about the field bins results scaling, and how this differs from humidity cell scale up?
- A: Goldcorp explains that if 6% were applied to humidity cells, this would be a conservative scale up. The field bins have more realistic weathering conditions, so they do not need to be accounted for in the scaling. Three main scale factors are temperature, flushing rate, and grain size. Field bins only have grain size, and the scaling factor is between 0.1 and 0.2; developed 9% scaling factor for these field bins. 6% was base case, 11% was upper case. This landed close to the independently derived 9%. The .9 grain size was based on what was in the field bin vs what is expected at full scale.
  
- Goldcorp is not expecting many fines in the WRSF, this is based on grain size distribution in the field bin compared to waste rock distribution. There is very competent rock types at site.
  
- Q: TH asks if 6% for base case is lower than the 9% or 12% for scale up?
- A: Goldcorp explains that the upscale based on an analog; which is Mt. Nansen. The base case is 6% and the 11% upper case. Source terms are always based on some sort of scale up of kinetic test data.
- TH wants to ensure that the analog site didn't have permafrost in the waste rock pile. Goldcorp confirms there was no permafrost in waste rock dump.
  
- Q: TH asks about the solubility controls for copper on pit walls?
- A: Goldcorp notes that the scale of the pit walls is similar to the scale of the field bins. Explains the results of the field bin work

- Q: TH asks what the pH of the water is in the field bin
- A: Goldcorp notes that there is very little copper in the ore or waste rock, and expects to see low copper coming off of WRSF, and in the metal leaching test work that was done. Copper has never come up as a concern for the project. Goldcorp explains that the pH coming off of the kinetic tests are representative of what will be full scale and that the pH is around 8.0.
  
- Q: TH asks why Goldcorp is applying constraints?
- A: Goldcorp replies to produce realistic source terms. Goldcorp can send the copper concentrations without the solubility constraints, but given the geological database available, this is not realistic. Also, the copper concentration with constraints was used in the WQM.
  
- Q: TH notes that copper is scaling with mass. Asks if Goldcorp can justify constraining it at low volumes?
- A: Goldcorp explains the results of the test work done, justifications behind the copper concentrations.
  
- Comment: TH suggests to look at the copper in the field bins at Mt. Nansen.
- Reply: Goldcorp notes that the field bins at Mt. Nansen were producing copper concentrations at the same levels as the full-scale WRSF.

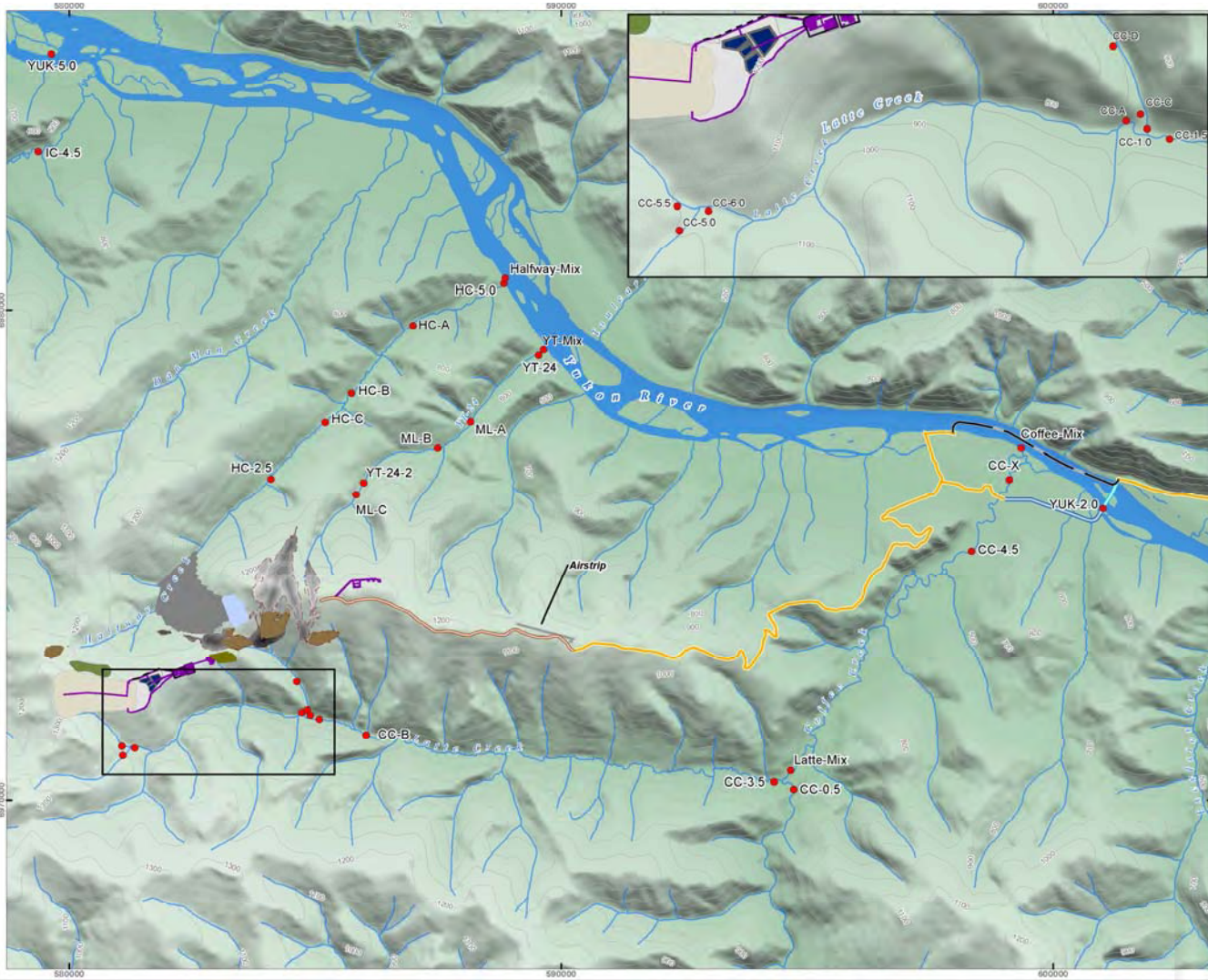
TH confirms with Goldcorp that the constraint was only applied for the pit walls, Goldcorp confirms this is the case. In contrast the copper concentration was scaled up for the WRSF source term.

End of meeting 3:30 pm.



## 1. Updated Baseline Water Quality Monitoring Stations – TH Suggestion back in February 2017

- Addition of 2 new water quality stations on Coffee Creek:
  - Latte Mix – located immediately downstream of Latte Creek confluence
  - CC-X – located closer to the mouth of Coffee Cree (Selkirk FN request)
  
- Mixing zone stations in Yukon River 75 m downstream of each tributary
  - Coffee Creek Mix
  - YT-24 Mix
  - Halfway Creek Mix
  
- Accretion sites in Halfway Creek, YT-24 and Upper Latte Creek



## 2. Site Conceptual Model – two approaches

- *Approach 1:* Developed an interactive model that integrates a 3-Dimensional site model with the Goldsim water balance and water quality model
- Provide a demonstration on how to utilize the model and various functions
- Still a work in progress with the ultimate objective of providing full access to the model to FN partners
  
- *Approach 2:* Developed an Excel based model that incorporates information from the Goldsim Water Balance and Water Quality Model – addresses questions regarding “*Does the balance actually balance?*”
- Allows the user to evaluate to track flow changes on all model nodes on a year by year basis
- Presenting Halfway Creek component of model but still a work in progress for complete site integration

### 3. Water Quality Model Loadings

- Requests to provide water quality model data in the form of Pie-charts that allow the reviewer to better understand the load contributions to the receiving environment and to key water management structures (e.g. Alpha Pond) in the model
- Seeking input and feedback on how to best present/provide this material as flows and loadings are time dependent
  - Over what period/periods do we integrate the Pie-charts?

### 5. Active Water Treatment Clarifications

- A number of IRs were asking for clarification on the proposed active water treatment system
- Developed a presentation to address a number of the IRs
- Clearly an area of ongoing developmental work and engineering design – bench testing provided as a proof of concept



### **6. Development of Water Quality Objectives and Areas of Collaboration**

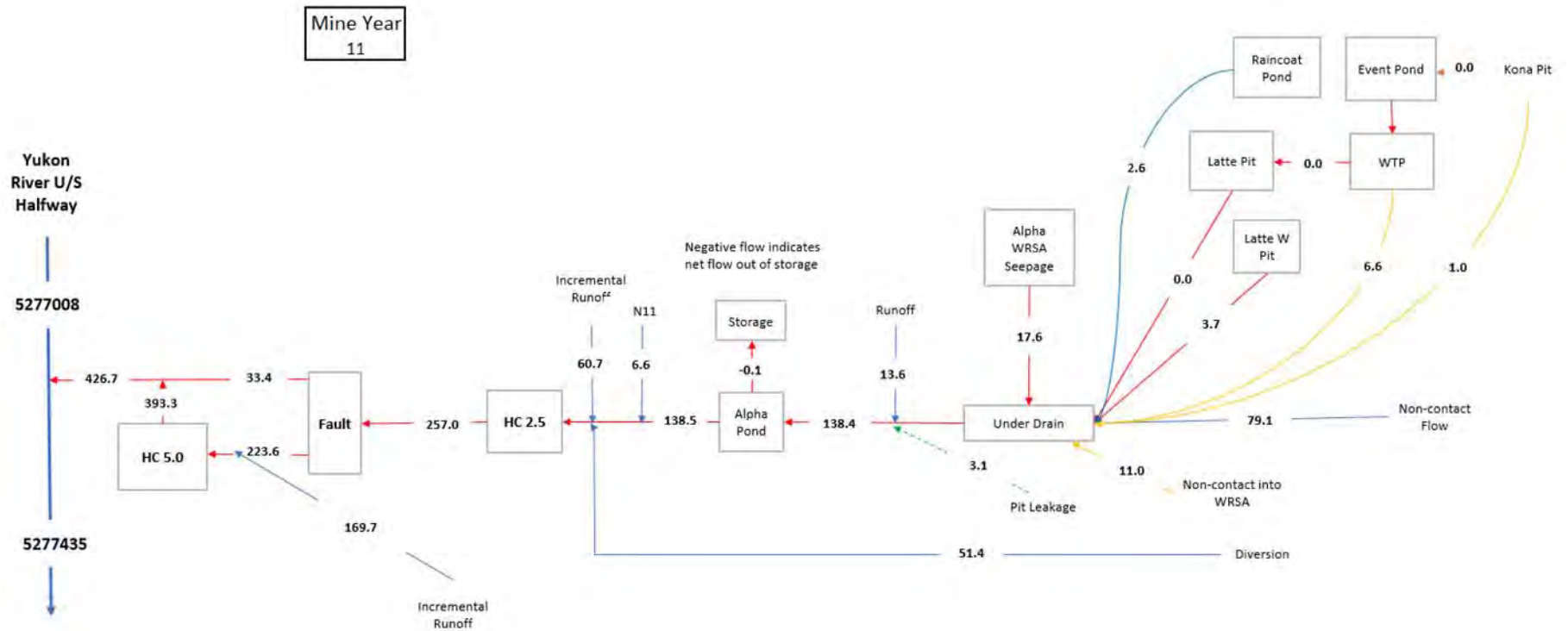
- Ongoing and fundamental component of the project and a central focus of the current workshop

### **7. HLF Passive Treatment System Description**

- Recently issued a memorandum providing additional information regarding the passive treatment system conceptual design, case studies of performance for parameters of interest and discussion of pre-feasibility and feasibility testing that will be required to advance the design
- Topic of discussion of October 17 Closure Workshop



# Conceptual Site Model – Excel Flow Tracking Diagnostic Tool

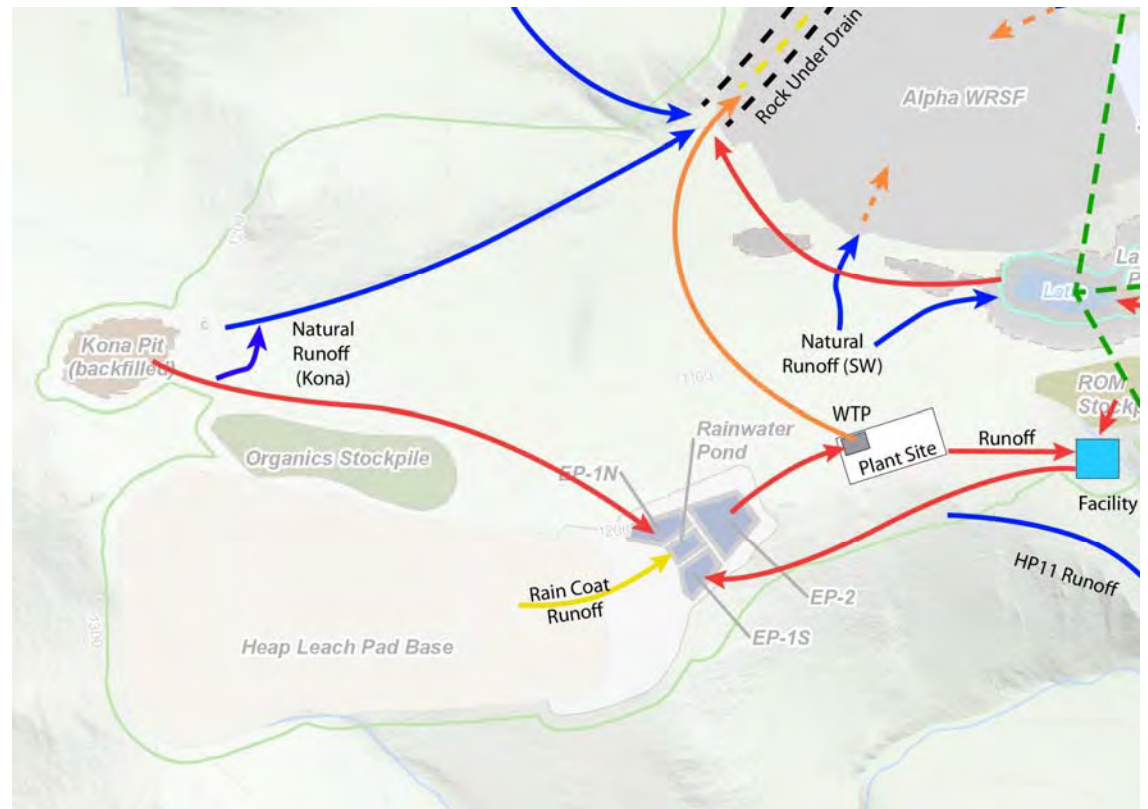




# Water Quality Model

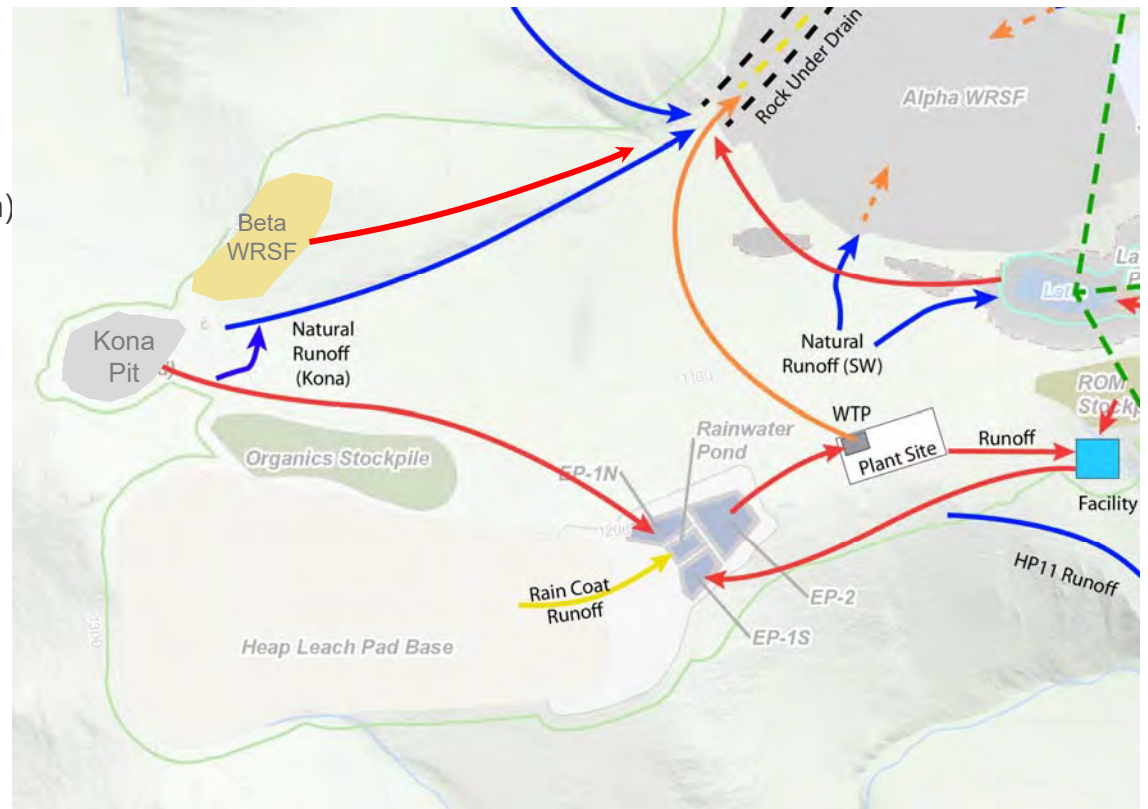
# Kona CSM: Project Proposal

- **Kona Pit**
  - 7.1 ha
  - Backfilled (no pit wall load)
  - Conveyed to EP 1 (North)
    - Added to HLF make-up water, or
    - Treated and released to underdrain
- **Beta WRSF**
  - None
- **Non-contact areas**
  - Conveyance around backfill
  - Report to underdrain





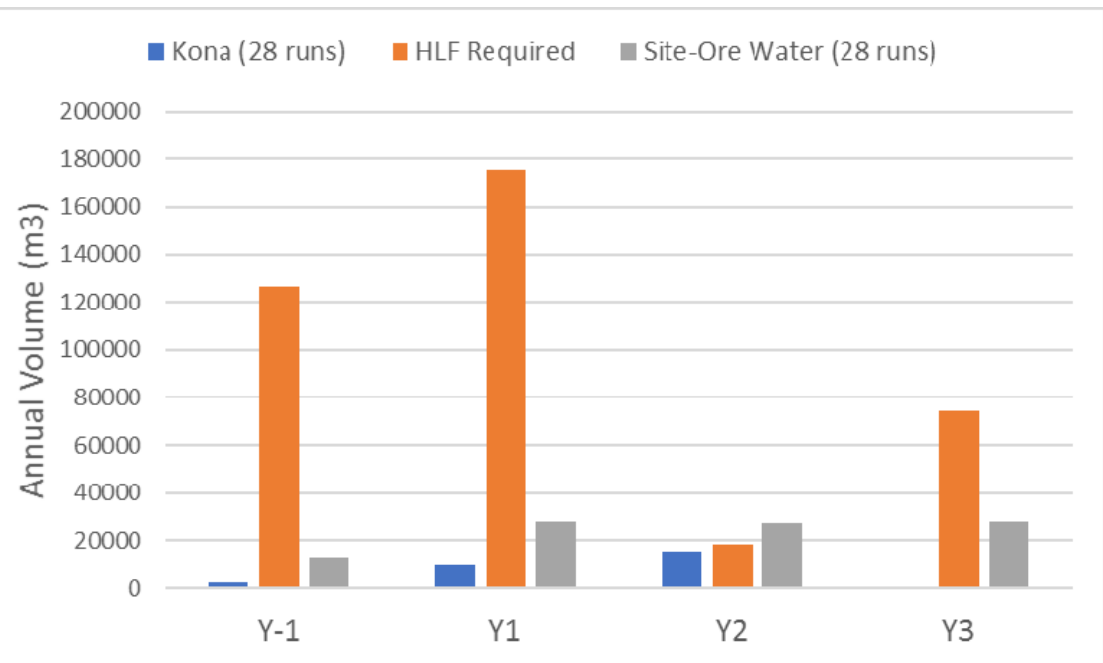
- **Kona Pit**
  - 7.6 ha
  - Pit wall runoff
  - Dewatered and conveyed to EP 1 (North)
    - Added to HLF make-up water, or
    - Treated and released to underdrain
  - Backfilled Y11
- **Beta WRSF**
  - 11.6 ha max (Y-1 to Y11)
  - Reports to underdrain
- **Non-contact areas**
  - Conveyance around backfill and WRSF
  - Report to underdrain



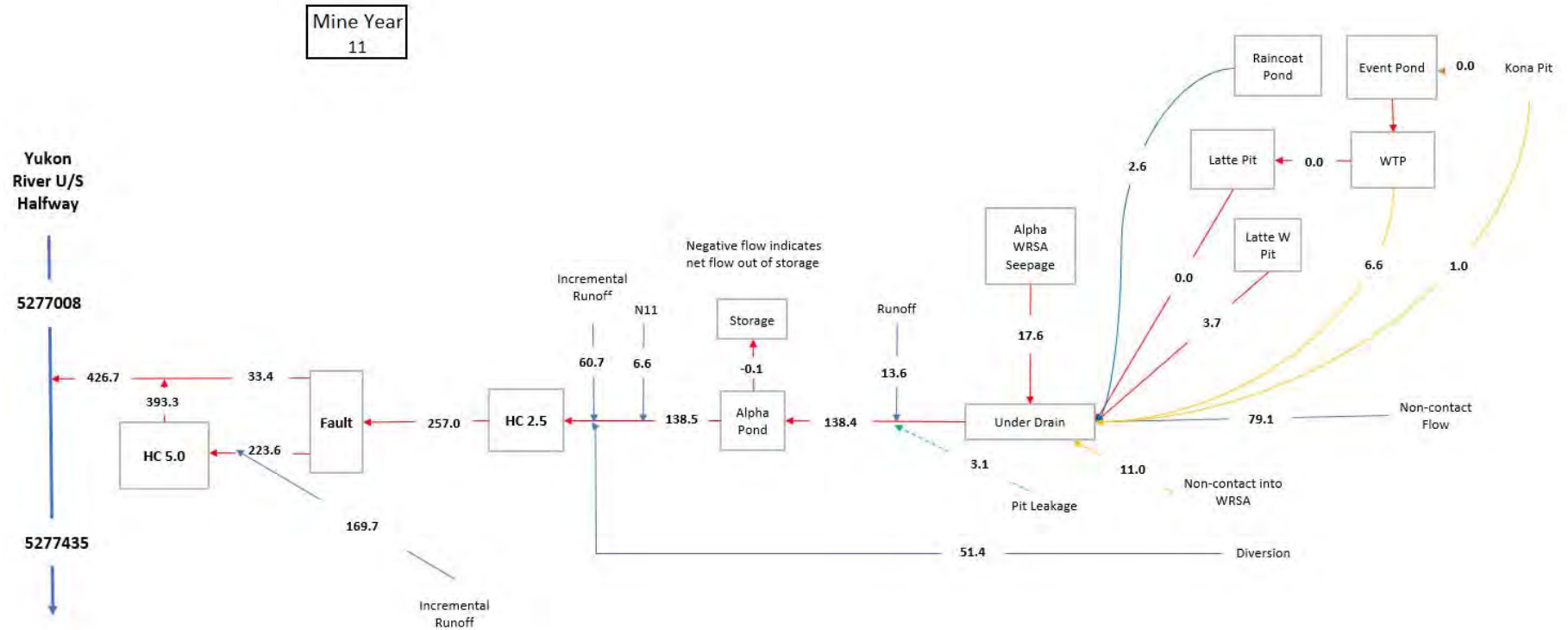
## HLF: Early Operations Y-1 to Y2

4

- **HLF Requires make-up water early**
- **Kona produces relatively little water during dewatering (Y-1 to Y2)**
- **Site water includes**
  - Runoff from Plant Site
  - Runoff from Ore Stockpile
- **Event Ponds hold ~460,000 m<sup>3</sup>**
- **Raincoats are needed around Y6 to begin limiting infiltration**
  - Raincoat pond ~57,000 m<sup>3</sup>
  - Excess RCP water tested and discharged to under-drain

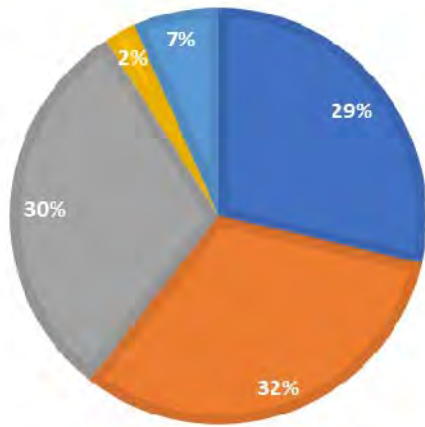


# WBM Flow Tracking Diagnostic Tool



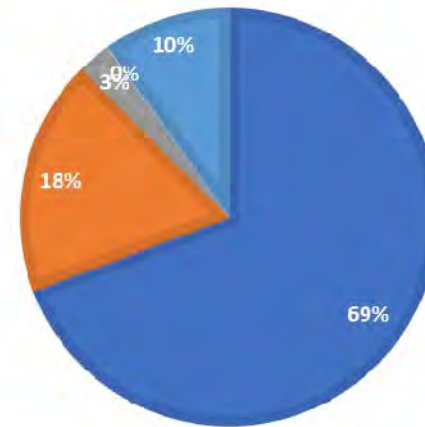
### ALPHA POND OPERATIONS ARSENIC LOADING

■ WRSA ■ NonContact ■ Other Contact ■ WIP ■ NC Thru WRSA



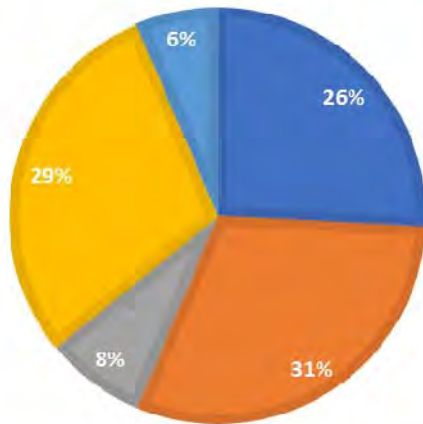
### ALPHA POND OPERATIONS URANIUM LOADING

■ WRSA ■ NonContact ■ Other Contact ■ WIP ■ NC Thru WRSA



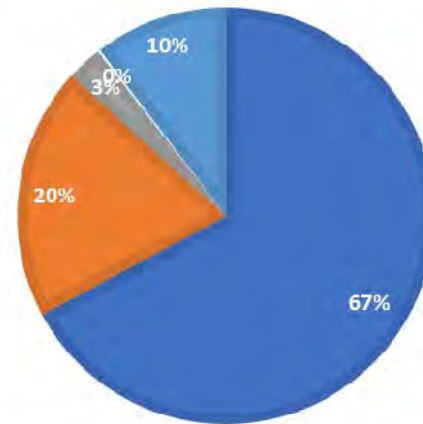
### ALPHA POND DRAINDOWN ARSENIC LOADING

■ WRSA ■ NonContact ■ Other Contact ■ WIP ■ NC Thru WRSA



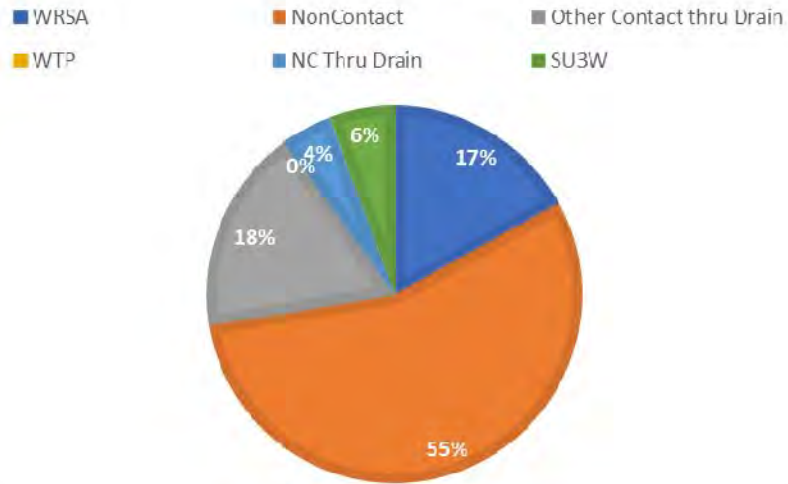
### ALPHA POND DRAINDOWN URANIUM LOADING

■ WRSA ■ NonContact ■ Other Contact ■ WIP ■ NC Thru WRSA

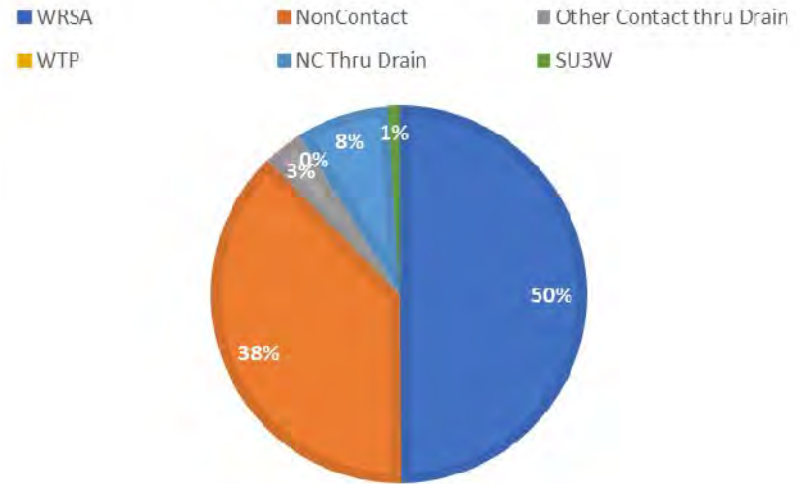




**HC-2.5  
POST-CLOSURE ARSENIC LOADING**



**HC-2.5  
POST-CLOSURE URANIUM LOADING**



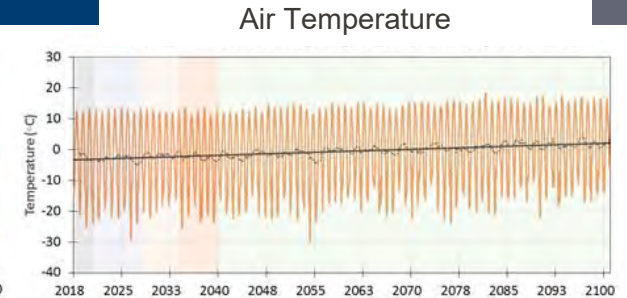
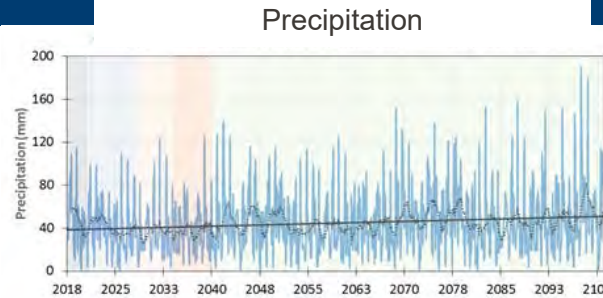
# Background Slides (Extra)

# Water Balance Model: Design and Assumptions

10

- **WBM Assumptions**

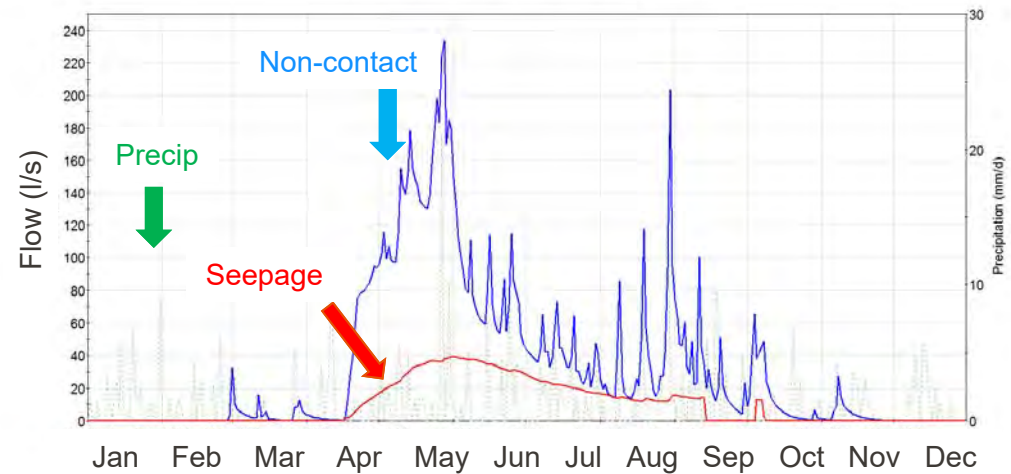
- Precipitation/Temperature driven
- Daily time-step
- EOM full footprint through operations



- **Snowmelt-Runoff catchment models**

- Individually calibrated in natural catchments
- Facilities customized to expected flow
- Flows are delineated:
  - Fast-reporting surface flow
  - Interflow
  - Baseflow
  - Aufeis generation

Diversion Flow vs Alpha WRSF Seepage



Alpha WRSF			
	28 Years	2041-2068	84 Years
min	21.6%	19.7%	15.8%
mean	33.2%	32.0%	31.4%
max	50.6%	50.6%	50.6%

HLF Seepage			
	28 Years	2041-2068	84 Years
min	22.5%	16.8%	14.6%
mean	35.5%	30.7%	29.5%
max	55.0%	55.0%	55.0%

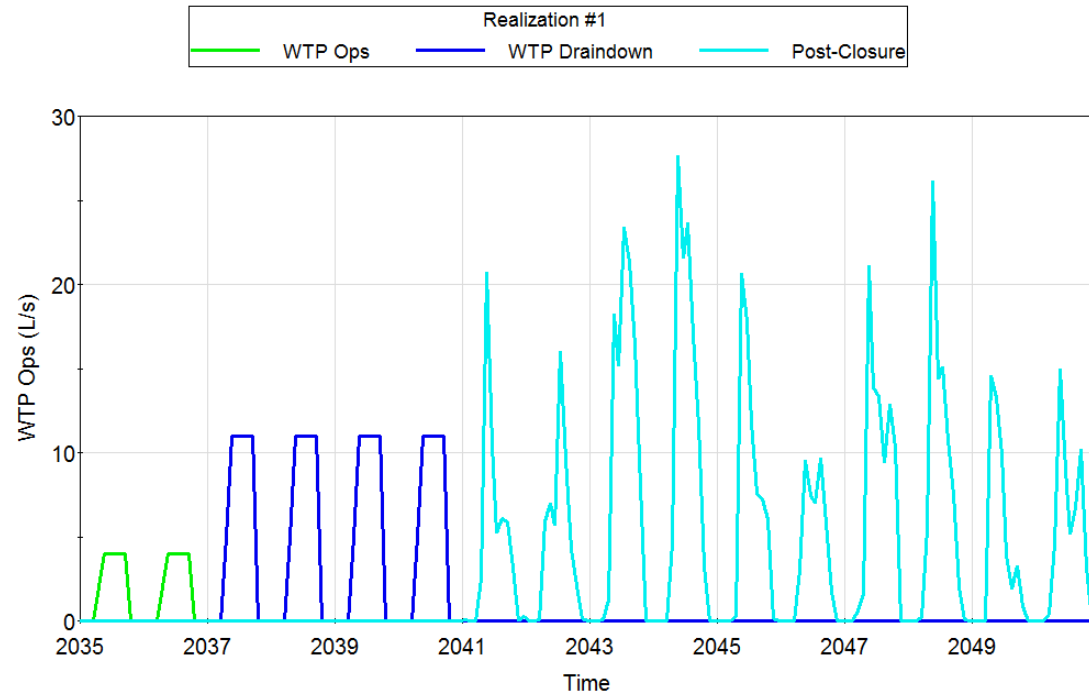




- Treatment Rates**

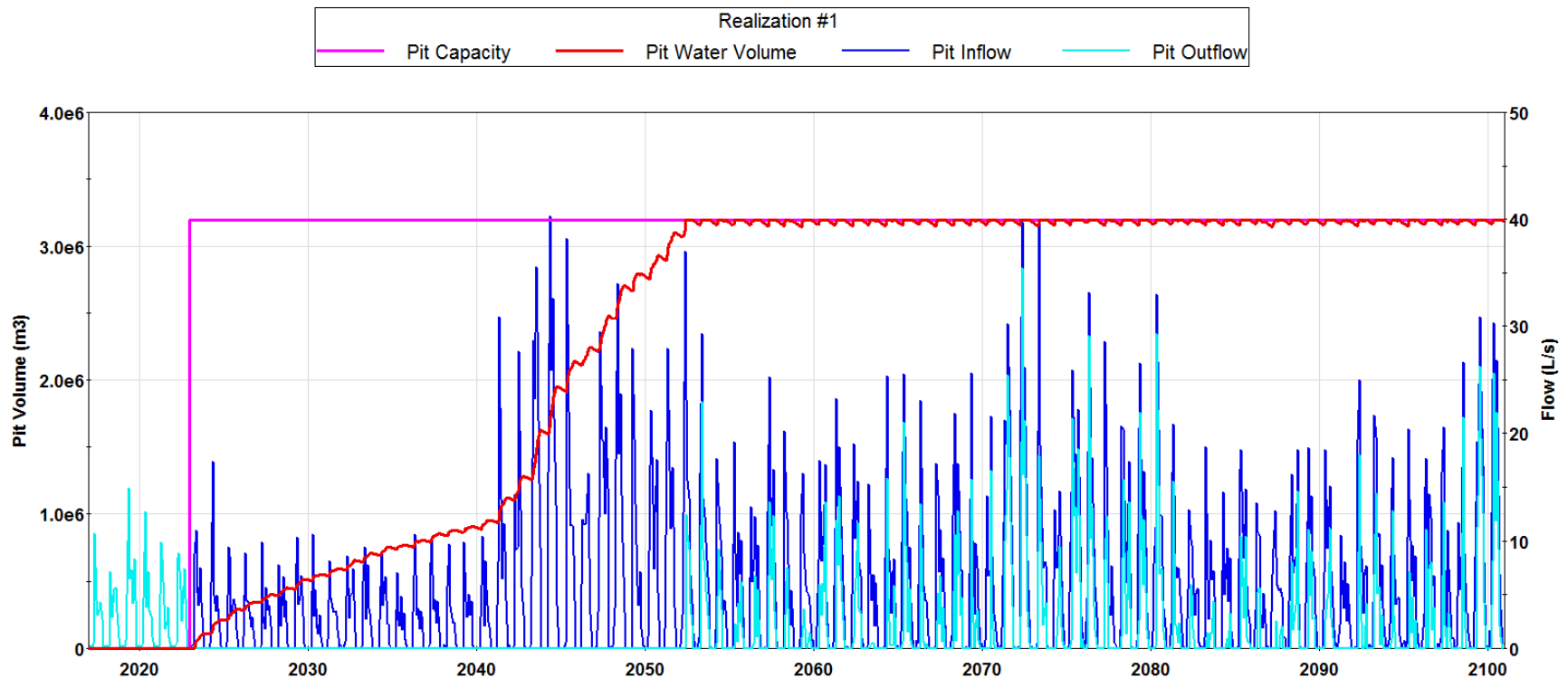
- Late Operations = 4 -11 L/s
- Draindown = 11 L/s

- Passive treatment/discharge begins when active WTP no longer required**



# Latte Pit: Operations to Closure/Spill

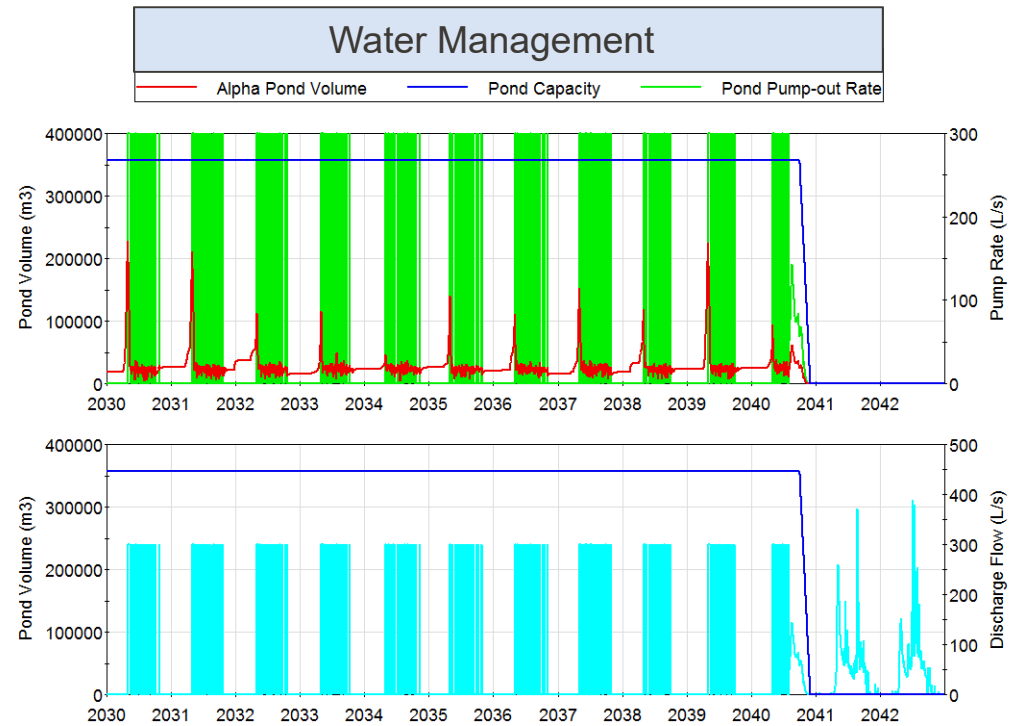
Latte Pit Volume and Inflow/Outflow



# Alpha Pond: Operations to Closure



- **Alpha Pond**
  - Capacity 357,400 m<sup>3</sup>
  - Max pump-out rate 300 L/s



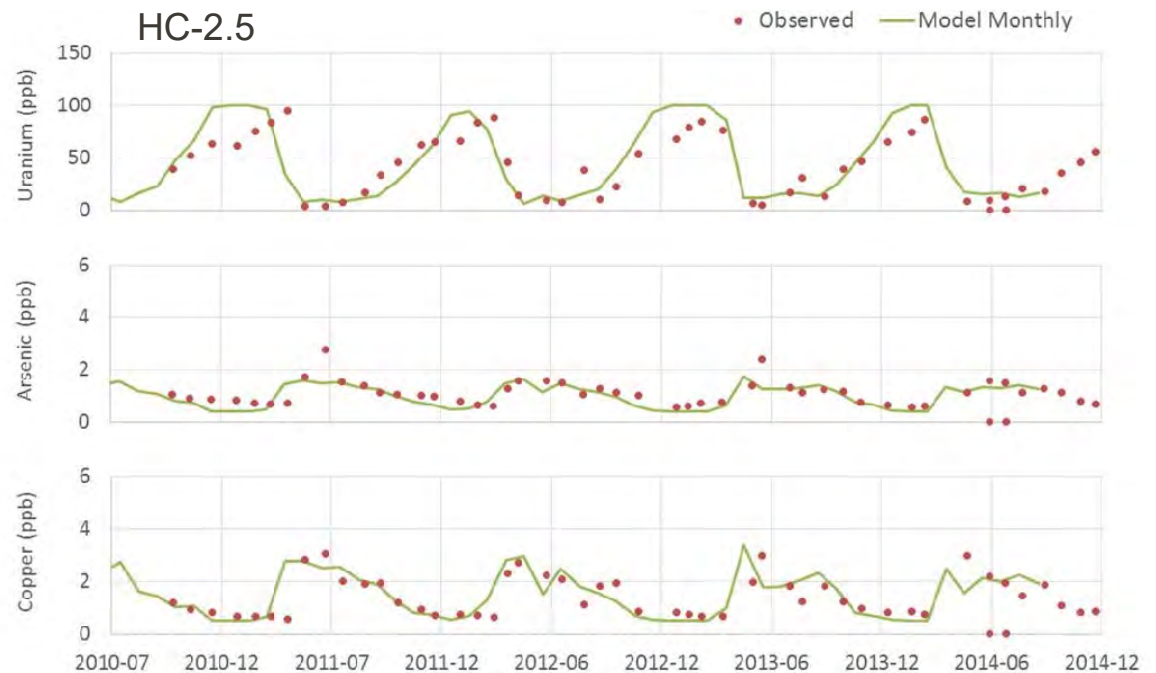
# Results Slides (Extra)

- **WQ Integrated into the background flow components**

- Quick flow (fast runoff)
- Interflow
- Baseflow (winter/low-flow)

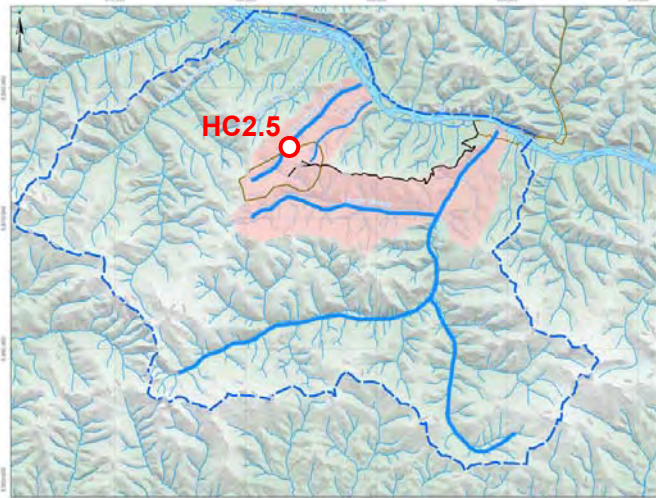
- **26 Parameters in each of 7 catchments**

- HC-2.5, HC-5.0
- CC-1.5, CC-3.5, CC-0.5, CC-4.5
- YT24



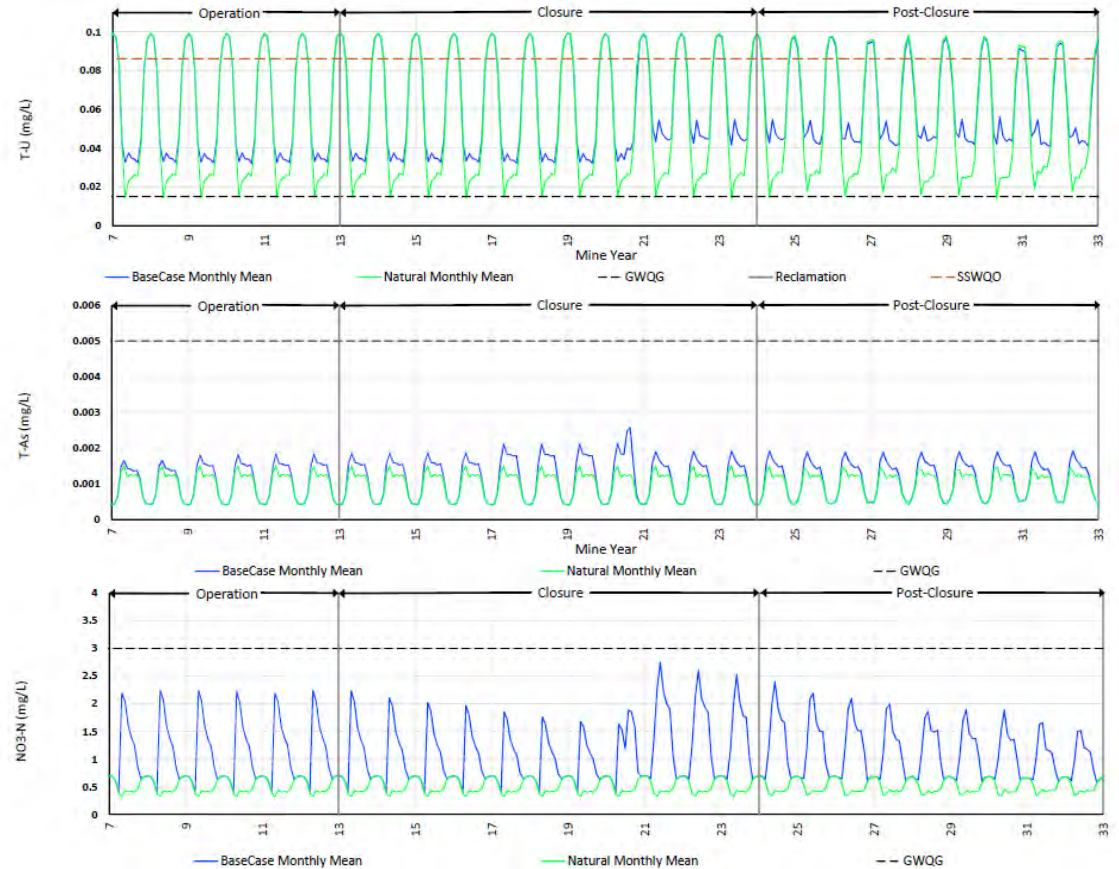


# HC-2.5 WQM Results: Base Case

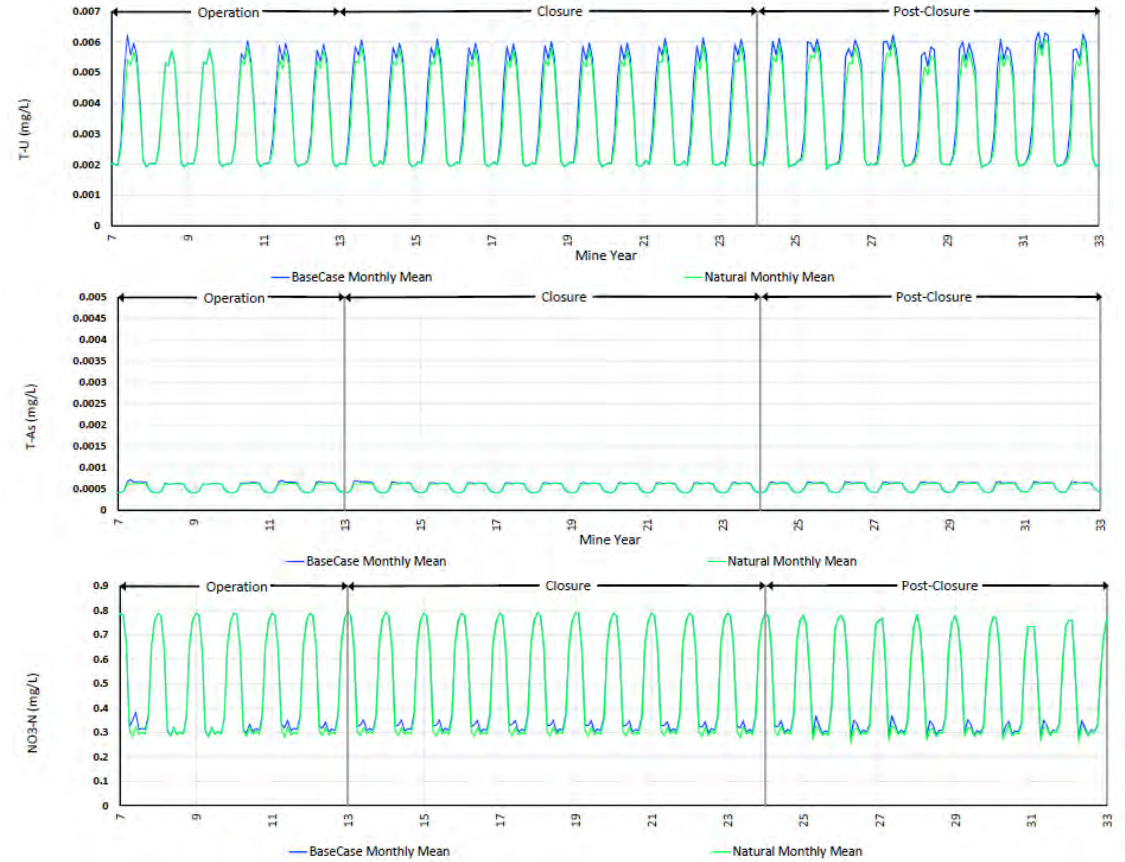
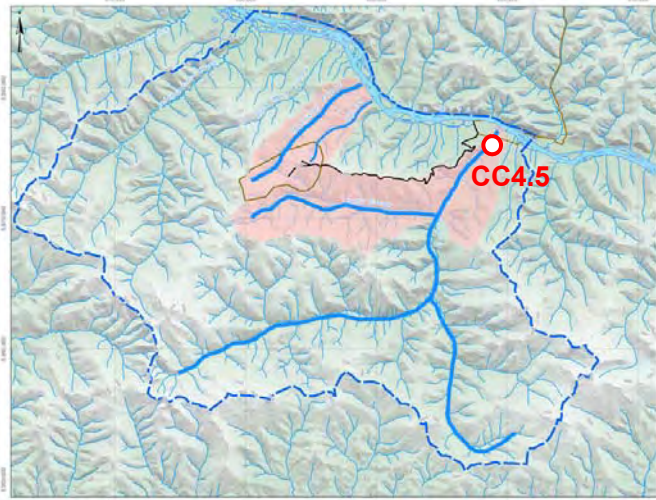


### WQO:

- **U = 0.086 mg/L (SSWQO)**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**

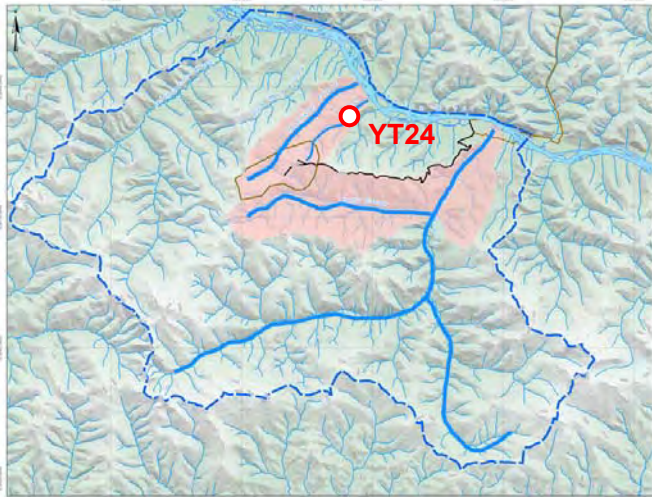


# CC-4.5 WQM Results: Base Case



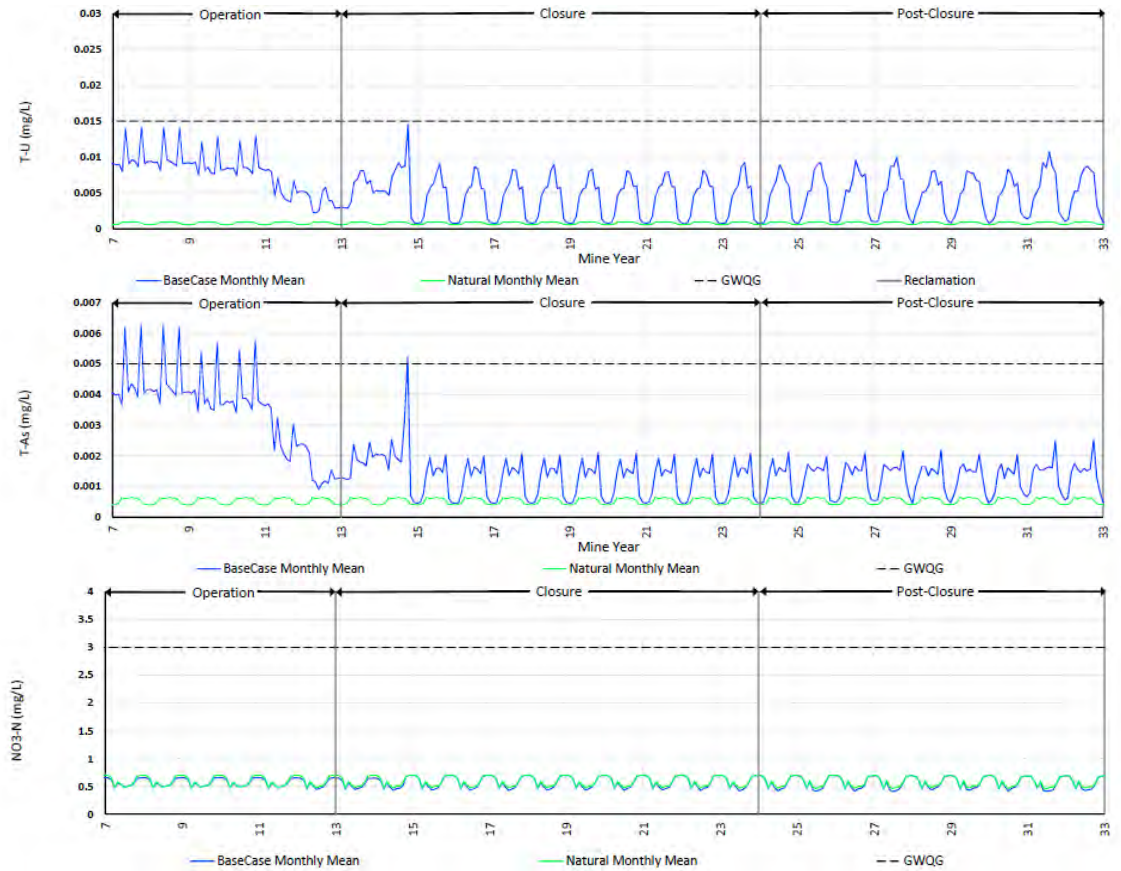


# YT24 WQM Results: Base Case

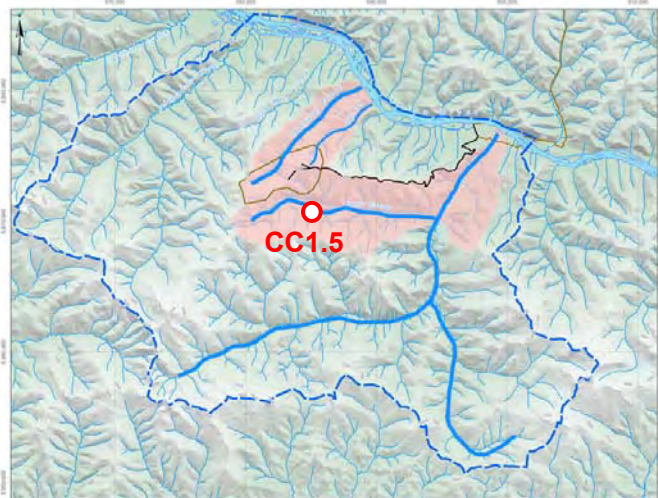


### WQO:

- **U = 0.015 mg/L**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**

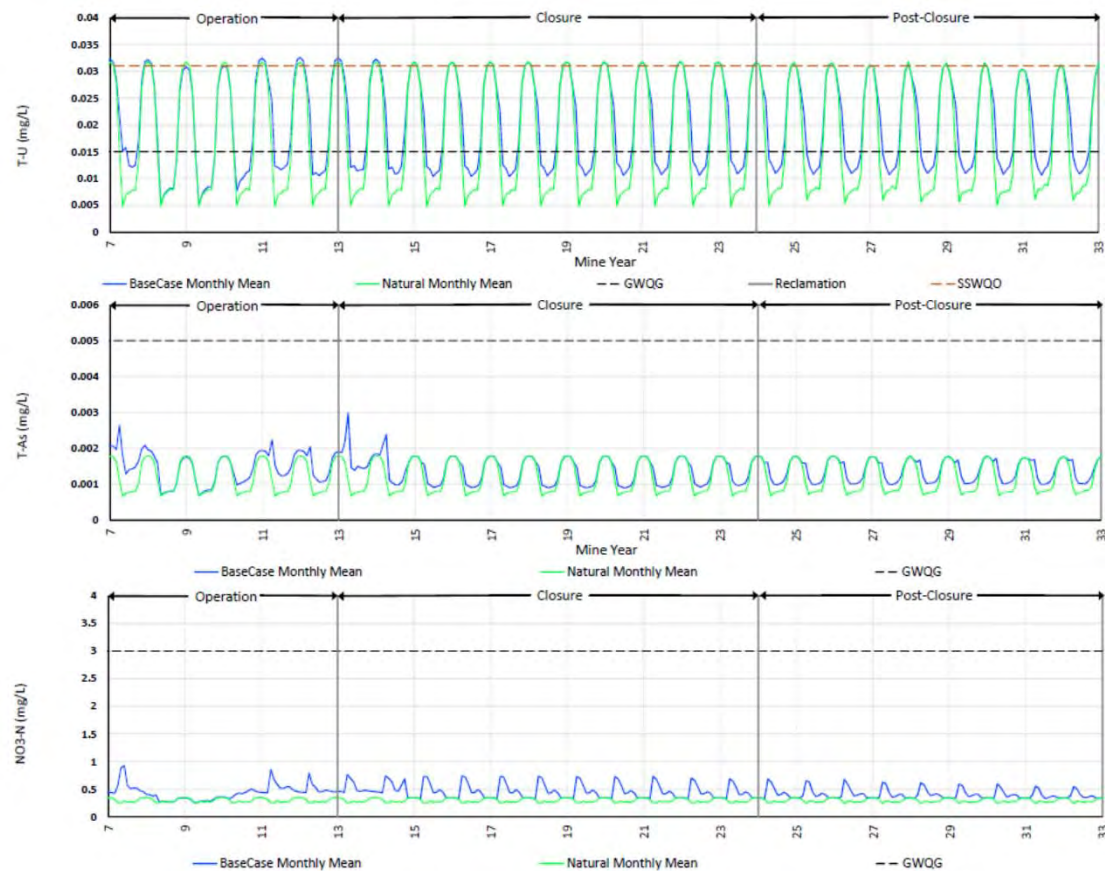


# CC-1.5 WQM Results: Base Case



### WQO:

- **U = 0.031 mg/L (SSWQO)**
- **As = 0.005 mg/L**
- **NO3 = 3 mg/L**







# Heap Leach Facility

September 29, 2017

 **GOLDCORP**



## HLF – Key Components

2

- **Heap leach pad built in stages and heap stacked using trucks\***
- **Free-draining, non-impounding, “Flat Pad” configuration\***
- **Event ponds to store solution in “upset” conditions**
- **Rainwater pond to store clean water**
- **No barren or pregnant ponds**



**\*Key trade off studies completed:**

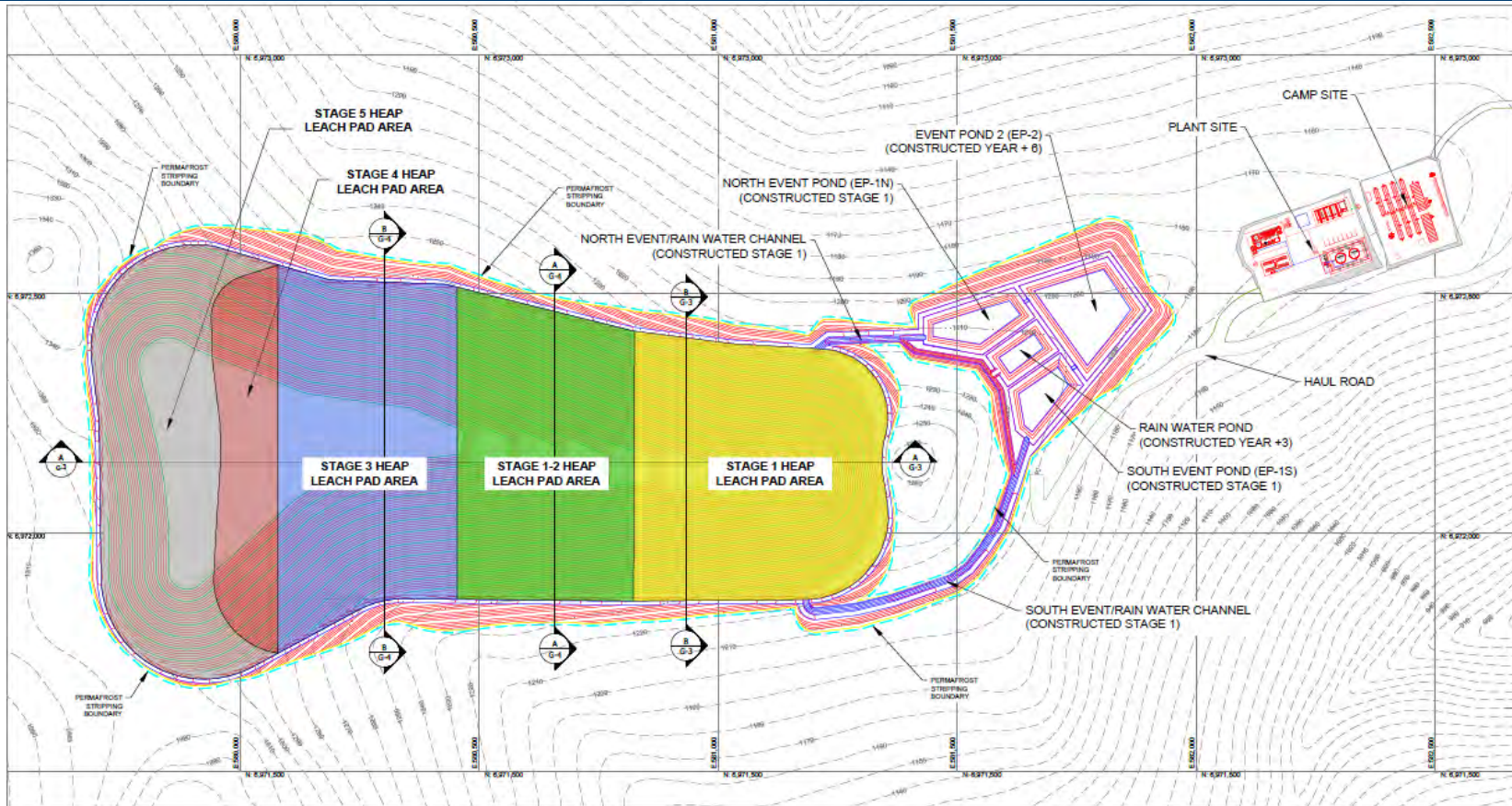
- **Trucks vs. Conveyor stacking**
- **Pad Location & Type**

# Similar Leach Pad Configurations Used Elsewhere





# Layout



- **Water for processing is dominantly sourced from within the heap footprint**
- **System is water neutral or net demand until Year 9**
- **Rinse water to be recycled to next stage of rinsing, or used for make-up water in process circuit**
- **Treatment plant to be commissioned in Year 8**
- **Large events ponds, raincoats allow significant operator control over water balance**
  - Operators can change infiltration volumes quickly by changing the raincoat usage
  - Ponds allow flexibility in timing of decisions; sized for:
    - Wettest year on record, and
    - Probable maximum precipitation, and
    - Heap drainage, and
    - Freeboard
  - Required pond capacity declines as areas of heap are capped, taken off line
    - This capacity becomes available for seasonal storage of surplus water

# Raincoats - Technology

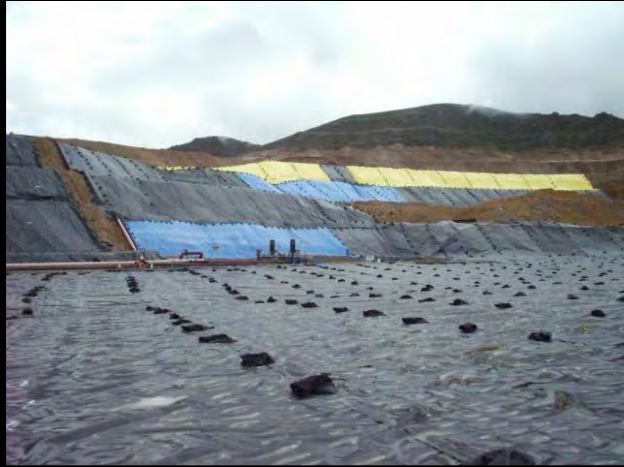
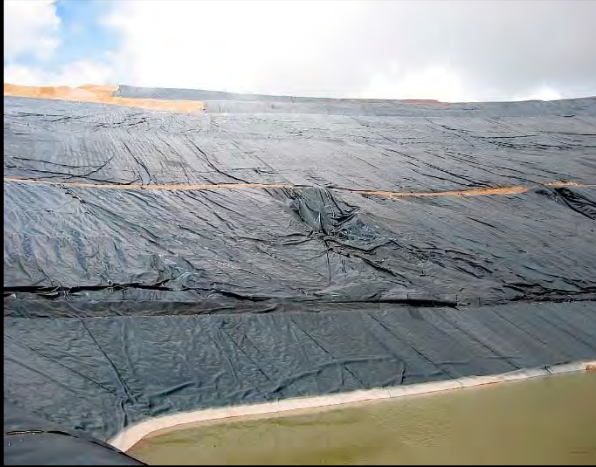
6

- **Temporary exposed geomembrane covers, or “Raincoats,” have a long history in mining and other industries for reducing or eliminated rainwater and snowmelt from entering operating systems**
- **Raincoats add flexibility to the water management system as the area under coverage can be increased or decreased quickly**
- **Starting in Year 3 to reduce infiltration, avoid dilution of process solutions, and maintain a neutral water balance**
- **Raincoats will also serve to conserve heat and increase heap temperatures in the winter months**





# Raincoats – Examples





# Raincoats - Application



# Raincoats – Demonstrated Technology

9

Project/Owner	Location	Years
Three gold mines	Ghana	1997-06
Newmont Yanacocha Complex	Peru	1988-98, 2012-16
Santa Rosa	Panama	1994-96
Mindanao mine, Philex	Philippines	1999-05
Pierina mine, Barrick	Peru	1999-16
Lagunas Norte, Barrick	Peru	2008-16
Kyisintaung	Myanmar	2000s
Aktogay	Kazakhstan	2000s
Savkino	Siberia, Russia	1990s-2016
Bingham Canyon demo heap	Utah, USA	2012-14





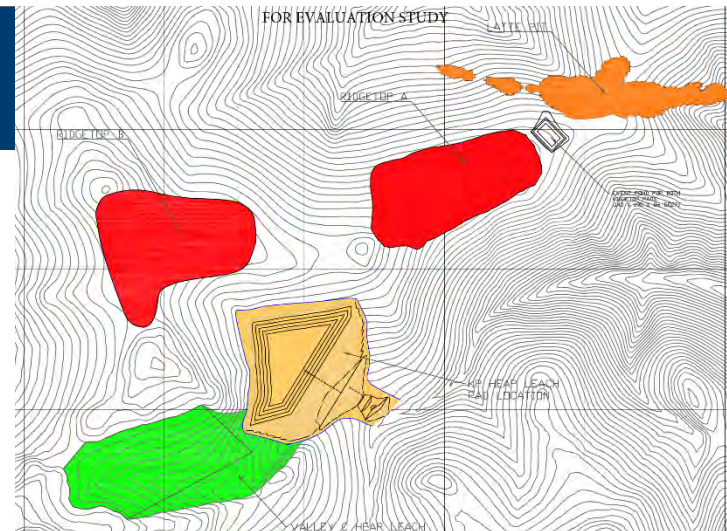


# APPENDIX SLIDES

## Pad Location & Configuration Trade-Off

11

- **Three main locations considered, one of each type (see sidebar)**
- **Rationale for selected option:**
  - Most commonly used technology, including for cold-climate
  - Most flexible design, allowing for adaptive management, staged construction, and staged closure
  - Fastest and simplest to build and simplest to operate
  - Lowest risk:
    - No dam or in-heap solution storage
    - Easiest and safest to close and reclaim
    - Design allows for progressive reclamation



### Pad Types:

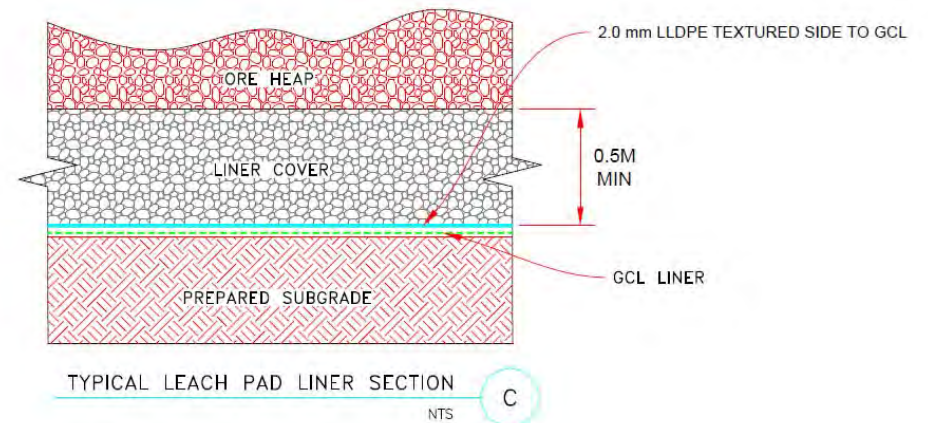
1. Valley fill with solution containment (impounding)
2. Valley fill, free-draining
3. Flat pad, free-draining



## Liner System – 6 Layers (from top down)

12

- **Overliner: 500mm crushed ore (P100 50mm)**
  - Contains drainage pipes
- **Geomembrane liner: 2.0 mm LLDPE (textured bottom)**
- **Reinforced GCL**
- **Wick drain for leak detection**
- **Prepared subgrade, stripped to bedrock**



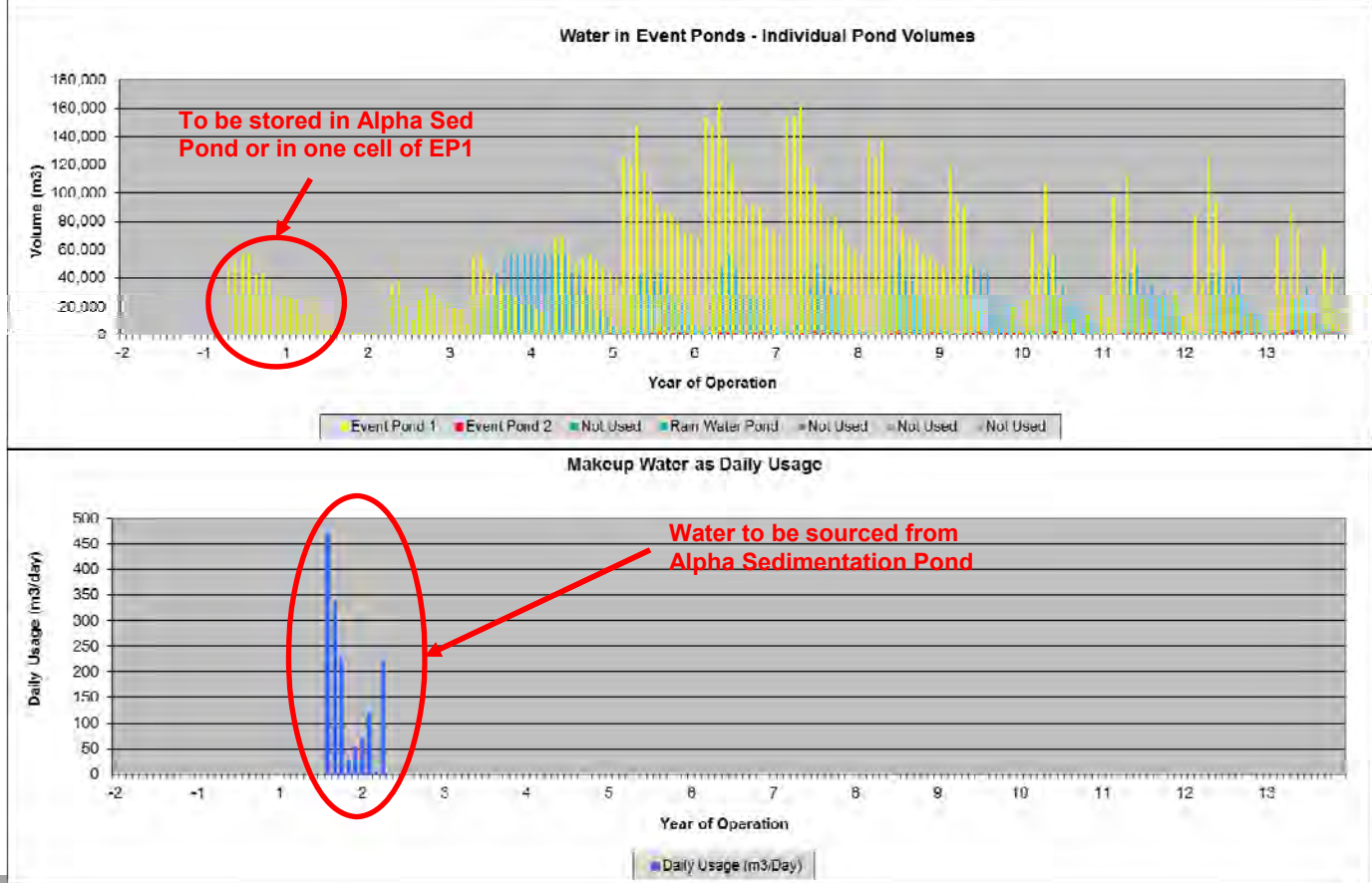
- **EP-1S and EP-1N: 5-layer system**

- Geomembrane: 2.5 mm HDPE (smooth)
- Drainage Layer (geonet)
- Geomembrane: 1.5 mm HDPE (smooth)
- GCL
- Prepared Subgrade

- **EP-2 and Rainwater Pond: 3-layer system**

- Geomembrane: 2.5 mm HDPE (smooth)
- GCL
- Prepared Subgrade
- Liner system simplified because:
  - EP-2 may never hold any solution, or will hold only highly diluted solution for short periods
  - Rainwater ponds only hold non-contact water

- **Make-up water is required throughout mine life**
- **External-to-heap water required for Make-up in Year 1 and 2**
- **Starting in Year 4, raincoats will be used to maintain optimal make-up water balance**



- **Fully isolated from environment**
  - Redundant system of liners, pipes, drainage layers, leak detection and monitoring systems
  - Every component that has contact with process solution has multiple, redundant containment layers plus monitoring
- **Event ponds sized for extreme events in excess of industry standards and regulatory requirements:**
  - “Probable Maximum Precipitation”, plus complete heap draindown, plus maximum seasonal water accumulation, plus freeboard
  - Additional contingency measures include: back up power, inventory of raincoats in excess of demands, rain water pond can be converted to events pond for extra containment

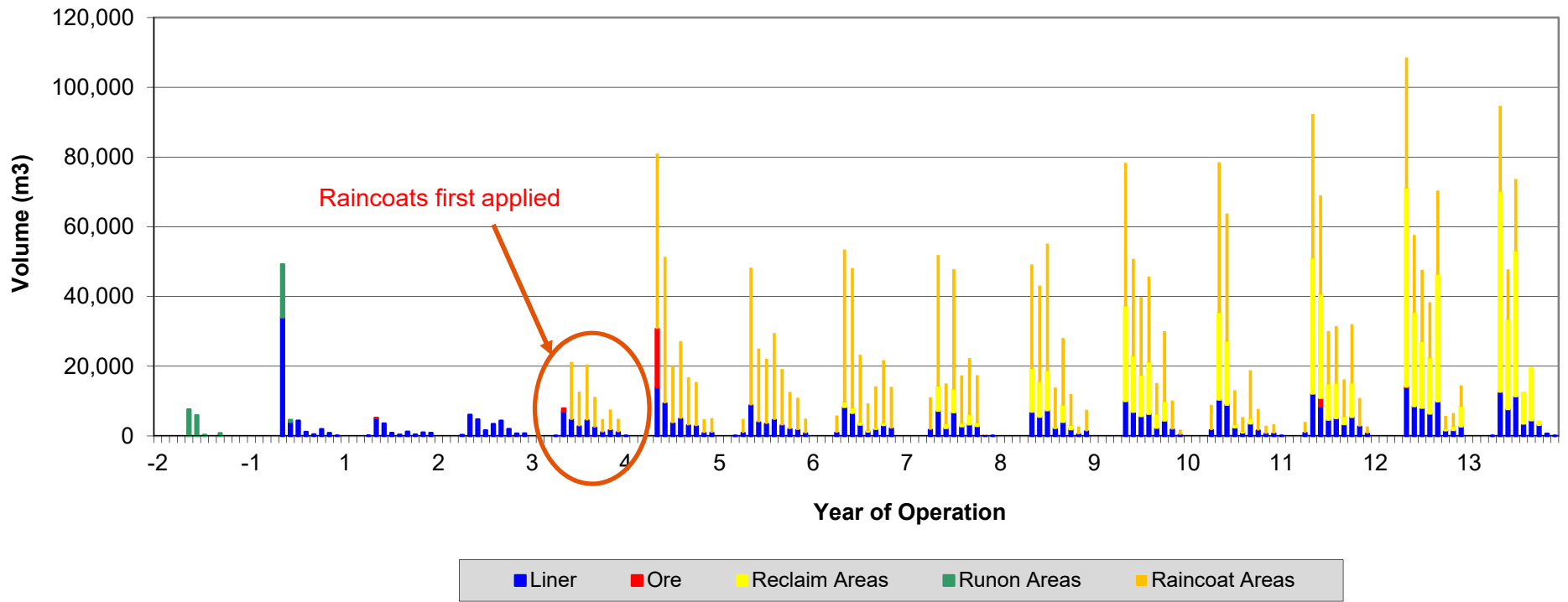


- **Freshwater and rainwater are kept away from the process circuit to the maximum extent practical**
- **Diversion ditches and berms around the leach pad**
- **Staged leach pad construction and heap stacking minimize contact water area**
- **Divider berms and ditches within leach pad between stages and cells**
- **Raincoats to divert precipitation from system**
- **Progressive closure to reduce maximum active footprint**

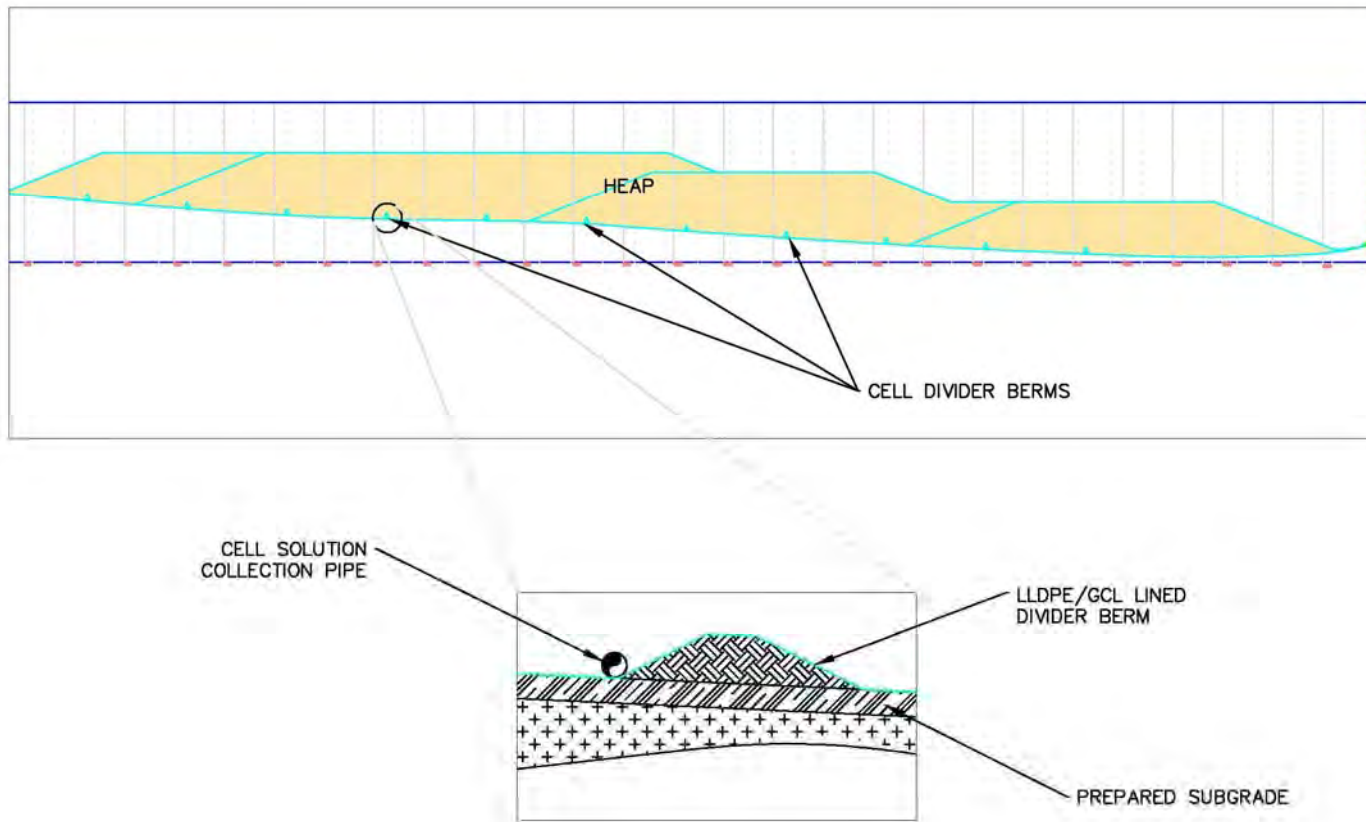




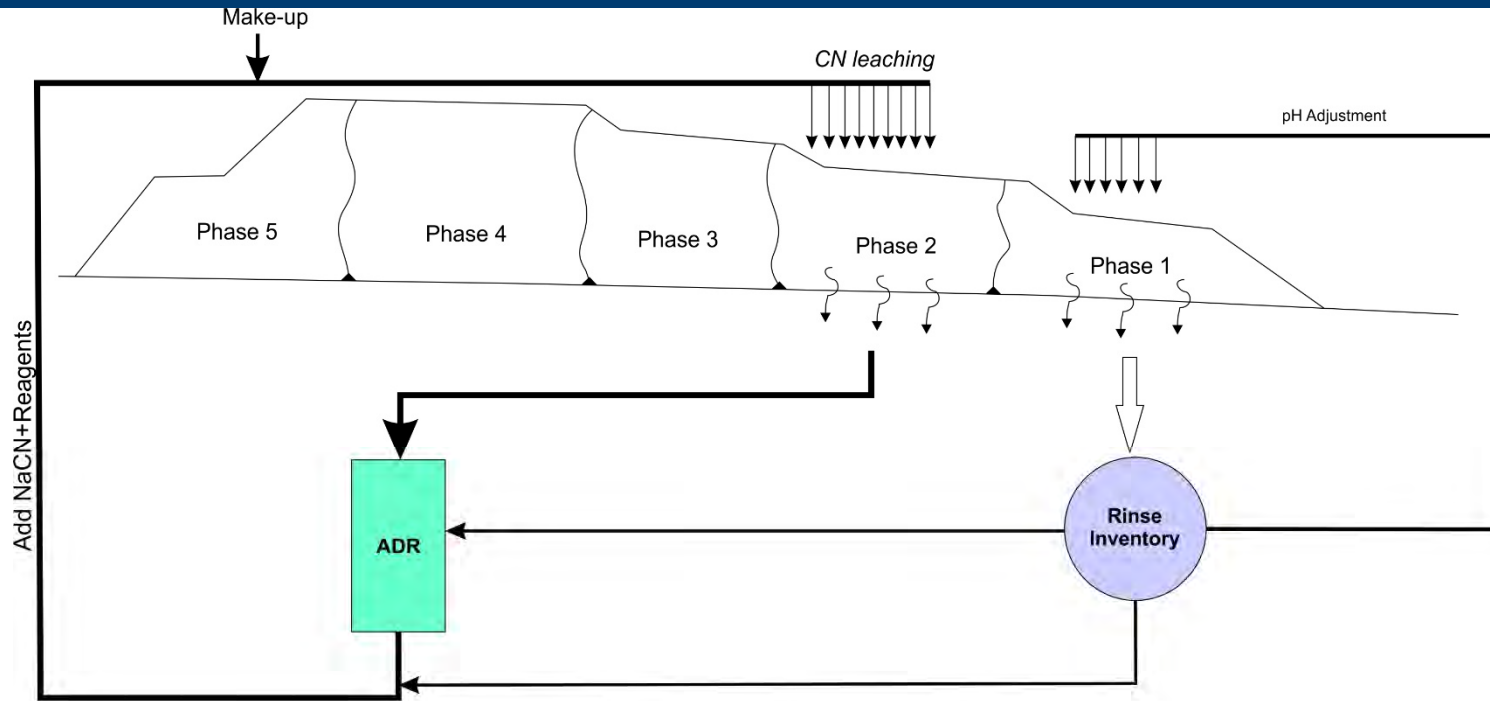
### Summary of Runoff Volumes



# Cell Separation Berms

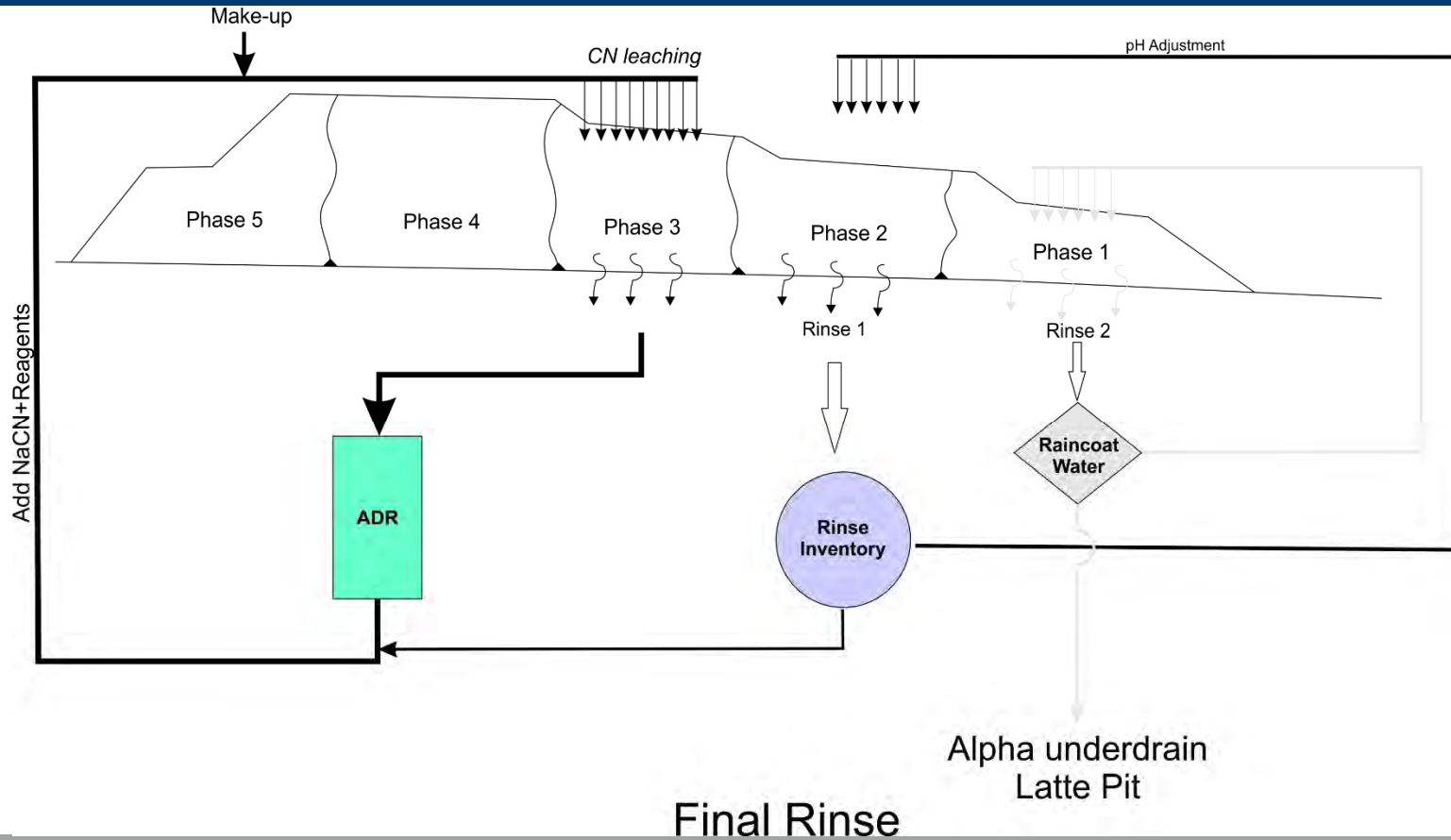






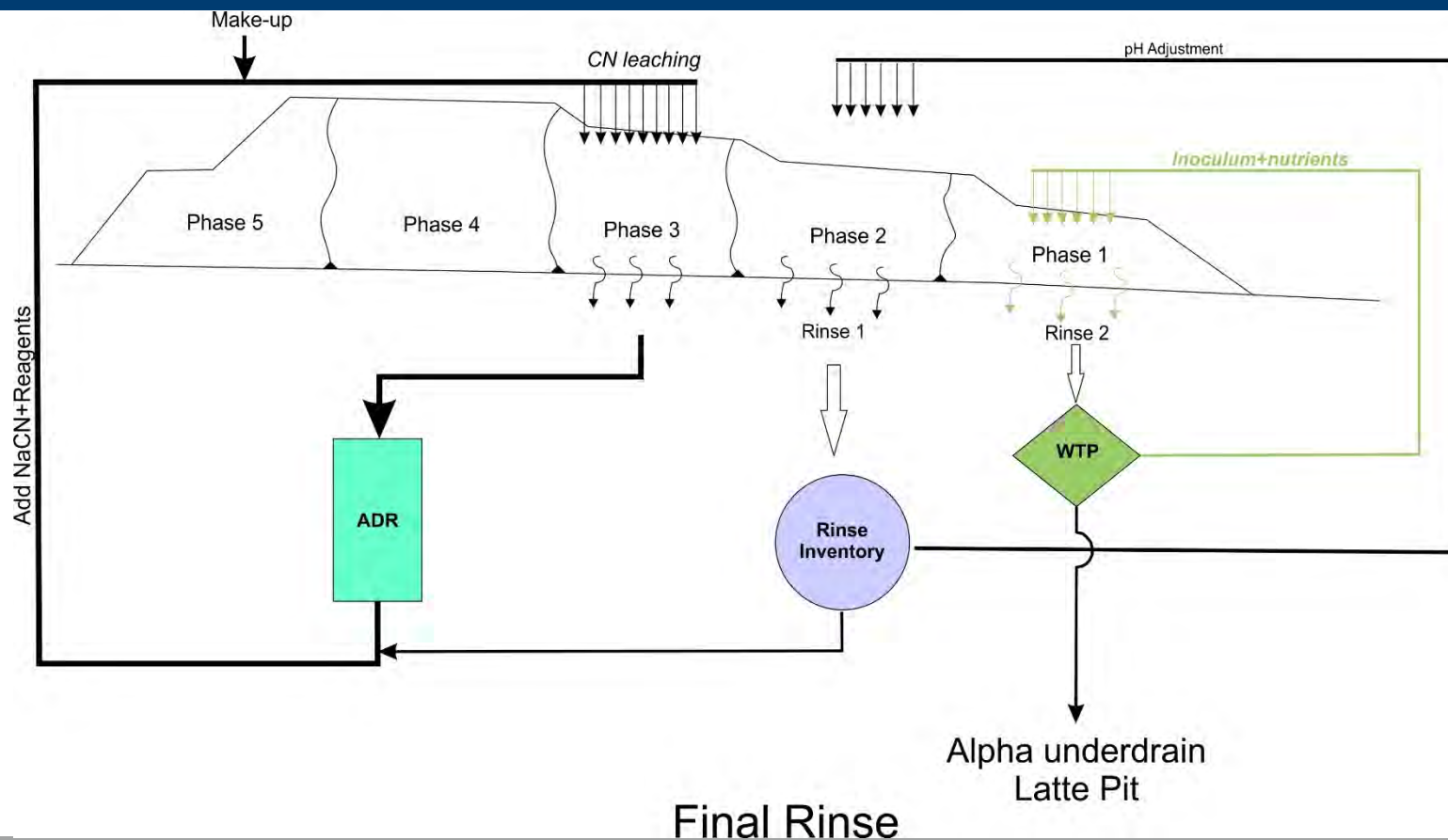
## Preliminary Rinse

# Rinsing





# Rinsing



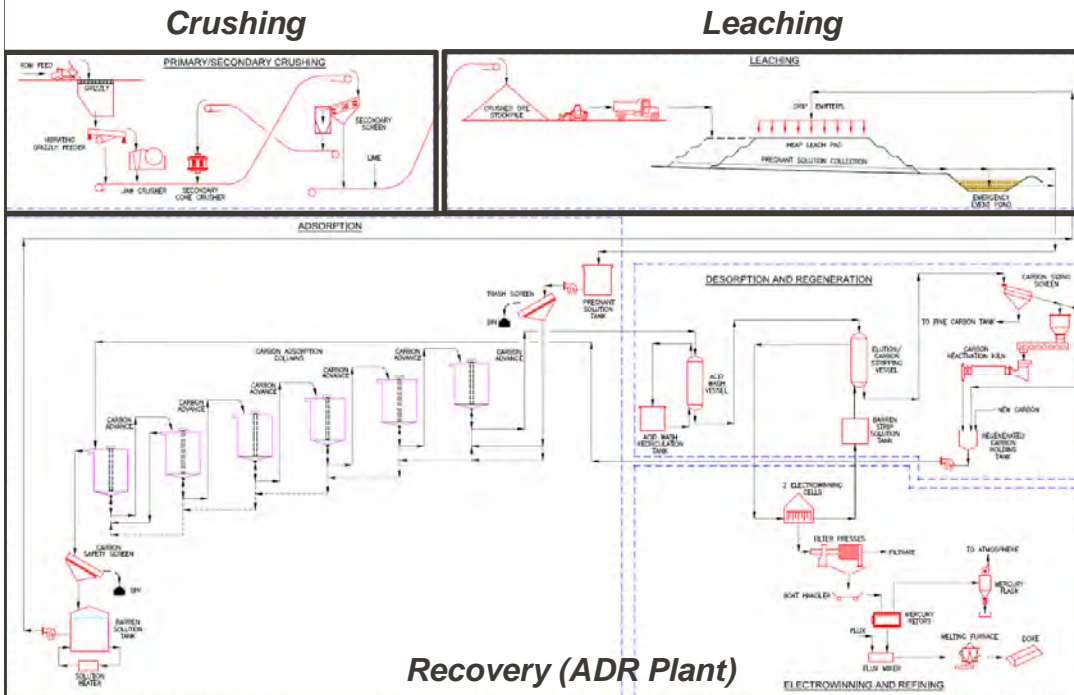
Final Rinse

# Heap Leaching Operations

NaCN briquettes  
 Image from <http://info.noahitech.com/blog/turning-cyanide-into-gold-sodium-cyanide-applications-in-mining>



Extraction of gold from crushed rock using dilute CN solution.  
 Gold Doré poured on-site.  
 Cyanide shipped to site as NaCN briquettes, which are mixed in alkaline water (pH~10) to form the Barren Solution.

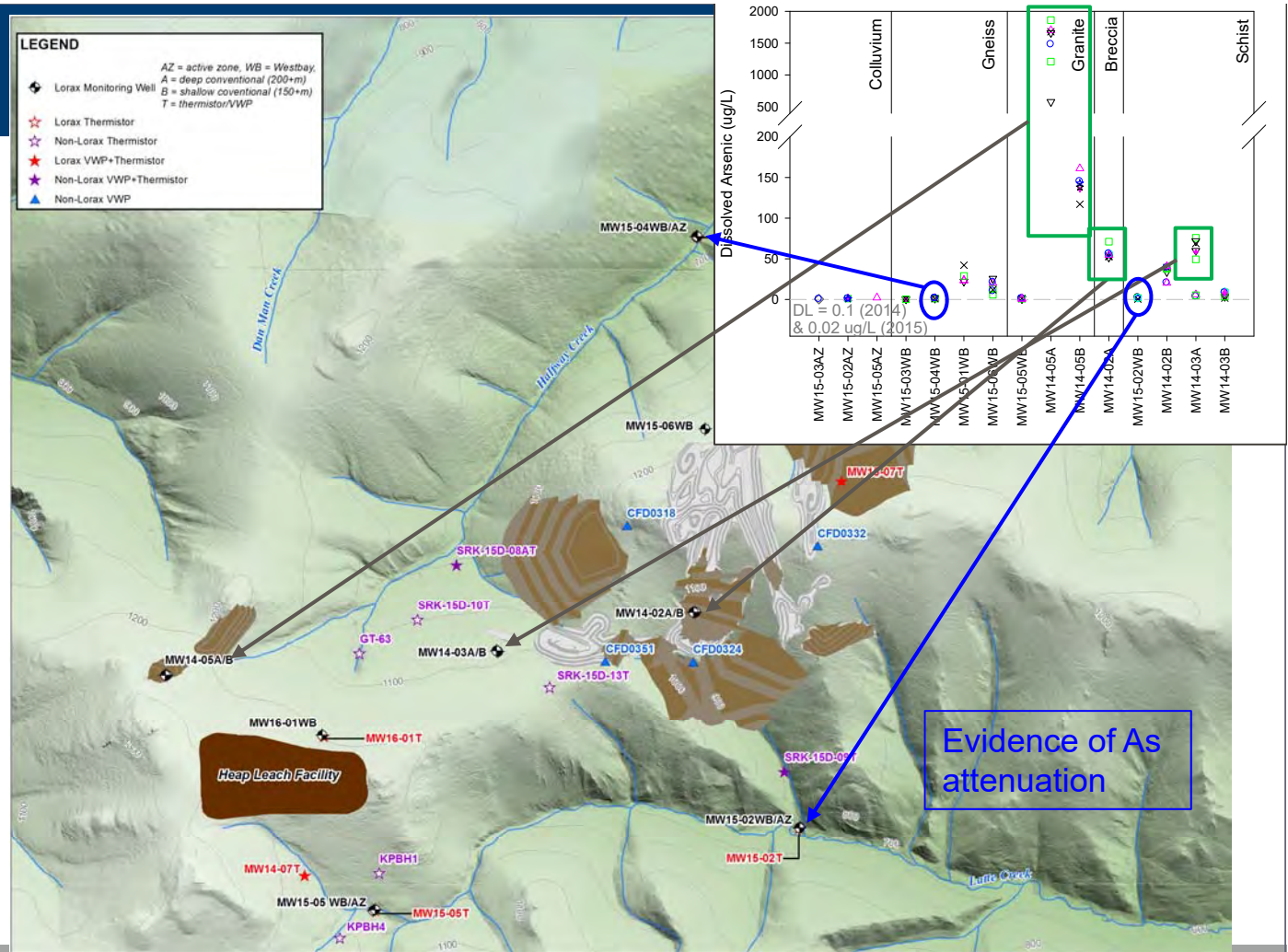


- **Applied a 75% “attenuation” factor to microbially-mediated redox sensitive parameters**
  - **Arsenic, antimony** – soluble under reducing or sub-oxic (low oxygen) conditions. Lower solubility due to adsorption onto oxide surfaces (Fe, Mn) under oxic conditions
  - **Nitrate** – susceptible to denitrification (conversion to N<sub>2</sub> gas) under reducing or sub-oxic conditions
  
- **Evidence in baseline groundwater and surface water quality monitoring that natural attenuation of As occurs along groundwater flow paths to surface water receptors**
  - Arsenic present in deep groundwater
  - Reducing conditions evident by presence of hydrogen sulphide, elevated Fe, Mn

# Baseline Results

## GW Quality - Arsenic

- Arsenic in upper Halfway (50 to 75 ppb)
- Arsenic is highest in deep groundwater at Kona (~1,500 ppb)
- Downgradient wells in valley bottoms, arsenic less than 2 ppb

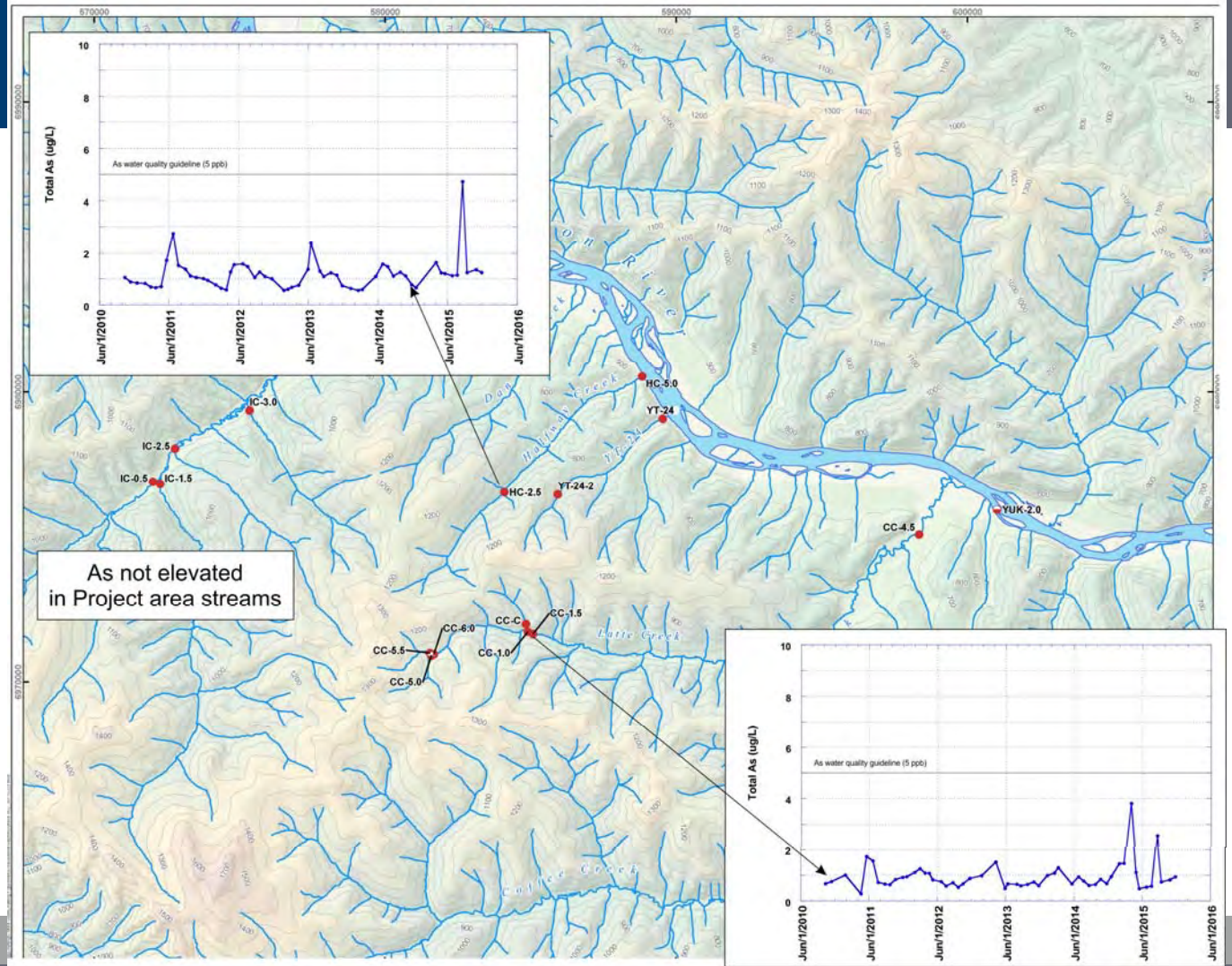




# Baseline Results

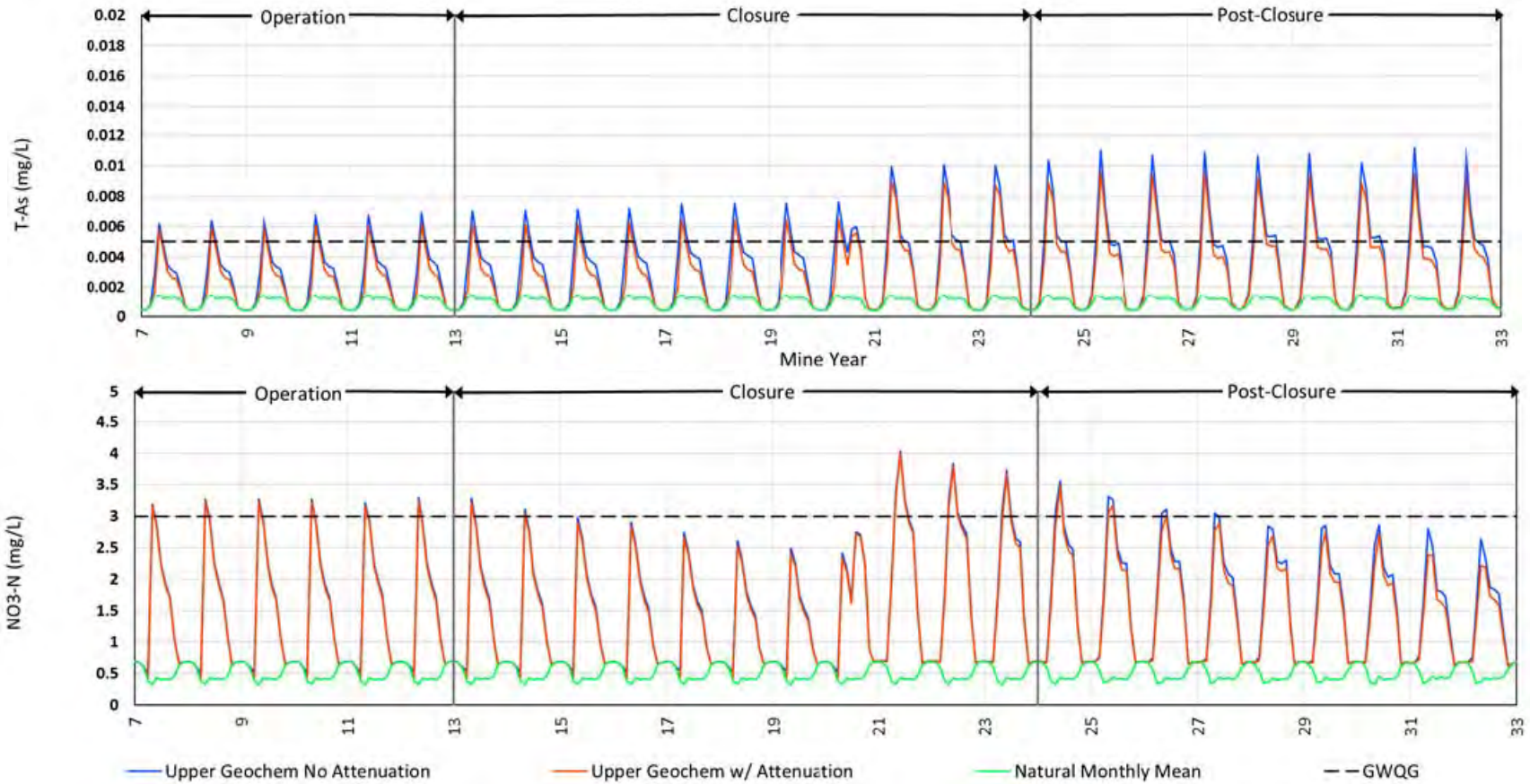
## SW Quality - Arsenic

- Seasonal signature of As; lowest concentrations during baseflow (> 1 ppb)
- Slightly higher concentrations during peak flows
- Concentrations in baseflow surface water ~98% lower than in groundwater
- Evidence of arsenic attenuation along groundwater flowpaths

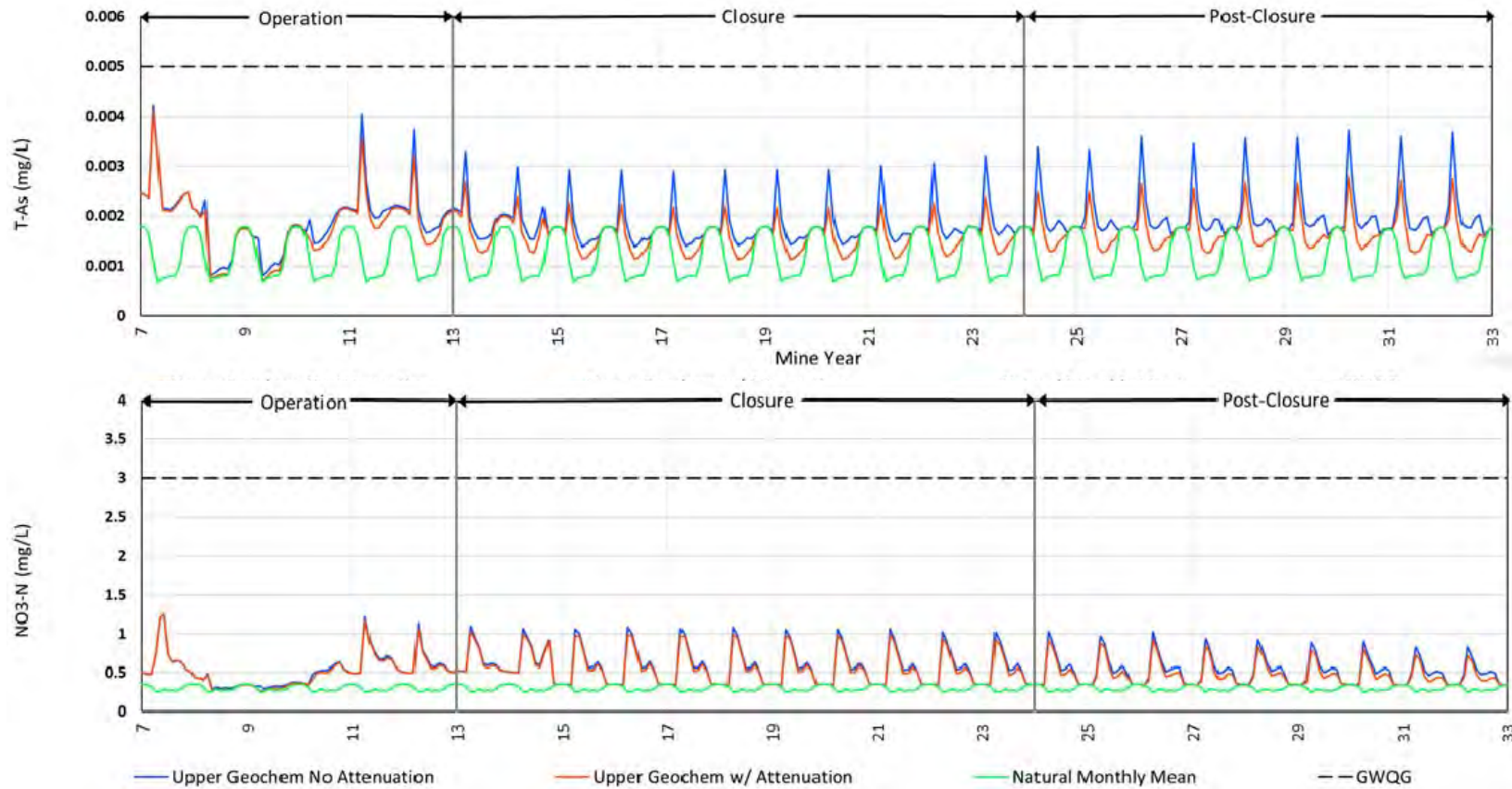




# Model Results applying No Attenuation – Halfway Cr



# Model Results applying No Attenuation – Latte Cr





## TECHNICAL MEMORANDUM

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**To:** Jennie Gjertsen

**Date:** September 27, 2017

**From:** Names Redacted

**Project #:** A362-2

**Subject: Coffee Gold Project – Proposed Water Quality Benchmark Objectives for the Receiving Environment and Suggested Components for Additional Collaboration with Tr’ondëk Hwëch’in**

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Water quality objectives (WQOs) for the receiving environment have been proposed for five receiving catchments potentially influenced by the project, namely:

- Halfway Creek (at station HC-2.5);
- Latte Creek (at station CC-1.5);
- YT-24 (at formerly named station ML-1.0);
- Coffee Creek (at station CC-4.5 downstream of the confluence with Latte Creek); and
- Yukon River (as represented at station YUK-5.0)

The information related to the derivation of the objectives was provided in Appendix 12-C (specifically, Appendix 12-C-4 of the referenced document). Since that time, a number of discussions have transpired with Tr’ondëk Hwëch’in (TH) and their consultants regarding the approach followed for derivation of WQOs for the Coffee Gold Project. Work is still ongoing to finalize the WQOs numerical values and thus, there are a number of areas/topics where collaborative efforts and input from TH would be beneficial and welcomed to complete this work. The key areas of collaboration include, but are not limited to:

- *Support and effectiveness of WQOs.* Development of toxicity tests to support the proposed WQOs is ongoing and has benefited from significant input from TH consultants. Input from TH consultants on the monitoring framework to evaluate both, the protective effectiveness of proposed site-specific WQOs and the potential for increasing trends in the concentration of key parameters in receiving aquatic environments would be beneficial;
- *Consensus on the locations of watershed water quality stations where WQOs are to be established and met.* Locations for WQO have been proposed but additional discussion with TH would be very helpful and would serve to constrain a very important variable in the process that will facilitate the development of effluent quality standards for the project;
- *Monitoring requirements at proposed WQO locations.* Little discussion to date has occurred around environmental effects monitoring within the watersheds particularly in association with the compliance points. There is likely a need for additional baseline monitoring for aquatic components other than water quality (e.g., benthic invertebrates, periphyton and fish) and these efforts would benefit from TH’s traditional knowledge. With respect to fish, the currently proposed compliance points show that these proposed

locations are generally not used by fish (e.g., HC-2.5 and YT-24) or have very limited use/value (CC-1.5). Accordingly, THs traditional knowledge and their local expertise with streams in the project area is clearly a necessary input to define the future monitoring needs;

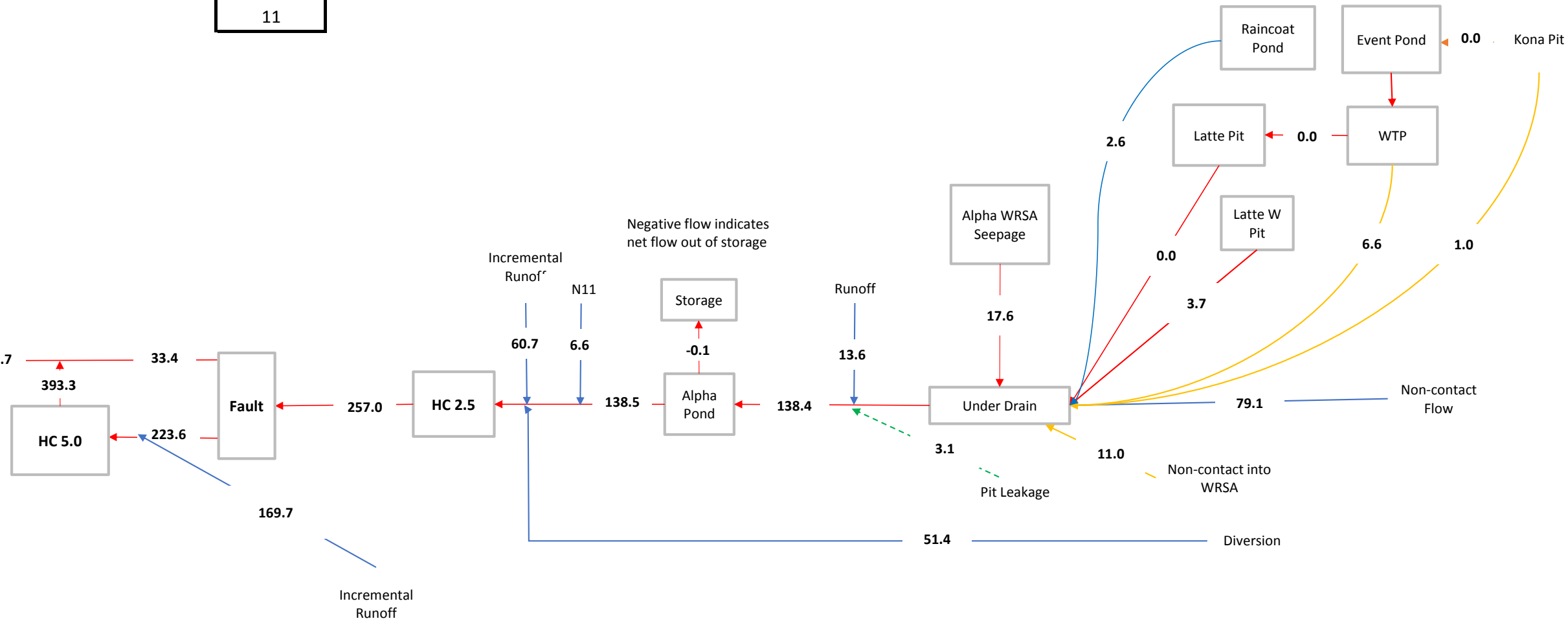
- *Effluent Discharge Locations and Standards.* Effluent discharge standards at the points of discharge resulting from downstream WQO have not been calculated. Discussion with TH about Effluent standards and the discharge monitoring would be beneficial to inform the development of more detailed management plans.
- *Adaptive Management Plan (AMP).* The AMP is a management tool that provides a consistent and predictable framework for identifying and responding to unforeseen environmental conditions potentially occurring due to project activities. The development of an effective AMP is critical for making the objectives and monitoring program meaningful and actionable (e.g., development of trigger values) as well as to provide feedback on the effectiveness of applicable mitigations plans. This critical area is very much in its infancy and collective discussion with TH around the development of the plan would be very beneficial.
- *Closure and Remediation plans.* Gathering feedback from TH on key environmental interests linked to the Coffee Gold mine site, including not only water quality but also fish and fish habitat, plants, wildlife, local and traditional land uses, recreational uses will be crucial for the development of an effective and successful remediation plan.
- *Environmental Protection Goals.* Goldcorp has discussed their commitment to continuous improvement objectives for environmental protection. Initiatives such as; *the Sustainability Excellence Management System, Towards Sustainable Mining, and Towards Zero Water* have continuous improvement and goal setting as components to those initiatives. TH input into development of areas for targets for environmental protection would be beneficial, and may advance the conversation around minimizing project impacts. A potential example could be, Nitrate Reduction – annual review of nitrate reduction strategies, and reporting of effectiveness of programs. Using the background concentrations of a given creek as a target that may not be reached, but consistently working towards it.

Mine Year  
11

Yukon  
River U/S  
Halfway

5277008

5277435



<i>Kona</i>	
to EP1	0.0 operations
to U/D	1.0 closure
<i>WTP</i>	
to U/D	6.6
to Latte	0.0
<i>Runoff</i>	
to Drain	79.1
RCP	2.6
to Pond	13.6
to HC-2.5	60.7
Diversion	51.4
N11	6.6
<i>Contact</i>	
Latte Pit	0.0
Latte W Pit	3.7
Pit Leakage	3.1
Runoff thru WRSA	11.0
Alpha Seep	17.6
Alpha Pond Storage	-0.1
<i>Halfway Creek</i>	
Alpha Pond	138.4
Alpha Pond out	138.5
HC 2.5	257.0
HC 5.0 Inrement	169.7
HC Fault to Yukon	33.4
HC Fault to HC 5.0	223.6
HC 5.0 to Yukon	393.3
HC Total	426.7
<i>Yukon River</i>	
YR U/S HC	5277008
YR D/S HC	5277435



- For each mine component, an upper case and a base case source term is calculated.

## Existing Source Terms

### ■ Waste Rock Facilities

- Alpha Dump
- Alpha Dump Rock Drain
- Supremo Backfill
- Latte Backfill
- Kona Backfill
- Double Double Backfill

### ■ Pit Wall Rock

- Gneiss oxide – ore/waste
- Gneiss transition – ore/waste
- Gneiss fresh - waste
- Schist oxide - ore/waste
- Schist transition - ore/waste
- Schist fresh - waste

### ■ Heap Leach

- Treated HLF Drainage

### ■ Mine Facilities

- Plantsite Area

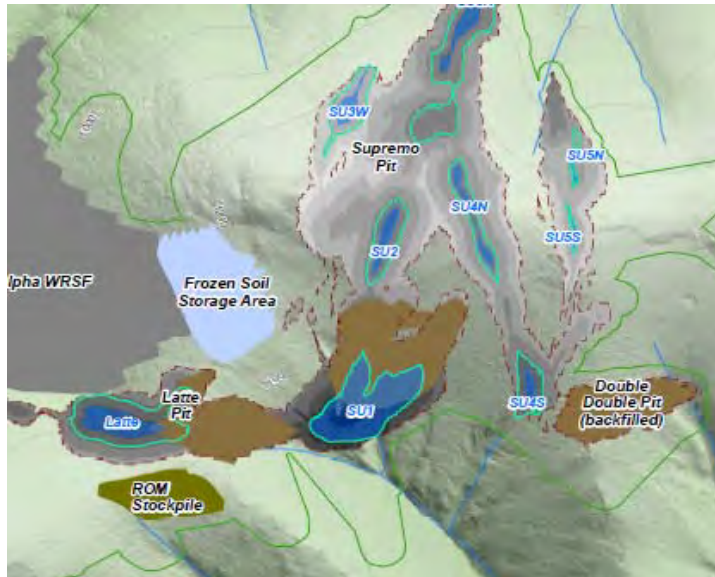
## Requested Source Terms

### ■ Operations only

- Beta Dump
- Rom Stockpile
- Granite wall rock

### ■ Closure

- Pond Dams
- Frozen Material Stockpile
- Untreated HLF
- Rock Drains in Backfill Dumps
- Flushing of WR/Waste



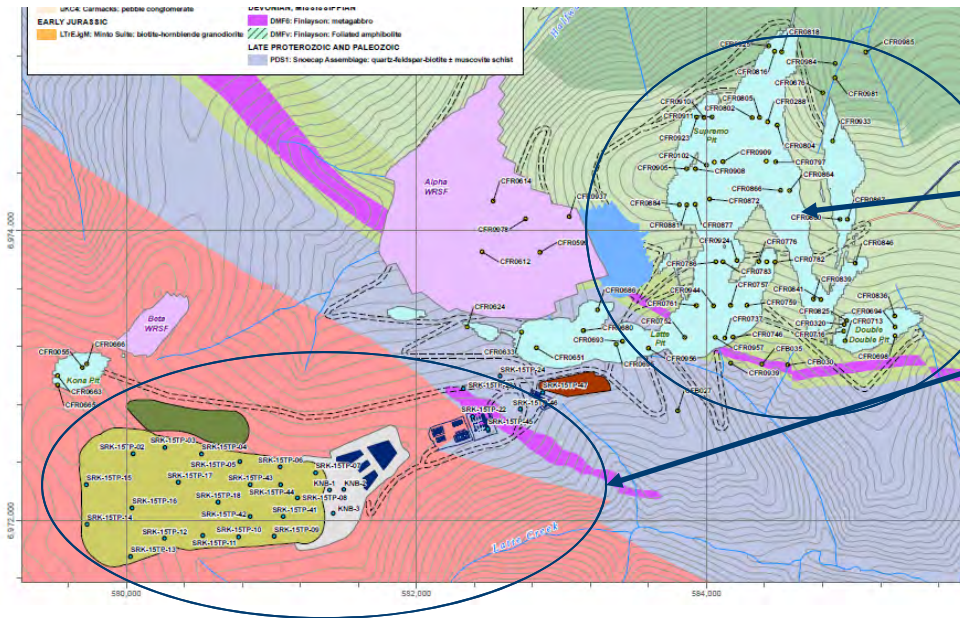
- **Flushing Source Term**

- At end of mine life 1% of waste rock (3Mt) and 21% of wall rock (45 ha) will be submerged by pit lakes
- Flushing source term will be incorporated into model sensitivity runs

- **Frozen Soil Stockpile**

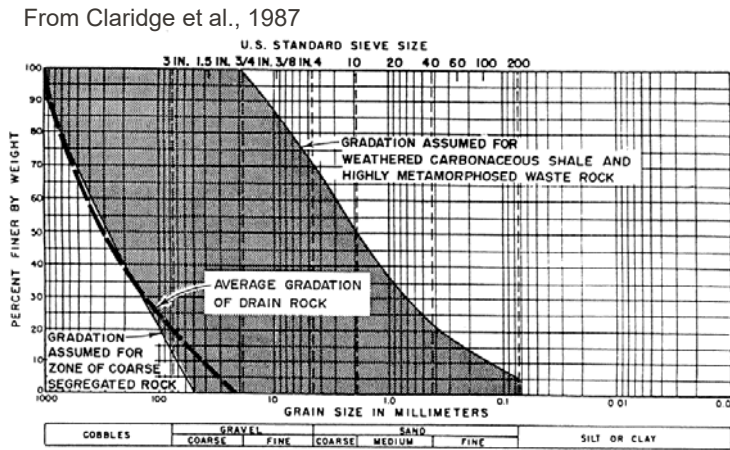
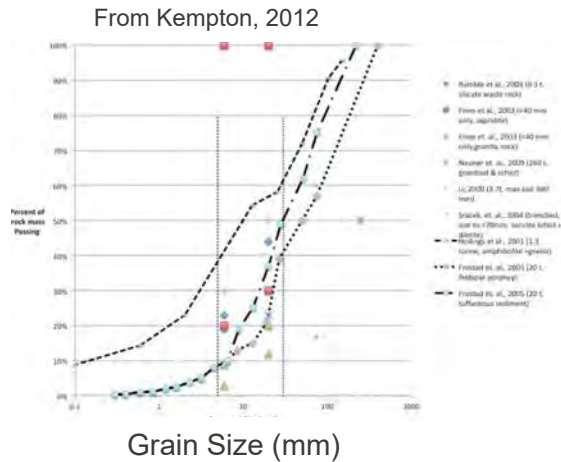
- Consists of ice containing organic topsoil, some rocky overburden excavated from mine facility footprints.
- The overburden source term is applied to this stockpile as a sensitivity

# Overburden Source Term



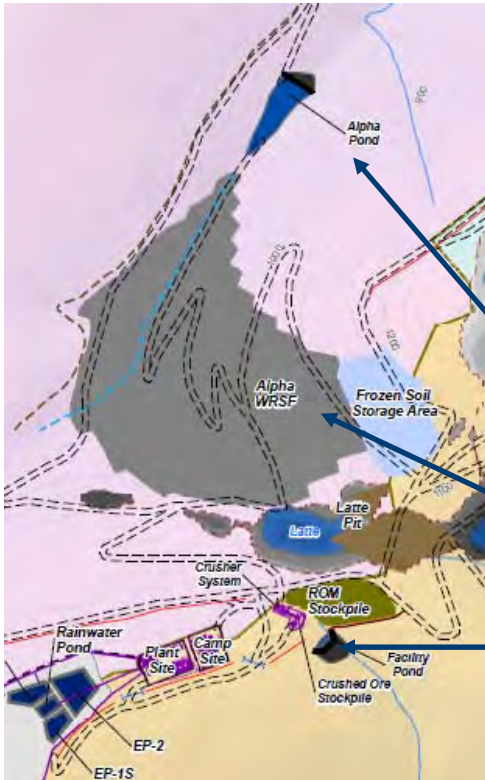
		As	Hg
		mg/L	mg/L
<b>Pit Footprint</b>	Max	0.096	0.00026
	P75	0.015	<0.00005
	P50	0.013	<0.00005
	n	14	14
	<b>HLF and ROM/Plant Footprint</b>	Max	0.026
P75		0.0034	<0.00005
P50		0.0023	<0.00005
n		11	11

- Comment SEA 32: *“Provide additional justification for the source term applied to the plant site (covered with overburden), particularly regarding arsenic source terms and how they relate to SFE test results”*
- Response: Only overburden from the plantsite and HLF area will be used to construct pads on in the plantsite and mine facilities area. Therefore, only samples collected from the footprint of these mine facilities are used to estimate this source term.



- **Rock Drain Gradation (Claridge et al., 1987)**
  - Median = 300 mm
  - 10<sup>th</sup> percentile = 40 mm
- **Waste Rock Gradation (Kempton, 2012)**
  - Median = 40 – 10 mm
  - 10<sup>th</sup> percentile = 6.0 - 0.1 mm

- **Rock drains will not be a significant source of loading given the coarse grain size**



- **Alpha Dam and Facilities Dam**
  - Dams will be constructed from ROM waste rock
  - Geochemical source term for dams will be incorporated into WQM as a sensitivity.
  - Only minor impact on WQ anticipated

	Footprint (m <sup>2</sup> )	Mass (tonne)
Alpha Dam	7,350	420,650
Alpha WRSF	1,510,000	248,000,000
Facility Dam	9,200	230,790



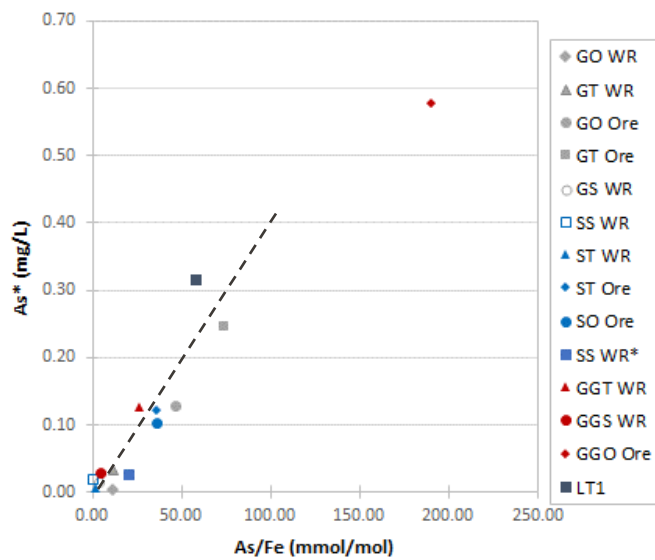
- Heap Leach Facility Post Closure**

- Most parameters upscaled from leach tailings column tests
- Nitrogen and WAD-CN concentrations observed at the closed HLF at the Brewery Creek mine applied to source term.
- Arsenic and Uranium solubility controls applied

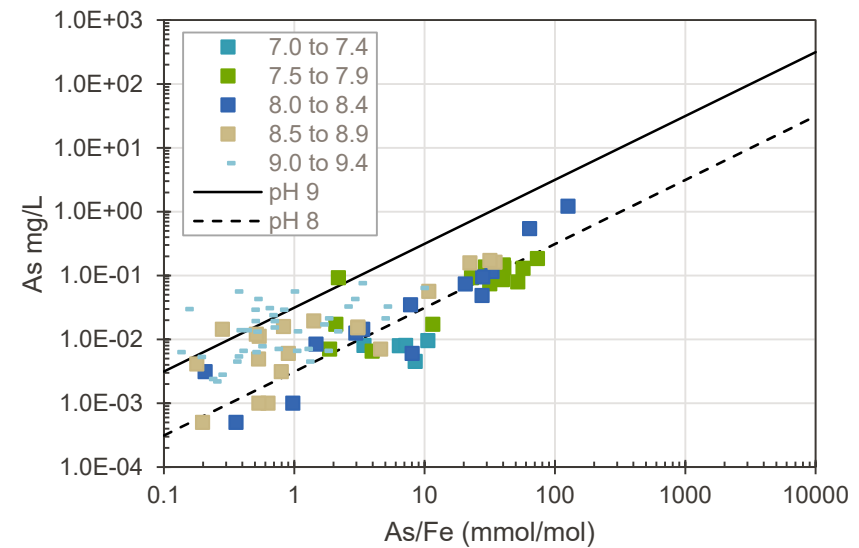
		HLF Post Closure		Brewery Creek <sup>1</sup>		
		Upper Case	Base Case	P90	P50	P25
<b>pH</b>	s.u.	8.50	8.30	8.09	7.94	7.76
<b>N-NH<sub>4</sub></b>	mg/L	0.057	0.024	0.057	0.024	0.0092
<b>N-NO<sub>3</sub></b>	mg/L	376	318	376	318	95.2
<b>N-NO<sub>2</sub></b>	mg/L	1.87	1.58	-	0.221	-
<b>Sulphate</b>	mg/L	353	99.6	738	500	217
<b>WAD-CN</b>	mg/L	0.196	0.086	0.196	0.086	0.0436
<b>As</b>	mg/L	2.00	0.661	0.416	0.339	0.284
<b>Hg</b>	mg/L	0.000261	0.000103	0.0008	0.0001	0.00005
<b>Mo</b>	mg/L	0.106	0.0331	0.0329	0.0266	0.0179
<b>Sb</b>	mg/L	0.493	0.166	1.81	1.42	0.935
<b>Se</b>	mg/L	0.0047	0.0014	0.194	0.151	0.0463
<b>U</b>	mg/L	0.682	0.292	0.0232	0.019	0.00626
<b>Zn</b>	mg/L	0.0518	0.0203	0.0139	0.0080	0.0047
<b>Ra-226</b>	Bq/L	0.068	0.047			

<sup>1</sup>Brewery Creek HLF monitoring data from April 2005 to September 2011 at BC-28a. Values reported at BC-28a are total concentrations.

Arsenic Solubility Developed from Kinetic Test Data



As Solubility Prediction  
SFE results



- **Arsenic solubility controls developed from kinetic testing to predict source terms can accurately re-produce SFE results**

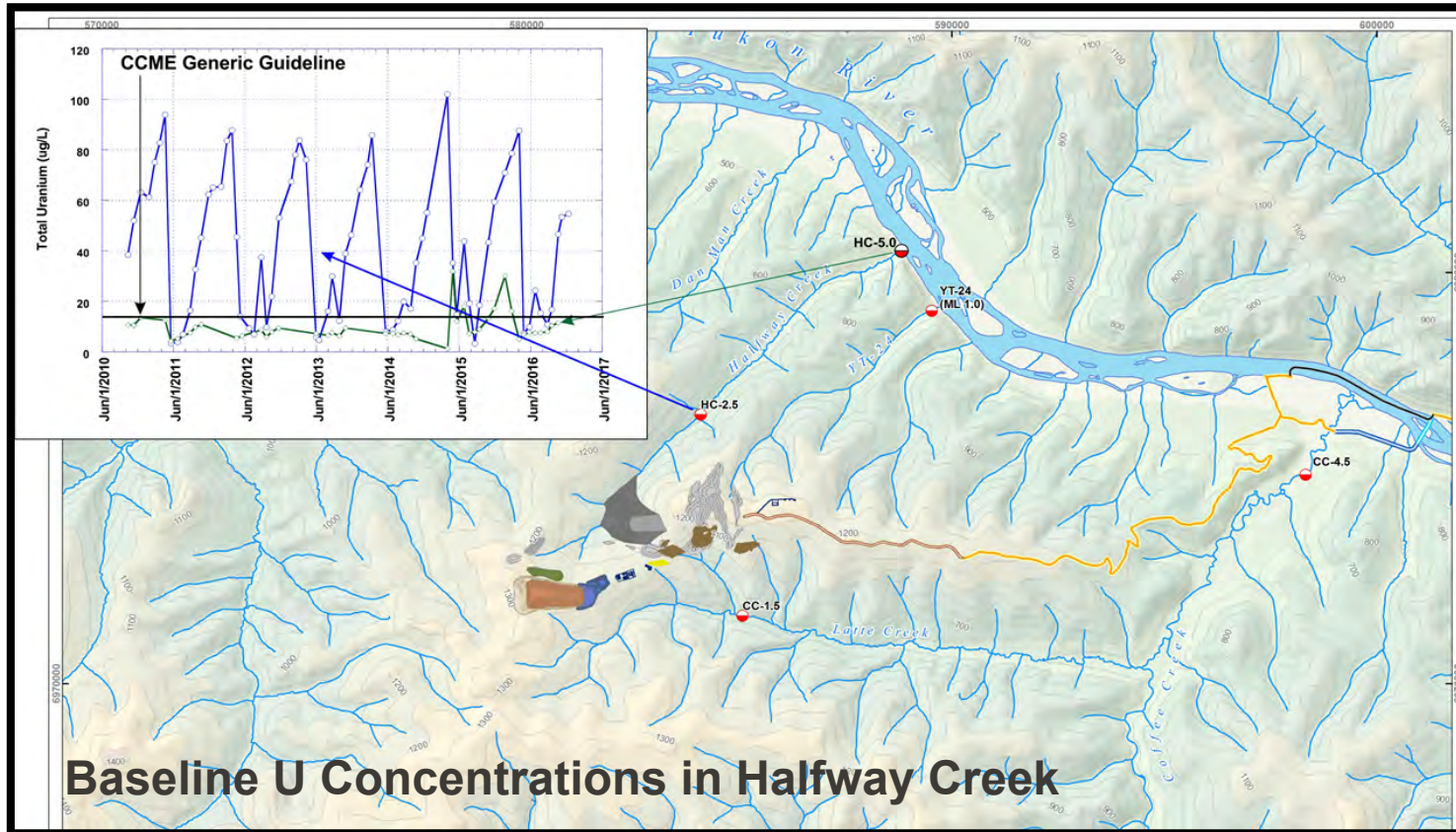


# Water Quality Objectives

## Chemistry

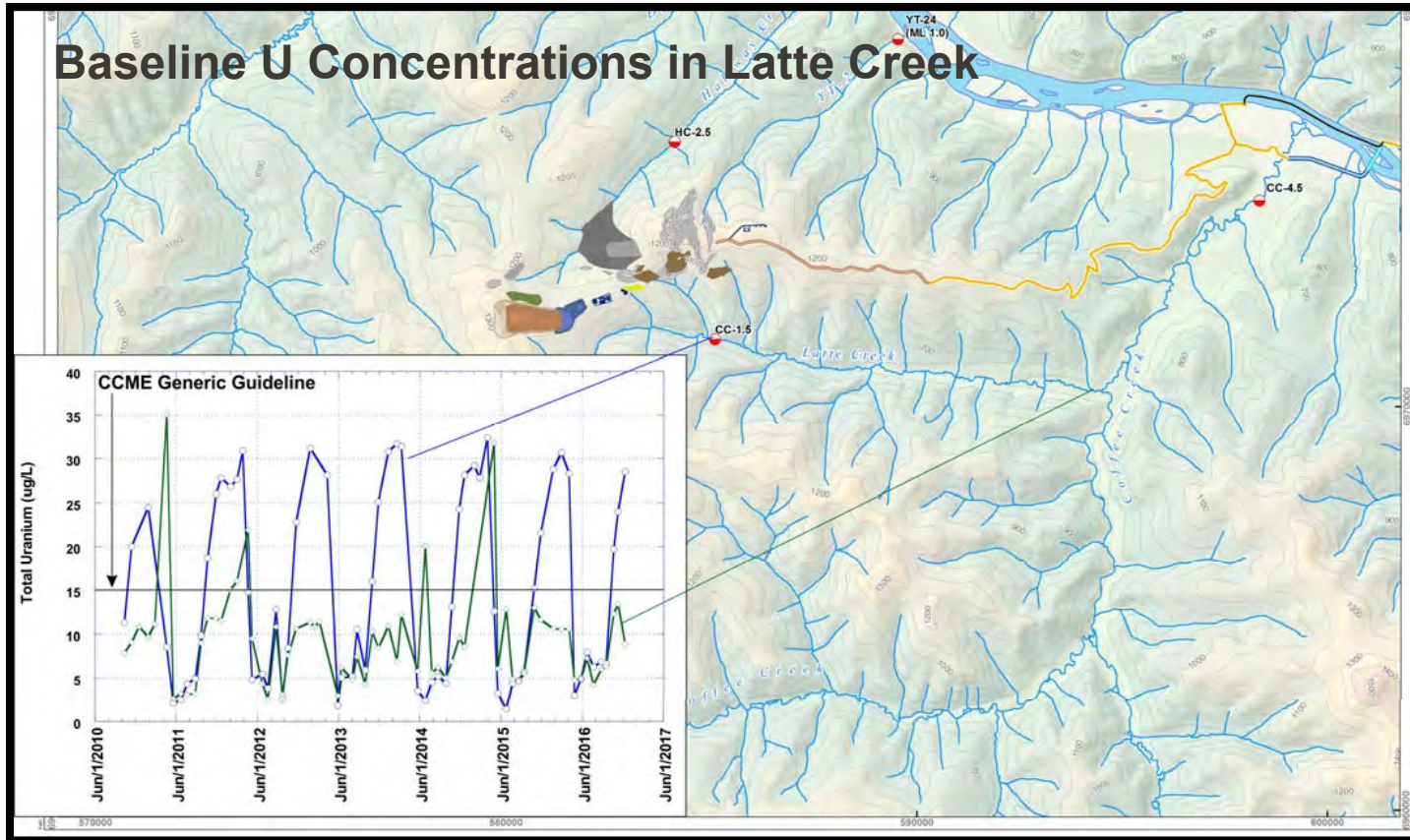
- Stream levels of uranium (U) are the highest in British Columbia and the Yukon (~100 µg/L) (CCME 2011)
- Four valences are found in the aquatic environment U (III), U (IV),  $\text{UO}_2^+$  (V),  $\text{UO}_2^{2+}$  (VI)
- Hexavalent forms (U [VI]) are most common in the aquatic environment
- Dissolved Organic Carbon (DOC) is known to form stable complexes with uranium in natural waters thus, decreasing its toxicity
- Alkalinity, hardness, pH and presence of other metals may also decrease uranium toxicity

# Uranium Baseline Concentrations in the Project Area





# Uranium Baseline Concentrations in the Project Area



# Derivation of Project Water Quality Objectives

5

Two approaches to assess potential adverse effects in aquatic systems:

## 1. Direct application of “generic” water quality guidelines (WQGs)

For those parameters with background concentrations below generic water quality guidelines

- *Examples include As, Cd, Hg, Se, Zn*

## 2. Background Concentration Procedure (as directed by CCME)

A number of parameters are present naturally at concentrations in excess of respective generic guideline. The CCME derivation protocol for site specific water quality objectives is the used of the 95<sup>th</sup> percentile value

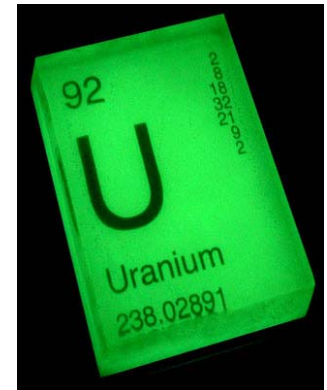
- *Examples include U, Al, Cu, Fe*

**Water quality objectives (WQOs)** are derived values (or concentrations) that are above water quality guidelines but still have a highly conservative and protective nature aimed to protect aquatic environments. These objectives are typically based on generic water quality guidelines, which are modified to account for local environmental conditions or other modifying factors.

# Derivation of Project Water Quality Objectives

6

- Derivation of water quality objectives for parameters of interest, including uranium (U)
- U is key parameter of interest for the Coffee Gold Mine Project due to naturally elevated background concentrations in aquatic systems within the project area
- Stations included: Latte Creek (CC1.5), Coffee Creek (CC4.5), YT24, Halfway Creek (HC2.5) and Yukon River (YUK5)
- We have tested the protective nature of the proposed WQOs for U through detailed toxicity testing using site waters collected under different flow conditions (low flow (winter) and high flow (summer-open water)).
- We have also tested the protective nature of proposed WQOs for As, Cr, Cu, and Zn by using a set of mixtures, to evaluate the potential for additive toxicity occurring between U and these metals



# Derivation of Project Water Quality Objectives

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## Yukon River (YUK5)

0.6 to 1.2  $\mu\text{g/L}$

## Coffee Creek (CC4.5)

1.2 to 3.8  $\mu\text{g/L}$



**Non degradation:** Calculated as the 90<sup>th</sup> percentile of available baseline data

## Latte Creek (CC1.5)

3 to 31  $\mu\text{g/L}$  (25 of 54  
Samples above CCME)

## Halfway Creek (HC2.5)

8 to 86  $\mu\text{g/L}$  (38 of 57  
samples above CCME)



**Use Protection (WQOs):** Calculated as the 95<sup>th</sup> percentile of available baseline data

# Proposed Water Quality Objectives

	Parameter List	Units	Halfway Creek	Latte Creek	YT-24	Regulatory Source
Dissolved Parameters	SO <sub>4</sub>	mg/L	218	309	218	BC WQO
	Nitrate-N	mg/L	3	3	3	BC WQO
	Nitrite-N	mg/L	0.02	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	1.91	1.63	1.91	BC WQO
	CN <sub>WAD</sub>	µg/L	5	5	5	BC WQO
	Al (diss)	µg/L	403	351	205	SSWQO
Total Metals	Sb	µg/L	9	9	9	BC WQO
	As	µg/L	5	5	5	CCME
	Cd	µg/L	0.11	0.13	0.1	CCME
	Cu	µg/L	3	3	3.4	SSWQO
	Fe	µg/L	1000	1000	1000	SSWQO
	Fe (dissolved)	µg/L	350	350	350	SSWQO
	Pb	µg/L	1.8	2.5	1.5	CCME
	Hg	µg/L	0.026	0.026	0.026	CCME
	Mo	µg/L	73	73	73	CCME
	Ni	µg/L	69	82	61	CCME
	Se	µg/L	2	2	2	BC WQO
	Ag	µg/L	0.25	0.25	0.25	SSWQO/CCME
	U	µg/L	86	31	15	SSWQO/CCME
	Zn	µg/L	13	15	11	CCME (draft)

Note: all metals and metalloids are as total unless otherwise noted



# Proposed Non-Degradation Objectives

Parameter List	Units	Proposed Water Quality Objectives		CC-4.5 Generic Guideline (for comparison only)	YUK-5.0 Generic Guideline (for comparison only)	Regulatory Source for Generic Guideline	
		Coffee Creek CC-4.5	Yukon River YUK-5.0				
Dissolved Parameters	SO <sub>4</sub>	mg/L	77	25	218	309	BC WQO
	Nitrate-N	mg/L	0.6	0.2	3	3	BC WQO
	Nitrite-N	mg/L	0.05	0.05	0.02	0.02	BC WQO
	NH <sub>3</sub> -N	mg/L	0.04	0.03	1.91	1.02	BC WQO
CN <sub>WAD</sub>	µg/L	0.5 (DL)	0.5 (DL)	5	5	BC WQO	
Total Metals and Metalloids	Sb	µg/L	0.14	0.2	9	9	BC WQO
	As	µg/L	0.6	1.3	5	5	CCME
	Cd	µg/L	0.05	0.21	0.12	0.14	CCME
	Cu	µg/L	4.2 <sup>1</sup>	5.5 <sup>1</sup>	2.84	3.48	BC WQO
	Fe	µg/L	349	2066 <sup>1</sup>	1000	1000	BC WQO
	Pb	µg/L	0.21	1.1	2.06	2.66	CCME
	Hg	µg/L	0.01	0.01	0.026	0.026	CCME
	Mo	µg/L	0.74	1.3	73	73	CCME
	Ni	µg/L	1.5	4.6	73	86	CCME
	Se	µg/L	0.1	0.56	2	2	BC WQO
	Ag	µg/L	0.007	0.02	0.25	0.25	CCME
	U	µg/L	3.6	1	15	15	CCME
	Zn	µg/L	5.2	17 <sup>1</sup>	17	13.5	CCME (draft)
	Dissolved Metals and Metalloids	Al	µg/L	263 <sup>1</sup>	45	50	50
Sb		µg/L	0.12	0.12			
As		µg/L	0.49	0.54			
Cd		µg/L	0.031	0.06			
Cu		µg/L	3.3 <sup>1</sup>	1.7			
Fe		µg/L	203	59	350	350	BC WQO
Pb		µg/L	0.055	0.06			
Hg		µg/L	0.01	0.01			
Mo		µg/L	0.68	1.25			
Ni		µg/L	1.3	1.7			
Se		µg/L	0.12	0.5			
Ag		µg/L	0.005	0.005			
U		µg/L	3.8	1			
Zn		µg/L	2.2	2.8			

All values for CC-4.5 and YUK-5.0 are 90th percentile of data unless otherwise noted.  
 1: based on 95th percentile of data  
 DL = detection limit

## U Toxicity to Aquatic Biota - Literature

- Fish- Acute  $>1,600 \mu\text{g/L}$ ; Chronic  $> 350 \mu\text{g/L}$
- Invertebrates - Acute and Chronic  $\sim 73 \mu\text{g/L}$  (Low hardness; Tox. generally at  $200\text{-}300 \mu\text{g/L}$ )
- Algae – Chronic (growth)  $> 40 \mu\text{g/L}$  (Low hardness; Tox. generally at  $3,100 \mu\text{g/L}$ )

Most sensitive organism to U exposure (CCME 2011)



*C. dubia*

## Performed Toxicity Test

### 1) Coffee Project Toxicity Studies Using *Ceriodaphnia dubia* (Water Flea)

- Site water exposure (winter-low flow) - Survival and reproductive endpoints
  - ✓ CC1.5 -  $31 \mu\text{g U/L}$ : no adverse effects
  - ✓ HC2.5 –  $78 \mu\text{g U/L}$ : no adverse effects
- Site water collected in June (summer-high flow) spiked with U (0 to  $351 \mu\text{g U/L}$ )
  - ✓ DOC –  $9.8 \text{ mg/L}$
  - ✓ No adverse effects on survival and reproduction at concentrations  $> 351 \mu\text{g U/L}$

## 2) Toxicity Test Using 3 Aquatic Species – Winter and Summer Water

- Fish: rainbow trout fry (*Oncorhynchus mykiss*)
- Invertebrates: *C. dubia*
- Algae: *Pseudokirchneriella subcapitata*



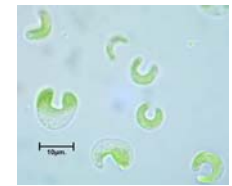
Rainbow trout



*C. dubia*

### 2a) (Winter Conditions: low flow; low DOC) and 2b) (Summer Conditions: high flow; high DOC)

- Fish, invertebrate and algae were exposed to collected site water from CC1.5 and HC2.5 plus laboratory control. Endpoints included survival (acute) for all species; reproduction (chronic) for *C. dubia*; and growth (chronic) for algae and rainbow trout fry
- Uranium spiked site water (Only for *C. dubia*) with concentrations up to 1,000 µg/L, in addition to laboratory control. Endpoints included: Survival (acute) and reproduction (chronic)



*P. subcapitata*

# Water Quality Objectives for U – Supporting Studies

2a)

Winter Water

- Site water exposure (3 species) – Survival and reproductive endpoints
  - ✓ DOC – 4.3 mg/L
  - ✓ CC1.5 - 32 µg U/L: no adverse effects
  - ✓ HC2.5 – 84 µg U/L: no adverse effects
  
- *Invertebrate (C. dubia)* exposed to site water spiked with U
  - ✓ DOC – 4.3 mg/L
  - ✓ Site water spiked with U (up to 1,000 µg/L)
  - ✓ No adverse effects on survival or reproductive endpoints

Endpoint	Uranium (µg/L)	
	CC1.5	HC2.5
<b><i>C. dubia</i></b>		
Survival (No Observed Effect Concentration)	1,065	1,115
Reproduction (No Observed Effect Concentration)	381	446.5

2b)

Summer Water

- Site water exposure (3 species) – Survival and reproductive endpoints
  - ✓ DOC – 18.3 mg/L for HC2.5 and 9.97 mg/L for CC1.5
  - ✓ CC1.5 - 7.20 µg U/L: no adverse effects
  - ✓ HC2.5 – 17.9 µg U/L: confounding factor (upstream drilling)
- *Invertebrate (C. dubia)* exposed to site water spiked with U
  - ✓ DOC – 18.3 mg/L for HC2.5 and 9.97 mg/L for CC1.5
  - ✓ Site water spiked with U (up to 1,000 µg/L)
  - ✓ CC1.5 - No adverse effects on survival (> 1,000 µg U/L) or reproductive endpoints (~ 900 µg U/L)
  - ✓ HC2.5 - tests results are inconclusive
  - ✓ Tests re-run will occur during summer 2018



## 3) Toxicity Test - 3 Aquatic Species Exposed to Metal Mixtures (Summer Water)

Base case	Parameter	Units	CC1.5	HC2.5
Maximum Monthly	As	ug/L	2.94	5.05
	Cr	ug/L	0.93	1.39
	Cu	ug/L	2.61	3.13
	U	ug/L	33.50	92
	Zn	ug/L	7.54	13.20
Upper case	As	ug/L	4.07	7.15
	Cr	ug/L	1.18	1.54
	Cu	ug/L	2.85	3.50
	U	ug/L	37.20	100
	Zn	ug/L	8.99	16.70
Baseline	As	ug/L	1.60	1.90
	Cr	ug/L	0.97	1.40
	Cu	ug/L	2.90	2.50
	U	ug/L	31	86
	Zn	ug/L	4.30	4.20

- Included metals that exceeded WQGs at Base Case
- Maximum concentrations for each case were selected for As, U and Zn
- Concentrations of Cr and Cu were kept constant for all exposures: Cu (3.5 µg/L) and Cr (1.5 µg/L)
- Exposure to 3 mixtures: Low, Moderate and High

**Mixture Low:** As 2 µg/L, U 31 µg/L and Zn 4 µg/L plus Cu and Cr.

**Mixture Moderate:** As 5 µg/L, U 86 µg/L and Zn 8 µg/L plus Cu and Cr.

**Mixture High:** As 8 µg/L, U 100 µg/L and Zn 16 µg/L plus Cu and Cr.

## 3) Toxicity Test - 3 Aquatic Species Exposed to Metal Mixtures (Summer Water)

### Water Chemistry

- ✓ DOC - ~ 10 mg/L
  - ✓ Sulphur - CC1.5 20 mg/L; HC2.5 8 mg/L
  - ✓ Hardness - 85 to 125 mg/L (CaCO<sub>3</sub>)
  - ✓ Ammonia < 0.005 mg/L; NO<sub>2</sub> up to 1.62 mg N/L; NO<sub>3</sub> < 0.001 mg N/L
- 
- No significant differences against controls for all species tested
  - No adverse effect in reproduction (*C. dubia*)
  - No adverse effects in growth (fish)
  - No adverse effect in survival (algae, *C.dubia* and fish)

- **Proposed water quality objectives for U (and other elements) are supported by:**
  - ✓ Toxicity test using *C. dubia* (*most sensitive specie to U*) indicates no adverse chronic effects (long term) at concentrations > 381 µg U/L (winter) and 900 µg U/L (open water); no adverse acute effects (short term) at concentrations > 1,000 µg U/L (winter and summer)
  - ✓ No adverse effects in chronic (reproduction and growth) and acute (survival) endpoints after exposure to mixtures of As, Cu, Cr, U and Zn for algae, invertebrate and fish
- **Further testing to be conducted using site water during the summer 2018 - open water period to repeat exposure to HC2.5 water**
- **Repeat mixtures test using winter water**

# TECHNICAL MEMORANDUM

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**To:** Jennie Gjertsen, Goldcorp  
**From:** Names Redacted

**Date:** September 27, 2017

**Subject:** **Coffee Gold Project: *In Situ* Passive Treatment of Heap Leach Facility  
Draindown Solutions Containing Arsenic, Nitrate, and Uranium**

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## ***1. Introduction***

Closure planning of the heap leach facility (HLF) at the Coffee Gold project is currently under development and conceptual strategies for ensuring physical and chemical stability of the HLF have been presented in Appendix 31-C. In the post closure scenario, HLF drainage will consist of meteoric water that infiltrates through the GCL liner or unlined slopes of the facility. The drainage chemistry from the HLF following rinsing is difficult to predict at this stage of the project in the absence of actual heap solutions. The progressive reclamation and closure of the HLF includes measures designed to improve heap seepage water quality. Specifically, the addition of microbes, carbon and nutrients to the heap during progressive rinsing and reclamation will foster reducing conditions within the heap pore waters allowing for *in situ* denitrification and ultimately reductive precipitation of metals. As such, the objective of *in situ* treatment is to treat constituents within the heap, as well as decreasing metals concentration to sufficiently low levels to either directly discharge, or at least provide water that is of sufficiently good quality to only require polishing in a passive treatment system. For the purposes of estimating post closure seepage water quality from the HLF, the use of additional polishing through passive treatment has been assumed in the water quality model.

Additional contingency reclamation efforts will be afforded to providing for passive treatment polishing of heap seepage solutions prior to release to the environment. For the Coffee heap leach facility, nitrate ( $\text{NO}_3^-$ ), arsenic (As) and uranium (U) represent the primary parameters of potential environmental concern from the HLF. Nitrate represents a residual product of cyanide degradation, while As and U represent leached components from the ore. The use of a passive treatment systems (PTS) employing permeable reactive barrier (PRB) technology have been a successful passive treatment technology for treating mine waste solutions. The Project Proposal provided an overview discussion of the passive treatment approach and included estimates of water chemistry for seepage waters exiting the passive treatment system.

Following submission of the Project Proposal and review of the above documents, a number of questions have been raised regarding the proposed conceptual reclamation strategy for the HLF and HLF draindown solutions. Specifically, more information has been requested on the characteristics of the flows entering the passive treatment system, how the passive system will be

constructed and operated, and evidence from case studies demonstrating the effectiveness of treatment in similar systems. The following memorandum addresses a number of the information requests.

## 2. Chemistry and Flow Characteristics of HLF Draindown Solutions

### 2.1 HLF Post-Closure Source Term

A cyanide heap leaching facility is planned for extraction and recovery of Au from oxide and transition ore. The ore will be crushed to 80% - 50 mm and stacked on the lined HLF pad using haul trucks in nominal 10 m lifts. The facility will reach a maximum mass (60 Mt) in year 11 of mine life and occupy a footprint of 109 ha. Ore will be leached with lime buffered NaCN solution applied with drip emitters. The leach solution will drain into collection pipes that will direct the pregnant solution to the process plant where precious metals will be recovered. The resulting barren solution will be amended with additional lime and NaCN as required and then recirculated to the heap to continue the leaching cycle. The mass and geologic composition of ore on the HLF at the end of operations is provided in Table 2-1.

**Table 2-1:  
 Lithology, oxidation and source of ore stockpiled in the Heap Leach Facility**

Lithology	Facies	Deposit				
		Latte	Double Double	Kona	Supremo	Total
Gneiss	Oxide (Mt)	0.39	0.53	0.00	37.36	<b>38.29</b>
	Transition (Mt)	0.01	0.87	0.00	4.46	<b>5.34</b>
	<b>Total</b>	<b>0.41</b>	<b>1.40</b>	<b>0.00</b>	<b>41.82</b>	<b>43.63</b>
Metabasalt	Oxide (Mt)	0.08	0.03	0.00	0.09	<b>0.20</b>
	Transition (Mt)	0.00	0.07	0.00	0.02	<b>0.09</b>
	<b>Total</b>	<b>0.08</b>	<b>0.10</b>	<b>0.00</b>	<b>0.11</b>	<b>0.29</b>
Schist	Oxide (Mt)	8.87	0.00	0.00	0.07	<b>8.93</b>
	Transition (Mt)	5.67	0.00	0.00	0.00	<b>5.68</b>
	<b>Total</b>	<b>14.54</b>	<b>0.00</b>	<b>0.00</b>	<b>0.07</b>	<b>14.61</b>
Granite	Oxide (Mt)	0.00	0.00	1.24	0.00	<b>1.24</b>
	Transition (Mt)	0.00	0.00	0.38	0.00	<b>0.38</b>
	<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>1.63</b>	<b>0.00</b>	<b>1.63</b>
<b>All</b>	<b>Total</b>	<b>15.03</b>	<b>1.50</b>	<b>1.63</b>	<b>42.00</b>	<b>60.15</b>



Following final leaching for gold recovery, heap closure will be initiated which involves the following steps:

- Preliminary rinsing of leached ore with pH adjusted water to export and volatilize cyanide and free cyanide
- Final rinsing of leached ore using rainwater and treated water from biological treatment system. Total rinsing effort of approximately 3 to 4 pore volumes. Rinsing with treated solution will provide inoculum to the heap to foster in-situ treatment;
- Irrigation with nutrients and soluble carbon source to further stimulate in-situ bioremediation of CN and nitrogen species;
- Capping of the HLF with geosynthetic clay liner (GCL) protected by 0.5 m of coarse waste rock for the flat surfaces, and 0.5 m of coarse waste rock over the slopes;
- If necessary, passive treatment of drainage to serve as a final polishing step of HLF drainage as contingency (*e.g.*, zero valent iron, coarse organic composted wood chips from tree clearing, suitable geologic material).

The HLF will be constructed in stages, as such, gold recovery from certain areas of the pad will be complete by Year 4 to 5 of mine life allowing closure measures to be initiated during operations. Discharge of any HLF solution during mine life or active closure will be treated prior to discharge. Treatment will consist of a two-step process, where CN is first destroyed by H<sub>2</sub>O<sub>2</sub> and then residual nitrate, metalloids and metals are treated with an biological system termed the Electrochemical Biological Reactor (EBR) system (see Section 5.3.9 of Appendix 31-E).

This section describes the source term development for the post-closure HLF drainage. This source term represents HLF drainage prior to passive, active or in-situ treatment.

### 2.1.1 Source Term Development Approach

In the post closure scenario, drainage will consist of meteoric water that infiltrates through the GCL liner or unlined slopes of the facility and through the HLF rinsed ore. The geochemical source term for this time period is based on upscaling kinetic test results on leach tailings samples. The concentrations of parameters U and As are based on alkalinity and pH estimates, using the same approach employed for waste rock described in the Appendix 12-D (*Geochemical Characterization Report Lorax, 2017*). Nitrogen species and residual CN in HLF drainage are taken from monitoring data from an analogue closed heap leach operation in Yukon.

### 2.1.2 Data Sources

Kinetic test loading rates for leach tailings are upscaled to produce the post closure HLF source term. During the rinsing phase, it is expected that 4 pore volumes will be rinsed through the HLF. Therefore, loading rates were calculated from leach tailings kinetic tests after this volume of pore

water has been rinsed. The kinetic test ID's and cycles used are presented in Table 2-2, not that the cycles vary with the size of the columns, with a greater number of cycles required to rinse the equivalent of 4 pore volumes in larger columns. Median loading rates are used for base case source terms and 75<sup>th</sup> percentile loading rates are used for upper case source term calculations.

**Table 2-2:  
 Kinetic Test Data used in HLF Post Closure Source Term**

<b>Kinetic Test ID</b>	<b>Metallurgic Sample ID</b>	<b>Mineralization</b>	<b>Lithology</b>	<b>Material Type</b>	<b>Cycles</b>
Col 1	70340	90% Oxide 10% Transition	82% Gneiss 23% Schist	Leach Tailings	23-87
Col 2	70340	90% Oxide 10% Transition	82% Gneiss 23% Schist	Leach Tailings	51-87
Col 16	20% 72162, 20% 72168, 30% 72150, 30% 72156	40% Oxide, 60% Transition	Schist	Leach Tailings	9-57
Col 17	35% 73028, 35% 73034, 18% 73040, 7% 72174, 3% 72180	80% Oxide 20% Transition	90% Gneiss, 10% Granite	Leach Tailings	8-57

### 2.1.3 Data Scaling

The post closure source term is calculated by upscaling kinetic test loading rates and weighting the scaled results proportional to the different ore types contained in the HLF. Scaling factors used in HLF source term calculation are summarized in Table 2-3.

**Table 2-3:  
 Heap Leach Post Closure Source Term Scaling Factors**

<b>Scaling Factors</b>	<b>Unit</b>	<b>Base Case</b>	<b>Upper Case</b>
MAP	mm	485	485
Runoff Coefficient	-	30%	30%
Grain size correction	-	20%	20%
% of material flushed	-	10%	25%
Bulk Scaling	-	2%	5%

Physical scaling factors considered in development of the HLF post closure source term include grain size factor and flushing rate. Note that kinetic testing was carried out in a cold room which maintained a temperature of 4°C. The HLF will approach mean annual temperatures of ambient air, which is near 0°C, and may become partially frozen during winter months. No consideration is given to freezing of the HLF during winter months or re-establishment of permafrost. The

geochemical loading rates measured at 4°C is expected to produce a conservative approximation of field loading rates, and no temperature scaling factor is applied.

There are differences in the grain size used in kinetic test samples, and the grain size specified in the design criteria of the HLF. Metallurgical leach columns were conducted on a variety of grain sizes to examine Au recovery. Laboratory kinetic test samples were collected from the smallest grain size samples of 80% -12.2 mm to ensure conservative results. The design criteria for the HLF is 80% - 50 mm. The grain size distribution on metallurgical leach column samples crushed to 80% - 50 mm found that on average 20% of the sample is -12.2 mm. Therefore, a grain size scaling factor of 0.2 is applied.

Unsaturated rock piles are known to develop preferential water pathways with variable moisture content. As a result, the entire mass of the reactive grain size fraction will not be equally rinsed by infiltrating water. Laboratory kinetic tests will experience a greater degree of flushing of mineral surfaces due to their small size and high flushing rate. In uncovered waste rock environments, an average contact water factor of 10% to 50% has been estimated (Elboushi, 1975; Kempton, 2012). Over 50% of the HLF will be covered with a geosynthetic clay liner at the end of mine life, which will direct much of the infiltration through uncovered slopes, limiting the contact with reactive mineral surfaces. Therefore, a contact water factor of 10% to 25% was applied to the base case and upper case source term calculations. The physical scaling factors used in the upper case and base case source term predictions are presented in Table 2-3.

Kinetic tests representing various ore types are weighted to reflect the expected composition of the HLF at the end of mine life. The relative proportions of Col 1, Col 2, Col 15 and Col 17 is 0.35, 0.35, 0.10, and 0.20, respectively. The volume of infiltration water through the HLF is estimated based on an estimated MAP of 485 mm, a runoff coefficient of 0.3 and a surface area of 95 ha (Appendix 12-C).

#### **2.1.4 Solubility Controls**

The post closure HLF source term is calculated by upscaling kinetic test loading rates. This approach to source term calculation frequently results in predicted concentrations that exceed thermodynamic solubility controls, particularly in neutral pH environments where numerous controls on dissolved concentrations influence drainage chemistry. Solubility controls for As, U and <sup>226</sup>Ra are calculated using the approach described in Section 5.1.4 of the *Geochemical Characterization Report* (Lorax, 2017).

The As solubility is partially based on a prediction of pH. Leach tailings kinetic tests show a gradual decline in pH values with time, from pH values as high as 8.9 to pH values as low as 7.8 over 98 weeks. This decline in pH reflects rinsing of residual lime added during metallurgical testwork. The range in pH values observed in kinetic tests after 4 pore volumes are flushed is shown in Table 2-4. These values are compared to data collected at the closed HLF at the Brewery

Creek Mine (Access, 2015). The decline observed in leach tailings columns is similar to what has been observed at the Brewery Creek heap leach facility, where pH values declined from pH 9.3 immediately after closure to stabilized values between 7.76 and 8.09 within five years after closure. For the purpose of determining As solubility is calculated assuming a pH 8.3 for the base case and pH 8.5 for the upper case source term calculation.

**Table 2-4:  
 Range of pH values observed in leach tailings columns and the  
 closed heap leach facility at the Brewery Creek Mine**

	Brewery Creek <sup>1</sup>	Col 17	Col 16	Col 15	Col 2	Col 1
<b>Max</b>	8.20	8.53	8.55	8.30	8.42	8.29
<b>P90</b>	8.09	8.44	8.45	8.25	8.39	8.25
<b>P50</b>	7.94	8.28	8.28	8.19	8.33	8.21
<b>P10</b>	7.76	8.21	8.22	8.14	8.31	8.27

<sup>1</sup>Brewery Creek HLF monitoring data from April 2005 to September 2011 at BC-28a

The uranium solubility controls are based, in part, on a prediction of alkalinity as described in section 5.1.4 of the Appendix 12-D (*Geochemical Characterization Report* (Lorax, 2017)). In the HLF pore water, alkalinity will be elevated similar to pH due to residual lime that will gradually be rinsed out of the system. Accordingly, high alkalinities are observed in initial cycles of leach tailings kinetic tests (*e.g.*, 495 mgCaCO<sub>3</sub>/L in first cycle of Col 1). The alkalinities can be seen to decline over the testing period, with Col 1 reaching a minimum alkalinity of 108 mgCaCO<sub>3</sub>/L after 94 weeks of testwork. Median values in the 10 cycles after the first 4 pore volumes are rinsed from the column range from 208 mgCaCO<sub>3</sub>/L to 470 mgCaCO<sub>3</sub>/L. For the purposes of determining U solubility, an alkalinity of 360 mgCaCO<sub>3</sub>/L is assumed for the base case and 470 mgCaCO<sub>3</sub>/L is assumed for the upper case.

### 2.1.5 Nitrogen Species

Elevated concentrations of nitrogen species are expected to be present in HLF drainage in post closure. Unlike other sources of nitrogen loading at the mine site, the primary source of nitrogen species in the HLF is from degradation of CN. Hence, nitrogen concentrations cannot be calculated based on an estimate of explosive use. Nitrogen loadings in the HLF will depend in large part on the rate of CN degradation during mine life and the effectiveness of rinsing closed sections of the heap during progressive reclamation. For the purposes of source term prediction, NO<sub>3</sub>, NH<sub>4</sub>, and WAD-CN concentrations produced at the closed heap leach facility at an analogue mine site, Brewery Creek are applied. The median and 90th percentile concentrations observed 4 to 11 years after closure are used as the Base Case and Upper source term concentrations for nitrogen species. Nitrite was not regularly monitored in HLF drainage at the Brewery Creek site. Therefore, the ratio of NO<sub>2</sub>/NO<sub>3</sub> in available Brewery Creek data was used to predict NO<sub>2</sub> concentrations based on the 90<sup>th</sup> percentile and median NO<sub>3</sub> concentration.

### **2.1.6 HLF Draindown Post Closure Source Term**

The final source term concentrations for the HLF is presented in Table 2-5. This source term represents drainage chemistry from the HLF after rinsing is complete, but does not include/consider any effects or benefits of in situ treatment during the final rinsing phase. As such, the post closure source terms are conservative, particularly for nitrogen species and cyanide which have been demonstrated to be treated using in situ stabilization methods proposed for the Coffee HLF. Values in Table 2-5 are representative of influent chemistry to the passive treatment system assuming no in situ treatment of the heap. The data are compared to monitoring data obtained from the closed HLF at the Brewery Creek Mine. This data is provided for perspective on drainage chemistry at closed HLF facilities at a similar site. Data from the Brewery Creek site is not directly applied to source term prediction, other than for nitrogen species as noted above.



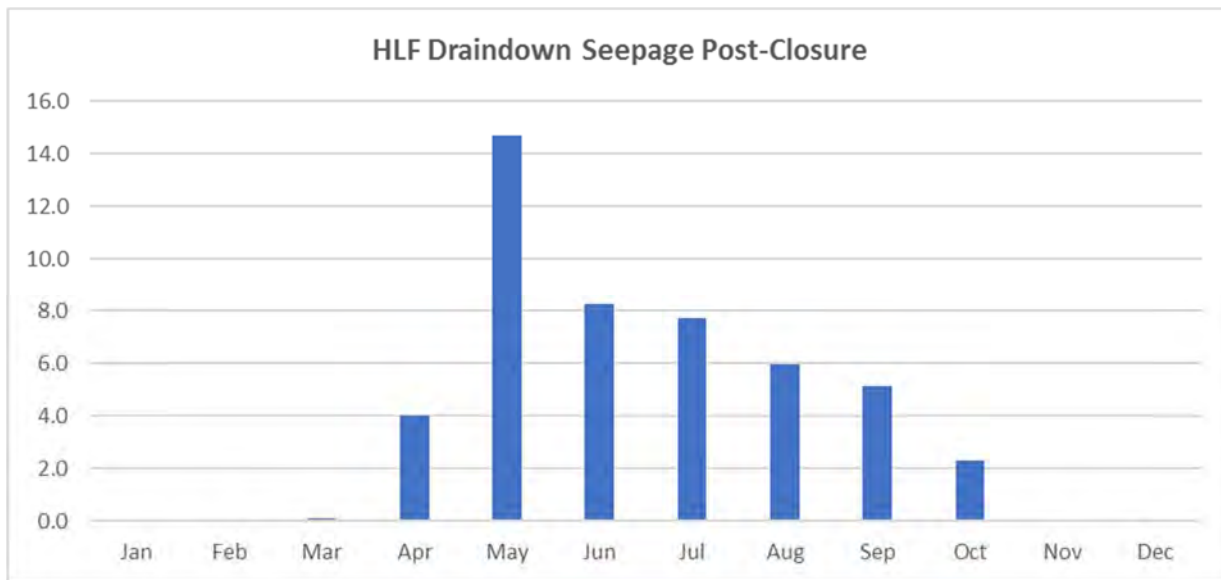
**Table 2-5:  
 Post Closure source terms for the Coffee heap leach facility compared  
 to data from the closed heap leach facility at the Brewery Creek Mine**

		HLF Post Closure		Brewery Creek <sup>1</sup>		
		Upper Case	Base Case	P90	P50	P25
pH	s.u.	8.50	8.30	8.09	7.94	7.76
N-NH <sub>4</sub>	mg/L	0.06	0.025	0.057	0.024	0.0092
N-NO <sub>3</sub>	mg/L	375	320	376	318	95.2
N-NO <sub>2</sub>	mg/L	1.9	1.6	-	0.221	-
Sulphate	mg/L	350	100	738	500	217
WAD-CN	mg/L	0.2	0.09	0.196	0.086	0.0436
Al	mg/L	0.2	0.06	0.583	0.020	0.0054
Ag	mg/L	0.00125	0.00009	0.00025	0.0001	0.00003
As	mg/L	2.00	0.660	0.416	0.339	0.284
Ca	mg/L	710	263	350	284	170
Cd	mg/L	0.00013	0.00004	0.000362	0.0002	0.00001
Cr	mg/L	0.014	0.004	0.00502	0.0012	0.0005
Cu	mg/L	0.014	0.004	0.0086	0.00211	0.00114
Fe	mg/L	0.5	0.15	0.723	0.30	0.189
Hg	mg/L	0.00026	0.0001	0.0008	0.0001	0.00005
Mg	mg/L	200	75	76.2	55.5	28.6
Mn	mg/L	0.06	0.016	0.0616	0.0297	0.016
Mo	mg/L	0.105	0.0330	0.0329	0.0266	0.0179
Ni	mg/L	0.006	0.002	0.0138	0.008	0.0038
Pb	mg/L	0.0013	0.00032	0.0022	0.00025	0.000062
Sb	mg/L	0.5	0.17	1.81	1.42	0.935
Se	mg/L	0.005	0.0015	0.194	0.151	0.0463
Tl	mg/L	0.004	0.0015	0.0005	0.00032	0.00014
U	mg/L	0.685	0.300	0.0232	0.019	0.00626
Zn	mg/L	0.052	0.02	0.0139	0.0080	0.0047
Ra-226	Bq/L	0.07	0.05			

<sup>1</sup>Brewery Creek HLF monitoring data from April 2005 - September 2011 at BC-28a. Values reported at BC-28a are total concentrations.

## 2.2 HLF Post-Closure Seepage Flow Estimates

Estimates of HLF post-closure seepage are generated from the Goldsim Water Balance Water Quality Model. As described previously, closure of the HLF involved covering of the flat portions of the rinsed heap with very low permeability GCL. Heap slopes will be covered with 0.5 m of soil/overburden and cover runoff will be directed in a series of perimeter ditches off the HLF. For the purposes of water balance modeling, an average net infiltration rate through the HLF cover system of approximately 30% was assumed for the post-closure condition (minimum of 17% and maximum of 55%). Figure 2-1 illustrates the average monthly flow rates from the HLF to the passive treatment system. For most of the seepage and treatment period of April to October, flow rates will be less than 6.0 L/s with peak values associated with spring freshet.

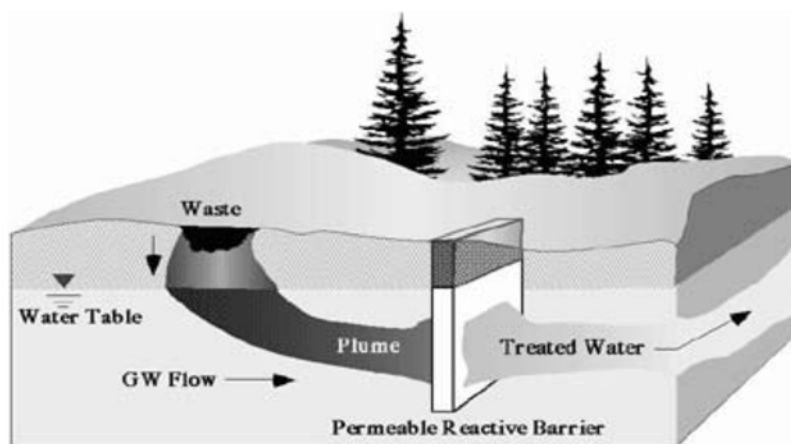


**Figure 2-1: Mean Monthly Seepage Flow Rates from Reclaimed HLF during Post Closure**

## 3. Background to Passive Treatment System Design and Principles of Operation

### 3.1 Overview

Biological reactors (BRs) are a group of engineered passive treatment systems constructed below or above ground, where contaminant removal typically occurs in association with anaerobic reaction pathways. Examples of this form of passive treatment system (PTS) include permeable reactive barriers (PRBs) and horizontal/vertical flow biological reactors. PRBs are typically placed to intercept a groundwater flow path, where flow direction is governed by the local hydraulic gradient (ITRC, 2011) (Figure 1). In contrast, horizontal/vertical flow BRs are constructed within lined impoundments, where flow migrates horizontally or vertically through a reactive matrix along engineered hydraulic gradients. Since 1994, more than 200 PRBs have been commissioned globally (ITRC, 2011), some of which in cold interior climates (e.g., Benner et al., 1997).



**Figure 3-1: Schematic of a Permeable Reactive Barrier (from USEPA, 2005).**

All forms of BRs rely on the passage of flow through a permeable matrix (e.g., gravel) amended with materials designed to promote contaminant removal. Common forms of reactive amendments include various sources of organic matter (e.g., hay, sawdust, compost and peat) and zero valent iron (ZVI). Within the reactive zone, favourable reactions may include denitrification, sorption with ZVI corrosion products (when ZVI employed) sulfate reduction and concomitant precipitation of metal sulfides (Benner et al., 1997; Blowes et al., 2000). Given that flow paths in BRs are contained below ground, they are influenced to a lower degree by atmospheric conditions in comparison to surface wetlands, and have been shown to function well in cold-interior climates (e.g., Benner et al., 1997). Maximum flow rates for BRs are typically in the range of a few L/s, with 10 L/s recently being cited as the global maximum for a full scale PRB (Mountjoy and Blowes, 2002).

Effective implementation of passive treatment requires the development of a site-specific operation and maintenance plan that includes performance monitoring and replenishment of reactive materials as required. In this regard, BR/PRB longevity is dependent on a number of factors, including the rate of flow, influent composition, rates of secondary mineral precipitation within the barrier, and the quantity and type of organic material. Ineffective performance of BR/PRBs can be generally linked to incomplete site characterization, inadequate hydraulic design, and hydraulic failure over time associated with decreases in porosity and development of preferential flow paths (e.g., associated with precipitation of secondary minerals within the barrier). With proper design, the longevity of BR/PRBs can exceed 20 years, with their lifespan ultimately limited by the availability of reactive materials (IRTC, 2011).

### **3.2 Parameters of Concern**

For the proposed heap leach facility at the Project, nitrate ( $\text{NO}_3^-$ ), arsenic (As) and uranium (U) represent the parameters of potential environmental concern. Nitrate represents a residual product of cyanide degradation, while As and U represent leached components from the ore. Each

parameter of concern has been demonstrated to be treated in biological reactor/PRB treatment systems.

Arsenic is a well-characterized element that is present in a variety of chemical forms, with As(III) generally considered to be more mobile and toxic than As(V). There has been considerable research focused on ZVI-type PRBs and its potential for removing As from water (*e.g.*, Bain *et al.*, 2006, Wilkin *et al.*, 2009). Results of these studies indicate that As removal occurs via adsorption onto corrosion products of ZVI, including iron hydroxides, oxyhydroxides, and mixed valence Fe(II)-Fe(III) green rusts (USEPA, 2008). The precipitation of As, as secondary arsenic sulfide minerals (*e.g.*, orpiment) and co-precipitation with pyrite also represent likely removal processes within PRB systems (USEPA, 1998).

Nitrate is a common groundwater contaminant related to agricultural activity, wastewater disposal, leachate from landfills, septic systems, and industrial processes (*e.g.*, use of cyanide in gold extraction). Treatment methods designed to foster microbially-mediated nitrate reduction (denitrification), such as PRBs, have been applied in a variety of forms and settings. In this regard, organic materials can provide an effective reactive media in PRBs to produce conditions conducive to bacterial denitrification (USEPA, 1998).

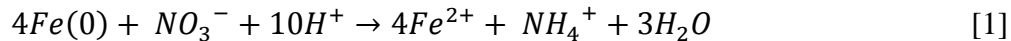
At circum-neutral pH, U exists in two major oxidation states: U(VI) and U(IV). The U(VI) species are highly soluble and therefore mobile, whereas U(IV) species are sparingly soluble at near-neutral pH. Since reduction of U(VI) to U(IV) results in a significant decrease in the solubility of U, reduction of U(VI) is a potential remediation strategy to sequester U(IV) in U-contaminated waters (Basu, 2013).

### 3.3 Remediation Processes Relevant to BR/PRBs

Remediation of contaminants using BR/PRBs may be achieved through abiotic reduction, biotic reduction, chemical precipitation, or adsorption processes. This section provides a brief summary of each process and associated reactions.

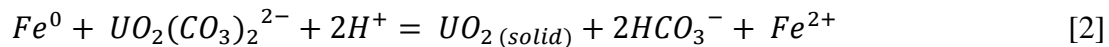
#### 3.3.1 Abiotic Reduction-Oxidation

Abiotic reduction-oxidation reactions relevant to BR/PRB remediation involve the oxidation of constituents in the reactive medium (*e.g.*, ZVI or organic matter) and the reduction of target contaminants in the contaminant plume. ZVI is the most common reactive material used for abiotic reduction because it effectively promotes reducing redox potentials that favour the reduction of sulfate, nitrate and several trace elements (*e.g.*, Fe, U, Mo, As). Reduction of  $\text{NO}_3^-$  by ZVI has been observed to proceed rapidly, resulting in production of  $\text{NO}_2^-$  and subsequently ammonium. Reduction of  $\text{NO}_3^-$  by ZVI is a spontaneous process with an optimal pH range of 4.0 to 7.0 which can generate ammonium instead of nitrogen gas (USEPA, 1998; Cheng *et al.*, 1997; Zhu and Getting, 2012), as per the reaction:



Anticipated pH conditions in the HLF seepage solutions are estimated to be approximately 8.0 and therefore are outside the optimal range for conversion. However, and more importantly, the generation of ammonium is highly undesirable and therefore the use of ZVI for nitrate removal is not preferred.

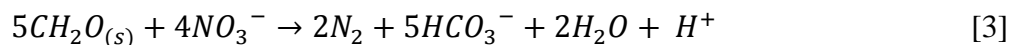
Metals, such as U, are removed through precipitation in this process. In carbonate-dominated groundwater at circum-neutral pH, ZVI is capable of reducing U(VI) to U(IV), whereby U is removed as  $UO_2$  (uraninite) as per the following reaction (USEPA, 2005):



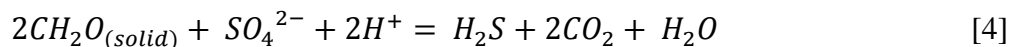
As previously discussed, metalloids, such as arsenic are removed from solution via adsorption onto corrosion products of ZVI, including iron hydroxides, oxyhydroxides, and mixed valence Fe(II)-Fe(III) green rusts (USEPA, 2008).

### 3.3.2 Biotic Reduction

Biotic reduction within BR/PRBs can be achieved by supplying electron donors in the form of organic matter (*e.g.* wood chips, saw dust, wheat straw, etc.) that is degraded (oxidized) by naturally-occurring microorganisms. In the presence of organic carbon, under anaerobic conditions maintained below a water cover in the subsurface, denitrification or the reduction of  $NO_3^-$  to  $N_2$  gas is thermodynamically favoured:



Under highly reducing conditions, sulfate ( $SO_4^{2-}$ ) reduction, which liberates dissolved hydrogen sulfide ( $H_2S$ ) (equation [4]) can be fostered for metal precipitation. Many trace elements (*e.g.*, As, Cu, Fe, Pb, Zn) complex with dissolved  $H_2S$  to form strongly insoluble secondary sulfide minerals. This form of metal removal is illustrated in equation [5], whereby  $CH_2O$  represents an organic carbon substrate,  $Me^{2+}$  is a divalent metal (such as Fe, Cd or Zn), and  $MeS$  is a sparingly soluble amorphous metal sulfide (*e.g.*,  $FeS_2$ ,  $CdS$ ,  $ZnS$ ) (USEPA, 2005).



Treatment strategies employing biologically mediated reactions have been proposed for direct treatment of nitrate and sulfate, and for indirect removal of trace elements through precipitation as sulfide phases.

## 4. Case Studies for the Treatment of Arsenic, Nitrate and Uranium

This section contains brief summaries of case studies selected to demonstrate the application of BR/PRB systems for the treatment of arsenic-, nitrate, and uranium. These summaries contain available details with respect to several key variables, including:



- Site location;
- Target parameters of concern;
- Contaminant removal rates;
- Effectiveness/longevity;
- General design/construction;
- Flow capacity; and
- Cost.

#### 4.1 Monticello Site

*Location: Monticello, Utah, USA*

*Phase: Full-scale*

*Contaminants: Arsenic, manganese, molybdenum, nitrate, selenium, vanadium, uranium*

In June 1999, a ZVI funnel-and-gate system was installed at the Monticello site in southeastern Utah to treat elevated concentrations of U, As, Se, Mo, V, Mn, and nitrate associated with seepage from U mill tailings (ITRC, 2005). The cost of this system was \$800,000. Two bentonite-slurry walls (30 m and 73 m in length) funnel the water into the PRB (USEPA, 2005). The treatment gate is 30 m long and 2.4 m thick in the direction of the groundwater flow and extends to the base of the aquifer (4.5-6 mbgs) (ITRC, 2005). The treatment gate has three components: 1) an upgradient gravel pack 0.6 m thick containing 13% ZVI; 2) a central zone of ZVI 1.2 m thick; and 3) a downgradient gravel pack 0.6 m thick containing 10% ZVI. Groundwater velocity in the treatment gate was estimated to be 5.7 m/day using flow sensors and tracers. Thus, residence time of contaminated groundwater in the 100% ZVI portion of the PRB is approximately 5 hours (ITRC, 2005).

Excellent treatment of all contaminants (except Mn) was achieved within the PRB. Uranium concentrations decreased from 396 mg/L in the influent to <0.24 mg/L in the effluent from the PRB. Arsenic decreased from 10.3 mg/L to <0.2 mg/L while nitrate decreased from 60.7 mg/L to <0.065 mg/L. Consistent with observations of other ZVI PRB systems, the pH of the groundwater within the ZVI increased from a maximum of 6.8 in the influent to 10 within and downgradient of the PRB.

The bulk hydraulic conductivity has decreased over time and is now less than that of the alluvial aquifer upgradient of the PRB. The greatest permeability decrease occurred within the center of the ZVI zone where calcite minerals on the upgradient side have accumulated. This clogging process poses a concern for long-term performance, and highlights the need for rigorous lab-based programs in the design phase. Despite the loss of conductivity, groundwater is still flowing through the PRB, with flow restricted to more permeable areas (USEPA, 2005).

## 4.2 Rocky Flats Environmental Technology Site (Solar Ponds Plume)

*Location: Golden, Colorado, Denver, USA*

*Phase: Full-scale*

*Contaminants: Nitrate, uranium*

The Solar Ponds site was used for the disposal of products containing nitrate and uranium. The ponds were drained and sludge removed in 1995, but contaminated groundwater had already reached a nearby stream (North Walnut Creek). Initial concentrations of nitrate and uranium in the aquifer ranged from 140-170 mg/L and 0.03-0.04 mg/L, respectively. Remediation targets required a reduction in nitrate to 100 mg/L and uranium to 0.015 mg/L (USEPA, 2005).

A two-cell reaction vessel BR/PRB system was installed in 1999 at a cost of approximately \$1,300,000. The system is 337 m in length and was placed 6-9 mbgs, 3 m of which was keyed into the claystone bedrock. The concrete treatment cell is divided into two sections. The first section is 9.8 m long by 5.2 m wide, with reactive media in the lower 3 m of the cell. The reactive matrix consists of a mixture of sawdust, leaf mold, and 10% ZVI by weight to facilitate denitrification. The second cell is 3.4 m long by 5.2 m wide and is filled with ZVI to provide polishing treatment. The two cells can be run separately or simultaneously (USEPA, 2005). Nitrate and uranium levels in the PRB effluent are generally less than 6 mg/L and 0.0003 mg/L, respectively (values well below the desired remediation targets) (USEPA, 2005).

## 4.3 ASARCO Site

*Location: East Helena, Montana, USA*

*Phase: Pilot-scale*

*Contaminants: Arsenic*

In June 2005, a pilot-scale PRB was constructed at a former metal smelting facility operated by ASARCO Inc. The PRB is 9.1 m long, 14 m deep, and 1.8-2.4 m wide (in the direction of groundwater flow) (USEPA, 2008). Cost information was not available. The pilot project was conducted in order to test the effectiveness of PRB technology for the treatment of mine-related As contamination of the groundwater system. The East Helena PRB uses ZVI as the reactive medium. Preliminary field and laboratory column testing indicated that the designed PRB was expected to last 10 years assuming constant contaminant influx (Wilkin *et. al.*, 2009).

A monitoring network of approximately 40 groundwater sampling wells was installed in July 2005 (USEPA, 2008). After over 2 years of monitoring, results show As concentrations > 25 mg/L in wells located hydraulically upgradient of the PRB. Within the PRB, As concentrations are reduced to <0.01 mg/L.

Detailed studies in the aquifer downgradient of the PRB show an upper zone of the saturated aquifer (8.8-12.8 mbgs) where As concentrations are reduced to <0.5 mg/L (Wilkin *et. al.*, 2009). In contrast, As concentrations in the lower zone of the downgradient aquifer (12.8 m to 14.6 mbgs) increase with increasing depth to a maximum value of ~27 mg/L (*i.e.*, roughly the same As concentration observed upgradient of the PRB). Ineffective treatment of As over the lower depth interval is inferred to reflect the bypass of contaminated seepage under the PRB. However, where hydraulic connection between the upgradient aquifer and the PRB is established, the pilot PRB is performing as expected (USEPA, 2008).

#### 4.4 DuPont Site

*Location: East Chicago, Indiana, USA*

*Phase: Full-scale*

*Contaminants: Arsenic*

A continuous-wall PRB was installed at an industrial site in June 2002 to treat elevated concentrations of As in groundwater. This was the first site to use basic oxygen furnace slag (BOFS) in a PRB to remediate As-contaminated groundwater. BOFS is a non-metallic waste by-product created during steel production, and is particularly rich in iron and calcium oxyhydroxides that serve as effective sorbents for As. Specifically, BOFS oxidizes As(III) to As(V), which will then sorb to the BOFS surface. Researchers from the University of Waterloo began using column tests with BOFS in the mid-90s to treat phosphorous, but it was not until 2002 that a BOFS PRB was installed at an industrial site for the treatment of As (USEPA, 2005).

Groundwater at the site is contaminated with 1-3 mg/L of As, predominately as As(III) (arsenite). The groundwater plume exhibits neutral-pH and slightly aerobic conditions (Eh ~ 50 mV) (Bain *et. al.*, 2006). Two parallel PRBs composed of 100% BOFS were installed 4.6 m apart, each measuring 610 m long x 0.8 m wide x 11.3 m deep. The average residence time for water in each of the PRBs is approximately 5 weeks (USEPA, 2005). Cost information was not available.

Results have shown a decrease in As concentration from 1-3 mg/L to <0.001 mg/L (USEPA, 2005), with PRB effluents meeting objectives. The monitoring data also indicate the potential for contaminant migration around and above the barriers. This is inferred to represent the leaching of As from a waste/ash layer (located 1.5 mbgs) during a period of high groundwater level.

## 4.5 Oklahoma Pork Facility

*Location: Logan County, Oklahoma, USA*

*Phase: Full-scale*

*Contaminants: Nitrate*

A carbon-based PRB was constructed for the *in situ* bioremediation of a groundwater nitrate plume caused by leakage from a swine CAFO (concentrated animal feeding operation) lagoon. The swine CAFO, located in Logan County, Oklahoma, operated from 1992 to 1999. The overall site remediation strategy includes an ammonia recovery trench to intercept ammonia-contaminated groundwater, and a hay straw PRB which is used to intercept a nitrate plume caused by nitrification of ammonia. The PRB, which averages 6 m in depth (thickness of the surficial saturated zone) and 1.2 m in width, extends approximately 260 m in length (Wilkin *et. al.*, 2006). Cost information was not available.

Geochemical conditions within the wall support microbially mediated nitrate-, iron- and sulfate-reduction. Nitrate concentrations have ranged from 23-77 mg/L N hydraulically upgradient of the PRB, from <DL (*i.e.*, less than detection limit) to 3.2 mg/L N within the PRB, and from <DL to 65 mg/L N downgradient of the PRB. Nitrate concentrations have generally decreased in downgradient locations with successive monitoring events. Mass balance considerations indicate that nitrate attenuation is governed dominantly by denitrification, but with some component of organic nitrogen production. Concentrations of dissolved organic carbon have progressively decreased with time within the PRB, from >850 mg/L to <100 mg/L. This trend may be an indication of decreased substrate capability to support denitrification, iron reduction, and sulfate reduction (Wilkin *et. al.*, 2006).

## 4.6 Wastewater Treatment Site

*Location: Langton, Ontario, Canada*

*Phase: Full-scale*

*Contaminants: Nitrate, phosphate*

A funnel-and-gate PRB system designed to remove nitrate and phosphate from a large-capacity septic system tile field was installed at a public school in Langton, Ontario in July 1993. The funnel consists of two sheet-piling walls extending 3.7 m from the central treatment gate area. The gate is 1.8 m wide, 1.5 m long, and approximately 0.9 m deep. Cost information was not available. The PRB contains two treatment zones: 1) a phosphate-treatment zone 0.6 m thick; and 2) a nitrate treatment zone 1.2 m thick. The nitrate treatment zone contains organic carbon in the form of wood chips. Nitrate is removed by bacterial denitrification.

Performance monitoring of the PRB system has shown effective nitrate removal, with concentrations upgradient of the PRB (23-82 mg/L as N) decreasing to very low values within the

PRB (< 1 mg/L as N). The very high organic carbon content of the nitrate treatment zone resulted in the release of high concentrations of dissolved organic carbon and other constituents from this portion of the gate (USEPA, 1998).

#### 4.7 Fry Canyon

*Location: Fry Canyon, Utah, USA*

*Phase: Pilot-scale/ Full Scale*

*Contaminants: Uranium*

The Fry Canyon site is an abandoned U ore milling and Cu leach operation. Subsurface drainage from mill ponds have led to groundwater contamination of U at concentrations ranging as high as 21 mg/L underneath the U mill tailings. The water table at this site is 2.4-2.7 mbgs and the underlying aquifer is 0.3-1.8 m deep.

In August 1997, three pilot-scale PRBs were installed in parallel for concurrent remediation of U. The system cost approximately \$140,000. Each funnel-and-gate barrier measures 2.1 m wide x 0.9 m thick x 1.2 m deep and was filled with approximately 3.1 m<sup>3</sup> of reactive media. Each of the PRBs treated U through a different process by using a variety of reactive materials:

- 1) precipitation by phosphate using phosphate rock;
- 2) reduction of U(VI) to U(IV) by ZVI using foamed ZVI pellets; and
- 3) adsorption to the ferric oxyhydroxide surface using AFO (USEPA, 2005).

The average influent U concentration to each of the three PRBs from September 1997 to August 1999 was 2.49 mg/L to the phosphate, 5.86 mg/L to the ZVI, and 17.18 mg/L to the AFO PRB. The U-removal efficiencies after 618 days of operation were greater than 99.9% for the ZVI, 99.5% for the phosphate, and 42.6% for the AFO. The U-removal efficiencies in the AFO PRB were higher during the first year. Decreased U-removal efficiencies in the AFO material during PRB aging were attributed to the substantially higher U mass loading to the AFO material relative to the other PRBs and the limited number of adsorption sites on the 2% iron and pea gravel mixture used in construction. Total mass of U removed in 730 days was estimated to be 0.22 kg in the phosphate PRB, 4.57 kg in the ZVI PRB, and 6.86 kg in the AFO PRB (Naftz *et. al.*, 1999).

#### 4.8 Mecsek Ore Site

*Location: Pecs, Hungary*

*Phase: Pilot-scale*

*Contaminants: Uranium*

The Mecsek Ore area is located near Pecs in Southern Hungary operated from 1958 to 1997, producing ~20 million tons of U tailings and 18 million tones of waste rock. A pilot-scale PRB (6.8 m long x 2.5 m thick x 3.8 m deep) was installed perpendicular to the groundwater flow path



downgradient of the largest waste rock facility (12.3 million tons). The PRB consists of two different zones emplaced with ZVI and sand. Zone I is 0.5 m thick with coarse ZVI comprising 12% by volume. Zone II is 1 m thick with fine ZVI comprising 41% by volume. Sand layers (0.5 m thick) were placed on both sides of the PRB to enhance groundwater flow. The PRB was lined with clay and geosynthetic clay liners, sealed with a geomembrane at both ends and on top, and covered with a layer of clay. The groundwater flow velocity is approximately 0.086 m/day. The average hydraulic conductivity of the barrier is  $3.36 \times 10^{-3}$  m/s (USEPA, 2005). Cost information was not available.

U concentrations in the contaminated aquifer (~1 mg/L) were reduced to values <0.01 mg/L within the PRB, illustrating effective performance. Groundwater pH increased from 7.2 to 9-10, and has been stable over the observational period. Precipitate formation in the PRB will lead to reduced reactivity and/or hydraulic conductivity over the long-term. The porosity of the iron/sand mixture is 30%, while the annual loss in porosity due to mineral precipitation is estimated to be 1.6% per year. From these data, a 62-year lifespan has been predicted for the PRB (USEPA, 2005).

#### 4.9 Cotter Corporation Uranium Mill

*Location: Cañon City, Colorado, Denver, USA*

*Phase: Pilot-scale*

*Contaminants: Molybdenum, uranium*

Groundwater at this previous U-ore milling site was contaminated with Mo and U, with mean concentrations of 4.8 and 1.0 mg/L, respectively. Groundwater flows through an alluvium composed of unconsolidated sand, gravel, and silt, and overlies a bedrock mixture of claystone, sandstone, and coal. Saturated thickness ranges from 0.15 m to greater than 1.2 m in the vicinity of the PRB and varies seasonally (USEPA, 2005).

A funnel-and-gate PRB was installed perpendicular to groundwater flow in June 2000. The PRB is 9 m wide x 2 m high and composed of a 1.5 m long zone of ZVI (approximately 80 tons) with 0.6 m of clean silica on the upstream and downstream sides. The concrete walls extend 87 m to the west and 26 m to the east. The PRB was keyed into the claystone/coal bedrock about 7.6 mbgs and captures nearly all of the contaminated groundwater. Uranium concentrations are reduced to values below detection (<0.01 mg/L) within the PRB, illustrating a high removal efficiency (USEPA, 2005). Cost information was not available.

Results from 2003 indicated that some water was migrating around the PRB by October 2004 (4 years into operation), very little groundwater was permeating through the barrier. Excavation of part of the barrier in October 2004 revealed that the ZVI was clogged by mineral precipitants (calcite, iron oxides and sulfide minerals). Nearly all U precipitates were within 0.15 m of the upstream wall of the PRB. The excessive precipitate buildup was attributed (at least partly) to flow stagnation along the upgradient face of the PRB (ITRC, 2011).

#### **4.10 Other Biological Reactor PRB Case Evaluations**

Other BR and PRB case studies targeting various parameters of interest are summarized in Table 4-1 below.

**Table 4-1: Summary of Additional Passive Treatment Case Studies**

Project and Location	Treatment Type	Target Parameters	Flow Rate	Performance	Notes
<sup>1</sup> Campbell Mine, Red Lake, Northwestern Ontario	CW (Full Scale)	NH <sub>3</sub>	60 to 120 L/s	NH <sub>3</sub> (89%), CN (78%), As (56%), Cu (33%)	<ul style="list-style-type: none"> <li>16 ha CR, hydraulic residence time of ~6 days</li> <li>Transplanted <i>Typha spp.</i> in substrate of inert waste-rock overlain by organic topsoil containing <i>Typha</i> rootstock and native flora</li> <li>CR outlet serves as the final point of discharge for the mine</li> <li>Effect of cold climate on performance mitigated by storing water upstream for winter period (Nov-Apr)</li> <li>System operates during the ice-free period only (May through October)</li> </ul>
<sup>2,3</sup> United Keno Hill Mine, Galkeno 900 Adit, Yukon	BR (Pilot Scale)	Zn, Fe, Mn, Ni, Cd, Cu	0.5 - 1 L/s	Zn (>98%), Cd (>93%), Ni (>80%)	<ul style="list-style-type: none"> <li>Operated since 2008, with operation occurring year-round</li> <li>Dimensions: ~30 m x 27 m x 3 m</li> <li>All pipes and valves buried &gt; 1 m below ground</li> <li>Soluble sources of organic carbon added to promote sulfate reduction and zinc sulphide precipitation</li> <li>Engineering problems included uneven flow distribution, pump failures, power outages and frozen pipes</li> </ul>
<sup>4</sup> Teck Smelter, Trail, BC	BRs + subsurface flow CWs (Full Scale)	As, Cd, Zn	~0.15 L/s	As (98%), Cd (99%), Zn (96%)	<ul style="list-style-type: none"> <li>In series: 2 BRs in combination with 3 subsurface flow CWs</li> <li>BR matrix: 60% pulp mill bio-solids, 35% sand, 5% cow manure</li> </ul>
<sup>5</sup> Cadillac Molybdenite Mine, Quebec	BR, oxidation pond, APS (Full Scale)	Al, Cu, Fe, Mn, Ni, Zn	0.4 L/s	Al (78%), Cu (97%), Fe (99%), Mn (40%), Ni (98%), Zn (99%)	<ul style="list-style-type: none"> <li>Year round treatment in subarctic climate</li> <li>Anaerobic BR dimensions: 10 m x 10 m x 1.7 m</li> <li>BR matrix: wood chips, limestone, hay, manure</li> <li>Oxidation pond: 150 m<sup>2</sup> with limestone-lined spillway and discharge ditch</li> </ul>
<sup>6</sup> Pacific Environment Centre, West Vancouver, BC	PRB (Full Scale)	Cu, Cd, Co, Ni, Zn	10 L/s	<sup>99</sup> Cu (99%), Cd (99%), Co (79%), Ni (75%), Zn (94%)	<ul style="list-style-type: none"> <li>PRB installed in 5 sections with varying barrier compositions</li> <li>530 m in length, 2.5 m in thickness, and up to 13 m in depth</li> <li>Barrier media included compost, limestone, pea gravel and iron filings</li> </ul>

Notes:

<sup>1</sup>Martin et al. (2015); <sup>2</sup>Harrington et al. (2015); <sup>3</sup>Alexco (2012); <sup>4</sup>Duncan et al. (2002); <sup>5</sup>Kuyucak et al. (2006); <sup>6</sup>Mountjoy and Blowes (2002);  
 n/a = not applicable; BR = biological reactor; CW = constructed wetland; PRB = permeable reactive barrier; APS = alkalinity producing system

## **5. Proposed Conceptual Passive Treatment for Coffee Heap Draindown Solutions**

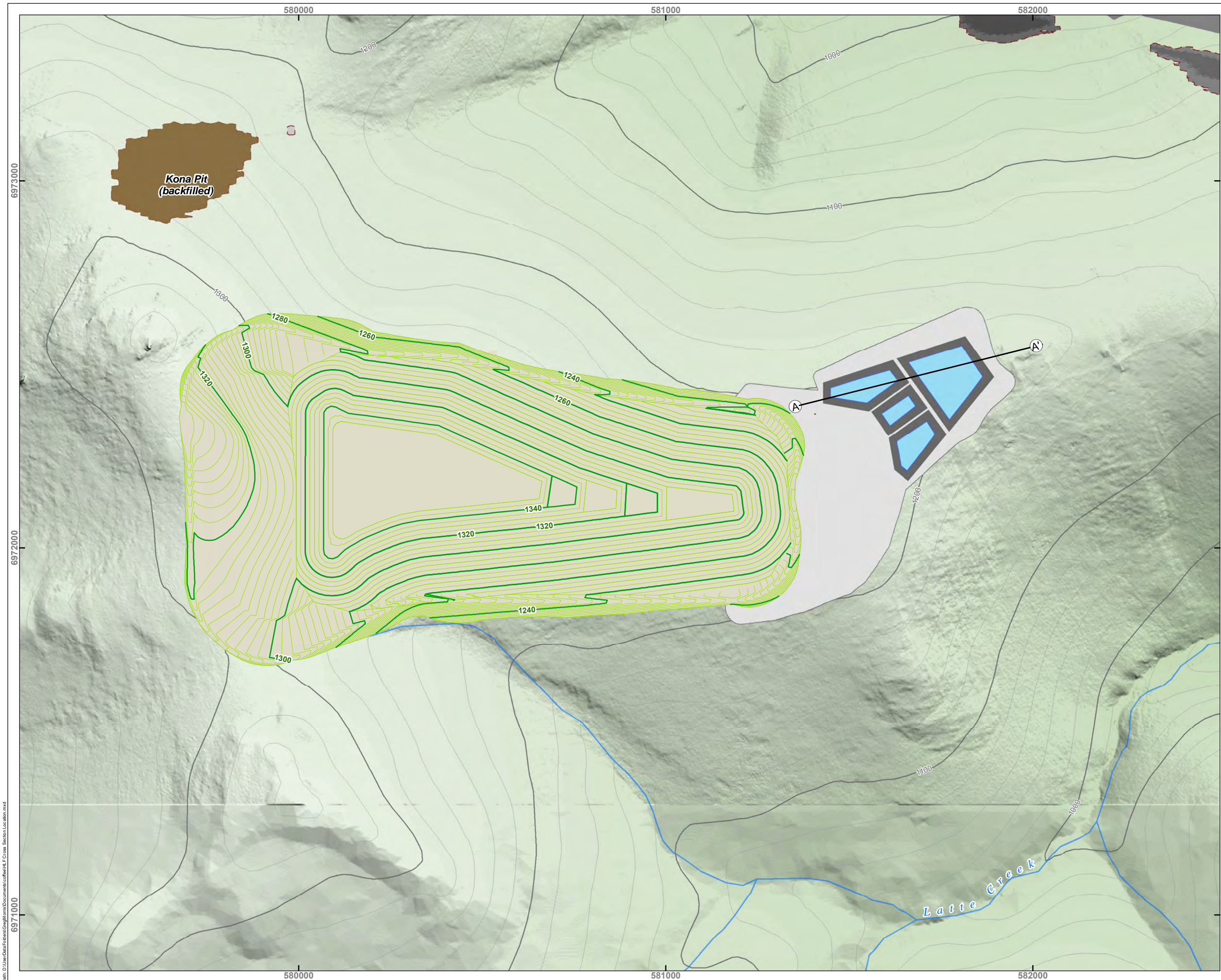
### **5.1 Conceptual Design**

Considerable work will be required to achieve a final passive treatment design for the Coffee Gold heap leach draindown solutions. However, some generalized design assumptions can be put forth. The proposed passive treatment system (BR/PRB) will ultimately be designed to collect heap leach seepage originating from the decommissioned facility and convey the solution through events ponds that have been converted to BR/PRB treatment cells. Collector drains from the perimeter of the facility will convey seepage flow to the events ponds (Figure 5-1). To improve system performance and robustness under the climatic conditions experienced at Coffee, treatment will occur in the subsurface to minimize the potential influence of freezing temperatures during the spring and fall shoulder periods of open water. Seepage flow from the HLF will be conveyed to the subsurface through permeable coarse rock drains constructed along the upstream slope of the events ponds (Figure 5-2).

Based on the primary parameters of concern (POPCs) predicted in the heap draindown solutions; namely  $\text{NO}_3$ , As and U, a two-phase system is proposed. The first phase of treatment would occur in a bioreactor system targeting primarily the denitrification of  $\text{NO}_3/\text{NO}_2$  and the conversion of these nitrogen species to  $\text{N}_2$  gas (Figure 5-2). Recognizing that experience from other nitrate treatment sites described in Section 4.0 indicates the potential for conversion of  $\text{NO}_3$  to  $\text{NH}_4^+$  (undesireable) in ZVI PRB systems, the initial treatment cell would be amended with a mixture of organic carbon (potentially wood chips or other recalcitrant carbon source) and sands/gravels. The objective would be to develop an appropriate organic carbon/substrate mixture that is sufficient to generate anaerobic conditions along the flow path to foster denitrification. Highly reducing conditions within the initial treatment cell would not be necessary to initiate denitrification and could be detrimental if overly reducing as the potential for dissimilatory nitrate reduction to ammonia (DNRA) to occur increases under strongly reducing conditions. Studies have demonstrated that strongly anaerobic environments with high organic carbon to nitrate ratios tend to favour DNRA over denitrification (Gilbert et al, 2008). Therefore, manipulating the organic carbon to nitrate ratio will be a further design consideration to minimize the potential for ammonium production.

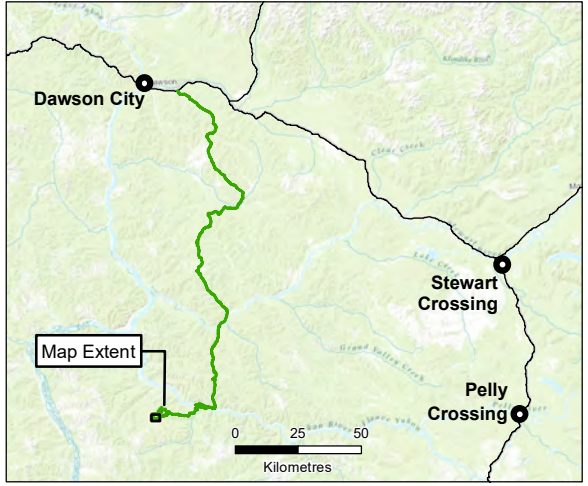
The second phase of treatment would target those remaining POPCs (As, U) that are readily treated in PRB type systems containing a permeable matrix (e.g., sand+gravel) amended with zero-valent iron (ZVI) and locally-available organic materials (e.g., sawdust, wood chips, peat etc.). As described in Section 4.0, As and U have been successfully treated using this amendment mixture (USEPA, 2005).





COFFEE GOLD MINE

**Heap Leach Facility  
at End of Operations**



- Legend**
- Municipality
  - ▭ Project Footprint
  - Highway
  - ▭ Waterbody
  - Watercourse
  - ⊖ ⊕ Cross Section
- Proposed Infrastructure**
- ▭ WRSF
  - ▭ Backfill
  - ▭ Total Pit Outline
  - ▭ Event Pond
  - ▭ Heap Leach Access Disturbance Footprint
  - ▭ Leach Pad Contour (20m)
  - ▭ Leach Pad Contour (5m)
  - ▭ Heap Leach Pad Base

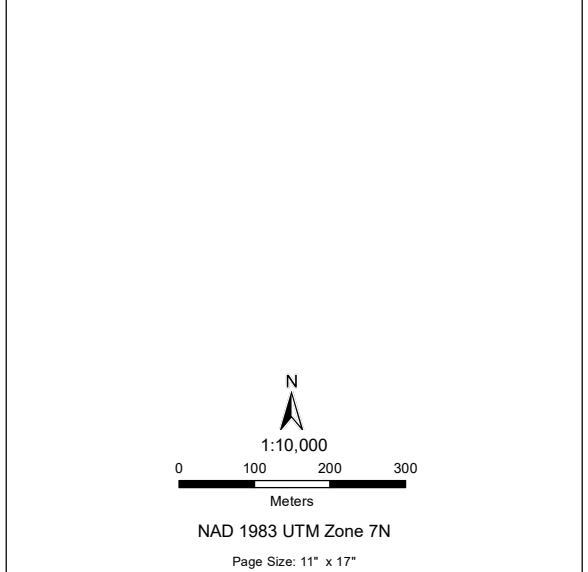


Figure 5-1	Date: Sep 26, 2017	Drawn by: GM	Reviewed: JS/LF
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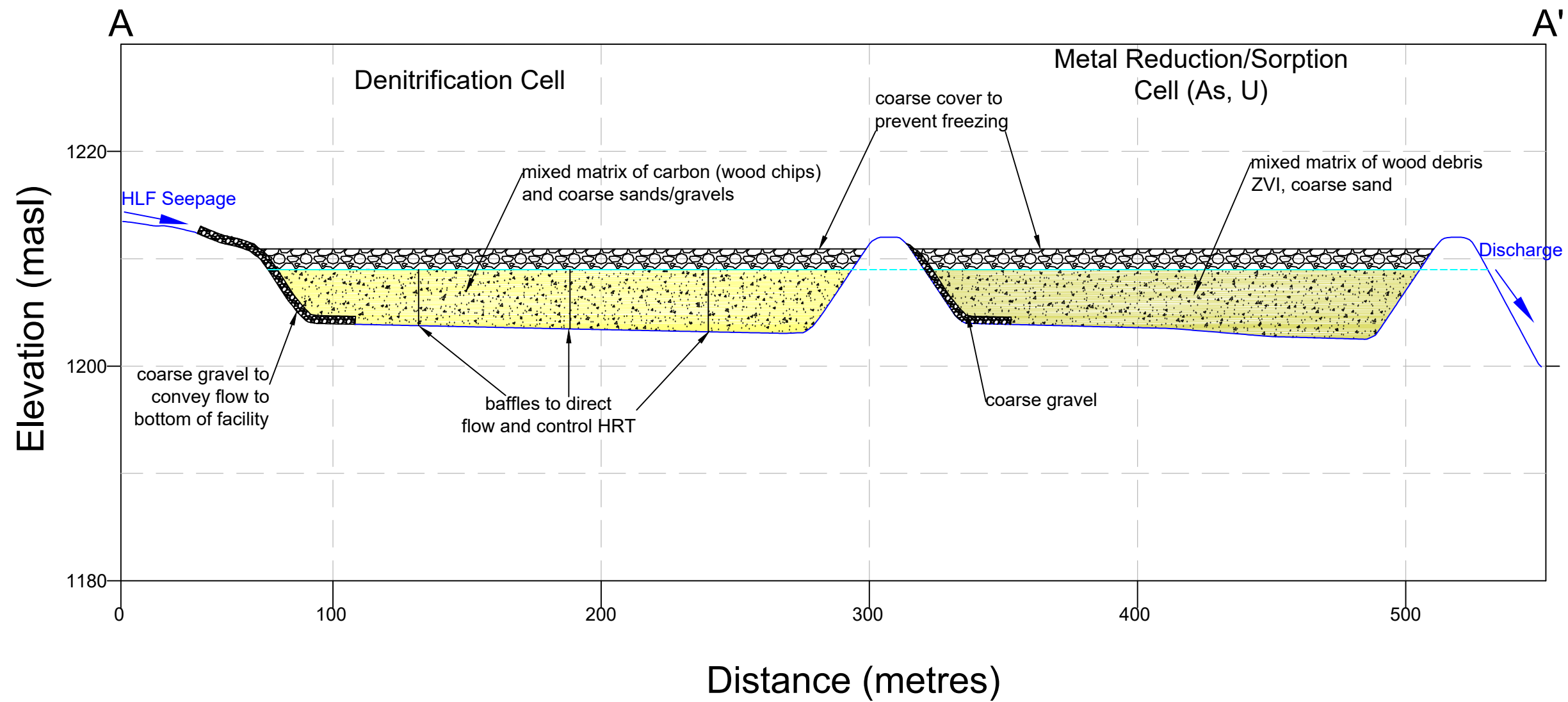


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Cross Section through Converted Events Ponds

Legend



V.E. =4X

Figure 5-2

Date:  
Sep 26, 2017

Drawn by:  
SSS

Reviewed:  
JS

The required hydraulic residence time (HRT) will be based on prefeasibility and feasibility testwork (outlined below), as well as data for relevant case studies. In turn, BR/PRB dimensions (e.g., path length) will be based on HRT requirements combined with estimates of seepage flow rates. Installation of baffles to direct flow paths may be beneficial within the treatment cells; however, their use will be dictated by the outcome of the prefeasibility and feasibility testing.

## 5.2 Proposed Testing Program

Development of a final passive treatment design will be dependent on the outcome of pre-feasibility level (lab-scale) and feasibility level (on-site pilot scale) assessments. Pre-feasibility work typically includes column-based experiments designed to: 1) demonstrate proof of principle (i.e., can the proposed BR/PRB system reduce POPC concentrations to desired levels?); 2) allow quantification of removal rates, which in turn has relevance to HRT requirements and passive treatment system dimensions; 3) identify the nature of secondary minerals that may affect the overall permeability of the system over time (relevance to longevity); and 4) identify any potential problematic parameters that may be generated by the proposed design (e.g., nitrite, ammonia, ferrous Fe, hydrogen sulfide).

In turn, pilot-scale experiments will be conducted on a larger scale, under site climate conditions at the mine. To permit acquisition of the most valuable data, pilot scale experiments should be implemented with similar materials and construction methods as would be used for a full scale application. The results of pilot-scale testwork are used to better quantify the limits of system performance, BR/PRB longevity, HRT requirements, system dimensions, and the potential risks associated with the unintended generation of undesirable solutes (e.g., nitrite, ammonia, ferrous Fe, hydrogen sulfide).

Effluents representative of the heap leach facility will become available in the early in the mine life (Year 4) owing to progressive reclamation. This will provide an invaluable opportunity to conduct the lab- and pilot-scale studies with actual effluent. Prior to this period, it may be possible to generate additional metallurgical solutions or create synthetic solutions of expected draindown chemistry that can be used in pre-feasibility evaluations during the permitting process.

Based on evidence in the literature, the current estimated seepage flow rates are on the upper end of passive treatment performance for certain periods of the year (e.g. freshet). Moreover, variable flow rates are not conducive to consistent BR/PRB performance. Additional work is required with respect to heap leach cover optimization to limit both flow rates and highly variable flow rates through the system.

## 6. Summary

The memorandum has provided information on predicted closure heap leach draindown chemistry as well as water balance estimates of expected flow rates following completion of physical

reclamation of the facility. On overview of key principals associated with the proposed bioreactor/PRB passive treatment approach has also been described. Relevant case studies selected to demonstrate the application of passive treatment systems for the treatment of arsenic, nitrate, and uranium have been summarized. The summaries contain details with respect to several key variables, including site location, target parameters, contaminant removal rates, effectiveness/longevity, design/construction, flow capacity and cost. The results of these studies provide confidence in the proof of principle that As, U and NO<sub>3</sub> are amenable to effective treatment using common passive treatment designs. Rigorous laboratory tests and pilot-scale work will be required to provide more detailed design information and to optimize passive treatment effectiveness and longevity.

## 7. Closure

We trust that this memorandum meets your expectations at this time. Please contact the undersigned with any questions or comments.

Respectfully submitted,

**Lorax Environmental Services Ltd.**

Signature Redacted

Signature Redacted

Name Redacted, **B.A.Sc., EIT**  
**Chemical Engineer**

Name Redacted **M.Sc., R.P.Bio**  
**Principal, Senior Geochemist**

Signature Redacted

Name Redacted **M.Sc.,**  
**Principal, Senior Geoscientist**

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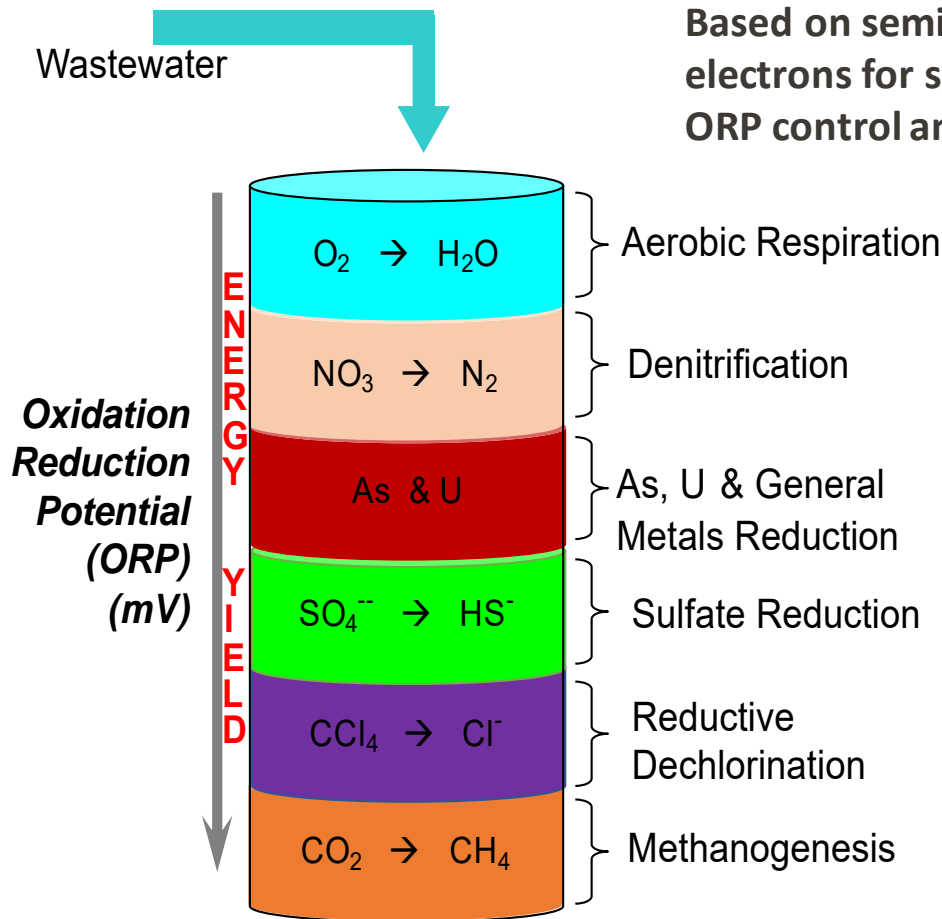


# Water Treatment Questions

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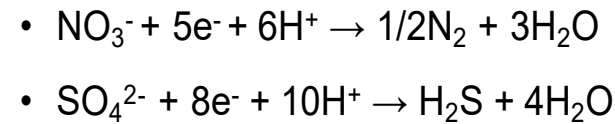
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# Water Treatment Questions – Background

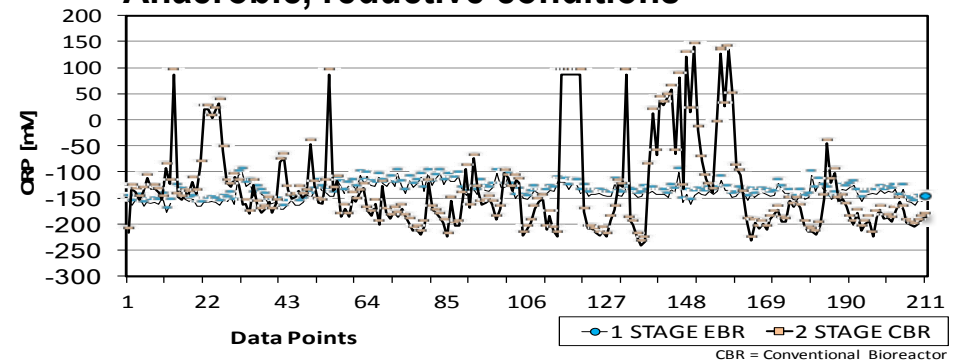


Based on semi-automated control of directly added electrons for site-specific water chemistries - adds ORP control and replaces excess nutrients additions

- Microbes mediate the removal of metal and inorganic contaminants through oxidation/reduction reactions

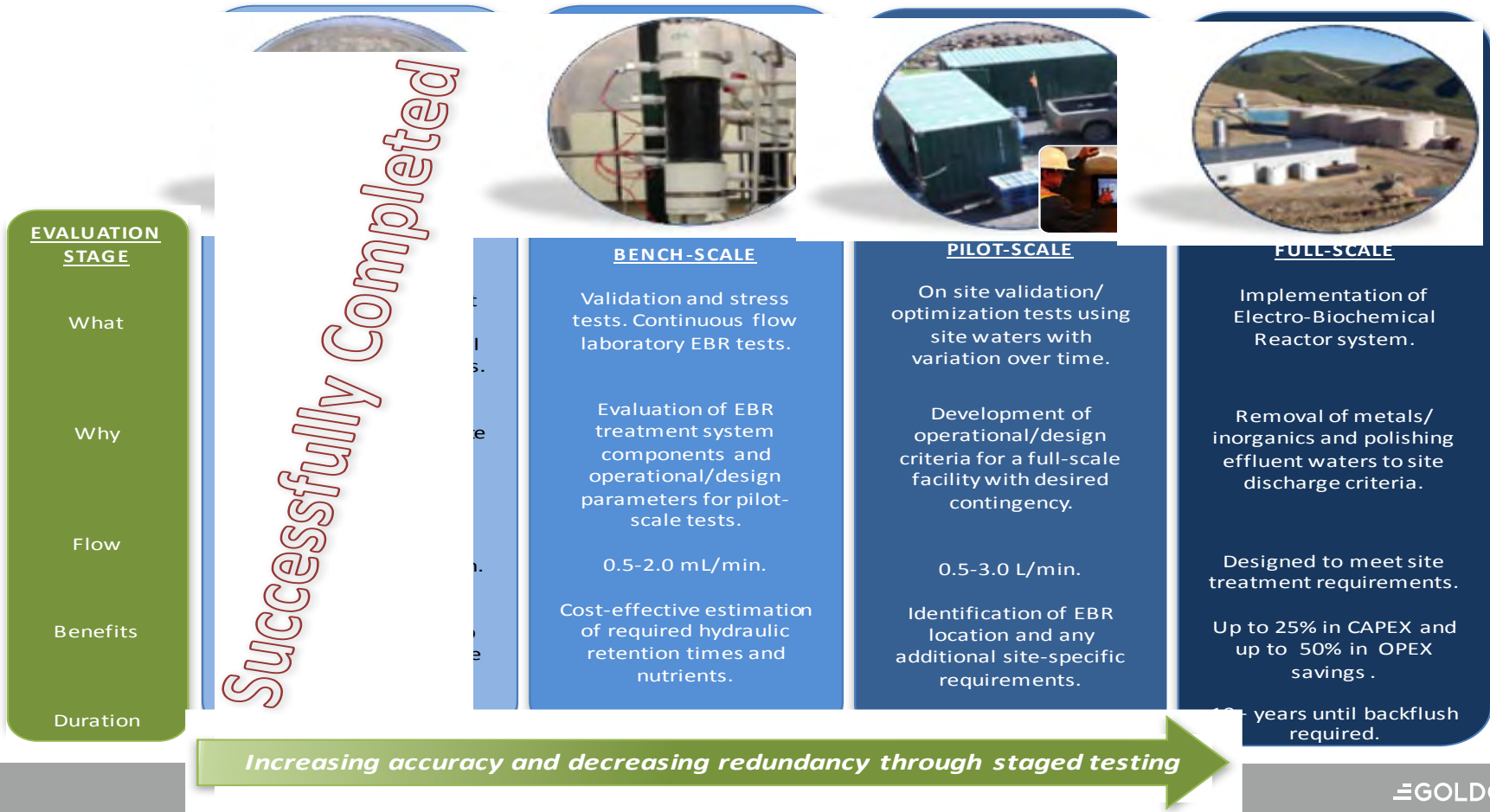


- Anaerobic, reductive conditions

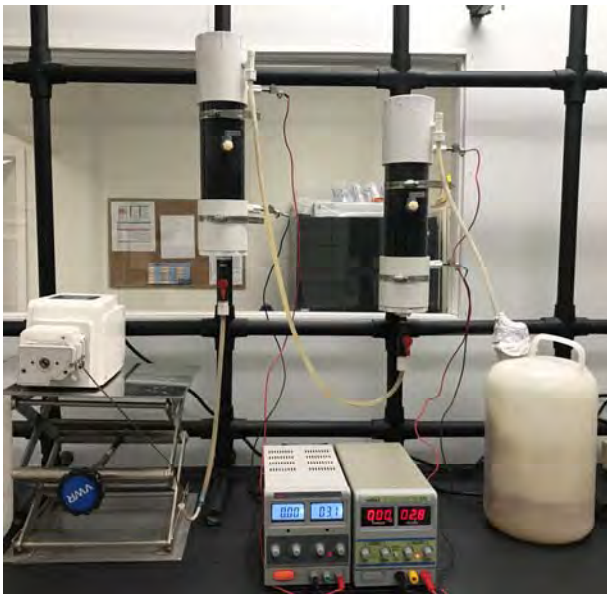


# Water Treatment Questions – Background

## INOTEC Testing and Implementation Path



# Water Treatment Questions – Background



## GOLDCORP Proof of Concept EBR Test

Parameter	Average EBR Influent	Average EBR Effluent	% Removal
Nitrate-N [mg/L]	188	< 0.19	> 99.9%
Nitrite-N [mg/L]	3.7	< 0.04	> 98.9%
As [µg/L]	1,113	12.9*	98.8%
U [µg/L]	92.5	0.8	99.1%
Al [µg/L]	737	< 35.8	> 95.1%
Sb [µg/L]	33.2	< 0.35	> 98.9%
Cd [µg/L]	1.3	< 0.02	> 98.5%
Cr [µg/L]	10.7	< 0.66	> 93.8%
Cu [µg/L]	267	< 2.4	> 99.1%
Fe [µg/L]	2.2	0.23	89.5%
Pb [µg/L]	1.9	< 0.17	> 91.0%
Hg [µg/L]	1.6	0.03	98.1%
Mo [µg/L]	59.5	< 6.9	> 88.4%
Ni [µg/L]	75.1	< 2.3	> 96.9%
Se [µg/L]	2.9	1.2	58.6%
Ag [µg/L]	3.9	< 0.06	> 98.5%
Tl [µg/L]	0.8	< 0.03	> 96.2%
Sn [µg/L]	32.5	0.8	97.5%
Zn [µg/L]	76.1	38.1	49.9%
WAD Cyanide [mg/L]	0.03	< 0.007	> 76.7%
Total Cyanide [mg/L]	0.48	0.16	66.7%
Ammonia-N [mg/L]	15.3	208	NA
Orthophosphate [mg/L]	0.2	47.1	NA

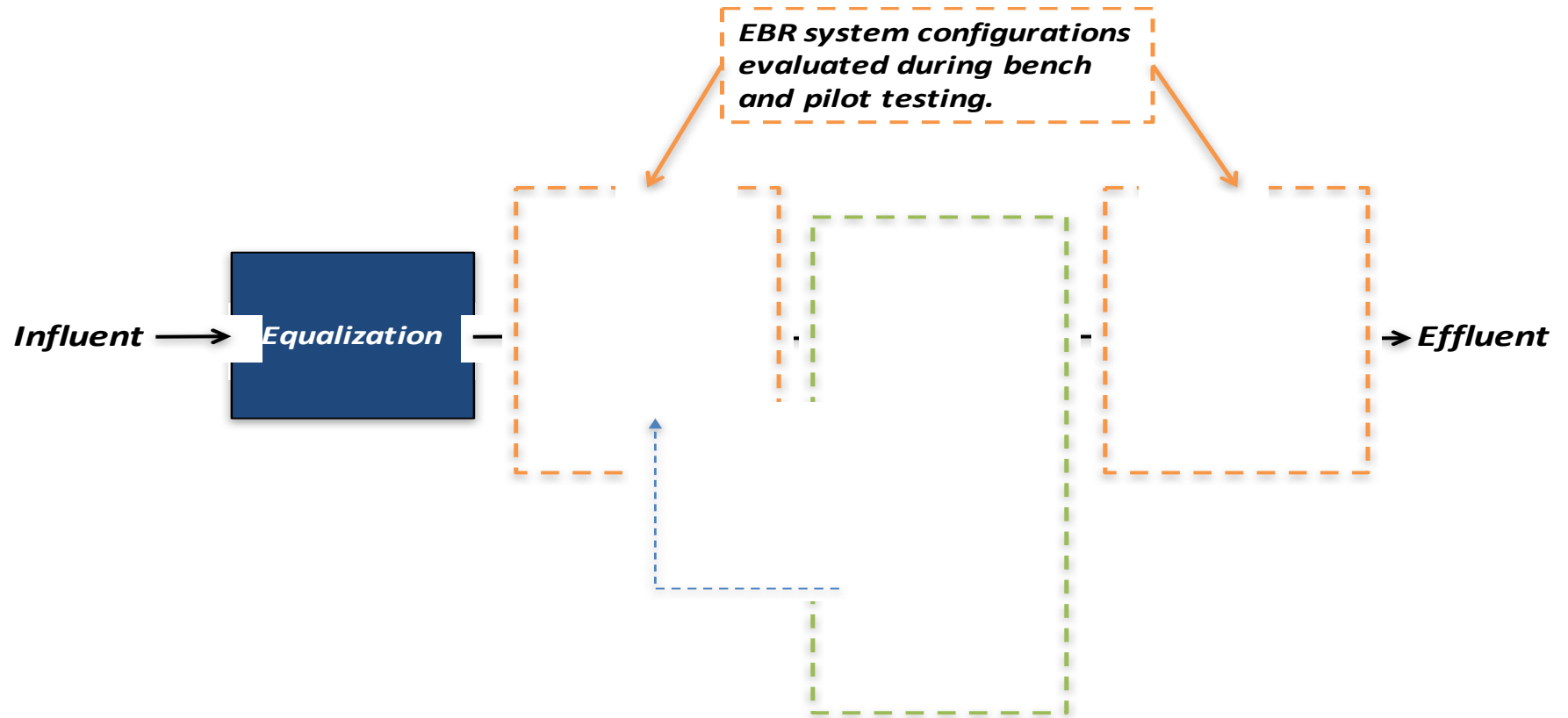
### Non-limiting microbial growth media used in EBR testing

- Enzymatic Digest of Casein ..... 17.0 g/L
- Enzymatic Digest of Soybean Meal ..... 3.0 g/L
- Dipotassium Phosphate ..... 2.5 g/L
- Dextrose..... 2.5 g/L
- \*Sodium Chloride.....5.0g/L



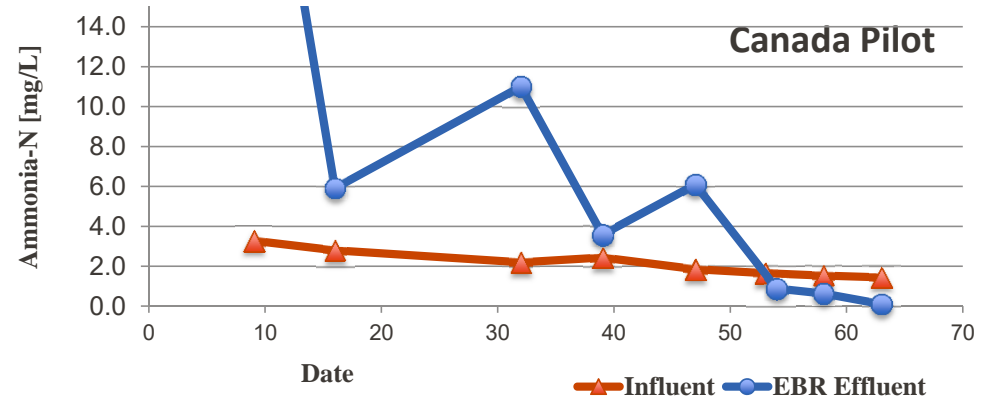
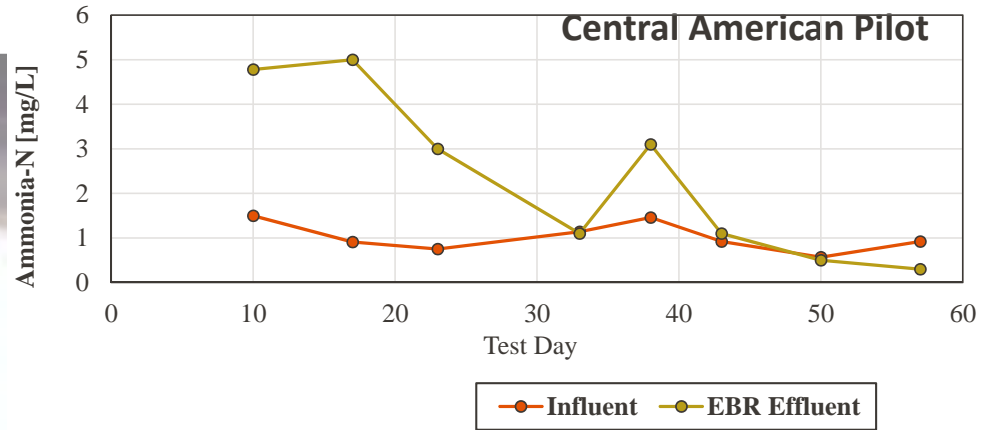
# Water Treatment Questions – Background

## *Additional testing and Optimization*



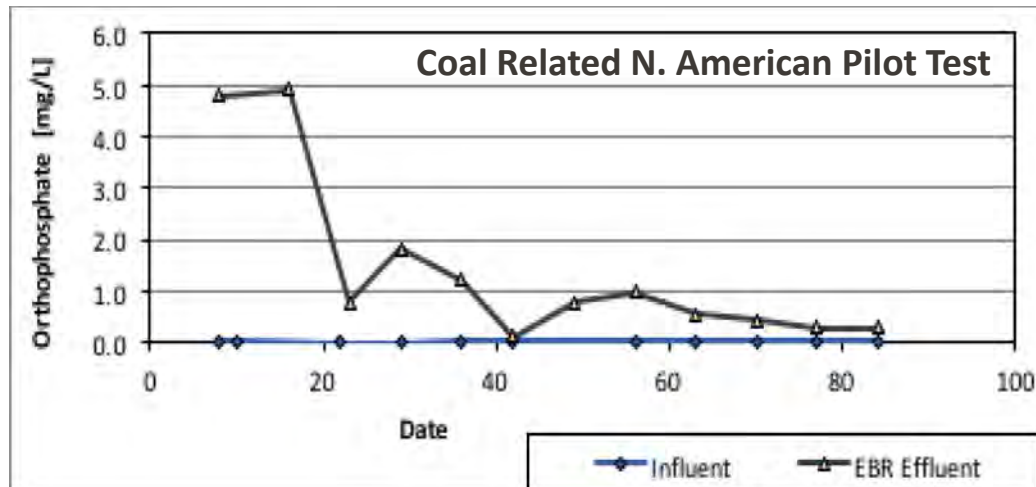
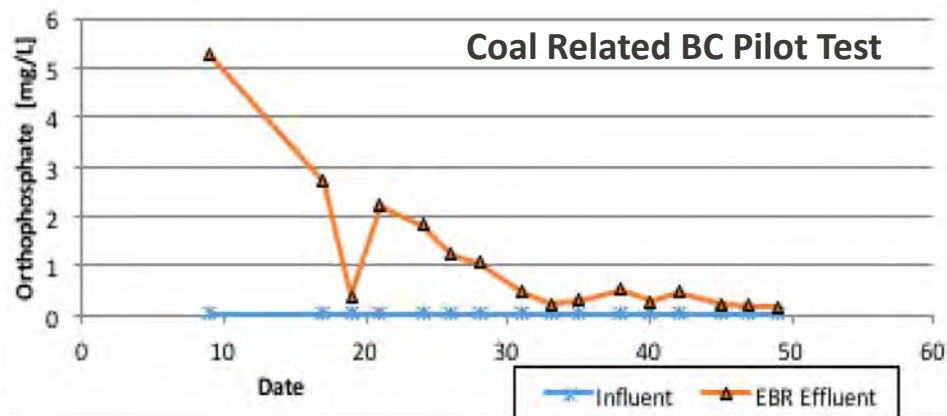
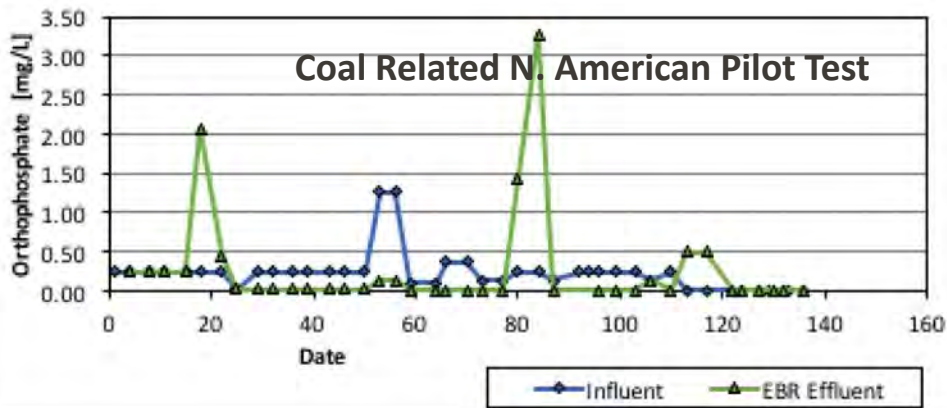
# EBR Pilot Performance: Ammonia-N

## 66. Residual Ammonia and Orthophosphate across Active Treatment



# EBR Pilot Performance: Orthophosphate

## 66. Residual Ammonia and Orthophosphate across Active Treatment



# EBR Yukon Zinc Pilot Performance: Residue Management

## 67. Active Treatment Residue Characterization and Management

- Selenium was the targeted contaminant in flotation-influenced waters containing a suite of other metals and inorganics that exceeded the site discharge standards
- Chemical treatment methods did not meet the Se discharge goal of 0.02 mg/L
- Side-by-side comparisons of the EBR and a leading fluidized bed bioreactor technology showed that the EBR was the only method able to meet discharge criteria
- Moved into EBR system design phase IV

Parameter [mg/L]	Average Influent (mg/L)	Average EBR Effluent (mg/L)	% Removal
Antimony	0.15	<0.001	>99.3
Cadmium	0.014	<0.0002	>98.0
Copper	0.41	<0.005	>98.7
Lead	0.30	0.0008	99.7
Molybdenum	0.10	<0.0005	>99.5
Selenium	2.73	0.002	99.9
Silver	0.041	<0.0001	>99.8
Zinc	0.46	<0.03	>93.5
Nitrate-N	3.3	<0.1	>97.1
Nitrite-N	0.9	<0.02	>97.8
Cyanide <sub>WAD</sub>	0.26	<0.005	>98.1
Cyanide <sub>TOTAL</sub>	0.47	<0.005	>98.9

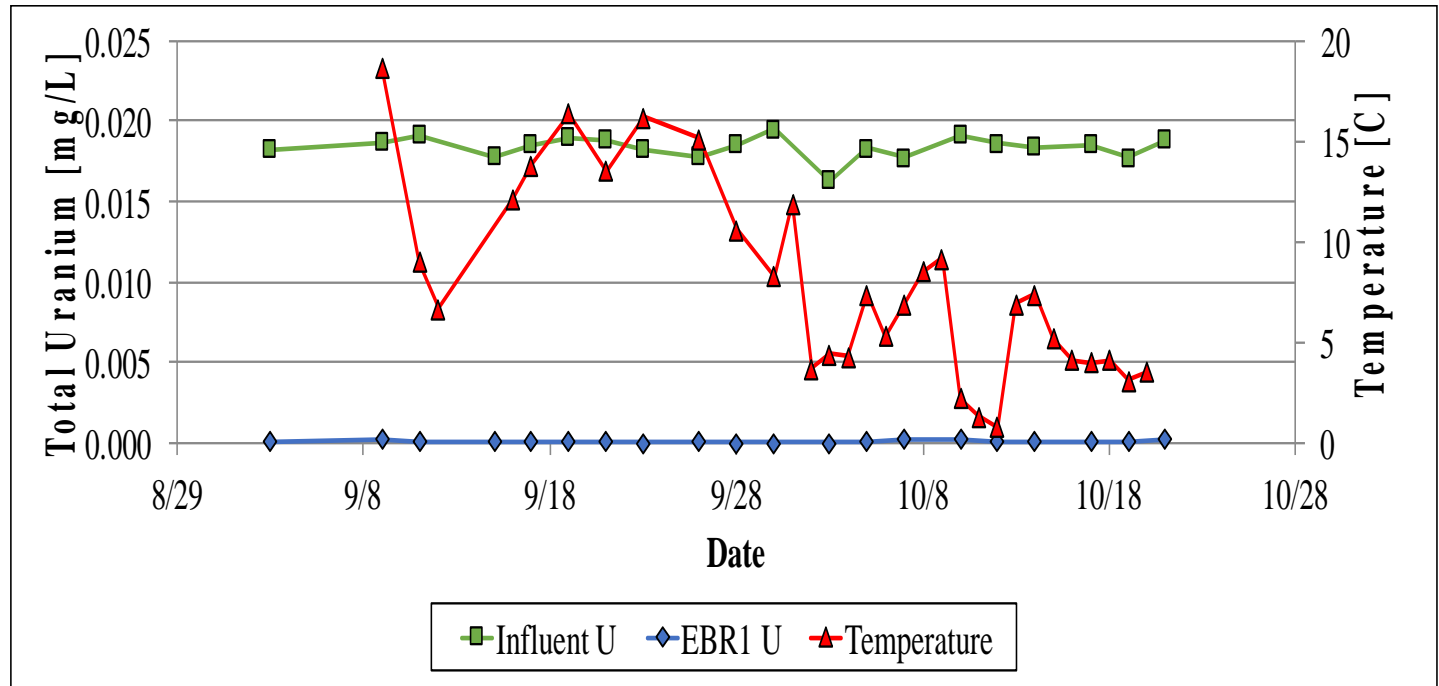


# BC Coal Mine: Pilot-Scale EBR Selenium Removal

## Adaptability: (Uranium Removal with Temperature Data)

### 68. Active Treatment Adaptability

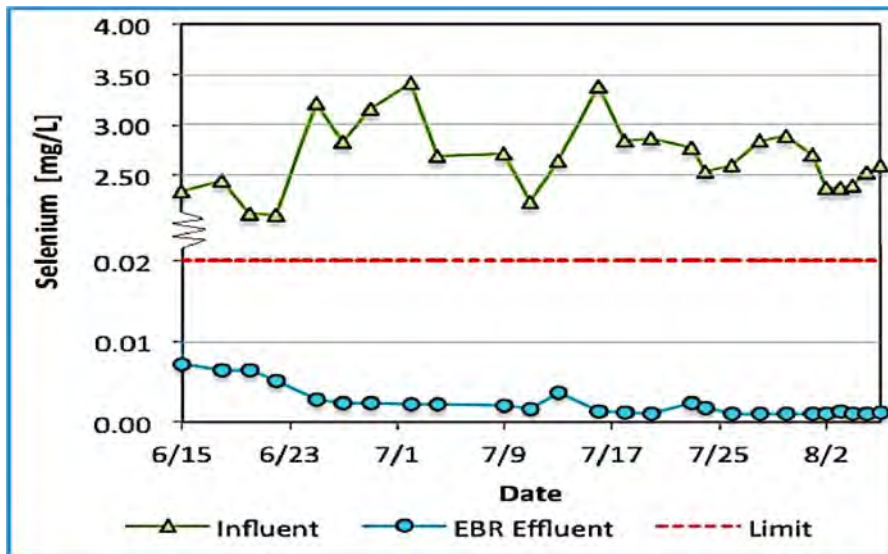
- A two-stage EBR system on-site pilot test; Uranium was a secondary contaminant, averaging 18 ug/L and removed to less than 0.1 ug/L in the first EBR stage





# EBR Yukon Zinc Pilot Performance: Adaptability

## 68. Active Treatment Adaptability

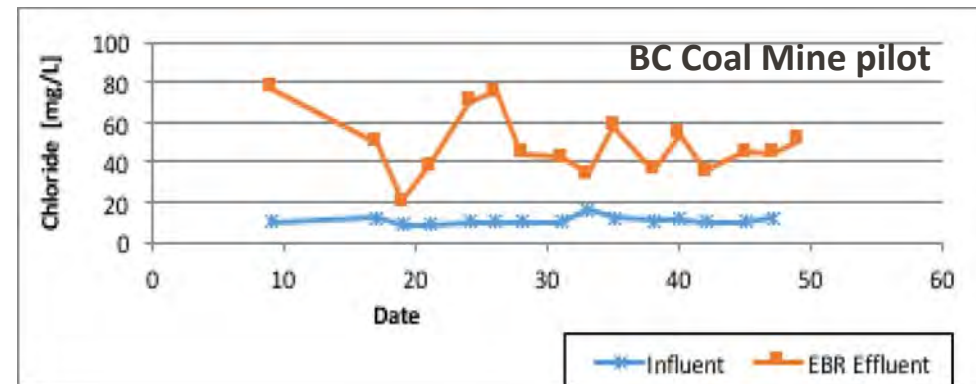
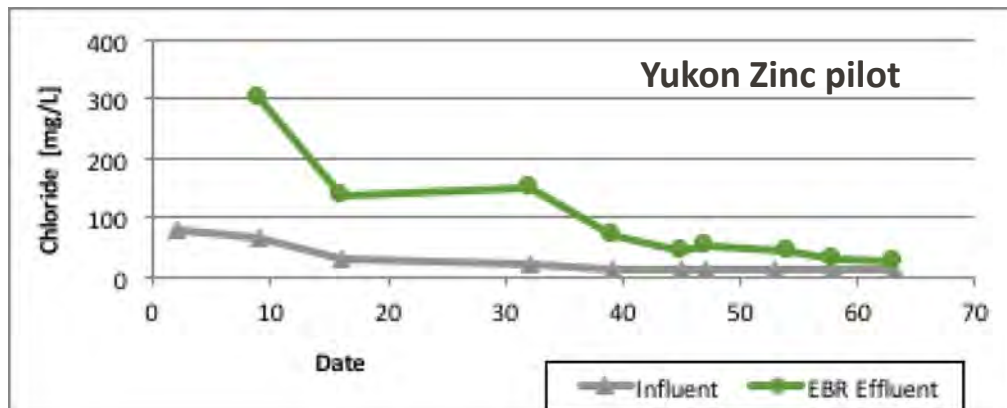
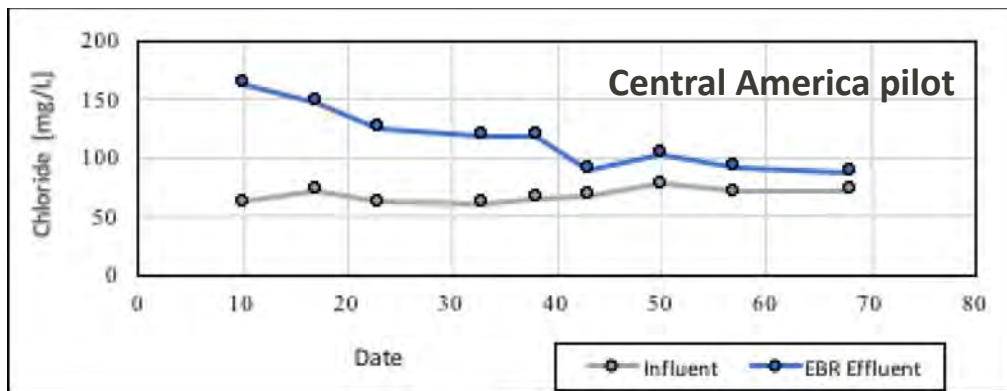


Parameter [mg/L]	Average Influent	Average Discharge	% Removal
Antimony	0.15	<0.001	>99.3%
Cadmium	0.014	<0.0002	>98.0%
Copper	0.41	<0.005	>98.7%
Lead	0.30	0.0008	99.7%
Molybdenum	0.10	<0.0005	>99.5%
Selenium	2.73	0.002	99.9%
Silver	0.041	<0.0001	>99.8%
Zinc	0.46	<0.03	>93.5%
Nitrate-N	3.3	<0.1	>97.1%
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Cyanide <sub>TOTAL</sub>	0.47	<0.005	>98.9



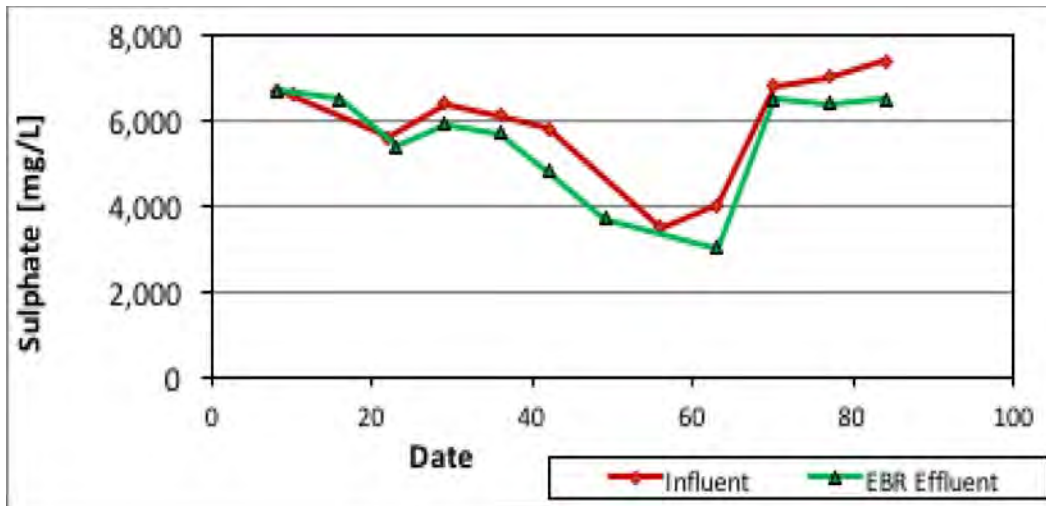
# EBR Pilot Performance: Chloride

## 69. Residual Chloride from Active Treatment

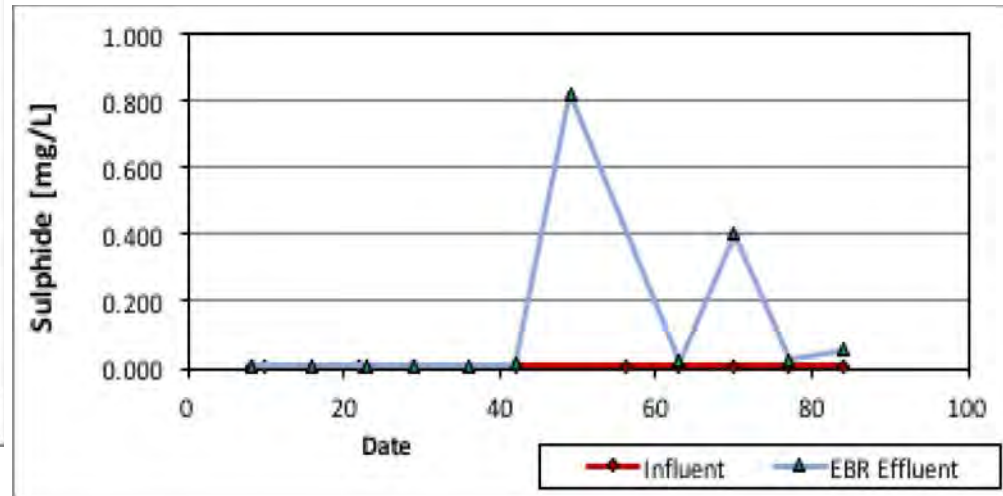


## 70. Sulfur Department Across Active Treatment

- Sulphur is often present at much higher concentrations than the contaminants of interest.
  - Sulphur was not a contaminant target in the Coffee EBR testing.
    - Most of the sulphate passed through the EBR and was in the effluent.
    - The small amount of sulphate removed was reduced to hydrogen sulphide.
    - Reacts to complex with metals present and is out-gassed to the atmosphere.



## Eastern US Gold Mine



# EBR Pilot / Full-Scale Performance and Data Comparison

Analyte	Influent	EBR Effluent (Pilot)	EBR Effluent (Full-Scale)	Limit
Inorganics [mg/L] - Averages				
pH	6.84	6.98	6.98	6.5 – 8.5
N+N	247	<0.02	1.2	10
NH <sub>3</sub> –N	.43	1.7*	8.6*	NA
BOD <sub>5</sub>	NA	<5*	NA	NA
COD	NA	37*	NA	NA
Cl	66	NA	73	NA
TSS	18	<16	NA	20
SO <sub>4</sub>	6440	6439	6374	NA
Metals, Total [mg/L] - Averages				
Al	0.34	<0.04	0.11	NA
As	0.014	0.007	<0.0002	NA
Ca	403	369	402	NA
Cd	0.135	<0.001	0.009	0.005
Cu	0.057	<0.013	<0.019	0.031
Mn	57	28	40	NA
Ni	0.832	<0.007	0.350	NA
Se	0.86	0.04	0.046	0.05
P <sub>(Total)</sub>	<1.0	1.0	<0.5	NA
Zn	2.26	0.04	0.5	0.388
CN <sub>(TOTAL)</sub>	0.084	<0.005	<0.005	0.005
CN <sub>(WAD)</sub>	0.012	<0.005	<0.005	0.005

**69. Residual Chloride from Active Treatment**

**70. Sulphur Department Across Active Treatment**

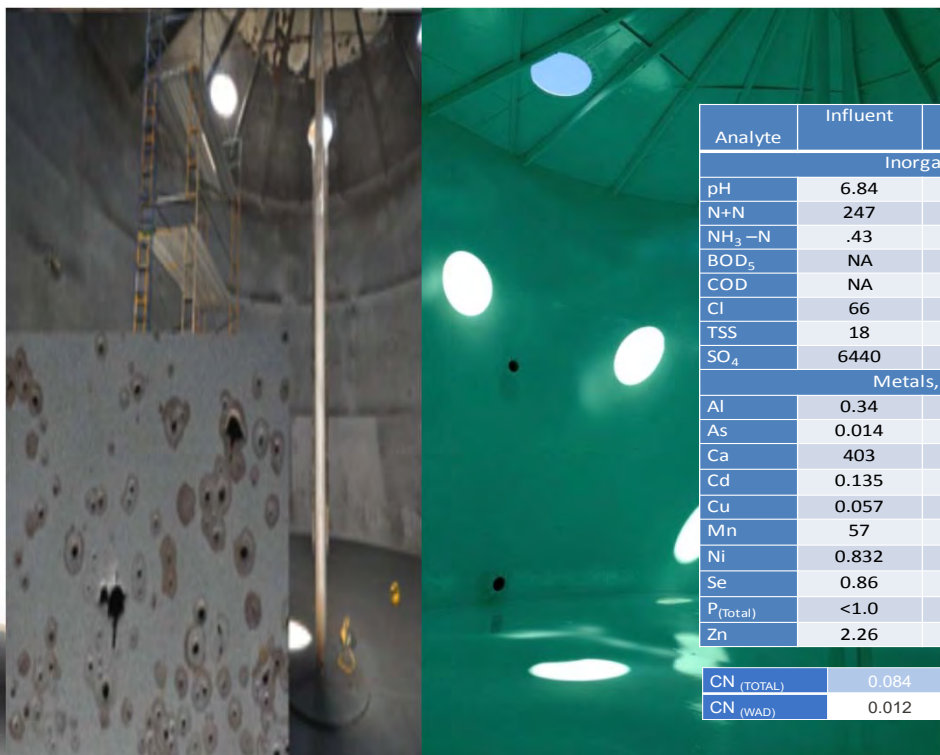
**72. Department of CN Residue Across Active Treatment**





# EBR Full Scale: Metal Bioavailability

## 71. Bioavailability of Metals Across Active Treatment



Analyte	Influent	EBR Effluent (Pilot)	EBR Effluent (Full-Scale)	Limit
Inorganics [mg/L] - Averages				
pH	6.84	6.98	6.98	6.5 – 8.5
N+N	247	<0.02	1.2	10
NH <sub>3</sub> -N	.43	1.7*	8.6*	NA
BOD <sub>5</sub>	NA	<5*	NA	NA
COD	NA	37*	NA	NA
Cl	66	NA	73	NA
TSS	18	<16	NA	20
SO <sub>4</sub>	6440	6439	6374	NA
Metals, Total [mg/L] - Averages				
Al	0.34	<0.04	0.11	NA
As	0.014	0.007	<0.0002	NA
Ca	403	369	402	NA
Cd	0.135	<0.001	0.009	0.005
Cu	0.057	<0.013	<0.019	0.031
Mn	57	28	40	NA
Ni	0.832	<0.007	0.350	NA
Se	0.86	0.04	0.046	0.05
P <sub>(Total)</sub>	<1.0	1.0	<0.5	NA
Zn	2.26	0.04	0.5	0.388
CN <sub>(TOTAL)</sub>	0.084	<0.005	<0.005	0.005
CN <sub>(WAD)</sub>	0.012	<0.005	<0.005	0.005

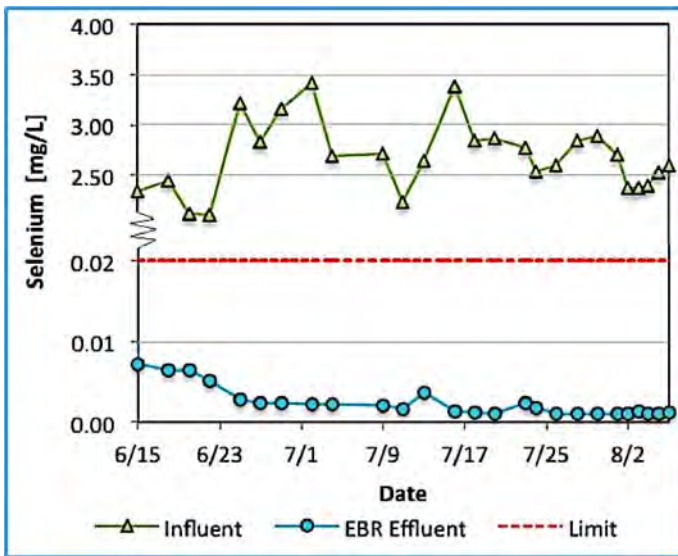
**Metal precipitates from the bioreactors removed during refurbishment passed TCLP and were stored on site.**

**Note that As was a contaminant that passed TCLP testing.**



# EBR Yukon Zinc Pilot: Metal Bioavailability

## 71. Bioavailability of Metals Across Active Treatment



Parameter [mg/L]	Average Influent	Average Discharge	% Removal
Antimony	0.15	<0.001	>99.3%
Cadmium	0.014	<0.0002	>98.0%
Copper	0.41	<0.005	>98.7%
Lead	0.30	0.0008	99.7%
Molybdenum	0.10	<0.0005	>99.5%
Selenium	2.73	0.002	99.9%
Silver	0.041	<0.0001	>99.8%
Zinc	0.46	<0.03	>93.5%
Nitrate-N	3.3	<0.1	>97.1%
Nitrite-N	0.9	<0.02	>97.8%
Cyanide <sub>WAD</sub>	0.26	<0.005	>98.1
Cyanide <sub>TOTAL</sub>	0.47	<0.005	>98.9

**Metal precipitates from the bioreactors removed during pilot tests passed TCLP and were stored on site.**



# EBR Water Treatment: Cyanide

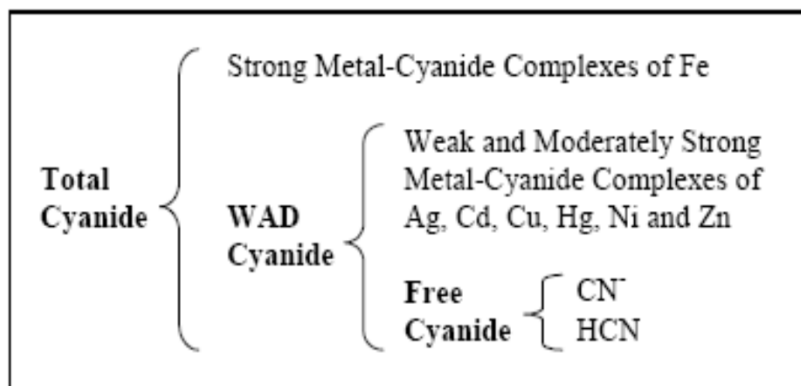
## 72. Department of CN Residue Across Active Treatment

Proposed chemical cyanide degradation before EBR treatment.

Recent work suggests that considering free, rather than total cyanide provides a more accurate measure of the biological effects of cyanides and provides a better basis for assessing water-quality criteria.

### GOLDCORP Proof of Concept EBR Test

Parameter	Average EBR Influent	Average EBR Effluent	% Removal
Nitrate-N [mg/L]	188	< 0.19	> 99.9%
Nitrite-N [mg/L]	3.7	< 0.04	> 98.9%
As [µg/L]	1,113	12.9*	98.8%
U [µg/L]	92.5	0.8	99.1%
Al [µg/L]	737	< 35.8	> 95.1%
Sb [µg/L]	33.2	< 0.35	> 98.9%
Cd [µg/L]	1.3	< 0.02	> 98.5%
Cr [µg/L]	10.7	< 0.66	> 93.8%
Cu [µg/L]	267	< 2.4	> 99.1%
Fe [µg/L]	2.2	0.23	89.5%
Pb [µg/L]	1.9	< 0.17	> 91.0%
Hg [µg/L]	1.6	0.03	98.1%
Mo [µg/L]	59.5	< 6.9	> 88.4%
Ni [µg/L]	75.1	< 2.3	> 96.9%
Se [µg/L]	2.9	1.2	58.6%
Ag [µg/L]	3.9	< 0.06	> 98.5%
Tl [µg/L]	0.8	< 0.03	> 96.2%
Sn [µg/L]	32.5	0.8	97.5%
Zn [µg/L]	76.1	38.1	49.9%
<b>WAD Cyanide [mg/L]</b>	<b>0.03</b>	<b>&lt; 0.007</b>	<b>&gt; 76.7%</b>
<b>Total Cyanide [mg/L]</b>	<b>0.48</b>	<b>0.16</b>	<b>66.7%</b>
<b>Ammonia-N [mg/L]</b>	<b>15.3</b>	<b>208</b>	<b>NA</b>
<b>Orthophosphate [mg/L]</b>	<b>0.2</b>	<b>47.1</b>	<b>NA</b>



# Landusky Full-scale EBR: Operation

17

## 73. Active Treatment Startup/Shutdown

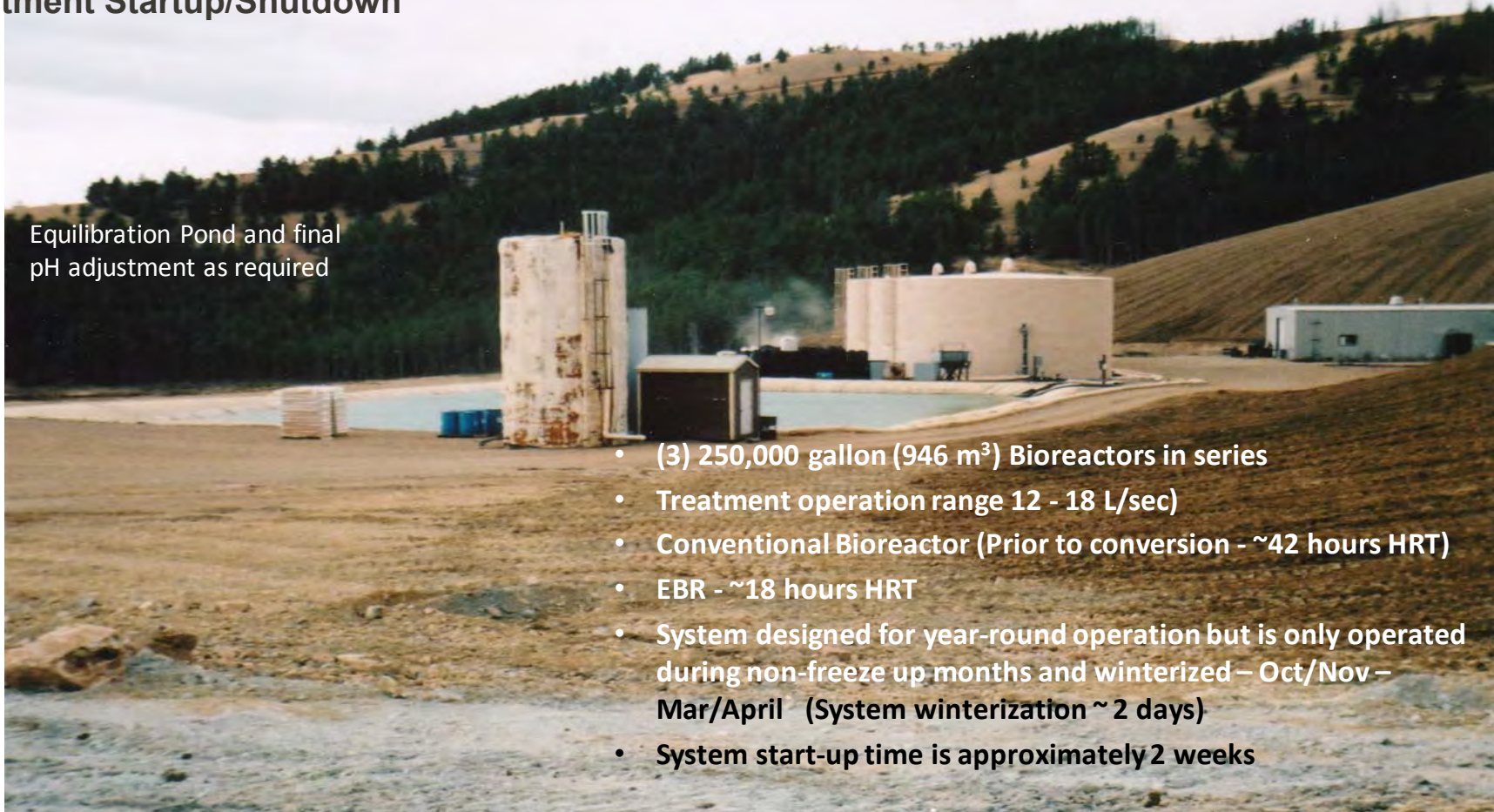


- Located in the Little Rocky Mountains, MT
- Site temperature range (-45 C to 38+ C)
- ~112 Million tons of Pad Materials
- ~150 Million gallons of water per year (567812 cubic meters)



## 73. Active Treatment Startup/Shutdown

Equilibration Pond and final  
pH adjustment as required



- (3) 250,000 gallon (946 m<sup>3</sup>) Bioreactors in series
- Treatment operation range 12 - 18 L/sec)
- Conventional Bioreactor (Prior to conversion - ~42 hours HRT)
- EBR - ~18 hours HRT
- System designed for year-round operation but is only operated during non-freeze up months and winterized – Oct/Nov – Mar/April (System winterization ~ 2 days)
- System start-up time is approximately 2 weeks

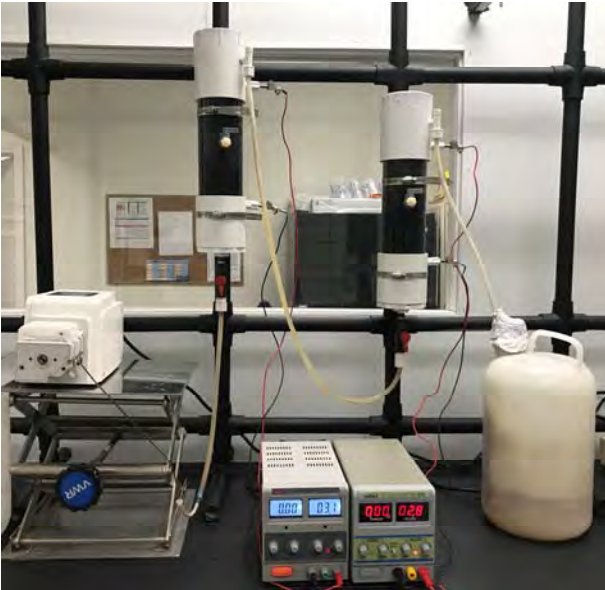
## 73. Active Treatment Startup/Shutdown

- If the EBR process is shut down and started up according to the operating manual, little impact on the effluent discharge quality is observed.
  - The EBR process can be shut down for a short periods of time (i.e., up to several weeks), due to unexpected site issues, without a significant influence on effluent quality.
  - The EBR process is similar to conventional bioreactors in that the highest efficiencies are obtained with continuous operation.

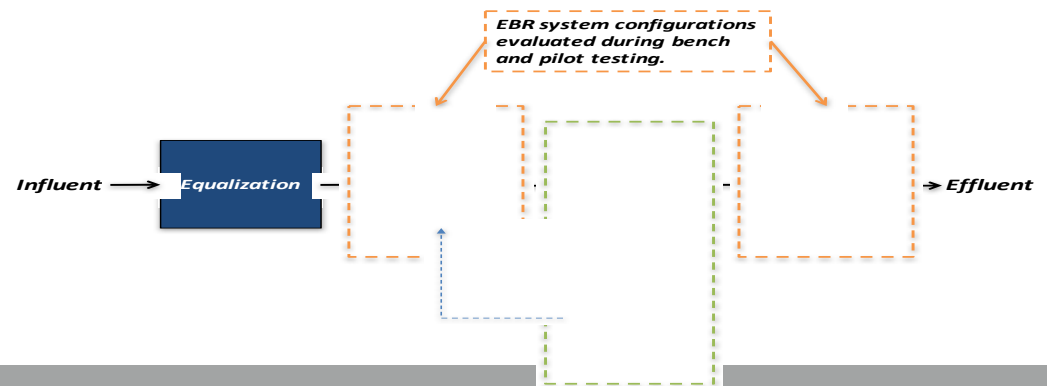




## 74. Active Treatment Variability with Flow



- **Coffee bench-scale testing**
  - Month long proof-of-concept test to demonstrate EBR removal of nitrate and uranium to required levels.
  - ***Required EBR Hydraulic Residence Time (HRT) is examined in the next phase of EBR treatment evaluation.***
  - The EBR process will be designed for a specific maximum flow or HRT as determined during bench- and pilot-scale testing.
    - Design HRT will incorporate the desired level of contingency.
    - Design will incorporate pre- and post-treatments if required.





**Meeting Title: TH General Assembly Presentation Summary**

**Date and Location: October 15, 2017 TH Hall**

**Introduction: Purpose and Objectives**

To provide a Coffee Project update to the TH Dawson Citizens and answer any questions they have.

**Attendance:**

TH:

Names Redacted

Goldcorp:

Buddy Crill

Names Redacted

**Discussion of Key Topics:**

Buddy gave an introduction of attendees and an overview of the presentation outline. An overview of Goldcorp, the location info and SEMS was provided. The SEMS logo represents all of the Goldcorp policies & procedures to ensure things are done right. A project overview, mine plan description was given and it was noted that heap leach will be similar to what Brewery Creek had. Road info including a description of the location was given. It was noted that Goldcorp took council members for a tour in the summer and that this route was chosen because of the least amount of new build. The road will only be used for trucking in supplies and fuel, not employees.

An exploration overview was provided which included infill drilling to move the resource to a measured status. This means increased frequency of drill holes to ensure the model of the body is accurate. ¼ of the budget has been spent on that. Geophysical, soil surveys to test targets with drilling, deep drilling in latte and supremo pits to greater understand the resource down to 800 m and what the future could hold for the project. Soil testing, geophysical, geochemical sampling was done to find new targets for next year. It was noted that a new road to the Kona zone will be built to make ongoing drilling more economic and safer.

The current existing camp maxes out at 80 people and is a one season camp (summer). A project next year will include building a 100 person exploration camp and is already covered in the class 4 permit. Testing for new targets, more infill drilling will take place in 2018.

The current workforce on the Coffee project is made up of 7% TH citizens. All of the diversity statistics for the project were explained and noted that there is a higher than mining industry average of women employees. It was noted that citizens should reach out to Name Redacted for employment opportunities. Goldcorp is hoping to have more TH citizens in the Driller Helpers Program running out of Dawson City in early 2018. Community Contribution and local procurement overview was provided.

Resubmission of the YESAA Project Proposal will take place in late November. It was noted that there are still different opportunities for feedback collection and if there were any questions on that, citizens can reach out to Names Redacted or a Goldcorp staff member. The current timeline is estimated at 1-1.5 years for YESAB review and then the water license application will be submitted. Road construction will take place in advance of mine construction so that construction materials can be trucked in. Production is expected and hoped for in 2021 dependent on project approval.

Hours for Goldcorp staff presence in the Dawson office are posted around town and it is generally 2 weeks every month. There will be an open house at KIAC this evening and another in January once Goldcorp has been reengaged in the YESAB process.

## Key Issues and Concerns:

Q: Do you have any grants with Yukon College?

GC – Not at this time but we are open to suggestions and interested in education. The driller program was successful this year but there were more jobs than people. If anyone is interested they should consider this as there is lots of opportunity for career growth.

Q: When industry comes to the territory they usually offer scholarships. Also, can any upcoming RFPs be placed on the TH website?

Comment from TH – Delving into discussions at the IBA table around scholarships. It is appreciated that there is a need to work with Yukon College. They should be put on a training session so that it is exclusively for local citizens. Perhaps rent the truck from Yukon College.

Q: Her grandfather is Name Redacted and he talked to her about the white man taking away their gold. It is a hard thing to swallow. Citizens must now look into what the road will do to the moose. Is it already started, what do other First Nations if there is any overlap think about the road?

Buddy – Most of the road already exists. Upgrades will need to take place but we are very early in the process and have done lots of consultation with TH which has been very productive. We constantly hear how important closure is to TH and what we are in discussions around what we can do to turn back the land as close to original as possible.

TH Chief – A TH citizens meeting may need to take place in Whitehorse. There was a citizen’s meeting one week ago and it is important to keep the citizens informed of the progress and information the consultants are providing. TH have visited the road and understand the impacts.

Q: Is Keno Hill a property of Goldcorp? Goldcorp has a 60,000 Hct land package but the project we are submitting is a smaller piece of land package. Keno Hill isn’t operated by Goldcorp.

Q: Are there any site visits coming up?

Catherine – No upcoming tours as we are closing down camp in the next month but you can talk to Pat in regards to next summer’s tours.

Q: How much of Goldcorp is owned by Canadian Pension Plan and Chinese entities?

Catherine – It is posted publically on the website who the top 10 shareholders are. We don’t have nay major Chinese shareholders that we know of. Most Chinese bought in to miner which are in Latin America owned by competitors. It hasn’t happened yet with Goldcorp. We have jointly operated mines but they are with Canadian companies.

Q: Protection is paramount for TH do we know of any chance of a Kinross or Barrick takeover?

Buddy – We don’t know of any takeovers but couldn’t legally say if there was. One must be cautious with what they take away from media as it can be skewed, especially in Latin America. There is opportunity for TH to visit Latin America sites if there is interest.

TH Chief – TH has a team that looks after negotiations and project review. Because the project is really portent to the people, the government is being diligent to ensure careful review and recommendations are taking place. Lots of baseline work has already been collected for the past 4 years. In relations to global corporations, these people represent Kaminak, hey don’t represent the corporate at the top level. TH can request corporate staff to come to Dawson to present at some point. Whatever is negotiated will be received and help up no matter who owns the project. There is legal assistance at all meetings who provide good advice to TH.

Q: Upon purchase of Kaminak has there been any exploration on other mines?

Buddy – No exploration is planned for other properties, we are currently determining what we will do with them, we may just let them go.

TH – Get in touch with Names Redacted for any other questions.

### Action Items/Next Steps:

Action Item	Person Responsible	Date Required





# AGENDA

## Tr'ondëk Hwëch'in and Goldcorp Closure Workshop October 17, 2017

**Location:** Kwanlin Dun Cultural Centre

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

**Tr'ondëk Hwëch'in (TH)**

Names Redacted

Names Redacted

TH Technical Support TBA

### **Coffee Project – Goldcorp Inc.**

Roger Souckey, Director, Sustainability

Jennie Gjertsen, Manager, Environment and Permitting

James Scott, Manager, Engineering

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Names Redacted

Kelly Constable, Hemmera

### **Agenda:**

#### **Day 1 – October 17, 2017**

1. **Introductions**
2. **Discussion on End Land Use Objectives for Mine Site and Northern Access Route**
3. **Active vs Post Closure Activities**
4. **Closure Covers**
5. **Reclamation Research and Planning**
6. **Clarification on Temporary Closure Requirements**
7. **Responses and discussion of additional IRs #2, #4, #6 to #13**
8. **Discussion on Social Closure**
9. **Discussion on Closure Plan Engagement Strategy**

## Tr'ondëk Hwëch'in Closure Workshop

October 17, 2017

Location: Kwanlin Dun Cultural Centre

Time: 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

### Attendees:

#### Tr'ondëk Hwëch'in (TH)

Names Redacted

#### Coffee Project – Goldcorp Inc.

Roger Souckey, Director, Sustainability

Jennie Gjertsen, Manager, Environment and Permitting

James Scott, Manager, Engineering

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Names Redacted

Kelly Constable, Hemmera

### Agenda:

Day 1 – October 17, 2017

1. Introductions
2. Discussion on End Land Use Objectives for Mine Site and Northern Access Route
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6. Clarification on Temporary Closure Requirements
7. Responses and discussion of additional IRs #2, #4, #6 to #13
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9. Discussion on Closure Plan Engagement Strategy

### Action Items:

Action Item	Responsible Party	Timeline	Status
Send RCP development timeline to TH	Goldcorp	Today, if possible.	Completed on November 17 via email.

Action Item	Responsible Party	Timeline	Status
Description of stages and phases in the RCP vs CRCP	Goldcorp	Q2 2018	
Nutrient analysis – include in current soil analysis being done for the cover investigation	Goldcorp	Q2 2018	
Cover Investigation: 1. Material balance investigation and characterization 2. Sensitivity analysis on infiltration reduction 3. Capability for infiltration reduction and revegetation 4. Integration of WQM/WBM and ecohydrological modeling 5. Workshop with TH where to apply scenarios	Goldcorp and TH	Q2 2018	
Provide workplan for WRSF cover investigation to TH	Goldcorp	Q1 2018	
Send TH the scope of work between Goldcorp and Name Redacted	Goldcorp	December 2017	
Share papers regarding HLF closure as they come available/are created	Goldcorp	Long-term; papers not currently under development.	
Follow up with Name Redacted regarding TK inclusion in reclamation and closure research, and look at how this was included in the RCP	Goldcorp	Q2 2018	
Incorporation of HHRA discipline in reclamation and closure research	Goldcorp	Q2 2018	
Consider pit lakes in reclamation research	Goldcorp	Q2 2018	

Action Item	Responsible Party	Timeline	Status
TH to inform Goldcorp of how they want to be involved in reclamation research; Goldcorp to follow up accordingly.	TH and Goldcorp	Q2 2018	
Discuss social closure at October 31 workshop; consider temporary and permanent closure	Goldcorp	October 31	Complete.
Outline Goldcorp's approach to the next iteration of the temporary closure plan	Goldcorp	Q2 2018	
Goldcorp to share submerged column testing work that is currently underway	Goldcorp	Q2 2018	
Consider eliminating pit lakes through double-handling, including an evaluation of cost for various scenarios	Goldcorp	Q2 2018	
For the next iteration of the RCP, include: <ul style="list-style-type: none"> <li>• Commitment to more backfill if possible</li> <li>• Timeline to determine when backfill decision will be made</li> </ul>	Goldcorp	Q2 2018	
Goldcorp to propose engagement for reclamation and closure plan to TH, TH to provide input	Goldcorp	November 2017	Complete, provided via email on November 17.
Share examples of social closure with TH	Goldcorp	October 31, 2017	Complete.

Summary of Discussion:

### Introductions:

- Goldcorp gives an overview of the closure workshop purpose, which is to continue conversations on closure and kick-off long term engagement and planning for closure of the Project.
- Goldcorp commits to more intensive follow up internally to ensure that TH receives meeting materials in advance.
- Goldcorp leads a safety share regarding winter driving conditions and ladders.
- TH notes wanting to discuss ecohydrology modeling at some point as well. Goldcorp will provide an update on Goldcorp's first steps on ecohydrology modeling during this workshop.

### End Land Use Objectives for Mine and NAR:

- Goldcorp notes that this meeting is a beginning point to understand what TH wants in terms of engagement on closure planning. Goldcorp will review the responses to specific IRs of interest with TH's team during this workshop as well.
- Goldcorp reviews the overall closure objective for the Project. There is a conceptual plan in the Project Proposal, and there will be a much more detailed plan for licensing. This will integrate views of Project partners and stakeholders. The goal is for that document to meet the expectations of partners and for licensing, and to develop the plan collaboratively.
- Goldcorp reviews the fundamental closure objectives as required in Yukon. Goldcorp wants to refine these for the Project with input from Goldcorp's partners in the Project.
- Goldcorp notes that the closure plan isn't set in stone, so there is a lot of opportunity for engagement. Goldcorp displays some discussion points.
- TH notes that there are terms used that can be interpreted in different ways related to the overarching Yukon closure objectives. TH notes that Yukon's views on closure are valid, but it is most important that the closure objectives meet the needs of TH, Citizens, and local people. Yukon's views are generally inconsistent with the needs of First Nations communities for closure.
- TH notes to consider the time it will take to achieve end land use objectives, like restoring habitat for certain species. This takes time, and it is important to communicate that in the reclamation and closure plan. TH recommends that the plan also consider the different ecosystem types.
- TH notes that from an ecological perspective, the current suitability of the site and the site's capability to host species/ecosystems is a good starting point for consideration of the end land use objectives. TH also notes to consider value added opportunities, but not to extremes, such as making habitat for species that aren't there naturally.
- Goldcorp agrees that status quo (note: meaning current state of the ecosystem at site) or enhancement is a good goal for closure.
- TH reaffirms that it is TH's views that closure should meet status quo (note: referring to current uses and capabilities of the land) or enhancement for closure.
- Goldcorp explains that there are aspects that will not be able to be returned to their current state. An example is the site water balance which will end up being very different than it is currently due to the HLF, but the goal is to stabilize the area in closure.
- Goldcorp describes that closure engagement will include ranking the facilities and/or areas on site and understanding what is more important for closure. Understanding priorities for TH in closure is important.
- Goldcorp is looking to understand how involved TH wants to be in closure planning and engagement.



- TH advises that a smaller table of people will be engaged to go through the closure objectives and to see what would need to be added. TH needs to be involved with this, and expressed at the very beginning that TH wants to be involved in the reclamation process from the beginning to the end, past closure. TH is still in discussions with YG, and has had a few meetings with them regarding a response to TH's proposal to YG regarding closure. It will be a long process, and having very good objectives will be beneficial for those involved into the future.
- Goldcorp agrees, and it will be important to make it clear about how the objectives were set and ensuring that the objectives are set collaboratively. Goldcorp notes that there is a later agenda item to discuss an engagement strategy for closure.
- TH adds that returning the land to the way it was to the extent possible is important for TH. TH recognizes that there's a level of acceptance that things won't be put back exactly where they started after the Project is over. Looking at the current Project Proposal, it's important to get to a point with a closure plan that is acceptable at a conceptual level that will be included in the EA. TH has problems with the lack of cover for the Alpha WRSF and pits/backfill areas. TH wants to get to a point where the land is returned back to the way it was as much as possible.
- Goldcorp agrees that TH and Goldcorp need to get the closure fundamentals right for the EA.
- Goldcorp notes that for the NAR, new parts of the NAR are proposed to be reclaimed, noting that a robust conversation needs to take place as there may be other desires for those areas of new build on the NAR.
- TH's view at this time is that the new build should be reclaimed, which aligns with the Project Proposal. TH's concern is that a third party would come in and want to maintain and keep the road open even though Goldcorp and TH agree to close and reclaim it.
- Goldcorp hears TH's concerns, and understands that generally, roads are rarely taken out after they are constructed; TH and Goldcorp agree to plan now for closure of the NAR new build and to go from there.
- Goldcorp commits to developing detailed site-specific end land use objectives with TH as part of the reclamation and closure plan. Goldcorp notes that the starting point is looking at objectives for each of the key areas, and the ending point is executing on these through post-mining prescriptions and commitments.
  
- Q: TH asks about timing and what is going to happen before the detailed EA is signed off?
- A: Goldcorp replies that there won't be another plan submitted for the EA phase (during the adequacy phase), but in early 2019 there will be a more detailed, but still at a conceptual-level, reclamation and closure plan submitted for licensing. The goal of this plan is to have conceptual prescriptions tied to ecosites, which will be used to eventually define site-specific prescriptions as project design progresses..
  
- TH notes that there's the middle stage before the detailed EA is reviewed and accepted that TH is interested in providing input.
- Goldcorp replies that they will continue to input additional detail through adequacy regarding closure. Goldcorp wants to get the management plans done more than a year before they need to be submitted for licensing, and the reason for that is to work with TH on refining the plans in advance. Goldcorp can't define at this time what level of detail various parts of the reclamation and closure plan will be at and at what time. The important part now is to understand the

priorities for TH; if TH is most concerned about wildlife, then Goldcorp and TH can start working on closure objectives related to wildlife now. Goldcorp wants to work with TH on the plan now and the first step is understanding priorities. Goldcorp has heard Alpha WRSF cover and open pits as concerns, so perhaps this is where Goldcorp and TH can start. There might not be a resolution, but can work on a process to get to resolution.

- Goldcorp notes that the next few years are key in developing a research plan for reclamation and closure, and creating a research plan that is tailored to TH's concerns and interests. Goldcorp needs input from TH on developing this research.
- Goldcorp is also required to look at alternatives for closure planning, and that will be a key engagement element with TH as well. The alternatives assessment is ongoing.
  
- Q: TH asks about timelines, and asks about milestones for the reclamation and closure plan. TH asks about changes to the reclamation and closure plan in the resubmission of the Project Proposal.
- A: Goldcorp confirms no anticipated changes to that component of the Project Proposal.
  
- Q: TH asks about an updated draft reclamation and closure plan in Q1 2018.
- A: Goldcorp replies yes. Goldcorp is working on the reclamation and closure plan now, and is hoping to provide enough of a draft to TH in Q1 for TH to review and critique. There will be gaps identified in the draft, and the conceptual reclamation and closure plan will be a foundation document that can be worked on together. It will have all of the technical requirements for closure required in a regulatory sense.
- Goldcorp notes that this is why an engagement plan for setting closure objectives is an important step now.
  
- Q: TH asks if this will be worked on prior to the EA being accepted by regulatory agencies?
- A: Goldcorp replies that the goal is to agree on the plan prior to submission with license applications. Licensing bodies cannot review the licensing documents until there is a decision document, Goldcorp plans to engage with regulators prior to submitting the documents. There will be a timeline where Goldcorp needs to put pens down on the conceptual reclamation and closure plan and submit it to regulators, but it's most important to develop a process to work on the plan together.
  
- Goldcorp notes that the conceptual reclamation and closure plan needs to be updated every two years in Yukon per regulations, so updating the reclamation and closure plan with TH input will be ongoing.
- TH would like to see a plan that is accessible to TH for input. Goldcorp agrees.
- Goldcorp reviews the response to IR #2.

#### Active vs Post Closure Activities:

- TH wants to understand "phases" vs "stages" in the Project Proposal as it relates to the Project life.
- Goldcorp explains phases and stages, and reviews the mine life closure schedule. Goldcorp gives an overview of the types of activities that occur in each phase of the mine life.

- Q: TH asks about temporary closure, where it fits in the schedule.
- A: Goldcorp explains that temporary closure is not planned for, so it is not scheduled within the construction or operation periods. Goldcorp will assess a state of temporary closure when the Project at its most vulnerable and inconvenient time for temporary closure to occur.
- TH notes that it is important that the terminology of stages and phases is clear so that as the Project progresses, TH representatives know what is happening and nothing gets missed; Goldcorp agrees.

#### Closure Covers:

- Goldcorp notes that it wasn't explicit enough in the conceptual reclamation and closure plan that Goldcorp will use materials if they are available to cover the WRSF. At the time of writing the conceptual reclamation and closure plan, there wasn't enough information to state the extent of available cover material. Goldcorp will make their assumptions clearer in the future.
- Goldcorp provides an overview of the soil cover material investigations that Goldcorp is undertaking. This involves starting with a test pitting program to characterize the soil profile at site.
- Q: TH asks if the geochemistry work involves a nutrient analysis to understand the productivity of the soil?
- A: Goldcorp replies that they are not looking at this currently, but that this is a good idea. This is added to the action items.
- Goldcorp reviews the current test pit program at site on a map, and explains the current limitations at site for some of the test pit sites.
- Goldcorp expects the test pit report to be available in February, and the geotechnical program information will be available possibly around this time as well.
- Goldcorp gives an overview of next steps on the soil cover investigation work. This includes considering the intent of the covers and the suitability of cover materials for the intent. These need to be discussed in the objectives for the closure plan.
- TH notes that they want the land restored to the way it was to the extent possible. TH notes that a land capability assessment, which relies heavily on the ecohydrological modeling, will be key in understanding what can be done with the site and prioritizing objectives.
- Goldcorp agrees with TH, noting that once Goldcorp understands the materials balance, they can understand the capability of the materials for infiltration reduction and revegetation. Goldcorp wants to look at what is supported at site and understand the reasons for the species that are supported at site, particularly from a water perspective. Goldcorp agrees with TH that it is an iterative process of understanding what is at site currently and considering end land use objectives in the context of what can be achieved and is desired at site at closure.
- Goldcorp notes that there will also need to be a scenario evaluation done based on what can be done and the priorities for closure. Goldcorp gives an example where a WRSF could be re-graded and covered to meet aesthetic goals and revegetation goals, but to the detriment of water quality goals. Goldcorp needs to understand TH's priorities.

- TH and Goldcorp discuss the lack of organic material at site, and Goldcorp's experience on site related to understanding material inventory.
- Q: TH asks about the mineral soil horizon on site.
- A: Goldcorp replies that the area was never glaciated, so it is in situ weathered bedrock. There is no clay on site, and not a lot of nutrient rich soil either.
- Goldcorp describes the natural segregation of particle sizes during end-dumping to create the WRSF and building the benches; naturally a soil-like top is created. Re-grading can disrupt this.
- Goldcorp and TH discuss a workplan for the WRSF cover investigation.
- Goldcorp describes the goal that a cover would reduce the water coming into contact with less desirable materials in the WRSF. This can be through storage and evaporation, diverting around or over. The idea is to limit percolation into the less geochemically ideal areas. The goal is to also enhance facility performance.
- Q: TH asks about pit lakes seepage.
- A: Goldcorp explains that the pit lakes will eventually seep into the groundwater table. This will be on a much different timeline than infiltration into the WRSF, and is much less geochemically concerning. Only some of the pit lakes penetrate into the groundwater table. The rock at depth is not very permeable at all. The materials for the pit walls is much less than in the WRSF. The predicted water quality in the pit lakes is expected to be much better than contact water in the WRSF.
- TH wants to engage on the WRSF cover investigation and look at scenarios for cover.
- Goldcorp iterates the workplan that Goldcorp will send to TH regarding the active and passive treatment, notes that it would be good for TH to provide input on the workplan, and then identify the touch-points in the workplan between Goldcorp and TH.
- TH agrees that this is a good approach.
- Goldcorp reviews IR #6, clarifying the disturbance areas provided in Table 2.1-1 of the conceptual reclamation and closure Plan and distributes a draft figure that show the areas of disturbance, which was developed based on a request by TH in July.
- Goldcorp and TH discuss areas where there may be deeper organic layers on site and discuss examples of where ice rich soils can be used.
- Goldcorp explains that IR responses will be formalized and sent to TH after resubmission of the Project Proposal; Goldcorp and TH discuss how some IR responses will be addressed in the WRSF cover workplan. Goldcorp notes the workplan would come prior to the IR responses and that IR responses would be provided soon after.
- Goldcorp describes the potential to compost on site to generate cover materials, noting that it is important for people to understand the purpose and information around the use of biosolids. Goldcorp provides an example in British Columbia (BC) where biosolid use has been banned due to misinformation/perception issues.
- TH notes that biomass can be used to generate heat for the HLF or for buildings as well. TH notes that compost can possibly be used to help keep the microbial community alive in the stockpile.

- Goldcorp reviews the response to IR #9 and #7. Goldcorp summarizes their engagement with Name Redacted regarding gaining greater understanding of a post-mining landscape based on conducting ecohydrological modeling. Goldcorp notes that ecohydrological modeling is recommended to be done when Goldcorp has more information from the site; Justin recommends not doing detailed modeling on conceptual information.
- TH notes that the workplan will be helpful in understanding next steps. TH also notes that reference sites for the soil conditions and vegetation communities will be important, as this can give information related to changes in conditions due to climate change, for example.
- Goldcorp agrees, notes that the ecosystems across the site vary greatly due to slope, aspect, and other factors. Goldcorp notes that this variability extends past soils and vegetation.
  
- Q: TH asks if the work will be done for IR #7?
- A: Goldcorp replies that a qualitative assessment around site capabilities needs to be undertaken first prior to modelling. Once soil characterization information is available, Justin can incorporate this information into the modeling work. This won't be done in the immediate future, but perhaps the 6 month range. The scope of work will be included in the reclamation and closure plan.
  
- Goldcorp reviews the general response to IR #12 regarding closing the HLF in the manner proposed. There are very few documents that pull together the sites that use the proposed methodology for the HLF that Goldcorp proposes. Nearly all HLF sites propose the water treatment the way Goldcorp does, re-grading is very common, and covering the HLF is a fairly common practice. Bio-treatment examples are Landusky and Brewery Creek.
- Goldcorp's progressive reclamation approach is fairly innovative, there aren't examples that have gone into post-closure to know how this could affect the outcome. Goldcorp assumes that by testing closure methods in advance during operations, there will be more flexibility in adapting closure measures along the way.
- Examples of closure of HLF in cold climates are listed by Goldcorp. Goldcorp's team is currently looking to develop a "state of the industry" paper on HLF closure in cold climates.
- Goldcorp notes that many sites have done some of the methods of closure that Goldcorp proposes, but few sites have done all of the methods that Goldcorp proposes. The idea was to design and plan according to best practice.
- TH notes that for Golden Bear Mine in BC, the market conditions and the environmental standards at the time in BC contributed to the closure of the site. There were many challenges there due to the amount of water in the climate and the tightness of resources at the time. There was also a lack of wildlife mitigations there.
- Goldcorp describes how progressive reclamation of the HLF will help with learning and improving closure methods.
- Goldcorp describes the current considerations of expanding the use of a low-permeability layer on the HLF in closure. Goldcorp doesn't want roots penetrating into the GCL layer. Goldcorp discusses the use of a GCL and drainage layers over WRSF in Yukon, noting that these are deterrents for trees to grow.



## Reclamation Research:

- Goldcorp provides an overview of reclamation research being done at site and some proposed research programs related to research interests of TH and of Goldcorp.
- Goldcorp prompts feedback from TH on reclamation research for the Project. Goldcorp notes future work to research composting options is being considered.
- TH notes the environmental monitor module course taught at the Kaminak site, and that environmental monitors have capacity. There was a plan for the TH Farm to work with Kaminak on nursing and storing a seed collection. The farm will continue, but there may not be an educational component. It will continue as an economic development project.
- TH always intended to look at mining reclamation in terms of rearing local plants. TH doesn't know what the educational component looks like with Yukon College at this point. Notes that it may require a test plot on the mine site and then look to replicate at the TH farm. TH notes that there could be a possible business opportunity there, but TH would need to look at the economics of it.
- Goldcorp asks TH about possible incorporation of Traditional Knowledge (TK) into plant rearing and reclamation research.
- TH replies that the module course identified traditional plants and TH elders were part of the courses, so that data collection wouldn't need to be re-done. It's about getting the information.
- Goldcorp notes that the information is publicly available online, and it's about making sure that it's incorporated into the plan.
- TH adds that there will need to be an analysis of the available data and identifying gaps before moving forward.
- Goldcorp discusses reclamation test plots on site currently. These test plots aren't on waste rock at this time, but they are on areas disturbed during exploration activities.
- TH wants a clear understanding of the composition of the soil, which has been discussed in the meeting already. Understanding the soil will help understand what will change at site and influence what can grow at the site in closure. For example, if the soil has been turned over and changes, native plants cannot grow.
- TH is waiting on a response on the design of the passive treatment system.
- Goldcorp replies that the testing program will look at how the design will be implemented, and various substrates that can be used, the proportions of how they're mixed and used in the system, how the chemistry is modified using the proposed substrates, and the residence time that needs to be looked at. It is an iterative process that will take some time before it is at a level of design. Testing with true solutions from site will need to occur as well to pilot the process.
- TH comments that Goldcorp needs as much existing information of the area as possible. Beyond doing test plots, TH hopes that over the mine there is success in growing native plants at the site.
- Goldcorp discusses closure planning, noting that relatively inert rock will be needed for the diversion channels and other such infrastructure in closure. Goldcorp needs to look at using the right rock for the right components on site for water management.
- TH wants to understand the extent to which plants may be taking up metals or how metals may be put into the food chain. TH gives an example of using plants for photo-remediation and not wanting animals to eat those plants.
- TH notes that dust monitoring can play into the bioaccumulation of metals piece as well. TH's interest is in dust deposited on plants, and understanding the dust footprint. TH recommends that Goldcorp do growth trials in the conditions that plants may be living in at site.

- Q: TH asks about Goldcorp doing an ecological risk assessment?
- A: Goldcorp replies that ecological risk assessment is something that can be discussed with the right technical experts in the room. Goldcorp describes how monitoring metals uptake in plants could trigger an increase in small mammals monitoring, if the data results suggest significant uptake in plants.
  
- TH states that if there is going to be a water body on site in closure, then it should be a healthy water body. Healthy means that one could eat the fish and drink the water and not be harmed.
- Goldcorp summarizes that such a requirement of a pit lake would be considering long term interactions between animals and pit lakes in closure.
- TH notes a vegetative shoreline is an example for creating a healthy water body in a pit lake.
- Goldcorp notes that the objective is important to consider here; does TH want to promote use or deter use of pit lakes by species?
- TH replies that this depends on the water quality.
- Goldcorp discusses the planned angles for the pit walls and how Goldcorp is considering leaving ramps into pits in closure to allow an escape route for wildlife should they enter the pit lake. Such considerations and design of pits in closure will depend on the objectives that Goldcorp develops in collaboration with TH.
  
- Q: TH asks if the expectation is that the pit lake will fill and have a static shoreline?
- A: Goldcorp replies that this depends on the pit, as some are expected to fill and spill. The design will be advanced and this can be worked out as the design is developed further.
  
- TH states that climate change needs to be considered, and consider land erosion and the slopes proposed for closure. Landslides are happening in the territory that have never happened before. TH's concerns relate to how long-term the slopes are for the Project.
- TH states that with climate change the Yukon and Dawson have been identified as warming faster in the Northern Hemisphere than any other place, and for Goldcorp to think about the vegetation in this context. In the past few years, there have been poor seasons for vegetation, for example too much or not enough rain.
- Goldcorp notes that when putting covers on facilities, the vegetation used for reclamation depends on the goals and objectives for closure. Different plants will be used for quick stability goals compared to the plants that would be used for long term vegetation diversity goals.
- TH notes that vegetation succession needs to be considered. Plants can be used to enhance the site for future conditions. Some non-native plants could have a role to play there in building the soil and creating desirable conditions.
- Goldcorp agrees.
- TH wants to be involved in developing the long-term reclamation research plan, as well as in monitoring afterwards. It's an opportunity for TH to expand their knowledge and capacity. TH is already involved in reclamation projects, and the people involved in that may be able to participate in Goldcorp's research. TH wants to be involved.

- Goldcorp agrees, noting that there's an opportunity for TH to write the research plans for closure. Closure research development will include engagement with TH and having TH participate in the research.
- TH sees this as an important aspect to be involved in.
- Goldcorp reviews the response to IR #10. A strategic plan for reclamation research is something that Goldcorp will develop and share.
- Goldcorp reviews the response to IR #11, noting that this aligns with the discussions today.
- TH notes that it's important to see the new build on the NAR reclaimed back to what it was. This reclamation also needs to consider climate change. Culverts aren't always 100% safe, there are wash-outs in early summer. This needs to be considered. Maintenance of culverts is important. Culverts need to be cleaned out.
- Goldcorp notes that the current culverts are consistently undersized along the NAR, and replacing culverts with the appropriate size is part of the upgrade plans for the NAR.
- TH confirms that it's just the new sections that need to be reclaimed, not the upgraded sections.
- TH notes that concerns for invasive species from trucks to the site being transmitted.
- Goldcorp is committed to inspection and washing vehicles in Dawson if needed as it relates to invasive plants mitigations.
- Goldcorp notes that they need to be clearer in the plan regarding monitoring and maintenance on the NAR in closure.

#### Temporary Closure:

- Goldcorp clarifies that temporary closure is not abandoning the mine. It is when there is a partial shutdown of operations and there is not active mining at the site, usually due to market conditions. In Yukon, there are detailed requirements for temporary closure. Goldcorp is assessing temporary closure when it is most awkward for the Project in terms of having to maintain some operations and when it is most likely. It involves maintaining the site when there is not active mining.
- Goldcorp describes how temporary closure considerations will look at worst-case conditions.
- TH asks about where Yukon Government has actually enforced moving from temporary closure to permanent closure.
- Goldcorp explains that it is up to 3 years of temporary closure, then a proponent is required to move into permanent closure. A proponent can ask the Chief of Mines to extend for two years, then it needs to be re-evaluated.
- Goldcorp and TH discuss water licensing in Yukon. Goldcorp clarifies that water licenses do expire, however the expiry requires a revision of the license. Water licenses are not allowed to simply "time-out".
- Q: TH asks about the NAR in temporary closure.
- A: Goldcorp replies that there would be a requirement to monitor the NAR in temporary closure under the QML. The NAR would be used for resupply in temporary closure as well.
- Goldcorp reviews the temporary closure commitments related to socio-economic considerations. Goldcorp prompts input from TH on this, noting that this might be incorporated into the SEMP. Goldcorp notes experiences elsewhere with workforce transition committees.

- Goldcorp and TH discuss economic benefits of the Project, and how this may affect Chief Isaac Inc. if the Project were to enter into temporary closure. Goldcorp notes there may be lessons learned from the oil sands in recent years that Goldcorp and TH can consider in this respect.
- Goldcorp notes the importance of considering social closure for the Project. TH and Goldcorp decide to discuss social closure at the socio-economic and health workshop on October 31.

#### Other IR Responses:

- Goldcorp reviews the response to IR #4. Goldcorp notes that they need to better understand the water quality impacts of having submerged waste rock. Until this is understood, Goldcorp can't know if backfilling is good or bad. Goldcorp also doesn't want to sterilize potential resources.
- Goldcorp describes the flooded columns testing that is currently underway, and that they are in early stages. Goldcorp will be able to come up with a source term for the water quality model (WQM) from this testing, and then incorporate it into the WQM and share results.
- Goldcorp notes that management plans change and adapt as lessons are learned from the site during operations.
  
- Q: TH asks if the submerged source term work has been underway for some time?
- A: Goldcorp explains that for one source of rock, the work was done for a SU1 partial submerged backfill. Now, Goldcorp is looking at all of the rock that could go into one of the backfills.
  
- Q: Goldcorp asks TH for more clarity regarding a closure scenario that does not include long-term pit lakes.
- A: TH notes that TH wants to see the site reclaimed back to its original version, if possible. TH also is considering the habitat of the Forty Mile Caribou, as TH has put in a lot of effort to help recover this species.
  
- Q: Goldcorp asks if TH is concerned about physical hazards at the site related to pit lakes, or changes to their habitat
- A: TH replies that it is about making sure that the environment is safe for the Forty Mile Caribou herd. There were problems at Brewery Creek where caribou went onto the HLF and couldn't get out due to the matting. There are also Citizens who live down river and they do hunting, fishing, trapping annually.
  
- Q: Goldcorp asks what TH's priority for closure requirements would be in a scenario where backfilling the pits resulted in no pit lakes, but it resulted in poorer water quality?
- A: TH replies that there will be a change to the caribou's habitat, so it's about restoring it back to caribou habitat as best as possible. If it can't happen due to adverse effects to fish habitat, or for other reason, then it just needs to be explained.
  
- Goldcorp explains that it will take some time to understand what the deeper mining potential is. More shallow pits will be determined earlier in mine life, but deeper pits will need well into operations to drill deeper and understand what is below.
- TH notes that there's potentially some fear associated with lakes being created as a result of mining in a landscape where there aren't lakes currently.

- Goldcorp and TH discuss the pits being migration/animal movement barriers. TH notes that from a wildlife movement perspective, several small areas rather than one large area is preferred.
- Goldcorp notes that it's important for Goldcorp to understand the ranking of the closure considerations noted by TH, such as the fear of pit lakes, fear of water quality, priority of caribou movement, and uncertainty.
- TH wants to make sure that the area can be used safely by humans and caribou afterwards. TH understands the challenges Goldcorp faces, and sees what Goldcorp has presented, but TH wants to be certain and wants to take into consideration alternatives.
- Goldcorp replies that there are alternatives, but that alternatives come out of understanding the priorities of TH.
- Goldcorp reiterates that if additional backfill doesn't have water quality impacts, then Goldcorp recognizes that additional backfill is in their best interests. This will change as Goldcorp better understands the information from the exploration program, so Goldcorp can't commit to additional areas of backfill at this time.
- TH notes that as the Project progresses, Goldcorp will understand where the resource is and can go back and backfill those areas where the resource isn't.
- Goldcorp explains the significant cost of re-handling materials.
- TH wants to work toward a resolution on the backfilling topic and some of the concerns raised with pit lakes.
- Goldcorp agrees, noting that there will not be a resolution today but wants to work toward a process on reaching a resolution.
- Goldcorp can look at the cost of complete backfilling of the site.
- TH thinks that it is a variable that should be considered for backfilling, but not the only variable. TH notes that Goldcorp is drilling deeper in some of the proposed pits, and one of the main considerations noted by Goldcorp is not condemning potential areas of resources. TH wants Goldcorp to look at these deep assays and consider the results and weigh them against TH's concerns.
- Goldcorp explains that this data will take years to compile.
- Goldcorp will ensure that it is clearer in the closure plan that Goldcorp will consider additional backfill should it make sense economically or have significant benefits environmentally
- TH notes that there needs to be considerations of effects to wildlife, in particular sloping the pits to blend them into the natural landscape. Everyone needs to be realistic about what the end scenario will be. TH recognizes that Goldcorp will not be able to re-create what the site looks like today.
- Goldcorp notes that backfilling the pits to the degree that there are not pit lakes may not necessarily require double-handling.
- TH notes that partially filled pits with re-sloping might be sufficient.
- Goldcorp notes that it's important to understand the vision, and understand the water quality results of submerged waste rock.
- TH notes that understanding the drilling results will help Goldcorp figure out where backfilling can happen.
- Goldcorp agrees, backfilling is cheaper than hauling to WRSF; however infill drilling is providing insight to upgrading the resource.



- Goldcorp gives an overview of the response to IR #13, noting that there is lots of opportunity for TH to provide feedback on monitoring programs.

#### Closure Engagement:

- Goldcorp notes that YG doesn't require social closure, so this is an opportunity to get creative with it.
- TH notes that this is a good opportunity for Goldcorp and TH to work on this together.
- Goldcorp notes that the steps in engagement can start with discussing what a healthy community looks like when mining is complete. This is something TH needs to inform Goldcorp of. Then, this informs how Goldcorp approaches looking at the options that have been discussed for operations and construction and closure, and the take that to inform the management plans for the Project.
- Goldcorp notes that there is good information on what the community wants to see for operations in terms of jobs and things like that. Goldcorp understands that these training programs for the Project need to set up potential employees for the future and jobs outside of the Project.
- TH and Goldcorp discuss considering engagement and planning for the proposed Project.
- TH notes that there is lots to think about in terms of socio-economic closure, noting that transparency provided to employees that speaks to the life of the Project. If there's temporary closure, communicating the potential effects to employees. How to plan for closure, financial impacts of that.
- TH thinks that workshops and good orientation packages are important for employees to understand that and manage their budget.
- TH notes that an understanding of the mine life and keeping that in the back of the community's mind, being prepared for closure. Perhaps educational programs that people can go into. Also ensuring businesses take that into consideration; TH and non-TH businesses.
- Goldcorp notes that if there are potential cultural and future social uses of the site in closure. Goldcorp asks if there are future social or cultural initiatives that TH wants Goldcorp to help support as well.
- TH thinks that the order of engagement is good for TH. TH thinks that the socio-ec side of the discussion would continue on October 31, including discussion of the best way to get TH's Citizens feedback.
- Goldcorp and TH discuss TH Citizens feedback on closure prior to the acquisition.
  
- Q: Goldcorp asks if TH citizens feel more or less familiar with the Project?
- A: TH thinks Citizens are more familiar now with the Project.
  
- Q: Goldcorp asks if Citizens would have more feedback or different feedback now on closure if they are more familiar?
- A: TH replies no.
  
- TH notes that citizens are very interested in training and employment for the Project.
- TH notes that pre-closure meetings with staff and citizens to understand the training and education that Citizens might want in the community.

- TH notes that it may not require too much training post-mining because most of the training related to construction and operations are transferrable. Need to identify transferrable skills. TH notes training for reclamation as well.
- Goldcorp notes that engagement with Citizens on management plans is the next steps for Goldcorp. Goldcorp wants to understand what TH is doing at a broad level and how Goldcorp can support that. Goldcorp will revisit this topic on October 31.
- Goldcorp notes that engagement with TH Citizens on the closure plan is very key.
- TH and Goldcorp agree for Goldcorp to propose an engagement plan for the closure plan and send it to TH for review. This engagement plan will incorporate near term and long term priorities.
- Goldcorp notes for TH to note other key components of engagement on the reclamation and closure plan and closure research.

Meeting ends at 4:48 pm.



# Coffee Gold Mine Closure Workshop

Goldcorp and  
Tr'ondëk Hwëch'in

October 17, 2017

 **GOLDCORP**

# Closure Workshop Agenda

2

1. **Introductions**
2. **Discussion on End Land Use Objectives for Mine Site and Northern Access Route**
3. **Active vs Post Closure Activities**
4. **Closure Covers**
5. **Reclamation Research and Planning**
6. **Clarification on Temporary Closure Requirements**
7. **Responses and discussion of additional IRs #2, #4, #6 to #13**
8. **Discussion on Social Closure**
9. **Discussion on Closure Plan Engagement Strategy**

# Coffee Gold Mine Reclamation and Closure Plans

3

**Conceptual Reclamation and Closure Plan** developed in accordance with industry best practice, and was informed by Yukon regulatory, policy, and guidance requirements.

- **Overall closure objective** – develop and implement a technically feasible plan to permanently close the mine with minimal long-term monitoring and maintenance.
- **Key strategies for successful closure include:**
  - Early and ongoing community and regulatory engagement;
  - Designing for closure, including reclaiming disturbed areas progressively during the Operation Phase;
  - Reducing affected water and controlling contaminants at source; and
  - Planning for long-term monitoring and maintenance, while minimizing long-term operational activities.

Additional detail will be provided in **Reclamation and Closure Plan** to be submitted with license applications



### End Land Use Objectives Discussion



Mine Site  
Northern Access Road



# Fundamental Reclamation and Closure Objectives

Value	Coffee Gold Mine Reclamation and Closure (R&C) Objectives
Physical Stability	Structures and facilities perform in accordance with designs (including withstanding severe climatic and seismic events).
Chemical Stability	Release of contaminants do not cause unacceptable exposure in the receiving environment.
Health and Safety	Eliminate or minimize adverse health and safety effects on the public, workers and area wildlife.
Ecological Conditions and Sustainability	Protect the environment from degradation and restore a self-sustaining biological community to achieve land use objectives for the mine site.
Land Use	Lands are restored to pre-mining conditions typical of surrounding areas or provide for other land uses that meet community expectations. Site access is consistent with community land use expectations.
Aesthetics	Restoration outcomes are visually acceptable.
Socio-economic Expectations	Avoid or minimize adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits and achieving outcomes that meet community and regulatory expectations.
Long-term Certainty	Minimize the need for long-term operations, maintenance and monitoring after R&C activities are complete.
Financial Considerations	Minimize outstanding liability and risks after reclamation activities are complete.

Consider the capacity of landscape after closure related to:

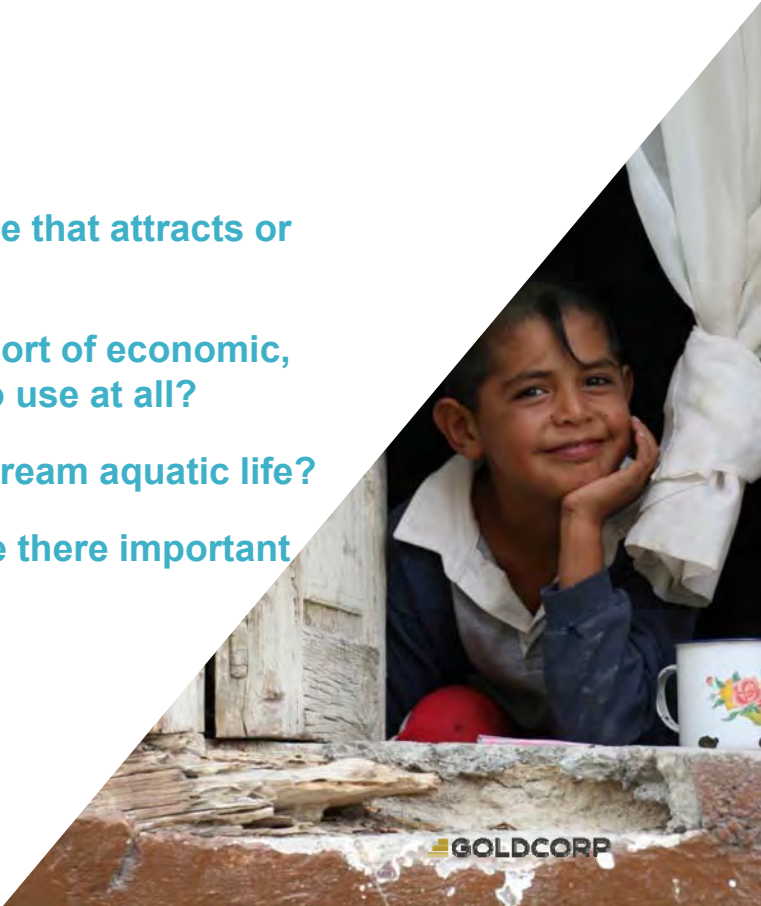


**Wildlife** – a place that attracts or deters?

**People** – what sort of economic, social uses? No use at all?

**Water** – Downstream aquatic life?

**Aesthetics** – are there important viewpoints?



Consider the capacity of landscape after closure related to:



**Wildlife** – a place that attracts or deters?

**People** – what sort of economic, social uses? No use at all?

**Water** – Stream crossings or diversions?

**Aesthetics** – are there important viewpoints?



## End Land Use – Identifying Priorities

8

In your opinion...

- What would be the ideal state of this area 10, 20 and 50 years after mining?
- Which land use is critical to achieve?
- Which ones are most closely linked?
- Do any of the uses challenge another?



### **Develop a detailed site-specific end land use plan.**

- Goldcorp is committed to developing a detailed site-specific end land use plan, based on input from the Project partners and stakeholders.

### **Tie reclamation prescriptions to the end land use plan and clearly tie this to the habitat projected to be lost as identified in the effects assessment.**

- Post-mining prescriptions will be based on closure objectives (including end land use objectives and plans), future site investigations/assessments (e.g., permafrost), results of ongoing and proposed reclamation research, criteria to ensure physical and chemical stability of facilities/infrastructure, etc.
- Based on these inputs, Goldcorp is committed to developing and refining post-mining prescriptions to ensure that the site is reclaimed to the extent possible, and that the level of proposed reclamation is acceptable to Project partners and stakeholders.

## IR#2 Mine Plan Objectives and Alternatives

10

### **Define Project environmental objectives/goals/milestones**

- By planning for closure, fundamental environmental and social objectives for closure apply to all Project phases – outlined in CRCP Table 1.3-1 (*next slide*)
- CRCP exceeded requirements for YESAB Project Proposal; RCP for license applications will include site-specific objectives, informed by input through further engagement

### **Provide detailed info on mine plan alternatives**

- Mine plan alternatives are described and evaluated in Project Proposal Section 2.10
- RCP for licensing will follow YWB/EMR Closure Plan Requirements, and closure alternatives will be described and environmental effects evaluated.

## Reclamation and Closure Phases and Stages



### Reclamation and Closure Phase

- Post-mining Closure Stage
- Active Closure Stage

### Post Closure Phase



# Closure Stages and Schedule of Activities

Phase / Activity	Project Year																										
	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<b>CONSTRUCTION PHASE</b>																											
Northern Access Route Construction																											
Mine Site Construction																											
<b>OPERATION PHASE</b>																											
Mining (including pre-production)																											
Ore Processing (including pre-production)																											
Heap Leach Rinsing																											
Operational Closure																											
<b>RECLAMATION AND CLOSURE PHASE</b>																											
Water Treatment																											
Reclamation and Decommissioning																											
<b>POST-CLOSURE PHASE</b>																											
Ongoing Monitoring																											














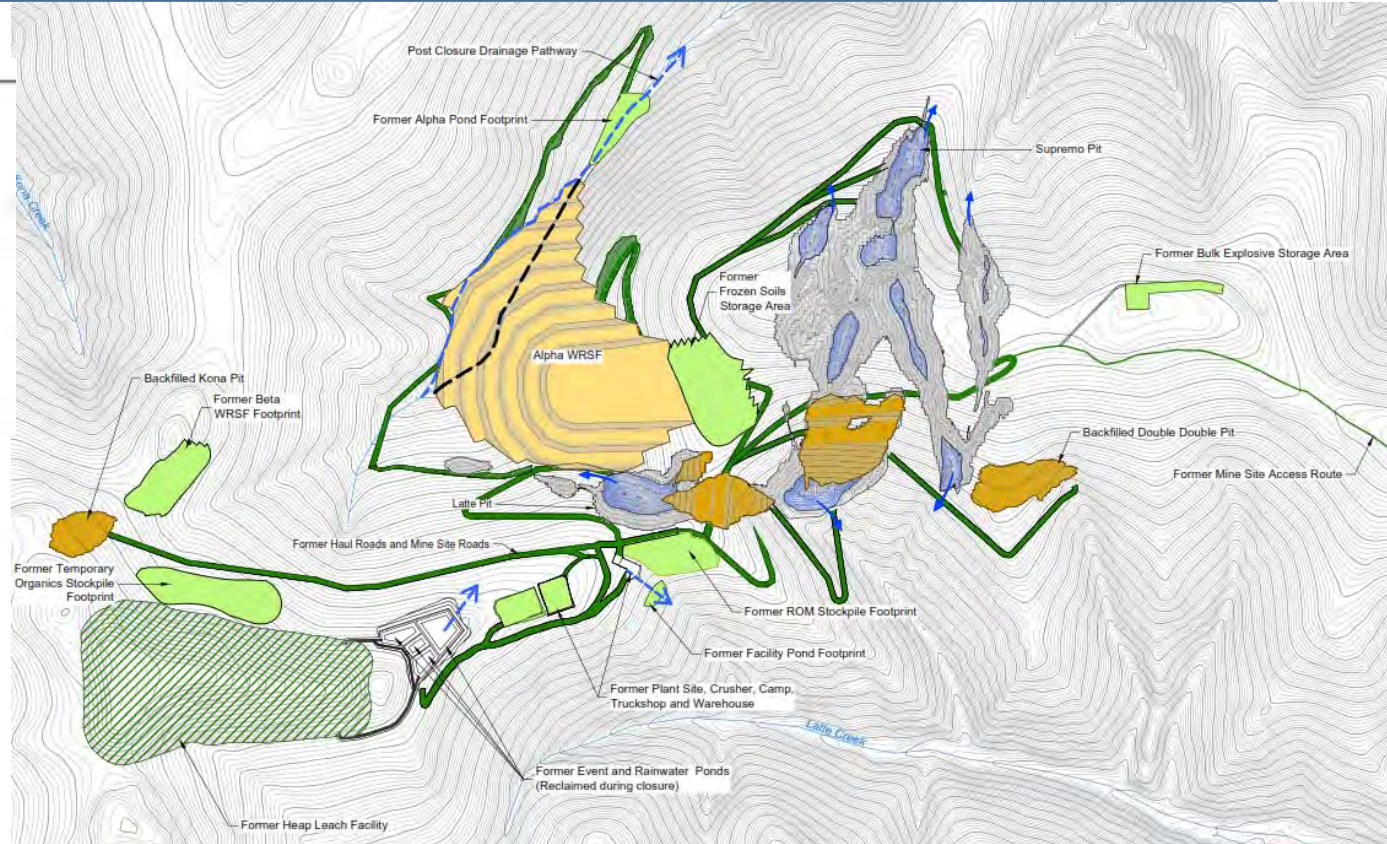


# Reclamation and Closure Phase - Activities and Monitoring

Phase	Timing	Objective	Typical Major Activities
<b>Reclamation and Closure Phase</b>			
Post-Mining Closure Stage	Year 13 to end of Year 18 Begins with the end of ore processing Ends with the decommissioning of the process plant and infrastructure	Completion of major closure activities related to ending heap leach rinsing, dismantling infrastructure, establishing final water conveyance network, and reclamation	Rinsing of the HLF until Year 15 Ongoing treatment of HLF drain-down rinse water Decommissioning of crusher, the bulk explosives storage facility, ROM stockpile area Contaminated soil investigation and cleanup
Active Closure Stage	Year 19 to Year 23 Begins with closure of remaining facilities Ends with the end of water treatment	Maintenance, monitoring, and closure of remaining facilities	Water treatment will continue until it is no longer required (estimated to be Year 20) and treatment sludge removal from site Decommissioning of remaining facilities in Year 18, including camp Decommissioning of site roads and access road Demobilization of equipment Contaminated soil investigation and cleanup Decommissioning of the Alpha Pond and the Facility Pond

# Mine Site During Post-Closure Phase (after Year 24)

- Legend**
-  Rock Drain
  -  Reclaimed Footprint
  -  Reclaimed Heap Leach Pad
  -  Reclaimed Haul and Mine Site Roads
  -  Pit Backfill
  -  Pit Footprint
  -  Pit Lake
  -  Waste Rock Storage Facility (WRSF)
  -  Pit Outflow Direction
  -  Flow Direction



# Post Closure Phase - Activities and Monitoring

Phase	Timing	Objective	Typical Major Activities
<b>Post-closure Phase</b>			
Post-Closure Phase	Year 24 onwards Begins with the end of water treatment Continues until all license conditions are met	Monitoring only	Geotechnical inspections of the HLF, WRSF, and the pit walls Water quality monitoring for the pits and WRSF Aquatic effects monitoring Terrestrial animal monitoring

- Wildlife monitoring requirements will be informed by the outcomes of previous monitoring campaigns conducted during the Reclamation and Closure Phase.
- Other monitoring during this phase to determine performance to meet closure objectives?

## Discussion

- a. Monitoring
- b. Safety
- c. Wildlife



# Closure Stages and Schedule of Activities

Phase / Activity	Project Year																										
	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
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Water Treatment																											
Reclamation and Decommissioning																											
<b>POST-CLOSURE PHASE</b>																											
Ongoing Monitoring																											

Possible Update: **Closure Phase** = Active Closure Stage (Year 13 – 23) and Post-closure Stage (Year 24+)

- Feedback?



## Closure Covers



**Committed to closing Alpha WRSF with a soil cover if materials available**



### **Test Pitting Program**

- Purpose is to accurately characterize the material overlying bedrock
- Test pits completed throughout all major areas to be subject to stripping and development activities.
- Each test pit will be logged, photographed, and select samples will be collected for either geotechnical characterization, geochemistry, or both
- For frozen samples, particle size distribution, moisture content, and ice contents will be determined
- A report summarizing the field and lab work will be completed



**Coffee Project Site Overview  
Mine Plan**



- Legend**
- ▭ Coffee Property
  - TestPits
  - Culverts
  - Collection Channel
  - Pond Berm
  - Diversion Channel
  - Road Drainage Ditch
  - Underdrain
  - ▭ Settling Pond Dam
  - ▭ Settling Pond
  - ▭ Catchments
  - Proposed mine road
  - ▭ Resource
  - ▭ Soil stockpile
  - ▭ Stockpile
  - ▭ Leach pad
  - ▭ Planned pit
  - ▭ Waste Dumps
  - Existing mine road

# Cover Investigation – Test Pit Program

22

## **Program Timeline**

- Program started early October
- Currently 60% complete
- Anticipated completion late October
- Lab work and reporting through November and December
- Report should be available early February

## **Next Steps**

- Use results of report and data to develop a material inventory for site
- Determine suitability of different materials for capping and/or regrowth media
- Use output of material inventory and suitability to develop a strategy for use at closure
- If material insufficient or unsuitable, evaluate other methods for achieving closure objectives

### **Cover Objectives Discussion**

- What makes the material unsuitable?
- What is the intended purpose of the cover?
  - Revegetation, infiltration reduction, short vs long term
- Next steps for cover investigation



## IR#6 Soil Covers for Revegetating Disturbance

24

### **Clarify the disturbances listed in RCP Table 2.1-1**

- *See next slide*

### **Describe the basis for the assumption that existing soil depth is 30cm**

- This assumption was based on preliminary geotechnical work conducted as part of the feasibility study. Additional work is underway to estimate of available soil

### **Clarify how Alpha WRSF footprint will be salvaged, including timing**

- Further work will be undertaken to define salvage opportunities and timing of removal of material; presence of permafrost is a primary consideration
- Details regarding salvage of soil and overburden will be described in the Waste Rock and Overburden Management Plan, and sequencing of activities related to the construction of the Alpha WRSF will be detailed in the Mine Development and Operating Plan

### **Describe comparable examples for use of salvaged and stockpiled frozen soils**

- Example of use of previously frozen soils at Minto Mine

### **Describe how options will be assessed for storing frozen soils to permit use in reclamation activities**

- Storage of frozen soils will be described in the WROMP.

### **Describe potential alternative sources of topsoil for reclamation activities**

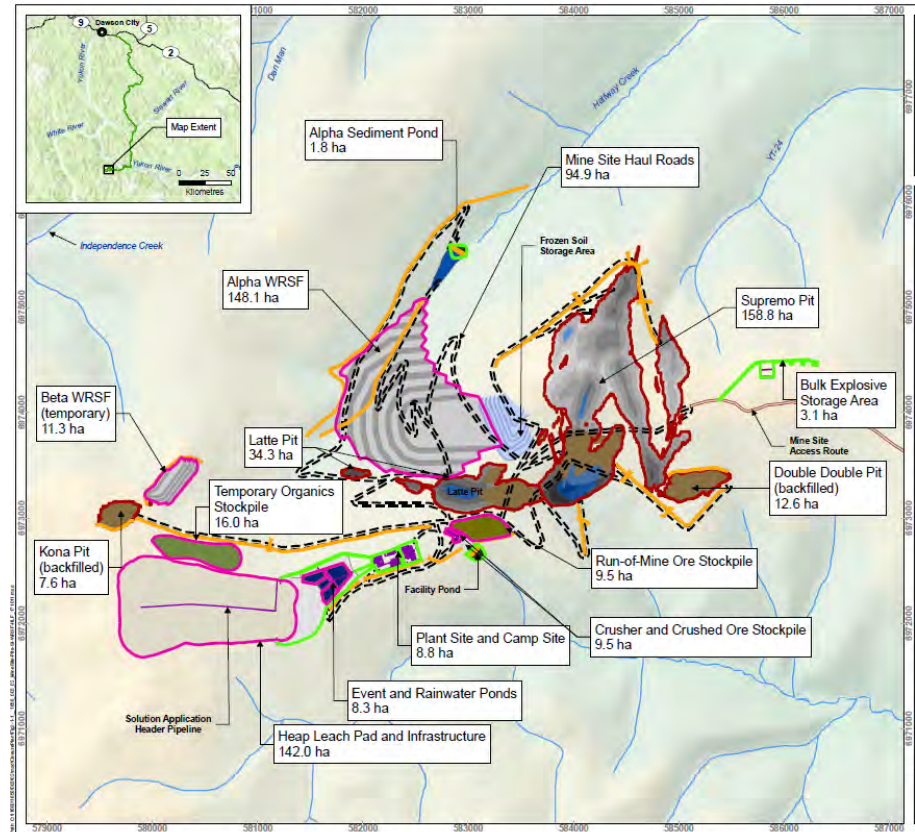
- There are no known easily accessible alternative sources of topsoil; however, future research will inform soil cover depth requirements and amendments (composting) to ensure coverage where planned.

# IR#6 Soil Covers for Revegetating Disturbance

- See Handouts

Mine Feature	Area (ha)	Area Reclaimed
<b>Open Pits<sup>a</sup></b>	<b>213.3</b>	
Double Double	12.6	Yes*
Latte	<del>34.0</del> 34.3	No
Kona	<del>24.4</del> 7.6	Yes*
Supremo	<del>7.6</del> 158.8	No
<b>Waste Rock Storage Facilities and Stockpiles<sup>b</sup></b>	<b>185.9</b>	
Alpha WRSF	148.1	No
Beta WRSF	11.3	Yes
Temporary Organics Stockpile	16.0	Yes
Run-of-Mine Ore Stockpile	9.5	Yes
Crusher and Crushed Ore Stockpile	1.0	Yes
<b>Heap Leach Facility<sup>c</sup></b>	<b>150.3</b>	
Heap Leach Pad and Infrastructure	142.0	Yes
Event and Rainwater Ponds	8.3	Yes
<b>Supporting Mine Infrastructure/Facilities<sup>a</sup></b>	<b>19.0</b>	
Plant Site and Camp Site	8.8	Yes
Bulk Explosive Storage Area	3.1	Yes
Alpha Sediment Pond	1.8	Yes
Facility Sediment Pond	1.7	Yes
Water Management Infrastructure	3.6	Yes
<b>Roads and Airstrip</b>	<b>560.7</b>	
Mine Site Access Route to Airstrip <sup>a</sup>	11.1	Yes
Mine Site Haul Roads <sup>a</sup>	94.9	Yes
Airstrip <sup>b</sup>	24.4	Yes
Northern Access Route – Project Portion <sup>c</sup>	375.0	Yes
Potential Spoil and Borrow Sites along Access Route <sup>b</sup>	48.9	Yes
Yukon River and Stewart River Ice Roads <sup>a</sup>	2.1	Yes
Yukon River Winter Road	4.3	Yes
<b>TOTAL AREA OF DISTURBANCE</b>	<b>1129.2</b>	

Notes: \* Progressively backfilled (either completely or partially) as part of operational closure activities.  
 a. Area includes 10 m buffer from centreline of roads or from perimeter of mine features.  
 b. Area includes 50 m buffer the perimeter of the Project airstrip running surface and the perimeter of spoil and borrow sites along the NAR.  
 c. Area represents the 37 km portion of access route that is newly constructed to support mine development and operations and includes 50 m buffer either side of the centerline.



## IR#9 Soil and Overburden Management Plan

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### **A site-specific soil management plan should be developed and implemented for the project.**

- The Waste Rock and Overburden Management Plan (Appendix 31-D) provides information on characterization, segregation, and storage of waste rock, organic material, topsoil, and frozen soils.
- Goldcorp is committed to minimizing the size of the disturbed Project footprint, utilizing salvaged soil and overburden material to the extent possible for reclamation and closure of the mine site, and updating site-specific plans for the management of soil as the project advances (i.e., as more information is acquired or changes are made based on actual site conditions).

## **Conduct ecohydrologic modelling**

- Goldcorp has consulted with Integral Ecology Group to determine the scope of potential work that could be undertaken based on the current understanding of the mine plan

## **Identify the soil depths and characteristic that are required to replicate soils conditions for existing vegetation communities**

- Goldcorp is committed to conducting further work to identify post-closure ecosystems

## **Develop a soil replacement plan that is not based on uniform or arbitrary soil depths, but on target ecosystems**

- Post-mining ecosystems will be defined as the mine plan and design advances – selection will be informed by site-specific closure objectives (including end land use objectives), and facility-specific closure criteria, outcomes of reclamation research programs, and the results other assessments (e.g., site mapping, modelling)

## **Identify contingencies to address a shortfall of soil resources**

- It may be too early to identify contingencies for soil shortfalls – the first step is to generate a realistic material balance based on onsite resources and closure cover requirements.

**Identify and describe comparable examples of heap leach facilities that have been successfully reclaimed and closed in the manner proposed in this application**

- For discussion

**Evaluate the consequences of natural ingress of woody species and trees into the HLF cover system**

- The objectives of the cover system are to provide for physical stability of the heap (including stable slopes and erosion resistance), route water away from the heap (runoff and precipitation), and provide a growth medium to sustain native plants (in accordance with land use objectives, and to further reduce infiltration and runoff).
- Since the HLF is closed progressively in stages, several studies will be undertaken during the operations phase to examine the types of vegetation that may be good candidates for revegetation, and those that may pose a risk. Further work is required on the cover system design before such an evaluation can be undertaken.



**Reclamation  
Research and  
Planning**



**Ongoing and Proposed  
Reclamation Research Studies**

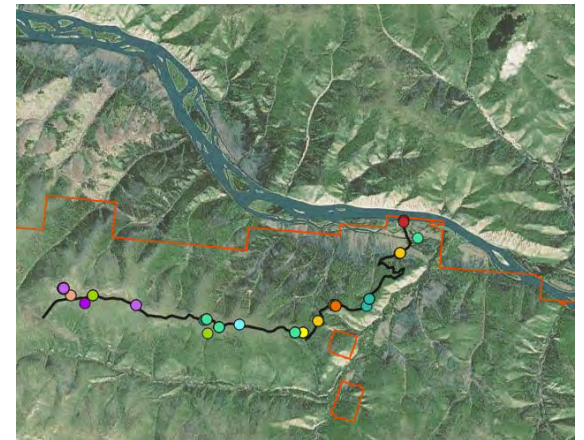


## Ongoing Reclamation Research Programs

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Objective – to inform and refine plans to return the mine site to a state as near as possible to that in existence pre-mining and that meet end land use objectives.

- Revegetation Reclamation Research Program (2013-current)
  - Investigating basic site prescriptions at disturbed exploration sites
  - Seed Collection, Inventory and Mapping Program to determine target plant species for site restoration
  - Training program partnership with TH and YK College
  - Revegetation and soil amendment and greenhouse trials
  - Establish/support nursery to grow native species
  - Program ongoing through Construction and Operation phases



# Future Reclamation Research Programs

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- **Plant-soil Interaction Studies**
  - Characterize the plant-root interface (rhizosphere) of native plants that are potential candidates for restoration
  - Examine use of local peat as a soil amendment
  - Establish a three-year field trial at disturbed sites in subalpine areas
- **Heap Leach Facility – Water Treatment Plant Pilot Program**
  - Bench-scale treatment testing of chemical and biological processes using metallurgical cyanide leach solutions completed
  - During Operation Phase, conduct field-scale pilot program to refine plant operating requirements
- **Heap Leach Facility – Vegetation Cover Trials**
  - During latter half of Operation Phase, conduct field-based revegetation trial program on Stage 1 of HLF, informed by results of other research programs

## Others?

- **Recognize the need for a strategic plan to address areas of uncertainty**

- Discussion – Other areas of research
- Recognize the need for a strategic plan to address areas of uncertainty

**Expand on the reclamation research program described in the application to test the prescriptions proposed and address uncertainties.**

- Once site-specific closure objectives (including end land use objectives) are defined, Goldcorp is committed to defining post-closure prescriptions, and testing revegetation treatments associated with these prescriptions in disturbed areas no longer needed to support mining activities (i.e., testing in actual site conditions)

**Develop a detailed implementation schedule for the reclamation research program**

- Goldcorp is committed to developing a detailed implementation schedule for the reclamation research program, noting that the program is expected to evolve and expand over time.
- Further input, discussion, and collaboration is required on future reclamation research programs to ensure that community expectations are achieved



### **Assess the viability of fireweed and suitable *Epilobium* species as candidate native species for use in the reclamation program**

- Goldcorp is committed to identifying appropriate vegetation species for reclamation to ensure that the re-establishment of vegetation is ecologically appropriate (i.e., tailored to local conditions and closure objectives).
- Vegetation cover trial will be conducted during the operations phase, and the viability of these and other species will be assessed.

## Temporary Closure



## Requirements for Temporary Closure During Mine Operations



## Temporary Closure

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**Goldcorp will be a responsible steward of the site and demonstrate its commitment to re-opening the site by retaining full-time care and maintenance and HLF operations staff**

- At the onset of temporary closure, **a care and maintenance program** will be implemented to maintain mining infrastructure and process in operable condition for **up to 3 years**
- **Key measures** to be undertaken are associated with:
  - Ensuring that the **site is secure and safe** to minimize health and safety risks, and
  - **Ensuring compliance** with all regulatory and licensing requirements to manage risks associated with potential abandonment of a site
- **Example** of requirements for a temporary closure:
  - Open Pits – protect human health and safety by controlling site access, place boulder fences and warning signs
  - Heap Leach Facility – Operation to continue, including maintaining water balance
  - WRSF and stockpiles – minimize erosion by maintaining physical stability and water management systems
  - Other – secure buildings, tanks, storage areas, equipment if non-essential; routine inspections and maintenance; monitoring and reporting as per applicable permits and licenses

- Workforce Transition Plan – staged reduction
- Employee Assistance Program – support for families and workers
- Communication – multiple channels; timing.
- Other aspects to consider?

# Additional Information Request Responses



- #2 Mine Plan Objectives and Alternatives
- #4 Pit Lakes and Backfill of Mine Waste
- #6 Soil Covers for Revegetating Disturbance
- #7 Ecohydrology Modelling
- #8 End Land Use Plan and EA
- #9 Soil and Overburden Man. Plan
- #10 Reclamation Research
- #11 Plant Species Selection
- #12 HLF Landform Monitoring
- #13 Reclamation Success Monitoring





## IR#4 Pit Lakes and Backfill of Mine Waste

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### **Develop a closure scenario that does not include long-term pit lakes**

- As per YK Requirements, RCP will describe alternative closure options associated with each key element of the mine site, including open pits.

### **Develop an operating plan that allows for backfill to be immediately deposited into pits to reduce loading from pit walls and potentially reduce treatment needs; Provide additional detail regarding backfill timelines for all pits and supporting rationale**

- A Mine Development and Operating Plan will be submitted for licensing – it will describe backfilling plans and timing based on current conditions and will be updated as conditions change

### **Describe company objectives to minimize footprint and backfill**

- Goldcorp SEMS and other corporate requirements will be integrated in the RCP

### **Describe sequencing alternatives that prioritize environmental over economic aspects**

- Backfill sequencing alternatives will depend on several factors, which will be outlined in the Mine Development and Operating Plan

### **Discussion of when we can decide to backfill more**

## IR#13 Reclamation Success Monitoring

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**Develop a program to characterize the pre-mining ecosystems with respect to significant biological indicators and parameters of the specific vegetation communities that are targeted and collect these data prior to disturbance.**

- Goldcorp commits to collaboratively establishing revegetation performance metrics that will be used in assessing the effectiveness of reclamation activities and identifying thresholds for adaptive management triggers.
- Discussion – what significant biological indicators and parameters of the specific vegetation communities could be collected other than that planned?



# Social Closure

## Tr'ondëk Hwëch'in Closure Workshop

October 17, 2017

 **GOLDCORP**

## What does YG expect on communities and closure?

42

- Yukon Government on **consultation and engagement in closure planning**:
  - Section 5.2: “Engagement with the community, including governments (First Nation, federal, territorial), local communities, assessment/regulatory authorities and non-government organizations is an **essential component** of reclamation and closure planning. Proponents need to understand the views and expectations of all parties, and RCPs should demonstrate how the proponent has considered and addressed these throughout the planning process.”
- **Socio-economic** aspects are NOT in the Yukon government’s requirements of a closure plan
  - Good practice internationally says socio-economics is a crucial topic in closure planning
  - Goldcorp’s internal approach (SEMS) require that socio-economics be part of closure planning

What topics related to closure and legacy are most relevant to TH citizens?

Culture? Health? Jobs? etc



Closure Plan  
Engagement  
Strategy



Process for Engagement  
Elements of Interest for  
Collaboration





What could the engagement process to discuss closure look like?

### **Step 1: Goldcorp listens**

- TH's vision of the future post-mining
- TH's priorities (connected to community and economic plans)

### **Step 2: Goldcorp and TH (plus others) discuss options**

- Construction
- Operation
- Closure and beyond

### **Step 3: Goldcorp presents its plans, which have TH input**

- Construction/operation
- Closure and beyond

- Who should be involved in conversations at each step?
- What is the best way to get TH citizens' input and feedback at each step?
- Are those steps in the right order?
- Are we missing any steps?
- Other topics?

## Closure Plan Engagement Strategy

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Key elements for input and collaboration include:

1. Identifying effective process of engagement & collaboration
2. Development of mine-specific reclamation and closure objectives
3. Reclamation methods and future research:
  - Refinement of ongoing and proposed research programs
  - Others research programs based on community objectives
3. Closure measures for mine site infrastructure and facilities to achieve specific closure objectives and design criteria







TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

## Selkirk First Nation and Goldcorp Updates Meeting

**Date:** October 18, 2017

**Location:** Westmark, Whitehorse

**Objective:** To discuss next steps regarding technical engagement with SFN.

### Attendees:

#### Selkirk First Nation:

Names Redacted

#### Goldcorp:

Name Redacted

Jennie Gjertsen

Name Redacted

Kelly Constable

### Action Items:

Action Item	Responsible Party	Timeline
Share updated commitments log	Goldcorp	Q4 2017 – complete via email Nov 6.
Ensure that Goldcorp's road management agreements have been shared with SFN	Goldcorp	ASAP

### Discussion of Key Topics:

The parties discuss the purpose of the meeting to discuss:

- the Project Proposal and YESAB Assessment,
- socio-economic aspects of the Project relating to SFN,
- the status of the Traditional Land Use Study (TLUS) being created,
- SFN's approach to technical review on the Project Proposal.

The parties discussed the meeting Goldcorp had proposed for this week with SFN Chief & Council and SFN noted it was premature to meet that week due to internal review process that SFN was undertaking. It was noted that it would be appropriate to meet at a different date in the future once SFN had met with all their technical consultants.

Goldcorp acknowledged SFN's process, noting that the meeting request was to discuss matters with Council that had been identified in workshops with SFN's technical team, which Goldcorp understood to

be preliminary, but not official concerns for SFN. Goldcorp understands SFN's approach. It was noted that it is an ongoing journey for relationship building directly with SFN Chief and Council and citizens.

SFN thanks Goldcorp for providing draft notes per SFN's request, however the disclaimer on the notes is confusing. Goldcorp explains that the disclaimer was in response to directions from SFN that the technical team would not be in a position during the workshops to present official views of SFN. SFN's technical representative agrees with the disclaimer.

Goldcorp explains the goal to get back into the YESAB process and submit by November 30<sup>th</sup>. Goldcorp requests that SFN provide formalized feedback no later than mid-November.

SFN explains that SFN sees another round of technical meetings where SFN's technical consultants communicate feedback after SFN's consultants brief and receive instruction from SFN Council. Formal feedback will come from Chief Nelson in a letter iterating SFN's views and recommendations for Goldcorp to consider. The first step; however, is for SFN's technical team to brief Council. This will occur in a few days.

Goldcorp confirms with SFN that the November 30<sup>th</sup> submission date is a firm deadline for Goldcorp. Goldcorp updates SFN on discussions between Goldcorp and YESAB regarding resubmission and the process and provides a summary of what is expected to be included in the resubmission. Goldcorp does not plan to change the existing Project Proposal (PP) unless a fundamental change were required as a result of consultation. Goldcorp will re-submit the existing PP with an addendum with updated information, such as the updated consultation section.

SFN notes the socio-economic primary data from SFN that will come Goldcorp's way after it has been reviewed and packaged appropriately for distribution by SFN. SFN would like to see this contribute to the PP. Goldcorp replies noting Goldcorp's previous attempts to access the data, and noting that Goldcorp respects that Citizens must review the data first. The question for Goldcorp revolves around how long to wait for data from SFN. At some point, Goldcorp has to submit the PP.

SFN highlights issues with using old census data. The primary socio-economic data from SFN will comprise information from SFN Citizens residing in Pelly Crossing and outside. Goldcorp acknowledges this, and notes that there are solutions once Goldcorp receives primary data from SFN. Goldcorp does not want to rush through sensitive primary data when it is received just to "get it in" the PP. Goldcorp can acknowledge data gaps in the PP and commit to an analysis of the data when it is received. Goldcorp notes a key opportunity to incorporate SFN primary data is into the Socio-economic Management Plan. The parties discussed potential points in the YESAB process where a review of SFN's primary data could be considered and included. It was noted that Goldcorp doesn't get the sense from discussions with SFN's technical team that the new data will materially impact the effects assessments.

SFN highlights some potential enhancements from the Project, and notes that Goldcorp may want to include that in the PP. Goldcorp notes that such enhancements are more related to a bilateral agreement to be negotiated, and as such, wouldn't be included in the PP.

SFN notes that enhancements are important to understand in the context of the PP and for Citizens to understand the enhancements related to the Project. The PP should be clear about the commitments to

enhancements, even if the end result of the enhancement is unknown. SFN would like to see commitments that are more concrete than a plan to make a plan.

Goldcorp will update the commitments table for the re-submission and show how new commitments have arisen from consultation.

SFN technical team is meeting with Chief and Council to review multiple files, including Coffee and the SFN primary data as well. SFN wants there to be collegial discussions with Goldcorp and for Goldcorp to consider how SFN Citizens will have access to work for Goldcorp. This is an aspect to be discussed outside of the PP.

Goldcorp is happy to discuss opportunities with SFN at any time and is looking to discuss this bilaterally with SFN. Goldcorp hopes that lessons from Minto can be implemented. Goldcorp notes that there are challenges with ensuring that all First Nations partners on the Project are engaged and the opportunities with the Project consider all Nations involved. Goldcorp notes that there are a few key items that could be big wins if Goldcorp and multiple First Nations work together, and gives an example of NAR governance and wildlife management.

Goldcorp asks SFN what the next steps are for technical engagement on the PP. SFN explains that SFN sees another round of technical workshops with Goldcorp. After these meetings, SFN will produce more formal recommendations on the Project and provide them to Goldcorp in the 3<sup>rd</sup> week of November.

Goldcorp reiterates the deadline of November 30<sup>th</sup> to submit the PP, and notes that 3<sup>rd</sup> week of November is very late to be receiving feedback. Goldcorp has been clear about the goal of November 30<sup>th</sup>, and notes that it has been 5 months of attempts to engage with SFN on the complete Project Proposal. Goldcorp suggests that SFN's feedback includes a letter noting areas of agreement on concepts with Goldcorp and SFN, and status of engagement.

SFN notes that Coffee Creek is an important place and that there is ongoing relationship work for Goldcorp to do with SFN. SFN will need to discuss providing a letter with Chief and Council.

SFN and Goldcorp discuss the NAR and YG's Resource Gateway Project. SFN suggests that Goldcorp may have to be creative in the solution on NAR governance.

End of meeting 10:00 pm.

# MEMORANDUM

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<b>Date:</b>	October 20, 2017
<b>To:</b>	Selkirk First Nation
<b>From:</b>	Goldcorp
<b>File:</b>	Goldcorp Coffee Gold Mine Project
<b>Re:</b>	Review of Minto Monitoring Report Valued Components and Indicators

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## 1.0 INTRODUCTION

At the request of the Selkirk First Nation (SFN), Goldcorp Inc (Goldcorp) has reviewed the Valued Components (VCs) and indicators presented in the Minto Mine Socio-economic Monitoring Program (SFN *et al* 2014) and the Socio-economic Monitoring Program: Minto Mine 2014 Annual Report (SFN *et al* 2016), (collectively the Minto program) and the use of the VCs and indicators in the Coffee Mine Project Proposal (PP) (Goldcorp March 2017).

The purpose of this analysis is to demonstrate areas of commonality between the Minto socio-economic program approach and the socio-economic assessment found in the Coffee PP. This analysis is also intended to identify potential areas where Minto program approaches can be incorporated into the Coffee Project's socio-economic management and monitoring approaches for the proposed mine.

## 2.0 OVERVIEW OF FINDINGS

The Minto program is organized into a hierarchy of core conditions, valued components and indicators. In contrast, the PP is organized into Valued Components and Sub-components. Indicators have been identified to assess the VCs in the PP, however will be reviewed and expanded for the SEMP and associated monitoring plans. The socio-economic issues identified in the Minto program are generally covered by the selection of VCs in the Coffee PP (Tables 1 and Table 2, appended). Some of the socio-economic issues have been organized in the Coffee PP at a more aggregated level – for example, the Coffee PP's VC of Economic Conditions covers the Minto VCs of Income and income distribution, Employment, and Business, which together form the core condition of Material Well-being. In other cases, issues have been organized differently in the Coffee PP. For example, traditional economy was grouped together with income, employment and business for the Minto program under the core condition "Material Well-being." For the Coffee PP, traditional economy was a topic (subcomponent) considered under the VC of "Social Economy."



## **2.1 POINTS OF DIFFERENCE BETWEEN MINTO MONITORING DATA AND THE COFFEE PP**

The subheadings below show areas in which the Coffee PP and the Minto program differ from one another, provide possible explanations for why the Coffee and Minto approaches differ, and suggest potential approaches for how these topics may be considered for the Coffee Project.

### **2.1.1 Regulatory Focus on Adverse Effects – Certain Data Not Presented to YESAB**

The Yukon Environmental and Socio-Economic Assessment Board (YESAB) approach to evaluating projects focuses on identifying and managing adverse (negative) effects that a Project may have. While the YESAB approach does not forbid discussion of positive effects (jobs, revenue, etc.) in the socio-economic assessment for the PP, the Proponent and its consultants have focused on the information known to be of most concern to regulators (i.e. adverse effects), as identified through engagement with YESAB staff.

As such, detailed data on the Project's potential positive effects (especially economic effects) has not been presented in detail in the PP, although enhancement measures to further support positive effects are identified. Since the Minto program began after the YESAB process was completed, the program had freedom to include the topics that were of interest to all parties (Capstone, Selkirk First Nation, and the Yukon Government).

Management plans within the Coffee Project's SEMP will include consideration of positive effects, and data on indicators for positive effects may be considered in the monitoring program.

### **2.1.2 Monitoring vs. Assessment – Certain Data for Coffee is Not Yet Available**

The indicators in the Minto program are more comprehensive than those identified in the Coffee project, because they incorporate information that cannot be gathered until mining begins, such as detailed safety incidents, taxes and royalties, etc.

Data related to the construction and operations phases of the mine may be considered in the monitoring program in the Coffee Project's SEMP.

### **2.1.3 Regulatory Focus on Environmental and Social Effects – Certain Topics “Out of Scope” for YESAB**

YESAB provides guidance on the topics it wishes to see included in the assessment for a PP, which are primarily related to environmental and socio-economic concerns. Certain topics – although important – are considered out of scope for this portion of the regulatory process, for example, certain topics related to worker health and safety (e.g. historic number of safety incidents). For this reason, certain topics are considered out of scope for the Coffee PP.

Data on topics considered “out of scope” for YESAB may be considered in the monitoring program in the Coffee Project’s SEMP.

#### **2.1.4 Topic Can Be Better Addressed with Primary Data, Which Is Not Available – Certain Topics Not Covered**

Small communities such as Pelly Crossing and First Nations communities such as Selkirk First Nation face data limitations. Census data is often suppressed for smaller communities out of the interests of individual and household privacy, while some First Nations communities have expressed concerns over the reliability of Statistics Canada (Statscan) data in describing their communities’ lived realities. As such, primary data is often preferable as a means to understand and describe socio-economic conditions in small communities and First Nations communities. In other cases, Statscan has not gathered information on the topic of interest because it is of most interest to a specific community (e.g. community-level engagement in traditional activity). Traditional land use information may be considered proprietary to the First Nation, and is therefore best collected directly by and/or for the First Nation.

At the time the Coffee PP was prepared, primary data on SFN traditional land use and certain other socio-economic topics was not available. Goldcorp welcomes primary data from SFN and looks forward to finding appropriate places to incorporate this information into its documentation and planning..

#### **2.2 POINTS OF SIMILARITY BETWEEN MINTO MONITORING DATA AND THE COFFEE PP**

Many of the same topics were included in the Minto monitoring report and the Coffee PP. Headings 3.0 and 4.0 below outline these similarities in detail.

### **3.0 VALUED COMPONENT COMPARISON**

The selected VCs represent the issues and potential effects to be considered and monitored. Each of the core conditions and valued components identified in SFN 2014 were reviewed to identify comparable valued components in the Coffee PP, to ascertain that no issues of concern to the SFN were omitted from the Coffee PP (**Table 1**).

The core conditions are found in the Coffee PP at a broad level, with the exception of “Sustainability and Legacy”. Goldcorp recognizes that this topic is important, and looks forward to finding appropriate places to consider this topic in its management planning. Some possible places to consider this core condition include:

- **Fate control and preparedness (ability of various groups to play their role in adapting to Project changes):** Goldcorp believes there is opportunity to address via the SEMP discussion on mitigation measures for the Project’s cumulative effects. Mitigation measure would be regular

engagement with other parties (e.g. government) to invite them to play their roles as providers of municipal services, enforcer of permits, etc.

- **Boom/bust management:** Goldcorp believes there is opportunity to address via the Reclamation and Closure Plan (RCP), which is foreseen to include a socio-economic component and to discuss both temporary and permanent closure. The RCP will be submitted during the permitting phase of the Project, which takes place after the PP has been assessed. Bilateral agreements with First Nations may also be an appropriate venue for discussion of economic boom/bust management concerns.
- **Intergenerational equity:** Goldcorp believes there is opportunity to address via the Reclamation and Closure Plan (RCP), which is foreseen to include a socio-economic component and to discuss both temporary and permanent closure. The RCP will be submitted during the permitting phase of the Project, which takes place after the PP has been assessed. Engagements with communities that are intended to inform the RCP are expected to include the topic of long-term environmental and socio-economic community visions for life post-mining. The SEMP may also be an appropriate location for this topic to be addressed.

The possible locations for information that is not covered in the PP can be discussed through ongoing engagement with SFN in late 2017 and early 2018.

**Table 1. Comparison of Valued Components between Minto Mine Socio-economic Monitoring Program and Coffee Mine Project Proposal**

Minto Mine Socio-economic Monitoring Program Framework		Coffee Mine Project Proposal – Comparable Valued Components	
Core Condition	Valued Components/Valued Conditions/Living Conditions	Valued Components / Intermediate components	Subcomponent or Topic, Plus Comments
Population and Health	Community Stability and Well-being	Demographics Community Health and Well-being	Crime
	Family Stability and Well-being	Partially addressed in Demographics	Demographics (Data to support certain indicators only available through SFN primary data)
	Individual Health and Well-being	Community Health and Well-being	Health conditions (Data to support certain indicators only available through SFN primary data)
	Housing	Infrastructure and Services	Housing and Accommodation
Material Well-being	Income and Income Distribution	Economic Conditions	Income and Income Distribution

	Employment	Economic Conditions	Labour Market (Data to support certain indicators not available until operation)
	Business	Economic Conditions	Sustainable Economic Development (Data to support certain indicators not available until operation)
	Traditional Economy	Social Economy	Traditional Economy
Capacity, Training and Education	Employment and Workforce Development	Economic Conditions	Labour Market (indicators not available until operation)
	Education and Training	Education Services	Industry-specific Community-based Training
Cultural Well-being	Connections to Land and Water	Land and Resource Use	Traditional Land Use
	Cultural Vitality	Land and Resource Use (Language not addressed)	Traditional Land Use
	Social Cohesion	Social Economy Land and Resource Use	Traditional Economy Traditional Land Use (first indicator not available until operation)
Sustainability and Legacy	Fate Control and Preparedness	Not addressed	(May be additionally addressed through mitigation measures for cumulative effects)
	Boom/Bust Management	Economic Conditions	(May be additionally addressed through Reclamation and Closure Planning)
	Intergenerational Equity	Partially addressed through Traditional Economy (in Social Economy VC) and Traditional Land Use (in Land and Resource Use VC)	(May be additionally addressed through Reclamation and Closure Planning, and/or the Socio-economic Management Plan [SEMP])

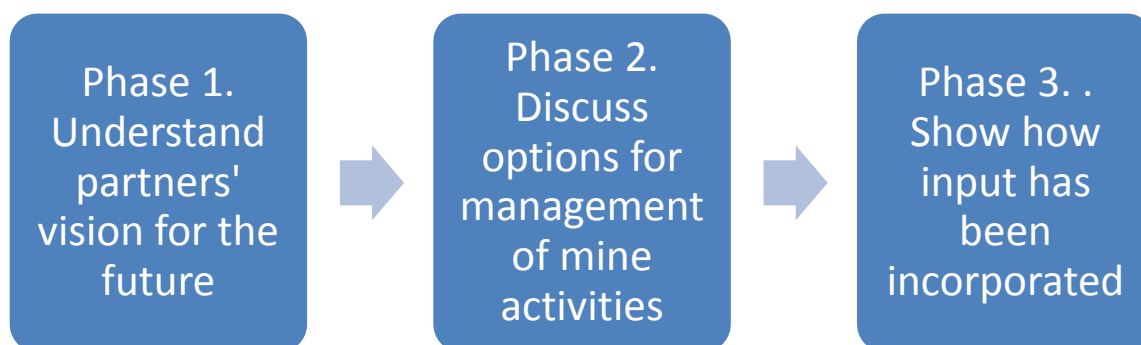
Source: SFN 2014. Note that terms changed to Living Conditions and Valued Conditions in SFN 2016

#### 4.0 INDICATOR COMPARISON

Table 2, attached as an appendix to this memo, shows a comparison of the socio-economic indicators included in the 2014 Minto monitoring report with the socio-economic VCs in the Coffee PP. This comparison shows further divergence in how the socio-economic topics were organized in the two reports while outlining the locations where the overlapping socio-economic information can be found.

## 5.0 NEXT STEPS

Goldcorp hopes to engage SFN during the remainder of 2017 and in the beginning of 2018 to explore ways that SFN data sources and concerns can be reflected in the Coffee Project's documentation. Goldcorp will propose a timeline for engagement on the development of the Socio-economic Management Plan and the Reclamation and Closure Plan, which will be prepared during 2018 to submit for licensing in 2019. It is envisioned that this development will follow a 3-phase engagement as illustrated in the figure below to listen to feedback on these issues and incorporate them into the draft. Implementation of the three phases of engagement is proposed for Q1-2018.



For additional questions or to provide feedback, please contact [Catherine.tegelberg@goldcorp.com](mailto:Catherine.tegelberg@goldcorp.com).



This Work was performed in accordance with Hemmera's various contracts between Hemmera Envirochem Inc. ("Hemmera") and Goldcorp ("Client"). This Report has been prepared by Hemmera, for sole benefit and use by Goldcorp. In performing this Work, Hemmera has relied in good faith on information provided by others, and has assumed that the information provided by those individuals is both complete and accurate. This Work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The findings presented herein should be considered within the context of the scope of work and project terms of reference; further, the findings are time sensitive and are considered valid only at the time the Report was produced. The conclusions and recommendations contained in this Report are based upon the applicable guidelines, regulations, and legislation existing at the time the Report was produced; any changes in the regulatory regime may alter the conclusions and/or recommendations.

SFN Condition	SFN VC	Indicator number	Detailed indicators for measurement (from Minto)	How Minto committed to measuring (data source)	What 2014 Monitoring Report says	Status for the Coffee Project Proposal (PP)	Notes/comment on status in the Mar 2017 PP	Corresponding Coffee VC Chapter	
Population & health	Community Stability & Well-Being	1	SFN citizens by residency	Census	Measured and reported as planned	The PP has some information related to this issue, but perhaps not on all topics in Minto (see note)	We haven't included this information. We could incorporate it from the monitoring report.	Demographics	
		2	Duration of residency	YBS	Measured and reported as planned	The PP doesn't contain this topic, and data appears to be available that could support this.	We haven't included this information. We could incorporate it from the monitoring report.	Demographics	
		3	Net migration	YG Health	Measured and reported as planned	Yes, the PP includes this.	Population size is a proxy for this. Minto Mine used pop size to refer to net migration	Demographics	
		4	SFN reasons for mobility	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Demographics	
		5	Crime severity	Canadian Centre for Justice	Measured and reported as planned	The PP has some information related to this issue, but perhaps not on all topics in Minto (see note)	Included from police reports as the source.	Community Health and Well-being	
	Family Stability & Well-Being	6	Family structure	Census, SFN Survey	Measured and reported as planned	The PP has some information, but perhaps not all topics requested (see note)	Reported at territorial level only.	Community Health and Well-being	
		7	Children in care	Canadian Centre for Justice	Missing from the report; no explanation provided	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	In small communities, this may also be a confidentiality issue	Community Health and Well-being	
		8	Family violence	Canadian Centre for Justice	Scoped it out of the programme	The PP has some information, but perhaps not all topics requested (see note)	SFN feedback on this topic and potential data sources is welcome.	Community Health and Well-being	
		9	Frequency of household moves in the last 5 years	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Community Health and Well-being	
	Health	10	Minto and contractors' safety statistics	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	This data is available now.	Not a PP topic.	
		11	Mental health and stress	SFN survey, Round table	Missing from the report; no explanation provided	The PP has some information, but perhaps not all topics requested (see note)	Statscan 2014 data on sense of belonging, sources of stress is included in the Coffee PP	Community Health and Wellbeing	
		12	Addictions	SFN survey, Round table	Missing from the report; no explanation provided	The PP has some information, but perhaps not all topics requested (see note)	Territorial and qualitative info provided.	Community Health and Wellbeing	
		13	Change in health status	SFN survey, Round table	Missing from the report; no explanation provided	The PP has some information, but perhaps not all topics requested (see note)	Data in PP show trends in perceived mental health over time in Yukon (2003 to 2013; Stats Can 2014). Data for non-infectious disease also show trends in this timeframe for Yukon for major chronic diseases.	Community Health and Wellbeing	
	Housing	14	Core need	SFN survey, Round table	Missing from the report; no explanation provided	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Infrastructure and Services	
		15	Condition	Census	Measured and reported as planned	The PP has some information, but perhaps not all topics requested (see note)	Does not include information on FN communities.	Infrastructure and Services	
			16	Average employment income by residency	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Not a PP topic.
			17	Average employment income by employees and contractors	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Not a PP topic.

SFN Condition	SFN VC	Indicator number	Detailed indicators for measurement (from Minto)	How Minto committed to measuring (data source)	What 2014 Monitoring Report says	Status for the Coffee Project Proposal (PP)	Notes/comment on status in the Mar 2017 PP	Corresponding Coffee VC Chapter			
Material Well-Being	Income & Income Distribution	18	Minto and contractors' annual and cumulative total employee income by group	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Not a PP topic.			
		19	Average and distributed household income	Census, SFN Survey	Measured and reported as planned	Yes, the PP includes this.	Additional information sources available outside of the PP (e.g. company reports)	Economic Conditions			
		20	Average and distributed personal income	Census, SFN Survey	Measured and reported as planned	Yes, the PP includes this.	Additional information sources available outside of the PP (e.g. company reports)	Economic Conditions			
		21	Income by source	Census, SFN Survey	Measured and reported as planned	Yes, the PP includes this.	Additional information sources available outside of the PP (e.g. company reports)	Economic Conditions			
		22	# of social assistance cases	SFN, YG	Missing from the report; no explanation provided	The PP has some information, but perhaps not all topics requested (see note)	SFN feedback on this topic and potential data sources is welcome.	Economic Conditions			
	Employment	Employment	23	Company hires by FN group	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports). Will become more relevant in Construction and Operations phases	Not a PP topic.		
			24	Company hires by residency	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports). Will become more relevant in Construction and Operations phases	Not a PP topic.		
			25	Employment by contractors	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports). Will become more relevant in Construction and Operations phases	Not a PP topic.		
			26	Company new hires for operations by group	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports). Will become more relevant in Construction and Operations phases	Not a PP topic.		
			27	Company employment by job category and group	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports). Will become more relevant in Construction and Operations phases	Not a PP topic.		
			28	Employment rate	YBS	Measured and reported as planned	Yes, the PP includes this.	None	Economic Conditions		
			29	Unemployment rate	YBS	Measured and reported as planned	Yes, the PP includes this.	None	Economic Conditions		
			30	Participation rate	YBS	Measured and reported as planned	Yes, the PP includes this.	None	Economic Conditions		
			31	Employment by group and residency	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports). Will become more relevant in Construction and Operations phases	Not a PP topic.		
			32	Employment by sector	Census	Measured and reported as planned	The PP has some information, but perhaps not all topics requested (see note)	Employment by occupation (job type group) and by industry (sector) for Yukon, and by community, and Aboriginal identity. Specific info on occupations that support mining operations and labour demand forecasts.	Economic Conditions		
			Business	Business	33	Company operations and capx by group	Company data	Measured and reported as planned	The PP has some information, but perhaps not all topics requested (see note)	Additional information sources available outside of the PP (e.g. company reports)	Project description
					34	Company annual and cumulative capital and operations expenditures by group	Company data	Measured and reported as planned	The PP has some information, but perhaps not all topics requested (see note)	Additional information sources available outside of the PP (e.g. company reports)	Project description
35	Yukon business names by group	Company data			Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Not a PP topic.			
36	Royalty payments	Company data			Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Available during Operations	Not a PP topic.			
37	Property tax payments and other fees	Company data			Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Available during Operations	Not a PP topic.			

SFN Condition	SFN VC	Indicator number	Detailed indicators for measurement (from Minto)	How Minto committed to measuring (data source)	What 2014 Monitoring Report says	Status for the Coffee Project Proposal (PP)	Notes/comment on status in the Mar 2017 PP	Corresponding Coffee VC Chapter
		38	Safety statistics	Company data	Measured and reported as planned	PP is not the place for this data	Same as Indicator #10.	Not a PP topic.
SFN Traditional Economy		39	% workforce-aged group engaged in harvesting activities	SFN survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Land and Resource Use. Would require SFN primary data.
		40	% amount of traditional foods consumed	SFN survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Land and Resource Use. Would require SFN primary data.
		41	Satisfaction with availability of traditional foods	SFN survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Only available during Operations phase
Capacity, Training & Education	Employment and Workforce Development	42	High-level description of programs, events and initiatives to facilitate and enhance skills development and labour force development	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Will be available in detailed management plans (e.g. local employment and procurement). Not yet available.
		43	Details of programs, events and initiatives to facilitate and enhance skills development and labour force development	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Will be available in detailed management plans (e.g. local employment and procurement). Not yet available.
		44	Government participation in programs, events and initiatives to facilitate and enhance skills development and labour force development	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	Additional information sources available outside of the PP (e.g. company reports)	Will be available in detailed management plans (e.g. local employment and procurement). Not yet available.
	Education and Training	45	Level of literacy and numeracy	Census	Missing from the report; no explanation provided	The PP has some information, but perhaps not all topics requested (see note)	Literacy only	Education Services. Data from Minto 2014 report could be added to the Coffee PP.
		46	Highest grade completed by work force aged individuals	Census + SFN Survey	Deferred measuring and reporting to a later date	The PP has some information related to this issue, but perhaps not on all topics in Minto (see note)	Graduation/dropout rates are included in the Coffee PP.	Education Services. Data from Minto 2014 report could be added to the Coffee PP.
		47	Number of individuals of work force age with high school diploma	Census	Measured and reported as planned	The PP has some information related to this issue, but perhaps not on all topics in Minto (see note)	Graduation/dropout rates are included in the Coffee PP.	Education Services. Data from Minto 2014 report could be added to the Coffee PP.
		48	School absenteeism	YG Education	Measured and reported as planned	The PP has some information related to this issue, but perhaps not on all topics in Minto (see note)	Graduation/dropout rates are included in the Coffee PP.	Education Services. Data from Minto 2014 report could be added to the Coffee PP.
		49	Highest diplomas, certificates obtained by individuals of work-force age	SFN Survey	Missing from the report; no explanation provided	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Would require primary data collection. We don't have this information.
	Cultural Well-being	Connection to land and water	50	% of workforce aged group engaged in harvesting activities	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.
51			Frequency of participation in harvesting activities	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Land and Resource Use. Would require SFN primary data.
52			Perception of likely level of participation in harvesting activities in 5 years; time and reasons	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Land and Resource Use. Would require SFN primary data.
Cultural vitality		53	% amount of traditional foods consumed	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Social Economy. Would require SFN primary data.
		54	Level of participation in processing or preparing traditional foods	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Social Economy. Would require SFN primary data.
		55	% of citizens speaking Northern Tutchone	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Social Economy. Would require SFN primary data.
Social Cohesion		56	Expenditure on initiatives to protect SFN cultural and community well-being	Company data	Measured and reported as planned	This topic would require SFN primary data, which was not available when the PP was written	Additional information sources available outside of the PP (e.g. company reports)	Goldcorp
		57	Level of participation in sharing or exchanging traditional food	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Would require primary data collection. We don't have this information.
		58	Frequency of participation in sharing or exchanging traditional food	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Would require primary data collection. We don't have this information.
	59	Knowledge of Dooli laws and customs	SFN Survey	Deferred measuring and reporting to a later date	This topic would require SFN primary data, which was not available when the PP was written	SFN primary data is welcome.	Would require primary data collection. We don't have this information.	
	Fate Control &	60	Ability of Minto/SFN/YG to manage Project-related socio-economic commitments, impacts and risks	Round tables	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SFN primary data is welcome.	Not included in the PP

SFN Condition	SFN VC	Indicator number	Detailed indicators for measurement (from Minto)	How Minto committed to measuring (data source)	What 2014 Monitoring Report says	Status for the Coffee Project Proposal (PP)	Notes/comment on status in the Mar 2017 PP	Corresponding Coffee VC Chapter	
Sustainability & Legacy	Preparedness	61	Resilience of households to manage stresses resulting from project-specific and cumulative effects	Round tables	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SFN primary data is welcome.	Detailed management plans	
	Boom & Bust management	62	Adjustment measures to manage the socio-economic effects of mine closure	Round tables	Deferred measuring and reporting to a later date	The PP has some information, but perhaps not all topics requested (see note)	This would be available during the detailed planning phase	Detailed management plans (not yet available)	
		63	Relative occupational and sectoral diversity and strengths in economic diversity	Census	Measured and reported as planned	Yes, the PP includes this.	None	Economic Conditions	
	Cost & Benefits for Future Generations		64	General description of matters addressed in Minto-SFN agreements	Company data	Measured and reported as planned	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SEMS 10.2 covers closure planning	Goldcorp
			65	Description of socio-economic effects and initiatives that will contribute to a net positive legacy beyond the life of mine	Company data	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SEMS 10.2 covers closure planning	Not included in the PP
			66	Displacement of costs and transfer of benefits to future generations	Round tables	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SEMS 10.2 covers closure planning	Economic Conditions
			67	Legacy socio-economic benefits	Round tables	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SEMS 10.2 covers closure planning	Not included in the PP
			68	Perceived availability of resources to meet the needs of future generations	Round tables	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SEMS 10.2 covers closure planning	Not included in the PP
			69	Perceived state of the environment to maintain socio-ecological systems	Round tables	Deferred measuring and reporting to a later date	This is out of scope for a PP (e.g. not envi/social, may be available during Operations only, etc). Information on this topic could be included elsewhere (e.g. monitoring or management plans)	SEMS 10.2 covers closure planning	Not included in the PP



# AGENDA

## **Tr'ondëk Hwëch'in and Goldcorp Socio-economic + Human Health Workshop October 31, 2017**

**Location:** Goldcorp Vancouver Office – Floor 31, Room G

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

**Tr'ondëk Hwëch'in (TH)**  
Names Redacted

**Coffee Project – Goldcorp Inc.**  
Names Redacted

Kelly Constable, Hemmera

### **Agenda:**

- 1. Introductions**
- 2. Socio-economic Management Plan overview**
- 3. Socio-economic Management Plan engagement process discussion**
- 4. Discussion of TH Feedback on Socio-economic Effects Assessment**
- 5. Discussion of Social Closure**
- 6. Discussion of TH Feedback on Human Health Effects Assessment**
  - a. Discussion of HHRA Amendment**

# **Tr'ondëk Hwëch'in** and Goldcorp Socio-economic + Human Health Workshop

October 31, 2017

**Location:** Goldcorp Vancouver Office – Floor 31, Room G

**Time:** 8:30 am – 4:30 pm (with option to extend to 5:00 pm)

**Tr'ondëk Hwëch'in (TH)**  
Names Redacted

**Coffee Project – Goldcorp Inc.**  
Jennie Gjertsen, Environment and Permitting Manager  
Names Redacted

Kelly Constable, Hemmera

## **Agenda:**

1. **Introductions**
2. **Socio-economic Management Plan overview**
3. **Socio-economic Management Plan engagement process discussion**
4. **Discussion of TH Feedback on Socio-economic Effects Assessment**
5. **Discussion of Social Closure**
6. **Discussion of TH Feedback on Human Health Effects Assessment**
  - a. **Discussion of HHRA Amendment**

## Action Items:

Action Item	Responsible Party	Time Frame	Status
TH to share specific VCs where there are LAA comments. Goldcorp and TH will have a follow-up methodology	TH	TBA	

Action Item	Responsible Party	Time Frame	Status
discussion.			
TH (Bea) to share information on considering women as a vulnerable population and equal access to Project benefits	TH	TBA	
Goldcorp to include the waste rock exposure scenario and dust fall scenario and run a larger suite of COPCs using UCLM 95	Goldcorp	HHRA Addendum	
Goldcorp to provide a rationale for exclusion of metals from consideration as contaminants of potential concern in combustion emissions	Goldcorp	HHRA Addendum	
Goldcorp to examine acute exposure scenario, in addition to chronic exposures, for the air quality health risk assessment (for contaminants of potential concern other than criterion air contaminants) in HHRA addendum	Goldcorp	HHRA Addendum	
Provide better documentation of the rationale for the assumed consumption rates	Goldcorp	HHRA Addendum	
Send TH the Health Canada comments on the Project Proposal	Goldcorp		Complete.
Goldcorp to send TH an engagement plan for the SEMP and Closure Plan	Goldcorp	Nov. 17	Complete.

## Discussion Summary:

Goldcorp and TH discuss objectives for the meeting. Goldcorp notes that this is a starting point for how to think about managing socio-economic effects. Goldcorp's objective is to understand how TH wants to walk through the socio-economic management process together and arrive at the right priorities for socio-ec management.

Goldcorp notes the Truth and Reconciliation Commission's call to action #92 for industry and how Goldcorp's sustainability goals are an opportunity for Goldcorp to put this call to action in motion.

#### SEMP Overview:

- Goldcorp gives an overview of the objectives of a Socio-Economic Management Plan (SEMP). It incorporates commitments as well as feedback from external parties. The SEMP applies throughout the Project life, and it is adaptable.
- Goldcorp gives an overview of socio-economic effects monitoring to help provide clarity on the differences and linkages between the SEMP and the Socio-Economic Effect Monitoring (SEEM). Socio-economic effects monitoring involves multiple parties, as socio-economic effects are complex.
- Goldcorp notes that monitoring is an important aspect and for TH and Goldcorp to consider which other parties to engage, like Yukon Government (YG), in order to get value out of the future monitoring.

#### TH and Goldcorp discuss indicators:

- Goldcorp notes that indicators are not pre-selected, so it is important for TH to think about what TH sees for the future to choose the indicators that are most important and effective for TH.
- TH agrees that there's a lot of things to consider and looking at the cross-cultural communication aspect is important.
- TH notes in some circumstances, they have developed a code of conduct for principles of engagement, and this helped guide discussions so that both parties understood one another.
- Goldcorp notes there will be a place in the SEMP for that concept of principles of engagement.
- Goldcorp explains that monitoring is not just quantitative data, but also qualitative.
- TH notes the cultural awareness training that TH offers that they would like to deliver to Goldcorp. Goldcorp notes plans to attend TH training and incorporate concepts into SEMP.
- TH notes the importance of identifying triggers for changes in approach and the fact that changes [in monitoring results] might be incremental. Goldcorp confirms that TH is expressing that locally developed indicators and thresholds are important.
- Goldcorp notes that it is important to understand how the indicators tie back to the Project, and that there may be triggers that result in the need for Government to take action. Being too specific about indicators can be difficult as well.
- TH notes that by operating in TH traditional territory there is a responsibility of stewardship on Goldcorp's part. Goldcorp acknowledges this. Goldcorp notes that reporting is part of the SEMP as well.

Goldcorp gives an overview of the other inputs to the SEMP development:

- Goldcorp reviews how the consultation and engagement program and the Sustainability Excellence Management System (SEMS) standards also inform the development of the Project, including the development and implementation of the SEMP. Goldcorp explains SEMS, noting it is a continuous improvement system. Goldcorp notes that part of this was driven by the fact that not every jurisdiction has the same regulatory requirements, so it was a way to standardize Goldcorp's mine development across the world. Goldcorp does internal audits for compliance with SEMS.
- Q: TH asks how long SEMS has been around?
- A: Goldcorp replies that it has been around since 2014, and has gone through some revisions based on feedback from the sites. Edits each year are done to ensure it is up-to-date with standards. SEMS is not publicly available at this point.
- Goldcorp gives an overview of how the SEMP connects and manages socio-economic activities and how it combines aspects of SEEM, consultation and engagement, and SEMS. Goldcorp explains that a one-page, very conceptual high level SEMP was submitted with the Project Proposal. Now, Goldcorp is working on the draft SEMP, and this requires heavy consultation with potentially affected First Nations and communities. Once the SEMP becomes "final", it is an adaptable living document.
- Q: TH asks what the consultation program looks like for the SEMP?
- A: Goldcorp replies that this is an objective of today to understand what TH wants to see in terms of engagement.
- Q: TH asks about best practices in Yukon examples?
- A: Goldcorp replies that there might be some lessons learned from other mines, like Minto Mine. There is lots to draw on from the environmental side for management plans, but not a lot for socio-economic management and monitoring. Goldcorp doesn't want to just use the Minto program, but wants to understand lessons learned there. Minto's program was very much tri-partite with Minto, Selkirk First Nation, and Yukon Government, and this was a success that Goldcorp wants to draw from. Goldcorp and TH are in a unique position now to engage and create a SEMP together. Goldcorp notes that there are examples in Yukon where a lack of process for integrating the socio-economic into Project management resulted in some failures. While there are not a lot of examples, there are lots of lessons to draw on.
- Q: TH asks if Goldcorp is looking at Northwest Territories for SEMP examples as well?



- A: Goldcorp notes it has been suggested by others and requests for TH to send along examples that TH may be thinking of for this. Goldcorp has lots of internal examples to follow as well. Effective documentation is one piece that Goldcorp is particularly interested in that TH can provide if they have any examples.

Goldcorp notes that there are case studies done in Nunavut done by the National Aboriginal Health Organization, but it's most important to understand what TH wants in this context. Goldcorp and TH brainstorm what "Best Practice" means in Yukon and in the north:

- TH notes that it's looking at where Yukon First Nations have been involved and communication has been there. Look at other First nations where they don't have the capacity to follow up, how do you make sure that follow up happens? Look at having consultation with the community on the objectives and layout of the plan
- TH notes the social and political context since Brewery Creek is so different now. TH is empowered at a different level now. TH notes that not getting caught in tokenism, following up and doing the work. TH notes that looking at TH traditional law, TH constitution, TH acts and legislation, and lots of ways TH law is enacted in ways the non-TH world would understand. Also be aware that there are communication understandings that need to be understood first.
- Q: Goldcorp asks about these TH laws that are enacted that aren't understood by non-TH people, how would Goldcorp understand those?
- A: TH notes that some laws and acts are very western. TH has been doing things to match a business style or a western style of communication but there's aspects that are missed in that western communication. TH notes that it's like the way you are at home compared to how you would be when you're doing business.
- TH notes that for First Nations, there's always some level of engagement acknowledgement that there is necessary time that needs to be allowed for things to be established. There needs to be faith in being heard in the meetings and that the consideration is real and the response is real. Good faith piece is very important.

SEMP Engagement Process and Planning Discussion:

Goldcorp notes the difference in how TH and Goldcorp approach time and how Goldcorp acknowledges that. Goldcorp is pressed on a quarter by quarter basis, and is aware that this is not how decisions get made at a

local level. Goldcorp notes that it's important to recognize that we might not get it right the first time, but a commitment to coming back and having the conversation again and working towards getting it right.

Goldcorp adds that the process for engagement is such an important piece for the development of the SEMP, so the draft SEMP will take some time. Goldcorp notes that the SEMP doesn't fall into the regulatory process the same way that other management plans do, so it is more important to get the SEMP right than to file it with a regulatory body.

Goldcorp and TH discuss an approach to engagement on the SEMP. Goldcorp reviews a suggested approach, asks TH for input on the approach. This begins with a discussion of future vision for TH's community, and TH discusses the following points:

- TH notes that cultural identity, notes there's 7-8 generations of erosion.
- Self-identity is important.
- TH is often reactive to others coming in. Consider what TH envisions in a territory where mining isn't possible. TH is constantly playing active host to these outside factors coming in. employment for example, thinking about employment from the Project is too narrow.
- TH Citizens are one generation out of residential school; this is important to recognize.
- Goldcorp should consider revitalizing TH identity and bringing it to the forefront. Cultural identity is not the surface actions of hunting, fishing, beading, it is about how to conduct TH as a community.
- Self-determination of self-government, the vision is being self-determined.
- Protecting culture and traditions is important for TH.
- Health and well-being of citizens and the community is important for TH.
- Traditional values through the heritage department.
- TH notes that TH's current governance is still colonial, there's a lot of fear around that. It was made illegal to govern as a First Nation the way it is done traditionally. Because of this, it is hard for TH to implement a governance structure that is more traditional.
- There is a TH constitution – there is a level of assimilation that has taken place. To govern ourselves in a culturally appropriate manner, how do we do that when people grew up in residential school?

Goldcorp notes that a mining company fundamentally moves around earth, and that there's a unique tie to the land for First Nations peoples. Goldcorp asks the question: how can Goldcorp support reconnection to the land, given what mining is, given that citizens are not all in Dawson? Goldcorp asks if it is appropriate to focus on Dawson as a location for TH Citizens, acknowledging that TH Citizens live outside of Dawson and Yukon as well? TH answers Goldcorp:

- TH notes that Citizens come home (to Dawson) to harvest, there is a tie to the land even if you live out of town. There's the environmental protection piece as well that ties people to the land.

- There is a traditional law piece as well when you consider working for a mining company as a Citizen. There is an internal conflict for Citizens, as it's a conflict between having a job and providing for family or being environmental stewards; both of these are traditional law. The question is, how do you manage that internal conflict as an employer? TH suggests that it could be about acknowledging that conflict with traditional law. TH notes an example in Australia where there's a clear recognition that working for the mine is in conflict with traditional values, but its traditional law to also provide for your family.
- TH notes that it's about realized effects or effects that are harder to see. TH suggests that Goldcorp look at cultural or mental health supports for Citizens working at a mine, to consider the dissonance that is there. Part of this can be considering closure activities as an opportunity to get Citizens involved in closure of the mine as a healing activity. This will allow Citizens that have been involved in mining to be involved in the healing the land piece as well.
- Community sustainability goes beyond economic effects of mining, but continuation of cultural values beyond the mine.
- TH notes impacts on community infrastructure and services will occur as well, for example there are healthcare services and community services for Citizens and elders specifically. Dawson daycares are full at the moment, and the Robert Service School has a large population now as well.
- Dawson has a lack of mental health and well-being focus in healthcare, and there is a cultural piece as well. There are mental health and well-being, as well as cultural effects, of a parent going out to work for two weeks at a time. In essence, a piece of the family unit is gone for half of the year.
- Culture is all year long. For example, there is preparing to go out and hunt a moose, hunting the moose, then coming back and processing the moose. One can't schedule cultural identity.

Goldcorp replies to TH's statements, noting that the baseline for the Project captures TH's programs in the community, and that there's a fear of being overwhelmed and capacity to respond when jobs and associated issues come up, so part of the mitigation is supporting existing programs so that being the tendency to be overwhelmed is avoided or reduced.

TH notes that Goldcorp should consider that jobs may not be the best way to support the community, maybe it's supporting these programs. People who struggle with employment need these programs first for the jobs to then come their way. Goldcorp needs to be a community member. TH has experienced many mining endeavors and has experienced ebbs and flows in population and employment. TH acknowledges Goldcorp's support in local sponsorships, noting that this is a positive place for that community member role, as long as it is appropriate to the needs and culture of the community.

Goldcorp acknowledges TH's statements, and notes that it's about being strategic and about supporting existing programs in the community that already have a degree of success. Goldcorp needs to understand how to

balance out the urgent, the important, the unseen, and the long-term chronic issues. There might be a natural fit for Goldcorp to support an initiative or program in the community, Goldcorp and TH may need to get creative.

Goldcorp asks TH about the self-determination aspect of employment for TH Citizen, TH provides some information:

- TH notes that the support for TH Citizens from Goldcorp could be investment in scholarships, or investment in the heritage sites, such as roles like the Mayor of Moosehide or the Caretakers of 40 Mile. These positions run based on investment dollars. A future for TH is to invest in TH's future.
- Goldcorp should look at future-based training, noting that there is trauma involved with being trained for jobs that don't materialize for the community.

Goldcorp notes that there was an idea brought up by TH in the Closure Workshop regarding opportunities for TH to grow local plants for reclamation. This kind of operation could be something that Goldcorp helps TH establish to support reclamation at Coffee, and the business could grow to supply other reclamation activities in the territory.

#### **TH's Vision** for Socio-Economic Effects Management:

TH and Goldcorp discuss ways that Goldcorp can be successful with TH in managing socio-economic effects from the Project:

- TH notes that it is important for Goldcorp to do the work to understand TH's perspective on the SEMP and effects management.
- Goldcorp asks about groups that exist in the community for Goldcorp to reach to provide information and to hear feedback?
- TH notes that people process information in the community, not necessarily in a meeting or focus group. By being in the community, one can observe how people interpret and share the information they've heard. TH notes that their observations about people in the community are informed by knowing the community.

TH and Goldcorp discuss engaging TH and Dawson-based youth:

- TH doesn't have any clear direction on how to engage youth. TH notes that people stop engaging because they don't feel heard, and there is engagement fatigue. Goldcorp recognizes engagement fatigue and wants to use existing avenues for engagement.

- TH advises Goldcorp to have a meeting specifically for youth. Suggests going to the school to discuss the Project and socio-economic engagement, and Goldcorp can go through TH to organize this.
- TH is having their first Youth Council meeting on November 16. This could also be an avenue through which to engage youth.
- Q: Goldcorp asks about career counselling at the school?
- A: TH describes how the school system has First Nations students that are so disenfranchised that the system doesn't help them. There's changes in the Yukon education system that have just happened to help this but that won't be the kids in school right now.
- TH notes that there's issues within the community where the message to students/kids is that they need to go away to pursue further education, but at the same time there's the message to not leave Dawson; to not leave the community.
- TH discusses vulnerable people in the community and opportunities for those people, such as women. TH is looking to Goldcorp to support those initiatives to give vulnerable people opportunities.
- TH emphasizes that it is not about skills as a barrier to employment, it's about teaching Citizens to balance their lives to be an employee (with any organization).
- TH notes that there is a crisis mentality within the community, for example people will leave work and return to the community for events that may not even affect them directly. An example is the death of a community member that may not directly affect a Citizen, but the Citizen drops everything and returns to Dawson to support their friends.
- TH describes how there are citizens who lack the foundation due to effects of residential school, and the community struggles with that. Part of the hurdle is getting people to adapt to coming to work.
- Much progress has been made by TH with TH citizens in the past two decades on this, but work is ongoing.

SEMP Topics Discussion:

Goldcorp prompts feedback from TH on SEMP topics:

- TH notes the TH Constitution is a good reference document for Goldcorp, and the Together Today for Our Children Tomorrow document should be part of the SEMP for relationship with Yukon First Nations.



- Goldcorp notes that the importance of these documents is recognized. Notes that Goldcorp wants to focus on what it can carry out directly.
- TH advises to use the TH Constitution as a reference for priorities. Cultural training would speak to this as well.
- TH notes that it's important to understand predicted effects as well.

Goldcorp reviews the education and training topic area for the SEMP:

- TH notes that education services or training some barriers for Indigenous peoples is even knowing how to access the opportunities. Also considering time frame for access to such opportunities.
- TH notes that there is a role like that in Yukon College for helping guide TH Citizens in their access to school.
- TH noted the college has essential skills program for students that will not go back to school for academic learning. Processes need to be in place to help students succeed in achieving their employment goals.
- Preferential hiring practices for TH citizens is important. Those policies will be included in an agreement with TH.
- TH encourages that Goldcorp considers having a workplace that values cultural values, for example being present for funerals in the community.
- TH notes that there are many people in the TH community who are ready to go and competent, but there are some aspects of building a business that are very daunting. Getting loans are daunting. Also CORE certification. Setting people up to be successful.
- Goldcorp notes wanting to hire local wherever possible, however the challenge in Yukon is that the unemployment rate is so low. Considering the gap that is left if Goldcorp takes people away from their current job. It's hard to predict how many people will want to move back to Dawson for a job with Goldcorp, or for people if they move to Yukon to know where they want to live.
- Goldcorp is looking to see where jobs don't need to be at the mine, where would you put them. Goldcorp envisions an office in Whitehorse for finance, for example and is looking at management of logistics in Dawson somewhere, with an office.
- TH notes that there are quite a few TH people who are able to work in finance and payroll now, so that office could be in Dawson.
- Goldcorp notes that they know that they need to be working closely with TH to be successful. How to work towards local hiring together, and looking at what TH can do that Goldcorp can't, and what to be cognizant of.
- TH notes it's about investing in the community, look at a training strategy and having people participate in that. TH has a number of citizens in Whitehorse and other parts of Canada as well. This should be considered in Goldcorp's definition of "local".

- TH discusses TH and the City of Dawson and how people coming back make a bigger tax base.

TH and Goldcorp discuss the Northern Access Route (NAR) and how this may need to be considered from a socio-economic perspective:

- TH notes that the NAR is a tricky aspect, and gets talked about more than the mine footprint. Roads are small but they impact a very large geographical area.
- TH Citizens are concerned about caribou, as roads disturb migratory herds.
- Highway access has allowed people to get around on the land differently and into other area. TH notes an example of TH people who were tied to WRFN people due to river access but changed with highway access and how people travel.
- TH notes that there were many comments and questions on the NAR during the Technical Working Group (TWG) but not sure how those have been addressed.
- TH notes that the NAR will be a trigger piece, an emotional connection to the area. People may equate development now with the negative aspects of development they've seen over their lifetime. TH gives an example of Indian River, where the land has gone from a green space to a parking lot over 20 years with road access. It's not related to the Project, but there are many reasons that Citizens have a negative connotations with the road.
- Goldcorp discusses the engagement with TH on the NAR to date, and NAR tours and how the current state has been well established as it relates to the road.
- Goldcorp notes that engagement the other actors on the NAR are a piece that Goldcorp has to work with on this. It's about discussing how to bring the other actors to the table. The commitment to engagement with multiple actors on the road may be something that is included in the SEMP.
- TH needs to have an internal discussions about this first. Goldcorp agrees.

TH and Goldcorp discuss community health and well-being:

- TH is interested in Goldcorp's view of this topic first.
- Goldcorp notes that there's inside the fence and outside the fence. Goldcorp wants everyone to go home safe, and wants to make sure that the public is safe as well.
- Goldcorp discusses how Health Impact Assessment (HIA) and significance were discussed in March, and how their significance is interrelated but separately lose their importance. Goldcorp notes that from their technical expert's view, it would be children and youth that would be very important. In terms of the Human Health Risk Assessment (HHRA), the priority might be looking at perceptions and country food quality.
- TH notes linking the project mitigations to the potential effects, and looking at the measures may be the best way to view this.

- Goldcorp notes that it is important that the discussion provide a strong sense of priorities, noting that the SEMP will be tied to the mitigations in the Project Proposal and that those mitigations are tied to effects.
- TH notes that there are aspects that are regulatory and aspects that are part of the TH-Goldcorp relationship.
- TH highlights the important consideration of TH's residential school generation, TH's intergenerational generation, and TH's resource extraction generation and how TH needs to figure the similarities, differences, and needs for each generation.
- Goldcorp notes that the SEMP is a place where Goldcorp and TH can discuss priorities and find areas to work on together. Development of the SEMP is a time to check in on VCs and see if they still apply and make sense.
- Goldcorp and TH discuss the Community Health and Well-Being Assessment (CHWB). There are mitigations regardless of significance. Goldcorp notes that the slide is to stimulate conversation about the topic.
- Goldcorp notes that a different way to look at priorities could be considering what initiatives are already underway for TH government. TH replies that there are some aspects of the CHWB that are harder for Goldcorp to get information
- TH notes that role of women in the community is a topic with more focus nationally in Environmental Assessment so that is something to consider, also considering Elders as a vulnerable group. Name Redacted  
raised the concern that the elderly may move further into poverty if they're already there; notes for Goldcorp to consider groups with a fixed income.
- TH notes that there is an aspect of cultural wellness to be considered as well.
- TH notes that an enhancement is economic and social security for citizens. An indicator could be housing, or low income housing or access to child care.
- TH notes that there could be a potential spike in single motherhood/births due to mobile workforce.
- TH and Goldcorp discuss the Non-wage Economy part of the Project Proposal and how a monetary value was not followed through for the Non-wage Economy, as it was hard to define.
- Goldcorp discusses how some mitigations from other VC reports applied to others, so Goldcorp tried to keep that consistent. Food security is an important part of Non-wage Economy.
- Goldcorp notes that it is important to not assess the same effect twice, so Goldcorp was careful about that in the Project Proposal.
- TH notes that there may be a missing mitigation or one that drops off between versions of the draft Proposal and the submitted version. Goldcorp asks TH to follow up with Goldcorp when they find the missing mitigation and note it.
- Goldcorp notes that cultural awareness training is under the Education and Training topic, and that there is also the Community Infrastructure and Services topic.

- Q: TH asks if there is an Air Quality management plan?
- A: Goldcorp confirms that there is an Air Quality and Greenhouse Gas Management Plan to be created for the Project.

#### TH Project Proposal Feedback Discussion:

Goldcorp explains that the agenda item is to provide high-level understanding of how Goldcorp will respond to TH's feedback on the Project Proposal

- Q: TH asks if Goldcorp is re-submitting the same HHRA?
- A: Goldcorp will submit the addendum if it is ready, but there is field data that is still being received. Goldcorp explains that the conversation has advanced with TH beyond "pre-submission" consultation.
- Goldcorp will discuss some of the issues identified by TH and look at a reasonable time frame for getting that back to TH. Goldcorp notes that the Project Proposal that was submitted was for the current mine plan. There are updates to the water quality modeling and air quality modeling that are being incorporated into the HHRA addendum, which will be submitted after the Project Proposal is re-submitted.
- Goldcorp reviews the general responses to TH feedback regarding management plans. Goldcorp notes that the management plans are to be developed in collaboration with TH.
- TH confirms that the SEMP will be developed through consultation in coming months.
- Goldcorp explains that it is appropriate to have a conceptual SEMP at this stage and work in detail from there. The mitigation measures from the socio-economic sections of the Project Proposal, noting that if there are mitigation measures that aren't in the Project Proposal the SEMP is where those should be as well.
- Q: TH asks about the time frame for the SEMP to be developed? Notes that TH just received the information on this. TH will need to do more visioning, and to be engaged more on this.
- A: Goldcorp is looking to develop the first draft of the SEMP in Q1 2018, and today is the first step, looking at how to organize the conversation and develop that communications process. Goldcorp notes that this will involve the community, more conversations with TH.
- Q: TH asks about the SEMP in relation to re-submission?
- A: YESAB doesn't require a SEMP. As licensing and the assessment progresses, more details on the Project will be developed. Goldcorp explains that by doing a fully formulated plan before there are opportunities for public comment is not a good idea or will make an effective plan.

- Goldcorp and TH review the YESAB process and how it relates to the development of the SEMP.

Goldcorp and TH discuss the Local Assessment Area (LAA) for socio-economic VCs:

- TH notes that differentiating TH from Dawson and Whitehorse was the question. Goldcorp explains the EA methodology for including Whitehorse and how it can fall off based on effects identification.
- Goldcorp asks if the comment was related to a specific VC as the LAA varies by VC.
- TH doesn't know right now, action item to follow up on this.
- TH notes that they believe that the scope of the LAA erased TH. TH will follow up on this. TH have different access to resources, different governance. This needs to be considered. TH comments were well-documented in the baseline, but then TH didn't show up in the assessment.
- Goldcorp notes that best efforts were made professionally to identify effects to vulnerable groups. Goldcorp notes data limitation issues are a real factor in Yukon as well. For example when looking at census data, can't distinguish TH from Dawson for certain indicators.
- TH notes that the issue is the specificity of effects, and looking at more vulnerable populations.
- Goldcorp notes that segregating TH from Dawson would be difficult and take a lot of time, so the question is to look at the effect more broadly and more broad mitigations and then look at ways of monitoring this with TH. Residual effects were difficult to discern, and there may be more value in looking ahead and dealing with things in the SEMP to address vulnerable communities that may not have been addressed in the Project Proposal.
- Goldcorp and TH discuss the primary data that has come from TH, noting that the majority of it is from TH Citizens, and how this was used to inform assessments for all First Nations in the absence of primary data from other First Nations.
- TH and Goldcorp discuss how TH does not represent other First Nations. Goldcorp acknowledges this and describes how there are efforts being made to give voice to potentially affected First Nations as the Project progresses.
- TH notes that the Project is in TH traditional territory, and other First Nations may be affected, but not as affected as TH. TH's perspective is that they need to be identified in these IRs, and working toward local employment and procurement initiatives for TH, not for other First Nations.
- TH notes that identity is an issue, even the term "First Nation", the process needs to be open and transparent.
- Goldcorp notes that there are many vehicles for considering TH specifically, such as the local employment and procurement piece, in areas of the SEMP and perhaps an agreement. It's about making sure that TH Citizens know what it means to have a Goldcorp mine in their traditional territory.

Goldcorp reviews Community Infrastructure and Services IRs:



- Goldcorp is working on revisiting information on the TH-specific services. Goldcorp notes limitations for Dawson-wide services data. Goldcorp is looking at TH-specific housing as an area of interest in updating information and how to include that in the SEMP.
- TH notes a strong dialogue between Goldcorp, TH, and YG will be important for this piece as well for infrastructure. Goldcorp notes that some of the infrastructure and services estimates in the PP are based on population assumptions. TH notes that social stability is an example where if a TH citizen can build a house during the Goldcorp era then can they maintain the house afterward. Social closure is part of this.
- Q: TH asks how City of Dawson is considered?
- A: Goldcorp replies that they are engaged regularly, and are an information source for the Project.
- TH explains that there is a collaborative report from Dawson and TH in 2006 regarding values intersection between both bodies.
- Goldcorp notes that this document was looked at for the Project Proposal development, and that the SEMP is a good place for engagement with TH on separating out information on TH regarding specific infrastructure as well.
- TH notes that mental health programs are specific to TH, and that is a concern identified in the baseline for the Project. This also is part of cultural integrity for TH Citizens working at the site.
- TH notes that Goldcorp will have to have flexibility regarding what involvement looks like for infrastructure and services, notes that 1996 a mining company paid for a full time math teacher because it was required.
- Goldcorp intends to engage with service providers to ensure they know what these groups need to have information in advance to prepare. This is to prepare for situations and hope that Goldcorp doesn't need to pay for a math teacher because it's been forecasted and handled by the government.
- TH notes that the baseline did a good job of documenting specific comments. It's about considering that in effects and mitigations. Goldcorp notes that the comments were considered in development of the VCs and mitigations.

Goldcorp reviews responses to Land and Resource use IRs:

- Goldcorp notes that increased access effects were considered in other effects assessments, such as the wildlife section.
- Q: TH asks if the rating is non-significant in the case where the effects are both positive and negative?

- A: Goldcorp replies that the mitigation is applied and then the residual effect is considered non-significant. Goldcorp describes where in the Project Proposal that NAR mitigations are discussed, such as wildlife mortality is discussed in the wildlife VC reports.
- Q: TH asks about a scenario where the Project Proposal determines that something is not significant, but through the implementation of the SEMP the item is looked at, and it is found that in the future the effect is significant?
- A: Goldcorp replies that the SEMP is to verify the predictions in the Project Proposal and monitor things like land and resource use and effects to that.
- Goldcorp notes that just because something is non-significant, doesn't mean Goldcorp won't look at it or stop talking about it. Goldcorp has heard that moose are important, for example, so even though there aren't expected to be effects to moose populations, Goldcorp will include this consideration in the SEMP and then if there is an effect, it can be managed.
- Goldcorp notes that the SEMP is an opportunity to also make sure that mitigations are being applied properly. There will be a reporting component that reports back to TH. Goldcorp and TH will develop this framework together. The SEMP will do what it can, but it will be developed over time, noting that there's only so much that Goldcorp can do. Hunting limits are the responsibility of Yukon Government.
- TH notes that the language is important to consider, for example oral history can provide information on moose yield, it is not a number but it is information.
- TH notes that this is where the code of conduct on principles of engagement is so important. TH notes that as far as fish and wildlife go, TH law comes into play as TH Citizens follow different law than non-TH Citizens.
- Q: TH asks about a Yukon Government plan for placer mining in the area?
- A: Goldcorp explains the YG Resource Gateway project, noting that Goldcorp is receiving no money from YG on the NAR and Goldcorp alone is building it. Gateway is not included in the cumulative effects because YG has not put anything into YESAB at this time.
- Goldcorp explains significance determinations. Goldcorp and TH discuss effects to women as a result of mining Projects. Aspects to consider are access to child care, exposure of young women to a largely mobile and probably male workforce, looking at STIs, unwanted pregnancy, and considering a largely male workforce, women are left at home as full time parents and looking at adjustment periods for re-entry and exit. Looking at how women are able to equally access economic benefit.
- Goldcorp and TH discuss the IR that discusses the role of TH Government as it relates to access to mental health care and things like policing. There are mitigations that Goldcorp can put forward on site

and to employees, but Goldcorp can't put a mitigation like "TH will hire more mental health workers", but Goldcorp can work with TH on how to make that happen.

HHRA Addendum Update and Discussion:

Goldcorp provides an overview of the HHRA addendum that is currently underway, noting that new air quality data is currently being re-done, and noise has been re-done, so that information will be incorporated.

Goldcorp reviews a summary of key issues as presented by TH's technical consultants. Goldcorp notes that they have been frank about arsenic and the WRSF in the landscape and the risk may pose without appropriate management.

Goldcorp will review the fish tissue, stream invertebrate tissue, and water quality data that were collected previously or are expected shortly (2017 studies). This information will be incorporated into the HHRA addendum. Goldcorp reviews the work being done on diesel particulate matter and the preliminary results.

- Q: TH asks what ratio being used for DPM to PM2.5
- A: Goldcorp needs to review it and get back to TH.
  
- Q: TH asks if Goldcorp assumes that all DPM is PM2.5 in the current HHRA?
- A: That is a conservative approach, and need to look at the results and determine if it is reasonably conservative.
  
- Q: TH asks if Goldcorp has thought about using Health Canada acute toxicity reference value for diesel particulate matter.
- A: Goldcorp will look into this and get back to TH.

Goldcorp discusses country foods ingestion approach is discussed for the HHRA addendum.

- Q: TH asks if the modeled uptake will be compared to baseline data? Notes confusion with data presented previously. How would you interpret data that is modeled where it will be lower than the current measured baseline information? IR 50 and IR 63 touched on this.
- A: Goldcorp notes the variability for plant uptake is a consideration. This IR comment was misunderstood previously by Goldcorp, and we now understand that the TH reviewers were pointing out that there are good baseline soil chemistry and plant tissue chemistry data that can be used to predict plant uptake and human exposures. Goldcorp will look at this very closely and do a better job of uses the relevant site-specific information.

- TH thinks that Goldcorp could use current conditions to calculate exposure. Goldcorp will have a look at this in the addendum.

Goldcorp and TH discuss trace air contaminants:

- Goldcorp discusses the approach to assessing air contamination, noting that 50 percentile was used in the dust fall scenario for waste rock arsenic scenario. Regarding dust fall, chemistry results in waste rock and ore samples are used for predictions. Many operating mines have dust monitoring programs, noting that you find a much lower concentration in areas adjacent to the source than the concentrations in the source materials themselves. The HHRA is taking the 50<sup>th</sup> percentile and depositing on the landscape as a conservative estimate.
- TH notes that certain plant species, for example berries and manganese, where you don't understand where the metals are. Not just arsenic is being disturbed when the earth's surface is being disturbed for the mine. To narrow the focus to one element isn't how TH's consultants would do this. 95<sup>th</sup> percentile would generate a new list of COPCs.
- Q: TH asks if the 95<sup>th</sup> percentile used just for screening?
- A: Goldcorp replies that this is correct. This is for arsenic and other metals.
- Action item to look at waste rock exposure scenario and dust fall scenario with a larger suite of COPCs using UCLM95 concentrations of the broader suite of trace elements as a way of deciding which of these to include in detailed human exposure estimates.
- TH would like a more robust discussion about why Goldcorp isn't looking at individual metals in truck exhaust, Goldcorp agrees to provide rationale in the HHRA addendum.
- Goldcorp reviews the original noise assessment estimates, 65 dB is the conservative estimate for the noise assessment.
- TH notes that there is a trap line there and looking at the considerations for that in terms of MPOI (Maximum Point of Impingement) for the air quality predictions.
- Goldcorp will ask the air dispersion modelling team if it is possible to get better information on predicted concentrations of airborne contaminants at the MPOI.
- TH notes questions about ingestion rates. Goldcorp will email out this excerpt from the HHRA. (Goldcorp subsequently acknowledged that a rationale for the assumed ingestion rates was missing from the original HHRA appendix, with apologies, and committed to providing this in the HHRA Addendum).
- Goldcorp summarizes that the HHRA was intended to be accessible to as large an audience as possible by focusing on key issues. This may differ from how other subject matter experts may do it.

- Goldcorp discusses mercury as a consideration for fish consumption, an issue raised by Health Canada. This is perhaps a misunderstanding, since the project will not change environmental quality for mercury (although this is discussed early on in the HHRA and water quality and aquatics sections of the Project Proposal as a hypothesized project effect).
- TH notes that a screening-level ecological risk assessment (ERA) could be done to tackle that, and asked if there are any plans to include a formal ecological risk assessment for assessing project effects on wildlife or fish.
- Goldcorp replies that an Ecological Risk Assessment has not been given a lot more thought, but has been discussed internally. Completing an effects assessment or aquatic life or wildlife can be completed using several different approaches, and ecological risk assessment is only one of these. For cases where the project is predicted to result in increased levels of metals/metalloids or other contaminants in air, soil, plants, water or sediment, comparing the potential exposures of aquatic life or wildlife to a threshold of effects is a risk assessment, but is not always presented in the same structured way that is used in a typical formal ecological risk assessment.

#### Social Closure Discussion:

Goldcorp gives an introduction to social closure and how closure was discussed at a workshop earlier in October. Goldcorp notes that not much is prescribed in Yukon for social closure, other than that it should be considered in closure. Goldcorp has a SEMS requirement regarding social closure. There are lots of lessons learned regarding closure from a socio-economic perspective. Goldcorp gives an overview of how the SEMP is applied in construction and operations, and then socio-economic content in the reclamation and closure plan that addresses temporary and permanent closure.

- Goldcorp provides a social closure topics handout, asks TH to take this away and provide feedback. TH provides preliminary feedback to consider women and financial literacy, as well as how land use might change.
- Goldcorp discusses the importance of community planning and economic development planning that Goldcorp is interested in for Dawson to avoid boom and bust cycles.
- Goldcorp discusses a workforce transition plan a staged approach to layoffs for closure
- TH notes that there's the piece of Goldcorp's community involvement managing dependencies on the community level.



Closing Notes:

- TH notes there should be participation from TH department heads and staff and Elders, and Citizens for SEMP development. Elders provide direction for mining engagement.
- Goldcorp encourages TH to consider experiences with closure in their traditional territory.
- Review action items. No additions.
- TH provides positive feedback on workshop format.

Workshop ends at 4:30 pm.



# Coffee Project

## Tr'ondëk Hwëch'in and Goldcorp Socio-economic and Human Health Workshop

Vancouver, BC  
October 31, 2017

 GOLDCORP

- 1. Welcome and Introductions**
- 2. Discussion of TH Feedback on Socio-economic Effects Assessment**
- 3. Socio-economic Management Plan Overview**
- 4. Socio-economic Management Plan Engagement Process Discussion**
- 5. Discussion on Social Closure**
- 6. Discussion of TH Feedback on Human Health Effects Assessment**
  - Discussion of HHRA Amendment



- 1. Welcome
- 2. Site-specific Safety Considerations
- 3. Introductions

<b>Goldcorp</b>	Name Redacted - <b>Jennie Gjertsen</b> , Environment and Permitting Manager - Names Redacted
<b>Tr'ondëk Hwëch'in (TH)</b>	Names Redacted
<b>Hemmera</b>	Name Redacted - <b>Kelly Constable</b> Names Redacted









# WHAT IS A SOCIO- ECONOMIC MANAGEMENT PLAN (SEMP)?

**Why:** To *manage* the Project's potential socio-economic effects (positive & negative) which were identified in the Project's Proposals socio-economic effects assessment reports.

**What:** Provides the Project's socio-economic commitments and policies, which contribute to enhancing positive effects and mitigating or eliminating negative effects.

**Who:** Goldcorp is responsible for developing and utilizing this plan to organize and operationalize the Project's socio-economic commitments. Will reflect inputs from various government bodies, First Nations, communities and stakeholders; however, Goldcorp is responsible for implementing and financing the SEMP and its related activities.

**How:** By incorporating the following on a regular basis:

- best practices established
  - in the Yukon,
  - by industry,
  - by Goldcorp SEMS Standards
  - locally relevant considerations gathered through consultation and SEEM

**When:** The SEMP is applicable throughout the Project life. Typically, these plans are submitted at a conceptual level with the Project Proposal to the Yukon Environmental and Socio-economic Board (YESAB), developed into “drafts” during the YESAB screening process, and are further refined into “final” plans prior to construction.



# WHAT IS A SOCIO- ECONOMIC EFFECTS MONITORING (SEEM)?

**Why:** To *monitor* the Project's socio-economic effects (positive & negative).

**What:** Uses select indicators and measures to monitor socio-economic conditions. In turn, this will also monitor the effectiveness of enhancement and mitigation, on an ongoing basis.

**Who:** The monitoring program will be developed in collaboration with potentially affected First Nations, communities and external stakeholders.

**How:** Indicators corresponding to socio-economic valued components in the Project Proposal will be tracked and measured. This data and feedback gathered with potentially effected First Nations and communities will be used to measure the validity of predictions and effectiveness of mitigations.

**When:** Can commence in advance of construction and will continue throughout the life of the Project.

- Socio-economic effects are complex and dynamic.
- Protecting and enhancing the socio-economic environment often requires the involvement of multiple agencies.



Shared Responsibility Framework adapted from LNG Community Level Infrastructure and Services Management Plan (June 2016), p.8.





**WHAT OTHER  
PROJECT INITIATIVES  
ARE RELATED TO  
MANAGING  
POTENTIAL SOCIO-  
ECONOMIC  
EFFECTS?**



**Why:** To inform all potentially affected First Nations and communities, as well as interested persons and other stakeholders, of the Project and to receive and incorporate the feedback from these groups into Project design, studies, mitigation, and management.

**Who:** The *Consultation and Engagement* program includes all potentially affected First Nations and communities, as well as interested persons, the public, the Yukon and federal government agencies and other stakeholders of the Project.

**How:** The *Consultation and Engagement* program has included such activities as community open houses, meetings, and workshops.

**When:** Meaningful consultation and engagement is an integral part of all Project activities

# Goldcorp's Sustainability Excellence Management System (SEMS)

**What:** Goldcorp's internal SEMS provides overarching standards specific to *safety and health* (SH Standards), *environmental performance* (EP Standards), *social performance* (SP Standards) and *security* (SS Standards), which apply to all sites.

**Why:** SEMS provide a minimum expected level of performance. Where local legislation or regulation exceeds the requirements of SEMS, the site is expected to meet the higher standards. These standards are used to ensure that Goldcorp maintains a 'best-in-class' sustainability program.

**Who:** Goldcorp is responsible for implementing the SEMS.

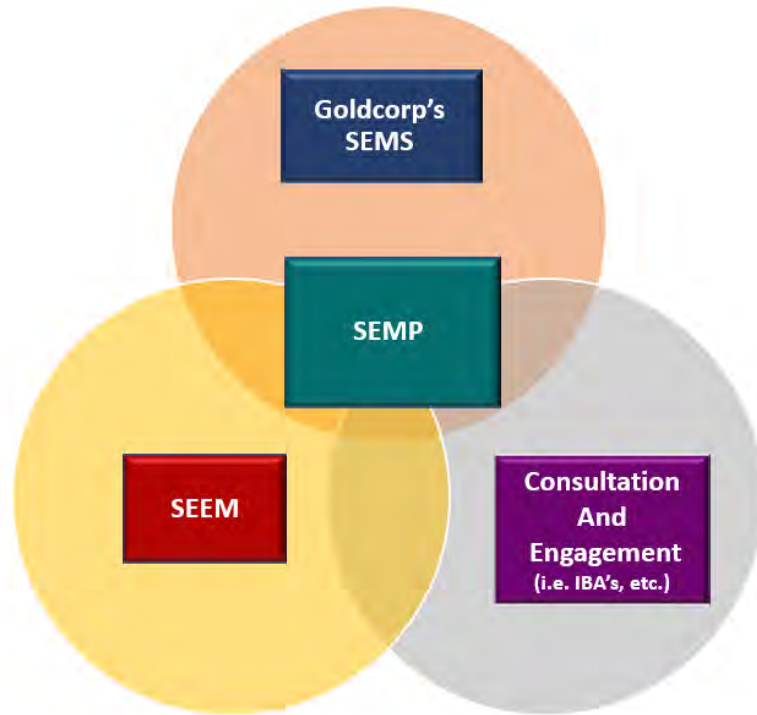
**When:** Applies to all Goldcorp properties, including exploration projects, development projects, operating mines or reclamation/closed properties.





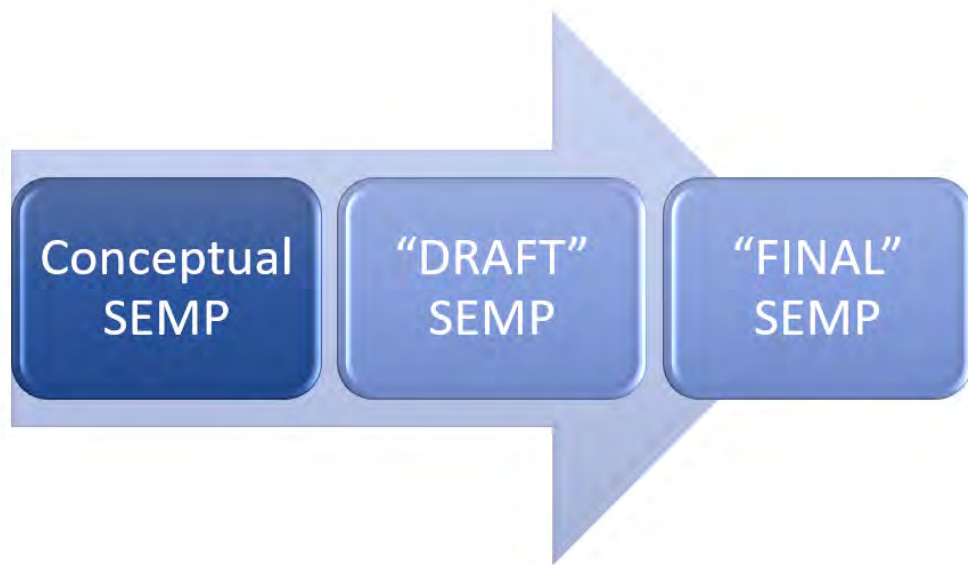


# HOW DOES THE SEMP RELATE TO THESE OTHER ACTIVITIES?



- An iterative, adaptive plan which uses feedback received from applicable project activities/inputs to manage the Project's potential socio-economic effects
- Potential Project-related socio-economic effects will be managed by the SEMP.
- The SEMP will be continuously adapted to:
  - consider SEEM results;
  - reflect SEMS standards;
  - incorporate feedback and developments which arise from consultation and engagement activities.
- These initiatives will work together to enhance Project benefits, including but not limited to:
  - Promote positive, productive and lasting relationships
  - Community engagement
  - Socio-economic opportunities





- Substantial consultation is required to develop the SEMP from “draft” to “final”
- It should be noted that the “final” SEMP is a living document which is adaptable to ongoing Project and socio-economic developments; it may be periodically updated.

# DRAFTING THE SEMP – A Suggested Approach

## **Step 1: Goldcorp listens** *(An objective of today's workshop)*

- Future vision for TH Community
- TH's priorities (connected to community and economic plans)
- TH's vision of managing potential socio-economic effects

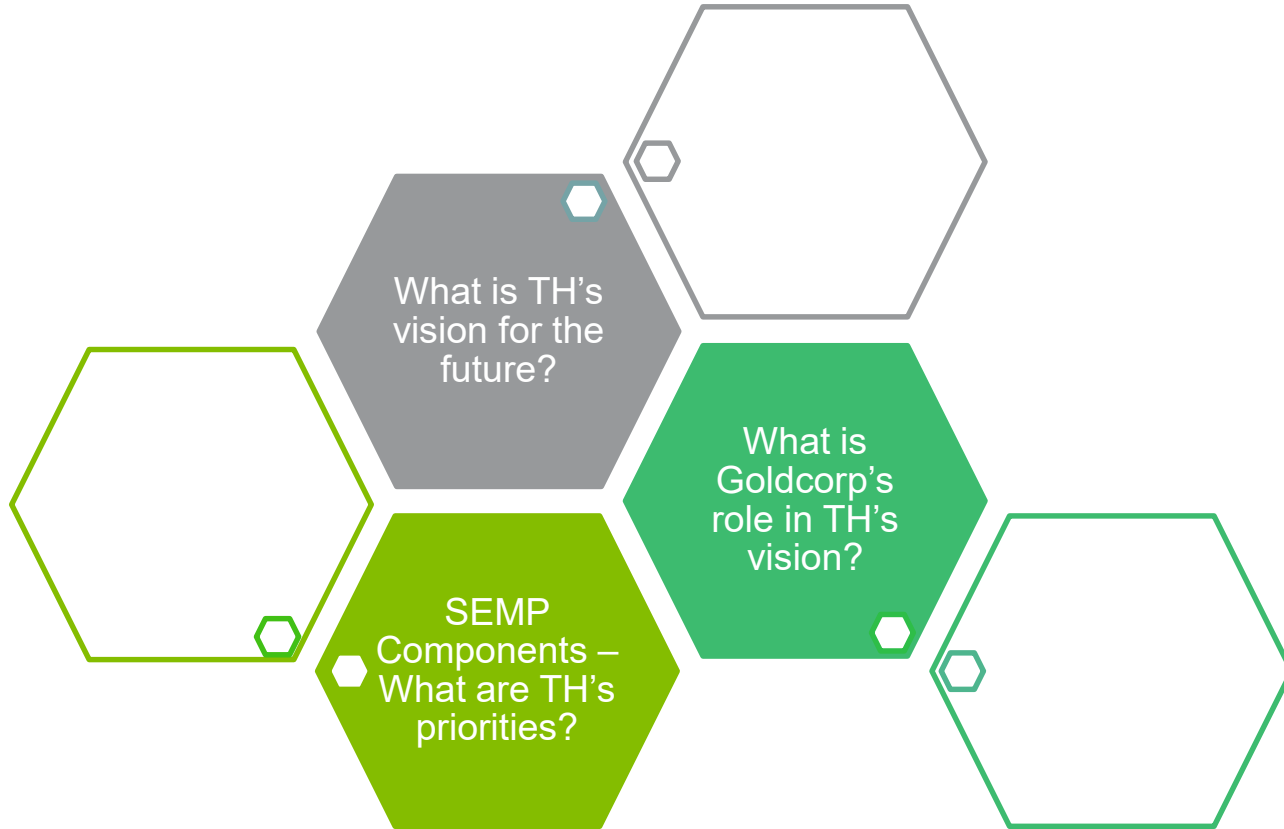
## **Step 2: Goldcorp and TH (plus others) discuss options**

- Construction
- Operation
- Closure and beyond

## **Step 3: Goldcorp presents its plans, which have TH input**

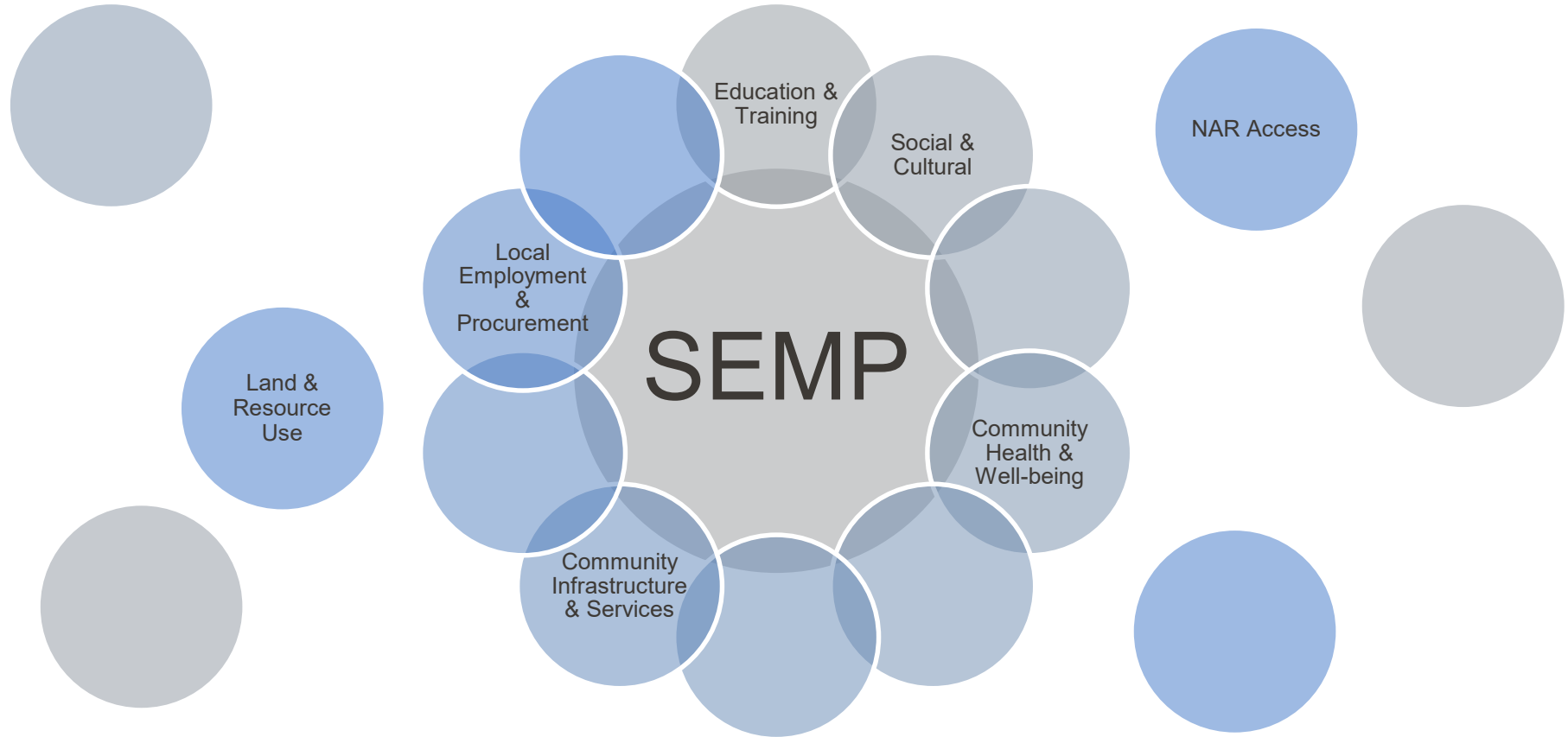
- Construction
- Operation
- Closure and beyond





# Draft Socio-economic Management Plan: Preliminary Topics

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**This topic is intended to address potential Project-related effects on:**

- Educational services (primary, secondary and post-secondary)
- Community-based training

**Other?**



**This topic is intended to address potential Project-related effects related to:**

- Local Hiring Practices
- Local Contracting and Procurement Practices

**Other?**



**Potential access-related effects to the NAR are addressed in the following management plans:**


- Access Route Construction Management Plan
  - Access Route Operational Management Plan
  - Wildlife Protection Plan
  - Vegetation Management Plan
- Examples of topics included in the above:
- Invasive plant management along the NAR is included in the Vegetation Management Plan
  - Access management for barge crossings is included in the Access Route Operational Management Plan

**Other?**



**This topic is intended to address a broad list of proposed mitigation and enhancement measures in the Project Proposal:**

- Accidents and Injuries
- Children and Youth
- Country Food Quality
- Crime
- Food Security
- Health Related Behaviour (i.e. drugs and alcohol, smoking, recreational opportunities, nutrition)
- Health Services Structure and Capacity
- Infections Disease
- Mental Health and Wellness



What aspects of community health and well-being does TH want to focus on? Are there other aspects to consider (that aren't listed here)?

**This topic is intended to address potential Project-related effects related to:**

- Land and Resource Use (Traditional and Non-traditional)
- Non-wage Economy
- Traditional Economy

**Other?**



## This topic is intended to address potential Project-related effects related to:

- Local health services structure and capacity
- Housing and accommodation
- Physical infrastructure (including water and wastewater infrastructure, solid waste disposal, electrical and communications infrastructure)
- Community services (including services for families with young children (e.g. day care and family support) and health and social services)
- Infrastructure for vehicle and air traffic

**Other?**





**Potential Project-related effects associated with this topic are addressed in the following management plans:**

- Water Management Plan
- Fish and Aquatic Habitat Protection Plan
- Wildlife Protection Plan
- Vegetation Management Plan

**Other?**





- **All comments provided by Tr'ondëk Hwëch'in on the Project Proposal were grouped by Valued Component for today's workshop**
- **Goldcorp is committed to providing fulsome responses to each of TH's comments once the YESAB process is reinitiated**
- **For today's workshop:**
  - The following slides present summaries of comments received from TH and high level responses
  - Comments related to more than one valued component are grouped and presented as 'general IRs'
  - Specific valued component comments are grouped by theme, where possible

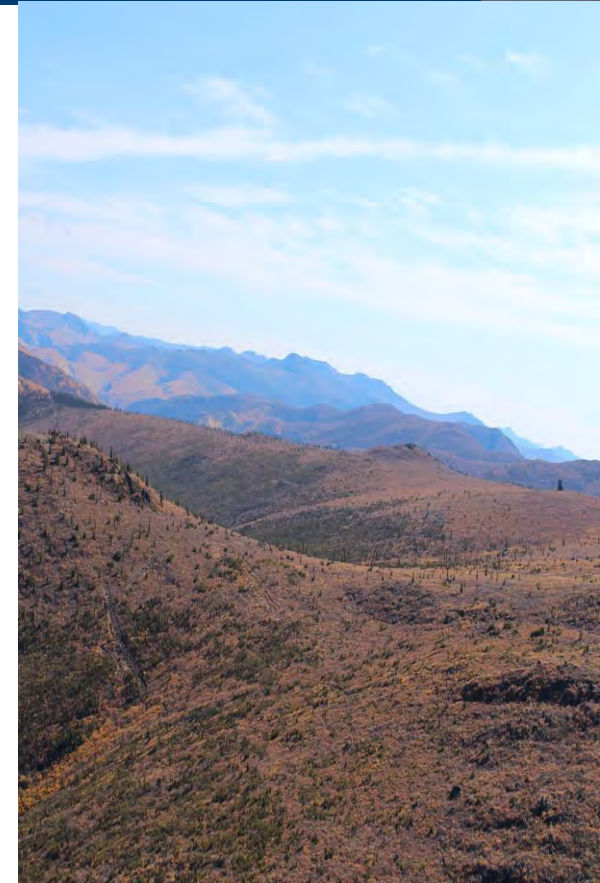


This Photo by Unknown Author is licensed under [CC BY-SA](#)



## Mitigation measures and proposed management plans are not detailed enough to evaluate

- The development of the Project's management plans are in progress, including the SEMP. The SEMP's management plans will be developed collaboratively through workshop's like today.
- The valued components presented in the Project Proposal are currently reflected as topics in the draft SEMP. These VCs were identified through consultation and primary data collection (interviews, focus groups, survey, and working group meetings) with TH. Consultation supported the development of mitigation and enhancement measures.
- The SEMP will 'operationalize' mitigations and enhancement measures through monitoring. Socio-economic effects monitoring can be initiated before construction begins, and adaptively managed.
- Goldcorp welcomes suggestions for specific measures and is committed to further engagement with TH on the development of detailed management plans.



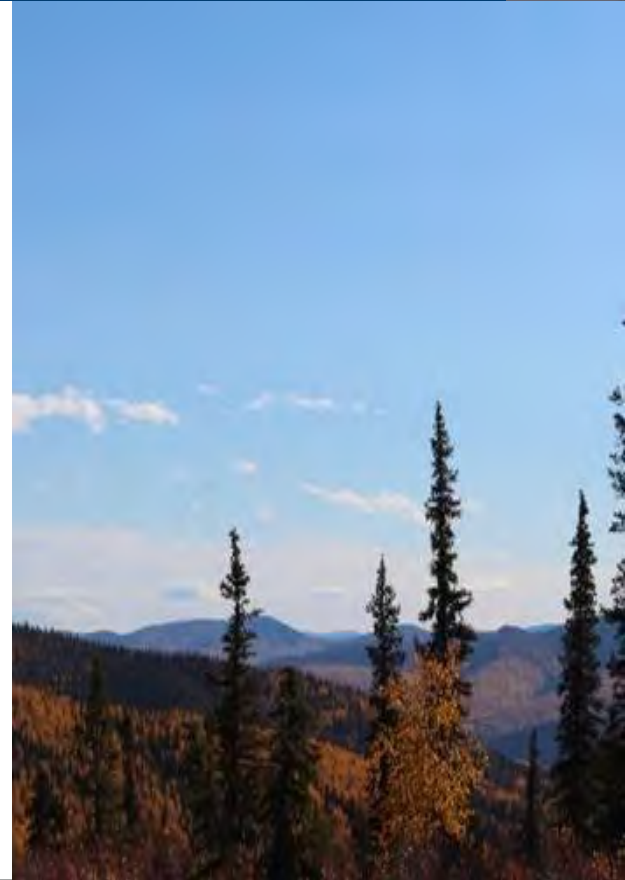
**The local assessment area (LAA) in the socio-economic chapters combines Tr'ondëk Hwëch'in into the overall Dawson City population, and sometimes includes Whitehorse in the LAA, significantly diluting the focus of effects assessment on Tr'ondëk Hwëch'in.**

- These spatial boundaries differ for the different valued components and sub-components.
- The LAA encompasses the maximum geographic extent within which the Project is expected to interact with and potentially have direct and indirect effects on.
- Whitehorse must be included in the LAA as some Project activities are located there and workers are expected to choose Whitehorse as a base for fly-in, fly-out.
- This definition of the LAA does not preclude the identification of potential effects to specific communities such as Dawson or to vulnerable populations.
- Where available, TH-specific data sources were considered, however Goldcorp will be pleased to consider additional information and discuss the potential for effects to vulnerable populations identified by TH as a component of ongoing consultation.



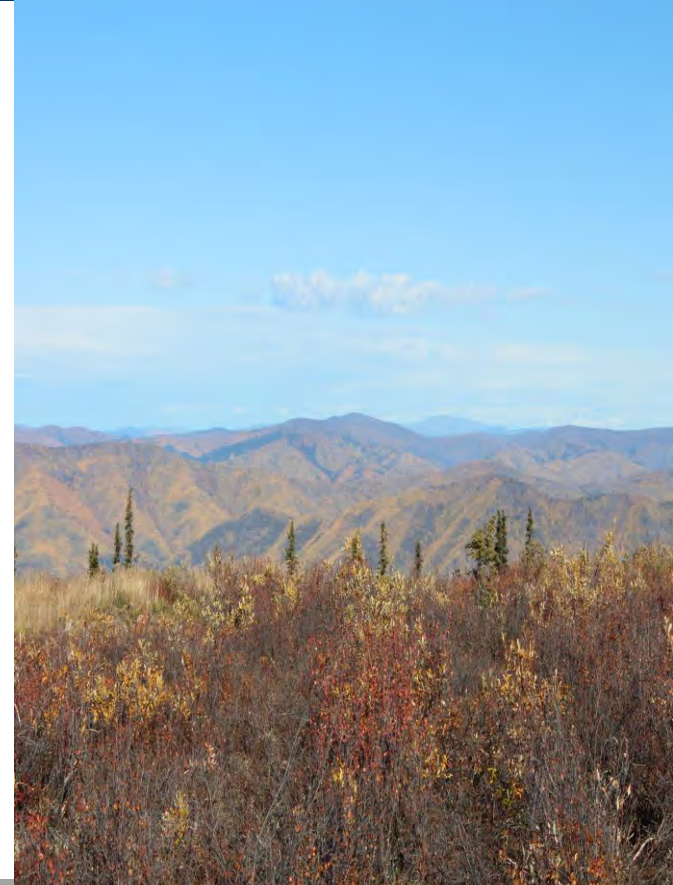
## Mitigation and assessment are generalized to all First Nations and not specific to TH

- Goldcorp recognizes that the Project potentially affects more TH traditional territory than for other First Nations.
- First Nation specific information was not uniformly and/or publicly available. TH was the only potentially affected First Nation which engaged in socio-economic primary data collection. Thus, TH information strongly informed the development of the assessment.
- Residual effects are not presented by First Nation as a result of the data constraints described above.
- The Project Proposal presents available information at the time of reporting for each First Nation; this information was used to support the assessment of Project-related residual effects.
- Anticipated residual effects for *traditional land and resource use* and *traditional economy* were assessed across each potentially affected First Nation's traditional territories, without a localized spatial focus; we consider this a conservative approach.



## Local employment and procurement planning and workplace cultural support (Economic Conditions, Education and Training VCs)

- Goldcorp understands that it important to TH to provide:
  - ✓ Training
  - ✓ Workplace cultural support
- Since March 31, Goldcorp has engaged TH and other potentially affected First Nations and communities in “Community Profiles” primary data collection in response to feedback received regarding the importance of local hiring and local procurement.
- Community Profiles helped Goldcorp better understand the employment and procurement capacity of potentially affected First Nations and communities, and informed the development of Goldcorp’s local employment and local procurement strategies.
- The process for creating local employment and procurement plans was initiated in January 2017, and is ongoing.



## Identify the project effects on the capacity of TH resources for housing and social services including:

- Housing for long term (non-seasonal) population,
  - General health care and mental health care services
  - Wastewater and water delivery, and
  - Police services.
- 
- Primary data collected with TH in advance of the Project Proposal submission included interviews with representatives from TH. Does TH have new data that they'd like to share to support the identification of Project-related effects to housing and social services?
  - Goldcorp would be pleased to receive and incorporate additional information in the update, in particular for housing in Dawson and TH-specific housing.



Photo credit:  
Yukoninfo.com

## Funding for public agencies to support infrastructure and services

- Goldcorp will regularly engage with public agencies throughout the Project life to share plans and identify opportunities to coordinate and share information and resources.
- Funding for public agencies is a responsibility of government.



Photo credit:  
Yukoninfo.com



## Specific community concerns are not matched with detailed mitigation for Tr'ondëk Hwëch'in administration, social support programs and culture

- Community concerns shared during consultation have been considered in the assessment.
- Goldcorp would be pleased to receive and/or discuss additional community concerns related to potential Project effects that were not addressed.
- Goldcorp must be able to implement the mitigation measures, and cannot propose mitigation outside of its control.

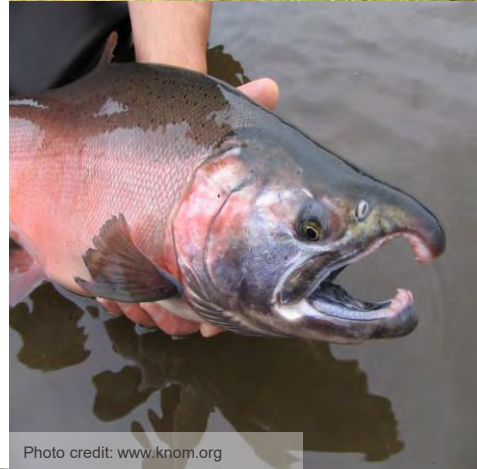


Photo credit: [www.knom.org](http://www.knom.org)



Photo credit: [www.env.gov.yk.ca](http://www.env.gov.yk.ca)



## Include a company policy that prohibits employees and associated contractors from recreational angling along the NAR

- Goldcorp will include angling in its no hunting policy.

## Provide summary of future quartz and placer mining projects

- This was provided in Section 5 (Methods) of the Project Proposal

## Use of term “current” for traditional land use

- Was based on usage for “current use” in Canadian Environmental Assessment Act (CEAA) 2012
- Intent is to include past, present, and future uses



**No clear conclusion on overall effects on resource use (e.g. fishing, hunting, and gathering). Consider the spatial and temporal extent of natural resources (fish, wildlife, birds, plants) and how the project may affect their current and future availability and accessibility**

- Assessment assumes that potential effects to harvesting are linked to effects to Surface Water Quality; Fish and Fish Habitat, Vegetation; Terrestrial Wildlife; Birds and Bird Habitat, as suggested.
- The residual effects to harvesting were assessed through :
  - quality of resources - not significant.
  - access - not significant, recognizing that access changes can be viewed as positive or negative
- Where available, information on harvesting is included in the VC assessments.
- Goldcorp would be pleased to consider harvesting data and suggested mitigation provided by TH in the management plans.



## Increase in access on NAR not considered, nor a resulting increase in other activities

- Current access is available to within 2km of Stewart River, per tour with TH in late August.
- Increase in access between Stewart River and the southern end of the existing road has been considered in effects assessments.
- An increase in rural residential properties is not anticipated in this section of the NAR: such development would be likely adjacent to existing portions of the route close to Highway and would not change with the Project.
- It is not considered likely that placer mining would substantially change given the existing density of uses, nor are forestry activities likely to change (see Appendix 24-A) and consumptive use of resources would continue to be managed in a sustainable manner by the Yukon Government.
- With respect to the multiple accounts analysis completed for the Maisy May and Black Hills options, there is more new road construction with the Black Hills option. TH and Goldcorp have concluded that the proposed (Maisy May) route is preferred by TH.



## HHRA comments:

- The CHWB assessment will be updated on completion of the HHRA addendum.
- The HHRA addendum will be discussed later in the agenda



## Decision making framework for significance not provided

- Rather than a decision making framework, VC-specific significance definitions were developed based on professional judgement and are considered appropriate for the qualitative socio-economic assessments
- Uncertainty in the significance assessment will be addressed the SEMP through the monitoring plan
- Are there specific effects that you would like to discuss?



## Assessment of potential effects to vulnerable communities not adequately addressed

- Methodology allows for the identification of effects which may be more pronounced for vulnerable populations, contingent on available data.
- For example, potential effects to children and youth are identified and mitigation presented in the assessment.
- The SEMP will consider potential project-related effects that may be specific to, or more pronounced for, vulnerable sub-populations that are identified through consultation.



## Expanded discussion of how mitigation reduces effects

- Goldcorp would be pleased to discuss specific mitigation measures in more detail through the development of the SEMP.



## Role of government and non profit agencies in determination of significance

- Goldcorp is not aware of instances where an action by a third party such as a governmental or non-government agency has been suggested as necessary to mitigate against a project-related effect that would otherwise be adverse and significant.
- Government and non-government agencies can support health and well-being.
- Goldcorp anticipates working with agencies in developing the SEMP and its associated monitoring plan.





# Communities & Closure: What does YG expect?

- Yukon Government on **consultation and engagement in closure planning:**

Section 5.2: “Engagement with the community, including governments (First Nation, federal, territorial), local communities, assessment/regulatory authorities and non-government organizations is an **essential component** of reclamation and closure planning. Proponents need to understand the views and expectations of all parties, and RCPs should demonstrate how the proponent has considered and addressed these throughout the planning process.”





# Communities & Closure: What does YG expect?

- **Socio-economic** objectives are a part in the Yukon government's requirements of a Reclamation and Closure plan (in very general terms)
  - “Reclamation and closure implementation avoids or minimizes adverse socio-economic effects on local and Yukon communities, while maximizing socio-economic benefits.” Specific topics are not defined.
  - Good practice internationally says socio-economics is a crucial topic in closure planning
  - Goldcorp's internal approach (SEMS) require that socio-economics be part of closure planning



## Socio-economic Management Plan (SEMP)

- Covers Construction and Operations phases

## Socioeconomic Content in Reclamation and Closure Plan

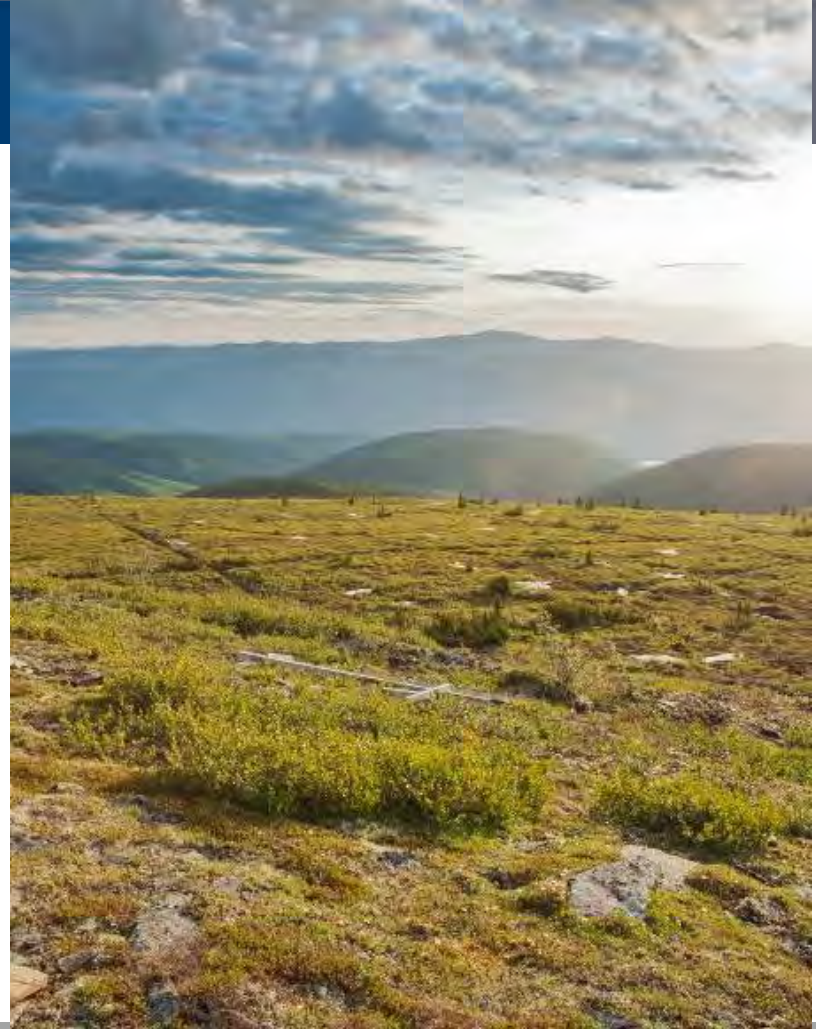
- Covers Reclamation and Closure Phases
- “Closure” covers both temporary and permanent closure







- Key objective is to predict potential risks due to mine operation (incremental) to help guide the need for monitoring and mitigation.
- Revised design and seven new Focal Areas of Interest (FAI) located in sensitive use areas near the mine site were considered.
- All key issues identified were considered and will be incorporated into the addendum, as appropriate





As per Intrinsic's October 4<sup>th</sup> memo:

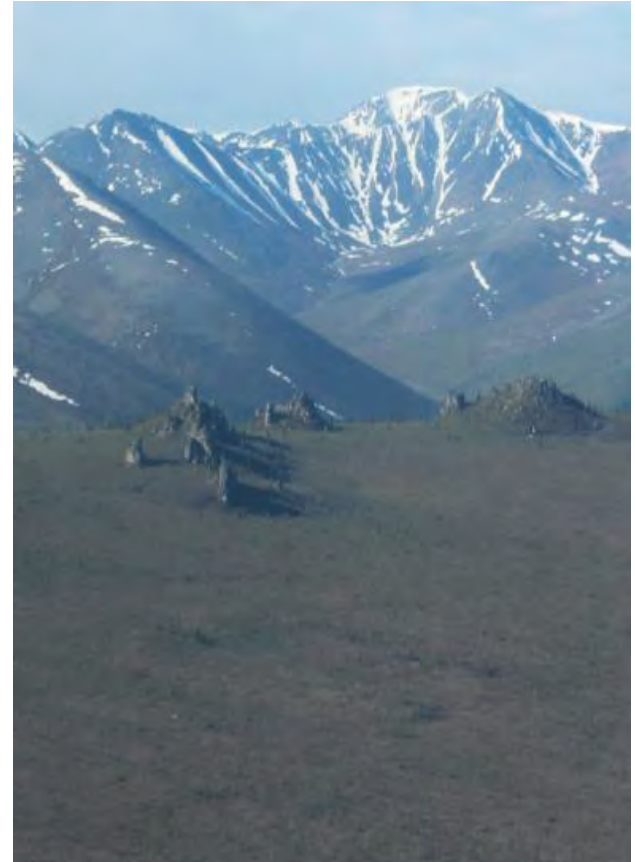
- Updated project description
- Predicted fish tissue and water quality
- Diesel particulate matter
- Country foods ingestion (duration, arsenic)
- Inclusion of baseline data
- Metals as a trace air contaminant
- Metals in truck exhaust
- Use of average rather than upper estimate (UCLM95)



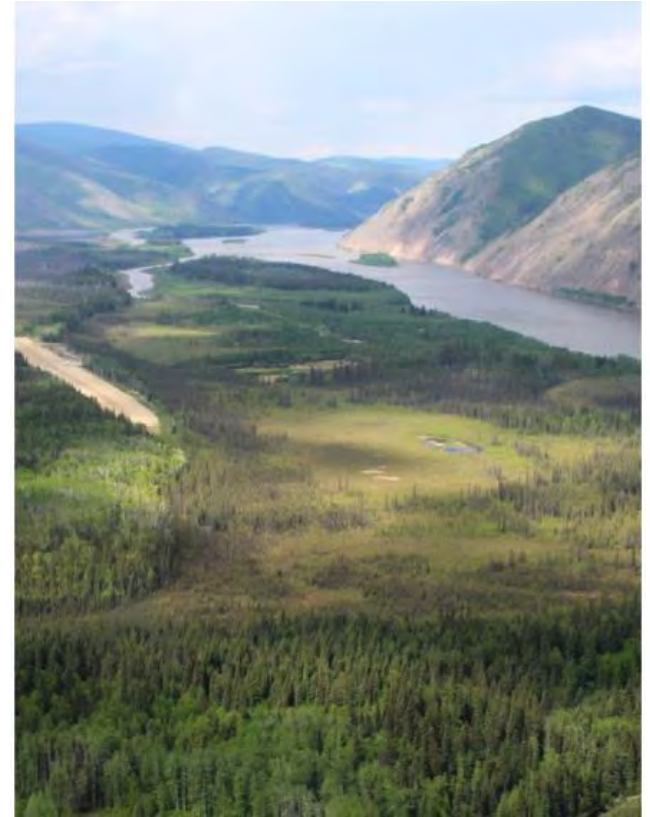
- *In the context of environmental quality and human exposures*



- **Status:**  
Potential risks due to consumption of surface water and fish will be integrated into the HHRA Addendum.
- **Approach:**  
Bioaccumulation modelling will be done to predict future fish tissue concentrations and compare to current concentrations  
  
Risks due to fish consumption and periodic consumption of surface water while fishing, hunting and trapping will be assessed  
Exposure scenarios will be appropriate for the aboriginal community



- **Status:**  
Potential health effects will be evaluated in the HHRA addendum
- **Approach/Preliminary Results:**
  - Annual concentrations of DPM were calculated based on ratio of DPM to PM<sub>2.5</sub> for all diesel emissions
  - Concentrations were compared with US EPA/Health Canada reference values of 5 µg/m<sup>3</sup>, which are safe for continuous lifetime exposure
  - The predicted annual average concentrations at all receptor locations are below 5 µg/m<sup>3</sup>
  - The highest concentration off-site is approximately 20x lower than the reference value



- **Status:**  
Potential risks associated with arsenic in country foods grown/harvested in the waste rock areas will be included in the addendum
- **Approach:**
  - Exposure to arsenic through country food ingestion will be calculated based on increased duration of exposure and the incremental risks due to the Project determined
  - Potential increases in plant tissue concentrations will be evaluated either qualitatively or quantitatively



Photo Credit: Tr'ondëk Hwëch'in

- **Status:**  
Health risks for existing conditions will not be included in the HHRA addendum
- **Rationale:**
  - Determining risks due to existing conditions can be counter productive and increase community concern about the quality of traditionally harvested foods.
  - Baseline environmental studies will provide the basis upon which potential future impacts are evaluated
  - Management plans have been developed to mitigate potential effects.
  - If monitoring shows unacceptable changes in environmental quality, adaptive management will be used to further mitigate potential future effects.



- **Status:**
  - Will be included in the HHRA addendum
- **Rationale:**
  - Incremental risks due to the project from the inhalation of arsenic in dust from the waste rock areas will be evaluated further based on revised exposure estimates that account for increased duration and frequency of exposure (also discussed in Country Foods slide)
  - The UCLM95 which is used to describe existing conditions will not be used as this will tend to reduce the significance of the incremental effect associated with the Project.
  - The dustfall and dispersion model results are conservative and are based on upper limit emission estimates.
  - The dust management plan describes the commitments for monitoring and mitigation to reduce dustfall to acceptable levels.



- **Status:**

Metals emissions in diesel exhaust will not be considered because they are not an important emission source:

- Not a priority COPCs for mobile source air toxics by the US EPA
- Health Canada (2016) does not indicate that metals are an important contaminant (report refers to transportation and industrial sources)
- Expected to be largely particulate form and comprise a portion of the particulate that is emitted
- Air quality standards/reference values are based on all substances which make up the particulate fraction(s) found in urban environments, including metals

- **Status:** Re-analysis using an upper estimate statistic (UCLM95) is not necessary.
- **Rationale:**
  - Professional judgement was used and considered many factors such as data quality and distribution, spatial distribution of impacts, exposure potential, etc.
  - Reliable risk estimate were developed based on conservative assumptions used in the HHRA and IC reports
  - Overly conservative estimates of risk do not inform the assessment
  - The UCLM95 which is used to describe existing conditions will not be used as this will tend to reduce the significance of the incremental effect associated with the Project.
  - A discussion of the uncertainty associated with the use of the average will provided

- **Status:** Noise levels at additional sensitive areas have been evaluated.
- **Approach / Results:**
  - Predicted to be within the range of noise levels typically encountered in wilderness areas
  - Noise from mine operations and access road may be audible at some locations depending on weather conditions and proximity of the human receptor
  - No adverse health effects due to noise exposure have been identified for off-site receptors

- **Status:** Use of the Maximum Point of Impingement (MPOI) is not appropriate when evaluating potential health risks.
- **Rationale:**
  - The MPOI represents the maximum concentration at any location at an time and has little relevance to evaluating health risks to individuals that only periodically may be exposed
  - Dispersion modelling guidelines often allow for the exclusion of the top 2 percentile concentration data because these data do not represent realistic/probable exposure conditions
  - Air quality standards/toxicity reference values are not appropriate for evaluating MPOI concentrations

Key Topics	Response/Comments
Predicted fish tissue and water quality	Included in addendum
Diesel particulate matter	Included in addendum
Country foods ingestion	Included in addendum
Inclusion of baseline data	Not included
Updated project description	Included in addendum
Metals in truck exhaust	Not included
Metals as a trace air contaminant	Included in addendum
Use of average rather than UCLM95	Included in a discussion of uncertainty

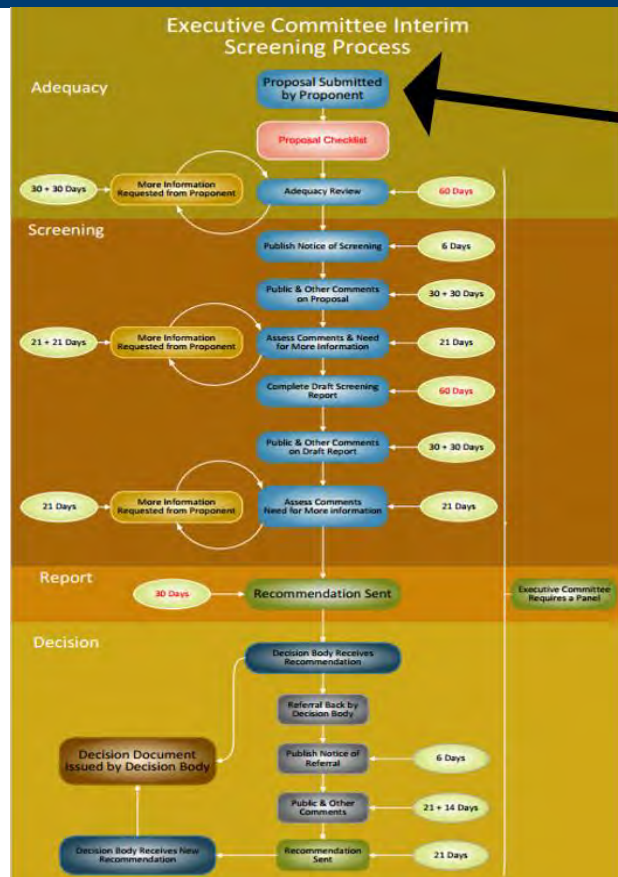


1. Equipment and generator air emissions
2. Dust generation from mine operations and transport, and dustfall
3. Noise from mining operations and transport
4. Contact water for mine waste/disturbed areas, and altered surface water / groundwater conditions
5. Chemicals used in ore processing and the heap leach facility, (focus on cyanide)
6. Mine wastes deposited to the land surface (waste rock deposit)



**QUESTIONS?  
THANK YOU!**

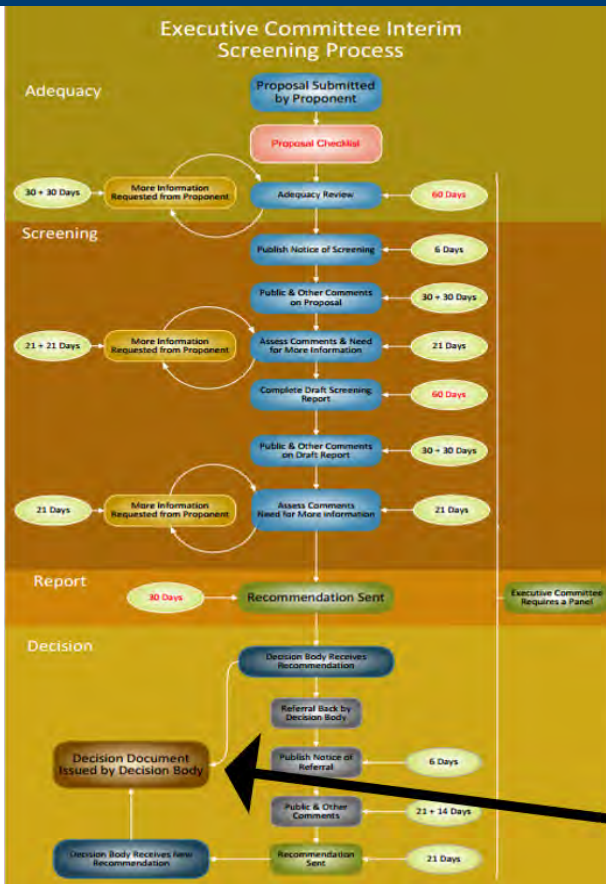
# Overview: SEMP Development and Project Timeline



A conceptual SEMP was submitted in the original Project Proposal, as expected by YESAB.



# Overview: SEMP Development and Project Timeline



- Draft SEMP will form part of Decision Document
- Project plans, such as the SEMP, are typically submitted as “draft” and “finalized” prior to construction phase

# MEMO



## Subject: Technical Review Comments

To: Names Redacted Date: October 4, 2017  
From: Intrinsic Corp. Names Redacted  
Re: Outstanding information requirements for the Human Health Discipline

Prior to the workshop in Vancouver on October 31<sup>st</sup> it would be beneficial to review the updated HHRA or the addendum to the original HHRA (which would include the identified updates). The original information request (IR) responses have been reviewed. For the responses identified as being resolved no further information is required at this time; the remaining IRs have been broken into two categories:

1. Those identified as being addressed in the HHRA addendum (Table 1) which primarily deal with:
  - a. Predicted fish tissue and water quality
  - b. Diesel particulate matter
  - c. Country food ingestion exposures, both duration and consideration of arsenic exposures
  - d. Inclusion of baseline data in the assessment
  - e. Updates in the project description
  - f. Consideration of metals as a trace air contaminant
  - g. Correction of typographical and other minor errors from the original assessment
2. Those IR that remain outstanding (Table 2) which primarily deal with:
  - a. Consideration of metals in truck exhaust
  - b. Use of an average statistic rather than an upper estimate
  - c. Inclusion of baseline data into the modelling assessment.

Table 1 - Topics for inclusion in the Addenda

Original IR #	Topic	Intrinsic Discussion/Goldcorp Commitment
1	Fish tissue quality and consumption	Should the updated water quality assessment (including sediment quality assessment) indicate a potential for increased concentrations of uranium or other substances as a result of the Project, a fish consumption health risk assessment will be completed.
1	DPM	Hemmera will update the HHRA to include DPM in the risk characterization based on a conservative assumption that all predicted PM2.5 is present as DPM.

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# MEMO



Original IR #	Topic	Intrinsic Discussion/Goldcorp Commitment
1	MPOI	Hemmera will look at providing an expanded suite of Focal Areas of Interest between the mine camp area (or airport location) and the closest area examined beyond the minesite.
1	Time period for country foods exposure	The assumed exposure duration for traditional land uses on areas with waste rock deposits following mine closure was 2 weeks. This may be too short compared to true periods over which people may be present and may be involved in the harvesting and consumption of traditional resources. We acknowledge that the characterization of risk potential for longer periods would be informative. Additional information will be provided as an addendum to the HHRA Technical Appendix as currently written.
1	Exclusion of measure baseline data for country foods	Hemmera will compare the risk based soil screening levels listed in Table 5-2 with the baseline soil concentration results documented elsewhere in the draft Project Proposal to evaluate whether comparison of the soil and waste rock analytical data to local soil background/baseline concentrations would have resulted in a different conclusion.
1	No ERA	Also accounted for in the Yukon Government questions. ENV#44 Contaminants uptake is listed as a project effect to wildlife but is not included in specific sections for Fortymile caribou, Klaza caribou, moose, thinhorn sheep, and grizzly. The wildlife listed consume vegetation which may be affected by contaminants and therefore, this should be included as a project effect for each. Include contaminants uptake as a project effect for Fortymile and Klaza caribou, moose, thinhorn sheep, and grizzly.
6	The emission sources are tied to the project description; however, the project description has changed over the evaluation period. The HHRA was completed in May 2016 and finalized in November 2016. The project description was finalized December 2016. Please provide details as to how changes in the project	Changes in the Project Description will be incorporated in an addendum to the HHRA, with a focus on any change in predicted conditions that could render the conservative exposure estimates used in the HHRA too low.

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90291  
[t] 310-392-6693

# MEMO



Original IR #	Topic	Intrinsic Discussion/Goldcorp Commitment
	will be incorporated into the HHRA.	
7	Fish consumption	Provide information on the potential health risks associated with eating fish potentially affected by the project and drinking surface water near the project area in addendum.
12	Water quality	Revisit assumption with new project design. Please include water-related pathways in addendum if water concentrations increase for COPC.
23	PAH Parent properties	Many of the parent PAHs will be heavier and tend to deposit more than naphthalene. This issue should be addressed in the HHRA addendum.
24	DPM	Inclusion of diesel particulate matter in the air modelling
27	Exposure limits	Clarify which agencies were used as sources of exposure limits and ensure they are consistent throughout all sections of the assessment. Confirm that this will be addressed in the addendum.
33	Averaging period	The 10 µg/m <sup>3</sup> AAQO should have been indicated as the annual average concentration, as shown in Table 4-3. We will correct.
36	Mixtures	No mixture assessment completed (consistent with Health Canada DQRA guidance) the Proponent will re-visit the possibility of additivity and mixture effects through a critical review of toxicological profiles for the COPC.
37	DPM	The available slope factors for DPM will be discussed in an addendum, along with ILCR estimates assuming that all pm <sub>2.5</sub> is comprised of DPM
40	Incorrect permissible dust level	This is correctly cited in Section 4.3.1 of the HHRA Technical Appendix. The incorrect value of 9,0000 µg/m <sup>3</sup> (sic) was contained in section 4.5.3, and this typographic error will be corrected.
41	ADAF and BaP references	It appears that the B[a]P columns were deleted from Table 4-13 as a result of formatting. The B[a]P chronic exposure threshold, based on lung cancer, is actually presented in Table 4-5. The relevant exposure data and risk calculations will be added back in as part of the addendum. ADAFs will be incorporated as requested.
44	Worked example	We are happy to provide worked examples as part of HHRA updates as discussed. Will a worked example be included if other exposure pathways are considered in the addendum to the HHRA (e.g., fish consumption)

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# MEMO



Original IR #	Topic	Intrinsic Discussion/Goldcorp Commitment
45	Drinking water (As)	The HHRA assesses drinking water intake as a source of exposure to uranium. As discussed exposures to arsenic from a variety of exposure routes can be built into the revised HHRA.
46	TMAC as component of truck exhaust	Health Canada's 2016 "Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality" specifically identifies metals associated with transportation fleets as COPCs. This suggests that the effects of metal emissions should be considered in the assessment.
50	Background concentrations	Risk-based soil screening levels (Table 5-2 of the HHRA) are used in lieu of screening against background concentrations as the most appropriate comparison, given the focus on health risks for the addendum to the HHRA, please also provide comparisons to local background values.
52	Element confusion thallium and tellurium and comparison to background	Any potential confusion between thallium and tellurium to be corrected for HHRA updates. Comparison to background levels is considered to be of secondary importance to screening against relevant risk based soil screening levels.
53	Incorrect risk based screening level for zinc	Correction will be made in addendum to HHRA.
61	Modelled small mammal arsenic exposure concentrations	There are a number of logical steps here, including degree of congruence of modelled and measured exposures or uptake, as a validation of model predictions. A sensitivity analysis could be completed to ascertain whether predictive estimates are consistent with baseline tissue concentration data where it exists.
62	Country food ingestion rate; ingestion of other types of vegetation	The ingestion rates cited will be reviewed and adjusted as merited in an update to the HHRA in the future.
63	Comparison to background concentrations	Please compare predicted concentrations to measured background data presented in the vegetation and soils IC report and the wildlife field report to determine incremental exposure risk. Please incorporate deposition of all of the metals from the dust and ore samples that exceed the measured (background) soil concentrations. Please revise the risk assessment accordingly.
64	Arsenic TRV	Table 5-10 presents an arsenic TRV (for non-cancer) of 0.003 mg/kg-day. The US EPA reference dose is 0.0003 mg/kg-day, which is 10-fold lower than the TRV presented in Table 5-10. Please confirm which TRV was used for arsenic-related non-

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# MEMO



Original IR #	Topic	Intrinsic Discussion/Goldcorp Commitment
		cancer effects in the HHRA. Please correct in the addendum to the HHRA.
65	Predicted values used in the ingestion exposure assessment are lower than baseline measured values	If the predicted baseline values appear to be lower than measured values this needs to be addressed in the HHRA addendum.
66	The use of average (50th percentile concentrations) requires review. For the food arsenic concentrations, the base assumptions are incorrect relating to the small mammal and plant apportionment. The assessment should account for both exposures. Water concentrations of arsenic were not included in the overall exposure assessment. Risk management measures are required.	The risk management measures, as stated, involve configuration of the waste rock deposit to prevent higher arsenic materials from being placed on the upper surface at closure, or other methods to deter use of the area in closure e.g. signage. Full detailed risk management plan if the assumptions used in the HHRA (e.g. 2-week exposure duration) inform the basis of the risk management plan then exposure controls will need to be implemented at the site.
69	DPM	Update the tox profiled list to include DPM

**Table 2 - Additional Outstanding Questions**

Original IR #	Topic	Discussion
4	noise	Please explain how the operational noise levels can be below the measured background levels. Should the statement be that operational noise levels will remain within predevelopment levels measured in the area?
8	Use of 50 <sup>th</sup> percentile concentrations in rock	Health Canada recommends using an upper estimate of the media concentration. Please evaluate exposure using upper estimates of media concentrations or provide details of risk management actions.

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# MEMO



Original IR #	Topic	Discussion
10	update the HHRA to include the baseline wildlife tissue data and fish tissue data	A detailed discussion of baseline wildlife and the fish tissue concentrations was not included since the assessment of project activities did not predict changes in soil or water quality, except in the case of arsenic for soil – please add as appropriate. This issue may be influenced by the findings of the HHRA addendum. For example, if the fish consumption pathway is included in the addendum, rationale will need to be provided why measured fish concentrations aren't included to represent baseline conditions.
22	Metals not included as TSP	Metals do not appear to have been considered in the assessment for emissions as fuel combustion by-products Health Canada's 2016 "Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality" specifically identifies metals associated with transportation fleets as COPCs. This suggests that the effects of metal emissions should be considered in the assessment.
25	MPOI	Due to the proximity of the trapline to the mine site please assess exposure risks at FAI CO-01 (camp) for a subsistence receptor.
34	Metals not included as COPC	Health Canada's 2016 "Guidance for Evaluating Human Health Impacts in Environmental Assessment: Air Quality" specifically identifies metals associated with transportation fleets as COPCs. This suggests that the effects of metal emissions should be considered in the assessment.
51	Use of averages	Recalculation of concentrations of host rock or ore through dustfall or direct exposure from 50 <sup>th</sup> percentile or average to upper estimate. Health Canada recommends using an upper estimate of the media concentration. Please evaluate exposure using upper estimates of media concentrations or provide details of risk management actions.
54	Use of 50 <sup>th</sup> percentile concentrations	Health Canada recommends using an upper estimate of the media concentration. Please evaluate exposure using upper estimates of media concentrations or provide details of risk management actions.

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# BRIEFING NOTE

<b>Date:</b>	October 27, 2017
<b>To:</b>	Goldcorp
<b>From:</b>	Hemmera
<b>Re:</b>	<b>Coffee Gold Project: Socio-economic Management Plan Overview</b>

## 1 Socio-economic Management Plan (SEMP) Overview

<b>Why</b>	To manage the Project’s potential socio-economic effects (positive & negative) which were identified in the Project Proposal’s socio-economic effects assessment reports.
<b>What</b>	The SEMP organizes the Project’s socio-economic (including community health and well-being) commitments, policies, and plans, in an operational format, in order to contribute to enhancing potential positive socio-economic effects and/or mitigating or eliminating potential negative effects.
<b>How</b>	The SEMP will incorporate the following where practical and applicable: <ul style="list-style-type: none"> <li>• best practices (Yukon, industry, Goldcorp’s Sustainability Excellence Management System (SEMS);</li> <li>• locally relevant information and considerations gathered through consultation and monitoring; and</li> <li>• lessons learned from other comparable Projects.</li> </ul>
<b>Who</b>	Goldcorp is responsible for developing, financing and utilizing the SEMP to organize and operationalize the Project’s socio-economic commitments. Goldcorp is committed to engaging with First Nations partners and communities so that the SEMP is developed as a collaborative initiative that reflects inputs from consultation and engagement.
<b>When</b>	The SEMP is applicable throughout the Project life. Typically, these plans are submitted at a conceptual level with the Project Proposal to the Yukon Environmental and Socio-economic Board (YESAB), developed into “drafts” during the YESAB screening process, and are further refined into “final” plans prior to construction. The SEMP is adaptive; therefore, will be iteratively revised, as necessary, throughout construction and operations.

## 2 What is the Purpose of the SEMP?

The purpose of the SEMP is to manage the potential adverse social, economic and health-related effects of the Project, as well as to enhance any positive effects. The SEMP achieves this by bringing the Project’s socio-economic (including community health and well-being) commitments, policies, mitigations and enhancement measures together in an operational format. In summary, the SEMP will:

- Develop operational management plans to manage potential project-related effects through the implementation and monitoring of measures proposed to enhance the potential positive effects, and avoid or minimize adverse effects.
- Verify the predicted socio-economic effects of the Project, as presented in the Project’s Socio-economic VC Assessment Reports, and where indicated by monitoring adapt the proposed mitigation;
- Support Goldcorp’s collaborative management approach, by involving potentially affected First

Nations and communities in its development and implementation.

- Support the Project's commitment to demonstrate best practices (including those established in the Yukon and by the Mining Association of Canada), and Goldcorp's internal Sustainability Excellence Management System (SEMS) standards, as well as incorporate locally relevant values identified through consultation and monitoring activities.

### **3 Is the SEMP Required in Yukon? If not, why are we doing it?**

YESAB expects a SEMP to be submitted at a conceptual level as part of the Project Proposal; typically, the conceptual SEMP is then developed into a 'draft' throughout the YESAB screening process, and is further refined into a 'final' SEMP prior to construction. The Quartz Mining License (QML) requires a SEMP. Further, it is industry best-practice to create and implement a Socio-economic Management Plan (SEMP), and it is a key avenue through which Goldcorp and the Project's First Nations partners and communities can work collaboratively on monitoring, mitigating, and enhancing the Project's potential socio-economic effects.

### **4 How does the SEMP contribute to the collaborative management of socio-economic effects?**

In addition to providing the operational management plans for potential project-related socio-economic effects, the SEMP details HOW the plan will be implemented. This includes such details as:

- **Engagement Principles**

- *Engagement Format*: What format of engagement is best suited to support meaningful and effective engagement opportunities (i.e. meetings, working groups, workshops, community meetings, etc.)
- *Frequency*: Engagement schedule
- *Community Response System*
- *Information Management*: Once appropriate engagement formats have been identified to facilitate the implementation of the SEMP, parties will need to identify how information will be managed; including: collaboration principles, confidentiality principles, and ownership of data.

- **SEMP Feedback Mechanisms**

The SEMP is iterative and adaptive, therefore feedback mechanisms need to be established to inform its development. The three main mechanisms anticipated to provide feedback to the SEMP are:

- Socio-economic Effects Monitoring
- Consultation and Engagement
- Goldcorp Sustainability Excellence System (SEMS)

### **5 How can the SEMP potentially make a difference for TH Citizens?**

Some of the ways that the SEMP can potentially make a difference to TH Citizens is by:

- Establishing a communication pathway that facilitates continuous collaboration with TH on the SEMP (and the plans which it includes) throughout the life of the Project to help ensure that the priorities, values, and concerns of citizens are being communicated to Goldcorp and managed accordingly;

- Monitoring/verifying the predicted project-related socio-economic effects, so that management of effects can be adapted (if necessary) to help ensure that they are mitigated and/or enhanced appropriately;
- Building TH and its citizens into the management of potential project-related socio-economic effects through monitoring.

## **6 What will the SEMP contain?**

As presented in Section 31.5 of the Project Proposal, the Socio-economic Management Plan will contain the following key measures:

- Cultural Awareness Training
- Current Traditional Land and Resource Use Enhancement Measures
- Education and Training Activities Engagement Plan
- First Nation Mentoring Program
- Flight Scheduling
- Local Contracting and Procurement Practices
- Local Hiring Practices
- Mitigation and Enhancement Measures for Food Security
- Mitigation Measures Associated with Country Food Quality
- Mitigation Measures for Crime
- Mitigation Measures for Health Services Structure and Capacity
- Mitigation Measures for Infectious Disease
- Mitigation Measures for Mental Health and Wellness
- Non-Wage Economy Enhancement Measures
- Traditional Economy Enhancement Measures
- Workforce Transition Strategy.

# Selkirk First Nation Citizens Meeting Minutes

Date: November 9, 2017 1:00 pm – 3:30 pm

Location: Link Building, Pelly Crossing

## Attendees:

Selkirk First Nation:

Names Redacted

(head count: 38)

Goldcorp:

Names Redacted

Kelly Constable, Hemmera

## Discussion Summary:

Goldcorp presents introduction on the Company and on the Project, gives an overview of the mine site and Northern Access Route (NAR) and Project schedule, and provides an overview of the assessment process for the Project Proposal and the current point in the Project schedule.

Q: Citizen asks what processing agents Goldcorp will use and in what quantity?

A: Goldcorp explains that the main reagent is Cyanide and summarizes the requirements under the International Cyanide Management Code. Goldcorp notes that under the ICMC, Goldcorp is audited every three years.

Q: Citizen asks where Cyanide sits on the dangerous goods scale?

A: Goldcorp will follow up and provide a response.

Goldcorp notes that site jobs will be posted in early 2018 and provides an overview of diversity statistics for the 2017 season hiring.

Q: Citizen asks if this information includes contractors.

A: Yes. There were ~160 people employed for the 2017 field season.

Chief of SFN asks Goldcorp to send jobs information and job descriptions to the training and employment and HR departments at SFN. This way, SFN can prepare Citizens for the work.

ACTION ITEM: Goldcorp to prepare and share with SFN job descriptions.

Q: Citizen notes seeing an ad for a driller helper program through Yukon College. Asks if there will be other training opportunities?

A: Yukon College runs the program in Dawson and Whitehorse. Goldcorp can look to discuss opportunities for this training program with SFN if there is interest in doing it other locations.

Goldcorp notes that they have had a few RFPs this year, are looking for Yukon companies and have been discussing opportunities with Selkirk Development Corporation.

Q: Chief asks if there are preferred opportunities for affected First Nations?

A: Goldcorp is preferentially looking at First Nations businesses. Goldcorp needs to understand from SFN what the SFN businesses are.

Q: Did the Whitehorse office space request for proposal (RFP) go to just affected First Nations, or if it went out more broadly?

A: Goldcorp representative did not see the final list of bidders so not aware of what other organizations may have received it, however they can confirm it was sent the opportunity to Selkirk Development Corporation. Goldcorp took a targeted approach with the office space RFP so some First Nation businesses may have received it if they had relevant office space available. However, Goldcorp will be sending notice of all RFPs to SFN as a standard procedure.

Goldcorp summarizes the YESAB application status. Permitting is expected to take 12-18 months and road construction is expected to begin in 2019.

Goldcorp summarizes consultation with SFN and notes the major issues raised by SFN to date have broadly fallen into 4 categories of water quality and fish, closure, socio-economic, and the Northern Access Route.

Q: Citizen is concerned about how many water treatment plants there are for the Project?

A: Goldcorp explains that there is one treatment facility for water for the Heap Leach Facility. Goldcorp explains the considerations of water quality that have been incorporated into the Project, and notes the decision to move the WRSF to one location in Halfway Creek in consideration of water quality in Coffee Creek, as well as the addition of another Coffee Creek water quality monitoring station in response to feedback from SFN advisors. Goldcorp also has also committed to further spawning surveys based on feedback received.

Q: Citizen is concerned about spawning and how Goldcorp can help bring back fish for Aboriginal use?



A: Goldcorp explains the spawning results for 2017 and previous years.

Q: Citizen asks if Halfway Creek is a spawning creek?

A: Goldcorp explains that it is not a spawning creek and provides details of fish use in lower Halfway Creek. Lower Halfway Creek is primarily Arctic Grayling and juvenile Chinook rearing ground, but even then it is not high use. There is no spawning.

Comment: The use of the word “potentially” affected First Nations is not accurate. These First Nations will be affected; Citizen does not endorse the use of a word that implies that effects on the nation are potential. In response to the discussion on water quality, SFN appreciates the efforts that have been made to protect Coffee Creek; however SFN is still concerned about water quality. SFN is concerned about Halfway Creek and YT-24, even though these creeks are outside of SFN traditional territory in the Umbrella Final Agreement, as that water flows to SFN traditional territory via the Yukon River. Citizen asks if there will be a water treatment facility within Halfway Creek?

Reply: Goldcorp explains that there is the Alpha Pond below the WRSF. Goldcorp will test water quality at this point. Goldcorp also acknowledges the concern related to the terminology and explains that it uses the term “potentially” because the mine is not approved yet so it is the “potential” concept and acknowledges that if it moves forward, there will be these effects. The Project requires scrutiny from interested parties and regulatory bodies, and it needs to have support to move forward. Goldcorp is not at the detailed planning stage at this point, but will need to be there for the water use license process. Goldcorp has had good discussions with SFN’s technical team and is committed to engaging SFN on the development of management plans for the Project. Goldcorp has received some very good feedback from SFN’s technical team.

Q: Does Goldcorp have a plan for the WRSF? SFN wants this plan in advance. SFN cannot wait until a water board hearing. SFN asks if the WRSF is in the best spot?

A: Goldcorp is not looking at any other options for the WRSF. Goldcorp explains the original mine plan of 3 WRSFs and the evaluation that Goldcorp went through to decide to move all waste rock to one WRSF in the Halfway Creek catchment. Goldcorp is currently looking at the best configuration of the WRSF and Alpha Pond. Detailed design is not complete at this time, which is typical for a Project in the assessment stage. Goldcorp is going to work with SFN on the management plans and detailed design throughout the YESAB process.

Comment: Goldcorp is new to the Yukon. There is a traditional territory for SFN in the Umbrella Final Agreement (UFA), however those are reference points for treaty purposes. SFN’s history and use is across a much larger landscape, and Goldcorp has heard that Coffee Creek is part of SFN’s history in an important way. SFN asks Goldcorp to confirm that they recognize SFN’s interest in the Coffee Creek area, including the broader Project area.

Reply: Goldcorp is committed to having conversations with SFN on the issues of interest to SFN.

Comment: Coffee Creek is highly important to SFN. SFN notes concern with the November 30 filing date, as this filing will include a “plan for a plan” (referring to management plans), this is an issue for SFN. Asks if this is an issue for assessors?

Reply: Goldcorp has taken cues from other YESAB proposals, and Goldcorp believes that there is substantial detail for the submission. YESAB doesn't require detailed management plans, however Goldcorp did include a few in the Project Proposal because they provided important details. An example is the NAR Construction and Operations Management Plans. Goldcorp has made commitments to put forward management plans in Q1-2018, and will build out a schedule for these and provide it to SFN (note: this was provided via email on November 17).

Comment: SFN believes that Goldcorp needs more detail to support the Project Proposal. Asks what "biodiversity enhancement" means?

Reply: Goldcorp recognizes the importance of Chinook salmon to SFN, and doesn't want to just mitigate effects of the Project. Goldcorp wants to enhance, and wants to work alongside SFN to find ways to do that. For example, if there are current initiatives that SFN has implemented with success, then Goldcorp wants so support that. Goldcorp wants to support initiatives that are already in place and being successful rather than introducing something new.

Goldcorp explains the NAR route selection process that Kaminak undertook.

Q: SFN knows that Goldcorp and YG meet, and SFN wants to know how road development will proceed through construction and operations.

A: Goldcorp explains the design of the NAR and construction and operation that is proposed. Goldcorp will pay all costs associated with the road, and construction will be all managed by Goldcorp. Goldcorp proposes to be the party maintaining the road, and explains the concerns associated with the current user-maintained model.

Q: Asks about dust control measures that Goldcorp is implementing?

A: There will be an air quality management plan and there are dust suppression mitigations in the Project Proposal.

Goldcorp describes the requirement to allow access down the road via the Placer Act. Goldcorp will be following existing placer tailings for most of the road route.

Q: Who pays for the access route?

A: Goldcorp is assuming all costs in the Project Proposal. Goldcorp is also proposing to close and reclaim all new build sections of the NAR.

Q: SFN Citizen notes that there are SFN Fish and Wildlife managers, YG managers, the Renewable Resource Council, the Fish and Game and Wildlife officers, and SFN has environmental monitors. SFN wants to know how the NAR opening up new areas will affect the people working in those positions.

A: Goldcorp has heard that there's not enough capacity to get out to all areas. Goldcorp wants to meet with the RRC and other relevant people to better understand this.

Goldcorp reviews closure of the HLF, including progressive reclamation and how this will allow for testing closure techniques. Goldcorp will backfill Kona entirely and cover the HLF. Goldcorp notes that there is limited soil at site, and that will be used to cover the HLF in closure. As such, there is not enough soil for

the WRSF. Goldcorp is committed to ongoing engagement with SFN on this and reclamation research to find ways to make soil or find more soil at site for cover.

Q: Asks about the access route negotiations and why SFN wasn't asked about the route. The route is mostly there, and SFN wasn't involved. SFN Citizen wants to see a management plan for engaging First Nations on the Road.

A: Goldcorp agrees with the SFN Citizen, and that there's conversations that need to take place with YG, SFN, and Goldcorp.

Comment: SFN notes that the Gateway Project has been approved and understood that the money is lined up for Gateway, including the NAR. SFN's understanding is that companies will be responsible for permitting and construction of the various sections of Gateway. Companies can apply to YG for compensation. SFN and Yukon Government want to pursue different conversations regarding the Goldcorp road. Conversations need to happen with YG and Goldcorp and SFN.

Reply: Goldcorp agrees that the sooner the conversation can happen, the better, more conversation is better than less.

Comment: There are funds in Gateway for proponents.

Q: Asks if Goldcorp is going to close to a Goldcorp standard, or to the standard that economics at the time allow? Is there a guarantee that closure will take place?

A: Goldcorp explains the closure bonding process in Yukon. The Coffee Project is Goldcorp, so it will be closed to Goldcorp's internal standards. Goldcorp wants to leave a positive legacy anywhere they go. Goldcorp gives an example of Conarium in Timmins that was abandoned and that Goldcorp has built good relationships there and has successful closure and current use of the area. Goldcorp gives an example at San Martin where closure is not yet complete from a social context, so Goldcorp will not leave until it is self-sufficient. The Closure Business Unit can come talk to SFN if that is of interest.

Q: There are land owners and users, trapping concession holders, and First Nations with territory and historic use in the Project area. How is Goldcorp compensating those people?

A: Goldcorp is interacting with trappers individually. For impacted First Nations, Goldcorp is actively engaging and has been talking about an agreement with SFN.

An SFN Citizen asks about Goldcorp's consultation with other First Nations. Goldcorp explains that in order to discuss the feedback received from other First Nations with SFN, Goldcorp would need to seek permission, just as they would to share SFN's concerns. Goldcorp explains that generally, the feedback is similar, for example wildlife concerns. Goldcorp is happy to have joint meetings.

Comment: SFN notes concern with the end of November submission date. Notes that Goldcorp should take the time to get the concerns worked out and working on plans, and that SFN has not heard enough detail about management plans. SFN doesn't want a plan for a plan. SFN needs to understand the guiding principles. SFN acknowledges that the Project Proposal has been on the table for a while, and notes that SFN has been engaging and have been engaging frequently in recent months. SFN wants to understand why Goldcorp is wanting to restart the YESAB process.

Reply: Seasonality of construction is driving the schedule for Goldcorp. The process needs to get started, and the detail required for a YESAB screening is less than what is needed for licensing. Goldcorp shared the Project Proposal documents before submitting the Proposal to YESAB before, and is committed to engaging SFN with transparency, and is sharing data as it becomes available.

Comment: SFN asks if Goldcorp has explored all possible options for the Project, such as management opportunities asked for by the SFN technical team. Adequate consultation to SFN is asking questions and getting answers.

Reply: To date, Goldcorp has been operating based on the instruction that the feedback from the SFN Technical Team isn't necessarily the feedback from SFN. Goldcorp explains the resubmission, which will include new Project and engagement commitments. Goldcorp also notes that an addendum on Aquatic Biota will be included per SFN's technical team's feedback, and that based on requests for clarification regarding NAR information, so Goldcorp will also be including a memo on the NAR. Goldcorp also heard from SFN that benefits such as those associated with Goldcorp's Sustainability Excellence Management System (SEMS) should be captured in the Project Proposal, so there will be a SEMS memo in the Project Proposal resubmission. Goldcorp needs to hear from SFN if there are any critical issues that need to be addressed.

Comment: SFN has international agreements to protect salmon. Cyanide is being carried across the landscape, what if there are accidents? This is a very potent material and the SFN Citizen doesn't like the idea of Goldcorp carrying cyanide across SFN's back yard.

Reply: Goldcorp explains the transport requirements for cyanide and the safety precautions that will be taken. Goldcorp explains the closed loop system for the HLF. Goldcorp uses cyanide at all sites, so there are well-established protocols for transporting and handling it. (Note: Goldcorp provided cyanide information and information on Goldcorp's management of cyanide to SFN on November 15).

Q: SFN technical team member asks what the worst case scenario is [meaning a worst-case environmental incident]. Advisor notes that the Project Proposal has low information on SFN. Also asks if there are any compensation programs that Goldcorp would implement if there were to be an environmental event?

A: The emergency response plan for the Project is in the Project Proposal. Goldcorp is willing to consider and provide an addendum to the Project Proposal regarding SFN information once Goldcorp receives this information. Goldcorp does not want to rush the analysis of this data, nor does Goldcorp want to rush SFN's review of this data with citizens. As such, Goldcorp will submit this potential addendum during the YESAB process. If SFN has examples of the type of compensation program they speak of, Goldcorp welcomes it.

Q: SFN technical team member asks about cumulative effects and a workshop to discuss scenarios regarding future development.

A: Goldcorp has a scenario analysis in the action items from the workshop on September 21. Goldcorp notes that a workshop would be valuable though had not previously understood that was desired by SFN. Goldcorp states that cumulative effects are ultimately the responsibility of YESAB. Goldcorp provides information in the Project Proposal to assist YESAB in their assessment.

Goldcorp notes that there will be specific engagement with SFN on the development of the socio-economic management plan and wants to develop this collaboratively. There will also be information sessions on contracting and procurement in early 2018.

SFN notes the following for Goldcorp:

- Council has been briefed by the SFN technical team and met with Citizens in the morning.
- Council supports the comments made in the meeting today by Citizens and the technical team.
- SFN wants SFN Citizens to be able to access jobs through Goldcorp contractors, for example, how to get jobs in catering at the exploration site, given that Chief Isaac Inc. has the contract.
- SFN wants the Selkirk Development Corporation to get in the door, create partnerships, and get Citizens jobs.
- Benefits to the community come through jobs.
- When the mine is gone, SFN is still here. Goldcorp needs to ensure that the environment is protected for generations to come.





# Goldcorp Coffee Project Update

November 2017

 **GOLDCORP**

- **Introductions and Project Overview**
- **2018 Season Planning**
- **YESAB Project Update & Engagement**
- **Questions**

- Goldcorp is a leading gold producer focused on responsible mining practices with safe, low-cost production throughout North and South America
- Canadian company headquartered in Vancouver
- Over 15,000 employees worldwide
- Primary product is gold, with silver, copper, zinc and lead by-products
- Goldcorp's vision is *Together, Creating sustainable Value*, which is build on 6 pillars: people, sustainability, safety, margins, reserves and safe production.



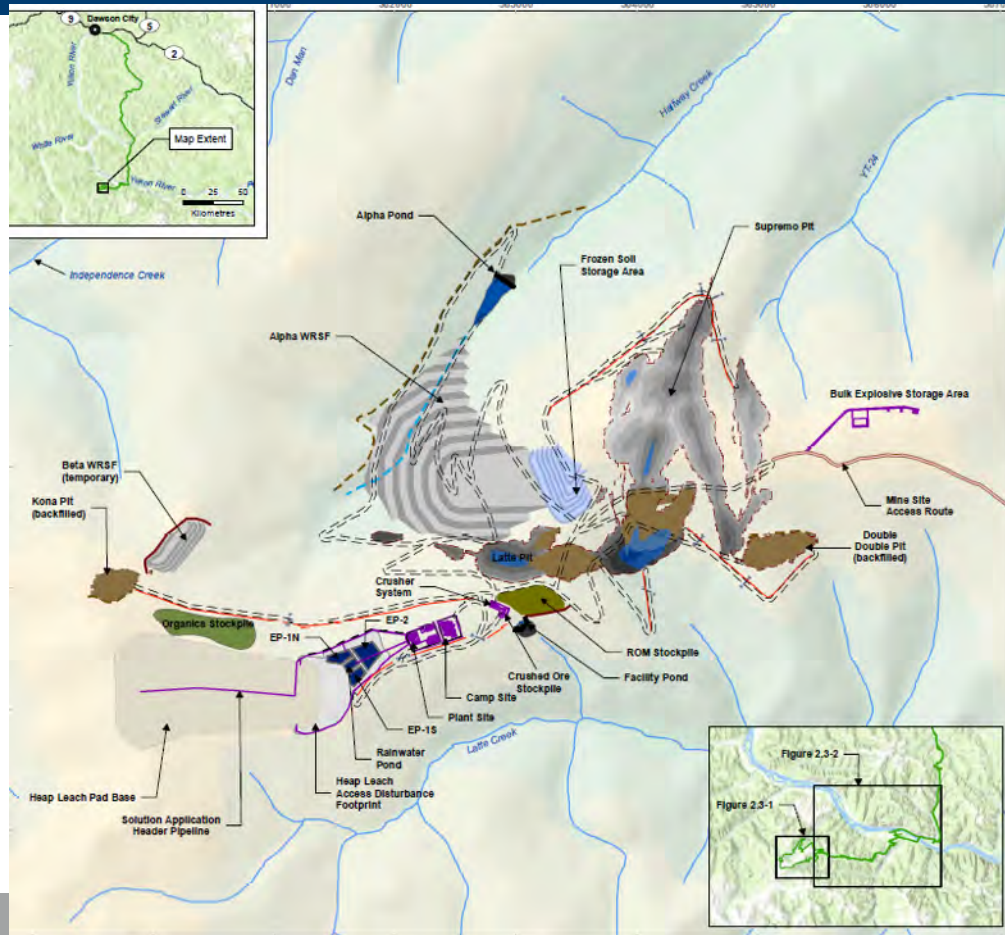
# Coffee Project Overview – Tintina Gold District





# Proposed Mine Plan

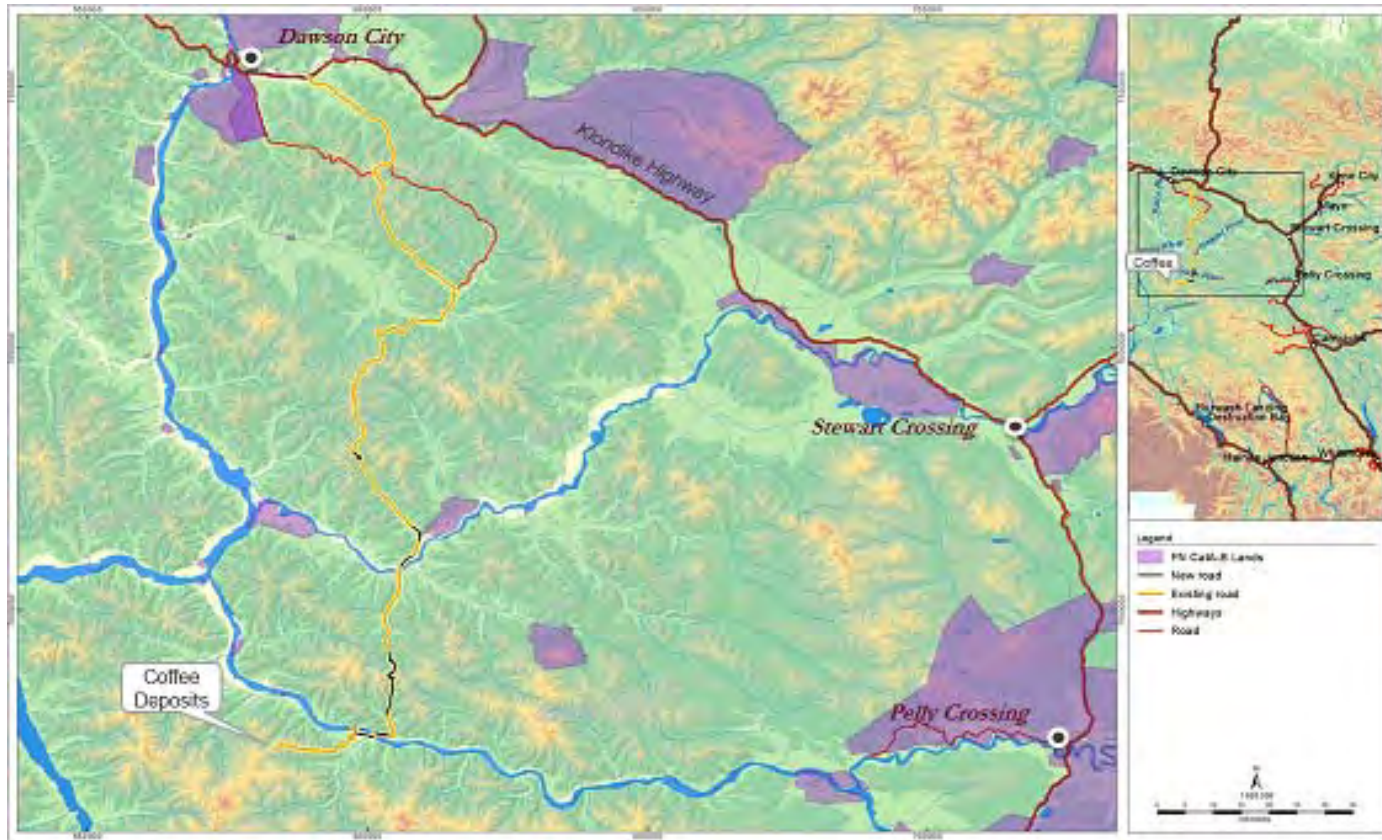
5



- **60Mt Ore**
- **300Mt Waste Rock**
- **4 open pits**
- **5-phase Heap Leach Facility**
- **1 Waste Rock Storage Facility**
- **4 In-pit backfill areas**
- **Soil stockpiles for reclamation**



# Northern Access Route





# 2017 SEASON & 2018 PLANS

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

# Coffee Gold Project Exploration Program Summary

## Summer/Fall 2017:

- Infill drilling at Latte to advance resources to Measured status
- Testing multiple targets, as shown in the next slide, to identify additional resources
- Deep drilling at Latte and Supremo
- Soil testing, geophysical, and geochemical surveys

## Planned 2018 Activity:

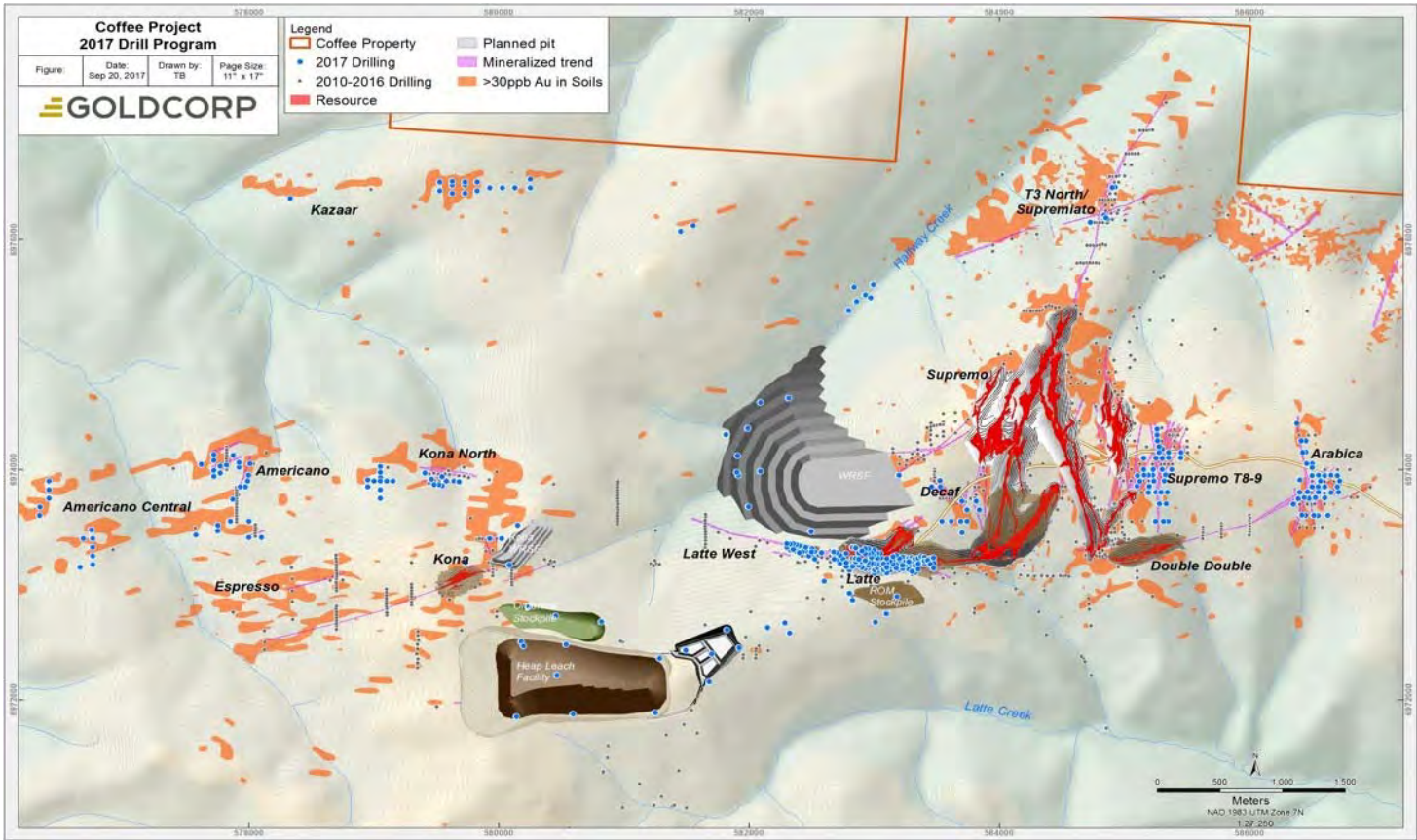
- Construction new exploration road to the Kona zone and improve the existing road to meet project standards (road base, grades, and curves)
- Construct the previously permitted 100-person exploration camp
- Drilling on Advanced Targets to progress them to Resource status
- Infill drilling at Supremo to advance resources to Measured status
- Testing of new targets identified in the 2017 soil anomaly testing and geophysical surveys



# Coffee Project Exploration Program – Context

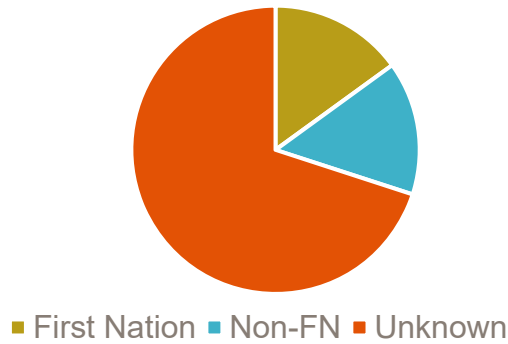


# Drilling Program 2017

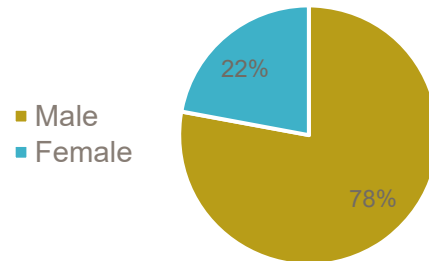




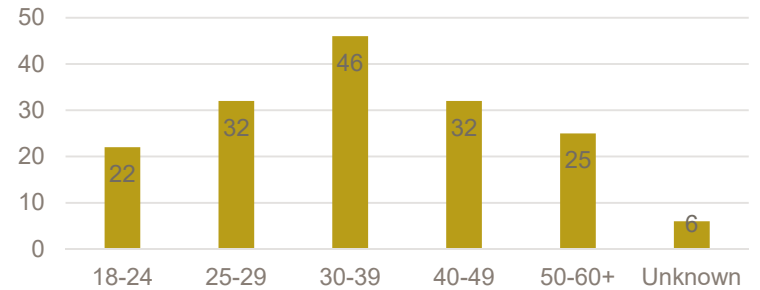
### First Nation Hiring



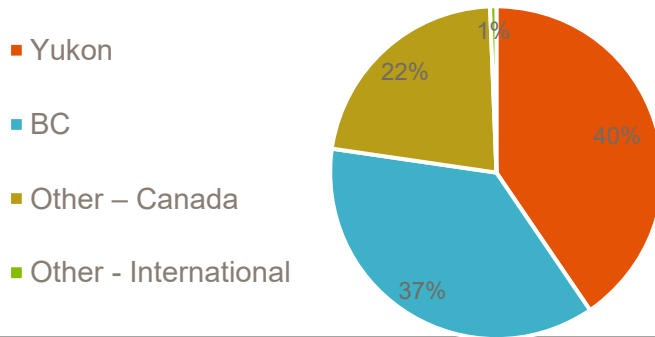
### Gender



### Age



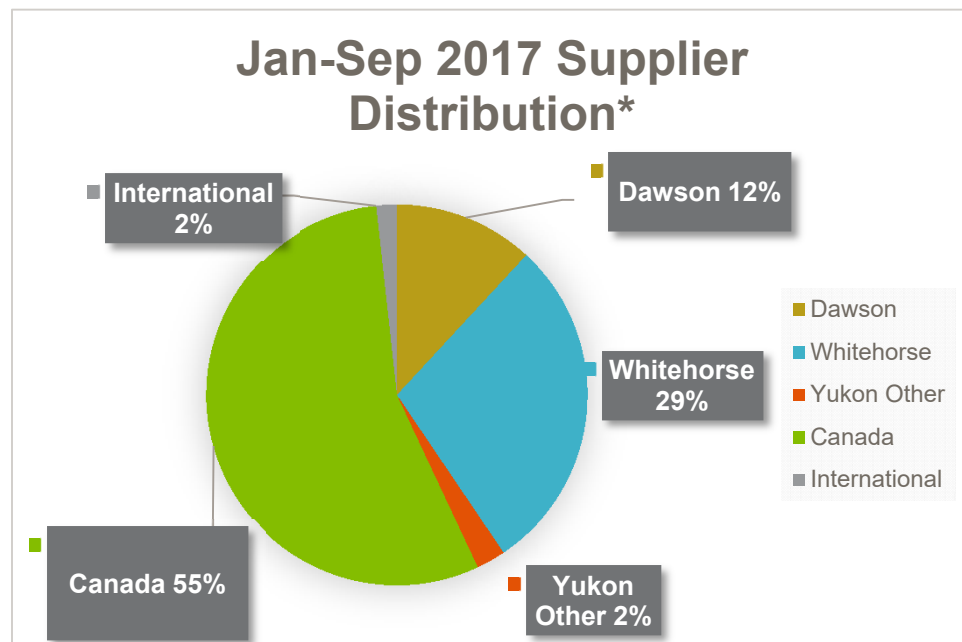
### Territory or Province of Residence



## Planning Ahead:

- Job postings for Next Season: Early 2018
- General Applications Open Now— via Liaison & Online

Coffee is committed to creating sustainable prosperity that brings long term social and economic benefits for neighbouring communities throughout the life cycle of the mine.



\*Based on spend

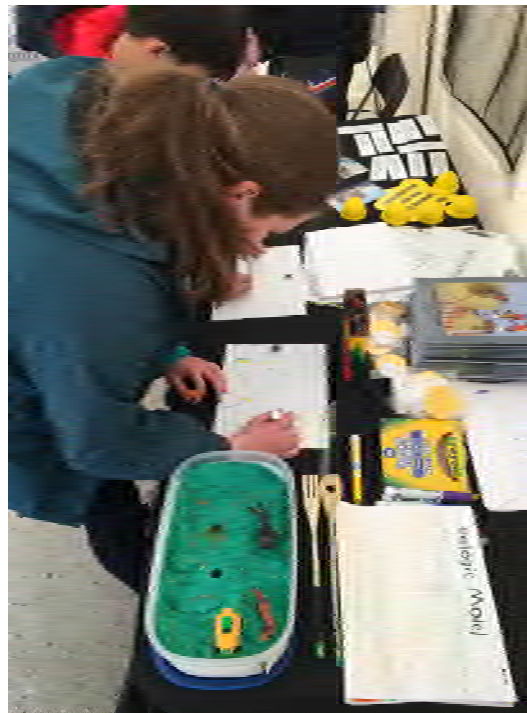
In 2017 we had 3 Requests for Proposals (RFPs) shared with SFN Development Corp:

- Office space
- Water trucks
- Microwave tower construction



Yukon River Quest at Coffee Camp

Yukon Women in Mining –  
Yukon Community Mining  
Experiential Extravaganza



Spirit Dancers & Hand Games  
at the NAIG



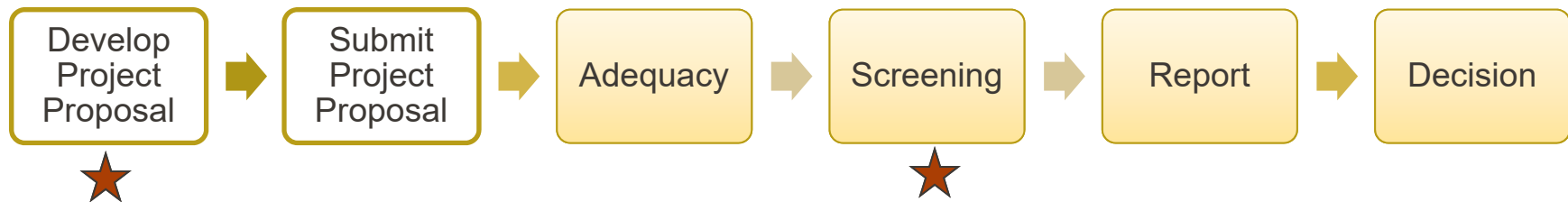


# YESAB PROJECT UPDATE & CONSULTATION

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

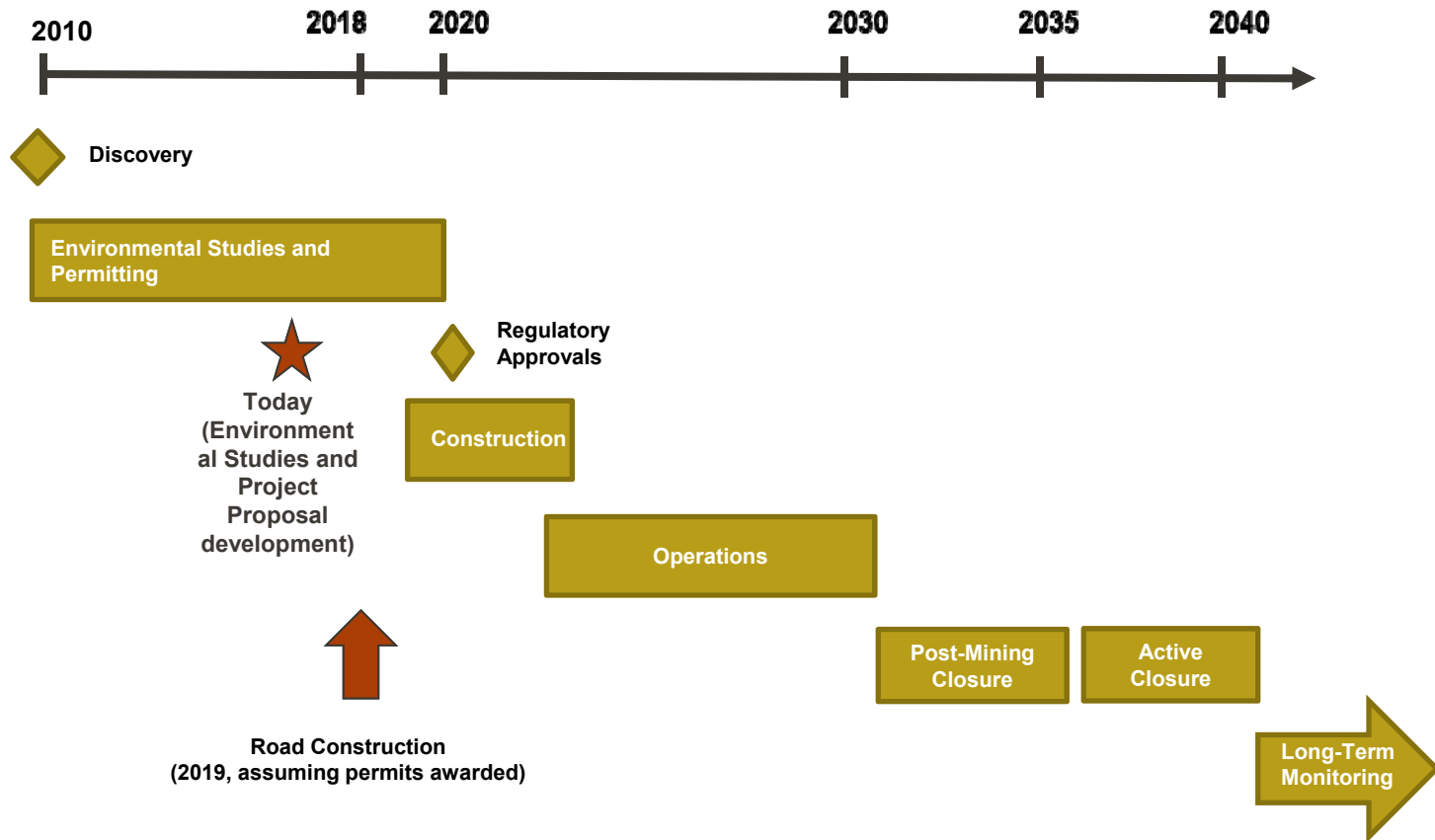
## The Coffee Project requires an Executive Committee Screening Under YESAB:



Goldcorp submitted the Project Proposal for the Coffee Project to the Yukon Environmental and Socio-Economic Assessment Board (YESAB) in March 2017. YESAB discontinued the Assessment in July 2017 to provide time for further consultation.



# Project Schedule



# ENGAGEMENT WITH SFN & SFN TECHNICAL ADVISORS

## Meetings: March 31 to Date

18

### Goldcorp and Selkirk First Nation meetings:

- May 29 – Chief and Council and Goldcorp introductions, Project overview
- June 23 – Chief and Council tour of Coffee Project site
- September 14 – SFN technical advisors site and Northern Access Route tour
- September 14 – Chief and Council Northern Access Route tour
- September 19 – SFN technical advisors Water and Waste Management workshop
- September 20 – SFN technical advisors Closure workshop
- September 21 – SFN technical advisors Socio-economic workshop
- September 22 – SFN technical advisors Wildlife workshop

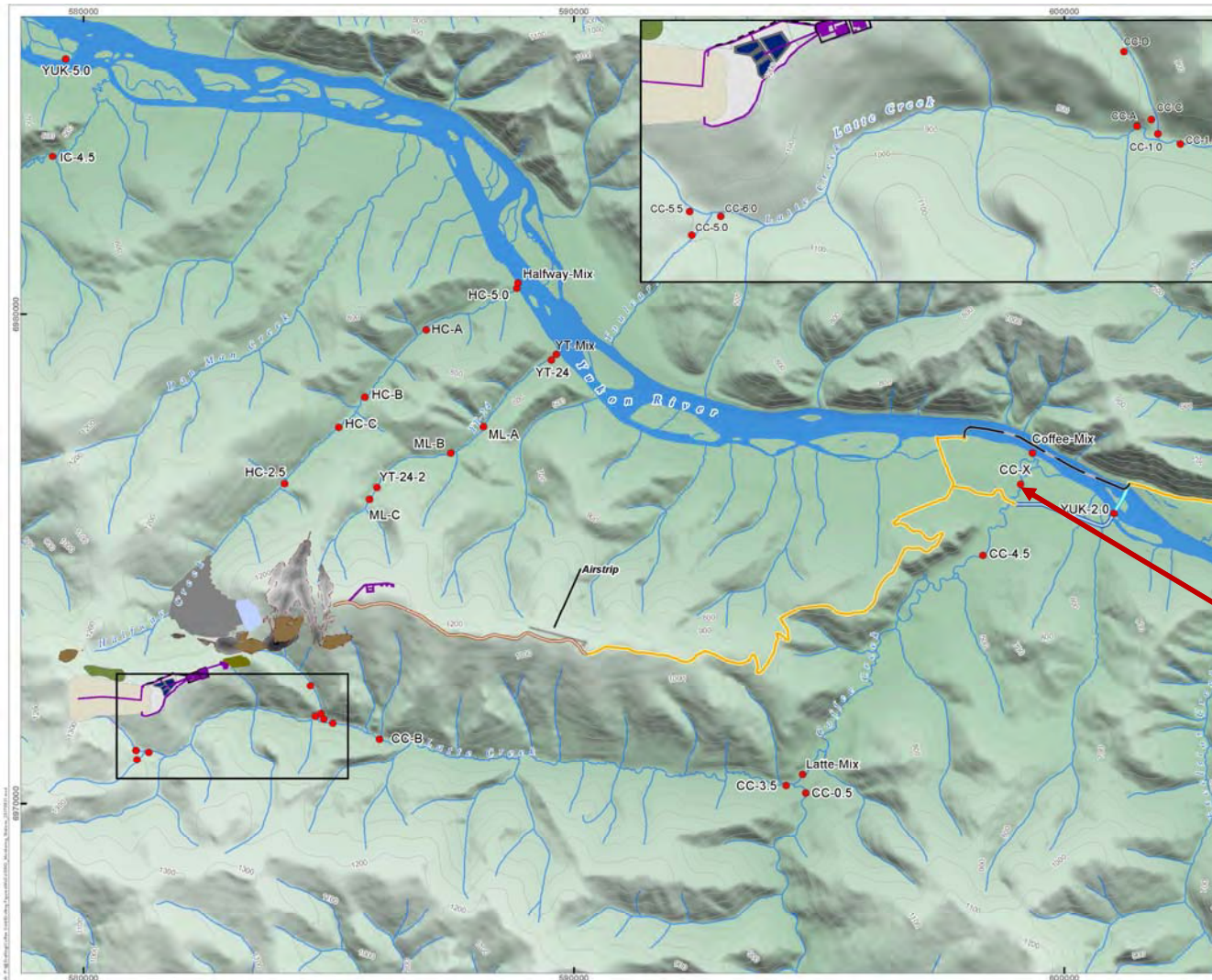


Picture: September 14 SFN  
Technical Advisor Site Tour

- **Over the course of engagement with Selkirk First Nation leadership, council, and technical advisors, Goldcorp has heard a number of concerns related to the following topics:**
  - Water Management, Water Quality, Effects to Fish
  - Northern Access Route
  - Closure
  - Socio-economic Considerations
- **Goldcorp's considerations of these concerns are summarized on the following slides**


Key Issues Presented by SFN	Goldcorp's Response
<p>A) Effects to water quality in Coffee Creek as a result of the Project; Coffee Creek is of cultural importance to SFN and is fish overwintering habitat.</p> <p>B) Effects to Chinook salmon as a result of the Project.</p>	<p>A) <b>Goldcorp understands the significance of Coffee Creek to SFN:</b></p> <ul style="list-style-type: none"> <li>• Current plan has all mine waste rock stored in Halfway creek.</li> <li>• improves water quality expected in Coffee Creek.</li> <li>• Committed to non-degradation of Coffee creek under current mine plan</li> <li>• Added water quality monitoring station at SFN technical team request.</li> </ul> <p>B) <b>Goldcorp appreciates the significance of Chinook Salmon to SFN:</b></p> <ul style="list-style-type: none"> <li>• Additional Chinook salmon spawning surveys in 2017</li> <li>• Will carry out ongoing surveys in the 2018 and 2019 field seasons.</li> <li>• Goldcorp is also committed to ongoing engagement with SFN regarding current and potential biodiversity enhancement initiatives, in particular those related to salmon</li> </ul>





- Goldcorp added a water quality monitoring station based on feedback from SFN.
- The new station is called “CC-X”.

Key Issues Presented by SFN	Goldcorp's Response
<p><b>A) Effects to wildlife, particularly moose, related to an increase hunting pressure as a result of improved access related to the Project.</b></p> <p><b>B) Wildlife mortality related to mine traffic.</b></p> <p><b>C) Increase in placer mining activity in the area between the Stewart and Yukon Rivers as a result of improved access related to the Project.</b></p>	<p><b>A &amp; C) Access Control and active engagement:</b></p> <ul style="list-style-type: none"> <li>• Control access where possible along the NAR (at the barge landings in the summer and the ice bridges in the winter).</li> <li>• Will work with SFN and with Yukon Government on NAR management.</li> <li>• Will conduct moose surveys throughout the Project life to monitor population.</li> </ul> <p><b>B) Improved visibility and safety measures to ensure mine traffic operates responsibly related to wildlife</b></p> <ul style="list-style-type: none"> <li>• Upgrading and building the NAR to specifications that allow for improved line of sight and an increase in pullouts, as well as speed limits along the NAR of 30-50.</li> <li>• Enforce speed limits on the NAR with mine traffic by remote monitoring.</li> <li>• Committed to ongoing engagement with First Nations and stakeholders.</li> </ul>

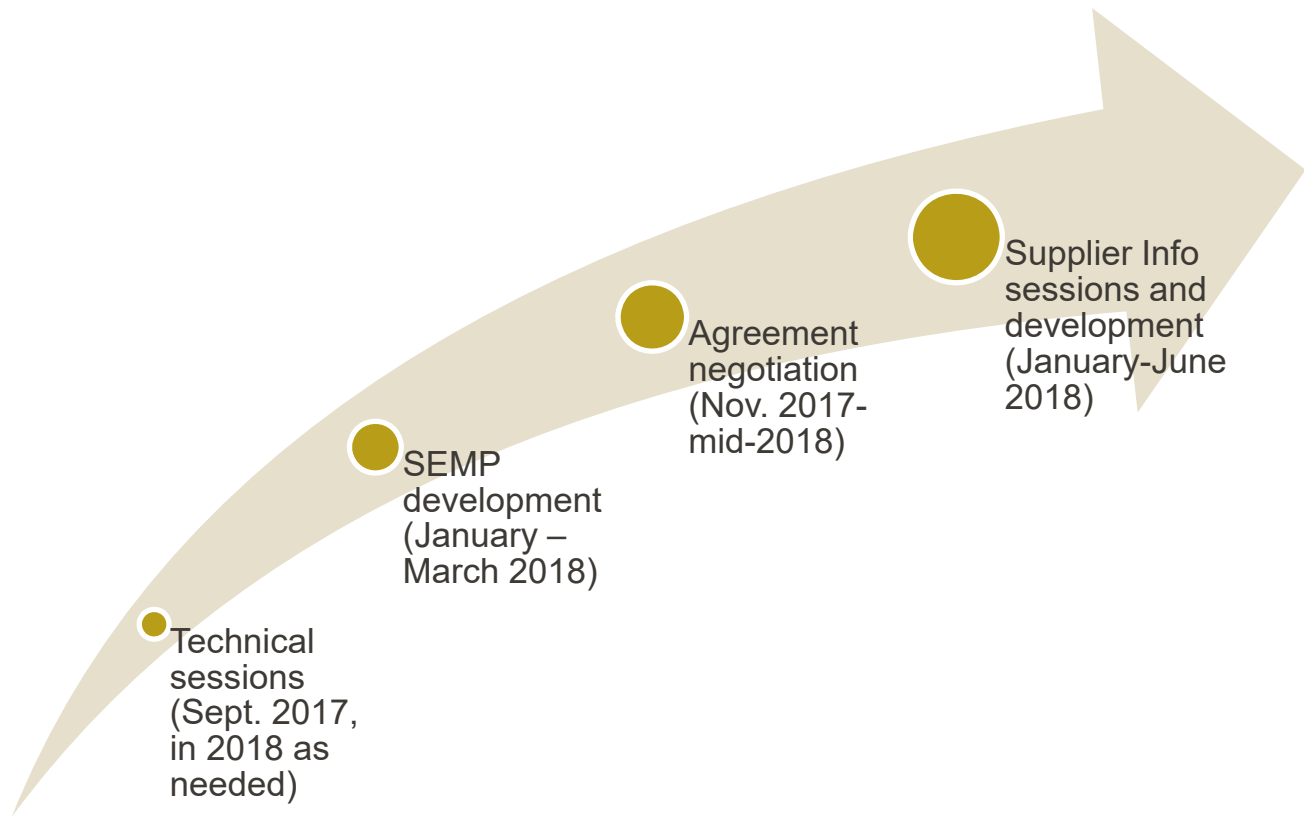
Key Issues Presented by SFN	Goldcorp's Response	
<p><b>A) Goldcorp proposal does not include a cover for the waste rock storage facility in closure.</b></p>	<p>Goldcorp does not currently have data that indicate it can cover both the Heap Leach and the Waste Rock Storage Facility.</p> <p>As a result, it has proposed a plan that will ensure the highest priority (the heap leach area) will be covered in closure.</p> <p>Goldcorp has committed to ongoing reclamation research for the Project, and has committed to ongoing engagement with SFN on the reclamation and closure plan.</p>	

# Socio-economic Considerations

Key Issues Presented by SFN	Goldcorp's Response
<p>A) SFN is concerned that Goldcorp has not considered SFN primary data in the socio-economic sections of the Proposal.</p>	<p>Goldcorp is committed to engaging SFN on the development and review of the Socio-economic Management Plan for the Project.</p> <p>Goldcorp will consider SFN's primary socio-economic data in the development of the Socio-economic Monitoring Plan for the Project when it is available.</p> <p>If such data shows our project assumptions to be in error, Goldcorp will address this issue by identifying relevant additional mitigations or enhancement measures.</p>











# DISCUSSION & QUESTIONS

TOGETHER, CREATING SUSTAINABLE VALUE

 GOLDCORP

- **Provides a transparent, replicable and confidential process for listening and responding to community ideas, questions and concerns.**
- **We commit to maintaining respect throughout the process will investigate all topics related to Coffee Gold activities.**
- **Contact us with your comments**
  - Toll-free Phone: 1-844-330-0277
  - Email: [coffee.feedback@Goldcorp.com](mailto:coffee.feedback@Goldcorp.com)
  - In person or writing at the Whitehorse office: Attn: Community Relations Dept. Suite 201-208 Main Street, Whitehorse, Yukon, Y1A 2A9

# Thank you

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## Contacts:

**Buddy Crill**  
**Mine General Manager**

**604-505-7613**

[buddy.crill@goldcorp.com](mailto:buddy.crill@goldcorp.com)

**Catherine Tegelberg**  
**Superintendent, Corporate Social Responsibility**

**604-318-0528**

[Catherine.Tegelberg@goldcorp.com](mailto:Catherine.Tegelberg@goldcorp.com)



**We look forward to working  
with Yukon Communities**

**First Nation of Na-Cho Nyäk Dun**  
P.O. Box 220  
Mayo, Yukon Y0B 1M0  
Tel: (867) 996-2265  
Fax: (867) 996-2267  
E-mail: [main@nndfn.com](mailto:main@nndfn.com)  
Website: [www.nndfn.com](http://www.nndfn.com)



November 9, 2017

Ms. Wendy Randal, Chair of the Executive Committee  
203-309 Strickland St  
Whitehorse Yukon  
Y1A 2J9

Attn: Ms. Wendy Randall, Chair of the Executive Committee, Yukon Environmental and Socio-economic Assessment Board

Re: Goldcorp Coffee Gold Mine Project

Dear Ms. Randall,

As you are aware, a portion of Goldcorp's proposed Northern Access Route for the Coffee Gold Mine Project (Project) falls within the Traditional Territory of the First Nation of Na-cho Nyak Dun (FNNND). The purpose of this letter is to inform you the status of consultation between Goldcorp and FNNND.

To date, Goldcorp has met with FNNND government on multiple occasions and FNNND Citizens on one occasion to consult on the Project. The questions, comments, and concerns regarding the Project raised by FNNND and FNNND Citizens were addressed during said meetings. FNNND received a full electronic copy of Goldcorp's Coffee Gold Mine Project Proposal on March 31, 2017 and a full hard copy of the Project Proposal on May 18, 2017. Subsequently, FNNND received a letter from Goldcorp on July 25, 2017 reiterating Goldcorp's commitment to meaningful engagement on the Project, and requesting FNNND's feedback on the Project Proposal. FNNND has verbally informed Goldcorp that it does not have any views to present on the Project Proposal, and this letter serves to advise that FNNND is satisfied with the level of consultation from Goldcorp on the Project. In particular, FNNND is of the view that the YESAA s.50(3) pre-submission consultation requirements on the Project Proposal are complete with respect to FNNND.

FNNND requests that Goldcorp continue to provide updates to the FNNND Lands and Resources department.

Sincerely,  
Signature Redacted

Chief Simon Mervyn

CC: Buddy Crill, Mine General Manager, Goldcorp Coffee Gold Mine Project



# Memorandum



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**To:** Jennie Gjertsen, Environmental and Permitting Manager, Coffee Gold Project

**From:** Name Redacted Wildlife Biologist & Project Manager, EDI

**Date:** October 25, 2017

**Project No:** 17Y0032

**Re:** Mineral lick along new sections of Northern Access Route

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During surveys of the proposed new sections of the Northern Access Route in September 2017 a mineral lick was discovered along one of the new sections of road between the Stewart River and the Yukon River. The lick is located in an area of groundwater seepage and shows heavy trampling with numerous moose tracks observed in the soft soils in and around the lick. Several well-established wildlife trails were found leading to/from the lick.

At the time of discovery, the mineral lick was located approximately 160 m from the proposed road. EDI has since been in contact with Onsite Engineering Ltd. and we are collaboratively investigating options to adjust the alignment further from the lick and/or develop mitigation measures to minimize the effect of the proposed road on the lick. Due to geographic constraints, the maximum change in the location of the road alignment will likely be less than 300 m (the altered road alignment will remain within the LAA identified for the project proposal and will pass through similar habitats as the original alignment; therefore no change to the environmental assessment for other disciplines is expected). Two remote cameras have been set up at the lick to document wildlife use of the site.



# MINUTES

**Tr'ondëk Hwëch'in – Goldcorp  
Coffee Project  
October 24, 2017**

**Location:** Aldridge and Rosling Office, Vancouver

**Time:** 9:00am – 10:30am (Tues)

**Participants:**

**Tr'ondëk Hwëch'in (TH)**  
Names Redacted

**– Goldcorp Inc.**

Buddy Crill, General Mine Manager

Roger Souckey, Director, Sustainability & Human Resources (HR) Coffee Project

Catherine Tegelberg, Superintendent, Corporate Social Responsibility (CSR) Coffee Project

Names Redacted

**Chairperson:** Tr'ondëk Hwëch'in  
Meeting commenced at 11:05am  
Reesa Meltzer recorded the minutes

## **Project Development**

1. Opening Prayer
2. Introductions / Sustainability / Safety / Personal Shares

There was a safety share around electricity. TH acknowledged that Mike Smith AFN vice-Chief passed away in the Yukon. He was a great leader in the territory and it is a great loss to the Yukon First Nations. A safety share around snow, slipping and icy conditions was provided. TH gave thanks to Goldcorp for attending the general assembly and noted it was well received by the citizens. Goldcorp thanked TH for allowing us to be a part of the general assembly.

3. Review of Today's Agenda and Approval of Project Development Minutes and Action Items of the September 13<sup>th</sup>, 2017 Meeting.  
No comments on the Sept. 13, 2017 minutes (last meeting).

Two additional agenda items for discussion include follow-up on technical consultants and any feedback as relates to October 2<sup>nd</sup> meeting.

# MINUTES

Action tracker was reviewed. There was only one outstanding item and TH noted that this has been covered off in the additional items that have been added to the agenda.

## 4. Items for Discussion

- a. Technical engagement plan status [Roger / Chief Joseph] and b. Proposed environmental work plan discussion [Catherine]

Goldcorp is looking for feedback on the technical engagement plan that was provided at the end of August. TH sent a response via email prior to the meeting and explained that they understood the Technical engagement plan was to serve as an updated scope of work for the addendum to the Capacity Funding Agreement. In the course of reviewing for completeness and technical teams perspectives it was realized that editing the Goldcorp document with TH material would create more confusion. To determine the budget it was felt the most efficient route would be to provide stand alone plans. The documents together would then form the totality of the scope of work. Additional confusion was created with recorded discussion at a technical level.

Goldcorp wants to confirm that the Technical Engagement Status & Plan document serves two purposes: capacity funding and consultation record. It is important for Goldcorp to have a response on it to ensure that they accurately understood the issues TH is raising through the engagement and ensure nothing was overlooked. TH's consultant's Environmental workplan (tabled following the water workshops in September) serves to duplicate this purpose but therefore seems unnecessary. Furthermore, it includes action items in it that were not discussed and agreed to at the meeting. Goldcorp needs to have a conversation with TH and their consultants about what was included in the document to understand these additional action items.

It was agreed that there are two outstanding deliverables: 1) TH to provide comments on Goldcorp's Technical Engagement Status & Plan to ensure it completely describes what is required for consultation and 2) Goldcorp to provide a list of action items that come out of the workshops.

**ACTION:** Goldcorp will organize a teleconference between TH and Goldcorp's technical consultants to review the additional action items in the TH Environmental Workplan.

**ACTION:** Following the technical meetings, a review of action items recorded will take place.

**ACTION:** TH will provide comments on the Technical Engagement Status & Plan

For technical sessions, TH requests that the materials ahead of time. Goldcorp was sending the PPT one day in advance as an FYI as to what will be reviewed at the meeting. It was noted that these were sent as a courtesy for situations where people were not able to connect via webex and were not required to be reviewed prior to the workshop. Goldcorp acknowledged that some materials should be sent earlier for review and will endeavour to do so. If an item is required further in advance it can be discussed prior to the next session. TH noted that when their team gets the slide decks the night before they assume they have to be reviewed. Once the TH technical team realized it was for background information they were less concerned.

# MINUTES

ACTION: Goldcorp will make a note in the email of the PPT deck to the technical teams prior to technical session if review prior to the meeting is required or not, and will send items that require review earlier if possible.

b. Exploration season summary and 2018 plans [Buddy / <sup>Name Redacted</sup>]

An update was given on the expanded exploration program. Unfortunately the river levels and barging issues didn't allow for the water truck to get to site in order to continue with the expanded program. Currently two reverse circulation drills are operating on-site. Work on building the road out to the Kona area is 1/3 of the way complete and will not be completed this season. The plan is to close the site on or around November 15. Lessons learned are that there is not a lot of capacity for barging in the summer because of lack of boat captains. Only 10 barges made it in to site this year as compared to 15 last year. Fuel had to be flown in which adds to operational costs. TH asked if we currently are using someone else's barge? Goldcorp doesn't have a barge and may look into purchasing one. Does Goldcorp use Groundtruth for drilling? Not for drilling, however Goldcorp used them for soil sampling this year.

c. YESAB re-submission <sup>Name Redacted</sup> ]

Goldcorp is on track for a November re-submission. The TH letter is still in a draft awaiting review.

The resubmission will not be substantially different from what was originally submitted. An updated consultation section from March 31 date of submission will be included as well as updates to the commitments table. TH is looking for some clarity around language on discussions moving forwards in the letter. Commitments document review would be appreciated prior to the letter being delivered to YESAB.

ACTION: Goldcorp to provide TH with a concise document of the updates to the consultation log.

5. Yukon Geoscience Forum participation <sup>Name Redacted</sup> ]

Chief and council as well as <sup>Name R</sup> and a member of the Lands Department will be in attendance. An invitation to the <sup>Name Redacted</sup> t to attend the Yukon Chamber of Mines Geoscience Awards Banquet November 20, 2017 7:00 to 10:00 PM. <sup>Name Redacted</sup> will attend the awards dinner with a council member.

In regards to a talk with TH and Goldcorp the subject can be anything around partnership or relationship building. It could be a joint talk between the two groups and then time for questions or it could be individual talks and a question period.

Action: Goldcorp will provide TH information on the topic of the panel discussion for Geoscience.

ACTION: TH will consider and respond to GC if they will participate in the panel discussion at Geoscience.

# MINUTES

## 6. Other

Goldcorp asked that technical consultants use the established channels of communication and not request attendance of Goldcorp technical consultants directly to those individuals.

Goldcorp asked if there was any feedback from the TH citizens meeting on Oct. 2<sup>nd</sup> that can be shared? TH gave a presentation on what had progressed since the last meeting and the engagement with Goldcorp to-date. The Northern Access Route (NAR) was also discussed including the analytical assessment of the Blackhills and details around the amount of pre-existing road. The citizens have a lot of confidence in <sup>Name Redacted</sup> and the team working with TH on the project. TH confirmed for Goldcorp that no further information was required related to that subject. A couple of youth citizens attended the meeting, which was agreed to be a positive aspect.

The draft letter to YESAB comments will be shared and TH will talk internally about Pat's participation in Geoscience after caucus tomorrow morning.

## 7. Preparation of next project development meeting

- a. Agenda
- b. Date

December 13-14, 2017 in Whitehorse. December 12<sup>th</sup> afternoon may be added for a drafting session. 10:00 am start. January 24<sup>th</sup> and 25<sup>th</sup> in Vancouver will be the following meeting dates.

ACTION: Goldcorp will confirm timing for the January meetings.

ACTION: Goldcorp will send calendar invitations for upcoming meetings.

- c. Chairperson

Goldcorp will chair the Whitehorse meetings in December and TH will chair the January meetings in Vancouver.

Meeting concluded at 12:10pm

# Project Memo:

## Coffee Gold Mine Project, Northern Access Route

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Prepared for:	<b>Tr'ondëk Hwëch'in</b>	Date of Memo:	<b>31 August 2017</b>
Prepared by:	Name Redacted <b>LGL Limited</b>	Meeting Date(s):	<b>24&amp;25 August 2017</b>
Meeting(s):	<b>Multi-Criteria Decision Analysis review / Site tour of access options</b>	Projects:	<b>Coffee Gold Mine Project</b>
Location:	<b>City of Dawson south to Stewart River</b>	Proponent:	<b>Goldcorp</b>

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### Background

This memo summarizes matters regarding regarding two aspects of the Coffee Gold Mine Project proposal by Goldcorp: (i) the Multi-Criteria Decision Analysis (MCDA) of two key route options in a portion of the section between Highway 2 and the Stewart River, and (ii) a site tour of the Northern Access Route, including the Black Hills option, between Highway 2 and the proposed barge landing at the north side of the Stewart River.

In June 2017 the Tr'ondëk Hwëch'in Natural Resources Department and Heritage Department together with LGL Limited prepared the draft report *Coffee Gold Mine Project Northern Access Route: Review of Route Selection Criteria and a Comparative Analysis of Goldcorp's Proposed Northern Access Route (Henderson Dome - Maisy May Creek) and an Alternate Route (Black Hills Creek)*. That report presented a technical review of the Maisy May and Black Hills route options from the perspective of Tr'ondëk Hwëch'in rights and interests under the Tr'ondëk Hwëch'in Final Agreement. Also around June 2017, Goldcorp commissioned a study by Onsite Engineering titled: *Northern Access Route Black Hills versus Maisy May route selection tradeoff study*. That study focussed on engineering considerations between the two route options identified above.

TH recognized the importance of considering the full range of factors for each route option (i.e. impacts of each route on TH treaty rights as well as the engineering considerations between the two route options) in order to better understand which route option might be optimal taking into account those factors.

Accordingly, TH requested that Goldcorp prepare a comprehensive multiple accounts analysis of the two routes in order to account for the interests of of Tr'ondëk Hwëch'in and Goldcorp in a single analysis. On 22 June 2017 TH held a conference call with Goldcorp during which we put forward our recommendation of a MCDA method. Goldcorp agreed with the MCDA method and undertook the comparative analysis.



Goldcorp then produced two documents:

- a memo detailing the Maisy May and Black Hills options MCDA - 170816 GC NAR MCDA Memo V31.pdf dated 16 August 2017 (the “MCDA Memo”)(attached); and
- an Excel workbook providing the mathematical documentation of the MCDA - Maisy May and Black Hills Routes\_MCDA\_2017\_08\_10.xlsx dated 10 August 2017.

In addition to this work, we also conducted a site tour of the route options with Goldcorp on August 25<sup>th</sup>, 2017 to view the environmental conditions of each route.

### **Multi-criteria Decision Analysis (MCDA)**

As mentioned, Goldcorp completed the MCDA in accordance with TH’s request. LGL reviewed the MCDA Memo and analysis and found the results to be very robust in that, regardless of how one alters the account and indicator parameter ratings, the MCDA always yields a result that points to the Maisy May route as the least impact option in comparison with the Black Hills route as pertaining to the parameters that were assessed under the environmental and socio-economic considerations.

A meeting with Goldcorp and their consultants was held via teleconference on August 24<sup>th</sup>, 2017 to review the MCDA Memo and analysis. Names Redacted of LGL participated, as did Pat Titus for Tr’ondëk Hwëch'in.

It is our view that the MCDA Memo and corresponding analysis is satisfactory and requires no further work.

### **Site Tour**

On August 25<sup>th</sup>, 2017 we embarked on a site tour of the two access options. The Goldcorp-led tour began and ended near Dawson City. Names Redacted LGL participated (land and air) as did Names Redacted (land only) for Tr’ondëk Hwëch'in.

We drove the Maisy May route down to the airstrip approximately 14 km north of the Stewart River. We then boarded a helicopter and flew the rest of the Maisy May route to the barge landing on the Stewart River. We then circled back and flew over the Black Hills route option then back to the single route connecting to Highway 2.

[As an aside, the environmental devastation that is occurring as a result of Placer mining should be noted and, from an environmental preservation perspective, the placer mining practices currently taking place constitute an unacceptable use of the land and water resources in the region.]

It was observed that both route options are already accessible by passenger vehicles from the north for the most part, although both would require that new road access be built in order to complete access to the Stewart River. To accomplish this, the Black Hills route would require a greater length of new road to be built (i.e., 18.3 km vs 12.0 km for the Maisy May route).

Name Redacted, Goldcorp’s consulting engineer, explained during the tour that placer miners have for the most part engaged in poor road construction and maintenance practices (including roadbed design, roadbed material, ditching practices, grading practices, and stream crossings). For the section of the road south of the point where the Yukon government maintains the road, it is clear that Goldcorp access construction and operations management planning would improve environmental conditions along whichever access route was selected. For example in several locations along both route options streams are currently flowing directly over the roadbed (fords). In the case where Goldcorp would be involved, those same stream crossings would be properly constructed (culverts) and maintained.

From what we saw from the ground along the Maisy May route, invasive plants are abundant in areas disturbed by placer mining operations and continue to be of concern and will need to be sufficiently addressed.

### **Conclusions**

The MCDA Memo supports the conclusion that the Maisy May route has fewer overall impacts on the environment than the Black Hills route and, from an engineering perspective, will be easier to construct and maintain and will result in less new road construction. As stated above, the results of the MCDA Memo are reliable.

### **Closure**

It is our view that the matter concerning the comparative environmental assessment of the two options for the Northern Access Route requires no further examination.

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*Current southern limit of active placer mining operations on Maisy May Creek (view to north). 25 August 2017*



**MEMORANDUM**

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<b>Date:</b>	August 16, 2017
<b>To:</b>	Tr'ondëk Hwëch'in
<b>From:</b>	Goldcorp
<b>Re:</b>	Maisy May and Black Hills routes comparative analysis

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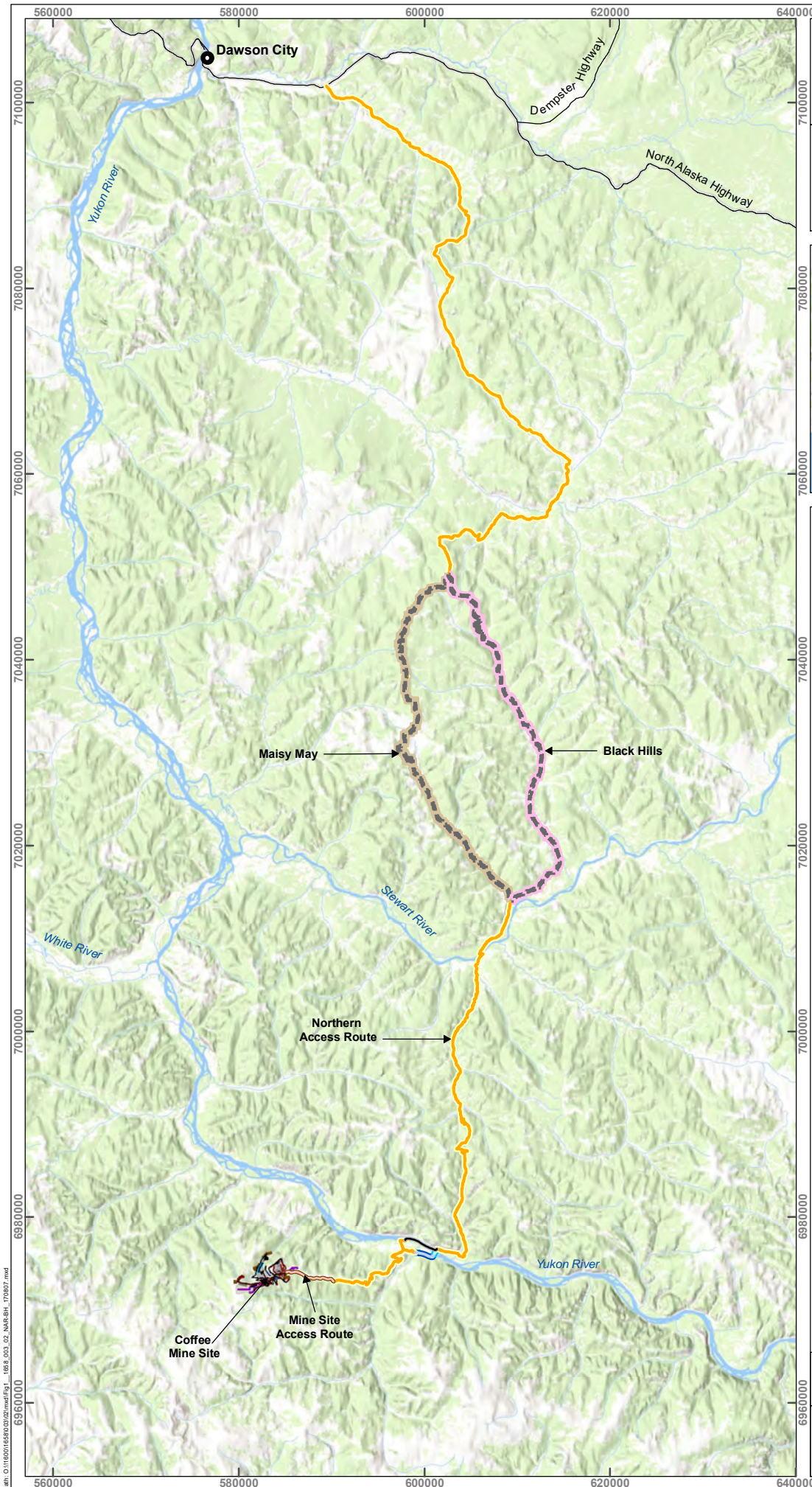
**1.0 OVERVIEW AND PURPOSE**

This memo describes the results of an options analysis between the Maisy May and Black Hills portions for the Northern Access Route. On June 13, 2017, Tr'ondëk Hwëch'in (TH) provided a route analysis worksheet requesting a quantitative comparative analysis between Route 1 (Maisy May) and Route 2 (Black Hills) (See Figure 1) that considers the impacts of the construction and operation of these alternative portions on valued components that TH identified to be of interest. Both proposed route options are located entirely within TH's Traditional Territory.

Initially, Goldcorp provided a report to TH describing the engineering and technical constraints of each of the route options. This report is included in Appendix A.

To address this request, Goldcorp has worked with TH to provide a robust comparison between the two route options, where availability of data allows. At the request of TH, Goldcorp has conducted a multiple-criteria decision analysis (MCDA) between the two routes, following the format and methodology provided to Goldcorp by TH. This memo summarizes the methodology employed, the analytical results, and the conclusions of the MCDA.





**COFFEE GOLD MINE**

**Maisy May and Black Hills Route**

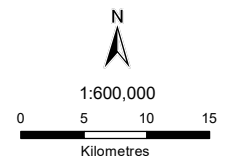


**Legend**

- Highway
- Black Hills Route
- Maily May Route
- Stewart River Ice and Barge Crossings
- Yukon River Barge Route
- Yukon River Ice Road
- Winter Road
- Mine Site Access Route
- Northern Access Route

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.



NAD 1983 UTM Zone 7N

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Figure 1	Date: Aug 7, 2017	Drawn by: JS	Reviewed: CPK
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## 2.0 METHODOLOGY

At the request of TH, Goldcorp conducted the MCDA using the methodology outlined in Environment Canada's (2016) Guidelines for the Assessment of Alternatives for Mine Waste Disposal (the Guidelines). The Guidelines provides a flexible and transparent methodology for evaluating multiple alternatives, and includes a mechanism for evaluating the sensitivity of results to potential bias.

Using the framework and accounts, sub-accounts and indicators provided by TH as a starting point, Goldcorp completed the MCDA by providing comparative data relevant to the two alternatives, where baseline or engineering data allowed. Goldcorp also added select additional accounts, sub-accounts and indicators where it was felt by Goldcorp that additional data points would lead to a more informed decision (e.g., engineering, safety and technical data). The MCDA was conducted for the following scenarios:

- Base case TH weightings
- Base case Goldcorp weightings
- For both TH and Goldcorp weightings, the following sensitivity analyses:
  - No engineering data (i.e., only environmental and socio-economic concerns considered)
  - All sub-accounts weighted equally
  - All sub-accounts and accounts weighted equally

## 3.0 RESULTS

Appendix B lists the accounts, sub-accounts, and indicators considered for inclusion in this analysis, as well as whether the sub-account or indicator was carried forward for formal evaluation and a rationale if not. Accounts, sub-accounts and indicators listed in Appendix B and Table 2-1 were provided by TH, unless otherwise noted in the appendix or table, respectively. The final multiple accounts ledger with associated scoring is provided in Table 2-1. The MCDA was then advanced using weightings provided by TH (Appendix C; Table 2-1), and those generated by Goldcorp (Appendix D; Table 2-1). Note that no weightings were provided by TH for individual accounts; the analysis has set all of these to a weighting value of '1'; other weightings shown in Table 2-1 were provided by TH or Goldcorp, as noted.

A description of accounts, sub-accounts, and indicators considered for the analysis but ultimately excluded is included in Appendix B, along with supporting rationale for exclusion. These data points include those that were both proposed and rejected by TH because, while they represented important values to TH, they were not thought to be sufficiently differentiating between the two routes and would add limited or no value to an options analysis. These data points include general heritage and way of life, traditional economy, trapping, thinhorn sheep, black bear, and wolverine. Analysis methodology for indicators (i.e., how the characterization data for each indicator was developed) is also provided in Appendix B.



**Table 2-1. Multiple Accounts Ledger, Weighting, and Scoring**

Account	Sub-Account	TH Weighting	Goldcorp Weighting	Indicator	Route 1 Score (Maisy May)	Route 2 Score (Black Hills)
Heritage	Heritage	4	4	# km of road in proximity to the river	6	1
Fish and Fish Habitat	Fish Habitat	3	3	Length of riparian area affected	6	1
		1*	1	# of stream crossings	6	1
		3	3	# of total fish bearing stream crossings	6	1
		5	5	# of stream crossings potential occupies by Chinook Salmon	6	1
Wildlife	Forty Mile Caribou Herd	5	5	# of km of road within high quality winter habitat	6	1
	Moose Harvest and Predation Risk	5	5	# of km of road within high quality fall/winter habitat	1	6
	Birds	3*	3	Bird diversity and abundance	6	1
Land and Resources	TH Settlement Land	5	5	Area (km <sup>2</sup> ) of settlement land within 500 m of a given route	6	1
	Invasive Plants	3	3	Area (km <sup>2</sup> ) of land sustaining native vegetation cover that is disturbed	6	1
	Wetlands	4	4	Area (km <sup>2</sup> ) of wetlands within 50m of the road	6	1
Cumulative Effects	Timber Harvest	3	3	Area (ha) of commercial timber stands within 5 km of a route	1	6
Road Attributes	New Road Construction	6*	4	# km of new road construction	6	1
	Ice-Rich Permafrost Affected	6*	5	# km of affected ice-rich permafrost	6	1
	Total number of bridges	5*	5	# of large stream crossings	6	1
	Area of new disturbance	4*	6	Total (ha) area of new disturbance	6	1
	Vegetated area cleared to	4*	4	Total area (ha) cleared	6	1

Account	Sub-Account	TH Weighting	Goldcorp Weighting	Indicator	Route 1 Score (Maisy May)	Route 2 Score (Black Hills)
	access borrow material					
	Construction cost	2*	6	Dollar value	6	1
Safety	Safety	6*	4	Number of switchbacks	6	1
		5*	6	Radius of switchbacks	6	1
		4*	6	Average road grade into valley bottom	6	1
		3*	5	Ice accumulation	6	1

\* indicator or sub-account was added by GC and, thus, no weighting was available from Tr'ondëk Hwëch'in. Weighting values were assigned to correspond to estimated Tr'ondëk Hwëch'in values. Note that the corresponding analysis spreadsheet will be provided to TH and these weightings can be changed to correspond to TH weightings.

The results of both the base case TH and Goldcorp scenarios provided in Table 2-1 indicate that the Maisy May option is the preferred option for both value systems (i.e., has the highest overall number; Table 2-2). Additionally, all sensitivity analyses indicate that the Maisy May option is preferred in all cases.

**Table 2-2. Multiple Accounts Analysis Results**

Account	Route 1 Final Result (Maisy May)		Route 2 Final Result (Black Hills)	
	TH	Goldcorp	TH	Goldcorp
Base case	5.0	5.0	2.0	2.0
No engineering included	4.6	4.6	2.4	2.4
All accounts weighted equally	5.0	5.0	2.0	2.0
All accounts and sub-accounts weighted equally	5.5*		1.5*	

\* when all accounts and sub-accounts are weighted equally, the value system of both TH and Goldcorp is removed; hence, results are shown for the route rather for TH/Goldcorp independently

## 4.0 CONCLUSION

The MCDA conducted to evaluate the difference between the Maisy May and Black Hills routing for the Northern Access Route indicates that the Maisy May route is the preferred option for all evaluated value scenarios. While the two routes are approximately the same length, the Maisy May option has the lowest overall potential for environmental, socio-economic, and cumulative impacts. The Maisy May route also involves lower overall construction efforts and cost, and is a safer route to operate than the Black Hills route.

## **Appendix A – OnSite Engineering Trade off study**

# **GOLDCORP**

## **COFFEE GOLD MINE**

Northern Access Route  
Black Hills versus Maisy May  
Route Selection Trade-Off Study

Prepared for:

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## 1. INTRODUCTION

At the request of Name Redacted of Goldcorp Inc. (Goldcorp), Onsite Engineering Ltd. (OEL) was retained to locate and complete a full geometric road design, stream crossing designs, and barge landing designs for the non-government maintained portion of the Northern Access Route (NAR) to the Coffee Gold Mine (the Project). This document serves to describe the route selection process for the specific portion of the NAR between the ridge top road after ascending out of Eureka Creek to the northern banks of the Stewart River just west of Maisy May. Please Refer to Figure 1-1 for an overview map of the area.

OEL has designed the non-government maintained portion of the NAR, a portion approximately 130 km long that begins approximately 58 km South-East of Dawson City at the Sulphur-Dominion Junction. The road from this junction north to Highway 2 is maintained by the Yukon Territory Department of Highways and Public Works. South of the Sulphur-Dominion junction, the NAR follows a series of roads currently maintained by various placer mine operations.

During the design process, many routes to the Coffee Gold Mine were considered. This included routes from the south, north, and west. The final overall route (the NAR) was selected based upon broad parameters including;

- Ensuring safety for all users along the route;
- Following existing roads wherever feasible;
- Minimizing disturbance, particularly to sensitive features such as archeological and cultural heritage sites, wildlife, biological and habitat, and shallow ice rich permafrost; and
- Minimizing road length.

The original, pre-fieldwork, NAR alignment followed the existing placer miner maintained roads down the Black Hills drainage and then along the north bank of the Stewart River. However, during the initial site investigation, it became clear that there were two potential routes from the hills above Eureka creek to the north bank of the Stewart River. This report describes the design process and decision matrix that was used to decide the selected route to the north bank of the Stewart River for the Coffee Project Proposal submitted to the Yukon Environmental and Socio-economic Assessment Board (YESAB) on March 31<sup>st</sup>, 2017.

Details on the design standards used and details regarding specific design decisions for various ground types, materials standards, and the current geometric can be found in the NAR road report prepared by OEL.

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# COFFEE GOLD MINE

## New Vs Existing Road For Black Hills and Maisy May Route Comparison



Black Hills Route

Maisy May Route

Stewart River

### Legend

### Northern Access Route

### Compared Routes

— Existing Road

— New Road

### Required Bridges



### Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



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NAD 1983 UTM Zone 7N

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Figure 1.1.

Date:  
May 18, 2017

Drawn by:  
M. Dickie

Reviewed:  
J. Araki  
P.Eng.



## 1.1. DESIGN PROCESS GENERAL CHRONOLOGY

The following is a general timeline of the design process starting from the time that the NAR was chosen as the preferred route until the selection of the Maisy May drainage route.

- May 2015: The initial site investigation of the entire route was conducted by a senior engineering geologist and senior engineer from OEL. During this investigation the entire route was traversed either by truck, helicopter, or on foot (for the portions of proposed new construction). At the time the Black Hills route was proposed so the field work was completed first along that route. The route was traversed by truck to the southernmost active placer operation and then traversed on foot and in a helicopter. Where existing active placer operations terminate a historic winter road continued toward the Stewart River. This road traversed large sections of ice-rich permafrost and was overgrown. Following the preliminary assessment it was clear the Black Hills route would require many existing fords to be upgraded to bridges and would require significant construction effort to build an all season road through the long sections of permafrost.
- May 2015: Following the site assessment of the Black Hills route, the Maisy May route was assessed by truck and foot. This route followed the existing road down into the Black hills valley but then ascended back up on the existing roads up to Henderson Dome and then back down into Maisy May.
- June, August and September 2015: Due to the uncertainty of the optimal location for the road in this section, LiDAR was collected on both routes. Following the collection of these data, OEL field crews were launched and collected site data for all the major crossings along both routes.
- August 2015: With the general crossing sizes and types confirmed and overall construction categories identified on both routes, OEL compiled cost comparison data for the two route options. From this it was clear that the number of larger bridges required along the Maisy May route was less, the initial construction cost for the road was lower, and there was far less construction on shallow ice-rich permafrost. At this time, it was decided to select the Maisy May route for the Proposal.
- August 2015: During the detailed design process, and as part of consultation with the local placer miners, we became aware that one of the miners was planning to connect the road from just above Eureka Creek over to Henderson Dome without descending into Black Hills at all. This further solidified the decision to use the Maisy May route because it avoided the steep and dangerous descent through the switchbacks down into Black hills and avoided three difficult bridge crossings.

## **2. ROUTE TRADE-OFF STUDY**

### **2.1. NEW ROAD CONSTRUCTION**

The Maisy May valley is developed and has active placer operations to within approximately 2 km of the valley bottom of the Stewart River. Black hills is active to within approximately 7.5km of the Stewart River valley bottom. Further, the Black hills route must traverse the Stewart River Valley west from Black hills to Maisy May. In total, the Maisy May and Black Hills routes have approximately 12.0 km and 18.3 km of required of trail upgrade or new road construction, respectively.

### **2.2. SENSITIVE SITE DISTURBANCE**

The Maisy May route follows existing roads until it enters the Stewart River Valley. It briefly crosses the valley bottom at the toe of Maisy May where it traverses a short section of wetland and ice-rich permafrost. Because Maisy May is heavily and currently disturbed by placer operations, the proposed road will only decrease the impacts that the current road has on the watercourses. Current crossings on this route consist of fords and undersized culverts. During construction of the Northern Access Route, these crossing will be upgraded to structures that have been sized to accommodate 1 in 100 year peak flows and anticipated auffs issues. These upgrades will decrease sediment delivery to the surrounding watercourses. Cross drain culverts on the current road are non-existent; during construction cross drain culverts will be added to rehabilitate the passage of surface and subsurface flows to their natural paths.

The Black Hills route leaves the last active placer operation and then traverses 14.2 km of undisturbed ground or old inactive road and trail. Further, the Black Hills route stays in the Maisy May valley bottom and wetland for approximately twice the distance as the Maisy May route. In total, the Maisy May and Black Hills routes traverse 1.0 km and 7.9 km of shallow ice-rich permafrost, respectively.

Large stream crossings are another area of potential site disturbance. In total, the Maisy May and Black Hills routes have 3 and 12 bridge crossings, respectively.

The total disturbed area of undisturbed sites is another measure of the impact of a road in the two areas. The Maisy May route has 40% less disturbed area of undisturbed sites (16.6 ha. for Maisy May versus 27.4 ha. for Black Hills).

### **2.3. ROAD SAFETY**

Road safety is related to several factors including consistency of design speed, road grade, and road surface among other considerations.

Consistency of design speed is important because of risks related to vehicles changing travel speeds. For example, a tight corner at the end of a long straight stretch or areas with broad sweeping curves can



cause issues because drivers are not expecting to have to slow down. Switchbacks require the road user to reduce their speed in such a manner. When comparing the two routes, the primary location where this concern becomes evident is where each route descends into their respective valleys. Both alignments descending into the Maisy May and Black Hills valley require adjustments to the horizontal alignment to achieve a desirable vertical alignment. The descent into the Maisy May valley requires significantly less realignment and requires only 2 switchbacks to achieve a desirable grade. The descent into Black Hills requires extensive realignment and requires 6 switchbacks to achieve desirable grades with two additional hard turns at the bottom of the descent that have not been counted as switchbacks but will have a similar effect on travel speed.

Road grades along the Maisy May route are typically lower. The Maisy May route has a higher peak elevation of 1170m but descends into the valley bottom (an elevation of 676m) over 17.0 km. The Black Hills route peaks just before it descends into the valley bottom dropping from its 1130m peak to 650m in only 6.3 km.

The main difference in road surfacing along the two routes is related to winter road use and heavy ice accumulations at the crossings near the bottom of the switchbacks into Black Hills. Further, the existing road network has shown that the upland roads are more stable in the shoulder seasons and have fewer soft spots.

#### **2.4. ROAD LENGTH**

The overall road length affects all road considerations listed above. The overall road length for the Maisy May and Black Hills routes are 48.9 km and 48.8 km, respectively.

#### **2.5. IMPACT AND COST COMPARISONS**

This report is a summary of the analysis that was completed as part of the route selection in the design process. The quantities and totals shown herein reflect those at the time of the analysis. However, the costs have been updated to reflect the more detailed design work completed since that time. These have been applied to both routes to show a fair comparison. The Tables below present the details of the summary quantities presented in the sections above.

For road construction cost and impact comparison, the routes were split into the construction categories shown in Table 2.5.1. Table 2.5.2 summarizes the construction cost estimates by category.

**Table 2.5.1: Construction Categories**

Road Type	Terrain	Gradient	Description
Type 1 (a)	Flat	<4%	No rock or muskeg
Type 1 (b)	Flat	<4%	Ridge top, no clearing/grubbing, no rock or muskeg
Type 1 (c)	Flat	<4%	Muskeg with road fill (within 1km of borrow pit)
Type 2	Hillside	<4%	No rock or muskeg
Type 2 (r)	Hillside	<4%	Rock substrate
Switchback	Steep	8-12%	No rock or muskeg

**Table 2.5.2: Construction Category Unit Costs**

Road Type	OEL Single Lane
Type 1 (a)	\$150,000
Type 1 (b)	\$140,000
Type 1 (c)	\$886,000
Type 2	\$204,000
Type 2 (r)	\$229,000
Switchback	\$1,019,000

The construction categories are summarized by length for each route in Table 2.5.3 and are shown on the maps in Appendix 1. Note that Type 1 (c) is road in shallow ice-rich permafrost. Table 2.5.4 shows the estimated construction costs.

**Table 2.5.3: Construction Category Lengths**

Maisy May Route		Black Hills Route	
Road Type	Length (km)	Road Type	Length (km)
Type 1 (a)	0.2	Type 1 (a)	NA
Type 1 (b)	36.8	Type 1 (b)	30.6
<b>Type 1 (c)</b>	<b>1.0</b>	<b>Type 1 (c)</b>	<b>7.9</b>
Type 2	6.7	Type 2	9.7
Type 2 (r)	3.5	Type 2 (r)	NA
<b>Switchback</b>	<b>0.6</b>	Switchback	0.6
<b>Total</b>	<b>48.9</b>	<b>Total</b>	<b>48.8</b>

**Table 2.5.4: Estimated Construction Costs**

<b>Maisy May Route</b>		<b>Black Hills Route</b>	
<b>Road Type</b>	<b>Estimated Cost</b>	<b>Road Type</b>	<b>Estimated Cost</b>
Type 1 (a)	\$31,000	Type 1 (a)	\$NA
Type 1 (b)	\$5,159,000	Type 1 (b)	\$4,278,000
Type 1 (c)	\$925,000	Type 1 (c)	\$7,037,000
Type 2	\$1,362,000	Type 2	\$1,974,000
Type 2 (r)	\$791,000	Type 2 (r)	\$NA
Switchback	\$655,000	Switchback	\$645,000
<b>Total</b>	<b>\$8,924,000</b>	<b>Total</b>	<b>\$13,934,000</b>

Bridge crossings represent significant capital expenditures. These costs are summarized in Table 2.5.5. Further, with the types of streams in the area have significant aufeis issues which can push the crossings to larger structures and cause significant operating cost increases.

**Table 2.5.5: Estimated Bridge Construction Costs**

<b>Maisy May Route</b>		<b>Black Hills Route</b>	
<b>Chainage</b>	<b>Estimated Cost</b>	<b>Chainage</b>	<b>Estimated Cost</b>
58.5 km	\$165,000	39.7 km	\$250,000
65.3 km	\$150,000	42.1 km	\$135,000
75.2 km	\$165,000	44.2 km	\$165,000
		46.2 km	\$170,000
		46.8 km	\$180,000
		49.3 km	\$150,000
		53.2 km	\$135,000
		54.4 km	\$135,000
		56.1 km	\$165,000
		56.5 km	\$190,000
		60.3 km	\$135,000
		75.7 km	\$180,000
<b>Total</b>	<b>\$480,000</b>	<b>Total</b>	<b>\$1,990,000</b>

### 3. CONCLUSION

When the two routes are evaluated based on safety, disturbance area and the cost of construction, it is clear the Maisy May route is safer, causes less disturbance to the area it passes through and is cheaper to construct. The reader is referred to Table 2.6 for a summary of the trade-off comparison.

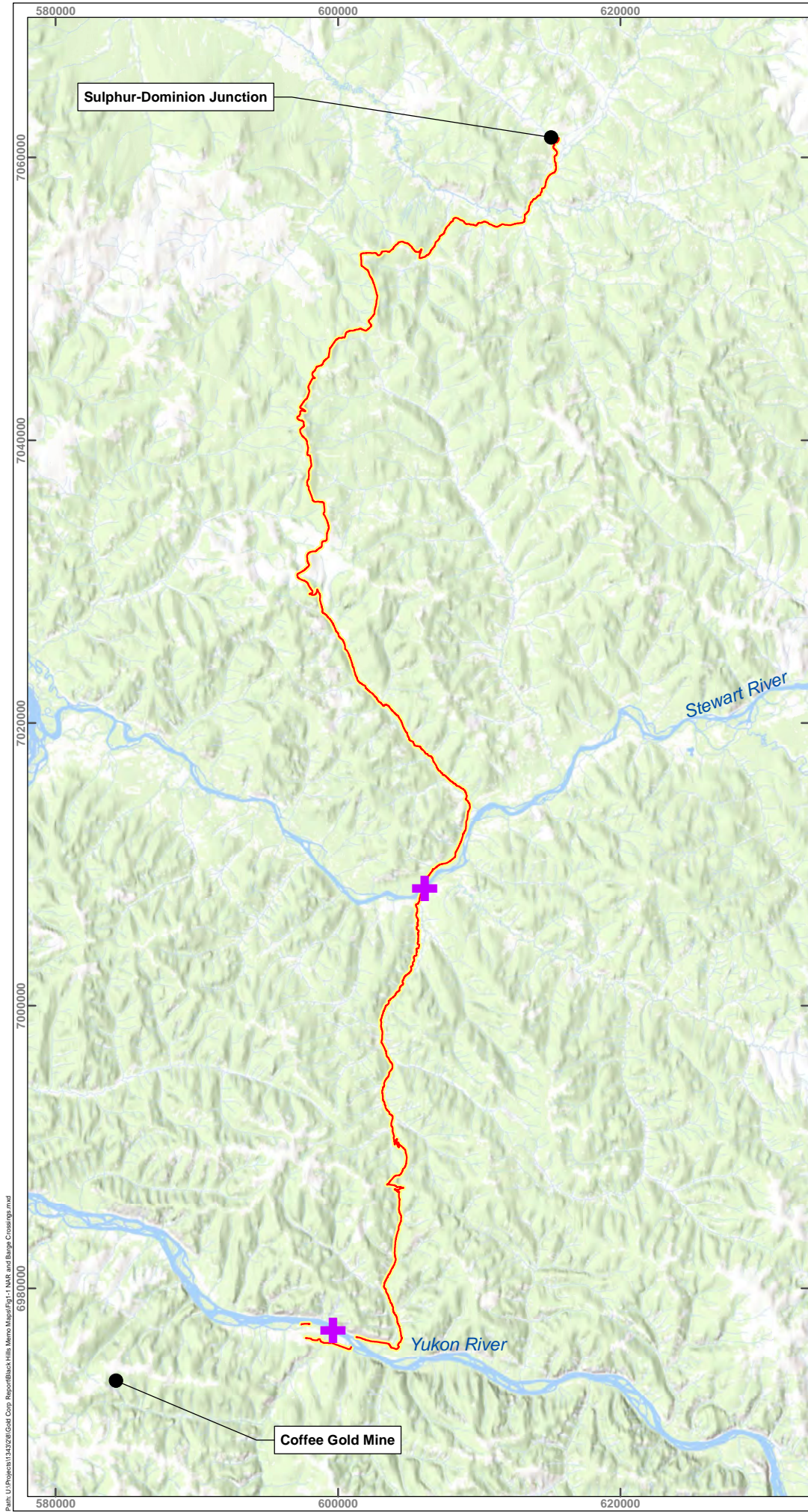
**Table 3.0.: Summary of Trade-Off Study**

<b>Attribute</b>	<b>Maisy May Route</b>	<b>Black Hills Route</b>
<b>Safety</b>	<ul style="list-style-type: none"> <li>• 4 switchbacks on route</li> <li>• Smaller average grade into valley bottom</li> <li>• Less ice accumulation</li> </ul>	<ul style="list-style-type: none"> <li>• 6 switchbacks on route</li> <li>• Higher average grade into valley bottom</li> <li>• Significant ice accumulation</li> </ul>
<b>New Road Construction</b>	12.0 km	18.3 km
<b>Ice-rich Permafrost</b>	1.0 km	7.9 km
<b>Large Stream Crossings</b>	3	12
<b>Disturbed Area in Undisturbed Sites</b>	16.6 ha	27.4 ha
<b>Road Length</b>	48.9km	48.8km
<b>Expected Construction Cost</b>	\$9,404,000	\$15,924,000

## APPENDIX 1

Road Route maps





**COFFEE GOLD MINE**

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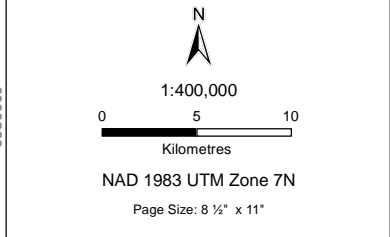
**Northern Access Route  
and Barge Crossing Locations**



- Legend**
- Northern Access Route
  - + Barge Crossing Locations

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



Appendix 1.1	Date: May 18, 2017	Drawn by: M. Lowe	Reviewed: J. Araki P.Eng.
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Path: U:\Projects\114326\Gold\_Corp\_Report\Black Hills Memo Maps\Fig1-1 NAR and Barge Crossings.mxd



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# COFFEE GOLD MINE

## Construction Categories For Black Hills and Maisy May Route Comparison

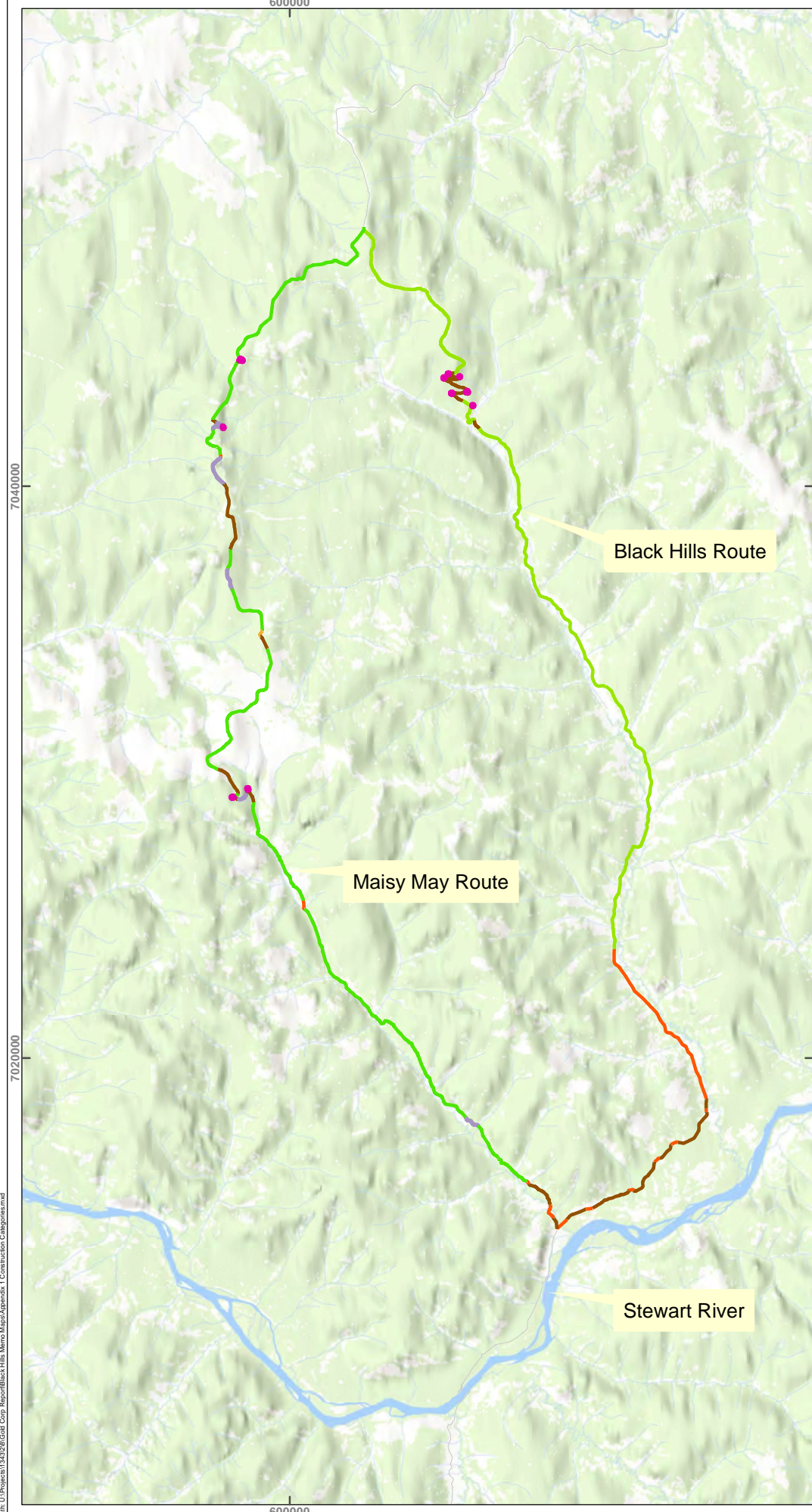


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Black Hills Route

Maisy May Route

Stewart River

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### Legend

### Construction Categories

- 1a
- 1b
- 1c
- 2
- 2r
- Switchback

### Northern Access Route

### Notes

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced report. It is intended to be used in conjunction with the scope of services and limitations described therein.



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NAD 1983 UTM Zone 7N

Page Size: 8 1/2" x 11"

Appendix 1.2

Date: May 16, 2017

Drawn by: M. Dickie

Reviewed: J. Araki P.Eng.



**Appendix B – accounts, sub-accounts, and indicators considered for inclusion in analysis**

Account	Sub-account	Indicator	Proposed By	Carried Forward?	Analysis Performed	Results - R1 Maisy May	Score R1 Maisy May	Results - R2 Black Hills	Score R2 Black Hills
<b>Heritage</b>									
	General Heritage and Way-of-Life	n/a	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Traditional Economy	n/a	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Trapping	Area (km*2) of traplines affected by access	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Archaeological/ Historic Sites (HRIA 16-13ASR)	Number and area of sites affected by the road	TH	no, insufficient data to compare between 2 routes. Further field work would be required	If necessary, further field work would be required	n/a	-	n/a	-
	Stewart River Crossing	# km of road within 1 km to the river	TH	yes	GIS analysis	934 m	6	2460 m	1
<b>Fish and Fish Habitat</b>									
	Fish Species	# of fish species present	TH	no, insufficient data to compare between 2 routes. Further field work would be required	Analysis not performed: there is limited sampling along Black Hills to support this analysis.	n/a	n/a	n/a	n/a
	Fish Habitat	Length of riparian area affected	TH	yes	Given the available data, length of riparian area affected was not calculated; however three other analyses were performed to help inform this issue: watershed area, total length of streams in watershed, and number of stream crossings along route. Watershed area and stream length within watershed was calculated using 1:50,000 watercourse layers along with contours and digital elevation model to digitize watersheds for Maisy May and Black Hills.	Watershed Area: 166.96 km <sup>2</sup> Length of streams in watershed: 159.83 km	6	Watershed Area: 418.24 km <sup>2</sup> Length of streams in watershed: 370.91 km	1
		# of stream crossings	TH	yes	GIS analysis based on 1:50,000 watercourse layers, the proposed route alignment and visual assessment of lidar.	16	6	24	1
		# of total fish bearing stream crossings	Goldcorp	yes	Data on fish-bearing status was pulled from Project sampling. Where Project sampling data was not available Fish Habitat Suitability data from the Yukon Placer Secretariat was used to assess assumed fish presence.	4	6	18	1
		# of total large stream fish bearing stream crossings	TH	no, insufficient data	Data on stream order and stream class was not available for all crossings; therefore the analysis did not differentiate between large and small fish bearing streams (see total # of fish bearing stream crossings above).	n/a	-	n/a	-
		# of total small stream fish bearing stream crossings	TH	no, insufficient data	Data on stream order and stream class was not available for all crossings; therefore the analysis did not differentiate between large and small fish bearing streams (see total # of fish bearing stream crossings above).	n/a	-	n/a	-
		# of existing stream fords at fish bearing stream crossings	TH	no, insufficient data	Analysis not completed — Data on existing crossing structures at stream crossings was not available for Black Hills.	n/a	-	n/a	-
		# stream crossings potentially occupied by Chinook Salmon	TH	yes	Data on fish-bearing status was pulled from Project sampling. Where Project sampling data was not available Fish Habitat Suitability data from the Yukon Placer Secretariat was used to assess assumed fish presence.	1	6	2	1
<b>Wildlife</b>									
	Forty Mile Caribou Herd	# of km of road within high quality winter habitat	TH	yes	GIS analysis of road length intersecting moderate- and high-value caribou habitat based on the caribou winter habitat RSF model (intersection was based on habitats within 500 m of the proposed road).	31.3 km (22.6 km mod, 8.5 km high)	6	39.4 km (18.6 km mod, 20.8 km high)	1
	Moose Harvest and Predation Risk	# of km of road within high quality fall/winter habitat	TH	yes	Late winter habitat — GIS analysis of road length intersecting moderate- and high-value moose habitat based on the moose late winter habitat HSI model (intersection was based on habitats within 500 m of the proposed road).  Fall/early winter distribution — GIS analysis of road length intersecting mod-high and high density areas based on 2015 early winter population census results (intersection was based on census blocks intersected).	Late winter: 29.7 km (11.5 km mod, 18.2 km high)  Fall/early winter: 20.8 km	1	Late winter: 14.7 km (13.9 km mod, 0.7 km high)  Fall/early winter: 14.4 km	6
	Thinhorn Sheep	Road proximity to Sheep Habitat	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-
	Grizzly bear	Mortality Risk	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-

Black bear	Mortality Risk	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-	
Wolverine	Mortality Risk	TH	no, not thought to be sufficiently differentiating	n/a	n/a	-	n/a	-	
Birds	Bird diversity and abundance	Goldcorp	yes	Review of bird baseline survey results along the routes	Sharp-tailed Grouse leks: 0 Cliff-nesting raptor nests: 0 Bank Swallow colonies: 0 Species at Risk: 3	6	Sharp-tailed Grouse leks: 2 Cliff-nesting raptor nests: 0 Bank Swallow colonies: 2 Species at Risk: 4	1	
<b>Land and Resources</b>									
TH Settlement Land	Area (km <sup>2</sup> ) of settlement land within 500m of a given route	TH	yes	GIS analysis of area (km <sup>2</sup> ) of settlement land within 500m of a given route	0.15 km <sup>2</sup>	6	8.39 km <sup>2</sup>	1	
Traditional Plants	Area of ecosystems containing key traditional plants intersected by a route	TH	no, not sufficiently differentiating	Ecosystem mapping (ELC and BEM) were not available for all of the Black Hills route, therefore analysis of areas containing traditional-plant-sustaining ecosystems was based on forest cover data. Ratings from ELC and BEM traditional plant analysis were extrapolated to forest cover data based on forest cover attributes (landscape position, soil moisture, stand age etc.). The intersection was based on habitats within 100 m of road routes.	2.44 km <sup>2</sup>	-	3.03 km <sup>2</sup>	-	
Invasive Plants	Area of land sustaining native vegetation cover that is disturbed	TH	yes	Area of native vegetation cover that will be disturbed is equivalent to the length of new road construction (see below). Alternative analysis calculated the length of road with existing invasive plant populations (based on the 2015 survey, note that the 2015 survey did not cover the entire Maisy May or Black Hills route).	Invasive plant extent as of 2015: 4 km (out of 26 km surveyed).	6	Invasive plant extent as of 2015: 16 km (out of 29 km surveyed).	1	
Wetlands	Area (km <sup>2</sup> ) of wetlands within 50 m of road	TH	yes	Wetlands were identified from ecosystem (ELC and BEM) mapping developed for the Project; for the sections of Black Hills not covered by ecosystem mapping, wetlands were digitized from a visual assessment of lidar. Analysis assessed total number of wetlands and area of wetlands within 50 m of road.	Number of wetlands: 8. Wetland area: 0.06 km <sup>2</sup>	6	Number of wetlands: 15. Wetland area: 0.15 km <sup>2</sup>	1	
Wildfire	Change to Fire Action Zone status	TH	no	n/a	n/a	-	n/a	-	
<b>Cumulative Effects</b>									
Exploration & Mining	Total area of lease/permit/claim within 5 km of a Route	TH	no, not appreciably different	GIS analysis completed	109,922 ha	-	106,223 ha	-	
Timber Harvest	Area of commercial timber stands within 5 km of a route	TH	yes	GIS analysis completed	8,921 ha	1	7,289 ha	6	
Residential development	Potential area near road to be developed	TH	no, neither route is expected to be identified as "preferred" as each has similar potential for adverse effects	n/a	n/a	-	n/a	-	
<b>Engineering</b>									
New Road Construction	# km of new road construction	TH	no, included under Road Attributes	n/a	n/a	-	n/a	-	
Construction Cost	Vegetated area cleared to access borrow material Dollar value	TH	no, included under Road Attributes	Compare each route and how borrow site disturbance effected	n/a	-	n/a	-	
<b>Socioeconomic</b>									
Road Safety	Accident rate (e.g., accidents per km driven)	TH	no, unable to directly describe accident rate at this time; have incorporated this consideration under the account "Safety"	n/a	n/a	-	n/a	-	
<b>Road Attributes</b>									
New Road Construction	# km of new road construction	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	12.0 km	6	18.3 km	1	
Ice-Rich Permafrost Affected	# km of affected ice-rich permafrost	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	1.0 km	6	7.9 km	1	
Total number of bridges	# of large stream crossings	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	3	6	12	1	
Area of new disturbance	Total area of new disturbance	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	16.6 ha	6	27.4 ha	1	
Road Length	Total Km either route	Goldcorp	no, not significantly different	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	48.9 km	n/a	48.8 km	n/a	
Vegetated area cleared to access borrow material	Area cleared	Goldcorp	yes	Maisy May route borrow sites have been mapped during field programs, whereas Black Hills borrow sites have been interpreted based upon GIS analysis of availability of appropriate surfacing media based on corroborating field observations. Subgrade deficits for each route where then calculated over areas of ice-rich permafrost, and the amount by was compared by volume. Average borrow rock densities were assumed and spatial areas were calculated for the necessary total aerial extent of potential borrow sources along each route.	8.3 ha	6	21.1 ha	1	



Construction Cost	Dollar value	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	\$ 9.404M	6	\$ 15.924 M	1
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**Safety**

Safety	Accident rate (e.g., accidents per km driven)	Goldcorp	no, not possible to directly estimate these data. Subsequent indicators provide proxies for this indicator	none	n/a	n/a	n/a	n/a
	Number of switchbacks	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	4	6	6	1
	Radius of switchbacks	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	lower radius	6	higher radius	1
	Average road grade into valley bottom	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	lower	6	higher	1
	Ice accumulation	Goldcorp	yes	Road engineering trade-off study completed. Work is summarized in "Northern Access Route: Black Hills versus Maisy May Route Selection Trade-Off Study" by OnSite Engineering Ltd., dated May 18, 2017.	lower potential	6	higher potential	1

## **Appendix C– Multiple Accounts Analysis – Tr'ondëk Hwëch'in weighting**

Accounts	Weighting	Sub-accounts	Weighting	Indicators	Scoring Maisy May	Scoring Black Hills
Heritage	1	Heritage	4	# km of road within 1 km to the river	6	1
				<b>SUMPRODUCT</b>	<b>24</b>	<b>4</b>
				<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>
Fish and Fish Habitat	1	Fish Habitat		3 Length of riparian area affected	6	1
				1 # of stream crossings	6	1
				3 # of total fish bearing stream crossings	6	1
				5 # stream crossings potentially occupied by Chinook Salmon	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>				
Wildlife	1	Forty Mile Caribou Herd Moose Harvest and Predation Risk Birds		5 # of km of road within high quality winter habitat	6	1
				5 # of km of road within high quality fall/winter habitat	1	6
				3 Bird diversity and abundance	6	1
				<b>SUMPRODUCT</b>	<b>53</b>	<b>38</b>
<b>Sub-account Weighted Average</b>	<b>4.1</b>	<b>2.9</b>				
Land and Resources	1	TH Settlement Land Invasive Plants Wetlands		5 Area (km <sup>2</sup> ) of settlement land within 500m of a given route	6	1
				3 Area of land sustaining native vegetation cover that is disturbed	6	1
				4 Area (km <sup>2</sup> ) of wetlands within 50 m of road	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Cumulative Effects	1	Timber Harvest		3 Area of commercial timber stands within 5 km of a route	1	6
				<b>SUMPRODUCT</b>	<b>3</b>	<b>18</b>
				<b>Sub-account Weighted Average</b>	<b>1.0</b>	<b>6.0</b>
Road Attributes	1	New Road Construction Ice-Rich Permafrost Affected Total number of bridges Area of new disturbance Vegetated area cleared to access borrow material Construction Cost		6 # km of new road construction	6	1
				6 # km of affected ice-rich permafrost	6	1
				5 # of large stream crossings	6	1
				4 Total area of new disturbance	6	1
				4 Area cleared (ha)	6	1
				2 Dollar value	6	1
				<b>SUMPRODUCT</b>	<b>162</b>	<b>27</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Safety	1	Safety		6 Number of switchbacks	6	1
				5 Radius of switchbacks	6	1
				4 Average road grade into valley bottom	6	1
				3 Ice accumulation	6	1
				<b>SUMPRODUCT</b>	<b>108</b>	<b>18</b>

<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>
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TOTAL

<b>SUMPRODUCT</b>	<b>35.1</b>	<b>13.9</b>
<b>Total Weighted Average</b>	<b>5.0</b>	<b>2.0</b>

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**Sensitivity Analysis**

No engineering	<b>SUMPRODUCT</b>	<b>23.1</b>	<b>11.9</b>
	<b>Weighted Average</b>	<b>4.6</b>	<b>2.4</b>

All accounts weighted equally	<b>SUMPRODUCT</b>	<b>35.1</b>	<b>13.9</b>
	<b>Weighted Average</b>	<b>5.0</b>	<b>2.0</b>

All subaccounts and accounts weighted equally	<b>SUMPRODUCT</b>	<b>122</b>	<b>32</b>
	<b>Weighted Average</b>	<b>5.5</b>	<b>1.5</b>

yellow cells indicate that subaccounts were created by Goldcorp, and no TH weightings were provided in the original spreadsheet.

## **Appendix D – Multiple Accounts Analysis – Goldcorp weighting**



Accounts	Weighting	Sub-accounts	Weighting	Indicators	Scoring Maisy May	Scoring Black Hills
Heritage	1	Heritage	4	# km of road within 1 km to the river	6	1
				<b>SUMPRODUCT</b>	<b>24</b>	<b>4</b>
				<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>
Fish and Fish I	1	Fish Habitat	3	Length of riparian area affected	6	1
				# of stream crossings	6	1
				# of total fish bearing stream crossings	6	1
				# stream crossings potentially occupied by Chinook Salmon	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6</b>	<b>1</b>				
Wildlife	1	Forty Mile Caribou Herd Moose Harvest and Predation Risk Birds	5	# of km of road within high quality winter habitat	6	1
				# of km of road within high quality fall/winter habitat	1	6
				Bird diversity and abundance	6	1
				<b>SUMPRODUCT</b>	<b>53</b>	<b>38</b>
<b>Weighted Average</b>	<b>4.1</b>	<b>2.9</b>				
Land and Resc	1	TH Settlement Land Invasive Plants Wetlands	5	Area (km <sup>2</sup> ) of settlement land within 500m of a given route	6	1
				Area of land sustaining native vegetation cover that is disturbed	6	1
				Area (km <sup>2</sup> ) of wetlands within 50 m of road	6	1
				<b>SUMPRODUCT</b>	<b>72</b>	<b>12</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Cumulative Ef	1	Timber Harvest	3	Area of commercial timber stands within 5 km of a route	1	6
				<b>SUMPRODUCT</b>	<b>3</b>	<b>18</b>
				<b>Sub-account Weighted Average</b>	<b>1.0</b>	<b>6.0</b>
Road Attribute	1	New Road Construction Ice-Rich Permafrost Affected Total number of bridges Area of new disturbance Vegetated area cleared to access borrow material Construction Cost	4	# km of new road construction	6	1
				# km of affected ice-rich permafrost	6	1
				# of large stream crossings	6	1
				Total area of new disturbance	6	1
				Area cleared (ha)	6	1
				Dollar value	6	1
				<b>SUMPRODUCT</b>	<b>180</b>	<b>30</b>
<b>Sub-account Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
Safety	1	Safety	4	Number of switchbacks	6	1
				Radius of switchbacks	6	1
				Average road grade into valley bottom	6	1
				Ice accumulation	6	1
				<b>SUMPRODUCT</b>	<b>126</b>	<b>21</b>
<b>Weighted Average</b>	<b>6.0</b>	<b>1.0</b>				
<b>Sub-account Weighted Average</b>						
<b>TOTAL</b>						
					<b>SUMPRODUCT</b>	<b>35.1 13.9</b>

FINAL Weighted Average 5.0 2.0

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Sensitivity Analysis

No engineering included	SUMPRODUCT	23.1	11.9
	Weighted Average	4.6	2.4
All accounts weighted equally	SUMPRODUCT	35.1	13.9
	Weighted Average	5.0	2.0
All subaccounts and accounts weighted equally	SUMPRODUCT	122	32
	Weighted Average	5.5	1.5



**BY PDF**

November 20, 2017

Goldcorp Inc.,  
201-208 Main Street,  
Whitehorse, YT  
Y1A 2A9

Attention: Buddy Crill,  
Mine General Manager, Coffee Project

Dear Mr. Crill:

**Re: Coffee Project Proposal**

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This letter is to provide Goldcorp with Selkirk First Nation's written comments with respect to the environmental and socio-economic aspects of the Coffee Project Proposal, as presented to us since July. Some comments take into account relevant aspects of Goldcorp's earlier edition of the Proposal which we understand Goldcorp intends to continue in its pending submission of the Proposal to YESAB.

We attach to this letter:

1. Memorandum re: Adequacy Review of Socio-Economic Effects Assessment from Lindsay Staples and Lois Craig, dated Nov. 15, 2017;
2. Memorandum re: Coffee Mine Project - Issues relating to Heritage Sites from Ruth Gotthardt, our heritage resources consultant, undated but received on Nov. 16, 2017; and
3. A report setting out the results of a Technical Review of Environmental Issues for the Proposed Coffee Creek Project from our environmental consultants, dated November 17, 2017.

We understand that Goldcorp, by way of the various bilateral discussions which have occurred in recent weeks, already has substantial notice of many of the comments and

recommendations that appear in the attached. We appreciate the effort and co-operation which all involved have brought to those discussions and look forward to continuing our discussion of various matters going forward.

This letter and the attached are provided to you as Selkirk's commentary with respect to the Coffee Project Proposal as presented to date and with the expectation that all will be given Goldcorp's "full and fair consideration" in finalizing your Project Proposal for submission to YESAB. All is provided to you without prejudice to any position Selkirk may take or further comment Selkirk may provide in the context of YESAB proceedings to be initiated after the Proposal is filed for assessment.

Sincerely yours,  
Signature Redacted

Name Redacted

## MEMORANDUM

To: Chief Nelson  
Selkirk First Nation  
Box 40, Pelly Crossing, YT YOB 1P0

From: Names Redacted(North\West Resources Consulting Group) and Names Redacted

Date: Nov. 15, 2017

Re. ***Adequacy Review of Socio-Economic Effects Assessment relating to the Coffee Creek Gold YESAB Project Proposal (March 2017) and additional commitments to date***

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The purpose of this memorandum is to convey our comments and recommendations to SFN arising from our early summer adequacy review of Goldcorp's (GC) (the Proponent) Coffee Gold Mine Project Proposal submitted to YESAB in Spring 2017 and additional supplementary commitments made by GC.

These comments address impacts on living conditions in Pelly Crossing, impacts on the SFN (mixed) economy and traditional land use, the assessment and management of cumulative effects resulting from access roads and other developments, socio-economic effects monitoring and adaptive management, project closure planning, and local employment, training and procurement opportunities.

### GENERAL COMMENTS

GC has indicated a willingness to enter into bilateral arrangements with SFN to address SFN project specific commitments (associated with impacts and benefits) and SFN will determine whether bilateral arrangements and or commitments to YESAB are preferred.

However, there are some key omissions in the Project Proposal that require attention as well as SFN and Pelly Crossing-specific information in order for the assessment to be complete in addressing effects upon SFN and Pelly Crossing. The documentation of baseline conditions for many VCs that apply in the socio-economic effects assessment to SFN/Pelly Crossing is weak and in some areas totally lacking. These limitations in turn affect predictions, judgements and confidence about the socio-economic effects of the Project on SFN and Pelly Crossing and the effectiveness of the mitigation and enhancement measures that manage them.

Delay in the preparation of a socio-economic management plan (SEMP) to the licensing stage of the Project exacerbates this general concern as does the company's unwillingness to provide a socio-economic monitoring program or framework during the YESAB assessment. At this point we do not see a commitment to provision of either during their YESAB resubmission.



The assessment of cumulative effects is a responsibility of the Proponent and their management is a shared responsibility between Goldcorp and the Yukon Government. There are concerns with respect to both that are discussed below.

## SPECIFIC COMMENTS

### **1. Spatial boundaries**

Inclusion of Whitehorse in the LAA (Local Affects Area) for many socio-economic VCs remains problematic for predicting socio-economic effects, designing effective enhancement and mitigation measures and judging the accuracy of the former and effectiveness of the latter as they affect Yukon rural communities. Comparisons of many available VC-related socio-economic data for Whitehorse and the smaller communities of Dawson, Pelly Crossing, Mayo and Beaver Creek indicate two solitudes where the state of baseline conditions and their trends are dramatically different. The inclusion of Whitehorse in the LAA effects assessment skews or “averages” Project outcomes and associated beneficial and adverse effects at the expense of communities like Pelly Crossing that are less resilient and adaptive to externally-induced changes, including those arising from the Project. These affect a wide-range of VCs, such as Economic Conditions, Community Infrastructure and Services, Education Services, and Community Health and Well Being.

Whitehorse is better suited to inclusion in the Regional Affects Area (RAA), along with total Yukon- wide effects.

*Recommendation: That GC prepare and submit to YESAB a SFN and Pelly Crossing-specific socio-economic effects assessment report.*

### **2. Selected Socio-Economic Valued Components**

Socio-economic VCs identified for the Project are generally attributed in the Proponent’s submission to consultations with the Trondek Hwech’in. Based upon a recent cross- walk of VCs by Goldcorp, we note that their proposed VCs generally align with those that have been identified, validated and applied by SFN, Minto Exploration Ltd. and the Yukon Government in the Minto Mine Socio-Economic Monitoring Program. However, several VCs included in the socio-economic monitoring program for the Minto mine that are relevant to the Proposed Project are absent or provide only partial coverage. These VCs are central to the assessment of the preparedness of governments and the Proponent to manage socio-economic effects and associated risks and surprises, the failure of which could result in an overall negative legacy of conditions for future generations.

*Recommendation: At least as they apply to SFN and Pelly Crossing, it is recommended that two additional VCs be included in the assessment and monitoring of effects on socio-economic conditions:.*

- a. *fate control and preparedness. Addresses the ability of GC, the Yukon Government and SFN to manage identified socio-economic commitments, impacts and risks,*
- b. *costs and benefits for future generations. A sustainability assurance that describes the socio-economic effects and initiatives that will contribute to a net positive legacy beyond the mine life*

*for future generations by evaluating the displacement of costs and transfer of benefits to future generations, legacy socio-economic benefits, perceived availability of resources to meet the needs of future generations and the perceived state of the environment to maintain socio-ecological systems.*

*Recommendation: GC should expand its YESAB assessment upon receipt of 2015 SFN Household Survey of Living Conditions data to include living conditions of importance to SFN as included in the Minto Mine Socio-economic Monitoring Program: these include family stability and well-being, individual health and well-being, economic well-being and cultural vitality.*

### **3. SFN and Pelly Community-Level Data**

Community-level data in the Yukon as it relates to measurement of many socio-economic baseline conditions and associated values that matter most to First Nations are generally very poor or non-existent. Where they do exist, they must be used with caution. Such is the case with community-level data collected through the 2011 National Household Survey – a national census that abandoned the long-standing mandatory long-form survey. The 2011 data from that census require extreme caution in their application and the interpretation of current conditions and trends. Where alternative data exist for alternative years, they may prove more reliable for assessment purposes – at least at the community level. The Proponent may wish to consider their assessment of a number of baseline socio-economic conditions in this light.

The Proponent's submission recognizes the data limitations and absence of primary data associated with many socio-economic VCs, especially as they apply to Pelly Crossing (e.g. Proposal, Vol. IV, App 21 A, p.4.29, p.4.31; App 24A, p.4.14). The Proponent has relied heavily on the 2007 Selkirk First Nation/ Pelly Crossing Integrated Community Sustainability Plan and the 2013 Klohn Crippen Berger Phase V/VI Socio-Economic Study for Minto Explorations Ltd. and relevant literature and previous studies that have application to SFN and Pelly Crossing.

More current and often higher quality data applicable to SFN and Pelly Crossing and the assessment of many of the Project's VCs are available through:

a. the Minto Mine Socio-Economic Monitoring Program 2014 Annual Report

[<http://www.gov.yk.ca/news/16-351.html>];

[http://www.selkirkfn.com/files/2414/7950/5973/Minto\\_Annual\\_Report.pdf](http://www.selkirkfn.com/files/2414/7950/5973/Minto_Annual_Report.pdf).

b. The Minto Mine Socio-Economic Monitoring Framework and Program, a tri-partite initiative of SFN, Minto Explorations Ltd. and Government of Yukon.

[[http://www.emr.gov.yk.ca/mining/pdf/mml\\_minto\\_socioeconomic\\_monitoring\\_program.pdf](http://www.emr.gov.yk.ca/mining/pdf/mml_minto_socioeconomic_monitoring_program.pdf).] The program is a requirement of Minto Mine expansion approvals established in SFN and Yukon Government Project Decision Documents.

Many of the socio-economic VCs in the Project Proposal that apply to SFN, Pelly Crossing, Whitehorse and the broader Yukon are also captured in the 2014 Annual Report. Those VCs that are not supported

by data in the 2014 Annual Report – many that apply to SFN and Pelly Crossing - will be addressed in the 2015 Annual Report anticipated for release in late 2017/early 2018.

The Minto Mine Socio-Economic Monitoring Program supported a household survey of SFN Living Conditions by the name of “Knowing Ourselves.” The survey was conducted in 2015 by the Selkirk First Nation. A total of 271 SFN citizens over the age of 15 and living in the Yukon were interviewed, with 187 interviews completed in Pelly Crossing (a 75% response rate) and 84 interviews completed in Whitehorse and other Yukon communities (a 60% response rate). Survey data covers many of the VCs identified in the Project Proposal that apply to demographics, community and family stability and well-being, traditional economy, food security, harvesting of traditional foods, connection to land and water, cultural vitality, health, housing, education and training, employment and income, health, and education.

This data will inform the proposed socio-economic and socio-cultural programs, plans, strategies and proposed enhancement and mitigation measures by Goldcorp.

GC’s continuing support of a traditional land use study documenting past and current use by SFN citizens of that portion of the SFN Traditional Territory encompassed by the spatial boundaries of the Local Assessment Area for VCs related to SFN traditional use and the implications of the findings for GC’s resubmission to YESAB are of highest importance to SFN. This information is central to assessment and monitoring of Project-specific and cumulative effects on VCs that fall within the nexus of SFN traditional land use.

*Recommendation: That GC incorporate data and information from the Minto Mine Monitoring Program 2014 and 2015 Annual Reports in a Pelly-specific socio-economic effects assessment report for submission to YESAB.*

*Recommendation: That GC incorporate data and information from the 2015 SFN Household Survey of Living Conditions and the 2017 SFN Traditional Land Use Study in a Pelly-specific socio-economic effects assessment report, subject to agreement by SFN and a date release agreement.*

#### **4. Cumulative Effects Assessment and Management**

Cumulative effects from past, present and future developments in the SFN TT are of central concern to SFN – one that has been expressed to YESAB previously. The assessment of Project-related cumulative socio-economic effects and related VCs (e.g. fish and fish habitat, wildlife and wildlife habitat) is dispersed throughout the Proposal on a VC-by-VC basis. A consolidated treatment of cumulative effects, in addition to what has been provided in the submission, would be helpful in better understanding and assessing the cumulative effects of interacting VCs and effects pathways and their net positive or negative outcome.

“Roading” of the SFN TT and associated access management and effects issues are at the core of cumulative effective concerns for SFN. This is noted in the Proponent’s submission. The contribution of road-related cumulative effects from the proposed Northern Access Route (NAR) to the current network

of roads and trails in the SFN TT and those that are reasonably foreseeable require more attention. For instance, maps of the SFN TT within the LAA documenting existing roads and major trails would be helpful in better understanding access and access management issues as they affect SFN traditional land use

The list of projects, activities and undertakings included in the cumulative effects assessment appears not to include consideration of the Yukon Government's Yukon Resource Gateway Project. As submitted to Canada in 2016 for infrastructure funding, the Project component in the Dawson Range includes upgrades to four separate road systems that will provide improved access to a significant area of mineralization in the central Yukon on existing public roads and resource-related access trails from southern and northern access points. The northern portion of Dawson Range access includes upgrades to the existing Goldfield Roads as well as improvements to the Indian River Road to Coffee Creek. The southern portion of the Dawson range access will include upgrades to the existing Freegold Road including construction of a bypass route around the community of Carmacks, as well as upgrades to the Casino Road. The final component of the Dawson Range access will be new road construction between the Casino and Coffee terminus points.

GC has provided an initial cumulative effects assessment by VC throughout their submission including the NAR. However, it is piecemeal and incomplete. Given the integral relationship of the NAR to the project, the recent Resource Gateway funding to open up additional road access linking the Coffee Project to a shorter southern access route and concerns associated with cumulative effects arising from new access to SFN and other FNs, a thorough and standalone cumulative effects assessment including the Yukon Resource Gateway Project of the NAR and southern access is needed. Additional associated information from YG should also be added to this assessment so that it is as complete as possible.

The management options for the NAR as outlined in the YESAB submission are silent with regard to the Yukon Government's views and position on those options. These should be provided to inform the assessment of the NAR's project-specific and cumulative effects.

The submission suggests that the cumulative effects assessment of the Project is limited by the cumulative magnitude of effects from other projects and activities in the LAAs and that the role of the Proponent in managing these effects is limited accordingly. It would be helpful if the Proponent could provide any available information regarding the role of other parties, including the Yukon Government, and associated management frameworks and monitoring programs that contribute to the management of cumulative effects in the affected LAAs.

*Recommendation: That GC convene a cumulative effects assessment workshop this fall or Winter to inform the assessment, including four or five scenarios developed and informed by participation of multiple parties. (note: we understood GC committed to this in our Sept. 21<sup>st</sup> Workshop)*

*Recommendation: That GC include in its YESAB submission a report consolidating the cumulative effects assessment of the Project for all VCs.*

*Recommendation: That GC prepare maps for YESAB and SFN of the SFN TT documenting existing roads and major trails in order to better assess the cumulative effects associated with the NAR.*

*Recommendation: That GC include the Yukon Government's Yukon Resource Gateway Project in its cumulative effects assessment of the NAR and that a standalone cumulative effects assessment of the NAR and the planned Yukon Resource Gateway Project south of the Project be prepared and submitted to YESAB.*

*Recommendation: That GC submit current information regarding the Yukon Government's views and interests in the NAR management options and alternatives.*

*Recommendation: That GC submit information regarding active cumulative effects management, including frameworks and programs established by the Yukon Government, that apply in the affected LAAs.*

## **5. Socio-Economic Effects Management Plan and Monitoring Program**

The Proponent indicates commitments to develop both a Socio-economic Management Plan (SEMP) and comprehensive socio-economic monitoring program in the future, not under YESAB. It is noted that the monitoring program is to be developed by the GC in conjunction with the City of Dawson, TH and YG.

As noted above, SFN, in partnership with Minto Explorations Ltd and the Yukon Government, has developed and implemented a socio-economic effects monitoring framework and program for the Minto mine, both of which are directly applicable to the Coffee Creek mine. These may inform the development of programs with other communities. However, at minimum, the Minto socio-economic effects monitoring program should form the basis for the design of a Coffee Gold Project socio-economic effects monitoring program that is directly applicable to SFN and Pelly Crossing, utilizing elements of the existing Minto database. The Coffee Creek Gold socio-economic monitoring program, as with the Minto program; should operate during each phase of the Project to assess the accuracy of effects predictions and the effectiveness of enhancement and mitigations measures, and provide for adaptive management in response to unanticipated consequences and areas requiring change on an as needed and ongoing basis.

*Recommendation: That GC submit to YESAB early in 2018 further information on the design, development and implementation of a socio-economic effects monitoring program for SFN and Pelly Crossing, including timelines and participants, with consideration to Minto Mine Socio-Economic Effects Monitoring Framework and Program. At minimum a framework for the Goldcorp proposed monitoring program should be submitted to YESAB, prepared in concert with SFN prior to submission.*

Extensive commitments have been identified in the submission for the management of effects on socio-economic VCs, including the development of strategies or plans as the Project unfolds. Six plans have been developed thus far and submitted, with another eighteen to be prepared in coming years, including a socio-economic management plan, heritage protection plan and training plan. Water



management plans and wildlife protection plans have been developed and incorporated in the Project submission. The VCs associated with these plans are clearly of core concern for effects management.

The management of Project effects on socio-economic VCs should be assigned equal weight. A socio-economic management plan, heritage protection plan and training plan should be developed and submitted as a part of the assessment and not deferred to the licensing state of the Project as currently proposed. Early attention to these plans in the early stages of Project planning provides greater flexibility and confidence in achieving arrangements and outcomes that are mutually acceptable to the Proponent, governments and affected communities.

*Recommendation: That GC submit to YESAB early in 2018 a socio-economic management plan, heritage protection plan and training plan for assessment of the residual socio-economic effects that follow from the enhancement and mitigation measures that they describe.*

## **6. Project Closure Planning**

Project closure planning provides little if any consideration of the socio-economic adjustment measures that communities typically require following mine closure. A socio-economic effects monitoring program that extends throughout the Project's life, including closure, provides a means for informing such measures. The Project submission is largely silent on this. The approach to Minto Mine closure planning considers such arrangements and attention to them in Project Proposal is warranted.

*Recommendation: That GC fully address socio-economic adjustment measures and socio-economic effects monitoring in the design of Project closure planning and submissions to YESAB and regulators. It should be informed by lessons from other applicable northern mine closures and impacts upon neighboring communities.*

## **7. Local Employment, Training and Procurement Strategies**

There are several clear commitments associated with hiring practices, training and local procurement. These are all of primary interest to SFN given the high rate of unemployment of SFN citizens in Pelly Crossing and since many impacts associated with the project pertain directly to SFN.

Some of the key commitments include: a proposed Local Employment Strategy under the Local Hire Practices VC, employment opportunities to qualified individuals with appropriate skills and qualifications, mentoring, communications regarding opportunities at the community level, identification of barriers to employment, a local procurement strategy, local hiring clauses in all project contracts, and working with local institutions to identify and encourage availability of courses necessary for project employment.

This project constitutes a major opportunity to build significant long-term capacity at the community level and across Yukon. It should include pre-employment and pre-project capacity building. A local employment and capacity building framework, at minimum, should be developed and required as a part of the YESAB submission. Many of the objectives and commitments are articulated in the Project submission. However, a ground-ready strategy prior to pre-construction is essential for success from the

outset of the Project. A comprehensive strategy that builds upon interests, capacity and future vision for each community and many of the commitments and objectives set out in the submission will help to better realize durable, positive outcomes for SFN and Pelly Crossing, other affected communities, as well as the Yukon broadly.

*Recommendation: That GC submit to YESAB a local employment and training strategy for SFN and Pelly Crossing, as well as other affected communities, to enable assessment of the anticipated effectiveness of the strategy and potential outcomes.*

*Recommendation: That GC develop jointly with SFN a training plan for SFN citizens*

*Recommendation: That GC work with SFN to identify barriers to employment in mining and work with SFN and other partners to build programs and sponsor courses that facilitate appropriate capacity building for pre-employment readiness and project employment for SFN citizens (note: in the upcoming 2015 Annual Report Minto Mine Socio-economic Monitoring Program there is a recommendation that a round table or workshop occur in Pelly Crossing regarding continuing barriers to employment at the Minto mine. It may be suitable for GC to either contribute to this initiative in 2018 or at least benefit from findings.)*

*Recommendation: That GC work with SFN to identify local procurement opportunities and enter into local procurement arrangements with SFN or SDC, including incentives for local contracts and procurement of goods and services*

## Coffee Mine Project – Issues relating to Heritage Sites

**Issue:** Sites related to the history and culture of Selkirk First Nation may be directly or indirectly impacted by Coffee Mine Project, specifically Northern Access Road.

**Question 1: Has work done to date been adequate to identify sites in the project area?**

Until 2017 Ecofor report received, unable to determine if heritage assessment work on NAR has been adequate to identify heritage sites that may be impacted by construction of the road.

**Question 2: Are actions proposed by Goldcorp adequate to address SFN concerns around heritage site protection?**

Proponent Commitments:

- Project redesign where possible to reduce disturbance and avoid heritage sites.
- Complete an HRIA for the NAR and any changes to the final Project footprint,
- Consult First Nations and regulators regarding the choice of appropriate mitigation measures for all heritage resource sites.
- Use flagging tape or physical barriers to mark a 30-m buffer around the resources to be avoided.
- Conduct systematic data recovery prior to any potentially ground-altering development activities if heritage resource sites cannot be avoided.
- Implement monitoring plans during Construction and Operation Phase clearing and ground-disturbance activities, which involve visual inspection by an archaeologist during Construction so that heritage resources can be appropriately managed if encountered.
- Implement Project-specific Heritage Resources Protection Plan, including a Chance Find Protocol, which provides methods for protection.
- Implement site-specific measures for paleontological resources and follow guidance provided in the Yukon Mineral Exploration Best Management Practices for Heritage Resources (Government of Yukon 2010).

**Response:** A Heritage Management Plan needs to be submitted with the Project Proposal. The HMP will set out timelines and process for how protection and management of heritage sites will be done in consultation with SFN and other affected governments. The HMP will ensure that management options are appropriate to the resource and SFN values. As part of the Project Proposal, the HMP will be included in the terms and conditions of project licensing.

Environmental Monitor position – training and employment opportunity for FN member; work would include monitoring of impacts of project activities on heritage resources.

Yukon Government also requested Heritage Management Plan be included in Project Proposal. Residual effects on heritage resources (permafrost erosion, increased access, accidental impacts) not adequately identified in Project Proposal.

# **Technical Review of Potential Environmental Issues**

## **Proposed Coffee Gold Mine Project**

Prepared for

**Selkirk First Nation**

November 2017

Prepared by:

Names Redacted ,

ELR Ecological logistics & Research Ltd.;

Gomm Environmental Engineering Consulting;

Northland Earth & Water Consulting Inc.; and

Slater Environmental Consulting;





# 1. Introduction

As requested by Selkirk First Nation (SFN), the following technical professionals have conducted a review of available materials provided by Goldcorp Inc. (Goldcorp) in relation to the proposed Coffee Gold Mine:

- Names Redacted
- **Names Redacted** of ELR Ecological logistics & Research Ltd.;
- Names Redacted Ph.D., P.Eng. of Gomm Environmental Engineering Consulting;
- Names Redacted M.Eng., P.Eng. of Northland Earth & Water Consulting Inc.; and
- Names Redacted, of Slater Environmental Consulting.

The above professionals have also participated in technical meetings with Goldcorp and Goldcorp's consulting team to explore issues and exchange views related to the project.

Collectively this Technical Team was assembled by SFN with the mandate of completing technical due diligence on matters directly or indirectly related to potential environmental impacts and potential environmental risks associated with the proposed project.

For the purpose of this due diligence process, the proposed Coffee Gold Mine is the project as defined by the March 31, 2017 Project Proposal submitted by Goldcorp to the Executive Committee of the Yukon Environmental and Socio-economic Assessment Board (YESAB).

Importantly, it is noted that on July 12, 2017, the Executive Committee of YESAB determined that the assessment of that Project Proposal would be discontinued due to inadequate consultation with effected First Nations. In respect to SFN, the Executive Committee found deficiencies in the consultation process at several levels including notice, time, and opportunity provided for SFN to form and provide its views on the Project to Goldcorp. It also concluded that, given these deficiencies, Goldcorp could not have fully and fairly considered the views of SFN in the content of the Project Proposal.

It is the intent of this report to provide to Goldcorp, for full and fair consideration in any subsequent Project Proposal, SFN's key technical concerns with the project and recommended means of addressing those concerns. To that end this report presents an overview of the key results of the Technical Team's due diligence and has been drafted to assist SFN with on-going bilateral discussions with Goldcorp on the planning, design, construction, operation and closure of the proposed mine.

The report is not intended to be used to represent a submission on behalf of SFN to the YESAB on any Project Proposal that may be submitted by Goldcorp or its subsidiaries to advance the project.

When a Project Proposal is submitted to YESAB on the Coffee Gold Project, it is understood that SFN will make specific submissions directly to YESAB as provided for under YESAA and under YESAB's rules.

## 2. Overview of Coffee Project

The Coffee Gold Project is a proposed gold mine located at the headwaters of Halfway Creek and Latte Creek in central Yukon roughly 140 km west of Pelly Crossing, Yukon. The project would be accessed by both air and vehicle traffic. Vehicle traffic would be from Dawson City using a 214 km long network of existing public and user maintained placer resource roads connected with several sections of newly proposed resource road. The road would include two large river crossings (Stewart River and Yukon River) that would entail barging in the open water season and ice bridges in the ice on season. Air traffic would be into an all-season air strip located roughly 5 km east of the proposed mine site.

The mine site itself is located primarily along the top of an east-west trending ridge line that separates the headwaters of Halfway Creek and Latte Creek. The mine site would ultimately include numerous small to large open pits, a large waste rock dump in upper Halfway Creek, a large heap leach pad on the ridge line above Halfway Creek and Latte Creek, as well as sundry other mine site infrastructure elements. Collectively, the project represents one of the largest mining endeavors ever proposed in Yukon with a total mass of waste rock to be created equivalent to that of the abandoned Faro mine.

The project would include mining, using truck and shovel methods, at a rate of 92,000 tonnes per day, and loading of crushed ore on the heap leach pad at a rate of 18,265 tonnes per day (over a roughly 275-day loading season). Gold would be recovered from the crushed ore via cyanide drip leaching that would be conducted year-round. It is expected that the project would entail 2-3 years of construction, 12 years of active mining and leaching, and 10 or more years of closure related activities prior to achieving a final closure state.

As noted in Section 1, a Project Proposal for the project was submitted to YESAB on March 31, 2017 but that Project Proposal was not accepted for assessment. Therefore, at present the assessment of the project is pending a revised submission to YESAB from Goldcorp.

## 3. Views on Technical Matters

As was conveyed to SFN Leadership in a briefing meeting, the Technical Team has identified a series of key technical issues with the project. These are the matters that the Technical Team recommends that SFN request Goldcorp to address in its development of the project and specifically in any resubmission of a Project Proposal to YESAB.

By and large these matters were discussed with Goldcorp during meetings with the Technical Team in September 2017. However, based on those discussions and further review by the Technical Team some of the issues have been refined to the form that is presented in this report.

The matters presented in this report are not comprehensive in that technical matters of a more minor nature are not necessarily included. It is expected that matters of a more minor nature can efficiently and effectively be addressed during the adequacy review and assessment processes.

In developing the views presented in this report the Technical Team has been guided by the understood SFN principle that protection of the environment is paramount and that SFN's ability to continue to enjoy its traditional use of effected lands should not be unduly impacted. As such all reasonable and prudent best practices, mitigations, and contingencies should be considered to minimize the environmental effects of mining on the environment. Such measures should be applied using a pre-cautionary approach that reasonably accounts for uncertainty that is associated with:

- the predicted environmental performance of the project (i.e. what is likely to happen if events unfold as expected by the mining proponent); and
- potential environmental risks represented by the project (i.e. what could happen if less desirable events occur).

In particular, it is understood that the long-term legacy of a mining project should be as benign as reasonably possible. To this end, accounting for adequate planning for closure of projects is necessary and should be based on minimizing long-term degradation of the environment as opposed to merely targeting thresholds of scientifically acceptable harm.

### **3.1 Alignment with Comments by Other Parties**

During the YESAB consideration of the March 31, 2017 Project Proposal submitted by Goldcorp, YESAB received numerous submissions on the technical adequacy of that Project Proposal from other parties. Those submissions typically included reference to both large scale issues and matters of lesser nature (i.e. down to typographic errors in figures and text). This report does not intend to reference or comment on the complete list of matters brought forward by those parties.

Therefore, the lack of reference or comment in this report on any specific issue brought forward by other parties does not imply that the Technical Team agrees or disagrees with any such matters. Having said this the Technical Team did find that there was broad congruence in the nature of environmental concerns identified by other parties. Moreover, given SFN's preference to a pre-cautionary approach, Goldcorp should expect SFN to be broadly supportive of environmental concerns and technical deficiencies identified by other parties.

## 4. Views and Recommendations

### 4.1 Overarching Comments

Sections 5 through 8 of this report will present the specific comments and recommendations of the Environmental Technical Team. These should be read with the understanding of the following overarching conclusions of the team in respect to the present definition of the project and its possible effects.

- 1) It was clear that the March 31, 2017 Project Proposal was submitted to achieve an internal corporate deadline that was unrelated to whether the content was fully to the level that should be expected for a project of this nature. Thus, there were clear deficiencies in the content of that submission that must be addressed to achieve a Project Proposal that is adequate for the assessment process.
- 2) It is the view of the Technical Team that Goldcorp should be more precautionary and more explicitly account for uncertainty in terms of its approach to:
  - a) predicting potential environmental effects;
  - b) accounting for the performance of mitigating measures; and
  - c) considering and planning for means of addressing potential environmental risks that are inherent but not certain to be realized.
- 3) Any resubmission of the project to YESAB should consider means of including flexibility in the execution of the project. This is to say that it is highly likely that the project will evolve as actual conditions affecting the execution of the project are realized. Goldcorp should include foresight into plausible evolution of the project (e.g. creating of larger or lesser amounts of waste rock, occurrence of extended periods of temporary closure due to economic constraints). This is so that the future realization of such events is accounted for in Goldcorp's planning and predictions and can be appropriately assessed.
- 4) Goldcorp should endeavor to include up to date environmental data and up to date environmental commitments that have accumulated in the interval between the cutoff date for data and planning included in the March 31, 2017 submission and that included in any resubmission to YESAB. As a minimum data collected during the 2017 field season should be accounted for in any Project Proposal.

### 4.2 Organization

The layout of issues in the following sections of this report are organized to reflect the structure of the March 31, 2017 Project Proposal, which was organized in five volumes.

- Volume I – The Coffee Gold Mine (i.e. a description of the project)
- Volume II – Physical Environment
- Volume III - Biophysical Environment

- Volume IV – Human Environment
- Volume V Additional YESAA Requirements (i.e. management plans)

This report will provide comments related to the contents of Volumes I, II, III, and V. Comments on Volume IV (Human Environment) have been provided by a separate consulting group to SFN.

## 5. Project Description

In reviewing Volume I (Project Description) of the March 31, 2017 Project Proposal including its supporting appendices, comments by other parties, and considering additional information provided by Goldcorp as part of bilateral discussions, the Technical Team identified the following key issues:

- Inadequate levels of engineering design and analysis for Alpha Waste Rock Storage Facility and the Alpha Pond and the need for supplemental analyses to further support the heap leach facility design;
- Inadequate alternatives studies for selection of a design for the Alpha WRSF facility, and for closure planning for both the Alpha WRSF and the Heap Leach Facility;
- Lack of risk assessments to guide the planning and design of both the Heap Leach facility and the Alpha WRSF;
- Lack of a global Aquatic Health valued component (VC) to carry through in the Assessment Methodology, and issues with consideration of residual effects and thresholds of significance applied in the assessment methodology; and
- Lack of due consideration of potential Cumulative Effects in the assessment.

### 5.1 Engineering Design Issues

#### Alpha Pond Dam

The dam required to form the Alpha pond is only described at a conceptual level within the Project Proposal. In engagement with Goldcorp since submission of the March 31, 2017 Project Proposal, there has been no evidence provided that an actual engineering design had been developed for this element of the project.

What is known is that it will be in the order of 30 m high, have the capacity to store up to 360,000 m<sup>3</sup> of mine affected water, and that it is located in an area that is affected by permafrost soils. It is understood that extensive geotechnical site characterization work for this structure was completed in the 2017 field season after the submission of the March 31, 2017 Project Proposal.

While the described purpose of this structure is to allow for settlement of total suspended solids (TSS) prior to discharge from the site, the Technical Team considers that this is not a precautionary objective.



As the last point of control for the majority of water that will be discharged from the site it should be considered that the Alpha Pond may be required to store water that does not meet discharge criteria for parameters other than TSS. Thus, the ability for more than temporary storm water detention should be proven by a sound engineering design.

For a project of lesser overall magnitude this structure itself would warrant significant effort to describe and support at the assessment stage and it would require an engineering design at least at the pre-feasibility level if not the feasibility level. In any case resubmission of the Project Proposal should include an appropriate engineering design of this element of the project.

#### Alpha WRSF

The proposed Alpha WRSF is also only described at the conceptual level. Supporting information for the facility does not show that an engineering design has yet been completed. Some general design criteria are identified but they do not appear to be supported by any completed analysis. What is known is that it will be a major engineering structure containing nearly 250 Mt of waste rock in a relatively steep valley that is extensively affected by permafrost.

The limited conceptual drawings showing the outline of the facility have been provided without any basis for how they were derived. It is understood that there is a need to buttress the facility by expanding it across the Halfway Creek Valley; however, it is not known how the degree of buttressing required was determined.

From the Technical Team's perspective evidence that the design has considered potential environmental risks is absent. Most importantly, the provided description of the facility does not suggest that it is being designed for closure to a standard that would be acceptable to SFN. Evidence of this is the lack of planning for a cover, proposed burial of valuable existing soils underneath the facility footprint, no consideration for optimal placement of different waste rock types, the intention to allow angle of response slopes in closure, and inclusion of surface drainage features that do not appear to optimize runoff or represent a robust self-sustaining system in the long term.

Resubmission of the Project Proposal should include a suitable design document for this facility with clear descriptions of the design objectives including objectives related to long term environmental performance.

#### Heap Leach Facility

The proposed heap leach facility is supported by a well-advanced design that generally meets or exceeds expectations for such a facility at the assessment stage. Having said this there are several analytic aspects of the design that should be advanced to improve the level of confidence in the design of the facility.

At an operational level, one of the most important aspects of the facility (from an environmental aspect) is its ability to manage the volume of water that may accumulate over time in the facility.

The design presented shows that this will be accomplished by utilizing a combination of storage (events ponds) and diversions (in this case the application of temporary synthetic covers - rain coats). It is clear that without the use of rain coats a larger volume of storage provided in events ponds may be required.

It is also clear that the desirable and beneficial plan to complete interim rinsing of heap cells (when loading and leaching of that cell has been completed) could conflict with the need to have rain coats in place to control excess precipitation inputs.

Discussions with Goldcorp consultants also identified that the logistics of interim rinsing were not trivial as phases of rinsing and resloping and further rinsing would be required most of which would need to occur in a limited period with above zero temperatures. Further exploration of this potential conflict and the risk associated with it should be examined through more in-depth water balance modelling.

In particular the use of stochastic water balance modelling is essential to provide confidence in the ability of the rain coat and event pond system to account for the safe management of excess water. Such stochastic modelling should also account for the impacts of periods of temporary closure at key points in the project life. The outcomes of stochastic modelling would likely lead to an understanding of operational rules that must be used to coordinate rain coat placement and activities such as interim rinsing. It may also provide input into the pre-cautionary timing for establishing water treatment facilities at the site.

Another analytical task is to provide greater transparency in the draindown modelling that has been provided. At present its analytical basis requires further explanation and governing assumptions (such as the treatment of meteoric precipitation inputs) require justification. In addition, it is not clear that draindown modelling accounts for concurrent gold leaching and interim rinsing that may be occurring during portions of the heap life. Moreover, the use of mean inputs in the draindown model suggests it is not precautionary. Confidence in draindown modelling is important as consideration of draindown volume may be a factor in ensuring adequate sizing of the heap's event ponds, understanding potential timelines for closing the facility, and appropriate sizing of water treatment facilities to dewater the heap.

These additional analytical exercises should be provided with re-submission of the Project Proposal.

## **5.2 Alternatives Studies**

It is now a commonly accepted best practice to subject critical mine waste facilities to alternative studies as a means of selecting, in a transparent manner, preferred options to bring forward into design and planning. This process also allows for third-parties to explicitly understand the basis for and underlying trade-offs that were made for selection of a design or management approach.

It is the view of the Technical Team that two critical alternatives studies have not been completed or not shared as part of the Project Proposal or engagement with SFN. These studies are:

- 1) An alternatives study for the design of the Alpha WRSF<sup>1</sup>; and
- 2) An alternatives study for the means of closing the heap leach facility.

For the Alpha WRSF the alternatives study should consider the interim and final design geometry of the facility (including its footprint in the Halfway Creek drainage), the means of its construction (including options for selective placement of different waste rock types), and the means of its closure. Important aspects to consider would be the overall footprint that options may yield, interim stability afforded by various approaches (i.e. the ability to accommodate early closure), potential water quality variations, and potential implications for infiltration and runoff management.

For the Heap Leach Facility, an alternatives study that considers greater application of sources control measures should be completed. For example, planning for reduced closure slopes to allow for the application of larger areas of low permeability covers should be considered.

### 5.3 Risk Assessments

It is now a commonly accepted best practice to subject critical mine waste facilities to incrementally completed risk assessments. The goal is to identify the risk of poor performance of such facilities early in the design and planning process and to ensure that these risks are understood and appropriately managed as the design and management plans for the such facilities evolve.

For the Coffee Gold project, it would be expected that appropriate level risk assessments would have been completed to support the designs and initial management plans for the Alpha WRSF and its pond, and for the Heap Leach Facility. It does not appear that such risk assessments have been completed or if they have that they have been included in the Project Proposal or shared with SFN.

A resubmitted Project Proposal should include risk assessments for these facilities. The assessments should be completed at an appropriate level, and be conducted using best practices that includes the involvement of individuals not directly responsible for the designs. Ideally individuals not commercially aligned with the proponent would be involved in such assessments.

### 5.4 Assessment Scope and Methods

Chapter 5.0 of the Project Proposal describes the general methodology for the environmental and socio-economic assessment, addressing scope of assessment, intermediate components (ICs), valued components (VCs), assessment boundaries, characterization of environmental and socio-economic effects, cumulative effects assessment, and evaluation of significance of effects. Specific

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<sup>1</sup> This differs from the alternatives study that was completed to select the general location of the Alpha WRSF.

details about assessment methods for each IC and VC are described in individual chapters and appendices. There are several issues related to assessment methodology that should be addressed in a revised YESAA Project Proposal.

1. Aquatic Health VC: The evaluation of effects on the fish and fish habitat relies on characterization of effects on three subcomponents, all of which are fish species: Arctic grayling, Chinook salmon and Chum salmon. Fish habitat is only addressed through indicators for each of these subcomponents.

Aquatic environmental health more broadly is an important value that could be affected by the Coffee Gold project, and should be considered in the assessment. To achieve this, aquatic health or stream health should be added as a VC or subcomponent of the fish and fish habitat VC. Indicators should include abundance, diversity and contaminant levels for benthic invertebrates and other relevant aquatic ecosystem components. Distribution and contaminant levels in Slimy sculpin should also be included as these are the only year-round fish species present in the local streams, with exposure to contaminants in water and sediment throughout their lives. Baseline data will be required to support assessment for the aquatic health VC.

2. Thresholds for Evaluating Residual Effects: The assessment methodology establishes a hierarchy that applies to the development of ratings for characterizing effects (Section 5.3.3.1). The first priority when developing these ratings is to rely on *“a published regulatory or industry standard or criterion that establishes a threshold.”* The provisions of First Nation Final Agreements should be considered as part of this highest priority. However, the assessments for specific VCs do not generally recognize thresholds that may be established in the Final Agreements.

For example, the Chapter 14 right for First Nations to have water that is flowing on or through Settlement Land remain substantially unaltered is not specifically identified as a threshold applicable for water quality (VC) and hydrology (IC). Instead, the evaluations of significance rely on Canadian and provincial guidelines that are aimed at protecting aquatic ecosystems. While these are also important thresholds for assessment, they should be considered in combination with the thresholds defined in the Final Agreements. Relevant rights and thresholds defined in the Final Agreements should be considered when evaluating all VCs.

3. Evaluation of Significance: Chapter 5 provides only a general definition of significance. Specific thresholds for evaluating significance of effects are defined in the VC-specific effects assessment chapters and appendices. Thresholds for defining significance are inherently values-based, but the thresholds provided in the Project Proposal should consider how a reasonable person may view the importance of potential effects. It is not clear that the thresholds described in the Project Proposal achieve this outcome.

For example, the significance thresholds defined for water quality may warrant further consideration. Presently, the significance threshold requires a combination of tests related to several factors before an effect would be considered significant. Specifically, an effect must be of high magnitude, AND regular or continuous occurrences, AND long-term or permanent, AND several other factors before it would be considered significant, warranting further mitigation. The effect must also occur on a VC for which the context is rated as High, meaning that it is particularly sensitive or in a pristine area, for example. The Technical Team does not agree that this approach would meet the test of how a reasonable person may view the importance of a potential effects. It certainly is not consistent with how SFN has viewed the significance of water quality impacts associated with mining projects in the past.

Finally, an effect is only considered to be significant if the scientific predictions provide a “*high level of certainty*” that it will occur. If there is a “*high level of uncertainty that the predicted effect will occur*” then it is not considered to be significant. This significance criterion does not appear to be consistent with the pre-cautionary approach whereby uncertainty in predictions would lead to a more cautious determination of significance.

## 5.5 Cumulative Effects Assessment

The March 2017 Project Proposal has not adequately considered the potential for cumulative effects that may arise from the Coffee Gold Project in combination with other projects. YESAA requires that assessors consider the effects of the proposed project in combination with the effects of “*other projects for which proposals have been submitted under subsection 50(1) [of YESAA] or any activities that have been carried out, are being carried out or are likely to be carried out.*”

In scoping its cumulative effects assessment, GoldCorp has considered “*future projects and activities [that are] reasonably foreseeable projects or land use activities for which proposals have been submitted under YESAA (subsection 50(1)), or have entered into a formal project approval or permitting process*” (Project Proposal, Section 5.4.2). This proposed scope for a cumulative effects assessment is far too narrow, especially for a project that includes development of improved and new access over a distance of over 200 km. The Northern Access Route (NAR) will induce activities in areas that are currently un-accessible or that have poor access. For example, hunting activities are likely to increase in many areas, and placer mining may expand in both existing and new areas. Conducting a cumulative effects assessment that only considers activities that are already in a formal government process fails to acknowledge or address the effects that will be induced by the activities of the project itself.

The narrow scope also fails to address effects that may be associated with extensive mineral staking and low-level exploration activities that do not require formal approvals. Potential larger exploration projects or mining activities, even those that may occur on Goldcorp’s own holdings are not addressed unless there is a formal government process already initiated.



Overall, it seems likely that the cumulative effects assessments for VCs have likely underestimated the potential growth in traffic, hunting, air traffic, placer mining and other activities along the NAR and in the vicinity of the project.

Even where activities are identified for consideration in the cumulative effects assessment, the assessment does not appear to thoroughly consider the implications of potential effects. For example, one of the potential cumulative effects most commonly identified by experts and community members for the Coffee Gold project is related to increased hunting pressure along the NAR. Increased and improved access in Yukon has historically led to increased hunting pressure on local wildlife resources. However, this issue does not appear to be comprehensively addressed in the cumulative effects assessment for wildlife. The activity is identified in the list of other activities for the cumulative effects assessment, listed as “trapping and hunting” with a description that focuses on formal trapping and guide outfitting:

*“Multiple Trapline Concession Areas and nine Guide Outfitter Concession Areas overlap with the RAA. Activity occurs seasonally.”*

The assessment concludes that there is no potential for cumulative effects on wildlife because:

*“Any disturbance from hunting and trapping would be short-term and localized and is not likely to interact cumulatively, assuming harvesting activities are well managed and do not exceed sustainable harvest thresholds.”*

This conclusion does not appear to rely on an adequate characterization of potential effects that may arise in association with the Coffee Gold Project.

With respect to assessment of cumulative effects on water quality, it is notable that project related effects were only carried forward to the cumulative effects assessment if the project itself resulted in exceedance of water quality guidelines. If there are other projects contributing to water quality changes, this approach creates significant risk because it does not consider the potential for small changes associated with Coffee Gold to combine with other projects and cause adverse effects.

The revised Project Proposal should include a thorough evaluation of potential cumulative effects, including consideration of induced effects associated with the development of improved and new access to the mine area. The cumulative effects assessment should focus on project-effects that overlap with other effects on the sustainability of VCs and ICs, and the sustainability of the ecosystems, socio-cultural systems, socio-economic systems and the interactions between them, rather than the effects of projects and activities that merely overlap with one another temporally and spatially.

## 6. Physical Environment

In reviewing Volume II (Physical Environment) of the March 31, 2017 Project Proposal including its supporting appendices, comments by other parties, and considering additional information provided by Goldcorp as part of bilateral discussions, the Technical Team identified the following key issues:

- The need to complete and present the geotechnical characterization of the Alpha WRSF site and Alpha pond site;
- The need to expand the temporal scope of water balance and water quality modelling to encompass all phases of the project;
- The need to improve the level of confidence in the predictions of the water balance and water quality model in respect to the timing, volume, and quality of contact water that will be produced by the project;
- The need to reconsider some aspects of proposed site specific water quality objectives; and
- The need to improve the level of confidence in developed source terms for the geologic materials that will be disturbed or exposed by the project.

### 6.1 Geotechnical Characterization

As identified in section 5, design work that is required for the Alpha WRSF and Alpha pond dam both require updated and more detailed consideration of the geotechnical characteristics of those sites. Thus, the inclusion of geotechnical characterization efforts from the 2017 field season is a requirement for the resubmitted Project Proposal.

### 6.2 Water Balance and Water Quality Modelling

As has been identified by other reviewers, the water balance and water quality modelling completed for the March 31, 2017 Project Proposal did not account for all of the years of project operation as the modelling starts in year 7 of the project. Any re-submission of the Project Proposal should include water balance and water quality modelling that accounts for the full temporal period of the project and includes loadings from sources that may only be temporary features of the project.

The Technical Team also questions the level of confidence that can be attributed to the current modelling. A number of reviewers, especially Yukon Government, have raised critical issues related to the driving hydrology that is used in the modelling. The Technical Team supports the resolution of those issues.

In particular the Technical Team views the issue of predicting contact water volumes as being a key uncertainty that is not presently adequately addressed in the water balance modelling. This arises because of the unique topography and layout of site features for this project. Contact water sources (pits and waste rock facilities) are generally located on either side of an east-west aligned ridge line. This results in some features being predominantly north facing and some being south

facing. Given the northern latitude of the project it is known that there are significant differences between hillslope hydrology depending on aspect, such differences need to be realized in any modelling exercise.

As the ridge line dividing the project is also the drainage divide, contact water arising on either side ultimately flows to different catchments; therefore, averaging the affects of aspect cannot be used to eliminate the differences (which of course would not account for differences in sources terms in any event). For example, it is not reasonable to expect the evaporation and sublimation of precipitation (i.e. removed from being contact water) from the south facing backfilled Double-Double pit would follow the same pattern of timing and magnitude as that of the north-facing, Alpha WRSF that is sheltered in the Halfway Creek Valley.

At present it appears that the modelling does not account for this critical driver for producing contact water volumes, i.e. the energy balance. For example, all WRSF's appear to use the same long-term average infiltration of 35% of mean annual precipitation. This is likely to under estimate contact water arising from some features and over estimate contact water from others. And, as noted these flows do not necessarily join, are likely chemically different and so cannot be averaged.

Resubmission of the Project Proposal should include a revised and expanded water balance and water quality model that addresses the issues raised by multiple reviewers and that explicitly addresses the critical issue of energy balance that drives the timing and volume of contact water that may be generated by the project.

### **6.3 Water Quality Objectives**

With respect to water quality objectives, the modelling for all cases (natural, baseline, upper) predicts concentrations of total copper that exceed water quality guidelines for local streams. The driver for these exceedances is background water quality, but the dataset indicates that background exceedances are associated with total suspended solids. If dissolved copper concentrations are compared with guidelines, exceedances are rare. Any release of copper from the Coffee Gold project will be primarily in dissolved form, which has greater potential to cause adverse effects on the aquatic environment. The proposed site-specific water quality objectives, based on the 95th percentile of background total copper concentrations may not be protective for the dissolved copper releases. It would be beneficial for the revised Project Proposal to consider whether it may be more effective to rely on the generic guideline for copper, but apply it to the dissolved contaminant concentrations.

For Yukon River and Coffee Creek, GoldCorp has proposed site-specific water quality objectives that are premised on a non-degradation approach to water management. Under this approach, water quality in these streams should remain unaltered from its pre-mining conditions. The Technical Team is supportive of this approach and it is consistent with views expressed by SFN on this project and other projects that can affect important waterbodies.

The proposed site-specific water quality objectives for the Yukon River and Coffee Creek are the 90<sup>th</sup> percentile (in some cases the 95<sup>th</sup> percentile – see paragraph below) of pre-project background conditions at these locations. This provides an estimate of the upper range of the water quality conditions (i.e., high concentrations) but fails to provide any metrics to define the distribution of water quality conditions. The Technical Team recommends that the proposed site-specific water quality objectives should have two components, one to define the upper range (e.g., 90<sup>th</sup> percentile) and one to define the central tendency (e.g., 95% Upper Confidence Limit of the Mean) of the distribution. Appropriate monitoring programs and attainment criteria should be defined to measure achievement of these two-part objectives.

GoldCorp has not provided a strong rationale for relying on the 95<sup>th</sup> percentile of pre-project background conditions as a site-specific water quality objective, when the general approach is to use the 90<sup>th</sup> percentile. It is understood that the 95<sup>th</sup> percentile was applied for parameters where the 90<sup>th</sup> percentile exceeded water quality guidelines. This exceedance of guidelines at the 90<sup>th</sup> percentile does not seem related to decisions about what statistic should be used to represent the upper range of natural conditions. Some additional rationale should be provided for the selected statistics.

As will be discussed in section 7.1, there may be a need to separately consider the clear water plumes in the Yukon River that form as discrete immiscible shoreline zones downstream of the mouth of project tributaries that flow into the Yukon River. This is to say that the assumption of a well mixed discharge into the Yukon River by project effected streams may not be appropriate; hence, generalized water quality objectives for the Yukon River may not be appropriate for these zones.

## 6.4 Geochemical Source Terms

In considering the geochemical sources terms that have been developed for the project, it is seen that other parties, especially Source Environmental Associates Inc., have raised a large number of technical issues that are supported by the Technical Team.

As with other parties, the Technical Team questions the reliance on the Mount Nansen mine waste rock seepage data to provide input for scaling loadings from field bins at the Coffee Project. The developed scaling factor appears to represent what might normally be a lower bound in terms of expected scaling (i.e. a best-case outcome).

The information provided to identify the reliability of using the Mount Nansen seepage data to scale seepage produced at the Coffee Mine WRSF's does not account for critical factors such as the potential differences in construction, macro-fabric, grain-size, mixing of rock types, and exposure to infiltration that may exist between the two sites.

Moreover, the Technical Team has questions regarding the overall reliability of the Mount Nansen dataset. The scale-up is based on a few data points collected in a single year at a facility that is approximately two orders of magnitude smaller than the proposed Alpha waste rock facility. Also, the material placement and seepage flow paths are poorly understood at Mt. Nansen. The Technical Team recommends that the sensitivity of the source terms to plausible levels of uncertainty in the scaling factor be examined.

In terms of other matters with the source terms for the WRSF's, it is noted that many of the source terms ultimately utilize a weighted average approach to account for different behavior (load release rates) of the various waste rock types that are scheduled to be in a given WRSF. This of course assumes idealized contact between infiltration and the waste rock materials. It is highly likely that this does not occur and that the geochemical signature of contact water is dominated by contact with one or other waste rock type. This could be a function of the WRSF design that results in sufficient volumes or thicknesses of a given rock type being in place near surface such that seepage reaches the scale transition point prior to lower rock layers being encountered. In any case understanding and emphasizing the geochemical influences of different waste rock types (lithology and weathering) also provides guidance for the design of WRSF's such that loading from the facilities might be minimized.

It is recommended that consideration be given to the range of loadings that may result from less than perfect seepage contact with the contents of WRSF's and that this be used to provide a band of potential source terms that might be plausible for a given WRSF.

With respect to spent ore on the HLF, the Kona Pit ore has some acid generating potential. The Project Proposal indicates that this material will be mixed with lime (to increase pH) and non-acid-generating rock in the HLF. Since high pH is required for leaching it is unclear how the addition of lime would be different for this specific ore. Also, local pockets of acid-generating material could lead to mobilization of some soluble metals, which may remain mobile even in the presence of non-acid-generating material. It would be useful for the Project Proposal to include the results of test programs that can demonstrate how this material is expected to perform.

It is also noted that given that water quality modelling must follow the entire development life of the mine, source terms based on weighted average of final build out of any given unit may be entirely inappropriate for interim states of those facilities.

Finally, as a general comment, the Technical Team found it unusual that the Project Proposal does not contain a summarized section on the project geology. Detailed geology is provided in supporting documents but a summarized version of this critical part of the physical environment would normally be expected. In particular the need to more directly outline the geochemical differences between rock types and the weathering of these units (i.e. degree of oxidation) should be presented in the Project Proposal.



## 7. Biophysical Environment

In reviewing Volume III (Biophysical Environment) of the March 31, 2017 Project Proposal including its supporting appendices, comments by other parties, and considering additional information provided by Goldcorp as part of bilateral discussions, the Technical Team identified the following key issues:

- The need to be more pre-cautionary in considering impacts to fish and fish habitat; and
- In respect to vegetation and wildlife, the following general issues were identified:
  - The documentation describing the baseline studies was found to sometimes lack details describing scientific methods, standard procedures, references to scientific literature, or generally how the studies were performed.
  - Some details of the project description that would have helped the Technical Team to assess potential project effects were not provided. Many of the figures lacked details that would have been useful (e.g., specific locations of study efforts or key features).
  - Portions of the effects assessment were conducted at a high or general level, not at the level of detail that that would provide confidence about the conclusions of the assessments.
  - Mitigations and proposed monitoring plans did not provide the level of detail needed to provide assurance that project effects could be adequately managed.

### 7.1 Fish and Fish Habitat

As stated in Section 3. of this Report, SFN's perspectives about the importance of environmental integrity lead to application of a pre-cautionary approach that accounts for uncertainty about our understanding of the environment, the project and potential effects. For fish and fish habitat (and associated water quality), there are uncertainties related to both the project and external factors that warrant application of a pre-cautionary approach. Key points of context that should be addressed in the Project Proposal and form the basis for a pre-cautionary approach include:

1. Status of Yukon River Chinook salmon populations: Chinook salmon populations have been severely depressed for more than 20 years. There are many stressors already effecting fish stocks and water quality. For example, these include overfishing, climate change and permafrost melt, existing abandoned mines. Additional stresses will come from additional mines in the planning stages and other development. Because of the severely depressed populations, current and baseline data for streams in the project area do not reflect past (or potential future) utilization by Chinook salmon of streams in the project area for spawning, rearing and overwintering.

2. Uncertainty about Effects: There is significant uncertainty associated with current project proposal and predictions of water quality and aquatic environmental health and impact assessments. Planning and predictions are at a preliminary stage and based largely on modelling. Much of the detail on project operations is scheduled to unfold as project development proceeds over the initial 5 years or more.

The project has the potential to effect fish and fish habitat over the very long term (>20 years) during operation, closure and post closure from long term surface and groundwater seepage from the heap Leach facility, Alpha WRSF, pits and in-pit WRSF's. Some of these effects may be irreversible especially when water treatment stops after closure and the mining site is abandoned.

There is uncertainty with commitment and resourcing to conduct closure activities beyond 10+ years after mining and the potential for site abandonment during closure when revenues cease and the ability to deal with ongoing post closure impacts when water treatment stops. The proponent has indicated that they plan to stop active water treatment after closure in approximately year 20 and abandon the site but there is uncertainty about how long this treatment may be required.

3. Reliance on Short-term Baseline Data: There is a lack of adequate baseline data to assess a major long-term mining project that has the potential to affect water quality and fish habitat over the very long term. Much of the fish habitat in the Yukon, especially in terms of tributary and higher altitude headwater streams, is considered relatively low productivity and is only used by fish seasonally or occasionally over the medium to long term depending on environmental conditions. However collectively it accounts for a major portion of the total fisheries productivity in the Yukon and is sensitive to incremental and cumulative developments.

Thus, several years of baseline monitoring may not provide a lot of information about utilization and importance e.g., baseline sampling in Halfway Creek revealed major utilization by Slimy sculpin, Arctic grayling, and juvenile Chinook salmon in some years and no fish in other years.

4. Cumulative Effects: The incremental effects of the mining on Chinook salmon and freshwater fish populations and water quality in the Yukon river drainage may be small but they will be additive to the many other factors that have a current and future effects: e.g., current abandoned mines and future proposed mining development in the drainage, over-fishing and changing environmental factors such as climate change that are affecting salmon, and fish and habitat productivity both in freshwater and marine environments. The issue of effects of mining in the Yukon on water quality and salmon is frequently raised by the U.S. representatives in Yukon River Salmon meetings.

The potential for cumulative effects from future placer mining on project area streams represents a significant uncertainty and concern. An examination of placer claims in the area indicates the existence of extensive claims especially on the headwater tributaries of

Coffee Creek. Even if these claims are currently inactive, they are more likely to be mined with the development of road access to the area which will improve economic viability of mining.

Application of a more pre-cautionary approach for considering and mitigating impacts to fish and fish habitat leads to the following needs for a revised Project Proposal:

1. Collection of Additional Baseline Data: Additional baseline data is required to adequately describe all important aspects of fish and fish habitat. For example, additional data may be required to address the aquatic health VC that is proposed in Section 5 of this Report. Also, there is a lack of adequate baseline for stream mouths of tributaries and the downstream clear water plumes they create along the shoreline of the Yukon River. Past studies have shown that stream mouths and clear water plumes are heavily utilized by rearing juvenile Chinook salmon and other fish species when turbidity in the Yukon River is high. Thus, contaminant levels in non-fish bearing and low fish bearing streams like YT-24 and Halfway have the potential for adverse effects on juvenile salmon and other fish species in the Yukon River. During a site visit on September 14, 2017 such a clear water plume was clearly visible on along the Yukon River downstream of the mouth of Halfway Creek. This should warrant further studies to determine the level of fish utilization of such zones throughout the season and the associated levels of turbidity and suspended sediments in this clear water plume and in the Yukon River.
2. Monitoring and Adaptive Management: A revised Project Proposal should include details about proposed monitoring and adaptive management plans to monitor impacts to fish and fish habitat, water quality and aquatic environmental health on an ongoing basis and an action and response plan with prescribed thresholds to address issues as they arise. These plans should demonstrate how the mine operators will detect any adverse changes in the aquatic ecosystem and the mechanisms that will be used to address the changes before they cause any unacceptable adverse effects. This plan should also have provisions for multi-party steering committee to oversee the monitoring program and administer the adaptive management plan including all effected management agencies and governments as well as the mine proponent.
3. Contingency Plans: Project design should include overdesign and redundancy to reduce the probability of failure and keep options open for mitigation, so fish and fish habitat and environmental health are maintained when plausible but unexpected events happen. Examples of this would be to plan for and keep options open for covers on the Alpha WRSF and heap leach facility should long term contaminant seepage be a problem and to route as much clean water as possible around the Alpha WRSF and to design and construct the Alpha pond with enough capacity to avoid a spill during a larger flood event.

4. Compensation and Restoration Activities: Given uncertainties of long term impacts of the mine to fish and fish habitat and aquatic health a pre-cautionary approach would be to initiate compensation and restoration activities in a proactive way before issues become evident and especially for vulnerable and culturally important species like Chinook salmon. This should be built in as a cost to the project. It is not clear at this point whether any habitat utilized by fish will be physically altered or destroyed requiring habitat offsets or compensation under the Fisheries Act. But it is known that some adverse impacts to fish and fish habitat are likely, whether predicted or not, from a project of this scale. The success of habitat compensation and offsetting projects that are often poorly conceived with a lack of longer term planning is questionable.

A much better approach would be to set up a compensation and restoration fund that would provide for longer term planning over the life of the mine. This would ensure that the Coffee project provides some benefits to the fisheries resource over the long term and potentially not only mitigate adverse impacts but set up net gain situation.

## 7.2 Wildlife and Vegetation

With respect to the description of existing conditions and assessment of effects on wildlife and wildlife habitat, and vegetation VCs, the review identified several general issues that should be addressed in a revised Project Proposal. These include:

- The documentation describing the baseline studies was found to sometimes lack details describing scientific methods, standard procedures, references to scientific literature, or generally how the studies were performed.
- Some details of the project description that would have helped the Technical Team to assess potential project effects were not provided. Many of the figures lacked details that would have been useful (e.g., specific locations of study efforts or key features).
- Portions of the effects assessment were conducted at a high or general level, not at the level of detail that that would provide confidence about the conclusions of the assessments.
- Mitigations and proposed monitoring plans did not provide the level of detail needed to provide assurance that project effects could be adequately managed.

Several specific manifestations of these general issues are described below.

### 7.2.1 Airstrips and Aircraft Use

Additional information about the location, access to, and estimated use of the airstrips (aircraft movements) is required in the Project Proposal. Aircraft use will almost certainly increase because deliveries of mine supplies and mine personnel shift rotations will be mostly supported by aircraft. Details are required to better understand the potential effects on wildlife during mine operations.

Aircraft movements near the cliffs adjacent to the Yukon River are a concern because of the documented occurrence of wildlife (including Thinhorn Sheep and Raptors) in the area. Moose, Caribou and other wildlife have also been documented in the area of the proposed new airstrip and mine infrastructure.

### **7.2.2 Mineral Lick**

At a September 22, 2017 meeting with Goldcorp and during the Coffee Gold site visit held on September 14, 2017, Goldcorp reported that a previously unknown mineral lick had been located along the Northern Access Road (NAR). The location of the mineral lick is reported to be relatively close to the proposed alignment of the NAR. At this stage it is unknown what course of action Goldcorp will take regarding mitigation measures to avoid the mineral lick. The Wildlife Protection Plan (WPP; p.5-13) states that mineral licks will be given a setback buffer of 200 m and the integrity of wildlife trails leading to the lick must be maintained. However, the 200 m setback buffer offered by Goldcorp is taken from a Government of Yukon (2014) guidelines and standards document related to temporary forest harvest activities. This setback is not considered to be appropriate for a haul road that will be used approximately 295 days each year for at least twelve years.

### **7.2.3 Wildlife and Vegetation Monitoring, Mitigation and Adaptive Management**

Having a clear understanding as to the kinds of mitigation measures that Goldcorp will adopt to reduce the effects of the mine and the NAR on wildlife needs to be more fully articulated. Although some specific mitigations have been listed by Goldcorp, an emphasis has been placed on monitoring the wildlife and not enough practical actions have been provided regarding mitigation measures to be taken if the project is found to have negative effects on wildlife. Some of the existing mitigation tables contained in the Wildlife Protection Plan are also incomplete.

Overall the revised Project Proposal should include comprehensive monitoring, mitigation and adaptive management plans for wildlife and vegetation. More clear and comprehensive mitigation measures for the valued components of wildlife and vegetation could be developed that, when necessary, state clear thresholds that will prompt a mitigation activity if those thresholds are exceeded (e.g., thresholds linked to wildlife fatalities and follow-up actions). This should be accompanied wherever possible by adaptive management frameworks that show how monitoring data will be used to inform mitigation decisions.

### **7.2.4 Uptake of Metals to Vegetation and Wildlife**

The project proposal provides baseline data describing vegetation metals levels and provides an effects assessment of potential further uptake resulting from the proposed project. However, this does not adequately explore the full potential of metals uptake and accumulation within plant tissue, nor the potential for transfer and accumulation to wildlife. Monitoring, response triggers, and mitigations need to be more clearly defined to demonstrate that there is a clear understanding of how to control potential project effects.



### **7.2.5 Rare, Traditional, and Medicinal Plant Studies and Assessment**

Baseline studies for rare plants were performed across the terrestrial study area. However, the project proposal did not provide information to determine whether all high-risk areas were sufficiently assessed. The effects assessment for traditional and medicinal plants used an index of berry abundance as a surrogate for traditional and medicinal plants, which may not assess potential effects sufficiently.

### **7.2.6 Grizzly Bear Den Surveys**

The results of the Grizzly Bear den surveys indicate that conditions for the surveys were less than ideal because of low snow pack, no fresh snow, and the presence of many tracks of other animals. Grizzly Bear denning surveys should be flown again to ground truth the denning suitability model results.

### **7.2.7 Bat Surveys and Mitigations**

Additional bat surveys and details about the surveys are required based on the results provided to date. More detailed information on mitigation measures to protect bat day roosts is also required.

### **7.2.8 Furbearers and Trapped Species Effects Assessment**

Data exist for furbearers and trapped species in the project proposal, but no specific effects assessment was presented for these species even though Goldcorp identified furbearers as focal species.

## **8. Environmental Management Plans**

While Volume V of the March 31, 2017 Project Proposal addresses a broad range of matters, the focus of the Technical Team's due diligence is in respect to environmental management plans that are described in Chapter 31 of Project Proposal and in associated supporting Appendices (31-C, 31-D, 31-E, and 31-F). The Technical Team considered this material, as well as comments by other parties, and additional information provided by Goldcorp as part of bilateral discussions. Based on this the Technical Team identified the following key issues:

- While acknowledging that the project is just (or will just) be entering the assessment stage, the level of planning represented in the supplied management plans was generally below what the Technical Team would expect to be provided. Moreover, it is known that SFN has long held (in respect to other projects) that plans for plans are not appropriate for project assessments;
- There are a number of management plans that the Technical Team would have expected to be provided as part of the assessment that have not yet been provided (e.g. heap leach facility management plan, cyanide management plan, etc.);

- Key management plans should be subject to alternatives assessments such that the rationale for selecting a given management approach is clearly understood and the trade-offs made in rejecting other options is can be understood by third parties;
- Key management plans should be subject to risk assessments (either independently or collectively with assessments of project infrastructure) that identify risks and guide the inclusion of contingency measures that address those risks;
- Modelling and analysis should be consistent with management plans (what is modelled should be what is planned), some reviewers have identified some inconsistencies related to plan contents and supporting analysis and models;
- Given the early stage of the project, it would be expected that plans would contain contingency measures that are linked to key uncertainties (e.g. water quality and volume, volume and type of waste rock, etc.) and reasonable limitations on the effectiveness of key mitigation. This generally appears to be lacking.

Having stated the above issues, the Technical Team acknowledges that correspondence from Goldcorp has identified that revised versions of existing management plans are expected to be provided to SFN in the first quarter of 2018. Also, initial versions of plans not yet shared with SFN are also expected to be provided over the course of Quarter 1 and Quarter 2 of 2018. It is the recommendation of the Technical Team that these revised plans and newly drafted plans be included in the project assessment process.

Comments on specific plans are presented below, but these are not comprehensive. In general management plans should be developed and provided to the level of detail needed to demonstrate that the described project performance is realistic and practical.

## **8.1 Conceptual Reclamation and Closure Plan**

As was stated in section 5 of this report, it is the view of the technical team that the reclamation and closure plan is a plan that should be subject to both an alternatives study and a risk assessment.

It is a specific concern of the present plan that reliance on long term semi-passive treatment is a primary mitigation for closure of the heap leach facility as opposed to greater use of source controls (i.e. low permeability covers). The plan should recognize the uncertainty of semi-passive treatment and provide for contingency to account for that uncertainty.

For the Alpha WRSF it has already been noted that the low degree of planning for closure associated with that facility does not meet with the Technical Teams expectations for such a facility. The Technical team acknowledges that Goldcorp has committed to study covering the Alpha WRSF; nonetheless, covering of this facility and substantive recontouring at closure are the minimum expectations for closing a facility of this nature.

## 8.2 Waste Rock & Overburden Management Plan

A key comment on the present waste rock management plan is that the potential benefits from selective use and placement of the geochemically superior schist waste rock that will be liberated early in the mine life does not seem to have been considered. Overall, considerations to optimize waste rock placement (by type) to limit environmental loadings does not seem to have been explicitly considered in the provided plan.

It is acknowledged that Goldcorp has indicated that studies of leaching from saturated waste rock columns is on going to assist in selection of waste rock that may be placed in areas that will ultimately be submerged (e.g. the base of causeways). This form of planning to minimize environmental loadings through consideration of the geochemical nature of differ waste rock types should be brought forward in a revised version of the waste rock management plan.

Finally, in viewing the complex nature of the proposed pit shells for the Coffee Mine project, it is reasonable to expect that variation in the ultimate shell geometries is highly plausible. To this end the waste rock and overburden management plan should account for potential increases or decreases in waste rock volumes and implications associated with variation in the proportions of a given waste rock type.

## 8.3 Water Management Plan

As with the reclamation and closure plan, the water management plan warrants completion of a risk assessment associated with the plan. There are reasonably high uncertainties associated with water quality and quantity predictions that would benefit from examination within a risk assessment process.

A key concern with the present water management plan is that lack of contingency planning in relation to the occurrence of poorer than expected water quality. In particular how unacceptable for discharge water would be managed if it accumulates in the Alpha pond is lacking. Based on the level of uncertainty around water quality predictions, the Technical Team considers the occurrence of water that is not acceptable for discharge to be a plausible scenario. The water management plan should foresee how such an event would be managed.

## 8.4 Adaptive Management Plan

Evaluations of effects for several VCs identify the need for strong monitoring and adaptive management plans to address areas of uncertainty. However, there are few details about adaptive management for the construction and operations phases of the project. Adaptive management plans should be developed to the extent that they identify key areas of performance uncertainty that may cause adverse effects. For these areas, the adaptive management plans should describe the intended indicators of performance, thresholds that would be used to trigger timely responses, and the range of responses that may be applied.

The plan should be developed to the extent needed to demonstrate that changing conditions can be identified and responses implemented before unacceptable conditions develop.

## **8.5 Wildlife management Plan**

Specific comments related to the perceived deficiencies with the wildlife management plan have been provided in section 7.2.

# Goldcorp – Selkirk First Nation Technical Engagement Status and Planning

December 5, 2017

## Overview:

Following Goldcorp’s submission of the Coffee Project Proposal to YESAB and the subsequent determination that Goldcorp required additional pre-submission consultation on the Proposal with affected First Nations, the Selkirk First Nation government and their technical advisors and the Coffee team have engaged on technical matters and Goldcorp has received a written compilation of SFN’s comments related to the YESAB Project Proposal. To date there have been 6 workshops/meetings (see table 1). On November 20, SFN provided to Goldcorp a letter with three appendices providing fulsome feedback on the Project Proposal. The broad topics covered by SFN included socio-economic concerns, concerns related to heritage, and concerns related to the physical and biophysical aspects of the Project and the Northern Access Route. This document is intended to summarize engagement to date with SFN, the key issues and concerns presented by SFN, and Goldcorp’s responses to these issues and concerns presented in Citizens meeting, technical meetings, and summarized in SFN’s document provided to Goldcorp on November 20. This document also captures next steps and the timeline for which next steps to resolve outstanding issues will take place.

*Table 1 SFN Engagement*

Workshop/Meeting	Date
Operational Mine Waste and Water Management	September 19, 2017
Closure	September 20, 2017
Socio-economic Effects	September 21, 2017
Wildlife	September 22, 2017
Technical Engagement – Next Steps	October 18, 2017
SFN Citizens Meeting	November 9, 2017

## Key Items for Further Technical Review and Status of Discussion:

### Socio-economic Effects

At the time of preparation of the Project Proposal, primary socio-economic data was not available to Goldcorp and therefore, publicly available secondary sources were used in the scoping and preparation of the Human Environment (Socio-economic) Valued Component (VC) Effects Assessment Reports of the Coffee Gold Mine Project Proposal. Goldcorp has acknowledged lack of primary data related to SFN in the Proposal. To address this, Goldcorp has funded SFN’s current regional Traditional Land Use Study (TLUS) project, which will cover the Coffee Creek area. In addition, SFN carried out a household survey in 2015, the data for which is now analyzed by SFN. As of November 20, 2017, SFN has granted Goldcorp access to a selection of this data on a confidential basis, which Goldcorp will use in an analysis of socio-economic effects related to SFN. The TLUS data is still under review and therefore has yet to be delivered to Goldcorp, acknowledging that Goldcorp is aware that the TLUS project is near completion as of November 20, 2017.

### **Description of SFN Concerns Raised in Engagement**



Further to the summary above, SFN and their technical advisors, as well as SFN Citizens, have brought forward a number of issues and recommendations regarding the Project Proposal. These issues and recommendations are captured below under the following general topics:

1. By including Whitehorse in the Local Assessment Area for some socio-economic VCs in the Project Proposal, the effects on smaller communities will be obscured and not adequately identified and addressed;
2. Recommendation that Goldcorp prepare and submit to YESAB a SFN and Pelly Crossing-specific socio-economic effects assessment report to expand upon its current effects assessments. This report would include consideration of data from the Minto Mine Monitoring Program 2014 and 2015 annual reports, information from the 2015 SFN Household Survey of Living Conditions (SFN socio-economic primary data – a selection of this data was delivered to Goldcorp on a confidential basis on November 20, 2017), and the 2017 SFN Traditional Land Use Study (yet to be delivered). This report is also recommended to include two additional VCs in the assessment and monitoring of effects on socio-economic conditions:
  - a. Fate Control and preparedness
  - b. Costs and benefits for future generations.
3. Recommendation that Goldcorp and SFN participate in a Northern Access Route cumulative effects scenario analysis workshop in fall or winter 2017
4. Recommendation that Goldcorp include in its YESAB submission a report consolidating the cumulative effects assessment of the Project for all VCs and active cumulative effects management in Local Assessment Areas;
5. Recommendation that Goldcorp submit to YESAB in early 2018 a socio-economic management plan, heritage protection plan, and training plan for assessment;
6. Recommendation that Goldcorp address socio-economic effects monitoring in closure planning and consider lessons learned from other applicable northern mine closures;
7. Recommendation that Goldcorp work with SFN to create opportunities for employment and procurement for SFN and SFN Citizens. This includes a training plan for SFN Citizens and that Goldcorp submit a local employment and training strategy for SFN and Pelly Crossing, as well as other affected communities. This also includes identifying barriers to employment and to build programs for pre-employment readiness, as well as working with the Selkirk Development Corporation to identify local procurement opportunities.

SFN’s technical advisors also provided comments regarding socio-economic issues related to the Northern Access Route, which are captured under this heading below.

***Goldcorp Consideration & Response***

The above topics were discussed in detail on September 21, 2017 and have also been revisited in confidential meetings regarding a formalized agreement between Goldcorp and SFN.

Issue	Response	Next Steps	Timeline
1. LAA Issues; concern that including Whitehorse	The reasoning for selecting the LAA for specific VCs to include Whitehorse was discussed and addressed in the September 21 meeting.	Upon receipt of the TLUS (and any other primary socio-economic data) from SFN, Goldcorp will assess if any unidentified effects specific to	Q1-Q3 2018.

Issue	Response	Next Steps	Timeline
skews effects assessments.	Goldcorp proposes Project activities in Whitehorse, and as such was included as part of the LAA for specific VCs in the Project Proposal, per YESAA requirements. Effects on smaller communities are identified in the VCs where appropriate.	SFN may exist; If so, Goldcorp will propose additional mitigations. Developing the Socio-economic Management Plan and Socio-economic Effects Monitoring program in consultation with SFN and SFN advisors.	
2. SFN- and Pelly Crossing-specific effects assessment based on specific primary data sets	<p>Goldcorp and SFN have discussed this on multiple occasions; Goldcorp has committed to an assessment specific to SFN upon receipt and analysis of the data sets that SFN references. Goldcorp received one data set on November 20, and has discussed in detail with SFN that in order to fulsomely address SFN’s concerns in this regard, Goldcorp will take the time to analyze the data provided by SFN and compile an assessment report in Q1-Q2 of 2018.</p> <p>Goldcorp also evaluated the current Project Proposal VCs against the 2014 and 2015 Minto Mine Monitoring Program information that is publicly available and sent that analysis to SFN on October 20, 2017.</p>	Upon receipt of the TLUS (and any other primary socio-economic data) from SFN, Goldcorp will assess if there are additional effects to SFN based on this information and propose mitigations as necessary. This will be made available to SFN and other relevant regulators and assessors when complete.	Q1-Q3 2018.
3. And 4. Cumulative effects engagement and analysis	Goldcorp has committed to a cumulative effects scenario analysis memo to provide to SFN in addition to the cumulative effects assessment that is already included in the Project Proposal. Goldcorp and SFN have discussed this topic during the meeting on September 21, and it has been made clear in	<p>Goldcorp to develop cumulative effects scenario analysis memo related to socio economic effects. Goldcorp will also hold a workshop on the contents with SFN once the memo is complete.</p> <p>Engagement is ongoing; Goldcorp and SFN to work toward tri-partite discussions</p>	Q1 through Q4 2018.

Issue	Response	Next Steps	Timeline
	<p>discussions that cumulative effects assessment is the responsibility of YESAB.</p> <p>Goldcorp is committed to ongoing engagement with SFN on topics of interest to SFN, and Goldcorp and SFN agree on the need for tri-partite discussions with YG on the management of the Northern Access Route, particularly as it relates to cumulative effects management.</p>	<p>with YG on the Northern Access Route and cumulative effects.</p>	
4. See above			
5. SEMP, Heritage Protection Plan, Training Plan	<p>Goldcorp and SFN have discussed Goldcorp's approach to management plans for the Project in detail during the course of the 4 workshops and subsequent meetings. Goldcorp will develop detailed management plans (including the SEMP and Heritage Protection Plan) for the Project in consultation with SFN and has committed to this in the Project Proposal.</p> <p>Goldcorp has sent an engagement plan to SFN for the development of the SEMP and is seeking to develop this collaboratively with SFN.</p> <p>Training programs for SFN Citizens is part of ongoing negotiations discussions and overall Project engagement.</p>	<p>SFN to provide feedback on the SEMP engagement plan; Goldcorp has provided a list and target timeframes for pre-drafting consultation and subsequently delivering draft management plans for review by SFN. Engagement on training and opportunities for SFN Citizens is ongoing.</p>	Q1 2018
6. SEEM Plan development	<p>Goldcorp and SFN discussed this on September 21; Goldcorp is committed to developing the SEMP and</p>	<p>Engagement on SEMP and SEEM development; see above.</p>	Q1 2018

Issue	Response	Next Steps	Timeline
	monitoring plan (SEEM) in collaboration with SFN.		
7. Employment, procurement, and training opportunities for SFN Citizens, including pre-employment readiness	Goldcorp is committed to ongoing engagement with SFN on these topics. These are also part of ongoing Impact-Benefit Agreement (IBA) negotiations with SFN.	Ongoing engagement and negotiations between Goldcorp and SFN. Examples include: providing SFN standard job descriptions, holding a supplier readiness workshop for local businesses and IBA negotiation with SFN leadership.	Q1 through Q4 2018

**Northern Access Route (NAR)**

The Northern Access Route (NAR) was selected in 2015 following an alternatives assessment, which is detailed in Section 2.10 of the Project Description in the Project Proposal. The alternatives assessment looked at 7 potential routes, which were general in nature (e.g. southern access, northern access, via barge). Once the NAR was selected, field studies were conducted in the summer of 2015 to determine the specific routing. Field studies continued in 2016 and 2017. The result of that field work and comparative assessment for various sections of the route resulted in the proposed NAR alignment.

**Description of SFN Concerns Raised in Engagement**

During discussions on September 21 and 22 with SFN and SFN advisors, SFN has raised concerns regarding cumulative effects related to the NAR, impacts to heritage sites along the NAR, and effects to wildlife, in particular a concern specifically related to a newly-discovered mineral lick nearby between the Stewart and Yukon Rivers. These issues and recommendations have been captured under the below general topics:

1. Cumulative effects related to the NAR are a concern for SFN. SFN requests that Goldcorp prepare maps of the SFN traditional territory document existing roads and major trails, and recommends a cumulative effects assessment on the NAR that includes the Yukon Government’s (YG) Yukon Resource Gateway Project (Gateway Project), including an assessment of the Gateway Project route south of the Project.
2. Recommendation that information on YG’s views and interests in the NAR management options and alternatives are submitted to YESAB,
3. Issues with the heritage assessment work on the NAR; SFN requests additional information and notes that the 2017 Ecofor report on the Heritage Resource Impact Assessment (HRIA) that was done along the NAR needs to be delivered to SFN before a determination on assessment adequacy can be made by SFN;
4. Recommendation that Goldcorp prepare and submit a heritage management plan with the Project Proposal;
5. Recommendation that Goldcorp create an environmental monitor position for a SFN Citizen to monitor impacts of Project activities on heritage resources; and
6. The discovery of a previously unrecorded mineral lick near the NAR between the Stewart and Yukon Rivers.

**Goldcorp Consideration & Response**

Goldcorp has conducted tours of the NAR with SFN Chief and Council as well as SFN advisors to help with understanding of the current level of disturbance and use of the NAR and surrounding area currently. Goldcorp has also committed to further engagement with SFN, including tri-partite engagement with YG, on the NAR and the proposed management of the NAR.

Issue	Response	Next Steps	Timeline
<p>1. Cumulative effects assessment</p>	<p>Goldcorp has committed to a cumulative effects scenario analysis memo to provide to SFN in addition to the cumulative effects assessment that is already included in the Project Proposal. Goldcorp and SFN have discussed this topic during the meeting on September 21, and it has been made clear in discussions that cumulative effects assessment is the responsibility of YESAB. Subsequent to Sept. 21, SFN requested that the memo also be discussed together in a workshop. SFN also suggested third parties attend (e.g. Yukon Government). Goldcorp requests that SFN provide a detailed list of who should be involved. Goldcorp is committed to participating in and contributing to a collaborative process.</p> <p>Goldcorp and SFN have agreed on the need for tri-partite discussions with YG on the management of the Northern Access Route, particularly as it relates to cumulative effects management.</p> <p>Goldcorp will prepare a map depicting trails and</p>	<p>Goldcorp to develop cumulative effects scenario analysis memo and engage SFN on the contents during a workshop.</p> <p>Engagement is ongoing; Goldcorp and SFN to work toward tri-partite discussions with YG on the Northern Access Route and cumulative effects.</p> <p>Goldcorp will prepare the requested maps for SFN.</p>	<p>Q1 through Q4 2018</p>



Issue	Response	Next Steps	Timeline
	roads in SFN Traditional Territory within the assessment area of the NAR.		
<p>2. YG's views and interests in the NAR management options proposed by Goldcorp to be included in the Project Proposal</p>	<p>Goldcorp has included in the Project Proposal re-submission a memo providing additional detail regarding proposed NAR management. This information has been shared previously with SFN leadership.</p> <p>Goldcorp's discussions with YG on NAR management are not advanced to the point where YG has provided definitive views on the matter, which has been discussed with SFN. This is largely due to the fact that both Goldcorp and YG feel that there is a need for YG to consult with SFN prior to taking a position. Goldcorp and SFN have agreed on the need for tri-partite discussions with YG on the management of the Northern Access Route.</p>	<p>NAR memo to be included in Project Proposal re-submission.</p> <p>As above; engagement is ongoing.</p>	<p>Q1 through Q4 2018.</p>
<p>3. Heritage impacts assessment</p>	<p>Goldcorp's 2017 HRIA work along the NAR was done to supplement work done in 2016 along the same route. As such, an assessment of impacts to heritage resources along the NAR exists currently in the Project Proposal. Updated information from the 2017 HRIA will be provided to SFN when it is prepared (December 2017).</p>	<p>Goldcorp will provide SFN the 2017 HRIA report when it is prepared for SFN's review and comment.</p>	<p>December 2017.</p>

Issue	Response	Next Steps	Timeline
4. Request for heritage management plan to be submitted with the Project Proposal	Goldcorp and SFN have discussed Goldcorp’s approach to management plans for the Project in detail during the course of the 4 workshops and subsequent meetings. Goldcorp will develop detailed management plans (including the heritage management plan) for the Project in consultation with SFN and has committed to this in the Project Proposal.	Goldcorp has provided SFN (via email on November 17) a list of all management plans that will be submitted as part of Project licensing and expected delivery dates of drafts for SFN’s review and input.	Q1 2018
5. Environmental monitor position for SFN Citizen	While this recommendation has been raised only very recently for the first time with Goldcorp in discussions on November 20, Goldcorp is willing to consider developing such a role for the Project.	Discussions on this will take place in IBA negotiations meetings between Goldcorp and SFN.	Q1 – Q2 2018.
6. Mineral lick near NAR	Goldcorp discovered a previously unrecorded mineral lick near the NAR and has since notified SFN and their advisors of its relative location approximately 160 m from the proposed NAR. Goldcorp has advised SFN that they are investigating mitigation measures to minimize the effect of the proposed road on the lick, including considering minor adjustments to the road alignment.	Update SFN on the mitigation/alignment options as they are developed.	Q1 2018.

**Water Management**

The proposed Coffee mine is situated in three creek catchments: Halfway creek, YT-24, and Latte Creek (which flows into Coffee Creek). One of the key drivers for determining appropriate site water management is the Contaminant of Potential Concern (COPC) Uranium, which is naturally elevated in

surrounding water bodies, with the exception of YT-24. The natural topography of the site and fish presence in the creeks, are other key considerations when making water management decisions.

**Description of SFN Concerns Raised in Engagement**

SFN and Goldcorp have discussed water management in multiple forums, specifically during the September 19 and 20 workshops and more broadly with SFN Citizens on November 9. Water management topics and concerns are related to multiple aspects of the Project, most relevant of which are the Alpha Waste Rock Storage Facility (WRSF) and the associated Alpha Pond, as well as the Heap Leach Facility (HLF) and associated events and raincoat ponds. SFN has also raised concerns regarding water quality and treatment related to closure; these concerns are summarized in the next section “Closure & Reclamation”. The issues and recommendations related to water management have been captured under the below general topics:

1. Concerns with the level of engineering design of the Alpha Pond, as SFN is of the view that the design should be more advanced for the Project Proposal submission;
2. Recommendation for additional water balance modeling, including stochastic modelling and draindown modelling, for inclusion in the re-submission of the Project Proposal;
3. Concerns regarding proposed water quality objectives, including a need for an improved level of confidence in the predictions of the water balance and water quality model through an expanded temporal scope of the model and an improved level of confidence in the geochemical source terms used in the model; and
4. Recommendation that a water management plan with associated risk assessment and alternatives assessment is developed and provided with the re-submission of the Project Proposal.

**Goldcorp Consideration & Response**

Goldcorp understands that SFN seeks a level of comfort with the proposed water management for the Project. Goldcorp is of the view that the water management structures and associated water management mitigations included in the Project Proposal are more than adequate for the purposes of a YESAB assessment. As discussed in meetings on September 19 and 20, Goldcorp has committed to further engagement on the topic water management, including engaging SFN on the development of the water management plan and the updates to the water balance and water quality models.

Issue	Response	Next steps	Timeline
1. Alpha pond design	Goldcorp is of the view that the water management structures are designed at a level that is adequate for the purposes of assessment. As Goldcorp refines the design of the Project, Goldcorp will continue to engage SFN on water management infrastructure.	Engage SFN on design of water management structures as the level of design increases.	Q2 through Q4 2018.

2. Additional water balance and water quality modelling	As discussed during two workshops with SFN on September 19 and 20 respectively, Goldcorp is committed to additional water balance and water quality modelling, as well as stochastic modelling. This updated modeling will also include an expanded temporal scope, as recommended by SFN.	Engage SFN on the updated water balance and water quality model; provide stochastic modelling results to SFN when prepared.  Goldcorp has also committed to providing SFN a “player” version of the water balance and water quality model as a result of the workshops in September.	Q1 2018
3. Water quality objectives	Goldcorp is committed to further engagement with SFN on water quality objectives.	Engage SFN on the development of water quality objectives	Q1 through Q4 2018
4. Develop water management plan	Goldcorp and SFN have discussed Goldcorp’s approach to management plans for the Project in detail during the course of the 4 workshops and subsequent meetings. Goldcorp will develop detailed management plans required for Project licensing (including the water management plan) for the Project in consultation with SFN and has committed to this in the Project Proposal.	Goldcorp has provided SFN (via email on November 17) a list of all management plans that will be submitted as part of Project licensing and expected delivery dates of drafts for SFN’s review and input.	Q1 2018

**Closure & Reclamation**

Goldcorp’s Sustainability Excellence Management System requires that all sites prepare a reclamation and closure plan that is sufficiently detailed for the stage of mine life, and that includes measures for both environmental and socio-economic closure. Goldcorp proposed a conceptual Reclamation and Closure Plan in the Project Proposal and a number of additional mitigation measures related to socio-economic effects were stated throughout the proposal.

**Description of SFN Concerns Raised in Engagement**

Engagement specifically on the Conceptual Reclamation & Closure Plan has been high level to date. The initial salient issue of discussion has been related to proposed plan for the Alpha Waste Rock Storage Facility, and more generally long-term waste rock storage, as well as the rinsing and closure of the Heap Leach Facility (HLF). The issues and recommendations related to closure and reclamation have been captured under the below general topics:

1. Concerns regarding stability and proposed lack of cover of the WRSF in closure;

2. Concerns regarding the closure of the HLF, including concerns about semi-passive treatment of the HLF and an alternatives study for the closure of the HLF; and
3. Reclamation and closure plan development, including an alternatives study and a risk assessment.

**Goldcorp Consideration & Response**

Issue	Response	Next Steps	Timeline
1. WRSF closure	Goldcorp and SFN have had detailed discussions regarding the reasoning behind Goldcorp not proposing to cover the WRSF in closure. In response to SFN’s concerns, Goldcorp has committed to performing a WRSF cover materials investigation and has committed to engaging SFN on the results of this study, as well as on reclamation and closure research throughout the life of mine.	Perform WRSF cover investigation work; engage SFN on results. Engage SFN on reclamation and closure research throughout life of mine.	Q1 2018
2. Closure of the HLF	As part of ongoing engagement on closure planning, Goldcorp is committed to further engagement with SFN on the closure of the HLF, including details regarding semi-passive treatment and progressive reclamation of the HLF.  During previous technical engagement, SFN had not explicitly requested an alternatives assessment of the HLF closure. Goldcorp will consider this request and respond to SFN.	Engage SFN on closure planning, including specific engagement regarding HLF treatment and closure	Q1 – Q4 2018
3. Reclamation and closure planning	Goldcorp is committed to engaging SFN on developing the next iterations of the reclamation and closure plan, including updates to this plan throughout the mine life.	Goldcorp sent SFN an engagement plan for the reclamation and closure plan as it relates to social closure on November 17; Goldcorp has also sent SFN a target date for providing the draft reclamation	Q1-Q2 2018



		and closure plan for SFN's review and input.	
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## Mine Design

Goldcorp has proposed a mine design plan that includes four open pits, two waste rock storage facilities, a heap leach facility, crusher system, plan facility, camp, mine site and haul roads, water management infrastructure and ancillary features. To date, the discussion of mine design has been focused on the waste rock storage facility design and management. Goldcorp has committed to ongoing engagement with SFN on the design of the WRSF.

### **Description of SFN Concerns Raised in Engagement**

SFN has expressed multiple times its concern regarding the Alpha WRSF related to stability of the structure in both operations and in closure. The issues and recommendations related to mine design have been captured under the below general topics:

1. Concerns regarding the WRSF engineering and stability, particularly related to the conceptual level of design of the WRSF and the lack of consideration for interim and final WRSF design;
2. Recommendation that Goldcorp perform a risk assessment and alternatives study of the WRSF;
3. Recommendation that Goldcorp use schist waste rock strategically as related to SFN's water quality concerns associated with the WRSF; and
4. Recommendation that Goldcorp create and include in the Project Proposal re-submission a waste rock and overburden management plan.

### **Goldcorp Consideration & Response**

Goldcorp engaged SFN's technical advisors in its alternatives assessment process in January and February 2017 when Goldcorp made the decision to move from three proposed WRSFs to the single Alpha WRSF in the Halfway Creek drainage. This change was made to the mine plan in consideration of SFN and other affected First Nations' views presented on the importance of Coffee Creek and potential effects to water quality associated with having a WRSF in the Latte Creek drainage (feeding into Coffee Creek). Through the course of discussions with SFN during the workshop on September 19, Goldcorp committed to further engagement on the WRSF and WRSF management, as well as engagement on additional geotechnical work done to understand the stability of the proposed WRSF area.

Issue	Response	Next Steps	Timeline
1. WRSF design	Goldcorp performed additional geotechnical studies in the proposed WRSF area in the 2017 field season and has committed to engaging SFN on the results of this study.	Engagement with SFN (for example through additional document sharing when the study is complete, workshops with technical advisors and a citizens meeting to review results of those workshops).	Q1 through Q4 2018

	<p>Goldcorp also committed to adding snow courses to the WRSF area to better understand climatic impacts in that location.</p> <p>Goldcorp is of the view that the current level of design of the WRSF is adequate for assessment purposes, and has committed to further engagement with SFN throughout the process of detailed design of this structure.</p>		
2. Risk assessment of the WRSF	This request was recently received by Goldcorp and is under review and consideration. Goldcorp will respond to SFN by January 2018.	Goldcorp to consider and respond.	January 2018
3. Strategic considerations for schist materials	SFN recommended this during the September 19 workshop. In response, Goldcorp committed to considering this throughout the detailed design process.	Engagement with SFN on detailed design of WRSF via technical workshops and additional relevant document sharing as it becomes available.	Q1 - Q2 2018
4. Waste rock and overburden management plan	Goldcorp and SFN have discussed Goldcorp's approach to management plans for the Project in detail during the course of the 4 workshops and subsequent meetings. Goldcorp will develop detailed management plans for Project licensing (including the waste rock and overburden management plan) for the Project in consultation with SFN and has committed to this in the Project Proposal.	Goldcorp has provided SFN (via email on November 17) a list of all management plans required for Project licensing and expected delivery dates for SFN's review and input on the drafts.	Q1 2018

## Biophysical Aspects

Biophysical aspects of the Project include those related to wildlife, vegetation, and fish. Goldcorp held a workshop dedicated to wildlife effects with SFN and its technical advisors on September 22, 2017, and has heard concerns related to fish and wildlife from SFN throughout the course of engagement with since acquiring Kaminak.

### **Description of SFN Concerns Raised in Engagement**

SFN's concerns related to fish are rooted in the fact that salmon are culturally important to SFN and populations of salmon in Yukon have been depressed for the past 20 years. Concerns regarding wildlife are particularly related to potential effects to moose as a result of increased access. SFN has also expressed concerns surrounding metals uptake in plants and the potential cascading effects in the food web associated with this. The issues and recommendations related to biophysical aspects have been captured under the below general topics:

1. Concerns related to the assessment of effects to fish and aquatic health in the Project Proposal with a specific recommendation to assess effects on aquatic biota, concerns with aquatic baseline data collected and lack of contingency plans and compensation/restoration plans associated with aquatic effects;
2. Concerns related to a lack of detail included in wildlife effects assessments, particularly related to aircraft use, studies on grizzly bear denning, bat surveys, and furbearers and trapped species;
3. Concerns related to a lack of detail included in vegetation effects assessments, particularly related to metals uptake in plants and baseline studies for rare, traditional, and medicinal plants; and
4. Wildlife management plan not being included in the Project Proposal re-submission.

### **Goldcorp Consideration & Response**

Goldcorp recognizes the importance that SFN places on ensuring the viability of habitat for salmon for current and future generations, and agrees with the protection of all aquatic life and habitat. Similarly, Goldcorp recognizes the importance of certain species, such as moose, caribou, and sheep, to the SFN way of life. As such, Goldcorp has committed to additional baseline surveys related to this work, as well as some specific considerations to be included in management plan development.

Issue	Response	Next Steps	Timeline
1. Assessment of effects to fish and aquatic biota; lack of plan for contingency and compensation/restoration	Goldcorp has now undertaken an Aquatic Biota (Periphyton and Benthic Invertebrates) Intermediate Component analysis, which will be included in the Project Proposal to address SFN's concerns. Goldcorp is also committed to additional spawning surveys in 2018 and further engagement with SFN on fish	Engagement with SFN on the results of next season's spawning surveys and fish compensation/restoration programs that SFN is currently implementing with a degree of success.	Q1 2018

	compensation/restoration programs.		
2. Concerns related to a lack of detail in wildlife baseline studies and assessments	Goldcorp explained in detail to SFN’s advisors the issues with conducting grizzly bear denning surveys in the region. Goldcorp is committed to additional grizzly bear denning surveys using alternate techniques to address this data gap in the upcoming field season. Goldcorp also committed to additional bat baseline studies in response to SFN’s concerns.	Engagement with SFN on the data from the additional baseline studies to be performed via technical workshops and sharing of additional relevant documentation as it becomes available.	Q4 2018
3. concerns related to a lack of detail in vegetation baseline studies and effects assessments	Goldcorp and SFN’s advisors discussed these matters in detail on September 22. Goldcorp has committed to including SFN’s recommendations in the development of vegetation protection and monitoring plans, and welcomes any information on traditional and medicinal plants that SFN may wish to provide.	Engagement with SFN’s technical team and Lands and Resources representatives on Vegetation Protection Plan and vegetation monitoring program development.	Q1 through Q4 2018
4. Wildlife management plan	A Wildlife Protection Plan will be submitted with the Project Proposal. Goldcorp and SFN have discussed Goldcorp’s approach to management plans for the Project licensing in detail during the course of the 4 workshops and subsequent meetings. Goldcorp will develop a more detailed Wildlife Protection Plan in consultation with SFN and has committed to this in the Project Proposal.	Goldcorp has provided SFN (via email on November 17) a list of all management plans required for Project licensing and expected delivery dates for SFN’s review and input on drafts.	Q1 2018

## Heap Leach

The Coffee mine proposes a Heap Leach Facility (HLF) to process oxide ore. This technology is not new to the Yukon; however SFN's familiarity with this processing methodology is low. While the heap leach technology has been covered in a cursory manner related to water management in the September 19 and 20 workshops, there has been interest expressed on both sides in having a dedicated workshop to review the technology used in the HLF, particularly as it relates to environmental protection, water management, and reclamation and closure. In addition, this topic has been raised in Citizens meetings and is a concept for further engagement at the community level.

### **Description of SFN Concerns Raised in Engagement**

Issues that SFN's technical team has raised regarding the HLF are summarized in the Water Management and Closure & Reclamation sections above. SFN has also recommended that Goldcorp perform a risk assessment of the HLF. Goldcorp has heard from SFN Citizens that there is a lack of understanding surrounding the HLF processing and the use and management of cyanide.

### **Goldcorp Consideration & Response**

Goldcorp proposes dedicated engagement on the HLF with SFN Citizens to help increase familiarity with the HLF processing and cyanide management.

Issue	Response	Next Steps	Timeline
1. Perform risk assessment of HLF.	This is a recent request and is currently under review and consideration by Goldcorp. Goldcorp will respond to SFN regarding their consideration of this in January 2018.	Goldcorp to consider and respond.	January 2018
2. Ensure SFN has adequate understanding of the environmental aspects of HLF management	Convey design detail regarding heap leach facility design criteria, construction and operation methodology, controls and monitoring, and closure methodology	Hold HLF workshop with SFN Citizens.	Q1 2018

## Other Views Presented By SFN

SFN has also expressed concerns related to assessment methodology for the Project, deficiencies with assessment of cumulative effects for the Project, and the lack of adaptive management plan for the Project. Goldcorp's consideration of these views is as follows:

- Goldcorp and SFN's technical advisors have discussed assessment methodology at length during technical workshops, and Goldcorp is of the view that where SFN and Goldcorp's views differ, there is a mutual understanding to "agree to disagree" on the assessment methodology.



- Goldcorp has discussed the cumulative effects assessment approach and methodology with SFN's technical advisors in detail. Goldcorp has agreed to a cumulative effects alternatives study related to the NAR (detailed above in the NAR section), and will engage SFN on the results. Goldcorp has made it clear during the September 21 workshop with SFN that cumulative effects assessments are the responsibility of YESAB.
- Goldcorp and SFN have discussed Goldcorp's approach to management plans for the Project in detail during the course of the 4 workshops and subsequent meetings. Goldcorp will develop detailed management plans required for Project licensing (including adaptive management components) for the Project in consultation with SFN and has committed to this in the Project Proposal. Goldcorp has also been clear that, where appropriate, adaptive management will be addressed in specific management plans for the Project.

## Goldcorp – TH Technical Engagement Status and Planning

November 28, 2017

### Overview:

Following Goldcorp's acquisition of the Coffee Project and re-instatement of relations between the Tr'ondëk Hwëch'in government and the Coffee team, the two parties have engaged regularly on technical matters related to the YESAB Project Proposal. To date there have been 23 workshops/teleconferences/meetings (see table 1) on technical matters and the YESAB process and Goldcorp has received and responded to 445 information requests. TH also submitted information requests to YESAB, and Goldcorp has committed to providing responses to these IRs in Q1 2018. Goldcorp has provided preliminary responses to IRs during technical workshops on September 28 & 29 and October 17 & 31.

Table 1 Technical Engagement

Workshop	Date
Waste Rock Storage Facility (WRSF) alternatives assessment	February 3, 2017
Batch 1 documents	February 22, 2017
Water Quality Objectives Teleconference – February 9 <sup>th</sup> Letter from TH	February 27, 2017
Geochemistry and Groundwater Modeling Teleconference	February 28, 2017
Geochemistry Teleconference	March 7, 2017
Community health & well-being (including Human Health Risk Assessment and Health Impact Assessment)	March 8, 2017
Batch 2 documents	March 9, 2017
Northern Access Route	March 14, 2017
Heap Leach Facility Teleconference	May 25, 2017
Northern Access Route	June 5, 2017
Reclamation & Closure	June 5, 2017
Water Management and Water Quality	June 6, 2017
Geochemistry Teleconference	June 9, 2017
Project Update (day 1 of negotiation session)	June 13, 2017
Site visit	June 20, 2017
Teleconference on NAR multiple accounts analysis	June 22, 2017
Meetings with GC CEO	July 11-12, 2017
Closure teleconference	July 14, 2017
NAR MCDA Teleconference	August 24, 2017
NAR Site Tours	August 23 and 25, 2017
Water Management	September 28 and 29, 2017
Closure	October 17, 2017
Socio-economic Management Plan + Health	October 31, 2017
<b>Upcoming Workshops</b>	
Closure Workshop (continuation from October 17 to discuss permafrost and groundwater)	January 2018
Water Management & Water Quality and Water Balance Model Update Workshop (2 days)	January/February 2018

Teleconference to discuss EBR testing work plan	Q1 2018
Site design Workshop	March 2018
HHRA addendum update teleconference	Q1 2018
SEMP Consultations (Interviews, focus groups)	Q1 2018
Socio-ec workshop on SEMP Draft	April 2018

### Key Items for Further Technical Review and Status of Discussion:

#### Northern Access Route (NAR)

The Northern Access Route (NAR) was selected in 2015 following an alternatives assessment, which is detailed in Section 2.10 of the Project Description in the Project Proposal. The alternatives assessment looked at 7 potential routes, which were general in nature (e.g. southern access, northern access, via barge). Once the NAR was selected, field studies were conducted in the summer of 2015 to determine the specific routing. Field studies continued in 2016 and 2017. The result of that field work and comparative assessment for various sections of the route resulted in the proposed NAR alignment.

#### **General Summary of TH Concerns Raised in Engagement**

In the course of the three workshops on the NAR, TH has raised the concern that there is insufficient information on the effects on wildlife using the Maisy May portion of the route, in comparison to an alternative section that would go through the Black Hills. TH has identified additional valued components to be documented in a multiple accounts analysis that compares the Maisy May section and the Black Hills section of the NAR. TH has provided a matrix for determining which valued components are ranked highest for priority.

TH has also raised concerns regarding the proposed management of the NAR and potential for cumulative effects related to increased access as a result of the NAR. Goldcorp has proposed access control at the barge landings and ice bridges built and operated by Goldcorp. Goldcorp does not have the authority to implement any further access management.

#### **Goldcorp Consideration & Response**

Goldcorp has conducted extensive field surveys to date, which led to the selection of the Maisy May section based on a number of considerations (minimization of new disturbance, safety, the relative absence of ice-rich permafrost, minimizing wetland disturbance and that differences in effects to wildlife will largely be negligible.) Goldcorp acknowledges TH's desire to better understand effects to key valued components and as a result has undertaken a multiple accounts analysis. Goldcorp and TH have participated in field trips to the NAR with TH consultants and Goldcorp completed the analysis using existing data. The results of this analysis were provided to TH on August 16, 2017. A teleconference between Goldcorp and TH's technical consultants was held on August 24, 2017 to discuss the results of this analysis. Both TH's technical consultants and Goldcorp are aligned in accepting the results of the analysis of the Maisy May vs Black Hills sections of the NAR. TH's technical consultants provided recommendations to TH based on the outcomes of the analysis and NAR site tours and shared the technical memo with Goldcorp in September 2017.

In consideration of TH's concerns related to NAR management and cumulative effects associated with the NAR, Goldcorp is committed to ongoing engagement with TH on this matter.

Table 2 - NAR Concerns Addressed

**Commented [KC1]:** As concerns are addressed for other topics, they will be moved into a similar table under the appropriate heading. For example, when SSWQOs are ultimately decided upon, they will move into a table like this under the water management heading.

Issue	Objective	Steps Taken	Timeline
Maisy May vs. Black Hills section	Provide TH technical team with additional knowledge of ground conditions which contribute to the decision to route through Maisy May.	Set up site visit to Northern Access Route with TH.	Took place August 23 and 25, 2017
	Provide additional analysis and rationale so that TH may understand the potential effects on identified Valued Components with the proposed road route in comparison to Black Hills.	Complete multiple accounts analysis using existing data on value components	Complete and provided to TH on August 16; discussed with TH technical team on August 24, 2017
	Determine if there are any valued component effects using the Maisy May route that differ from the Black Hills route that need additional mitigation than those already proposed.	Goldcorp to complete assessment using template provided by TH on remaining valued components.	Complete and provided to TH on August 16; discussed with TH technical team on August 24, 2017
	Conclude Maisy May vs Black Hills multiple accounts analysis results.	TH consultants to provide memo to TH with recommendations to close-off of the Maisy May vs Black Hills analysis; TH to provide decision in written form to Goldcorp.	Provided August 16, 2017 via email

**Commented [CC2]:** Table needs to be updated.

**Commented [KC3]:** Added table instead. These issues are dealt with; ongoing engagement focuses on NAR management and cumulative effects.

Table 3 - NAR Concerns to be Addressed

Issue	Objective	Next Steps	Timeline
NAR Management and cumulative effects management	Ongoing engagement TH on NAR management; tri-partite discussions with YG on this matter (road users group meetings)	Update meetings with TH regarding discussions with YG; support tri-partite discussions with YG at the direction of TH.	Q1 through Q4 2018

**Commented [CC4]:** Table needs to be updated.

**Commented [KC5]:** Added table instead. These issues are dealt with; ongoing engagement focuses on NAR management and cumulative effects.

### Water Management

The proposed Coffee mine is situated in three creek catchments: Halfway creek, YT-24, and Latte Creek (which flows into Coffee Creek). Goldcorp is of the view that one of the key drivers for determining appropriate site water management is the Contaminant of Potential Concern (COPC) Uranium, which is naturally elevated in surrounding water bodies, with the exception of YT-24. The natural topography of the site and fish presence in the creeks, are other key considerations when making water management decisions.

**Commented [CT6]:** Text added to clarify per Names comment.

**Commented [CC7]:** This is a Goldcorp point of view

### General Summary of TH Concerns Raised in Engagement

TH provided a letter to Goldcorp on February 9 2017, which “recommends that the mine plan proposed and ultimately developed by Kaminak ensures that the Latte Creek, Coffee Creek and Halfway Creek drainages remain substantially unaltered in terms of water quality and flow (i.e. non-degradation) to protect rearing habitats for Chinook salmon which are a species of salmon that [TH has] a constitutionally protected right to harvest under the final Agreement and which are extremely important culturally.” Furthermore TH “requires that YT-24 will be afforded a level of protection consistent with typical waters in Yukon (protection of designated uses). The main water management goal should be to provide protection for aquatic life from exposure to COPCs resulting from the Project.”

Subsequent to and in furtherance of TH’s February 9<sup>th</sup> letter, TH also provided to Goldcorp a proposal in respect of the approaches to, and recommended procedures for, setting the water quality objectives for Latte Creek, Halfway Creek, Creek YT-24 and the Yukon River. TH also outlined its expectations regarding the location of water quality monitoring and effluent discharge locations, development of an Aquatic Effects Monitoring Program and an Adaptive Management Plan.

TH also expressed concerns regarding:

- the assessment of the short-term and long-term water quality associated with the Heap Leach Facility, including the effectiveness of the active and passive treatment design plans as submitted as part of the Project Proposal;
- whether the water quality predictions were reasonably conservative for use in the surface water affects assessment;
- whether the implications of long-term permafrost melting had been adequately considered in the mine design and affects assessment

It is both TH and Goldcorp’s expectation and understanding that the concerns raised by TH during engagement on the project will continue to be discussed and addressed through the YESAB process.

**Goldcorp Consideration & Response**

Goldcorp recognizes the importance that TH places on ensuring the viability of habitat for salmon for current and future generations, and agrees with the protection of all aquatic life and habitat. Goldcorp will not be able to meet the non-degradation threshold for Halfway Creek and Latte Creek. The use-protection approach for YT-24 can be met. Goldcorp needs to propose a strategy for water management and discharge that can be met in the Operations and the Closure period. Based upon discussion and this feedback from TH, Goldcorp has elected to reduce the amount of waste rock reporting to Latte Creek by eliminating the external-pit south WRSF. Goldcorp can meet a use-protection approach for all watersheds affected by the mine and commits to setting appropriate site-specific water quality objectives using that approach in partnership with TH. Goldcorp and TH have also reached a consensus on additional proposed water quality monitoring stations and SSWQOs for the Yukon River and Coffee Creek. Furthermore, in recognition of TH’s objective to protect salmon habitat, Goldcorp is open to considering a biodiversity enhancement strategy that supports ongoing efforts that TH and others in the Territory are making.

Table 4 - Water Management Concerns Addressed

Issue	Objective	Steps Taken	Timeline
SSWQOs	Commitment to non-degradation SSWQOs for Yukon River and Coffee Creek	Committed to by Goldcorp.	September 28 and 29



Issue	Objective	Steps Taken	Timeline
Water Quality Monitoring Stations	Create confidence in the Water Quality Monitoring program for the Project	<ul style="list-style-type: none"> <li>• TH and Goldcorp agreed to the following station to monitor water quality in Yukon River: <ul style="list-style-type: none"> <li>○ 1 station upstream of YT-24</li> <li>○ 1 station upstream of Halfway Creek</li> <li>○ 1 station downstream of Halfway Creek</li> </ul> </li> <li>• Goldcorp and TH agreed that YUK 5.0 is not the spot to monitor attainment for non-degradation of Yukon River.</li> <li>• TH and Goldcorp agree to the following water quality monitoring stations: <ul style="list-style-type: none"> <li>○ 1 station downstream of the Halfway Creek mixing zone</li> <li>○ 1 station in an upstream location that is not necessarily YUK 2.0</li> </ul> </li> </ul>	September 28 and 29

Table 5 - Water Management Topics Addressed & to be Addressed

Issue	Objective	Next steps	Timeline
Water management and site-specific Water Quality objectives (SSWQOs)	Resolve outstanding action items from June 5/6 to ensure TH has adequate understanding of water flows, quality and modelling	<p>Action items that are closed-off:</p> <ul style="list-style-type: none"> <li>• Pie graph of the water contributions</li> <li>• Conceptual diagram of pit leakage</li> <li>• Label approximate WQ station numbers by each on conceptual diagram</li> <li>• More information on passive water treatment in closure</li> </ul> <p>Outstanding action items from June workshops:</p> <ul style="list-style-type: none"> <li>• Water quality modeling update and engagement Pit lakes water quality included in water quality modelling</li> <li>• To be provided in IR responses as discussed with TH: <ul style="list-style-type: none"> <li>○ SEA requests a simple table to show average flows or summation of flows.</li> </ul> </li> </ul>	January 2018

Commented [CC8]: Table to be updated?

Commented [KC9]: Updated

Issue	Objective	Next steps	Timeline
		Inflows = outflows +/- storage	
	Meeting to confirm/resolve outstanding information requested and look for potential water management opportunities	Coordinate meeting to discuss water management for each mine facility in-depth and documents listed above. While Goldcorp and TH met to discuss water-related topics on September 28 and 29, water management was not discussed to a level of detail that resolves the need for water management discussions. An additional water management workshop is proposed.	January/February 2018
	Determine appropriate use-protection SSWQOs to be included in submissions for Water Board Licensing	A workshop was held on September 28 and 29 to address concerns regarding water quality objective setting. While this workshop addressed many concerns, engagement on SSWQOs is ongoing. As part of this engagement, Goldcorp will hold a workshop to review and discuss updates to the Water Quality and Water Balance Model.	January/February 2018
Water Treatment (Closure)	Generate increased comfort and understanding of the proposed active and semi-passive treatment for the HLF.	<p>A memo was provided on September 28 and water treatment was discussed in detail on September 29. As a result of these discussions, Goldcorp has committed to testing related to the Electro Bioreactor (EBR) water treatment, and will provide a work plan including the following:</p> <ul style="list-style-type: none"> <li>• A list of the tests to be done</li> <li>• The desired outcome of the tests</li> <li>• Certainties that will result from the tests</li> <li>• Timeline for the tests.</li> </ul> <p>Further engagement is committed to with TH on the topics of active and semi-passive water treatment.</p>	Q1 2018

Commented [CC8]: Table to be updated?

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#### Closure & Reclamation

Goldcorp's Sustainability Excellence Management System requires that all sites prepare a reclamation and closure plan that is sufficiently detailed for the stage of mine life, and that includes measures for both

environmental and socio-economic closure. Goldcorp proposed a conceptual Reclamation and Closure Plan in the Project Proposal and a number of additional mitigation measures related to socio-economic effects were stated throughout the proposal.

**General Summary of TH Concerns Raised in Engagement**

Engagement specifically on the Conceptual Reclamation & Closure Plan has been high level to date. The initial salient issues of discussion has been related to proposed plan for the Alpha Waste Rock Storage Facility (WRSF), and more generally long term waste rock storage, including use and quantity of soil cover materials for the waste rock piles and eco-hydrology mapping in order to facilitate land-use capabilities and reclamation land use goal setting. In addition, further information has been requested related to closure measures for the Heap Leach Facility, particularly in regard to water treatment for the closure phase, as discussed in the water management section. TH has also raised concerns in respect of the process for developing and implementing measures in the case of a temporary closure of the project. Closure was discussed in detail during a workshop with TH on October 17, where reclamation and closure research and cover of the WRSF were topics of key interest for TH, in particular the concern regarding the lack of cover proposed for the WRSF.

It is noted that the discussions on social closure were initiated on October 31 and an engagement plan for social aspects of closure was provided via email to TH for review and comment on November 17.

**Goldcorp Consideration & Response**

Goldcorp believes that there is both opportunity and benefit to continuing the discussions on closure in additional formal workshops.

Table 6 – Closure & Reclamation Topics to be Addressed

Issue	Objective	Next Steps	Timeline
Detailed discussion on closure plan	Determine aspects of the closure plan that require additional information for this stage of the mine life.	TH to review Conceptual Reclamation & Closure Plan and provide comments	January 2018
	Update Conceptual Closure & Reclamation Plan for Water Licensing	Workshop to review comments and elements of the plan in depth	Q4 2018
WRSF cover	<p>WRSF cover investigation:</p> <ul style="list-style-type: none"> <li>Material balance investigation and characterization</li> <li>WQM sensitivity analysis on infiltration reduction</li> <li>Capability for infiltration reduction and revegetation</li> <li>Integration of WQM/WBM and ecohydrological modelling</li> </ul>	Perform WRSF cover investigation and engage TH on the results	Q2 2018

Commented [CC10]: Update table  
 Commented [KC11]: updated

Issue	Objective	Next Steps	Timeline
Reclamation research	Ensure understanding of reclamation research underway by Goldcorp, identify potential opportunities for TH to participate and provide input into this research	Engage on reclamation research as there are updates	Q4 2018

Commented [CC10]: Update table

Commented [KC11]: updated

### Mine Design

Goldcorp has proposed a mine design plan that includes four open pits, two waste rock storage facilities, a heap leach facility, crusher system, plan facility, camp, mine site and haul roads, water management infrastructure and ancillary features. To date, the discussion of mine design has been focused on the waste rock storage facility alternatives assessment and a site tour. Goldcorp believes that there is further benefit to discussing the rest of the mine design in deeper detail.

As part of those discussions, TH has asked Goldcorp to provide a conceptual site model for the receiving environment that would model various key time steps. To date, Goldcorp has provided 3 versions of a conceptual site model, including an interactive 3D model that can be used to engage on a technical level and on a community level. TH provided feedback to Goldcorp that the 3 previously provided versions of the conceptual site model did not meet the expectations of TH's technical consultants. Goldcorp is currently developing a 4<sup>th</sup> and final iteration of the conceptual site model based that criteria recently provided by TH. This conceptual site model will also support discussion on the development of the Aquatic Effects Management Plan.

Table 7 - Mine Design Topics to be Addressed

Issue	Objective	Next Steps	Timeline
Site design	Ensure that the backfilling opportunities and challenges are understood.	Mine design workshop	February/March 2018
	Provide TH with sufficient detail on mine design and process (e.g. geology, crushing method/configuration, mining rate, equipment selection, stacking rate) and effects of other installations (e.g. landfill, waste, plant, etc.) that will be on site.		
	Increase understanding of permafrost and groundwater interactions		

### Heap Leach

The Coffee mine proposes a Heap Leach Facility (HLF) to process oxide ore. This technology is not new to the Yukon nor the Tr'ondëk Hwëch'in, having been utilized by the Brewery Creek mine in the 90's and proposed for other mines in the territory, such as Victoria Gold's Eagle mine project. Heap leach technology was covered in a cursory manner related to water management in the June 6<sup>th</sup> workshop, and the proposed HLF design, water management (raincoat use), and closure was discussed in detail during the September 28 and 29 water workshop. Ongoing engagement related to the HLF is captured under the "water management" and "closure & reclamation" headings above.

Table 8 - HLF Topics Addressed

Issue	Objective	Steps Taken	Timeline
Ensure TH has adequate understanding of the environmental aspects of HLF management	Convey design detail regarding heap leach facility design criteria, construction and operation methodology, controls and monitoring, and closure methodology	HLF design, water management, and closure discussed in detail during workshop on September 28 and 29.	September 2017

### Socio-economic Management Plan

Prior to submission, Goldcorp held two workshops which covered the eight socio-economic valued components of the project (Batch 1 and Batch 2 workshops).

#### **General Summary of TH Concerns Raised in Engagement**

TH provided a number of information requests (IR) prior to submission of the Proposal to YESAB, for which responses were provided. A number of those IRs were also submitted to YESAB for consideration in the adequacy review. Key general concerns from Goldcorp's understanding are:

- There is no specific TH socio-economic baseline capacity, impact assessment, mitigation and monitoring plan.
- Management plans are identified but not yet complete and therefore TH cannot make a determination if the proposed mitigations are sufficient.

On October 31, Goldcorp held a socio-economic and health workshop with TH to begin discussing the Socio-economic Management Plan (SEMP) and developing it in collaboration with TH. Goldcorp and TH also discussed updates to the Human Health Risk Assessment (HHRA).

#### **Goldcorp Consideration & Response**

In Goldcorp's view the project baseline and effects assessment methodology is appropriate for the YESAA process. However, Goldcorp acknowledges that there were certain components of the effects assessment that could not be adequately assessed due to lack of data. Goldcorp proposes that it work with TH to identify 3-6 core socio-economic valued components (VCs) that are of greatest importance to TH to monitor throughout the life of project and ensure that there is adequate baseline data to utilize in the management and monitoring of those VCs. Furthermore, since initially submitting the Project Proposal in



March 2017, Goldcorp has completed a Community Profile Study, which provides greater information on various aspects of the local economy, which may be of use to TH in its assessment of that component.

In addition to the review of TH-specific VC data, Goldcorp also proposes to work collaboratively with TH in the development of the SEMP. Goldcorp provided an engagement plan for the SEMP via email on November 17 to TH for review and comment.

Table 9 - Socio-economic Topics to be Addressed

Issue	Objective	Next Steps	Timeline
Lack of TH specific assessment	Determine TH priority VCs and identify related data gaps to be closed.	Primary interviews and focus groups to determine order of priority of VCs and additional detail related to mitigations for management planning purposes	Q1-2018
Absence of socio-economic management plan	Socio-economic Management plan reflects TH priority VCs and appropriate measures to manage VCs of concern	Draft Engagement Plan provided for TH review includes target dates for sharing draft SEMP and process for review (workshops, comment period, etc.)	April 2018

#### Human Health

The Project Proposal includes a Community Health & Well-being Valued Component (VC) Effects Assessment. This VC encompasses two sub-components of Environmental Quality and Socio-economic Factors. The assessment of the former, Environmental Quality, was supported by a Human Health Risk Assessment (HHRA). The latter was supported by a Health Impact Assessment (HIA). Prior to submission, Goldcorp and Tr'ondëk Hwëch'in participated in a workshop on the HHRA and HIA as it relates to this VC. Through this discussion it was determined to integrate the HIA directly into the Community Health & Well-being VC Effects Assessment. The final version submitted to YESAB on March 31st included the concepts of the HIA integrated into the Assessment as discussed with the TH technical team and the stand-alone HHRA appendix. The HHRA was discussed in a workshop on October 31 with TH and TH's technical consultants, where TH's technical consultants suggested multiple changes/additions to an HHRA addendum. Goldcorp agreed to these changes and the HHRA addendum is anticipated to be ready for engagement with TH in Q1-2018.

#### **General Summary of TH Concerns Raised in Engagement**

TH provided a number of information requests (IR) prior to submission of the Proposal to YESAB, for which responses were provided. A number of those IRs were also submitted to YESAB for consideration in the adequacy review. Key general concerns from Goldcorp's understanding are:

- Capacity of healthcare services and infrastructure in Dawson
- Lack of TH-specific effects and associated mitigations regarding health in the HHRA and HIA, and Community Health and Wellbeing VC.

- Additional data related to consumption of traditional food, particularly related to fish desired to support TH’s assessment of the proposal.
- The rationale for the exclusion of metals from combustion emissions.
- Analysis of acute exposure scenarios to combustion emissions.
- Additional baseline data used for metal concentrations in air and soil desired to support TH’s assessment of the proposal.

**Goldcorp Consideration & Response**

In Goldcorp’s view the project baseline and effects assessment methodology is appropriate to the YESAA process. However, Goldcorp acknowledges that there were certain components of the effects assessment that could be further developed. Goldcorp proposes that it meet with TH to discuss concerns related to human health in more detail. Additionally, since submitting the initial Project Proposal, Goldcorp has continued air quality monitoring studies associated with the Northern Access Route to gather additional baseline data. As noted above, Goldcorp has committed to including the recommendations from TH from the October 31 meeting in the HHRA addendum.

Table 10 – Human Health Topics to be Addressed

Issue	Objective	Next Steps	Timeline
Lack of TH specific assessment	Determine TH priority topics in effects assessment and identify related data gaps to be closed.	Meeting to discuss current list of VCs and subcomponents and determine highest priority VCs for management planning purposes	Q1-2018
Attaining additional information on traditional food and potential mitigations	Understand TH’s concerns related to potential effects on traditional foods and proposed mitigations.	Meeting to discuss traditional foods and effects assessment and identify potential mitigations for management planning	Q1-2018
Attaining additional data for in Human Health-related effects assessments and mitigations in the Project Proposal	Understand and address concerns in Human Health related effects data and proposed mitigations	Meeting to discuss Human Health effects assessments and potential mitigations for management planning	Q1-2018
Human Health Risk Assessment issues	Update the HHRA according to TH’s feedback	Complete an addendum to the HHRA and engage TH on the updates.	Q1-2018



An aerial photograph of a vast, rolling landscape. The foreground and middle ground are dominated by dense, dark green coniferous forests covering the slopes of hills and valleys. In the distance, a range of mountains stretches across the horizon under a sky filled with soft, grey clouds. The overall scene conveys a sense of natural beauty and environmental stewardship.

# **Sustainability Excellence Management System Memorandum**



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<b>Date:</b>	November 2017
<b>To:</b>	Name Redacted
<b>From:</b>	Goldcorp Inc.
<b>Subject:</b>	SEMS Memo for YESAB

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## **1.0 SUSTAINABILITY EXCELLENCE MANAGEMENT SYSTEM (SEMS)**

At Goldcorp, sustainability is both a foundational component and functional element that applies company-wide.

Over the years, Goldcorp committed to various international codes, standards and protocols. These include the International Council on Mining & Metals' 10 Sustainable Development Principles, the International Cyanide Management Code, the Global Reporting Initiative, the Carbon Disclosure Project, and the Mining Association of Canada's Towards Sustainable Mining Protocols. It was important to have confidence that these commitments were being met through a consistent "gold standard" performance across all sites and. In that context, Goldcorp created and rolled out in 2014 the SEMS is Goldcorp's integrated management system for Safety and Health, Environment, Corporate Social Responsibility (CSR) and Security.

Composed of a framework and clearly defined performance standards, the SEMS provides organizational structure, responsibilities and practices for implementing and maintaining a desired level of sustainability performance. It is designed to apply across the entire mining lifecycle and across the various jurisdictions where Goldcorp operates. Through its implementation, we can effectively deliver on our commitments, measure and monitor our impacts, and achieve our vision of Together, Creating Sustainable Value.

Historically, the various components of sustainability – whether CSR, health and safety, security or environment – were viewed as separate responsibilities. SEMS incorporates sustainability into our core business at all levels, so that our workforce understand they all have a role to play in implementing sustainability at Goldcorp.

## **2.0 WHAT ARE THE SEMS?**

The SEMS is Goldcorp's integrated management system composed of a framework and a set of standards for implementing and maintaining a desired level of sustainability performance throughout the company. It is intended to be fully integrated into all core business functions and emphasizes responsibility and accountability at all organizational levels. It's made up of 2 main sections:

### **1. Standards Applicable to all SEMS Functions**

The SEMS framework has a set of overarching standards that are applicable across the company and throughout the mining life cycle. These standards represent performance benchmarks that all of our sites are expected to meet. They apply to all areas departments and can be applied in a number of situations. Examples of standards in this section are Leadership & Accountability, Sustainability Competence & Training, Human Rights, and Reclamation & Closure Planning.

## 2. Standards Applicable to Specific Areas

In addition to the overarching standards applicable to all functions, the SEMS contains standards specific to Safety and Health, Environmental Protection, Community Relations and Security.

### a. Safety and Health Standards

Help Goldcorp create a safe and healthy workplace by stipulating the requirements for implementing and monitoring safety practices, initiatives and programs.

### b. Environmental Protection Standards

Stipulate the requirements for the effective management of materials, water, energy, and waste and hazardous materials. They define the requirements for environmental monitoring and exploration, closure, and reclamation planning.

### c. Community Relations Standards

Require each Goldcorp operation to understand the local social, cultural, economic, political and institutional context and create locally adapted engagement and impact management plans.

### d. Security Standards

Help Goldcorp ensure that security management at all sites reflects our commitment to respect human rights, everywhere we do business.

## 3.0 HOW DOES SEMS WORK?

The SEMS objectives are designed to cover all aspects and activities that have the potential to affect the sustainability of our sites and the communities where we operate. The SEMS framework is based on a continuous improvement cycle:

**PLAN >** Establishing objectives, process and structure necessary to deliver results and desired outcomes

**EXECUTE >** Implementing plans or processes to consistently and effectively manage risk and meet regulatory and voluntary commitments

**REVIEW >** Monitoring and evaluating performance and results

**IMPROVE >** Sharing leading practices and developing a culture of continued improvement

A key component of SEMS is accountability. Everyone at Goldcorp has a role to play in implementing SEMS, and the ultimate accountability at each site lies with the Mine General Manager. It is owned and applied across each site.





Goldcorp takes compliance seriously and requires each site to undergo an annual self-assessment as well as an internal audit every three years. Each site prepares action plans that consist of multiple tasks designed to address the audit findings. Moving forward, we will continue implementing SEMS standards across our sites, and will assess compliance with the system, strengths and areas of opportunity.

Another vital component to the success of SEMS at Goldcorp is effective training. In response to requests from the mines for a better understanding of SEMS, Goldcorp launched an online training module, Introduction to SEMS, to build awareness and understanding of the system's purpose and standards, and how to apply SEMS in daily work. This training was a key part of ensuring we meet our annual sustainability requirements and was available to employees and contractors with access to computers. Over 3,000 employees and contractors completed the training. Moving forward, Goldcorp will roll out SEMS course refreshers to our workforce. At Coffee, we will undertake a training needs analysis and ensure that employees and contractors are equipped to apply SEMS appropriately in the local context.

#### **4.0 HOW DOES SEMS APPLY AT COFFEE**

Coffee, just like any other Goldcorp site, will be required to implement SEMS, and indeed the journey has already begun! In 2017, the Coffee team undertook a self-assessment over a 2 day workshop and identified priority tasks and objectives for 2018 and beyond. In addition, an assessment was undertaken to align the requirements with SEMS with the anticipated management plans, procedures and protocols. As these core documents are further developed over the coming year, the Coffee team will be responsible for ensuring that the SEMS requirements are integrated into the drafts where appropriate, and also that they are executed effectively.



# **Project Description Addendum: Northern Access Route Clarification**



## MEMORANDUM

<b>Date:</b>	November 17, 2017
<b>To:</b>	Yukon Environmental and Socio-economic Assessment
<b>From:</b>	Goldcorp Inc.
<b>Subject:</b>	Addendum to Project Description - Northern Access Route – Additional detail

### 1.0 PURPOSE

The purpose of this memo is to provide additional details related to the proposed Northern Access Route (NAR) upgrades and discuss Goldcorp's potential strategies for ongoing road maintenance. Goldcorp is engaging in ongoing dialogue with potentially affected First Nations, communities, and Yukon Government (YG) to arrive at a consensus regarding ongoing NAR maintenance details and requirements. The objective of this memo is to enhance the collective understanding of the proposed NAR and both support and advance ongoing discussions.

### 2.0 EXISTING ROAD MANAGEMENT AND USE

The proposed NAR will extend approximately 214 kilometers (km) from the Klondike Highway 2 turnoff at Hunker Road, follow a combination of existing road and new construction segments to the proposed Coffee Gold Mine Site, south of the Yukon River. Over 80% of the road is in place, with the northernmost portion up to the Indian River seasonally maintained by YG and the remainder functioning as a user-maintained public road. The road network south of the Stewart Rover and North of the Yukon River is accessed by placer miners primarily through barges or smaller watercraft.

Placer miners with claims along the route provide much of the seasonal maintenance of most of the NAR. Seasonal maintenance by YG of the NAR's northern portion includes road grading, surfacing, vegetation brushing, some snow plowing, as well as ditching and drainage structure repair and replacement.

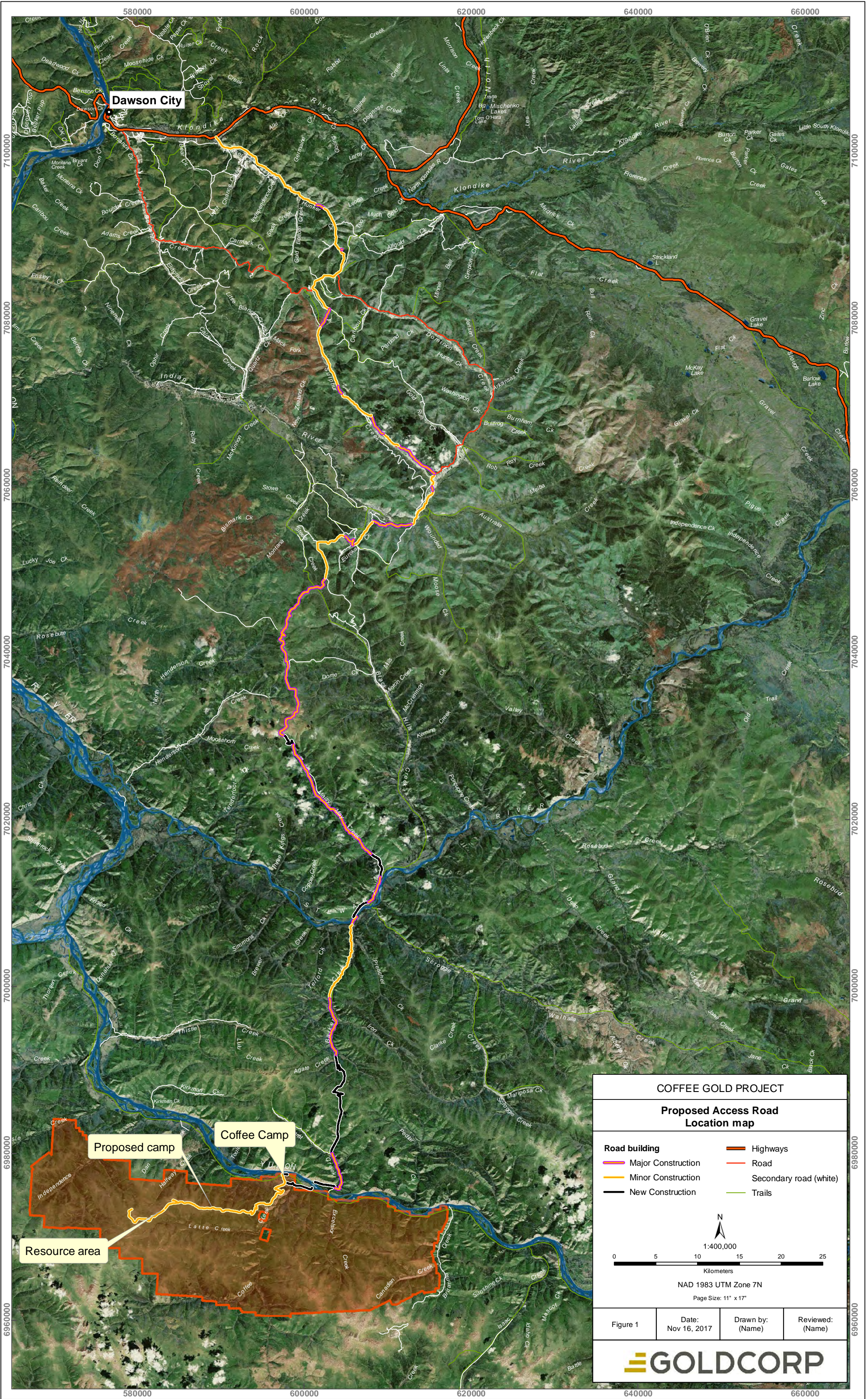
In addition to being used by placer miners, the road is also used by trappers, hunters, First Nations members engaging in traditional activities, and outdoor adventure groups such as the Yukon Quest.

### 3.0 EXISTING ROAD SECTIONS AND PLANNED WORKS

Detailed construction plans for the road are included in the Project Proposal in the **Access Route Construction Management Plan (Appendix 31-A)**, and in associated appendices. The overall alignment and road sections by category and landmark or km mark are shown on **Figure 1**. The planned works can be more broadly described in three main categories:

- Minor upgrade to existing road
- Major upgrade to existing road/trail
- Construction of new road.





Dawson City

Coffee Camp

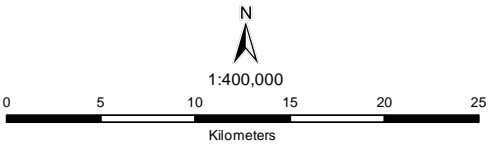
Proposed camp

Resource area

**COFFEE GOLD PROJECT**

**Proposed Access Road Location map**

- |                      |                        |
|----------------------|------------------------|
| <b>Road building</b> | Highways               |
| Major Construction   | Road                   |
| Minor Construction   | Secondary road (white) |
| New Construction     | Trails                 |



NAD 1983 UTM Zone 7N

Page Size: 11" x 17"

Figure 1	Date: Nov 16, 2017	Drawn by: (Name)	Reviewed: (Name)
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### **MINOR UPGRADE TO EXISTING ROAD**

Minor upgrades are proposed for areas where the NAR is generally structurally sound and/or of a consistent construction quality. The majority of the YG-maintained section of the NAR north of the Indian River falls into this category. Proposed work consists of ditching, grading, some resurfacing, clearing, addition of appropriate drainage structure, and infrequent minor realignments to adjust vertical and horizontal curves to meet the design speed criteria of 30 km per hour (km/hr) to 50 km/hr. A typical section of minor upgrades is shown on **Figure 2**.



**Figure 2 Photo of Existing Road on the Sulphur Section Typical of the Minor Upgrade Category**

### **MAJOR UPGRADE TO EXISTING ROAD**

For areas where major upgrades are required the quality of the existing road is variable. The Project team has observed that the integrity of the road generally degrades further south where there are fewer users; however, the quality of the road is highly dependent on the surficial material used in the local area as well as the water table and natural drainage features. Major upgrade work includes adjustment of horizontal and vertical alignments to accommodate larger-curve radii, surfacing and subgrade improvements, the addition of inter-visible turnouts (which enable views of oncoming vehicles with the naked eye), and addition of bridges and other minor drainage structures. A typical section of road requiring major upgrades is shown on **Figure 3**.





**Figure 3 Existing Condition of Sulphur Road Typifying the Major Upgrade Category**

#### **CONSTRUCTION OF NEW ROAD**

New road construction works will apply to sections of the alignment where there is no existing road or trail. The new road will be constructed as an all-weather, single lane, gravel-surfaced road with inter-visible turnouts. As described in **Appendix 31-A** of the Project Proposal, areas of new road construction cross a wide variety of terrain types, ranging from low, flat areas of shallow, ice-rich permafrost to rocky, high mountain passes. Strategies for road building in all terrain units are described in **Appendix 31-A**.

## **4.0 PROPOSED MANAGEMENT**

### **REGULATORY FRAMEWORK FOR CONSTRUCTION AND MANAGEMENT OF THE NORTHERN ACCESS ROUTE**

The proposed NAR falls wholly within public territorial lands. There are several components to the regulatory framework governing the construction and use of a resource access road in the Yukon. They are:

- *Yukon Environmental and Socio-economic Assessment Act*, SC 2003, c. 7 (YESAA) – requires an assessment for a project or activity listed in the Assessable Activities, Exceptions and Executive

Committee Projects Regulations (SOR/2005-379). Under these regulations, roads must be identified (part 6, item 10) as an activity that requires a permit, authorization, or a transfer of land, or utilizes federal funding. The Yukon Environmental and Socio-economic Assessment Board conducts all assessments required under YESAA, and must consider the potential environmental and socio-economic effects of proposed activities, including input from relevant sources.

- License(s) and permit(s) required– There are expected to be multiple authorisations required for the construction, use and maintenance of the NAR. A *Waters Act* authorisation issued by the Yukon Water Board will be required for the installation of water crossings (culverts and bridges) and the barge landing locations. Authorisations for the land-based components of the road will be issued by Energy, Mines and Resources. The exact permitting regime applicable to the road will depend on the approach taken in cooperation with YG regarding ownership and management of the NAR.
- New Resource Access Roads Framework – provides guidelines to regulators, industry, and the public on managing resource access roads for quartz mining and oil and gas activities (and some large placer mining operations). This Framework identifies the respective responsibilities of government and companies during the construction and operation of access roads, and provides direction on permits required for land use. In addition, the Framework notes that when existing and new roads are used by more than one proponent, the Government of Yukon may facilitate cost-sharing arrangements between the users to ensure all actual costs of upgrading and maintaining the road are shared equitably. The Framework also encourages industrial users to work together to propose shared-use arrangements for YG's consideration.
- *Placer Mining Act* Implications – Placer claims are governed by the *Placer Mining Act*, SY 2003, c.13. While conflicts between public road users and placer miners are not addressed directly in the Act, it appears that placer claim holders hold the exclusive right to enter their claim to complete mining work on that claim, but they do not have the right to prevent other persons from entering their claim for other reasons. Furthermore, the mining recorder may grant rights of entry to other claim holders if access is necessary to operate their own claims.

#### **KEY ISSUES IDENTIFIED THROUGH CONSULTATION**

Throughout the Project's engagement and consultation process to date, Goldcorp has received a wide range of concerns related to management of the NAR. In particular, consultation with potentially affected First Nations has identified concerns about impacts to wildlife from new traffic on the NAR from Project-related users, other industrial users, and occasional hunters. In conversations with both potentially affected First Nations and members of the Dawson community, a key question has focused on how the road will be maintained in a consistent condition, given that placer miners may wish to modify the route to work their own claims. Goldcorp has included some proposed mitigation measures in the Project Proposal, specifically in the Access Route Construction Management Plan and Access Route Operation Management Plan (**Appendix 31-A** and **Appendix 31-B**, respectively), which specifically address the issues of access control, route stability, and maintenance. **Table 1** presents a selection of examples of the concerns expressed to date and the responses to these concerns.

**Table 1 Key Issues Identified through Consultation on the Northern Access Route**

Concern	Party	Proposed Mitigation
Improvements to the NAR may result in increased access for hunting, putting additional pressure on wildlife populations	Potentially affected First Nations	In summer, there is vehicular access on the existing road to within several kilometres of Stewart River. Goldcorp is proposing to control access at the barge/ice bridge crossings to prevent additional access south of the Stewart River, where the majority of the new build will be situated.
Additional traffic along the NAR (mine-related or other) may be unsafe and result in collisions with wildlife	Potentially affected First Nations	Goldcorp is proposing the addition of safety measures during NAR construction to minimize the likelihood of animal/vehicle collisions, such as clearing lines of sight through brushing and limiting speed of Project-related vehicles using the NAR.
Improvements to the NAR may result in increased placer mining activity in the region.	Potentially affected First Nations	Goldcorp acknowledges this concern, and has participated in site tours of the NAR with potentially affected First Nations in part to provide a first-hand view of the proposed NAR route. Placer mining and access for increased placer mining in the area is an existing condition in this area. Goldcorp proposes to restrict access to Project barges and ice bridges at the Stewart and Yukon Rivers. Goldcorp is also committed to ongoing engagement with affected First Nations and stakeholders along the road to ensure it is managed responsibly during construction, operation and closure.

**NORTHERN ACCESS ROUTE MANAGEMENT – OVERALL OBJECTIVE**

Goldcorp has identified three potential management strategies for the operation of the NAR, and has discussed them with YG to seek guidance. In addition, Goldcorp has shared these strategies with Tr’ondëk Hwëch’in First Nation and Selkirk First Nation for their consideration and feedback. The potential management approaches are summarized below.

The cost and implementation of completing road upgrades and constructing the new build portion of the NAR have been factored into the Project Proposal. Goldcorp anticipates applying for a successional permit per the Resource Access Road Framework to complete construction of the NAR.

Goldcorp’s objective with the NAR is to provide continuous and unimpeded access for successful construction, operation, and reclamation and closure of the Coffee Gold Mine. In considering all options, Goldcorp recognizes that the Project will not be the only user of the NAR, and emphasizes the need for continuing transparent and open dialogue with potentially affected First Nations and stakeholders.

**GOLDCORP’S PROPOSED OPTIONS FOR NORTHERN ACCESS ROAD MANAGEMENT**

**4.1.1 Option 1: Goldcorp Management**

Once the road is fully constructed, Goldcorp intends to seek a 30-year lease from YG to operate the road. Under this scenario, road management would be entirely under Goldcorp’s control. Access control points would be established where legal authority for Goldcorp to restrict access exists (i.e. the use of Project ice

bridges and barges at river crossings). Additional potential context or measures under a Goldcorp management scenario could be:

- Goldcorp would not be in a position to deny access (other than to barges and ice-bridges). Access for placer miners is provided for in the *Placer Mining Act*.
- Communication and cooperation protocols could be developed with affected First Nations and trapline licence holders to address issues of concern as they arise.
- All non-project-related road users would be required to sign a waiver that use of the road is at their own risk.
- Goldcorp would assume development costs related to upgrade and new build areas of the NAR. Maintenance costs will be shared with non-project road users.

#### **4.1.2 Option 2: Yukon Government Management**

Under the management of YG, Goldcorp would contribute an annual fee toward maintenance costs. Management and implementation of road maintenance would be undertaken by YG. Any access control points and route management would be determined by YG, with the exception of the barge/ice road crossings of the Stewart and Yukon Rivers, which Goldcorp (or a contractor) would operate. Only Project-related vehicles would be permitted to use the crossings, unless otherwise directed by YG, and liability arrangements would be required.

#### **4.1.3 Option 3: Private-Public Partnership**

A third party would be selected jointly by YG, Goldcorp, and other potentially affected parties to operate and maintain the road. Road users, including Goldcorp, would pay an annual fee, and access protocols would be determined by the operator. As with the previous option, Goldcorp would participate in dialogue with First Nations to ensure that their concerns and rights related to their traditional territory are respected.

In addition to the preceding scenarios, if access to the NAR became an issue with a placer operator, Goldcorp could apply to the mining recorder to obtain a right of entry over the placer claims to the Project. In the process of such an application, Goldcorp would support and participate in dialogue with First Nations and YG to ensure that First Nations concerns and rights related to their traditional territory are respected.

## **5.0 CONCLUSION**

Goldcorp's primary objective for the NAR is to ensure continuous access for successful construction, operation, and reclamation and closure of the Coffee Gold Mine Project. In considering all options, Goldcorp recognizes that Project-related employees, suppliers, and contractors will not be the only users of the NAR, and emphasizes the need for transparent and open dialogue with potentially affected First Nations and stakeholders to reach a mutually acceptable strategy that meets the needs of all affected groups.





# **Periphyton and Benthic Invertebrates Analysis Report**





# Coffee Gold Mine – YESAB Project Proposal Periphyton and Benthic Invertebrates Analysis Report

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December 2017

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## Acronyms and Abbreviations

Acronym / Abbreviation	Definition
AEG	Access Consulting Group
AFDM	Ash-Free Dry Mass
BC MoE	British Columbia Ministry of Environment
BCWQG	British Columbia Water Quality Guidelines
BCSQG	British Columbia Sediment Quality Guidelines
BMP	Best Management Plan/Practice
CCME	Canadian Council of Ministers of the Environment
CWQG	Canadian Water Quality Guidelines
CSQG	Canadian Sediment Quality Guidelines
CoPCs	Contaminants of Potential Concern
CRA	Commercial, Recreational or Aboriginal (Fishery)
EA	Environmental and Socio-Economic Assessment
EDI	EDI Environmental Dynamics Inc.
EPT	Ephemeroptera-Plecoptera-Trichoptera
HLF	Heap Leach Facility
IC	Intermediate Component
LSA	Local Study Area
MMER	Metal Mining Effluent Regulations
PECG	Palmer Environmental Consulting Group
Project	Coffee Gold Mine Project
PSSWQO	Proposed Site-Specific Water Quality Objectives
QA/QC	Quality Assurance / Quality Control
SFN	Selkirk First Nation
TH	Tr'ondëk Hwëch'in
TK	Traditional Knowledge
TSS	Total Suspended Solids
VC	Valued Environmental Component or Valued Socio-economic Component
WRFN	White River First Nation
WRSF	Waste Rock Storage Facility
YESAA	Yukon Environmental and Socio-Economic Assessment Act
YESAB	Yukon Environmental and Socio-Economic Assessment Board

## 1.0 INTRODUCTION

### 1.1 GENERAL INTRODUCTION

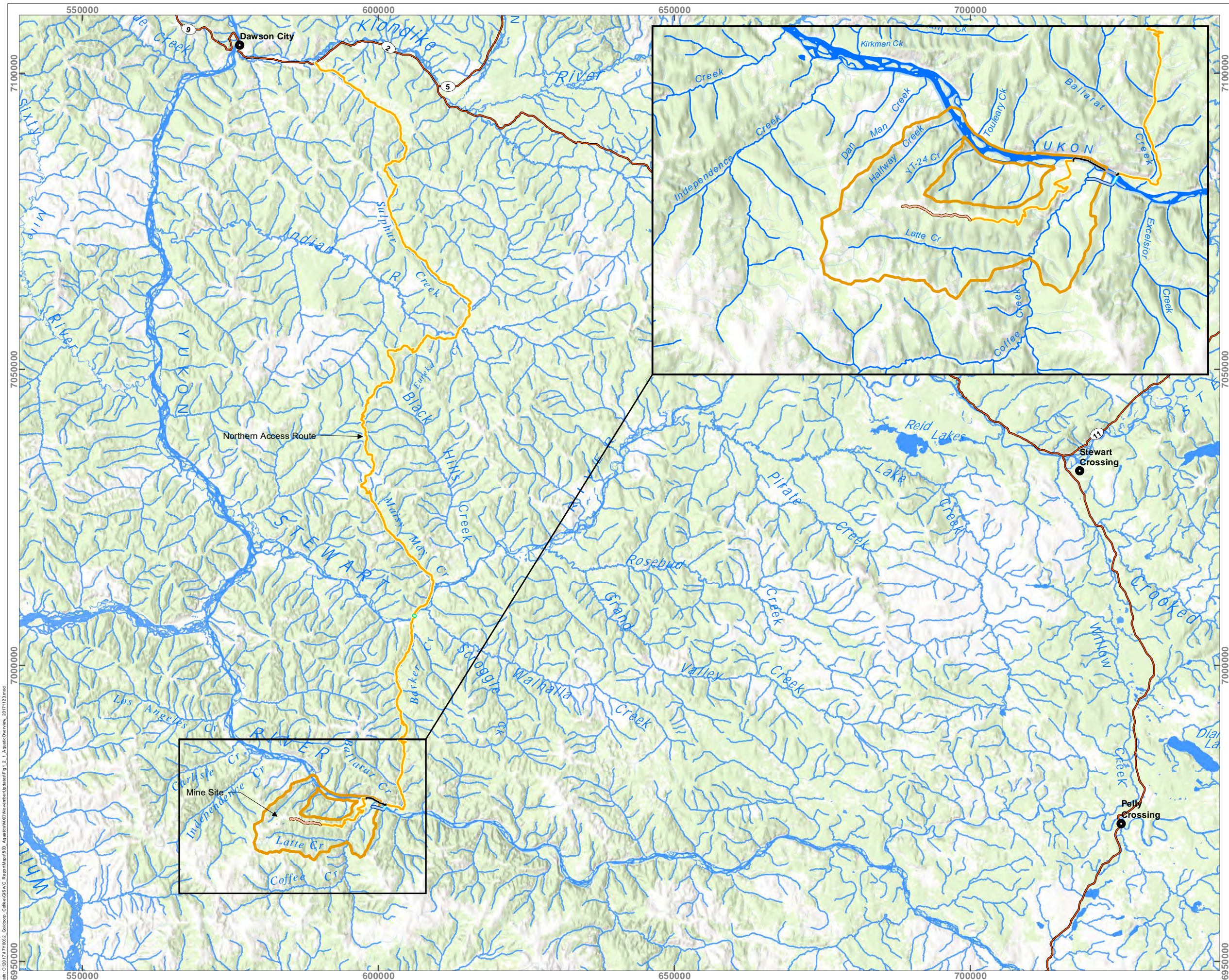
This Periphyton and Benthic Invertebrate Analysis Report presents an analysis of potential changes to periphyton and benthic invertebrates associated with the future construction, operation, reclamation and closure, and post-closure phases of the Coffee Gold Project. Periphyton is the assemblage of algae, bacteria, fungi, and meiofauna attached to submerged substrate (e.g., rocks, bedrock, woody debris) in freshwater streams and represents primary production in running water. Benthic invertebrates are small animals without backbones (e.g., insects, snails, worms) that live on or in submerged substrate. Benthic invertebrates are typically representative of secondary (and/or tertiary) trophic levels, are indicators of secondary productivity, and are important food for fish.

Periphyton and benthic invertebrates are recognized as independently valuable resources. During the review of the Fish and Fish Habitat Assessment Report in the draft Coffee Mine Project Proposal (PP) prepared for submission under the *Yukon Environmental and Socio-Economic Assessment Act (YESAA)*, a number of comments were provided by the Tr'ondëk Hwëch'in, White River First Nation, Fisheries and Oceans Canada (DFO), and YESAB that specifically requested the analysis of potential Project associated changes to periphyton and benthic invertebrates. Accordingly, this Report has been prepared to supplement the Fish and Fish Habitat VC Assessment Report (**Appendix 14-B Fish and Fish Habitat VC Assessment**). This Report provides a summary of existing periphyton and benthic invertebrate conditions, considers the potential interactions with Project activities that have the potential to interact with periphyton and benthic invertebrate, considers specific mitigation measures, identifies residual changes, and identifies relationships and implications to the Fish and Fish Habitat VC Assessment. The analysis of the potential for the Project to interact with and cause adverse and positive changes to aquatic biota follows the methodology for Intermediate Components (ICs) described in **Section 5.0 Assessment Methodology** of the Project Proposal. All references to sections and appendices in this Report refer to sections of the Project Proposal submitted in November 2017, or to internal report sections.

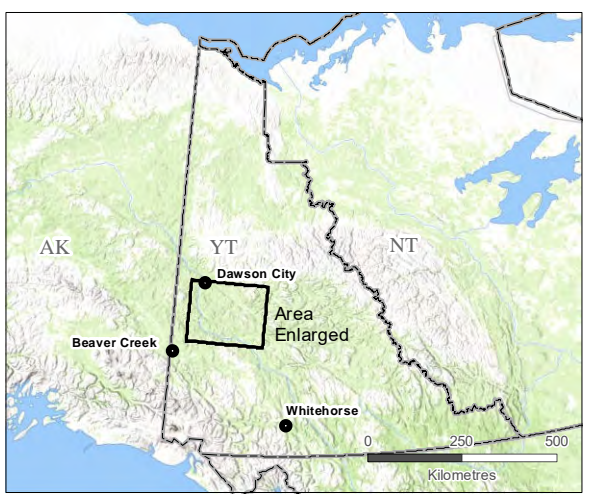
### 1.2 COFFEE GOLD PROJECT OVERVIEW

The Coffee Gold Project is described in detail in the Project Proposal (**Section 2.0 Project Description**). Briefly, the Coffee Gold Project is owned by the Kaminak Gold Corp., a wholly-owned subsidiary of Goldcorp Inc. and is a proposed open pit gold mine project located in west-central Yukon, approximately 130 kilometres (km) south of the City of Dawson (**Figure 1.2-1**). The Project is located on Territorial Land within the Traditional Territory of Tr'ondëk Hwëch'in (TH) and the asserted territory of White River First Nation (WRFN). The Traditional Territory of the Selkirk First Nation (SFN) overlaps with the Northern Access Route at the barge landing sites on the Yukon River but does not overlap with the Mine Site. The Project proposes to use a cyanide heap leach process to leach gold from ore. The Project would consist of an 18-month construction period, followed by a 12-year mine life with an average operation rate of five million tonnes per annum of heap leach feed.





**COFFEE GOLD MINE**  
**Map of Project Location within Yukon**



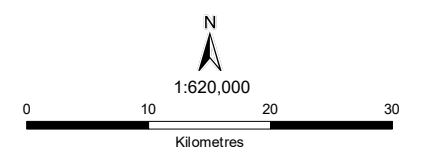
- Legend**
- Stewart River Ice and Barge Crossings
  - Yukon River Barge Route
  - Yukon River Ice Road
  - Winter Road
  - Mine Site Access Route
  - Northern Access Route
  - Project Footprint
  - Local Study Area (Mine Site)

**Notes**

- This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

**Sources**

- Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCAN, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
- Project access and infrastructure provided by Goldcorp Inc. (2017).
- Aquatic study areas developed by EDI Environmental Dynamics Inc. (2016).



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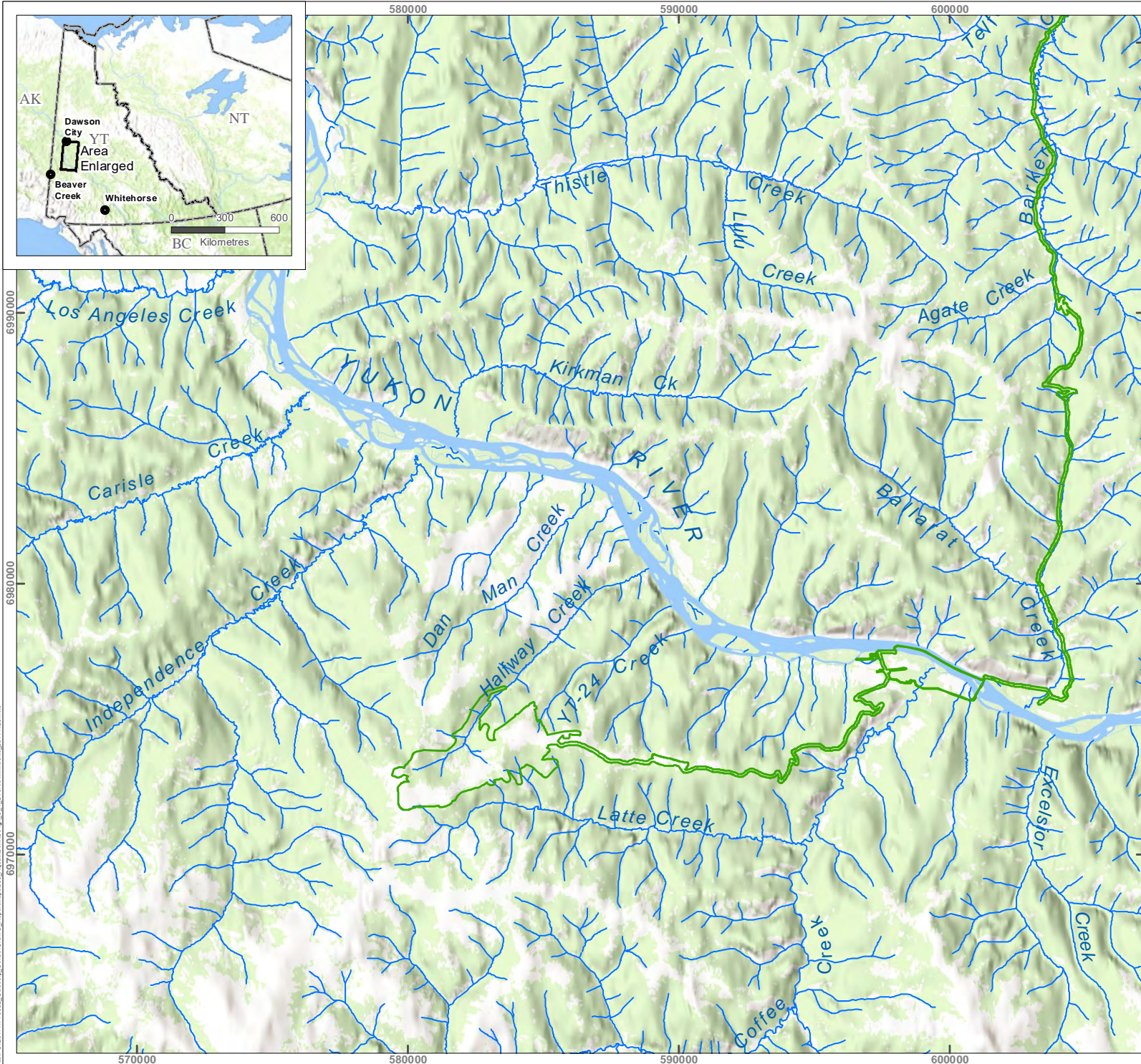
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### 1.3 ENVIRONMENTAL SETTING

The environmental setting for aquatic resources of the Coffee Gold Project is described in detail in the Project Proposal (**Sections 4.0 Project Setting, 6.0 Introduction to Physical Environment, and 13.0 Introduction to Biophysical Environment**) and in environmental baseline reports (**Appendices 8-A Hydro-meteorology Baseline Report, 12-A Baseline Water Quality Report, 14-A Fisheries and Aquatic Resources Baseline Update - 2016, and 14-C Fish and Aquatic Resources Baseline**). This section provides a brief overview of the environmental characteristics relevant to the analysis of periphyton and benthic invertebrates. More detailed description of existing periphyton and benthic invertebrate conditions is provided in **Section 3.0**.

The Project is located within the Yukon Plateau North Ecozone, in the Klondike Plateau subzone of the Boreal Cordillera Ecozone. Geography in the ecozone is characterized by rolling uplands leading into large U-shaped valleys (Smith et al. 2004). The topography of the Project area is consistent with the characteristics of unglaciated ecozones, and is characterized by deep soil weathering and strong erosional patterns linked to precipitation and snowmelt (Grods et al. 2012). Creeks that could potentially be influenced by the Project (Latte Creek, Coffee Creek, YT-24, Halfway Creek, Kona Tributary, and Independence Creeks; **Figure 1.3-1**) are predominantly erosional with rocky substrate that varies from cobble and boulder in upper reaches to cobble and gravel in lower reaches. Upper creek areas are typically comprised of cascade-pool or step-pool sequences, whereas lower/larger creek areas are typically comprised of riffle-run sequences. Pool habitat is limited in all creeks except for Coffee Creek. Creek geomorphology is consistent with high gradients in the upper creek areas (commonly >8%) and moderate gradients ( $\leq 4\%$ ) in the lower/larger creeks (EDI 2017). Complete winter ice cover occurs in the upper creeks, with aufeis (thick sheet ice that forms due to the successive flows of ground water at freezing temperatures) observed in Coffee, Latte, YT-24, and Halfway Creeks (EDI 2017).



**COFFEE GOLD MINE**

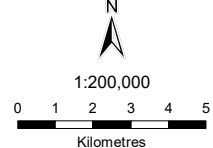
**Overview of Coffee Project Area**

- Legend**
- City/Town
  - ▭ Project Footprint

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

- Sources**
1. Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCAn, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
  2. Project access and infrastructure provided by Goldcorp Inc. (2017).



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Figure 1.3-1	Date: Nov 23, 2017	Drawn by: HG/MP	Reviewed: MAS/PT
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The hydrology of Project area creeks tends to be flashy, and is surface water driven during freshet and groundwater driven at other times of year. Seasonality in hydrology and water chemistry is more pronounced upstream in the upper catchments. Total suspended solids concentrations are typically low, although peak flow events are associated with elevated total suspended solids. Baseline aqueous concentrations of a number of metals (aluminum, arsenic, cadmium, chromium, copper, iron, selenium, and uranium) have been observed at concentrations greater than water quality guidelines (**Appendix 12-B Surface Water Quality VC Assessment**). In general, seasonal patterns include greater concentrations of some metals during low-flow conditions (e.g., uranium) and of others that are elevated in the total form during high suspended solids events as occurs during spring freshet (e.g., total arsenic, total cadmium, total copper, total chromium, total selenium). Peak flows also typically include annual maximum concentrations of total suspended solids, dissolved organic carbon, dissolved aluminum, and particulate-bound metals. During winter low-flow periods, uranium concentrations have consistently been above corresponding guidelines. Although the creeks potentially influenced by the Project are predominantly erosional and do not support sediment accumulation, some sediment sampling has been completed. Samples were predominantly sand, but chemical analysis of their finer fractions indicated that the silt and clay components contained concentrations of arsenic and chromium that were consistently greater than Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (CCME 1999) and that arsenic concentrations were greater than Probable Effect Levels in a number of samples.

Most tributary streams in the area are nutrient-poor and have cool water temperatures (e.g., all creeks except Coffee Creek remained less than 5°C during baseline summer sampling in 2014 and 2015; PEGC 2017), which limit their overall productivity. Periphyton sampling indicated that streams have very low primary productivity (e.g., chlorophyll-a concentrations of  $\leq 0.088$  mg/m<sup>2</sup>; PEGC 2017; EDI 2017), which is common of low nutrient, northern watercourses. The periphyton community is dominated by blue-green algae (Cyanophyta), which typically make up approximately 80% of the community. Benthic invertebrate communities are also typical of nutrient-poor, erosional, northern watercourses, with 18 to 34 taxa observed in Project area sampling sites, dominated by dipterans (mainly chironomids [non-biting midges]), mayflies, and stoneflies (PEGC 2017).

Evaluation of the use of Project area creeks by fish has confirmed that three species utilize the creeks, mostly in the lower reaches (arctic grayling, juvenile chinook salmon, and slimy sculpin; PEGC 2017; EDI 2017). The upper reaches of creeks within the mine footprint are small, steep, have poor habitat and with are located significant distances from documented fish bearing locations. Lower in the watersheds, these creeks eventually provide fish habitat or flow into areas that are used by fish. The most complex and high-quality fish habitat is located in the large creeks (Coffee and Independence creeks) nearer to the Yukon River. These lower gradient creeks have moderate size (mean channel widths range of 12 to 25 m) with riffle-pool morphologies and primarily a gravel dominated bed. Upper/smaller creeks (e.g., Latte, Halfway, YT-24, Kona Tributary) have substantially smaller channel widths, no deep pools (>1 m) and higher

gradients, especially at sampling stations further upstream in the watersheds. Latte and Coffee Creeks are used by Arctic grayling for summer rearing/feeding purposes, and Coffee Creek provides year-round rearing habitat for juvenile chinook salmon and arctic grayling. The smaller creeks have confirmed fish presence only in the very lower reaches (and only at the mouth of YT-24). Fish overwintering in Project area creeks appears to be unlikely outside of the Yukon River, Coffee, and Independence creeks (EDI 2017).

No salmon spawning has been observed in the creeks, although Traditional Knowledge indicated that chinook spawning occurred historically in Coffee Creek. Arctic grayling spawning may occur in Coffee Creek, but most adult arctic grayling captured were in a condition that suggested they were not using Coffee Creek for spawning (PECG 2017). Limited examination of arctic grayling gut contents indicated that diet was comprised of benthic invertebrates, with actual benthic invertebrate taxa present in the gut samples largely in proportion to their availability (i.e., taxon distributions were similar to those obtained in benthic samples).

#### **1.4 ISSUES SCOPING**

The Fish and Fish Habitat VC Assessment (**Appendix 14-B**) considered potential changes to periphyton and benthic invertebrates in the effects pathway to fish and fish habitat through the consideration of habitat suitability, contaminant toxicity, and stream productivity indicators. However, the emphasis of the assessment was on potential effects to fish and fish habitat. The scope of this report is to provide additional analysis focused squarely on periphyton and benthic invertebrates. This analysis evaluates the potential influence of physical disturbance, contaminant toxicity, and nutrient inputs on periphyton and benthic invertebrates. If the analysis indicates that residual changes to periphyton and benthic invertebrates are likely, the scope of this report also includes the assessment of the significance of the changes to the Fish and Fish Habitat VC. Similar to the Fish and Fish Habitat VC Assessment Report, this report considers potential direct and indirect changes due to Project interactions associated with Construction, Operation, Reclamation and Closure, and Post-Closure phases. This report is focussed on the mine area and does not include the Northern Access Route.

Key foundations for the identification of issues specific to periphyton and benthic invertebrates include the Project interactions matrices for the Fish and Fish Habitat VC developed for the Project (**Appendix 5-A Project Interaction Matrix; Appendix 14-B**), engagement and consultation outcomes (**Appendix 14-B**), residual effects identified in VC Assessments (**Appendices 12-B and 14-B**), residual changes identified in IC Analyses (**Appendices 7-B Groundwater IC Analysis and 8-B Surface Hydrology IC Analysis**), and comments provided during the preliminary YESAB Executive Committee Screening. Key residual changes to Surface Hydrology and residual effects to Surface Water Quality are summarized in **Table 1.4-1**. A number of comments were provided by Tr'ondëk Hwëch'in, White River First Nation, Fisheries and Oceans Canada (DFO), and YESAB that specifically requested the analysis of potential Project associated changes to periphyton and benthic invertebrates.

**Table 1.4-1 Overview of Residual Changes to Surface Hydrology and Residual Effects to Water Quality**

Component/Report	Location	Residual Change or Effect
Surface Water Hydrology (Appendix 8-B)	Latte Creek (upper)	Moderate changes (reductions) in annual runoff, monthly distribution, low flows, and high flows.
	Latte Creek (lower)	Low changes (reductions) in annual runoff and high flows, and moderate changes in monthly distribution and low flows.
	Coffee Creek	No residual adverse changes are likely.
	YT-24 Creek	High magnitude changes (increases) in annual runoff, monthly distribution, low flows, and high flows.
Surface Water Hydrology (Appendix 8-B)	Halfway Creek (upper)	High magnitude changes (increases) in annual runoff, monthly distribution, low flows, and high flows.
	Halfway Creek (lower)	Moderate/high magnitude changes (increases) in annual runoff, monthly distribution, low flows, and high flows.
Surface Water Quality (Appendix 12-B)	Latte Creek (upper)	Slight increase in maximum monthly concentrations of total uranium. Increases in total uranium to further above guidelines in summer open water months.
	Latte Creek (lower)	No residual adverse effects are likely.
	Coffee Creek	No residual adverse effects are likely.
	YT-24 Creek	Slight increase in maximum monthly concentrations of total arsenic over the period from startup to Year 10.
	Halfway Creek (upper)	Increases in total uranium to further above guidelines in summer open water months. Increases in total zinc concentrations to above guideline for a short period (one month) in Year 20. Increases in nitrate concentrations starting in construction. Further increase starting in Year 20. <sup>1</sup>
	Halfway Creek (lower)	Increases in total uranium to further above guidelines in summer open water months.

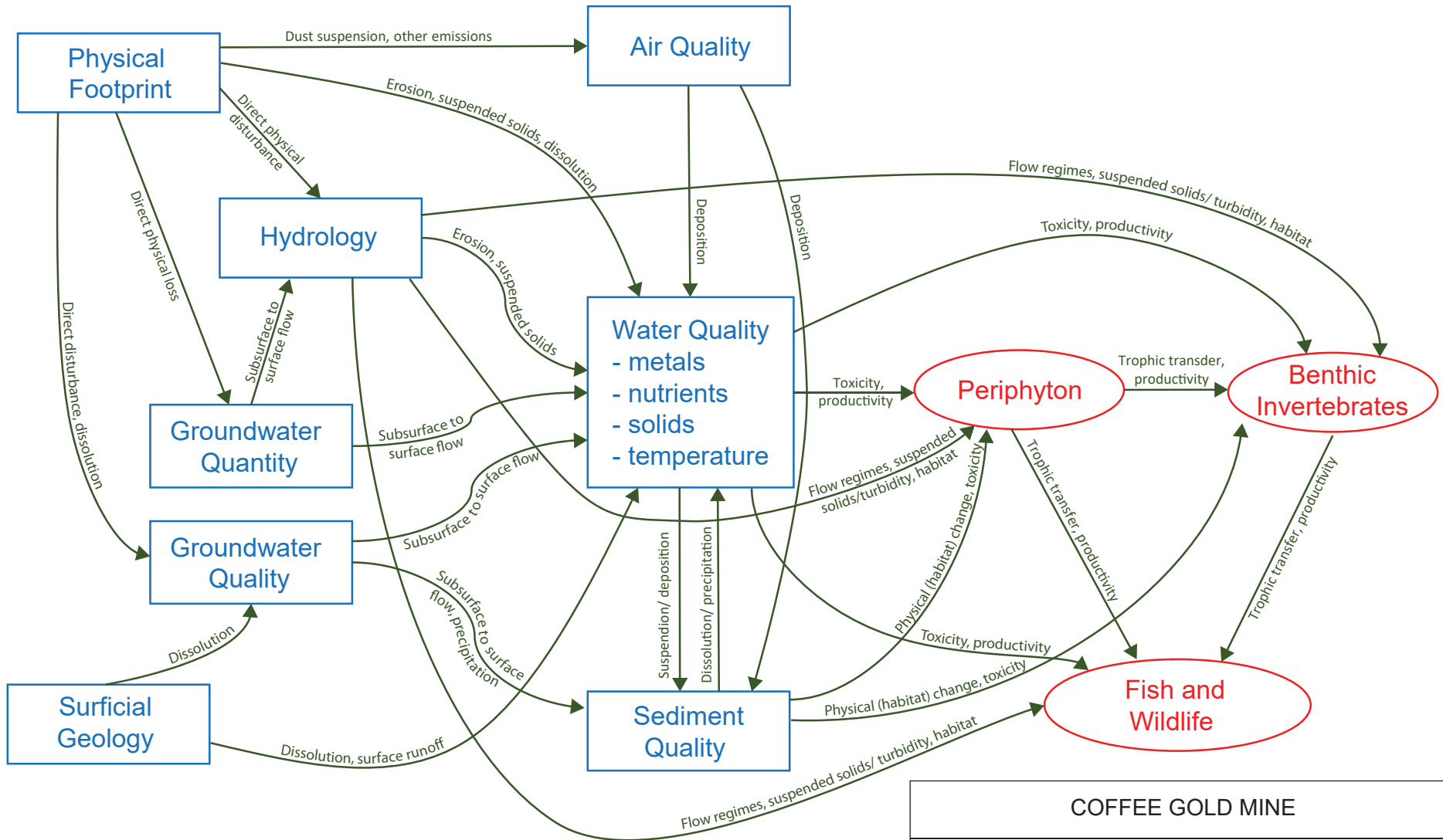
Both land-based and water-based Project activities have the potential to affect surface hydrology, water quality, fish, and fish habitat (Appendix 5-A) and would therefore also have the potential to affect periphyton and benthic invertebrates. Land-based disturbance is associated with construction activities including, but not limited to, vegetation clearing, excavation and grading, and the use of explosives. These activities can potentially alter base-flow through changes to groundwater pathways, change habitat structure and cover, food supplies, and potentially alter water temperatures. They can also result in increased sediment, contaminant, and nutrient inputs to watercourses. Water-based activities including, but not limited to, changes in timing, duration and frequency of flows, placement of material and structures in water, and use of industrial equipment can potentially decrease the amount of habitat available to periphyton and benthic invertebrates, and can increase sediment inputs to watercourses. Potential Project-related effects to surface water quality may include erosion and sedimentation, leaching from mine materials, leaching of nitrogen-based residues generated from blasting, discharge of camp waste water,

<sup>1</sup> This increase was incorrectly identified in Appendix 12-B as occurring to concentrations greater than guideline. This error was due to the use of older water quality model data rather than the correct water quality model data as presented in Appendix 12-C Water Balance and Water Quality Model Report.

leaching of residues from the heap leach facility, groundwater and surface water interactions and seepage, and atmospheric deposition.

Based on the interactions identified above, periphyton and benthic invertebrates would be expected to be influenced primarily by residual effects of the Project on hydrology (identified in **Appendix 8-B**) and water quality (identified in **Appendix 12-B**). These residual effects are introduced here and associated quantitative data are provided in **Section 4.2**. Key Project-related changes in surface water hydrology include moderate reductions in flows, alteration of the monthly distribution of flows, and alteration of the magnitude of low/high flows within upper Latte Creek (**Table 1.4-1**). The opposite (flow increases) are expected in Halfway Creek and YT-24 (**Table 1.4-1**). No residual changes in hydrology are expected in Coffee Creek or the Yukon River. Key changes in surface water quality are predicted to occur in Latte Creek, YT-24, and Halfway Creek, with the greatest relative change predicted to occur in Halfway Creek, particularly in the upper watershed (**Table 1.4-1**). In upper Latte Creek, slight exceedances of the water quality guideline for total uranium (which is naturally elevated) are predicted to occur in open water months, with exceedances of both the water quality guideline and the proposed site-specific water quality objective for total uranium occur predicted to occur in winter months. In YT-24, slight exceedances of the water quality guideline for total arsenic are predicted to occur in the months of May and October from start of construction until year 10. In Halfway Creek, residual mine-related increases to uranium and, to a lesser extent, nitrate and zinc were predicted. Nitrate increases were predicted to occur in the open water season (typically May to July) with the start of operations, to then increase further starting in year 20, and to then decrease to natural case (baseline) following the cessation of mining. Total uranium (which is naturally elevated) was predicted to increase to above guideline during open water months starting in construction and continuing beyond post-closure, but to remain below proposed site-specific water quality objective (SSWQO; **Appendix 12-B and 12-C Water Balance and Water Quality Model Report**). Total zinc concentrations in Halfway Creek are predicted to increase during the first half of operations, but to remain below the guideline. Total zinc concentrations are predicted to increase further in year 20 (as with nitrate) to slightly greater than guideline for a period of only one month (in association with shutdown of the heap leach facility treatment plant) after which some annual peak concentrations equal to guideline are predicted to occur during the open water period beyond post-closure. No residual effects to water quality are expected in Coffee Creek or the Yukon River.

A conceptual site model (CSM) for the periphyton and benthic invertebrates was developed in order to summarize the description of Project interactions (**Appendix 5-A**), support the selection of periphyton and benthic invertebrates as ICs, and assist with the identification of key indicators and measurable parameters. The conceptual model (**Figure 1.4-1**) provides a representation of the pathways that could result in changes to periphyton or benthic invertebrates and their linkages to the Fish and Fish Habitat VC. The key pathways to potential changes to periphyton and/or benthic invertebrates are of physical and or chemical origin, with the most direct pathways associated with hydrology and water quality (**Figure 1.4-1**). In turn, key Project interactions affecting hydrology include direct/indirect physical activity, erosion, changes in groundwater quantity, and changes in surface runoff. Project interactions with water quality include all of those affecting hydrology, as well as groundwater quality and air quality.



Sources and Media

Pathways

Receptors

COFFEE GOLD MINE

**Conceptual Model of Potential Project Influences to Aquatic Receptors**

Figure 1.4-1

Date:  
Nov 20, 2017

Drawn by:  
KMC

Revised by:  
PS





### 1.5 INDICATORS AND MEASURABLE PARAMETERS

Indicators are project interaction categories that can be either mechanistic (e.g., toxicity) or descriptive (fish habitat) and assist in describing existing conditions as well as in evaluating potential Project-associated changes to ICs and/or effects to VCs. For the purpose of this document, mechanistic Indicators were selected (physical disturbance, toxicity, and productivity), and the rationale for their selection is presented in **Table 1.5-1**. Measurable parameters are parameters that are sensitive to potential changes in the Indicator and can be measured quantitatively and preferably with a level of replication that allows statistical contrast. Measurable parameters are often referred to as an endpoints or metrics. For periphyton, which include algae, bacteria, fungi, and meiofauna that cannot be readily separated from each other in field-collected samples, measurable parameters emphasize the algal component as an indicator of the health and nutrient status (productivity) of an aquatic environment. This is standard practice and is reflected in baseline data availability (**Appendix 14-A**).

**Table 1.5-1 Intermediate Indicators for Periphyton and Benthic Invertebrates**

Intermediate Component	Indicator	Rationale for Selection	Measurable Parameter
Periphyton	Physical Disturbance	Project activities that physically disturb aquatic areas and their watersheds, and/or affect surface water quantity (hydrology) may affect periphyton	<ul style="list-style-type: none"> <li>• Periphyton Chlorophyll-a</li> <li>• Periphyton Ash Free Dry Mass</li> </ul>
	Toxicity	Project activities that affect surface water quality, including metal chemistry and bioavailability, may in turn affect periphyton	<ul style="list-style-type: none"> <li>• Periphyton Chlorophyll-a</li> <li>• Periphyton Ash Free Dry Mass</li> <li>• Periphyton Community Composition</li> <li>- % blue-greens (Cyanophyta)</li> </ul>
	Productivity	Project activities that affect surface water quality, particularly temperature regimes and nutrient chemistry and/or bioavailability may affect periphyton	<ul style="list-style-type: none"> <li>• Periphyton Chlorophyll-a</li> <li>• Periphyton Ash Free Dry Mass</li> <li>• Periphyton Community Composition</li> <li>- % blue-greens (Cyanophyta)</li> </ul>
Benthic Invertebrates	Physical Disturbance	Project activities that physically disturb aquatic areas and their watersheds, and/or affect surface water quantity (hydrology) may affect periphyton and benthic invertebrates	<ul style="list-style-type: none"> <li>• Benthic Invertebrate Density</li> <li>• Benthic Invertebrate Taxon Richness</li> <li>• Benthic Invertebrate Community Composition</li> <li>- % functional feeding groups</li> <li>- % habitat preference groups</li> </ul>

Intermediate Component	Indicator	Rationale for Selection	Measurable Parameter
Benthic Invertebrates	Toxicity	Project activities that affect surface water quality, including metal chemistry and bioavailability, may affect periphyton and benthic invertebrates	<ul style="list-style-type: none"> <li>• Benthic Invertebrate Density</li> <li>• Benthic Invertebrate Taxon Richness</li> <li>• Benthic Invertebrate Diversity and Evenness</li> <li>• Benthic Invertebrate Community Composition</li> <li>- % EPT taxa</li> <li>- % mayflies</li> <li>- % metal sensitive chironomids</li> </ul>
	Productivity	Project activities that affect surface water quality, particularly temperature regimes and nutrient chemistry and/or bioavailability may affect periphyton and benthic invertebrates	<ul style="list-style-type: none"> <li>• Benthic Invertebrate Density</li> <li>• Benthic Invertebrate Taxon Richness</li> <li>• Benthic Invertebrate Community Composition</li> <li>- % functional feeding groups</li> <li>- % habitat preference groups</li> </ul>

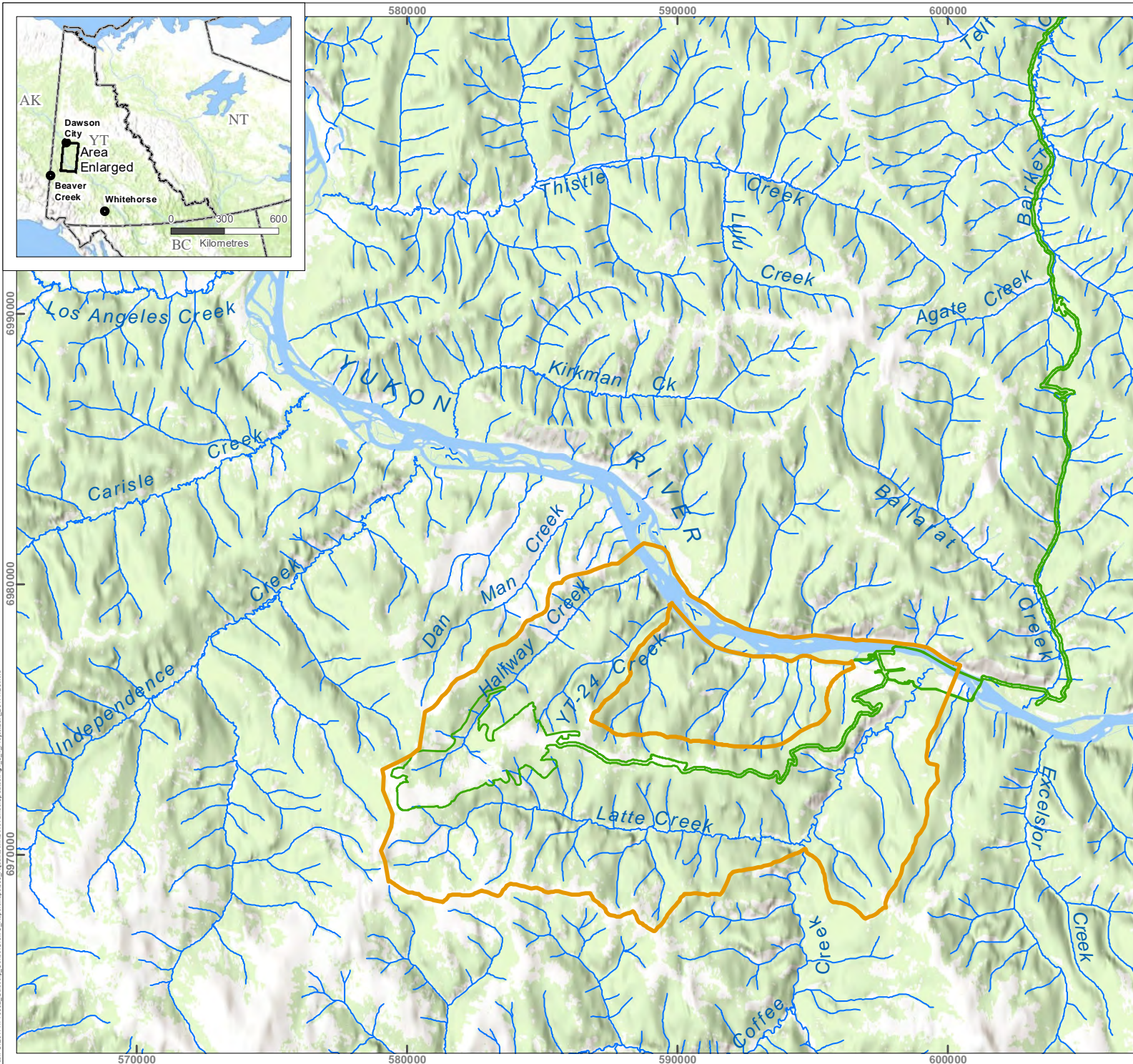
## 1.6 ESTABLISHMENT OF ANALYSIS BOUNDARIES

### 1.6.1 SPATIAL BOUNDARIES

The Local Study Area (LSA) is defined as the maximum geographical extent that direct and indirect Project effects are expected to occur on periphyton and benthic invertebrates. The extent of the LSA was based on the Project area extent and the understanding of the extent of potential effects downstream on periphyton and benthic invertebrates as a result of changes in water surface water hydrology and/or water quality (based on flow predictions from the Project’s Water Balance and Water Quality Model Report; **Appendix 12-C**). The spatial extent focused on the drainages that would be influenced by mine activities. The Northern Access Route was not included given the minimal influence of the road upgrade on surface water hydrology (**Appendix 8-B**) and water quality (**Appendix 12-B**), which represent the primary pathways that could result in potential changes to periphyton and benthic invertebrates. The installations of crossings structures are limited to one-time events and in most cases represent upgrades with respect to prevention of sediment mobilization into drainages.

Periphyton and benthic invertebrates in the near downstream vicinity of the proposed mine site could potentially be affected by changes in surface water hydrology and water quality. Accordingly, watersheds in and downstream of the exposure area of the proposed mine site were included in the LSA. This includes the Halfway Creek and Yukon Tributary (YT-24) watersheds, Latte Creek, and Coffee Creek downstream of the confluence with Latte Creek to the Yukon River (**Figure 1.6-1**). Regional context, as presented in the environmental setting in **Section 1.3**, is considered as necessary; however, no specific Regional Study Area (RSA) is proposed. Potential changes to periphyton and benthic invertebrates are localized to areas with residual effects to surface water hydrology and water quality. Potential effects on a regional basis were considered in the Fish and Fish Habitat VC Report (**Appendix 14-B**).





COFFEE GOLD MINE

Coffee Project Local Study Area (Mine Site)

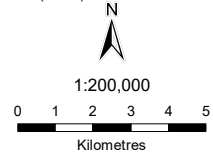
- Legend**
- City/Town
  - Project Footprint
  - Local Study Area (Mine Site)

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

**Sources**

1. Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCAN, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community  
 2. Project access and infrastructure provided by Goldcorp Inc. (2017).



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### 1.6.2 TEMPORAL BOUNDARIES

The temporal characteristics of the Project's Construction, Operation, Reclamation and Closure, and Post-Closure phases are described in **Section 2.0 Project Description** of the Project Proposal. The temporal boundaries established for the assessment of Project effects on periphyton and benthic invertebrates encompass all Project phases.



## 2.0 ANALYSIS METHODS

This section describes the methods used to identify and assess potential Project-related changes to periphyton and benthic invertebrates. This detailed consideration of the potential Project-related changes applies the assessment methodology outlined in the Project Proposal (**Section 5.0 Assessment Methodology**) and utilizes the same definitions for the change characteristics as in **Appendix 14-B** of the Project Proposal. Periphyton and benthic invertebrates were each analysed as ICs, utilizing the existing conditions information summarized above (**Section 1.3**) and in **Appendix 14-B** and data collected as part of ongoing monitoring in 2017. The analysis was informed by input provided during consultation and engagement pertaining to the Fish and Fish habitat VC, as well as in reviewer comments as described in **Section 1.4**. For each IC (periphyton and benthic invertebrates), the analysis focusses on three indicators – physical disturbance, toxicity, and productivity. For each of IC-indicator combination, analysis methods are focussed by considering model responses and key measurable parameters.

### 2.1 PERIPHYTON

#### 2.1.1 PHYSICAL DISTURBANCE

Project activities that physically disturb aquatic areas and their watersheds, and/or affect surface water quantity (hydrology) may affect periphyton. Accordingly, the influence of physical disturbance on surface water hydrology (flow quantity and temporal patterns) represents a key physical disturbance pathway (**Figure 1.4-1**), and may result in some changes to suspended solids loads and sedimentation, as well as some changes to temperature regimes.

Analysis of potential change to periphyton due to physical disturbance involved bringing together the following data:

- 1) residual Project-related changes that fall into the physical disturbance category;
- 2) existing periphyton conditions within the LSA; and
- 3) model responses of periphyton to physical disturbance.

Residual project changes were reviewed in **Section 1.4**. As they relate to periphyton and benthic invertebrates, physical changes are primarily manifest in changes to surface water hydrology (**Appendix 8-B**). Accordingly, quantitative descriptors of these changes (e.g., in mean annual discharge, the monthly distribution of flows, and the magnitude of low and high flows) were summarized (**Section 4.2.1**). Existing periphyton data were compiled from aquatic environmental baseline reports (PECG 2017; EDI 2017; **Section 3.3**). Key quantitative endpoints include biomass per unit area (ash free dry mass per square metre), chlorophyll-a per unit area, density, taxon richness, and community composition to the phylum/division (algae) or class (diatoms) level. Model responses to these endpoints were retrieved from the scientific literature. Reported responses were often qualitative or semi-quantitative,



and effort was specifically applied to the compilation of quantitative model responses that could be used to bridge the existing conditions data and the residual Project-related changes to hydrology.

The analysis included the following steps:

- 1) identifying potential Project interactions;
- 2) describing potential Project-specific changes;
- 3) describing proposed mitigation measures;
- 4) characterizing residual changes and the level of confidence in their characterization; and
- 5) defining the significance of the residual change.

Potential project interactions are described in **Sections 1.4** and **Section 1.5**. Evaluation of potential Project-specific change due to physical disturbance was completed by applying literature-based responses/relationships to link the predicted residual changes in hydrology (using the quantitative descriptors outlined above) to model responses in endpoints for which baseline data are available (using the quantitative endpoints identified above).

Mitigation measures that will be applied to the project have been described in the Project Proposal (**Section 32.0 Project Design Measures and Commitments**) and are considered in characterizing residual changes. Residual changes are described as the best prediction of what is likely to occur based on knowledge of the Project components and activities, the predicted pathways of change, and the proposed mitigation.

Residual changes are then characterized using the following criteria: direction, magnitude, geographic extent, timing, frequency, duration, reversibility, and probability of occurrence. Definitions for residual change characterization were derived according to the following hierarchy:

- 1) published regulatory or industry standards or criteria that establish a threshold;
- 2) a range of values or standards that, while not regulated, are widely recognized and accepted; and
- 3) professional judgment based on a review of literature, precedents, Traditional Knowledge, scientific, and other information that support establishment of a threshold.

For the characterization of residual change to periphyton due to physical disturbance, key interpretive tools included water quality guidelines for suspended solids (CCME 1999; BCMOE 2017a), as well as literature-based findings of responses to sediment deposition (reduced flow) and shoreline bed erosion (increased flow). The characterization of a residual change was assigned a level of confidence (low, moderate, or high). In establishing the level of confidence, considerations included:

- 1) scientific certainty relative to the quantification of the effect, including the quality or quantity of data and the understanding of effect mechanisms;

- 2) scientific certainty relative to the effectiveness of the proposed mitigation; and
- 3) professional judgment based on prior experience in assessing effects and the known effectiveness of proven mitigation measures.

The final step of the analysis was to define the significance of the residual changes in periphyton and benthic invertebrates. In the case of the periphyton and benthic invertebrates, significance is evaluated based on the potential to affect fish and fish habitat, as described in **Section 2.3**.

### 2.1.2 TOXICITY

Project activities that affect surface water quality may affect periphyton through toxicity (defined here in an aquatic environmental context as the adverse effect of chemical contaminants on individuals, populations, and/or communities [after Luoma and Rainbow 2008]). Potential changes to productivity associated with changes in nutrient chemistry are considered separately (next section). Project influences may result in some changes to water quality that could potentially result in toxicity to periphyton that are exposed to water and/or sediment (although the latter is primarily present in suspended form in the erosional creeks of the LSA). Water quality analytes evaluated in the Water Quality VC included total suspended solids/turbidity, conductivity, pH, hardness, total dissolved solids, cyanide species, nutrients (total phosphorus, ammonia, nitrate, nitrite), biochemical oxygen demand, chemical oxygen demand, total metals, and dissolved metals (**Appendix 12-B**).

Analysis of potential toxicity to periphyton involved bringing together the following data:

- 1) residual Project-related changes in water quality;
- 2) existing periphyton conditions within the LSA; and
- 3) model toxic responses by periphyton to the analytes for which residual change was identified.

Residual project changes to water quality were briefly reviewed in **Section 1.4** and included increases in uranium concentrations in Latte Creek, increases in uranium, nitrate, and zinc in Halfway Creek, and short-term increases in arsenic in YT-24 (**Appendix 12-B**). Quantitative descriptors of these changes (concentrations with and without the project) were summarized (**Section 4.2.2**). As noted above, existing periphyton data were compiled from aquatic environmental baseline reports (PECG 2017; EDI 2017; **Section 3.3**). Key quantitative endpoints included biomass per unit area (ash free dry mass per square metre), chlorophyll-a per unit area, density, taxon richness, and community composition to the phylum/division (algae) or class (diatoms) level. Model responses in these endpoints to analytes with residual change (uranium, nitrate, arsenic, and zinc) were retrieved from the scientific literature.

Evaluation of potential Project-specific change due to toxicity was completed by applying literature-based responses/relationships to link the predicted residual changes (increases in the concentrations of uranium, nitrate, arsenic, and zinc) to model responses in endpoints for which baseline data are available (using the

quantitative endpoints identified above). Mitigation measures are considered and residual changes are described as the best prediction of what is likely to occur based on knowledge of the Project components and activities, the predicted pathways of change, and the proposed mitigation.

Residual changes are then characterized based on the criteria described in **Section 2.1.2**. For the characterization of residual change to periphyton due to toxicity, key interpretive tools included water quality guidelines for each of the analytes with predicted residual change (CCME 1999; BCMOE 2017a,b). Information underlying the water quality guidelines was also considered (e.g., species sensitivity distribution data presented in the guideline documents), and was augmented by consideration of recent findings reported in the scientific literature, as well as consideration of uncertainty in the guidelines and any uncertainty factors applied in guideline derivation. In the case of metals, additional consideration was given to whether the particular metal is essential (zinc) or non-essential (arsenic and uranium; Wood 2012), to whether site-specific water quality conditions would be expected to modify bioavailability and toxicity (through chemical speciation [primarily complexation] and/or competition; Tessier and Turner 1995; Arche et al. 2016), and to the baseline conditions under which organism have existed and evolved. As summarized above, the characterization of residual change was assigned a level of confidence (low, moderate, or high) and the significance of the residual change was evaluated based on the potential to affect fish and fish habitat, as described in **Section 2.3**.

### 2.1.3 PRODUCTIVITY

Project activities that affect nutrient concentrations in surface water may affect periphyton productivity. Analysis of the potential changes to productivity associated with changes in nutrient chemistry also includes a potential interaction with temperature and other nutrients. Project influences may result in some changes to water quality and temperature which can potentially affect periphyton productivity. Aqueous nutrients evaluated in the Water Quality VC included total phosphorus, ammonia, nitrate, and nitrite (**Appendix 12-B**).

Analysis of nutrient influences to periphyton involved bringing together the following data:

- 1) residual Project-related changes in aqueous nutrient concentrations;
- 2) existing periphyton conditions within the LSA; and
- 3) model responses to periphyton productivity to the nutrients for which residual change was identified.

Residual project changes to water quality were briefly reviewed in **Section 1.4**. Residual changes in nutrients were limited to an increase in nitrate concentrations in Halfway Creek (**Appendix 12-B**). Quantitative descriptors of this change (concentrations with and without the project) were summarized (**Section 4.2.2**). As noted above, existing periphyton data were compiled from aquatic environmental baseline reports (PECG 2017; EDI 2017; **Section 3.3**). Key quantitative endpoints included biomass per

unit area (ash free dry mass per square meter), chlorophyll-a per unit area, density, taxon richness, and community composition to the taxonomic level of class (diatoms) or phylum/division (other algae). Model responses in these endpoints to analytes with residual change (nitrate concentrations) were retrieved from the scientific literature.

Evaluation of potential Project-specific in periphyton productivity was completed by applying literature-based responses/relationships to link the predicted residual change in nitrate concentration to model responses in endpoints for which baseline data are available (using the quantitative endpoints identified above). Mitigation measures are considered and residual changes are described as the best prediction of what is likely to occur based on knowledge of the Project components and activities, the predicted pathways of change, and the proposed mitigation.

Residual changes are then characterized based on the criteria described in **Section 2.1.3**. For the characterization of residual change in periphyton productivity, key interpretive tools included water quality guidelines for nitrate (CCME 1999; BCMOE 2017a), as well as productivity classification schemes that include nitrate or total nitrogen as descriptors (e.g., Dodds et al. 1998). Information underlying the water quality guidelines or classification schemes was also considered and was augmented by consideration of recent findings reported in the scientific literature. As summarized above, the characterization of residual change was assigned a level of confidence (low, moderate, or high) and the significance of the residual change was evaluated based on the potential to affect fish and fish habitat, as described in **Section 2.3**.

## **2.2 BENTHIC INVERTEBRATES**

### **2.2.1 PHYSICAL DISTURBANCE**

Project activities that physically disturb aquatic areas and their watersheds and/or affect surface water quantity (hydrology) have the potential to affect benthic invertebrate communities. The influence of physical disturbance on surface water hydrology (flow quantity and temporal patterns) represents a key physical disturbance pathway (**Figure 1.4-1**) that may result in changes to suspended solids loads, sedimentation, and erosion.

Analysis of potential change to benthic invertebrate communities at due to Project-related physical disturbance at LSA watercourses involved bringing together the following data:

- 1) residual Project-related changes that fall into the physical disturbance category;
- 2) existing benthic invertebrate community conditions within the LSA; and
- 3) model responses of benthic invertebrate communities to physical disturbance.

Residual project changes as they relate to benthic invertebrate communities were summarized in **Section 1.4**, with physical changes primarily manifest as changes to surface water hydrology (**Appendix 8-B**). Accordingly, quantitative descriptors of these changes (e.g., in mean annual discharge,

the monthly distribution of flows, and the magnitude of low and high flows) were summarized (**Section 4.2.1**). Existing benthic invertebrate community data were compiled from aquatic environmental baseline reports (PECG 2017; EDI 2017) and additional data collected in 2017 (**Section 3.4**). Key quantitative endpoints for the baseline characterization included benthic invertebrate abundance (numbers per station), richness (number of distinct taxa), Simpson's Evenness Index and relative abundance of dominant taxonomic groups, functional feeding groups and habitat preference groups (proportion of community). Model responses to these endpoints were supported using information from the scientific literature. Reported responses were often qualitative or semi-quantitative, and effort was specifically applied to the compilation of quantitative model responses that could be used to bridge the existing conditions data and the residual Project-related changes to hydrology.

The analysis methodology used to evaluate potential changes in periphyton due to Project-related physical disturbance, as summarized in **Section 2.1.1**, was applied to selected benthic invertebrate community endpoints as determined and/or supported based on review of the published literature information.

### **2.2.2 TOXICITY**

Project activities that affect surface water quality may affect benthic invertebrates through toxicological means (as defined in Luoma and Rainbow 2008). Project influences may result in some changes to water quality of LSA watercourses that could potentially result in toxicity to resident benthic invertebrates that are exposed to water and/or sediment. Water quality indicators evaluated in the Water Quality VC included total suspended solids/turbidity, conductivity, pH, hardness, total dissolved solids, cyanide, nutrients (total phosphorus, ammonia, nitrate, nitrite), biochemical and chemical oxygen demand, and total and dissolved metals (Appendix 12-B). Suspended solids was the primary sediment quality indicator evaluated previously, and thus was not examined from a toxicity standpoint.

Analysis of potential toxicity to benthic invertebrates involved bringing together the following data:

- 1) residual Project-related changes in water quality;
- 2) existing benthic invertebrate community conditions within the LSA; and
- 3) model toxic responses by benthic invertebrates to the analytes for which residual change was identified.

Residual project changes to water quality were briefly summarized in **Section 1.4**, and included increases in uranium concentrations in Latte Creek, increases in uranium, nitrate and zinc concentrations in Halfway Creek, and short-term increases in arsenic concentrations in YT-24 Creek (**Appendix 12-B**). Quantitative descriptors of these changes (concentrations with and without the project) were summarized (**Section 4.2.2**). As indicated previously, existing benthic invertebrate community data were described using available aquatic environmental baseline reports (PECG 2017; EDI 2017) and additional data collected in 2017 (**Section 3.4**). Key quantitative endpoints for the baseline characterization included



benthic invertebrate abundance, richness, Simpson's Evenness Index and relative abundance of dominant taxonomic groups, functional feeding groups and habitat preference groups. Model responses for key endpoints (i.e., those anticipated to reflect a toxicity-related effect) to analytes predicted to result in a residual change (uranium, nitrate, arsenic, and zinc concentrations) were retrieved from the scientific literature.

The analysis methodology described in **Section 2.1.2**, was used to evaluate potential changes in benthic invertebrate communities due to Project-related toxicity by with specific focus on those benthic invertebrate community endpoints likely to demonstrate an effect as determined/supported by recent published literature information.

### **2.2.3 PRODUCTIVITY**

Project activities that affect nutrient concentrations in surface water may affect benthic invertebrate communities by altering the quantity and/or quality of food resources. Project influences may result in some changes to water quality and temperature of LSA watercourses which can potentially affect primary productivity and, secondarily, biota that rely on primary producers as food. Aqueous nutrients evaluated in the Water Quality VC included total phosphorus, ammonia, nitrate, and nitrite (**Appendix 12-B**).

Analysis of nutrient influences to benthic invertebrates involved compiling the following data:

- 1) residual Project-related changes in aqueous nutrient concentrations;
- 2) existing benthic invertebrate community conditions within the LSA watercourses; and
- 3) model responses to benthic invertebrates related to the nutrients for which residual change was identified.

Residual project changes to water quality were briefly reviewed in **Section 1.4**. Residual changes in nutrients were limited to an increase in nitrate concentrations in Halfway Creek (**Appendix 12-B**). Quantitative descriptors of this change (concentrations with and without the project) were summarized (**Section 4.2**). As indicated previously, existing benthic invertebrate community data were described using available aquatic environmental baseline reports (PECG 2017; EDI 2017) and additional data collected in 2017 (**Section 3.4**). Key quantitative endpoints for the baseline characterization included benthic invertebrate abundance, richness, Simpson's Evenness Index and relative abundance of dominant taxonomic groups, functional feeding groups and habitat preference groups. Model responses for key endpoints (i.e., those anticipated to respond to changes in nutrient input) to nitrate concentrations (i.e., the analyte showing a residual change) were retrieved from the scientific literature.

The analysis methodology described in **Section 2.1.3**, was used to evaluate potential changes in benthic invertebrate communities due to Project-related residual changes in nutrient concentrations with specific focus on those benthic invertebrate community endpoints likely to demonstrate an effect as determined/supported by recent published literature information.

### 2.3 RELATIONSHIP TO FISH AND FISH HABITAT

The significance of residual changes to the ICs of periphyton and benthic invertebrates was evaluated in terms of their relationship to the Fish and Fish Habitat VC. Essentially, the residual changes identified in periphyton and benthic invertebrates was considered within the assessment framework for the Fish and Fish Habitat VC as described in **Appendix 14-B**. Residual changes results to periphyton and benthic invertebrates were re-introduced into the Fish and Fish Habitat VC assessment to determine if the IC changes would result in residual effects to the Fish and Fish Habitat VC and included an assessment of the significance of the residual effects accordingly to methodology described in **Section 5.0** and **Appendix 14-B**. This included rating each residual effect as Not Significant or Significant with the provision of associated rationale, consideration of how likelihood (i.e., probability of occurrence) influenced the determination of significance, and expression of the level of confidence in both the significance and likelihood determinations. In addition, the nature and source of any uncertainty that lowered the level of confidence in the residual effects assessment was described.

### 3.0 EXISTING CONDITIONS

This section provides a description of existing periphyton and benthic invertebrate conditions within the LSA (i.e., conditions prior to interaction with the Project) with supplemental regional information where relevant. This is based on available scientific information, TK, the baseline data collected for the Coffee Gold Mine Project (**Appendices 14-A and 14-C**), and additional data collections completed in 2017. Existing conditions are described in the following paragraphs in the context of the key Indicators (physical disturbance, toxicity, and productivity; see **Section 1.6**). These conditions form the basis for the analysis of changes to the Periphyton and Benthic Invertebrate IC (**Section 4.0**). The quality and reliability of the data as well as uncertainty and knowledge gaps are described as they relate to each IC-indicator combination, and natural and human caused trends that may affect periphyton and benthic invertebrates are discussed where applicable.

#### 3.1 REGULATORY CONTEXT

Regulatory context for the Periphyton and Benthic Invertebrate IC Analysis is generally the same as for the Fish and Fish Habitat VC Assessment (**Appendix 14-B**). Under the federal *Fisheries Act*, Section 35 prohibits serious harm to fish that are part of or support a Commercial, Recreational, or Aboriginal (CRA) Fishery, which includes the destruction of fish habitat (DFO 2013). Serious harm to fish includes the destruction of fish habitat of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes. Section 36 of the federal *Fisheries Act* prohibits the deposit of deleterious substances into waters frequented by fish, unless authorized by regulations under the *Fisheries Act* or other federal legislation. A deleterious substance can be any substance that, if added to any water, would degrade or alter its quality such that it could be harmful to fish, fish habitat or the use of fish by people. The Metal Mining Effluent Regulations (MMER) are the key regulations affecting application of Section 36 of the *Fisheries Act* to the Coffee Gold Project, but only apply to effluent discharges. The MMER authorizes the deposit of deleterious substances into waters frequented by fish provided that the concentrations of deleterious substances do not exceed specified effluent quality limits, effluent pH remains between 6.0 and 9.5, the deleterious substance is not an acutely lethal effluent, and the owner or operator complies with conditions governing the authority to deposit (Government of Canada 2017). MMER conditions include routine effluent quality monitoring, acute lethality testing, and Environmental Effects Monitoring (EEM), as well as notification and monitoring requirements. EEM includes effluent characterization, effluent sublethal toxicity testing, receiving water quality monitoring, and biological monitoring studies to evaluate potential effluent-related effects on fish populations, benthic invertebrate community, and (if triggered by mercury concentrations in effluent greater than 0.10 µg/L), on fish tissue.

Water Quality Guidelines (WQGs) represent science-based goals for water quality that are typically derived using rigorous procedures utilizing available effects data for a given parameter of interest (e.g., CCME 2007). Although guidelines are considered to be voluntary (unless specifically adopted through

licencing), Canadian Environmental Quality Guidelines (CEQGs; CCME 1999) are typically applied in the Yukon as key tools for evaluating the quality of aquatic and terrestrial ecosystems. CEQGs are defined as numerical concentrations or narrative statements that are recommended as levels that should result in negligible risk to biota, their functions, or any interactions that are integral to sustaining the health of ecosystems and the designated resource uses they support (CCME 1999). CEQGs are recommended for parameters of national concern that are found in the ambient environment and represent generic recommendations that are based on the most current scientific information (i.e., they do not directly consider site-specific or management factors that may influence their implementation). A number of jurisdictions within Canada and internationally have their own science-based environmental quality guidelines or criteria. In cases where such guidelines are available for analytes that do not have CEQGs, or where they reflect more recent scientific developments than reflected in the CEQG, these are often used to augment interpretation based on CEQGs.

Additional First Nations Acts and Regulations were described in the Fish and Fish Habitat VC Assessment (**Appendix 14-B**). Under the Umbrella Final Agreement and Yukon First Nation Final Agreements, First Nations have representation on all fish and fish habitat management councils and boards and have the ability to draft acts to manage Fish and Fish Habitat on their Settlement Lands. To date, the TH have established the *Tr'ondëk Hwëch'in Fish and Wildlife Act* (Tr'ondëk Hwëch'in 2009).

### **3.2 BACKGROUND INFORMATION AND STUDIES**

The assessment for periphyton and benthic invertebrates is based on the background information noted in **Appendix 14-B** of the Project Proposal, and includes traditional knowledge, scientific and other information and baseline studies conducted for the Project. Baseline studies are summarized in **Table 3.2-1** and **Figure 3.2-1**.







**Table 3.2-1 Summary of Baseline Studies Related to Periphyton and Benthic Invertebrates (Appendices 14-A and 14-C)**

Study Name	Study Purpose, Duration and Spatial Boundaries
Coffee Gold Mine Fish and Aquatic Resources Baseline Report ( <b>Appendix 14-C</b> ; PEGC 2017)	<p><b>Study Purpose:</b> Detailed baseline characterization of fish and aquatic resources of the Project area.</p> <p><b>Timing:</b> August and October 2014; March, June, July, and September 2015.</p> <p><b>Periphyton and Benthic Invertebrate Data:</b> Periphyton and benthic invertebrate sampling at sites in Latte Creek, Coffee Creek, YT-24 Creek, Halfway Creek, Independence Creek, Isaac Creek, and Los Angeles Creek. Periphyton endpoints included biomass (ash free dry mass), chlorophyll-a, and community composition (to the phylum/division [algae] or class [diatoms] level). Benthic invertebrate community endpoints included abundance, taxon richness, biodiversity, evenness, and community composition (to the lowest practical level).</p> <p><b>Additional Aquatic Environmental Data:</b> Sediment quality, fish habitat, fish distribution, fish community, fish population (size, age, condition), and fish tissue quality. Fish sampling and habitat investigations in lower reaches of Coffee, Halfway, and Independence creeks; salmon spawning survey in a 31 km section of the Yukon River in the vicinity of the Project area and lower Coffee and Independence creeks.</p>
Coffee Gold Mine: Fisheries and Aquatic Resource Baseline Update ( <b>Appendix 14-A</b> ; EDI 2017)	<p><b>Study Purpose:</b> Supplementary baseline characterization of fish and aquatic resources of the Project area. Additional data collection and synthesis with traditional and scientific knowledge and previously collected data.</p> <p><b>Timing:</b> March, July, August, and October 2016</p> <p><b>Periphyton and Benthic Invertebrate Data:</b> Periphyton chlorophyll-a and benthic invertebrate tissue sampling at sites in Latte Creek, Coffee Creek, YT-24 Creek, Halfway Creek, Independence Creek, and Los Angeles Creek.</p> <p><b>Additional Aquatic Environmental Data:</b> Additional baseline characterization of fish and fish habitat including environmental DNA sampling, winter studies, summer fish and fish habitat assessments, chinook salmon spawning surveys, fish tissue quality, and stream gradient modeling around Project area.</p>
2017 Data Collections (not previously reported; Appendices A and B of this document)	<p><b>Study Purpose:</b> Supplementary baseline characterization of fish and aquatic resources of the Project area.</p> <p><b>Timing:</b> August 2017</p> <p><b>Periphyton and Benthic Invertebrate Data:</b> Replicated benthic invertebrate sampling in two areas: a “future exposed area” on Halfway Creek and a matched reference area located on a tributary to Carlisle Creek. Benthic invertebrate community endpoints included density, taxon richness, biodiversity, evenness, community composition (to the lowest practical level), habitat preference groups, and functional feeding groups. Periphyton and benthic invertebrates were also sampled at sites in Latte Creek, Coffee Creek, YT-24 Creek, Halfway Creek, Independence Creek, and Los Angeles Creek. Periphyton endpoints included biomass (ash free dry mass), chlorophyll-a, and community composition (to the phylum/division [algae] or class [diatoms] level). Benthic invertebrate community endpoints included abundance, taxon richness, biodiversity, evenness, and community composition (to the lowest practical level).</p> <p><b>Additional Aquatic Environmental Data:</b> Additional baseline characterization of stream sediments at the same sites as periphyton and benthic invertebrates. Fish tissue in Halfway Creek (near the mouth) and in Independence Creek.</p>

### 3.3 DESCRIPTION OF EXISTING PERIPHYTON CONDITIONS

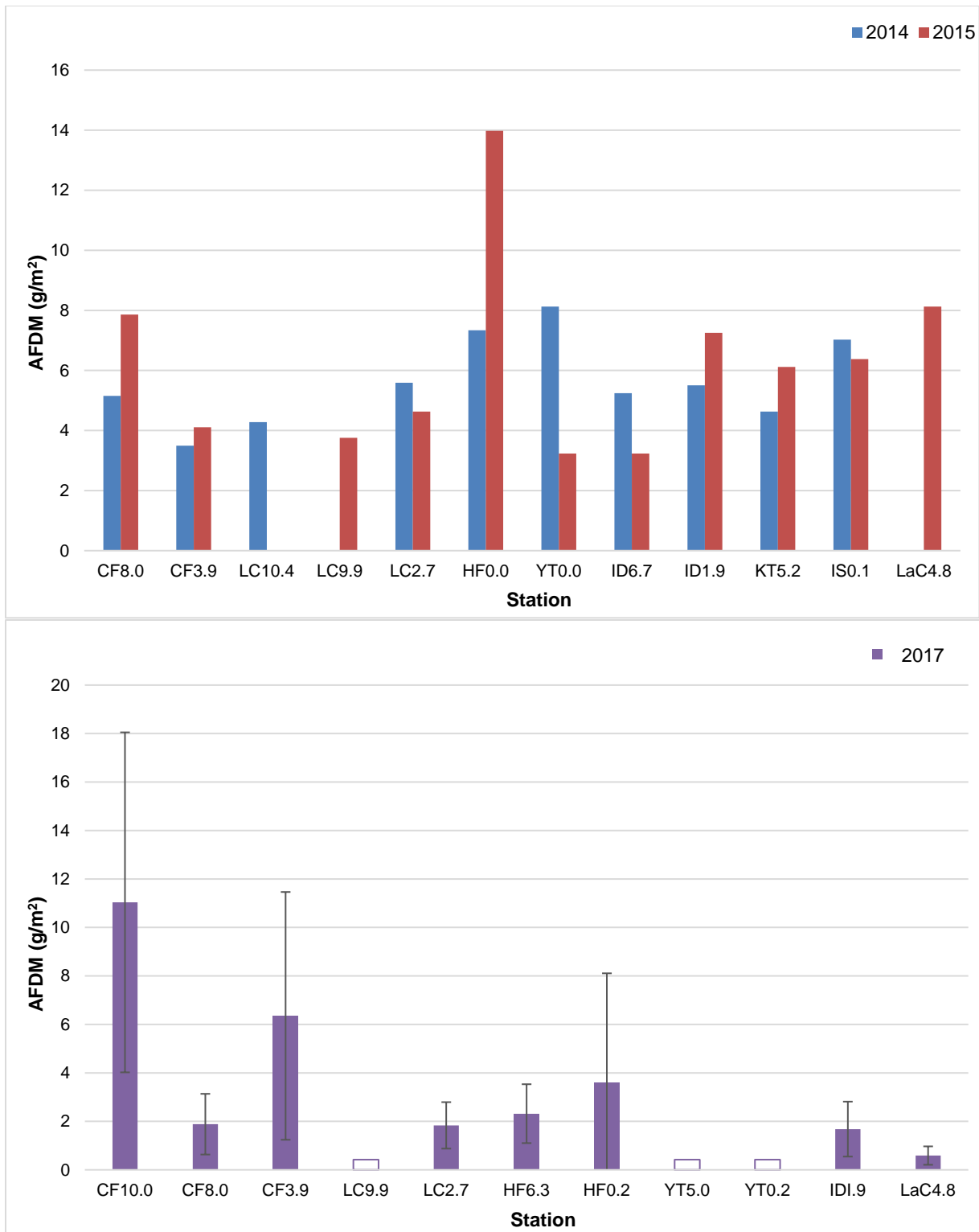
This section provides a description of existing conditions (i.e., conditions prior to interaction with the Project) for periphyton. Where relevant, any uncertainty, data gaps, natural trends, or human-caused trends that may be affecting the IC are described as they relate to each indicator. Periphyton data were reviewed in the Fish and Fish Habitat VC Assessment Report (**Appendix 14-B**). The review is expanded herein to include some additional data that were collected in 2017 (included as **Appendix A** of this Report).

Periphyton sampling was completed in 2014, 2015, 2016, and 2017 within the LSA including Latte, Coffee, Halfway, and YT-24 creeks as well at reference stations (Independence, Los Angeles, and upper Coffee creeks; **Figure 3.2-1**). Ash-free dry mass (AFDM) ranged from 3.5 to 8.1 g/m<sup>2</sup> in 2014 and 3.2 to 14 g/m<sup>2</sup> in 2015, while mean AFDM ranged <0.42 to 25 g/m<sup>2</sup> in 2017 (**Figure 3.3-1**). At Coffee Creek, AFDM was lower downstream compared to upstream in 2014 and 2015. AFDM was higher downstream compared to upstream at Latte (all years) and Independence (only in 2015) creeks (**Figure 3.3-1**). There was little variation in AFDM among stations in 2014 and 2015, but large variation, both among and within stations, in 2017 (**Figure 3.3-1**).

Mean chlorophyll-a concentrations were very low in all watersheds in the Mine Area (**Appendix 14-A**; PEGC 2017, EDI 2017), which is typical of northern, nutrient poor aquatic habitats. Laboratory holding times were exceeded during chlorophyll-a sampling in 2014 and 2015, and therefore abundances of chlorophyll-a were expected to represent an underestimation during this time period. Chlorophyll-a sampling was conducted again in 2016 and 2017, and sampling met all lab holding times and requirements. Abundances of chlorophyll-a ranged from 0.79 to 3.5 mg/m<sup>2</sup> in 2014, and 0.96 to 2.5 mg/m<sup>2</sup> in 2015 (**Figure 3.3-2**). Maximum chlorophyll-a concentrations in these years occurred at Isaac Creek (IS0.1; 3.6 mg/m<sup>2</sup>) and at the downstream YT-24 Creek station (YT0.0; 2.5 mg/m<sup>2</sup>) in 2014 and 2015, respectively. Mean chlorophyll-a abundances in 2016 and 2017 ranged from 1.4 to 8.8 mg/m<sup>2</sup> and <0.42 to 11 mg/m<sup>2</sup>, respectively (**Figure 3.3-2**). These abundances are within the range of oligotrophic streams (<20 mg/m<sup>2</sup>; Dodds et al. 1998), and are well below the short-term maximum British Columbia guideline for the protection of aquatic life (100 mg/m<sup>2</sup>; BCMOE 2017a). In 2016, chlorophyll-a was generally lower at upstream compared to downstream stations across the watershed, including Coffee Creek (5.7 and 8.8 mg/m<sup>2</sup>, respectively), Latte Creek (1.4 and 2.7 mg/m<sup>2</sup>, respectively), LT-24 Creek (6.1 to 7.6 mg/m<sup>2</sup>, respectively), and Halfway Creek (3.0 to 7.0 mg/m<sup>2</sup>, respectively). In 2017, this was only observed for Latte Creek, while chlorophyll-a was higher upstream compared to downstream in YT-24 creek. Chlorophyll-a concentrations were generally higher in 2016 compared to 2017, and likely reflects temporal variability. The maximum mean chlorophyll-a concentrations in 2016 and 2017 were observed at the upstream (CF3.9; 8.8 mg/m<sup>2</sup>) and downstream (CF10.0; 3.0 mg/m<sup>2</sup>) Coffee Creek stations (**Figure 3.3-2**).

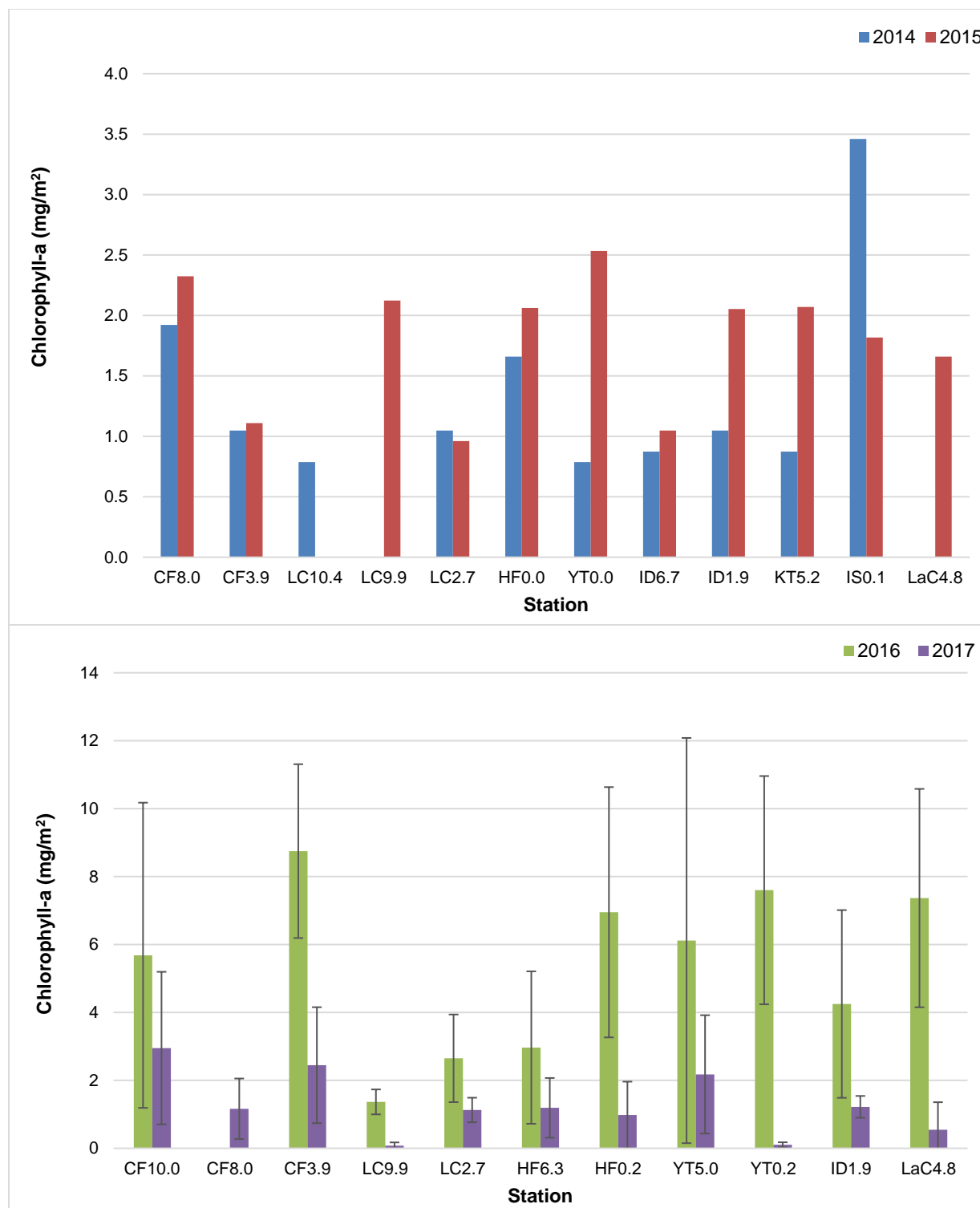
Cyanophyta (blue-green algae) were dominant at all stations and in all years except for Isaac Creek in 2014, where Bacillariophyta (diatoms) were dominant (**Figure 3.3-3**). The mean periphyton communities for all stations in 2014 and 2015 were dominated by blue-green algae (72% and 89%, respectively), followed by diatoms (24% and 8%, respectively), and green algae (Chlorophyta; 4% and 3%, respectively).

Rhodophyta (red algae) were only observed at Isaac Creek in 2014, and were a minor component of the periphyton community (1.9%). Taxon richness were similar among stations and years, and varied between 8 and 14 (**Figure 3.3-4**). Upstream taxon richness was lower at upstream compared to downstream stations in Coffee and Independence creeks, while the opposite was observed for Latte Creek (**Figure 3.3-4**).



**Figure 3.3-1 Periphyton Ash-Free Dry Mass per Square Metre, 2014 to 2017**

Notes: Open bars indicate mean values below the method detection limit (MDL). For 2017, mean ± standard deviation are reported for 4 to 6 replicates per station. Mean and standard deviation were estimated using the survfit function in the survival package in R (R Core Team, 2016) using the methods for censored data described in (Helsel 2012).



**Figure 3.3-2 Periphyton Chlorophyll-a Concentrations, 2014 to 2017**

**Notes:** For 2016 and 2017, mean abundance ± standard deviation are reported for 5 to 6 replicates per station. Mean and standard deviation were estimated using the survfit function in the survival package in R (R Core Team, 2016) using the methods for censored data described in (Helsel 2012).



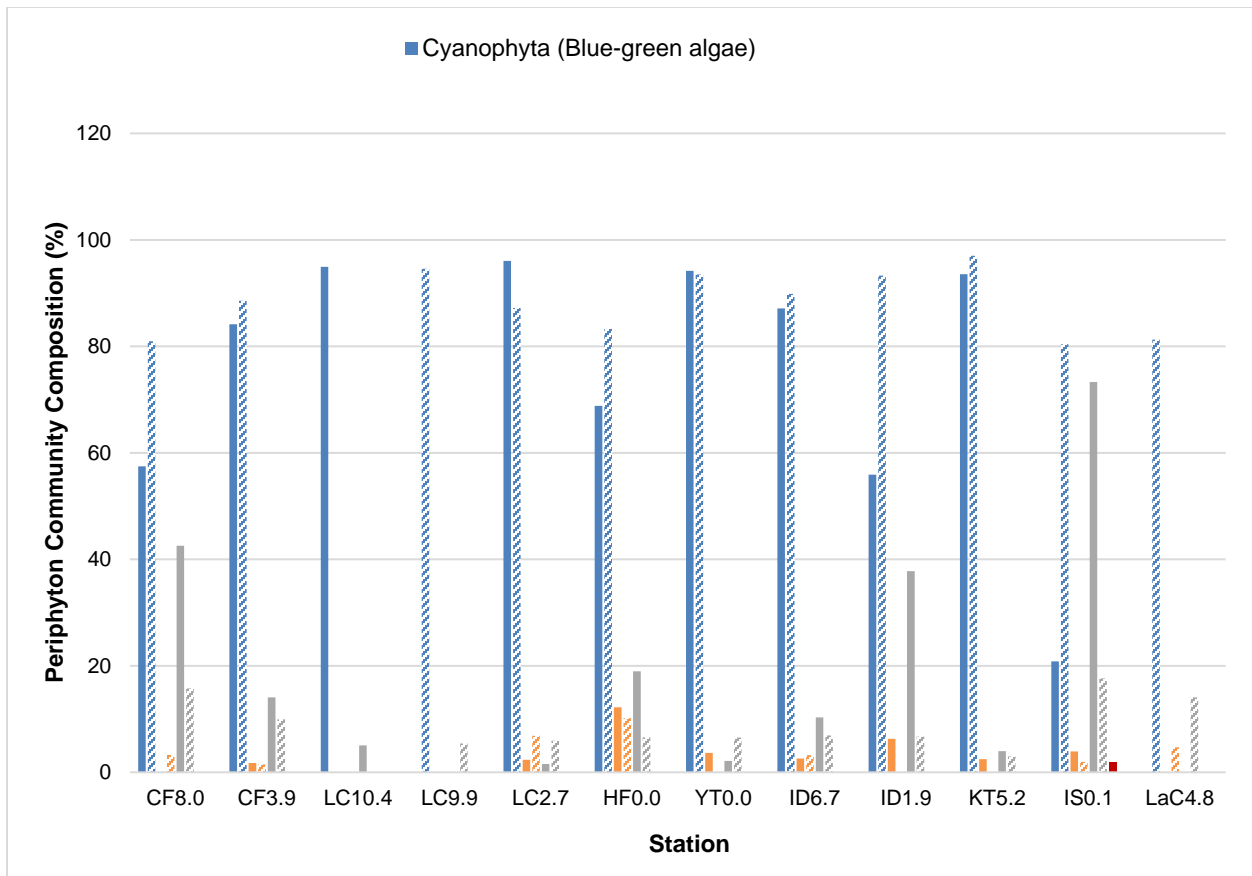


Figure 3.3-3 Periphyton Community Composition, 2014 to 2017

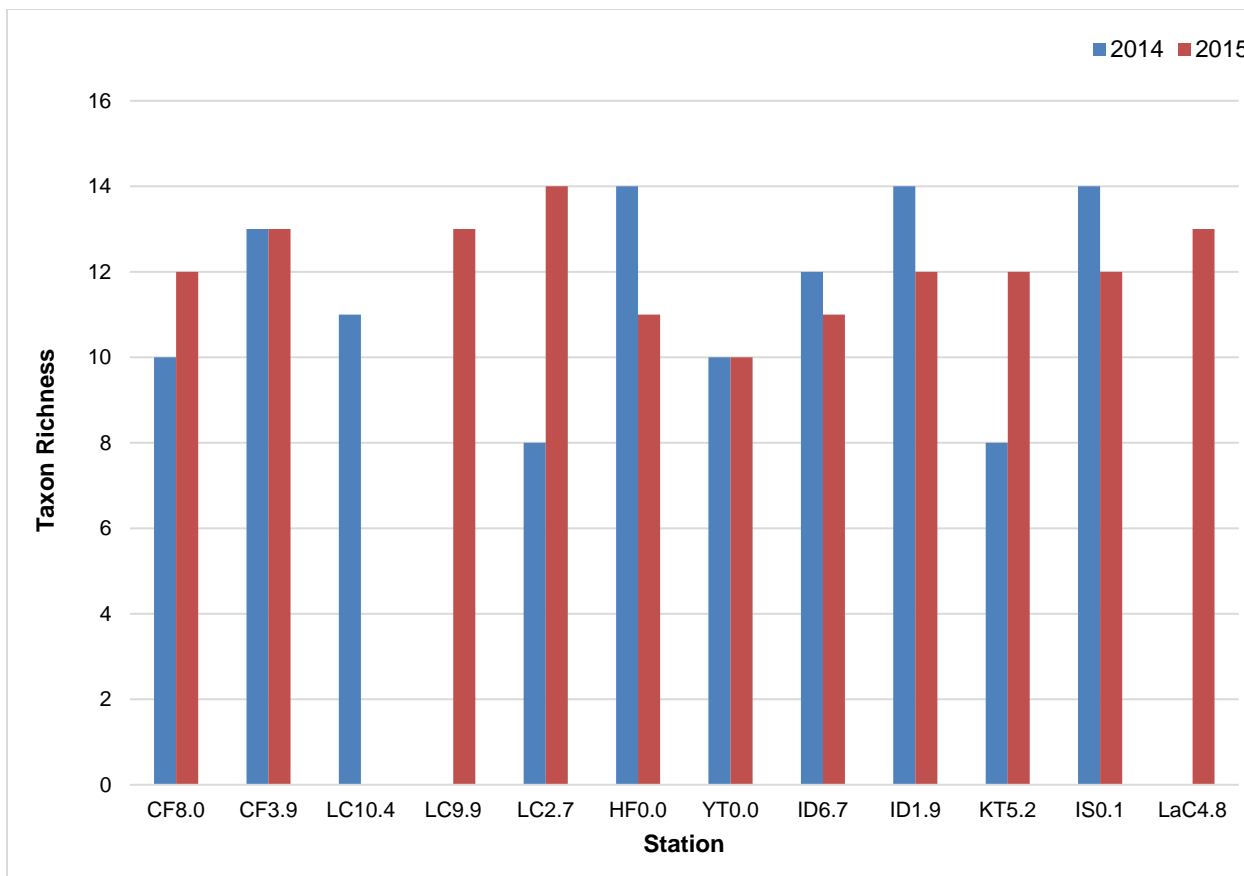


Figure 3.3-4 Periphyton Taxon Richness, 2014 to 2017

### 3.4 DESCRIPTION OF EXISTING BENTHIC INVERTEBRATE CONDITIONS

This section provides a description of benthic invertebrate communities at watercourses under existing conditions (i.e., prior to interaction with the Project). Where relevant, any uncertainty, data gaps, natural trends, or human-caused trends that may be affecting the IC are described as they relate to each indicator. Benthic invertebrate community data, which were briefly reviewed in the Fish and Fish Habitat VC Assessment Report (**Appendix 14-B**), were subject to further review herein to include several additional endpoints and to also incorporate additional data that were collected in 2017 (included as **Appendix B** of this Report).

The majority of baseline benthic invertebrate community data was collected using a kick-and-sweep method (CABIN 2012). This method collects one sample per site and does not provide an estimate of variability within the site. Kick-and-sweep benthic invertebrate community sampling was undertaken in 2014, 2015, and 2017 at Independence, Kona, Isaac, Los Angeles, Latte, Coffee, Halfway and YT-24 creeks within the LSA (**Figure 3.2-1**). Highest mean abundances (organisms per 3-minute kick-and-sweep) across all years (2014 to 2017) were observed in Los Angeles Creek (4,590), Independence Creek (2,510), and Coffee Creek (991), followed by Kona Creek (893), YT-24 Creek (813), Latte Creek (758), Halfway Creek (644), and Isaac Creek (391). Total abundance generally increased in a downstream direction within YT-24 Creek and Independence Creek watersheds. The highest mean taxon richness across all three years was observed in Coffee, Latte, and Isaac creeks (24), Halfway Creek (23), followed by YT-24, Independence, and Los Angeles creeks (19), and Kona Creek (16). Unlike abundance, there was no apparent pattern in taxon richness from upstream to downstream.

Dominant benthic invertebrate taxon groups included Ephemeroptera (mayflies) and Plecoptera (stoneflies) in 2017, whereas Chironomidae (non-biting midges) and/or Simuliidae (black flies) were dominant in 2014 and 2015 (**Figure 3.4-1**). In 2017, E and P taxa (Ephemeroptera and Plecoptera) made up the majority of the benthic invertebrate community in Coffee Creek, Latte Creek, Halfway Creek, YT-24 Creek, and Los Angeles Creek, and generally decreased in a downstream direction within watercourses. EPT abundance fluctuated among years, and was comprised mostly of Ephemeroptera (mayflies) in Coffee Creek, Latte Creek, Independence Creek, Isaac Creek, and Los Angeles Creek, and Plecoptera (stoneflies) elsewhere. Trichoptera (caddisflies) only made up a small average proportion of the total community, and were only observed in Coffee (3.5%), Latte (3.5%), Halfway (0.4%), and Independence (1.8%) creeks in 2014, and in Coffee (1.9%), Latte (0.4%), Halfway (0.2%), and Independence (0.5%) creeks in 2017. Trichoptera were not present in samples collected in 2015. In 2017, Dipterans represented the second largest proportion of the community at creeks sampled within the LSA with the exception of Independence Creek, where Ephemeroptera and Plecoptera were the dominant groups (**Figure 3.4-1**). Among dominant taxa, the Simuliidae showed the greatest variability in relative abundance within- and among-watercourses and study years (**Figure 3.4-1**), potentially reflecting variability in emergence, habitat, and/or sampling artifacts. In general, Ephemeroptera and/or Plecoptera were typically present in higher relative abundance upstream

in the watershed, whereas Diptera typically dominated sites lower in the watershed. The relative abundance of metal-sensitive chironomids<sup>2</sup> was generally low across all sites over the three sampling years.

Functional feeding group (FFG, as defined by Mandaville 2002) composition showed relatively minor variability among the three sampling years at individual LSA creeks, and was largely represented by collector gatherers (**Figure 3.4-2**). Differences in the proportions of filterers and shredders were observed among sampling years, which depending on the sampling year, made up the next largest proportion of FFG in the community at most LSA creeks (2014 – shredders, 2015 – filterers, 2017 – shredders). The proportion of FFG scrapers and predators was generally low (i.e., less than 10% of the community), and was higher in 2014 compared to 2015 and 2017. Habitat preference group (HPG, as defined by Merritt and Cummins 1996) composition appeared to shift from being dominated by sprawlers in 2014, to clingers by 2017 (**Figure 3.4-3**). Consistent with the erosional habitat sampled, burrowers predominantly represented by Oligochaetes (aquatic worms) were found in low numbers in all three years of baseline sampling.


In 2017, benthic invertebrates were also collected using a Hess sampler at a future mine-exposed area (Halfway Creek) and at a potential future reference area (Area 129, a tributary to Carlisle Creek), with replication of 5 stations per area (**Figure 3.2-1**). The average density of organisms was lower at Halfway Creek (839 org/m<sup>2</sup>) than at Area 129 (2,079 org/m<sup>2</sup>), but average taxon richness was similar between these creeks (Halfway Creek = 18.8; Area 129 = 19.6). Simpson's Evenness and Shannon-Weiner Diversity were higher at Halfway Creek than at Area 129 (**Table 3.4-1**). The mean proportion of EPT was similar between areas (Halfway Creek = 24.4%; Area 129 = 25.7%); however, Halfway Creek had similar proportions of Ephemeroptera (33.4%) and Plecoptera (37.3%) whereas Area 129 was dominated by Plecoptera (67.9%). Neither area had a high density of Tricoptera as was also observed in the kick-and-sweep sampling. Chironomidae made up a greater proportion of the community at Halfway Creek (12.8%) than at Area 129 (6.4%), but small proportions of the community overall at both sites. Of the taxa present at Halfway Creek, 9.0% were metal sensitive (and 67% of the chironomids present were metal sensitive).

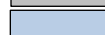
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<sup>2</sup> Specific to this study, this group includes *Micropsectra* sp., *Stempellinella* sp., *Tanytarsus* sp., *Arctodiamesa* sp., *Psuedokiefferiella* sp., *Diamesa* sp., *Pagastia* sp., *Pottastia gaedii*, and *Pseudodiamesa* sp.; members of the metal-tribe Tanytarsini and subfamily Diamesinae (Kraft and Sypniewski 1981; Clements and Kiffney 1995; Clements et al. 2000).

**Table 3.4-1 Statistical Comparisons for Benthic Invertebrate Community Endpoints for 129 Reference (n = 5) and Halfway Creek (n = 5), Sampled in 2017 for the Coffee Gold Project**

Endpoint	Units	Data Transformation	Test	Test P-value	Mean or Median <sup>1</sup>		Observed ES (Halfway Creek - 129 Reference)/ SD	
					129 Reference	Halfway Creek		
Number of Organisms	org/m <sup>2</sup>	none	T	0.017	2,079	839	-1.9	
Total Number of Taxa	-	none	T	0.719	19.6	18.8	-0.24	
Simpson's Evenness (E)	-	square root	T	0.003	0.116	0.270	2.7	
Shannon-Weiner Diversity (H')	-	none	T	0.009	1.95	2.87	2.2	
Bray-Curtis Index	-	log	Tunequal	0.028	0.264	0.824	1.5	
Percent Composition	Oligochaeta	%	log	T	0.201	7.98	3.98	-0.88
	Ephemeroptera	%	square root	T	<0.001	8.73	32.8	3.3
	Plecoptera	%	none	T	0.006	67.9	37.3	-2.3
	Trichoptera	%	rank	MW	0.009	0	1.51	-
	Chironomidae	%	none	T	0.015	6.38	12.8	1.9
	Metal Sensitive Chironomidae	%	log	T	<0.001	0.903	8.60	9.4
	Simuliidae	%	none	T	0.182	2.23	4.75	0.92
Functional Feeding Groups	Collector Gatherers	%	none	T	0.008	22.5	49.5	2.2
	Filterers	%	none	T	0.203	2.37	4.75	0.88
	Scrapers	%	none	Tunequal	0.151	5.17	2.68	-0.79
	Shredders	%	square root	T	0.007	67.5	39.0	-2.3
Habitat Preference	Clingers	%	square root	T	<0.001	13.0	42.2	4.1
	Sprawlers	%	none	T	0.017	74.0	51.2	-1.9
	Burrowers	%	log	T	0.282	9.17	5.39	-0.73

 P-value < 0.1

 Magnitude of observed effect size > 2 SD

<sup>1</sup> For transformed data, the back-transformed mean is reported; for ranked data, the median is reported.

**Notes:** T= t-test; Tunequal = t-test for unequal variances; MW = Mann-Whitney test; log = logarithm base 10  
The observed effect size is calculated on the transformed scale when the data were transformed for analysis.  
No effect size is reported for the Mann-Whitney test.



As with the CABIN data from 2017 and previous years, the Hess FFG data showed that collector/gatherers and shredders made up the largest percentages of the community at Halfway Creek (**Table 3.4-1**). This was also observed at Area 129, but data showed a much greater proportion of shredders to collector/gatherers. Again for Halfway Creek, Hess and CABIN mean data both indicated that HPG were largely made up of clingers and sprawlers in similar proportions. Area 129 was largely dominated by sprawlers (74.0%), with clingers and burrowers in similar, smaller proportions (13.4% and 12.6% respectively (**Table 3.4-1**). Statistical comparisons between the two areas using two sample t-tests indicated that Halfway Creek was significantly different from Area 129 on the basis of almost all endpoints examined despite similar physical characteristics (**Table 3.4-1**). This is indicative of spatial variability even under baseline conditions.

Benthic invertebrate tissue samples were collected in March and August of 2016 and analyzed for total metals concentrations (**Appendix 14-A**). Of the metals for which residual effects to water quality were identified (uranium, arsenic, and zinc; **Appendix 12-B**), baseline concentrations were generally higher in the spring (March 2016) than in the summer (August 2016). Estimated baseline methylmercury concentrations (54% of total mercury) did not exceed the CCME guideline for the protection of piscivorous wildlife (0.033 µg/g ww; CCME 2000) in any samples (maximum 0.023 µg/g ww in a sample collected from Coffee Creek in March; **Appendix 14-A**). Conversely, baseline selenium concentrations exceeded the interim British Columbia guideline for dietary exposure to fish (invertebrate tissue; 4 µg/g dw) in a number of samples (maximum 7.6 µg/g dw in a sample collected from Coffee Creek in March 2016; **Appendix 14-A**).

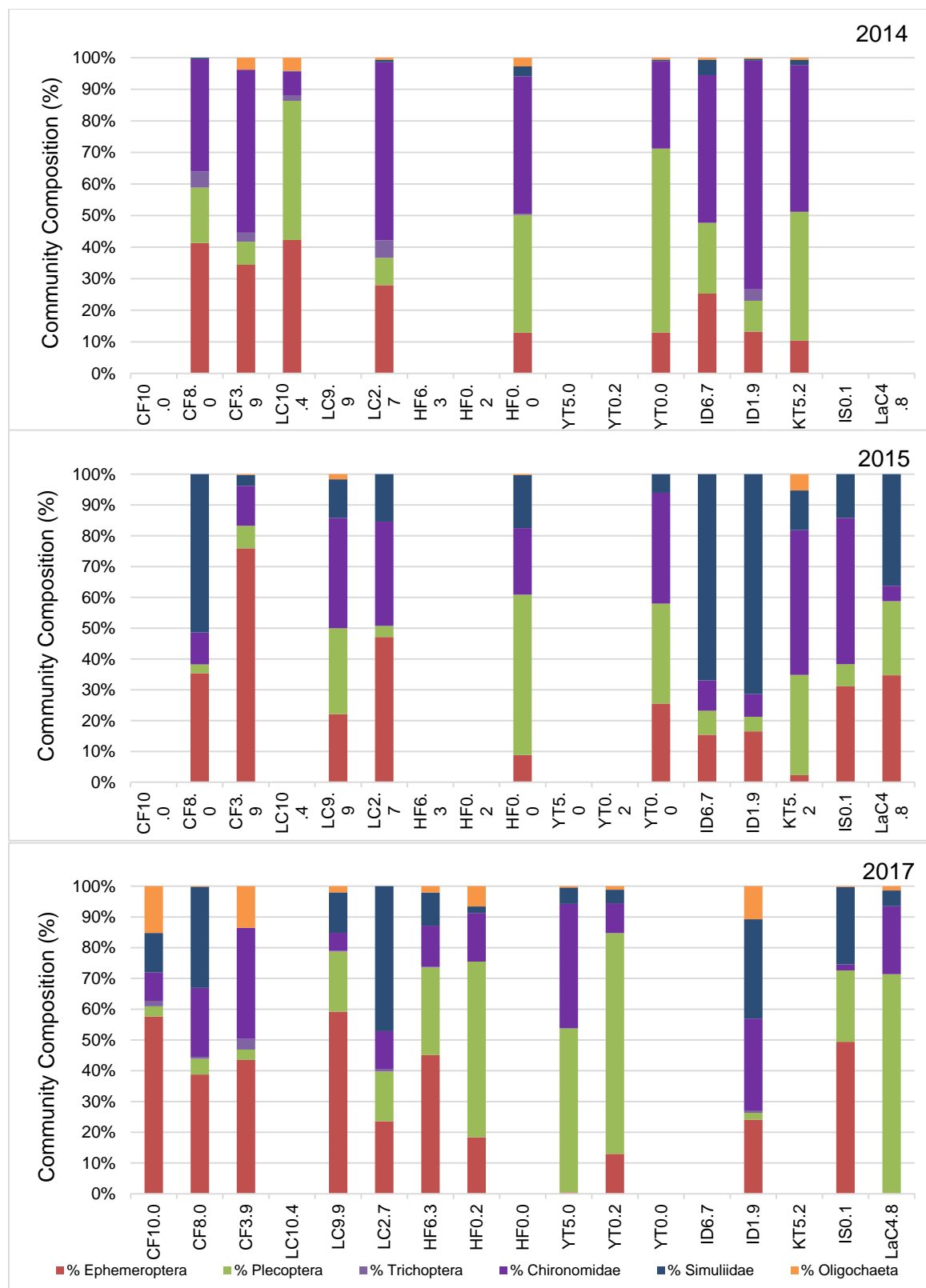


Figure 3.4-1 Percent Composition of Major Benthic Groups

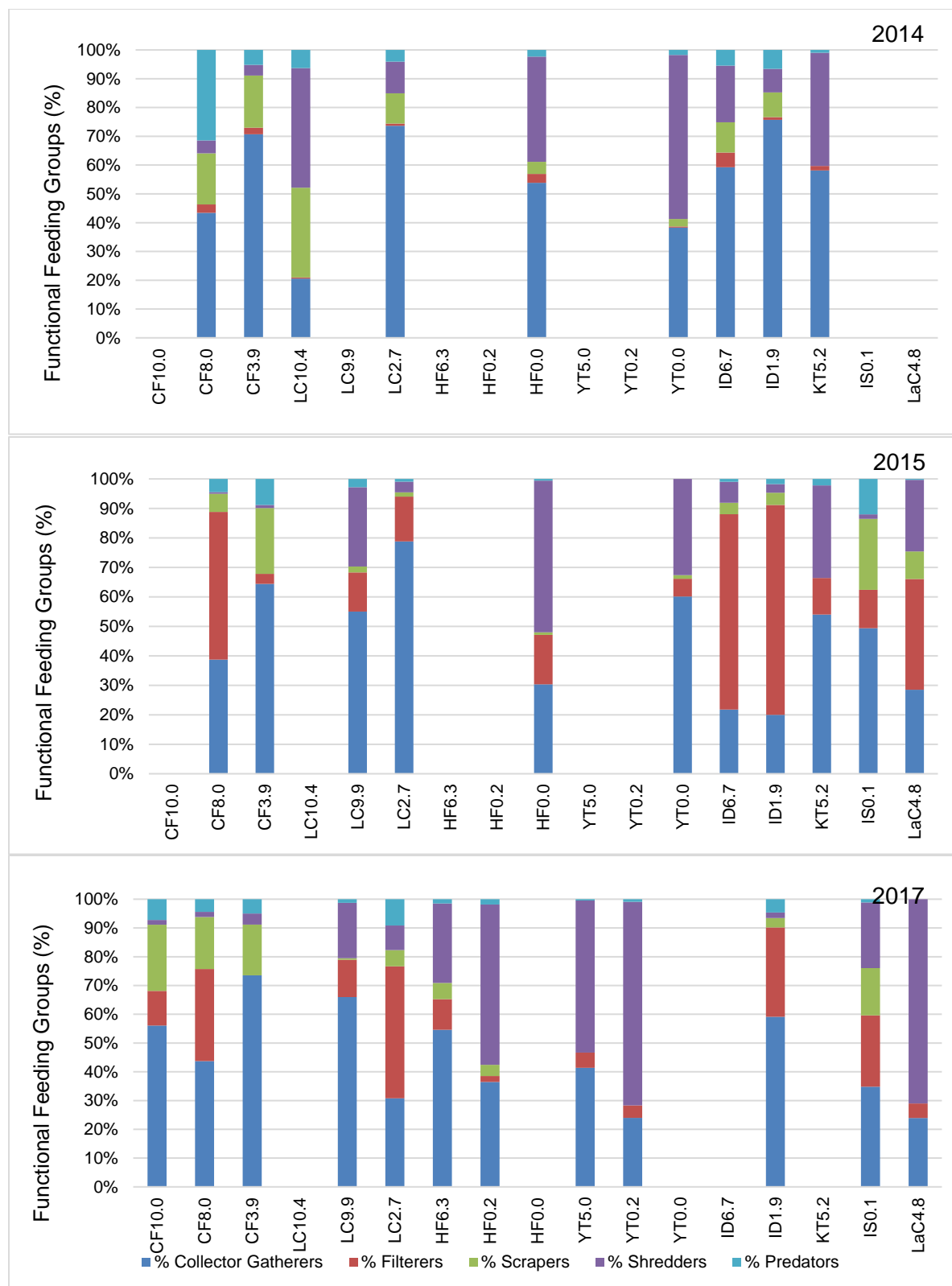


Figure 3.4-2 Percent Composition of Benthic Functional Feeding Groups

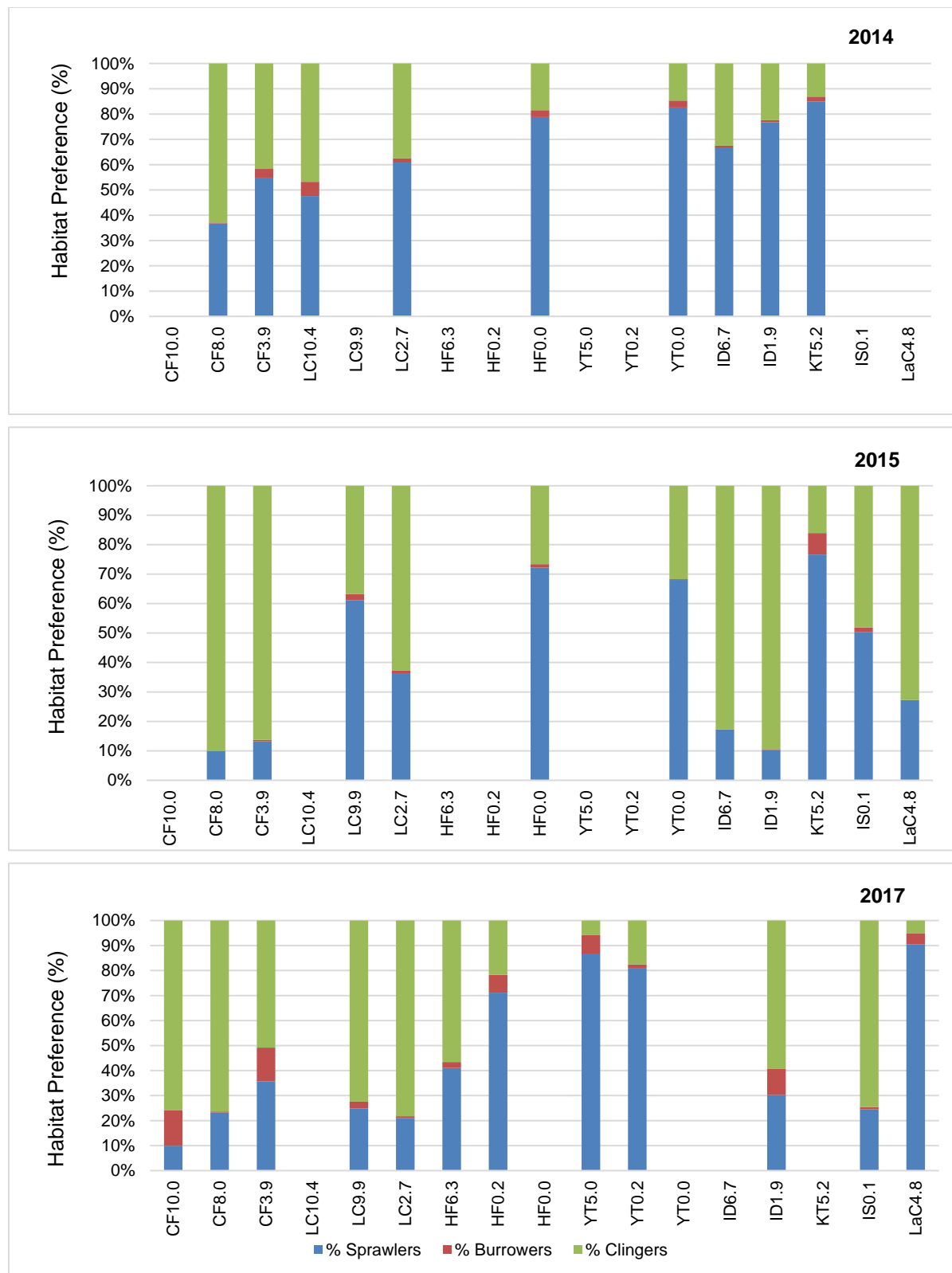


Figure 3.4-3 Percent Composition of Benthic Habitat Preference Groups

## 4.0 ANALYSIS OF PROJECT-RELATED CHANGES

This section reviews potential Project Interactions, reviews residual effects to linked VCs and residual changes to linked ICs, evaluates potential Project-specific changes to periphyton and benthic invertebrates, and considers proposed mitigation actions to reduce or eliminate potential changes to periphyton and benthic invertebrates. Based on the anticipated effectiveness of the mitigation measures, residual changes to periphyton and benthic invertebrates are characterized, and the likelihood of each predicted residual change is identified. The evaluation of the potential implications of changes to periphyton and benthic invertebrates to the significance of the residual effects to Fish and Fish Habitat is addressed in **Section 5.0**.

### 4.1 POTENTIAL PROJECT-RELATED INTERACTIONS

Project Interactions were outlined in **Appendix 5-A** of the Project Proposal, and were used, along with comments put forward by reviewers of the Project's Project Proposal and in consideration of a Conceptual Site Model (**Figure 1.4-1**), in Issues Scoping (**Section 1.4**) to define the key interactions with the potential to change periphyton and benthic invertebrate conditions. This exercise served to focus the analysis on those interactions of greatest consequence to periphyton and benthic invertebrates and identified that key Project-related influences to periphyton and benthic invertebrates occurred via surface water hydrology and surface water quality (which, in turn integrate interactions and potential changes/effects to groundwater [**Appendix 7-B**], air quality [**Appendix 9-B Air Quality and Greenhouse Gas Emissions Intermediate Component Report**], and surficial geology, terrain, and soils [**Appendix 11-B Surficial Geology, Terrain, and Soils Valued Component Assessment Report**]).

Residual Project-related changes/effects to surface water hydrology and surface water quality (i.e., after mitigation and other considerations outlined in in the Surface Hydrology IC Analysis Report (**Appendix 8-B**) and the Surface Water Quality VC Assessment Report (**Appendix 12-B**) are used as the basis for evaluating potential changes to periphyton and benthic invertebrates. A summary of the residual changes/effects from these reports is presented in **Section 4.2**.

Consequent associated potential changes to periphyton and benthic invertebrates were categorized according to three indicators: physical disturbance, toxicity, and productivity. Project interactions are discussed further in **Sections 4.3** and **4.4**, which outline the potential Project-related changes to periphyton and benthic invertebrates, respectively.

### 4.2 REVIEW OF CHANGES/EFFECTS TO HYDROLOGY AND WATER QUALITY

Changes to hydrology and effects to surface water quality, along with associated causes, have been reviewed in detail in the Fish and Fish Habitat Effects Assessment (**Appendix 14-B**). Changes to surface hydrology following mitigation were evaluated from the end of operations, through closure, and into post-closure in the Surface Hydrology IC Report (**Appendix 8-B**), were reviewed in the Fish and Fish Habitat



Effects Assessment Report (**Appendix 14-B**), and were introduced in **Section 1.4** of this report. Effects to surface water quality following mitigation were identified in the Surface Water Quality Hydrology IC Report (**Appendix 12-B**), were reviewed in the Fish and Fish Habitat VC Report (**Appendix 14-B**), and were introduced in **Section 1.4** of this report.

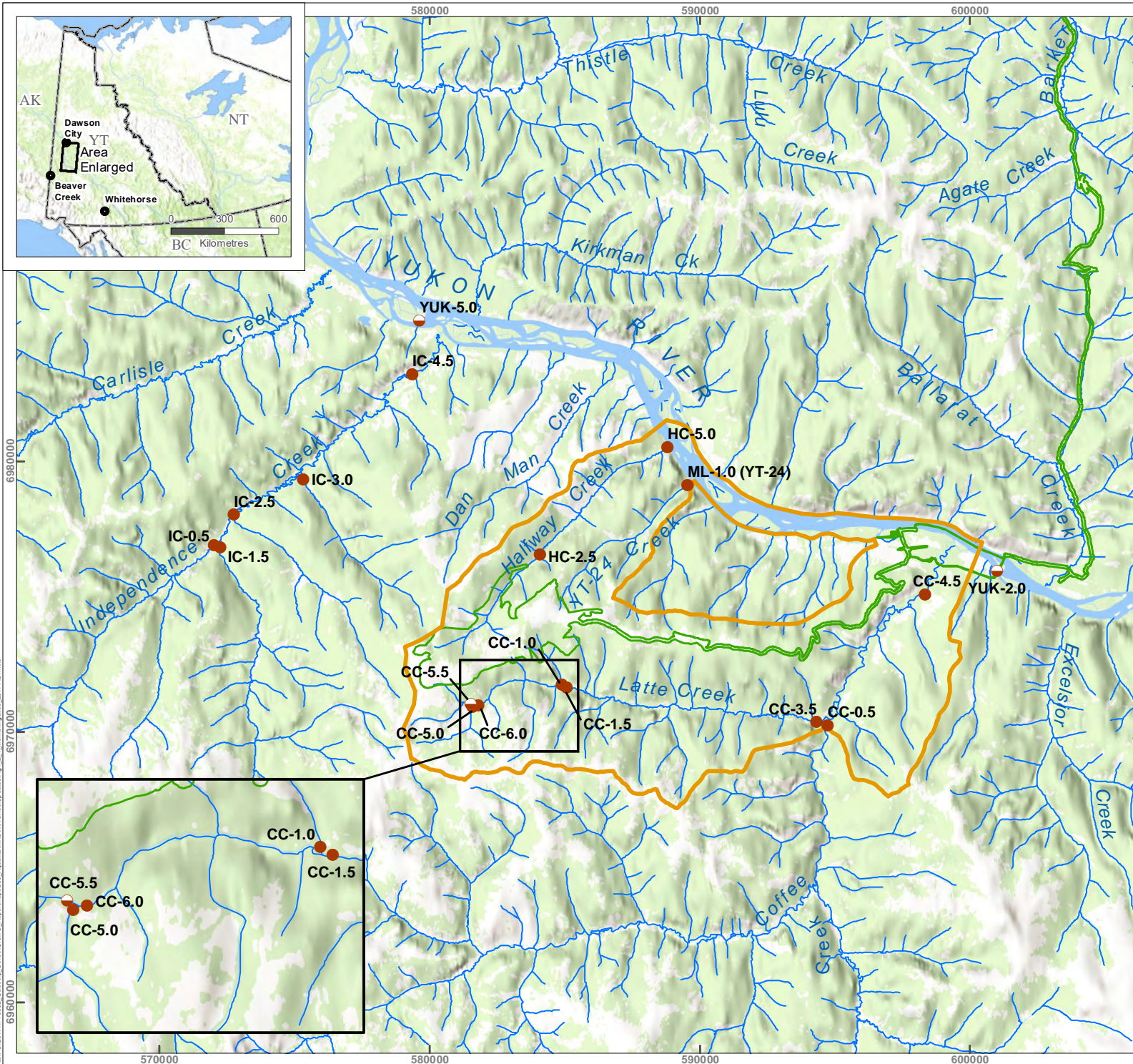
Residual Project-related changes/effects to surface water hydrology and surface water quality (i.e., after mitigation and other considerations) outlined in in the Surface Hydrology IC Analysis Report (**Appendix 8-B**) and the Surface Water Quality VC Assessment Report (**Appendix 12-B**) are used as the basis for evaluating potential changes to periphyton and benthic invertebrates, as summarized in the following sections.

#### 4.2.1 SURFACE HYDROLOGY

The largest changes to surface hydrology are predicted to occur when the project footprint is at its greatest, which is represented by end of operation and is used herein. Residual changes to surface hydrology are predicted to be largely confined to the headwater reaches of Latte, YT-24, and Halfway creeks (see **Figure 4.2-1** for relevant assessment locations). Project-related residual changes in surface hydrology include moderate reductions in flows, alteration of the monthly distribution of flows, and alteration of the magnitude of low/high flows within upper Latte Creek. Conversely, moderate increases in flows, alteration of the monthly distribution of flows, and alteration of the magnitude of low/high flows are expected in YT-24 and Halfway creeks. In each of Latte, YT-24, and Halfway creeks, the influences of the project are greatest in the headwaters and decrease downstream. No residual changes in hydrology are expected in Coffee Creek or in the Yukon River.

Specific quantitative decreases in Mean Annual Discharge (MAD) of Latte Creek were of low magnitude (i.e., less than the 5% error bounds of the Water Balance Model; **Table 4.2-1**). The greatest predicted change in MAD within Latte Creek was a 4% decrease in Upper Latte Creek at the end of operations (**Table 4.2-1**) and is associated with very small changes (mostly reductions) in 10<sup>th</sup> percentile, mean, and 90<sup>th</sup> percentile flows (**Figure 4.2-2**). The majority of modelled flow results for upper Latte Creek are within 0% to -10% of Natural Case, with some rare instances of positive change at lower flows (**Appendix 12-C-3**). Specific quantitative increases in Mean Annual Discharge (MAD) in YT-24 and mid Halfway creeks were of similar magnitude at the end of operations (8% to 11%) and post-closure (10% to 15%), but were lower in YT-24 (3%) than in mid Halfway (10% to 14%) during reclamation and closure. Small to moderate increases in 10<sup>th</sup> percentile, mean, and 90<sup>th</sup> percentile flows are expected in YT-24 Creek, with greatest increases evident in May and October (**Figure 4.2-3**). The majority of modelled flow results for YT-24 Creek are within the 0% to +20% of Natural Case, with some rare instances of higher positive changes at lower flows (**Appendix 12-C-3**). Small to moderate increases in 10<sup>th</sup> percentile, mean, and 90<sup>th</sup> percentile flows are expected in mid Halfway Creek (**Figure 4.2-4**). The majority of modelled flow results for mid Halfway Creek are within the 0% to +40% of Natural Case, with some rare instances of flow reductions during low flows and higher positive changes at moderate flows (**Appendix 12-C-3**).





**COFFEE GOLD MINE**

**Surface Water Monitoring Stations**

**Legend**

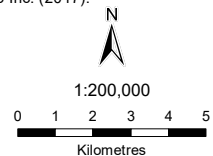
- City/Town
- Surface WQ Monitoring Stations
- Surface and Hydrology Monitoring Stations
- ▭ Project Footprint
- ▭ Local Assessment Area (Mine Site)

**Notes**

1. This map is not intended to be a "stand-alone" document, but a visual aid of the information contained within the referenced Report. It is intended to be used in conjunction with the scope of services and limitations described therein.

**Sources**

1. Sources: Esri, HERE, DeLorme, increment P Corp., NPS, NRCAN, Ordnance Survey, © OpenStreetMap contributors, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
2. Project access and infrastructure provided by Goldcorp Inc. (2017).



NAD 1983 UTM Zone 7N

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Figure 4.2-1

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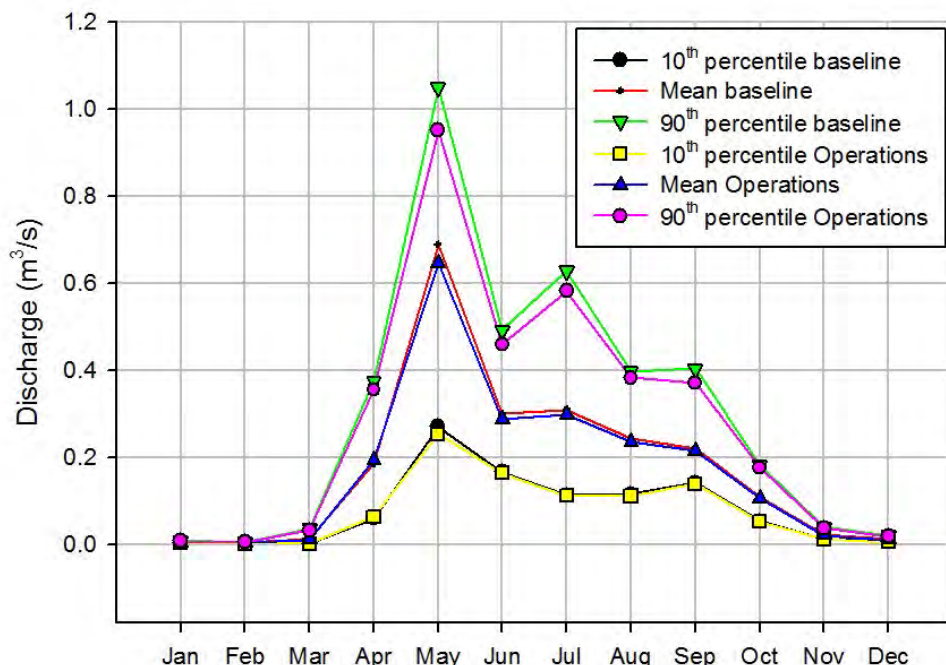


Path: O:\2017\170032\_Goldcorp\_Coffee\GIS\C\_ReportMap\Fig\_2\_1\_MonitoringSites\_20171124.mxd

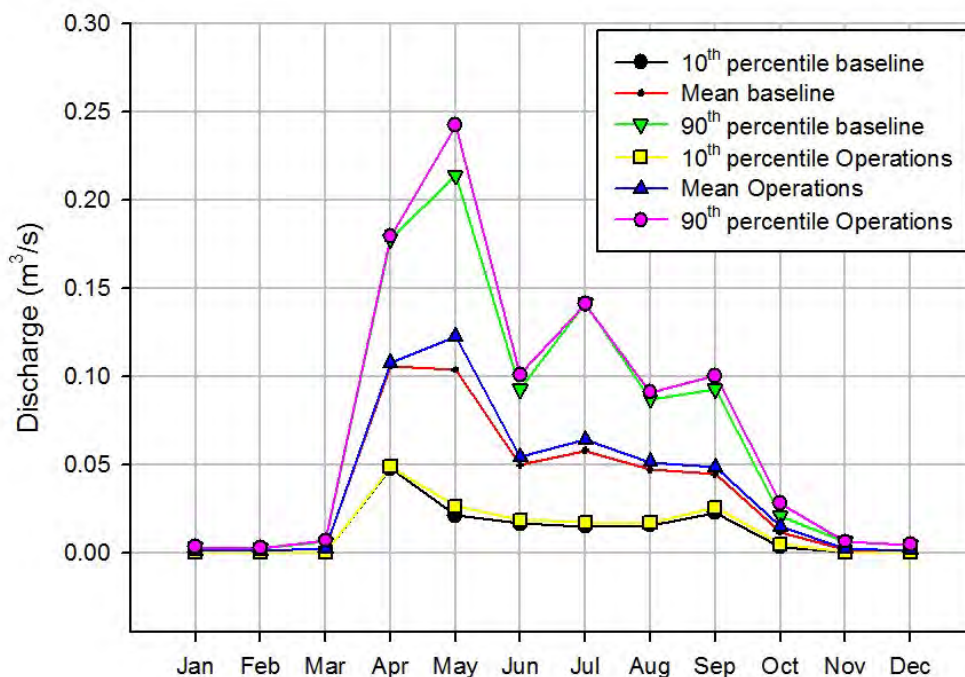
**Table 4.2-1 Predicted Changes in Mean Annual Discharge (MAD), between Baseline and Mine Conditions (Appendix 8-B)**

Predicted Change in Mean Annual Discharge (m <sup>3</sup> /s) between Baseline and Mine Conditions				
Site	Scenario	Project Phase		
		End of Operations	Reclamation and Closure	Post-Closure
Upper Latte Creek (CC-1.5)	Baseline	0.177	0.176	0.195
	Mine	0.170	0.171	0.195
	Difference	-0.007 (-4%)	-0.005 (-3%)	0.000 (<1%)
Lower Latte Creek (CC-3.5)	Baseline	0.330	0.328	0.357
	Mine	0.325	0.326	0.359
	Difference	-0.005 (-2%)	-0.002 (-1%)	0.002 (1%)
Lower Coffee Creek (CC-4.5)	Baseline	2.839	2.823	3.134
	Mine	2.834	2.821	3.136
	Difference	-0.005 (<1%)	-0.002 (<1%)	0.002 (<1%)
Mid Halfway Creek (HC-2.5)	Baseline	0.085	0.084	0.094
	Mine	0.094	0.096	0.108
	Difference	0.009 (11%)	0.012 (14%)	0.014 (15%)
Lower Halfway Creek (HC-5.0)	Baseline	0.137	0.137	0.151
	Mine	0.149	0.151	0.168
	Difference	0.012 (9%)	0.014 (10%)	0.017 (11%)
Lower YT 24 Creek (YT-24)	Baseline	0.036	0.036	0.039
	Mine	0.039	0.037	0.043
	Difference	0.003 (8%)	0.001 (3%)	0.004 (10%)

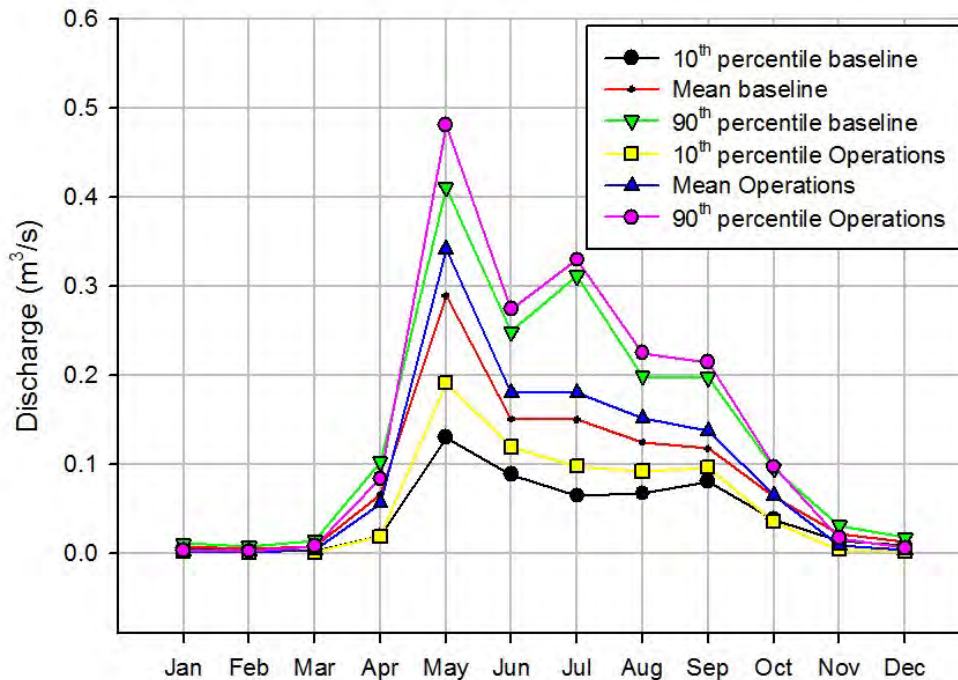




**Figure 4.2-2 Predicted Monthly Discharges in Upper Latte Creek (Site CC-1.5) for the End-of-Operation Phase (Figure from Appendix 8-B)**



**Figure 4.2-3 Predicted Monthly Discharges in Lower YT-24 Creek for the End-of-Operation Phase (Figure from Appendix 8-B)**



**Figure 4.2-4 Predicted Monthly Discharges in Mid Halfway Creek (Site HC-2.5) for the End-of-Operation Phase (Figure from Appendix 8-B)**

**4.2.2 SURFACE WATER QUALITY**

Project-related residual effects to surface water quality are expected in Latte Creek, YT-24 Creek, and Halfway Creek, with the greatest relative change predicted to occur in Halfway Creek, particularly in the upper watershed. Concentrations greater than CCME water quality guidelines are expected for uranium in Latte Creek, arsenic in YT-24 Creek, and uranium and zinc in Halfway Creek. No residual effects to surface water quality are expected in Coffee Creek or in the Yukon River.

Concentrations of a number of analytes were present within Latte, YT-24, and Halfway creeks at concentrations that naturally exceed water quality guidelines (**Table 4.2-2**). This is typical of areas that support economic ore deposits and of areas with seasonally elevated loads of suspended solids. Analytes with maximum monthly concentrations that were naturally greater than guidelines include dissolved aluminum, total chromium, total copper, and total uranium (**Table 4.2-2**). Under the modelled Base Case, maximum monthly concentrations greater than guidelines were observed at one or more locations for the same analytes that naturally exceeded guidelines for arsenic and zinc (**Table 4.2-2**). Overall, maximum monthly concentrations greater than water quality guidelines within the LSA under Base Case were predicted for:

- Dissolved aluminum, total copper, and total uranium at Latte Creek stations CC-1.5 and CC-3.5;
- Dissolved aluminum and total copper at Coffee Creek station CC-4.5;



- Dissolved aluminum, total chromium, total copper, total uranium, and total zinc at Halfway Creek station HC-2.5 and dissolved aluminum, total chromium, total copper, and total uranium at Halfway Creek station HC-5.0; and
- Dissolved aluminum, total arsenic, and total copper at YT-24.

The guideline exceedances observed for dissolved aluminum, total chromium, total copper, and total uranium are largely driven by naturally elevated background concentrations (**Appendix 12-B**).

In Latte Creek, as with all Project-influenced creeks, a higher proportion of mine-impacted water will be present within the upper reaches. In upper Latte Creek (Station CC-1.5), guideline elevations of dissolved aluminum, total copper, and total uranium were predicted, and are largely driven by naturally elevated background concentrations (**Table 4.2-2**). Maximum monthly concentrations of total uranium are predicted to increase slightly under Base Case conditions from 0.032 mg/L to 0.033 mg/L (**Table 4.2-2; Figure 4.2-5**). Slight increases to further above the water quality guideline for total uranium (i.e., further above 0.015 mg/L) are predicted to occur in open water months, with exceedances of both the water quality guideline and the proposed site-specific water quality objective for total uranium (0.031 mg/L) predicted to occur in winter months (**Figure 4.2-5**). Slight increases were observed for several additional analytes (nitrate, nitrite, total phosphorus, weak acid dissociable cyanide, total antimony, total arsenic, total molybdenum, total chromium, total thallium, and total zinc), but the relative degree of change is low and predicted Base Case values remain below corresponding water quality guidelines (**Table 4.2-2**). Concentrations of total uranium are greatest during winter base-flow conditions due to the greater proportional influence of groundwater. During the summer open-water period from Model Year 11 onwards, predicted Base Case uranium concentrations are more than double Natural Case levels, but generally remain below the water quality guidelines (**Appendix 12-B**). In contrast, mine development is expected to result in winter base-flow concentrations marginally (approximately 0.001 to 0.002 mg/L) higher than Natural Case, and up to 5% higher than the proposed site-specific water quality objective (0.031 mg/L) in model Years 11 to 14 (**Appendix 12-B**). In lower Latte Creek (Station CC-3.5), guideline elevations of dissolved aluminum, total copper, and total uranium were predicted, and are largely driven by naturally elevated background concentrations, but no increases in maximum monthly mean concentrations over Natural Case were predicted (**Table 4.2-2; Figure 4.2-6**). Lastly, in Coffee Creek (Station CC-4.5), guideline elevations of dissolved aluminum and total copper were predicted, and are largely driven by naturally elevated background concentrations, but no increases in maximum monthly mean concentrations over Natural Case were predicted (**Table 4.2-2**).

**Table 4.2-2 Predicted Maximum Monthly Analyte Concentrations**

Parameter	Unit	CC1.5		CC3.5		Screening Level	CC4.5			HC2.5		HC5.0		Screening Level	YT24		
		Maximum Monthly Concentrations		Maximum Monthly Concentrations			WQG	Maximum Monthly Concentrations		Screening Level	Maximum Monthly Concentrations		Maximum Monthly Concentrations		WQG	Maximum Monthly Concentrations	
		Natural	Base Case	Natural	Base Case	Natural		Base Case	Natural		Base Case	Natural	Base Case	Natural		Base Case	Natural
Ammonia	mg/L	0.034	0.035	0.034	0.034	1.6	0.037	0.036	1.1	0.038	0.037	0.040	0.038	1.9	0.030	0.032	1.9
Nitrate	mg/L	0.35	1.1	0.57	0.82	3.0	0.79	0.79	3.0	0.70	2.8	0.69	1.9	3.0	0.70	0.70	3.0
Nitrite	mg/L	0.0050	0.0074	0.0050	0.0065	0.020	0.0050	0.0052	0.020	0.0050	0.015	0.0050	0.012	0.020	0.0050	0.0052	0.020
Sulphate	mg/L	249	249	174	171	309	89	89	218	100	200	29	131	218	40	40	218
Total Phosphorus	mg/L	0.014	0.016	0.014	0.015	0.10	0.017	0.017	0.10	0.016	0.026	0.016	0.020	0.10	0.015	0.017	0.10
Cyanide (WAD)	mg/L	0.000010	0.00011	0.000010	0.000083	0.0050	0.000010	0.000018	0.0050	0.000010	0.0016	0.000010	0.0010	0.0050	0.000010	0.000010	0.0050
Dissolved Aluminum	mg/L	0.27	0.26	0.27	0.26	0.050	0.32	0.31	0.050	0.28	0.27	0.29	0.28	0.050	0.055	0.053	0.050
Total Antimony	mg/L	0.00020	0.0012	0.00015	0.00065	0.0090	0.00023	0.00028	0.0090	0.0012	0.0043	0.00045	0.0028	0.0090	0.00040	0.0026	0.0090
Total Arsenic	mg/L	0.0018	0.0030	0.0012	0.0015	0.0050	0.00064	0.00072	0.0050	0.0016	0.0027	0.0016	0.0023	0.0050	0.00067	0.00064	0.0050
Total Cadmium	mg/L	0.000041	0.000040	0.000041	0.000040	0.00013	0.000040	0.000040	0.00012	0.000028	0.000027	0.000030	0.000028	0.00011	0.0000090	0.000015	0.00010
Total Calcium	mg/L	140	140	95	93	-	40	40	-	60	60	42	49	-	30	41	-
Total Chromium	mg/L	0.00074	0.00075	0.00074	0.00074	0.0010	0.00072	0.00072	0.0010	0.0012	0.0013	0.0012	0.0013	0.0010	0.00050	0.00050	0.0010
Total Copper	mg/L	0.0025	0.0025	0.0025	0.0025	0.0020	0.0033	0.0033	0.0020	0.0029	0.0028	0.0030	0.0029	0.0020	0.0027	0.0026	0.0020
Total Iron	mg/L	0.29	0.29	0.29	0.28	1.0	0.39	0.39	1.0	0.79	0.73	0.81	0.76	1.0	0.14	0.14	1.0
Total Lead	mg/L	0.00030	0.00029	0.00031	0.00030	0.0025	0.00028	0.00027	0.0021	0.00033	0.00031	0.00033	0.00032	0.0018	0.000060	0.000065	0.0015
Total Magnesium	mg/L	44	44	30	30	-	14	14	-	25	27	10	21	-	10	13	-
Total Manganese	mg/L	0.049	0.049	0.051	0.050	0.97	0.028	0.028	0.92	0.056	0.095	0.058	0.075	0.89	0.0050	0.022	0.86
Total Mercury	mg/L	0.000011	0.000011	0.000011	0.000011	0.000026	0.000011	0.000011	0.000026	0.000011	0.000011	0.000011	0.000010	0.000026	0.0000080	0.0000080	0.000026
Total Molybdenum	mg/L	0.00060	0.0052	0.00057	0.0031	0.073	0.00081	0.0011	0.073	0.0025	0.027	0.00066	0.017	0.073	0.00053	0.0059	0.073
Total Nickel	mg/L	0.0016	0.0016	0.0016	0.0016	0.082	0.0015	0.0015	0.074	0.0014	0.0018	0.0014	0.0016	0.069	0.0015	0.0015	0.061
Total Selenium	mg/L	0.00040	0.00040	0.00028	0.00028	0.0020	0.00013	0.00013	0.0020	0.00016	0.00067	0.000083	0.00046	0.0020	0.00012	0.00021	0.0020
Total Silver	mg/L	0.000012	0.000012	0.000011	0.000011	0.00025	0.000015	0.000015	0.00025	0.000012	0.000018	0.0000063	0.000013	0.00025	0.000012	0.000013	0.00025
Total Thallium	mg/L	0.0000080	0.000033	0.0000070	0.000020	0.00080	0.0000070	0.0000090	0.00080	0.0000090	0.00015	0.0000080	0.000097	0.00080	0.0000060	0.000041	0.00080
Total Uranium	mg/L	0.032	0.033	0.021	0.021	0.015	0.0064	0.0067	0.015	0.10	0.10	0.023	0.037	0.015	0.0010	0.015	0.015
Total Zinc	mg/L	0.0044	0.0054	0.0044	0.0050	0.015	0.0045	0.0046	0.017	0.0040	0.014	0.0041	0.010	0.013	0.0014	0.0032	0.011

**Notes:**

Dark-shaded (Base Case) and light-shaded (Natural Case) cells represent concentrations that exceeds WQG

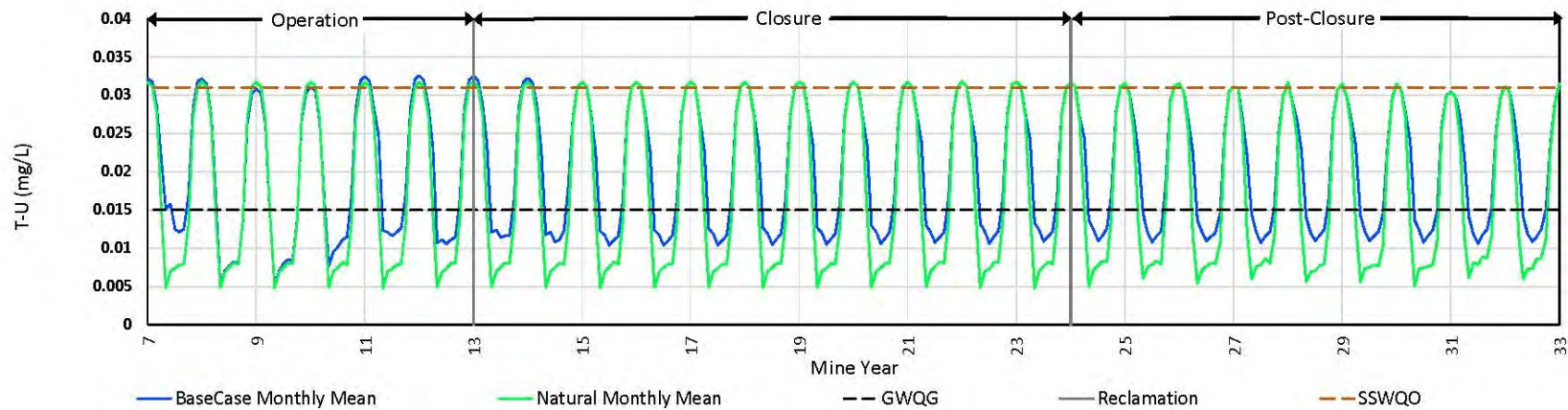
"Base Case" = model-predicted, mine-impacted water quality under expected or base case condition

"Natural Case" = model background case (no mine-impact); includes climate change effects

WQG = BC WQG or CCME WQG, based on guidelines identified in **Appendix 12-C-4**

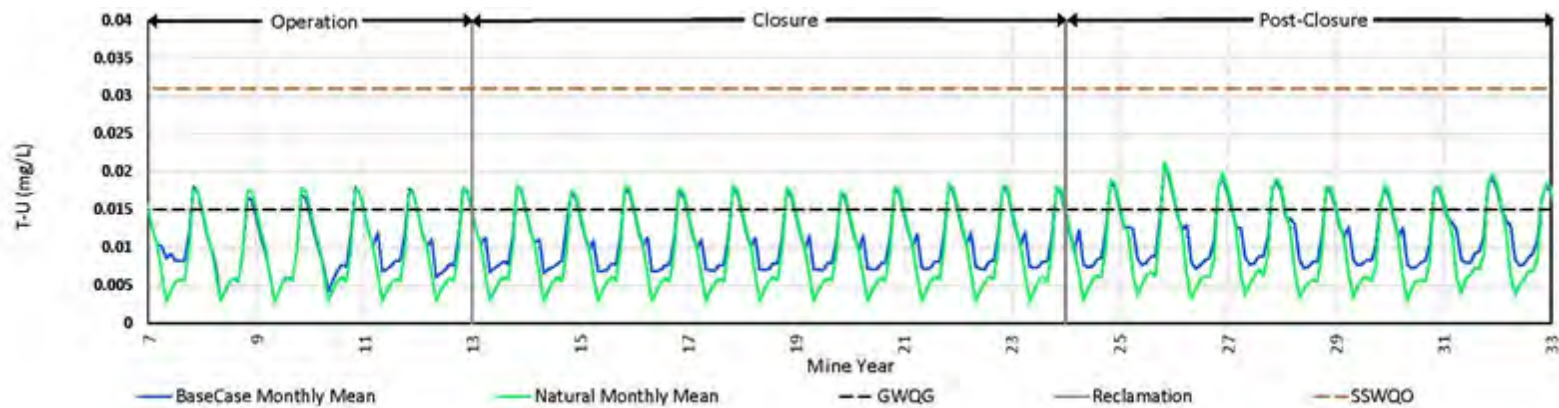
All metals shown as total fraction. Dissolved guideline for Al shown

Hardness- and pH-dependent guidelines calculated using 25th P of baseline dataset for corresponding station



**Figure 4.2-5 Total Uranium Base Case Compared to Natural Case at CC-1.5 Through Operation, Closure, and Post-Closure Mine Phases**

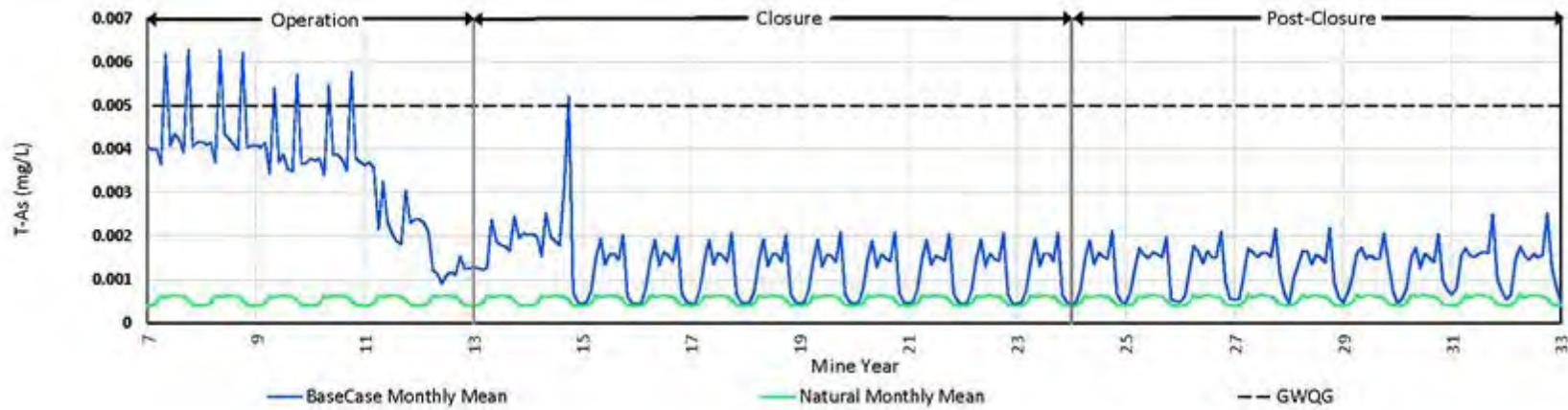
**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life. SSWQO = preliminary site-specific water quality objective.



**Figure 4.2-6 Total Uranium Base Case Compared to Natural Case at CC-3.5 Through Operation, Closure, and Post-Closure Mine Phases**

**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life. SSWQO = preliminary site-specific water quality objective.

In YT-24 Creek, guideline elevations of dissolved aluminum, total arsenic, and total copper were predicted, of which the elevations in dissolved aluminum and total copper are largely driven by naturally elevated background concentrations (**Table 4.2-2**). Slight increases were observed for several additional analytes (total phosphorus, total antimony, total calcium, total magnesium, total molybdenum, total selenium, total silver, total thallium, total uranium, and total zinc), but the relative degree of change is low and predicted Base Case values remain below corresponding water quality guidelines (**Table 4.2-2**). Maximum monthly concentrations of total arsenic are predicted to increase from below the guideline to slightly greater than guidelines under Base Case conditions (**Table 4.2-2; Figure 4.2-7**). The slight exceedances of the water quality guideline for total arsenic (0.005 mg/L) are predicted to occur in the months of May and October from start of construction until year 10 (up to a maximum monthly mean concentration of 0.0063 mg/L; **Table 4.2-2; Figure 4.2-7**).

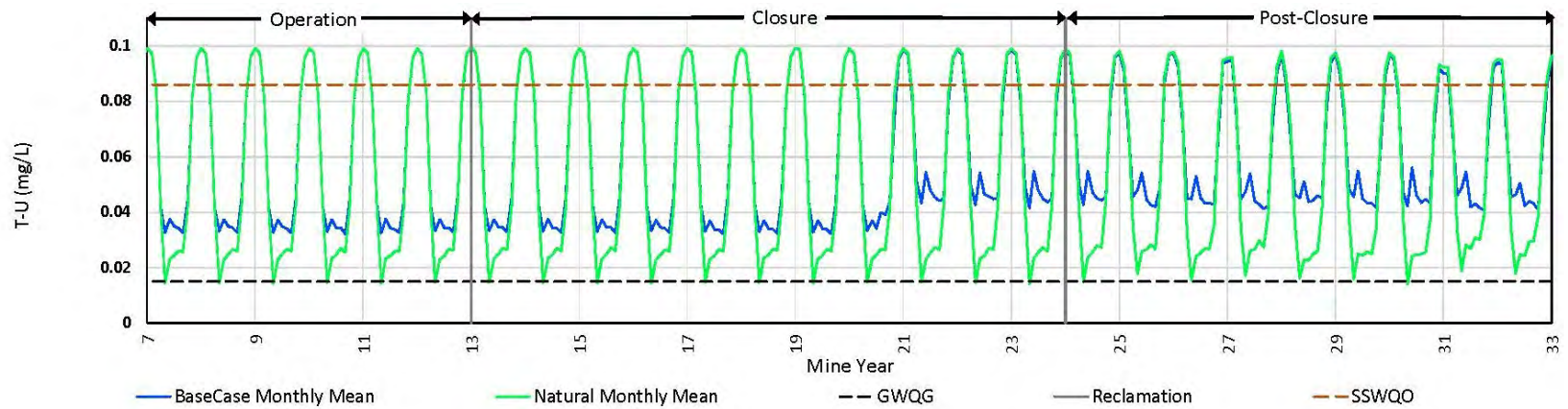


**Figure 4.2-7 Total Arsenic Base Case Compared to Natural Case at YT-24 Through Operation, Closure, and Post-Closure Mine Phases**

**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life.

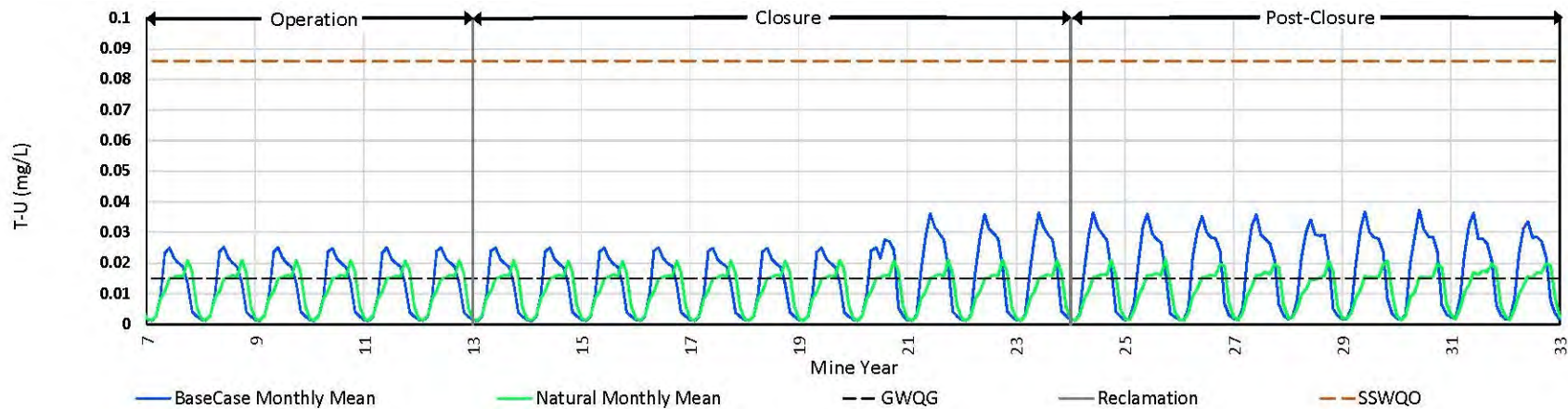


In Halfway Creek, as with all Project-influenced creeks, a higher proportion of mine-impacted water will be present within the upper reaches. In upper Halfway Creek (Station HC-2.5), guideline elevations of nitrate, nitrite, dissolved aluminum, total chromium, total copper, total uranium, and total zinc were predicted (**Table 4.2-2**). Of these, dissolved aluminum, total chromium, total copper, total uranium are largely driven by naturally elevated background concentrations (**Table 4.2-2**). Slight increases were observed for many of the additional analytes modelled, but the relative degree of change is low and predicted Base Case values remain below corresponding water quality guidelines (**Table 4.2-2**). Residual mine-related increases to uranium and, to a lesser extent, nitrate, nitrite, and zinc were predicted. Maximum monthly concentrations of total uranium are predicted to remain similar to Reference Case under Base Case conditions (**Table 4.2-2**); however, total uranium is predicted to increase to above guideline (up to approximately 0.055 mg/L) during summer open water months starting in construction and continuing beyond post-closure (**Figure 4.2-8**), but to remain below the proposed SSWQO (0.086 mg/L; **Appendix 12-B**). Some total uranium elevations above guideline are expected throughout Halfway Creek (**Figure 4.2-9**). Total zinc concentrations in Halfway Creek are predicted to increase during the first half of operations, but to remain below guideline (0.013 mg/L). Total zinc concentrations are predicted to increase further in year 20 to slightly greater than guideline for a period of only one month (to 0.016 mg/L in association with shutdown of the heap leach facility treatment plant; (**Table 4.2-2**; **Figure 4.2-10**) after which some annual peak concentrations equal to guideline are predicted to occur during the open water period beyond post-closure (**Appendix 12-B**). Total zinc elevations above guideline are expected in lower Halfway Creek (**Figure 4.2-11**). Maximum monthly concentrations of nitrate and nitrite are predicted to increase under Base Case conditions from 0.70 mg/L to 2.8 mg/L and from 0.005 mg/L to 0.015 mg/L, respectively (**Table 4.2-2**). This differs from what was reported in **Appendix 12-B** due to an error in the transferring results from **Appendix 12-C**, which present the correct data (see **Appendix 12-C-5** for the correct Base Case data). Increases in nitrate concentrations were predicted to occur in the open water season (typically May to July) with the start of operations, to then increase further starting in year 20 (up to 4.3 mg/L; **Table 4.2-2**), and to then decrease to natural case (baseline) following the cessation of mining (**Figure 4.2-12**). A similar pattern is expected at lower Halfway Creek (**Figure 4.2-13**). In lower Halfway Creek (Station HC-5.0), guideline elevations of dissolved aluminum, total chromium, total copper, and total uranium were predicted, and are largely driven by naturally elevated background concentrations ((**Table 4.2-2**). A slight increase in maximum monthly mean concentrations total chromium and a moderate increase in maximum monthly mean concentrations of total uranium (0.023 mg/L to 0.038 mg/L) over Natural Case were predicted (**Table 4.2-2**).



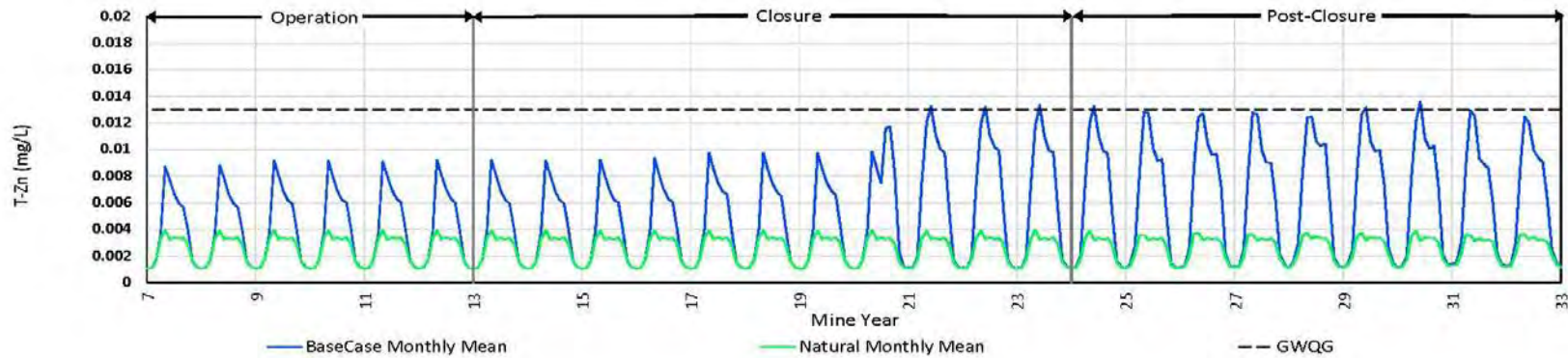
**Figure 4.2-8 Total Uranium Base Case Compared to Natural Case at HC-2.5 Through Operation, Closure, and Post-Closure Mine Phases**

**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life. SSWQO = preliminary site-specific water quality objective for HC-2.5.



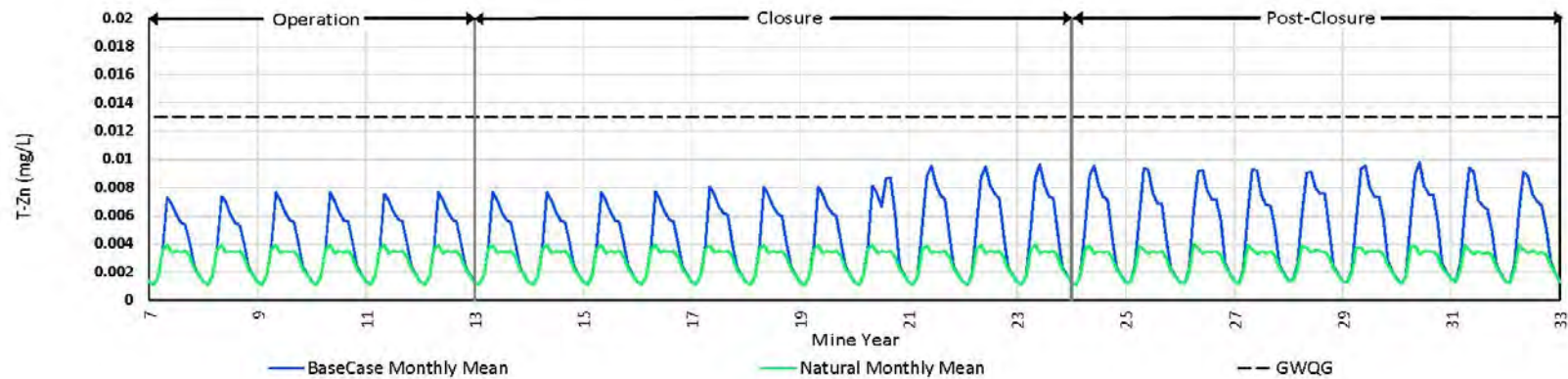
**Figure 4.2-9 Total Uranium Base Case Compared to Natural Case at HC-5.0 Through Operation, Closure, and Post-Closure Mine Phases**

**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life. SSWQO = preliminary site-specific water quality objective for HC-2.5.



**Figure 4.2-10 Total Zinc Base Case Compared to Natural Case at HC-2.5 Through Operation, Closure, and Post-Closure Mine Phases**

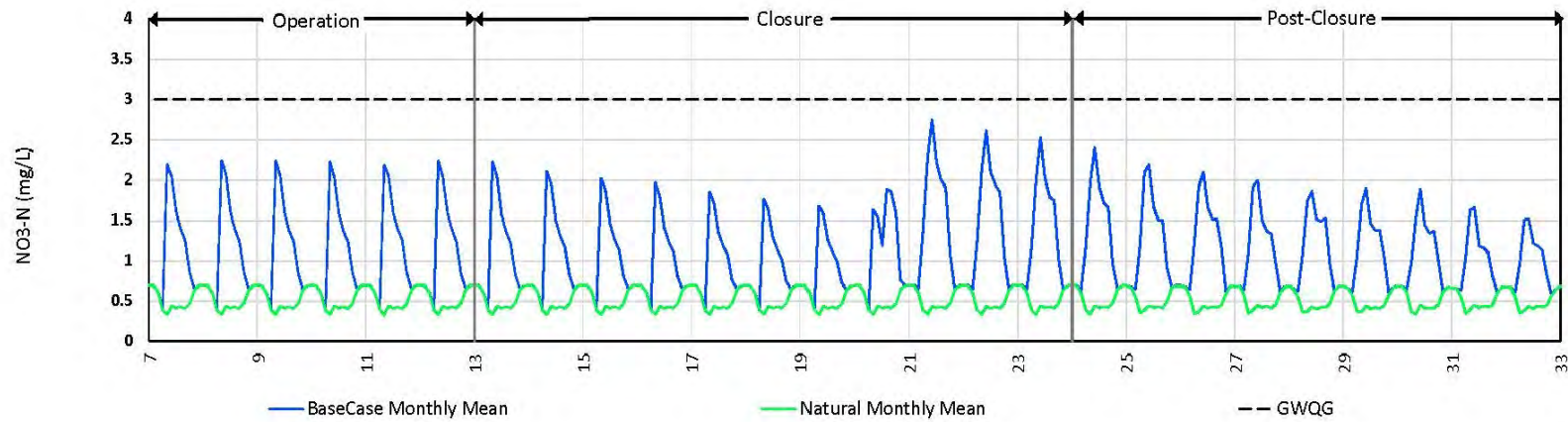
**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life.



**Figure 4.2-11 Total Zinc Base Case Compared to Natural Case at HC-5.0 Through Operation, Closure, and Post-Closure Mine Phases**

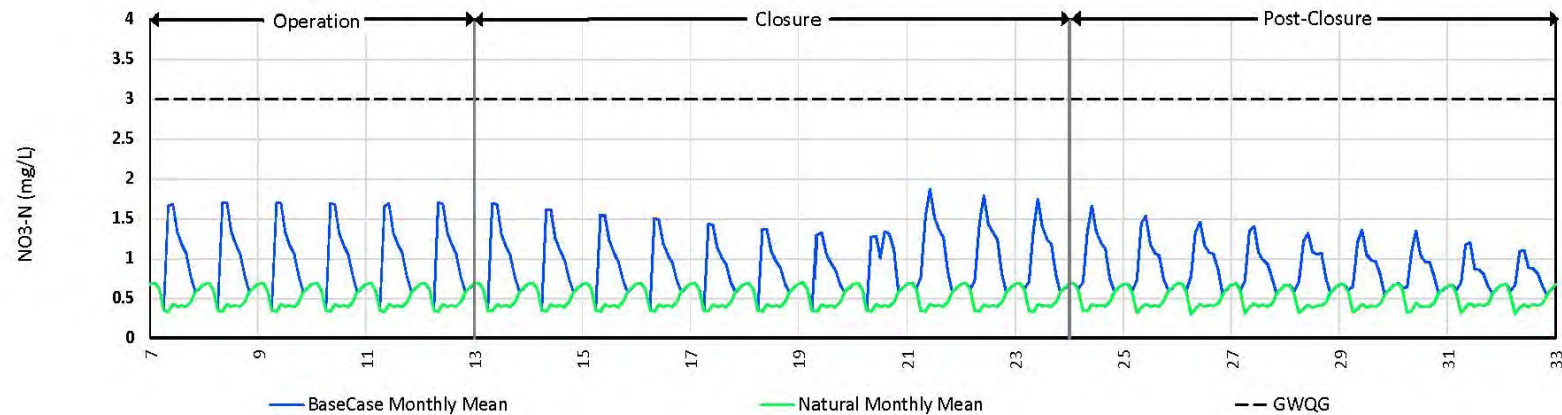
**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life.





**Figure 4.2-12 Nitrate Base Case Compared to Natural Case at HC-2.5 Through Operation, Closure, and Post-Closure Mine Phases**

**Notes:** GWQG = generic BC long-term water quality guideline for the protection of freshwater aquatic life.



**Figure 4.2-13 Nitrate Base Case Compared to Natural Case at HC-5.0 Through Operation, Closure, and Post-Closure Mine Phases**

**Notes:** GWQG = generic CCME long-term water quality guideline for the protection of freshwater aquatic life.

### 4.3 POTENTIAL PROJECT-RELATED CHANGES TO PERIPHYTON AND BENTHIC INVERTEBRATES

Project-related interactions have the potential to change periphyton and benthic invertebrate density/production and/or community characteristics. Periphyton and benthic invertebrate communities are continually exposed to in-situ conditions and are good indicators of overall aquatic ecosystem health. This section describes the nature of the potential Project-associated changes in terms of the indicators listed in **Table 1.5-1** (Physical Disturbance, Toxicity, and Productivity). For each of the indicators, there is background information on the potential effects, and an assessment of the potential changes from the Project to surface hydrology and surface water quality and consequent potential changes to periphyton and benthic invertebrates.

#### 4.3.1 CHANGES DUE TO PHYSICAL DISTURBANCE

Causes of physical disturbance to creeks supporting periphyton and benthic invertebrates were described in detail in the Surface Hydrology IC Analysis Report (**Appendix 8-B**) and in the Water Quality VC Assessment Report (**Appendix 12-B**), and generally fall into the categories of direct physical disturbance due to project activities (e.g., direct loss of headwaters, construction within watersheds), flow changes, and flow-associated changes to sediment suspension (erosion) and deposition (sedimentation), all of which can alter aquatic habitats. Of these, quantitative description of change is only available for the loss of headwaters and for flow changes (hydrology), with residual changes in hydrology expected in Latte, YT-24, and Halfway creeks (**Section 4.3; Appendix 8-B**). No residual changes in hydrology are expected in Coffee Creek or in the Yukon River. Changes in creek flows include changes in the frequency of flushing and channel forming flows and can alter creek habitat variables (i.e., width, depth, and/or velocity) thereby affecting the quantity and quality of habitat for periphyton and benthic invertebrates. The Fish and Fish Habitat VC Assessment (**Appendix 14-B**) identified potential effects to fish and fish habitat in association with flow changes and sediment suspension. This section provides an assessment of potential changes to periphyton and benthic invertebrates in association with loss of headwaters, associated flow changes, and sediment suspension/deposition. The latter is focussed on potential direct physical influences of sediment suspension (turbidity and concentrations of total suspended solids), whereas potential sediment suspension-induced influences to metal concentrations in surface water are considered in the following section (**Section 4.3.2**).

##### 4.3.1.1 *Review of Typical Changes to Periphyton and Benthic Invertebrates*

Changes in flow within lotic systems can alter many aspects of the instream physical environment, and the most common include changes in water depth and velocity, channel wetted width, and sedimentation due to changing water velocities (Dewson et al. 2007; Harrison et al. 2007). Physical habitat alteration associated with flow augmentation in lotic systems manifests as increased water depth and velocity, potential increased channel wetted width, higher suspended sediment concentrations, potential scouring (erosion) of bed and bank material within high gradient areas, and excessive sediment deposition within



low gradient areas. In contrast, habitat alteration associated with water abstraction includes decreased water depth and velocity, decreased channel wetted width, lower suspended sediment concentrations, and thus reduced deposition within low gradient areas. These changes in physical features may initiate changes in the periphyton and benthic invertebrate communities by altering the within-watercourse availability, suitability, and ecosystem functioning of habitat for the resident assemblages of periphyton and benthic invertebrates.

Responses of periphyton to changing flow can be either positive or negative, and depend on numerous inter-related and interacting site-specific variables, including nutrient concentration, light, temperature, and the initial periphyton community composition (e.g., review by Dewson et al. 2007). Thus, quantitative prediction of periphyton responses to changing flow at any given site based on generic guidelines and/or findings in the scientific literature is uncertain, and so qualitative predictions are made. Increased flow rates are associated with increased total suspended solids (TSS) concentrations, and can result in periphyton scouring or burial by sediment deposition, respectively (Biggs et al. 1999; Niyogi et al. 1999; Murdock et al. 2004). High TSS/turbidity can also reduce sunlight penetration, and reductions in chlorophyll-a concentrations have been observed at high concentrations (200 mg/L) in an artificial stream (and thus should be considered a tentative threshold; Birkett et al. 2007). Accordingly, AFDM and chlorophyll-a are expected to decrease during periods of enhanced flow rates or TSS concentrations that are elevated above background. However, following short-term increases in flow, re-colonization of scoured surface can be relatively rapid (Horner et al. 1990). Increases in TSS/turbidity due to sediment suspension are expected to reduce light penetration, which could reduce photosynthesis and reduce periphyton biomass (chlorophyll-a and AFDM). Periphyton biomass responses to changes in flow rates are complicated by site-specific community composition experiencing changes in flow. Periphyton biomass (chlorophyll-a and AFDM) will likely increase as flow increases if the community composition is dominated by mucilaginous mats (e.g., some diatoms and blue-green algae) due to increased mass transfer of nutrients at faster flow rates (Horner et al. 1990; Biggs et al. 1998). In contrast, filamentous algal growth typically increases at lower flow rates due to decreased scouring associated with faster flow rates (Horner et al. 1990; Biggs et al. 1998). Thus, at slower flow rates, periphyton communities are expected to be dominated by non-filamentous algae, while mucilaginous algae are expected to dominate at faster flow rates.

The most common responses of benthic invertebrate communities to water abstraction from lotic environments include reduced taxonomic richness (i.e., species diversity) and changes to benthic invertebrate community composition. Lower taxonomic richness may reflect increased rates of invertebrate drift as a short-term response, or losses due to a reduction in available habitat and/or habitat diversity (e.g., loss of high water velocity habitat) and changes in periphyton (food base) assemblage as a long-term response, to flow reductions within a system (Minshall and Winger 1968; Dewson et al. 2007). Sedimentation can alter available habitat through the clogging of substrate interstices and result in a change

in community composition to include a higher proportion of taxa in the collector-gatherer Functional Feeding Group (FFG) and taxa exhibiting a burrowing habit.

The most common responses of benthic invertebrate communities to flow augmentation of lotic environments typically include reduced taxonomic richness and changes to benthic invertebrate community composition. Lower taxonomic richness can result from increased rates of invertebrate drift as a short-term response to flow augmentation within lotic systems (Culp et al. 1986; Kandler and Seidler 2013). Benthic invertebrate community compositional changes due to flow augmentation may occur as a secondary response to the changes in periphyton community discussed previously (e.g., transition from filamentous green algae-dominated assemblage to diatom-dominated algae assemblage with augmented flows) or as a direct response due to influences of suspended fines (e.g., impediment of food collection for filter feeders; Wood and Armitage 1997) in high gradient habitats subject to erosion. In such habitats, the changes in benthic invertebrate community composition with flow augmentation can be reflected as a lower proportion of filterer and scraper FFG taxa (the latter in the event that augmented flows result in elevated concentrations of suspended solids) and a higher proportion of taxa exhibiting a clinging habit. At low gradient depositional habitats, changes to substrate composition resulting from excessive sedimentation (burial) can result in a higher proportion of benthic invertebrate community being dominated by the collector-gatherer FFG and taxa exhibiting a burrowing habit (Harrison et al. 2007).

Sediments entering creeks or mobilized in faster flowing sections of creeks are typically suspended in water and are deposited in slower moving areas such as pool habitats. While sediment mobilization/deposition is a natural process, elevated levels of suspended sediments related to development/disturbance can lead to excessive deposition and ultimately to habitat alteration. Numerous studies have demonstrated the negative effects of excessive sediment deposition on periphyton and benthic invertebrate habitat, including the changing of stream bed material composition, infilling of pool habitat, and covering/changing of habitat (e.g. Birtwell 1999; Robertson et. al. 2006). However, sediment deposition is limited within the high gradient, erosional creeks of the LSA and high TSS loads occur naturally during high flow periods (**Appendix 12-A**). Maximum monthly mean total suspended solids concentrations observed during the baseline study for Latte, Coffee, and Halfway Creeks were 27, 43, and 68 mg/L, and occurred between May and August (**Appendix 12-A**). These concentrations are well below a tentative threshold of total suspended solids on periphyton growth (200 mg/L) using an artificial stream (Birkett et al. 2007), and concentrations were typically lower for other months.

#### **4.3.1.2      *Project-related Changes to Periphyton and Benthic Invertebrates***

After the application of mitigation measures for surface hydrology, water quality, and fish/fish habitat, there remains the potential for residual changes to flow in Latte, YT-24, and Halfway creeks to affect periphyton and benthic invertebrates. In addition, the surface area of all watershed areas are predicted to decrease (**Table 4.3-1**), which can alter the total available habitat for periphyton and benthic invertebrates. In the

context of the Coffee Project, the direct loss of watershed area is compensated by the redistribution of flows as communicated in residual changes to hydrology (e.g., although the mid-Halfway Creek watershed is reduced by 21%, water flows are predicted to increase under the mine plan; **Section 4.3**). Overall, a small (2%) total loss is predicted for watersheds impacted by Project activities. Halfway Creek is predicted to lose the largest watershed area (3.07 km<sup>2</sup>) and to experience the largest relative change (11 to 21% decrease) compared to other watersheds (0.4 to 9% decrease). However, given that flow rates will increase in both YT-24 and Halfway creeks, this loss should be at least partially compensated for by increased stream width and thus downstream habitat area (e.g., mean annual discharges are predicted to increase by 3% to 10% in YT-24 and 11% to 15% at mid Halfway Creek; **Table 4.2-1**).

**Table 4.3-1 Changes in Watershed Areas at Hydrology/Surface Water Quality Stations**

Watershed	Station	Pre-Project Area (km <sup>2</sup> )	Maximum Mine Footprint (km <sup>2</sup> )	Remaining Natural Watershed Area (km <sup>2</sup> )	Change in Area (%)
Latte Creek	CC-1.5	23.13	2.03	21.10	-9%
	CC-3.5	69.83	2.03	67.80	-3%
Coffee Creek	CC-4.5	484.0	2.03	482.0	-0.4%
YT-24	YT-24	11.83	0.40	11.43	-3%
Halfway Creek	HC-2.5	14.76	3.07	11.69	-21%
	HC-5.0	27.04	3.07	23.97	-11%
Total		630.59	12.63	618.0	-2%

In upper Latte Creek, mean annual discharge (MAD) is predicted to decrease by up to 4% (**Table 4.2-1**), which is within the error bounds of the water balance model. Therefore, no persistent changes to the periphyton are expected due to flow. Although quantitative predictions of TSS were not performed, lower TSS concentrations are associated with slower flow rates, but the modest changes in flows suggest that changes in TSS should also be modest and transient. The small reduction of flow rates throughout the year at the end of operations phase may result in a small increase in periphyton biomass (chlorophyll-a and AFDM) dominated by filamentous algal species (e.g., chlorophyta) during periods of low flow. Since the baseline periphyton community was dominated by diatoms and blue-green algae, this may result in a small change to the species composition compared to baseline.

The magnitude of reduction in flow predicted for the upper and lower portions of Latte Creek is much smaller than that typically shown to elicit responses in the benthic invertebrate community of creek environments, which generally necessitate that an approximate 25% reduction occur before mild influences on benthic invertebrates can be expected (Rader and Balish 1999; Dewson et al. 2007). Moreover, the MAD reductions predicted for Latte Creek near the end of mine operations were within the 5% error bounds of the Water

Balance Model. Given the modest reduction in flow predicted as a result of Project activities, no adverse changes to benthic invertebrate density, richness, or community composition are predicted for Latte Creek during any phases of mine operation or post-closure. No reductions in flow were predicted for other creeks associated with the Project, including Coffee Creek, Halfway Creek and YT-24 Creek (the latter two of which experience flow increases; **Table 4.2-1**).

In YT-24 Creek, mean annual discharge is predicted to increase by 3 to 10% (**Table 4.2-1**). Flushing flows are considered to be flows above 200% MAD (Tennant 1976), which should occur at least annually to ensure fines are flushed out of larger substrates, and transported downstream, and there is some mobility of the larger substrate (Wald 2009; Robinson 2007). Channel forming flows are often defined as being discharges greater than 400% MAD (Hatfield et al. 2003), which are capable of eroding and transporting larger sediment particles, recruiting gravel and organic material, and preventing encroachment from riparian vegetation. Conversely, insufficient flushing flows can lead to infilling of substrate interstices by fine sediment, which can have a detrimental effect on periphyton and benthic invertebrates. The moderate to high changes in MAD have the potential to cause some scouring of filamentous algae by faster flows. Associated responses include increased abundance of mucilaginous algae (some diatoms and blue-green algae).

Similarly for Halfway Creek, mean annual discharge is predicted to increase by 9 to 15% (**Table 4.2-1**). Thus, an increase in periphyton biomass (chlorophyll-a and AFDM) dominated by mucilaginous periphyton (e.g., diatoms and blue-green algae) is expected at Halfway Creek during periods of high flow. Since the baseline periphyton community was dominated by diatoms and blue-green algae, this should have a negligible impact on the species composition compared to the natural case. Although quantitative predictions of TSS were not performed, higher TSS concentrations typically occur with faster flow rates. The CWQG for suspended solids (total particulate matter) allow for short-term increases of 25 mg/L and long term increases of 5 mg/L relative to background conditions during base flows and maximum increases of 25 mg/L or 10% (whichever is higher) under high flows (CCME 1999; Caux et al. 1997). The consistently faster predicted flows will likely result in moderately higher TSS concentrations, but these will likely be modest and transient. They will also likely have only a minimal impact on light penetration as the baseline higher TSS concentrations are well below the tentative threshold (200 mg/L). The consistently greater flows have the potential to cause some scouring of filamentous algae by faster flows. Associated responses include increased abundance of mucilaginous algae (some diatoms and blue-green algae).

The magnitude of augmentation in MAD predicted for YT-24 Creek and Halfway Creek is generally within the variability of flow expected under natural streamflow conditions, and therefore no substantial changes in benthic invertebrate community density, richness or compositional features are expected at either YT-24 Creek or Halfway Creek due to flow augmentation. In the event that TSS concentrations become highly elevated (i.e.,  $\geq 200$  mg/L) such that periphyton communities are affected (see Birkett et al. 2007), some

changes to benthic invertebrate community composition may result during the spring period. Although the benthic invertebrate community of YT-24 Creek and Halfway Creek could show lower diversity and a lower proportion of filter feeder and scraper FFG in spring under the end-of-operation or post-closure augmented flow compared to the natural case, these changes are expected to only be a short-term response to seasonal (i.e., one to two months) elevation in TSS concentrations.

#### **4.3.2 CHANGES DUE TO TOXICITY**

Causes of changes in water quality (and hence of potential toxicity) within creeks supporting periphyton and benthic invertebrates were described in detail in the Water Quality VC Assessment Report (**Appendix 12-B**), and generally fall into the categories of erosion and sedimentation, leaching from disturbed mine materials, leaching of nitrogen residues from blasting, discharge of treated camp waste water, leaching of residues from the heap leach facility (HLF), other interactions between groundwater and surface water, and atmospheric deposition as reviewed in the Surface Water Quality VC Assessment (**Appendix 12-B**). Project-related changes to water quality have been identified for a number of analytes, with concentrations of most analytes either remaining below water quality guidelines or having concentrations greater than guidelines due to natural conditions (**Appendix 12-B; Section 4.3** above). Residual changes in water quality are expected in Latte Creek (uranium concentrations), in YT-24 Creek (arsenic concentrations), and Halfway Creek (uranium, nitrate, and zinc concentrations; **Section 4.3**; note that neither nitrate nor nitrite are expected to exceed guidelines as reported in **Appendix 12-B**).

##### **4.3.2.1 *Review of Typical Changes to Periphyton and Benthic Invertebrates***

Typical periphyton responses to changes in water quality at levels sufficient to cause toxicity include:

- Direct effects to organism survival, growth, reproduction (Newman 1998; Luoma and Rainbow 2008);
- Reduced taxon richness and diversity (Austin et al. 1985; Deniseger et al. 1986; Griffith et al. 2002);
- Reduced biomass, typically measured as ash free dry mass (AFDM) or cell abundance (Hill et al. 2000; Griffith et al. 2002);
- Reduced photosynthesis, typically measured as concentration of the primary photosynthetic pigment chlorophyll-a (Hill et al. 2000; Griffith et al. 2002);
- Reduced abundance of metal-sensitive taxa, and enhanced abundance of metal-tolerant taxa (Austin and Deniseger 1985; Austin et al. 1985; Hill et al. 2000);
- Reduced non-diatom species richness (Griffith et al. 2002); and
- Reduced relative abundance of Chlorophyta (green algae; Deniseger et al. 1986).



Typical benthic invertebrate responses to changes in water quality at levels sufficient to cause toxicity include:

- Reduced density (Taylor and Bailey 1997; Maret et al. 2003; Environment Canada 2012);
- Reduced taxon richness (Niemi et al. 1993; Hickey and Clements 1998; Mebane et al. 2015);
- Reduced biomass (Beltman et al. 1999);
- Reduced abundance and/or proportions of EPT taxa (Ephemeroptera [mayflies], Plecoptera [stoneflies] and Trichoptera [caddisflies]; Rosenberg and Resh 1996; Hickey and Clements 1998; Mebane 1999; Maret et al. 2003)
- Reduced metal-sensitive Ephemeroptera (Winner et al. 1980; Kiffney and Clements 1994; Clements and Kiffney 1995; Hickey and Clements 1998; Clements et al. 2000; Maret et al. 2003; Mebane et al 2015).
- Reduced metal-sensitive Plecoptera (Kiffney and Clements 1994 ; Clements et al. 2000)
- Increased metal-tolerant taxa (Clements 2004)
- Reduced metal tolerant Chironomidae (non-biting midge larvae; Kiffney and Clements 1994; Rosenberg and Resh 1996)
- Altered relative proportions of metal-sensitive versus metal-resistant taxa (Courtney and Clements 2002; Rainbow et al. 2012; Mandaville 2002);
- Increased drift (Clements 2004); and
- Altered predation-prey interactions (Clements 1999).

#### **4.3.2.2 Project-related Changes to Periphyton and Benthic Invertebrates**

Predicted periphyton and benthic invertebrate responses to the specific residual changes in water quality identified in Latte Creek, YT-24 Creek, and Halfway Creek are discussed by location and account for site-specific physical, chemical, and biological conditions. A number of key considerations in the analysis of potential toxicity changes have been discussed in the Water Quality VC Assessment Report (**Appendix 12-B**) and in the Fish and Fish Habitat VC Assessment Report (**Appendix 14-B**). Considerations that are generally applicable to the analysis of potential change to periphyton and benthic invertebrates due to toxicity include:

- Analytes for which predicted monthly maximum concentrations under the Base Case (**Appendix 12-C**) did not exceed guidelines are not expected to cause adverse toxic effects to periphyton or benthic invertebrates. Water quality guidelines for the protection of aquatic life are typically the most stringent relative to other guidelines applicable to water, and are meant to protect all forms of aquatic life and all aquatic life stages, including the most sensitive life stage of the most sensitive species over the long term (CCME 1999). Generic water quality guidelines are conservative as they are typically derived based on tests conducted in laboratory environments that support greater bioavailability than most surface waters. In some cases, the derivation of water quality guidelines also applies a substantial uncertainty factor.

- Effect data at the species and population level are more widely available than effect data at the community level and therefore form the primary basis for evaluation. Community level data are considered as available, but although they are ecologically relevant, they have poor power to identify cause of effects (e.g., Newman 1998) and thus poor applicability to effect prediction.
- The potential bioavailability and toxicity of metals is modified by a number of physical and chemical factors within natural aquatic environments, and for most metals is a function of free metal ion concentration, which in turn is dependent upon dissolved metal concentration, complexation with other dissolved constituents, and competition for uptake at the site of interaction with an aquatic organism (e.g., Wood 2012).
- Because guidelines are developed based on tests of a variety of species and endpoints and are highly dependent on the lowest tested concentration reported to cause an effect, if the species-endpoint for which the lowest effect concentration was reported is not site-relevant, the guideline may not be site-relevant. Such cases can be identified by reviewing the guideline to identify which underlying results are relevant to the site and which are not.
- Responses of organisms that have adapted to site conditions over an extended period of time may differ from responses of naïve organisms that are typically used in toxicity tests that underlie water quality guidelines, as organisms evolve/adapt to site-specific characteristics (Klerks and Levinton 1993; CCME 1999).

In Latte Creek, concentrations of uranium, a non-essential metal (Goulet et al. 2012), are predicted to increase due to Project-related activities (**Figure 4.2-5** and **Figure 4.2-6**). Upper Latte Creek will be subject to greater influence by the Project than lower areas of Latte Creek or Coffee Creek. Uranium concentrations have been shown to be much greater in winter months than in summer open-water months due to natural differences in the relative contribution of groundwater (higher in the winter). The greatest Project-influence is predicted to occur in the summer, but concentrations in upper Latte Creek are expected to remain below the CWQG of 0.015 mg/L in summer months (**Figure 4.2-5**). Conversely, in winter months, Project-influence is lowest, but concentrations are predicted to be highest (up to 0.033 mg/L in upper Latte Creek), which is slightly greater than the 95<sup>th</sup> percentile of baseline data (0.031 mg/L). Ecosystems have developed over a long period of time and the organisms have become adapted to their environment (Klerks and Levinton 1993; CCME 1999). Consideration of specific data available on the effects of uranium to periphyton (or algae) indicate a lowest observed effect concentration of 0.040 mg/L uranium which was an IC10 (10<sup>th</sup> percentile Inhibitory Concentration - the concentration that caused a 10% reduction in algal growth in a laboratory environment) for the green alga *Pseudokirchneriella subcapitata* (Vizon Scitech 2004 in CCME 2011). Elevated pH, alkalinity and hardness in winter months (8.0-8.1 pH units, 170-210 mg/L and 230-430 mg/L, respectively; **Appendix 12-A**) and elevated dissolved organic carbon (DOC) concentrations in summer months (10 to 22 mg/L; **Appendix 12-A**) are expected to reduce the bioavailability and potential toxicity of uranium in waters relative to laboratory conditions (Markich 2002; Trenfield et al. 2011; Goulet et al. 2012). Amelioration of potential toxicity associated with site-specific waters has been demonstrated in site-specific toxicity testing conducted with an invertebrate (*Ceriodaphnia dubia*) in tests conducted using upper Latte Creek waters in 2016 (**Appendix 12-B**). Based on summer concentrations below the generic

CWQG, winter concentrations that are very similar to natural case and below effect concentrations, and in consideration of an ecosystem adapted to elevated uranium concentrations, no changes in periphyton in Latte Creek (or further downstream) are expected due to uranium concentrations.

Consideration of specific data available on the effects of uranium to benthic invertebrates indicate a lowest observed effect concentration of 0.012 mg/L uranium which was an 28-day EC10 – growth (10<sup>th</sup> percentile Effective Concentration - the concentration that caused a 10% reduction in growth in a laboratory environment) to the amphipod *Hyalella azteca* (Liber et al. 2007 in CCME 2011). The next most sensitive taxa was the cladoceran *Ceriodaphnia dubia*, for which a 7-day IC10 - reproduction of 0.073 mg/L was identified (Vizon Scitech 2004 in CCME 2011). Amphipods have been identified within the LSA, whereas cladocerans have not. As noted above, site-specific pH, alkalinity, hardness, and DOC concentrations are all expected to modify the bioavailability and potential toxicity of uranium in waters relative to laboratory conditions (Markich 2002; Trenfield et al. 2011; Goulet et al. 2012). Amelioration of potential toxicity associated with site-specific waters has been demonstrated in toxicity testing conducted with *C. dubia* in tests conducted using upper Latte Creek waters in 2016 and indicated no effects on survival or reproduction in winter at concentrations in excess of 0.075 mg/L as well as no effect on survival or reproduction in summer at nominal concentrations up to 0.32 mg/L (**Appendix 12-B**). Conversely, samples prepared with laboratory water during the winter testing negatively impacted reproduction, with an IC25 value of 0.106 mg/L (**Appendix 12-B**). Based on predicted concentrations lower than site-specific effect concentrations, no changes in benthic invertebrates in Latte Creek (or further downstream) are expected due to uranium concentrations.

In YT-24 Creek, concentrations of arsenic, a non-essential metal (McIntyre and Linton 2012), are predicted to increase due to Project-related activities (**Figure 4.2-7**). Maximum monthly concentrations of total arsenic are predicted to increase from 0.0007 mg/L (below the CWQG of 0.005 mg/L) to 0.0063 mg/L under Base Case conditions. The slight exceedances of the water quality guideline for total arsenic (0.005 mg/L) are predicted to occur only in the months of May and October from start of construction until year 10 in association with freshet and heavy rainfall driven outflows from pit dewatering. The exceedance of the guideline predicted until Year 10 represents a very slight exceedance of a guideline that incorporates a 10-fold safety/uncertainty factor (CCME 1999b). Although aquatic algae appear to be the most sensitive group to toxic effects of arsenic, the lowest observed effect concentration was reported as 0.050 mg/L – an EC50 (50<sup>th</sup> percentile Effective Concentration - the concentration that caused a 50% reduction in algal growth in a laboratory environment) to the green alga *Scenedesmus obliquus* (Vocke et al. 1980). A more recent guideline (criterion) has been developed by the United States Environmental Protection Agency (USEPA) and includes a chronic value of 0.15 mg/L (USEPA 1995). In consideration that the minimum chronic response of an algae was 0.050 mg/L arsenic (CCME 1999b), which is well above the maximum monthly mean for the base case (0.0063 mg/L), no changes in periphyton are expected at YT-24 Creek due to arsenic concentrations.

Benthic invertebrates are notably less sensitive to arsenic than algae and plants (CCME 1999; McIntyre and Linton 2012). The lowest reported effect concentrations for invertebrates (CCME 1999) were for the copepod *Cyclops vernalis* (a 14-d EC20 sublethal concentration causing 20% reduction in growth of 0.32 mg/L; Borgmann et al. 1980), and for the cladoceran *Daphnia magna* (a 21-d EC16 - reproduction) of 0.52 mg/L (Biesinger and Christensen 1972). Therefore, no changes in benthic invertebrates are expected at YT-24 Creek due to arsenic concentrations.

In Halfway Creek, concentrations of uranium are predicted to increase due to Project-related activities (**Figure 4.2-8** and **Figure 4.2-9**). Mid Halfway Creek will be more influenced by the Project than lower Halfway Creek. Uranium concentrations in mid Halfway Creek are continuously at concentrations greater than the CWQG even the absence of the Project. As observed in Latte Creek, uranium concentrations are much greater in winter months than in summer open-water months due to natural differences in the relative contribution of groundwater (higher in the winter). The greatest Project-influence is predicted to occur in the summer, when total uranium is predicted to increase to above guideline (up to approximately 0.055 mg/L) starting in construction and continuing beyond post-closure (**Figure 4.2-8**), but to remain below the 95<sup>th</sup> percentile of baseline data (0.086 mg/L; Appendix 12-B). Conversely, in winter months, the predicted Project-influence is lowest, but concentrations are highest (**Figure 4.2-8** and **Figure 4.2-9**). Summer concentrations are predicted to increase to a concentration greater than the lowest effect concentration observed for the green alga *P. subcapitata* of 0.040 mg/L uranium (Vizon Scitech 2004 in CCME 2011), but well below the 95<sup>th</sup> percentile of baseline data (0.086 mg/L). As previously indicated, some adaptation to/tolerance of the naturally uranium-enriched environment is expected (e.g., Klerks and Levinton 1993; CCME 1999). In addition, elevated pH, alkalinity, and hardness in winter months (7.9-8.0 pH units, 108-136 mg/L and 160-200 mg/L, respectively; **Appendix 12-A**) and elevated dissolved organic carbon (DOC) concentrations in summer months (12 to 24 mg/L; **Appendix 12-A**) are expected to reduce the bioavailability and potential toxicity of uranium in waters relative to laboratory conditions (Markich 2002, Trenfield et al. 2011; Goulet et. al. 2012). Amelioration of potential toxicity associated with site-specific waters has been demonstrated in site-specific toxicity testing conducted with an invertebrate (*C. dubia*) in tests conducted using upper Latte Creek waters in 2016 (**Appendix 12-B**). This supports site-specific amelioration, and suggests that changes to periphyton in Halfway Creek due to uranium concentrations are unlikely. However, there is some uncertainty due to the possibility that algae might not respond in the same manner as the invertebrate *C. dubia*.

As noted above for Latte Creek, a lowest observed effect concentration of 0.012 mg/L uranium (28-day EC10) was shown for the amphipod *Hyalella azteca* (Liber et al. 2007 in CCME 2011). The next most sensitive taxa was the cladoceran *Ceriodaphnia dubia*, for which a 7-day IC10 - reproduction of 0.073 mg/L was identified (Vizon Scitech 2004 in CCME 2011). Site-specific pH, alkalinity, hardness, DOC, and phosphorus concentrations are all expected to modify the bioavailability and potential toxicity of uranium in waters relative to laboratory conditions (Markich 2002; Trenfield et al. 2011; Goulet et. al. 2012) and site

organisms have evolved to site-specific conditions versus the naïve test organisms used for laboratory tests. Amelioration of uranium bioavailability and toxicity in site waters has been demonstrated in site-specific toxicity testing conducted with *C. dubia* using upper Latte Creek waters in 2016 that indicated no effects on survival or reproduction in winter at uranium concentrations in excess of 0.075 mg/L and no effect on survival or reproduction in summer at nominal concentrations up to 0.32 mg/L (**Appendix 12-B**). Conversely, samples prepared with laboratory water during the winter testing negatively impacted reproduction, with an IC25 value of 0.106 mg/L (**Appendix 12-B**). This suggests that changes to benthic invertebrates in Halfway Creek due to uranium concentrations are unlikely. However, uncertainty over potential effects to periphyton carry over to benthic invertebrates due to a food chain relationship (reduced periphyton abundance and/or changes in community composition have the potential to affect benthic invertebrates).

Concentrations of zinc, an essential metal (Hogstrand 2012), in Halfway Creek are predicted to increase due to Project-related activities (**Figure 4.2-10** and **Figure 4.2-11**). Total zinc concentrations in Halfway Creek are predicted to increase during the first half of operations, but to remain below the CWQG (0.03 mg/L) and a newer draft CWQG (0.013 mg/L; **Appendix 12-B**). Total zinc concentrations are predicted to increase further in year 20 to slightly greater than the draft CWQG (but below the currently applicable CWQG) in middle Halfway Creek for a period of only one month (up to 0.016 mg/L) in association with shutdown of the heap leach facility treatment plant, after which some annual peak concentrations equal to guideline are predicted to occur during the open water periods beyond post-closure (**Figure 4.2-10**). The predicted exceedance of the draft CWQG is marginal and very short-lived and concentrations do not exceed the currently applicable CWQG. Therefore, no changes to periphyton or benthic invertebrates in Halfway Creek are expected due to zinc concentrations.

Concentrations of nitrate in Halfway Creek are predicted to increase due to Project-related activities (**Figure 4.2-12** and **Figure 4.2-13**). Maximum monthly concentrations of nitrate are predicted to increase under Base Case conditions from 0.70 mg/L to 2.8 mg/L (**Table 4.2-2**). Increases in nitrate concentrations were predicted to occur in the open water season (typically May to July) with the start of operations, to then increase further starting in year 20 (up to 2.8 mg/L) and to then decrease to natural case following the cessation of mining (**Figure 4.2-12**). Nitrate is not considered toxic to algae and serves as the primary source of nitrogen for aquatic plants in well-oxygenated systems. As maximum predicted nitrate concentrations remain below the CWQG of 3.0 mg/L, no changes to periphyton or benthic invertebrates in Halfway Creek are expected due to nitrate toxicity. However, as nitrate levels rise, there is an increasing risk of eutrophication (Nordin and Pommen 1986; CCME 2012), which is considered under “productivity” below.



### 4.3.3 CHANGES TO PRODUCTIVITY

Causes of physical and chemical conditions with the potential to change periphyton and benthic invertebrate productivity of LSA creek systems include direct physical disturbance, changes in nutrient chemistry, and changes in water temperature. Direct physical disturbance was discussed in **Section 4.3.1** and is not repeated here. Changes in nutrient chemistry were described in detail in the Water Quality VC Assessment Report (**Appendix 12-B**), and are predicted to be caused primarily through nitrogen leaching from blasting residues, leaching from disturbed mine materials/waste, camp waste, and other interactions between groundwater and surface water as reviewed in the Surface Water Quality VC Assessment (**Appendix 12-B**). Changes in creek water temperature have not been addressed quantitatively, but may result from the creation of standing water (e.g., sedimentation/holding ponds) and removal of riparian vegetation within creek watersheds affected by the Project. This assessment considers changes in aquatic biota productivity due to changes to physical and water quality conditions

#### 4.3.3.1 *Review of Typical Changes to Periphyton and Benthic Invertebrates*

Periphyton are effective indicators of changes in stream productivity. Increased nutrient inputs can result in excessive periphyton growth which, through changes to physical habitat and water quality that include influences on dissolved oxygen concentrations, can affect characteristics of benthic invertebrate communities (Horner et al. 1983). Benthic invertebrates consume aquatic biota within these lower trophic levels, assist in the decomposition of organic material, and are a primary food source for fish and other wildlife.

Stream productivity, defined here as the capacity of a system to generate biomass through all trophic levels including primary (e.g., periphyton) and secondary (e.g., benthic invertebrates) routes, is affected by a variety of abiotic and biotic parameters such as changes in water quality resulting from nutrient enrichment, changes in riparian vegetation, and changes in sedimentation. Nutrient-enriched run-off, generated from Project infrastructure and/or blasting residues, and primarily reflecting inputs of nitrogen and phosphorus to affected aquatic systems, can directly affect stream productivity at primary and secondary levels. The removal of riparian vegetation is a primary factor driving changes in stream productivity (Broadmeadow and Nisbet 2004). The removal of riparian vegetation can result in increased sunlight exposure, altered water temperature regime, and altered organic matter and nutrient inputs to aquatic systems. Light can limit trophic productivity in small, heavily shaded streams, with nutrients becoming the primary factor limiting primary productivity in habitats in which stream shading is removed (Hill 1996). With greater light penetration, changes in water temperature can be expected that then alter in-stream primary productivity. Riparian vegetation is also a major source of energy for stream food webs through the provision of organic material (e.g., leaf litter, woody debris) and terrestrial insects that fall from overhead canopies and serve as a food source to aquatic biota (Bisson and Bilby 1998; Wallace et al. 1999). Woody debris provides a source of organic carbon and substrate habitat for aquatic biota, including aquatic insects, an important source of

food for salmonids (Keely and Slaney 1996). Therefore, the alteration or removal of riparian vegetation affects food source quality and quantity as well as nutrient inputs. Increased sedimentation, potentially resulting from terrestrial/riparian vegetation removal, upslope development, and/or erosion of stream bank soils due to flow augmentation, and can similarly result in the input of nutrients, affecting water clarity/light penetration, and/or natural water temperature regimes that, in turn, affect primary and secondary productivity.

Predictions of periphyton response to nutrient and temperature changes can be challenging because periphyton abundance and community composition is controlled by a combination of (and interactions between) nutrient availability, light, temperature, and grazing (e.g., Bothwell 1988; Feminella and Hawkins 1995; Morin et al. 1999; Rosemond et al. 2000; Hillebrand 2002). Indeed, the influence of benthic invertebrate grazing on periphyton can impart a stronger control on periphyton growth than nutrient concentrations (e.g., Hillebrand 2002). Because periphyton grazing and influences of light availability were not predicted for base case scenarios, the predicted responses on periphyton and benthic invertebrate communities provided herein focus on the influences of potential Project-related activities on changes in water temperature and nutrient concentrations of the LSA watercourses. Typical periphyton responses to increased in-stream water temperature include greater periphyton biomass (as determined by chlorophyll-a concentrations and ash free dry mass [AFDM]), the response of which can be expected to be greater when nutrients are more abundant (Bothwell 1988; Francoeur et al. 1999; Morin et al. 1999). Generally, elevation in nitrogen or phosphorus concentrations can be expected to result in increased periphyton biomass (Dodds et al. 1998; Stelzer and Lamberti 2001). Meta-analysis suggests that, in general, stream periphyton respond to nitrogen or phosphorus additions equally, and increasing concentrations of both of these nutrients together typically results in a synergistic response (Elser et al. 2007; Marcarelli and Wurtsbaugh, 2007). An alteration of periphyton community composition is also expected to occur in lotic systems with changes in nutrients including, but not limited to, increased diatom richness and evenness as nutrient concentration increases (Stevenson et al. 2008; Chambers et al. 2012).

A guidance framework for the management of phosphorus in freshwater systems developed by CCME (2004) provided 'trigger' concentrations for total phosphorus (**Table 4.3-2**). A trigger range, defined as a range of concentrations that, once the upper limit is exceeded, can be indicative of a potential environmental problem that warrants further investigation was developed for phosphorus concentrations (CCME 2004). Given the variability in total phosphorus concentrations used to define trigger ranges, an additional precautionary step was advised for the assessment of possible effects as follows: if the total phosphorus concentration is predicted to increase by 50% or more above the natural case, then the risk of an observable effect on the periphyton community is considered high. Dodds et al. (1998) also provided a set of trophic classification thresholds relevant to temperate streams based on total nitrogen, total phosphorus, and periphyton chlorophyll-a concentrations (**Table 4.3-2**). Although there is discrepancy between the total phosphorus concentrations used to define CCME oligotrophic trigger ranges and the alternate threshold,

the values used to define eutrophic water bodies overlap, and were considered the most relevant to the potential impact of Project activities. It is also noted that ecosystem response to nutrient concentrations is region-specific, and some jurisdictions apply ecoregion approaches accordingly (e.g., USEPA 2002).

**Table 4.3-2 CCME (2004) Trigger Ranges for Total Phosphorus in Canadian Water Bodies, and Dodds et al. (1998) Thresholds for Classifying Stream Trophic Status**

Trophic Status	Canadian Trigger Ranges for Total Phosphorus (mg P/L)	Total Phosphorus (mg P/L)	Total Nitrogen (mg N/L)	Chlorophyll-a (mg/m <sup>2</sup> )
	Waterbodies (CCME 2004)	Temperate Streams (Dodds et al. 1998)		
Ultra-oligotrophic	<0.004	--	--	--
Oligotrophic	0.004-0.010	<0.025	<0.70	<20
Mesotrophic	0.010-0.020	--	--	--
Meso-eutrophic	0.020-0.035	--	--	--
Eutrophic	0.035-0.100	>0.075	>1.5	>70
Hyper-eutrophic	>0.100	--	--	--

Changes in the trophic status of a watercourse as a result of nitrogen and phosphorus enrichment can negatively affect the biotic integrity of streams including growth and health of aquatic biota (Miltner and Rankin 1998). Baseline phosphorus, nitrogen, and chlorophyll-a concentrations in Latte, Coffee and Halfway creeks are indicative of ultra-oligotrophic to oligotrophic conditions, whereas YT-24 Creek baseline nutrient and chlorophyll-a concentrations are indicative of oligotrophic conditions during open water months (May to September; **Appendix 12-A** and **14-A**). However, it should be noted that available monthly mean phosphorus concentrations (reported as dissolved concentrations, but assumed to represent total concentrations in the water quality model; **Appendix 12-C**) reported during the baseline study from May to September (**Appendix 12-A**) for Latte Creek (lower, mid, and upper; 0.0029 to 0.0095 mg/L), Coffee Creek (lower and upper; 0.0031 to 0.010 mg/L), Halfway Creek (lower and upper; 0.0026 to 0.0093 mg/L), and YT-24 Creek (0.0024 to 0.0084 mg/L) are nearly all lower than those reported for the natural case scenarios for all creeks during open-water months (>0.01 mg/L; **Appendix 12-C-5**). Thus, comparisons of trophic status changes between the natural and base case – not the baseline and base case – are applied to assessing the potential changes in the stream trophic status as a result of Project activities.

The response of benthic invertebrate communities to nutrient and temperature changes can often mirror responses of periphyton to changes in these parameters in stream environments (e.g., Johnston et al. 1990; Hart and Robinson 1990; Perrin and Richardson 1997). Nutrient augmentation in lotic systems generally results in an increase in benthic invertebrate abundance and biomass and changes in community composition, largely due to feeding on a more abundant periphyton food supply (Hershey et al. 1988). Key changes in benthic invertebrate community composition can include a greater relative abundance of the scraper FFG, various Orthocladinae midges and mayflies at nutrient enriched areas as these groups often

rely on periphyton as a primary food source (Perrin and Richardson 1997). Nitrogen has been shown to be most limiting for periphyton/benthic invertebrates within some lotic environments, although with the addition of inorganic nitrogen concentrations as low as 10 ug/L, phosphorus can become the limiting nutrient. Responses of benthic invertebrate communities to increased temperature in lotic environments are variable, but most often include lower taxonomic richness and changes in community composition to assemblages dominated by chironomids and oligochaetes (Logan and Maurer 1975; Snoeijs 1989; Nedeau et al. 2003; Ponti et al. 2010). Notably, changes in benthic invertebrate community richness and composition related to warmer water temperatures reflect a relatively substantial temperature change ranging from 8 – 18°C (see Hamelin 2013). Evaluation of temperature-related changes in benthic invertebrate density mainly focus on exceptionally warm thermal regimes (i.e.,  $\geq 30^{\circ}\text{C}$ ) that will not be experienced at the Project LSA. However, in cooler water habitats of Labrador and Ontario, an overall increase in density of relatively mine-sensitive mayflies and caddisflies, as well as other invertebrate groups, can occur at waters 4.5 – 12°C warmer than ambient temperatures (Gammon 1973; Dahlberg and Conyers 1974 in Environment Canada 2014).

#### **4.3.3.2 Project-related Changes to Periphyton and Benthic Invertebrates**

After the application of mitigation measures for surface hydrology, water quality, and fish/fish habitat, there remains the potential for residual changes to water quality in Latte, YT-24, and Halfway creeks to affect periphyton and benthic invertebrates.

After the application of mitigation measures for surface hydrology, water quality, and fish/fish habitat, residual changes to nitrate, and/or phosphorus nutrient concentrations in Latte, YT-24, and Halfway creeks have the potential to affect periphyton and benthic invertebrates. At Latte Creek, open-water period nitrate and nitrite concentrations are predicted to be higher during all Project phases than natural case except for year nine of operation (**Appendix 12-C**). However, in all cases, the predicted nitrate and nitrite concentrations will remain below applicable water quality guidelines (**Table 4.2-2**). Total phosphorus concentrations at Latte Creek are predicted to change negligibly between all Project phases compared to natural case (**Appendix 12-C**). Because phosphorus concentrations are predicted to remain low for all phases of the Project, phosphorus will likely limit periphyton production to levels near the oligotrophic-mesotrophic boundary during open-water months (when light and temperature are less likely to limit periphyton growth) and, as a result, no substantial change to the trophic status of Latte Creek is expected during open-water months. Accordingly, despite potential for some slight increases in periphyton indicators of AFDM and chlorophyll a concentration related to increases in nitrate concentrations over the course of the Project, chlorophyll a concentrations are anticipated to remain well below the water quality guideline for periphyton chlorophyll a in British Columbia (100 mg/m<sup>2</sup>; BCMOE 2017) at Latte Creek. By extension, because no marked changes in periphyton abundance are predicted, no meaningful changes in benthic invertebrate community abundance, richness, or community composition are expected due to the predicted changes in nutrient concentrations at Latte Creek for all mine phases. The maximum mine footprint within

the Latte Creek watershed is expected to be limited to 9% and 3% at upper and lower portions, respectively. Removal of approximately 39% of the vegetation from a British Columbia stream watershed (including riparian 'buffer' areas) resulted in an average stream water temperature increase of 7°C between May and October (Holtby and Newcombe 1982). Because the footprint of the Project is expected to be much lower than 39% and a minimum water temperature difference of 8°C is generally required to affect biota within lotic systems, no mine-related changes to the temperature regime of Latte Creek are anticipated provided that suitable mitigation measures are undertaken. Therefore, no nutrient- or temperature-related changes to periphyton or benthic invertebrate communities are anticipated at Latte Creek through all mine phases compared to the natural case.

At Coffee Creek, concentrations of nitrate, nitrite and phosphorus are predicted to remain relatively unchanged during all mine phases compared to the natural case (**Table 4.2-2; Appendix 12-C**). Based on predicted total phosphorus concentrations, trophic status will not change during open water months compared to the natural case (predicted to be mesotrophic based on the CCME 2004 classification) at Coffee Creek through all mine phases using CCME (2004) classification. The maximum mine footprint within the Coffee Creek watershed is expected to be less than 1% and, as a result, no appreciable changes in water temperature are expected as a result of the Project. Overall, no appreciable changes in nutrient concentrations and water temperatures are predicted for Coffee Creek related to the Project, and as such, no substantial changes to the periphyton and benthic invertebrate communities of Coffee Creek are anticipated due to the Project.

At YT-24 Creek, concentrations of nitrate and nitrite are predicted to remain relatively unchanged, and total phosphorus concentrations are predicted to increase only marginally compared to the natural case conditions (**Table 4.2-2; Appendix 12-C**). The trophic status of YT-24 Creek is not expected to change during open water months compared to the natural case (predicted to be mesotrophic based on the CCME 2004 classification) using predicted total phosphorus concentrations for the creek through all mine phases. The maximum mine footprint within the YT-24 Creek watershed is expected to be less than 3% and, as a result, no appreciable changes in water temperature of the creek are expected as a result of the Project. Overall, no appreciable changes in nutrient concentrations and water temperatures are predicted for YT-24 Creek related to the Project, and as such, no substantial changes to the periphyton and benthic invertebrate communities of YT-24 Creek are anticipated due to the Project associated with these variables.

At Halfway Creek, open-water period nitrate and nitrite concentrations are predicted to be higher than the natural case during all Project phases (**Appendix 12-C**). Maximum concentrations of nitrate and nitrite within upper Halfway Creek are predicted to be approximately three-fold and two-fold higher, respectively, in all mine phases than natural case, but will consistently remain below applicable water quality guidelines (**Table 4.2-2**). The concentration of total phosphorus in Halfway Creek is also predicted to become slightly elevated from natural case through all Project phases, with more substantial elevations of approximately



50% higher predicted for open-water periods during mine closure (reclamation) phase years 17 through 20 (Appendix 12-C). Despite the prediction of elevated total phosphorus concentrations at Halfway Creek as a result of the Project, the trophic status is not expected to change during open water months compared to the natural case (predicted to be mesotrophic based on the CCME 2004 classification) using predicted total phosphorus concentrations for the creek through nearly all mine phases. Only in year 20 is a small change in trophic status (predicted change from mesotrophic to meso-eutrophic) predicted, and so only minor and transient changes to the periphyton community are expected. The maximum mine footprint within the Halfway Creek watershed is expected to be 21% and 11% at upper and lower portions, respectively. The relatively high proportion of Halfway Creek anticipated to be affected by the project, as well as potential influences associated with release of effluent to Halfway Creek, may result in increased water temperatures of upper Halfway Creek to levels near the lower threshold of those shown to affect cool-water biota (i.e., 4.5°C)<sup>3</sup>. Collectively, the combination of higher nutrient concentrations and water temperatures at Halfway Creek as a result of the Project can be expected to result in greater periphyton productivity (i.e., higher AFDM and chlorophyll a concentrations) and changes in periphyton community structure to include a higher proportion/diversity of mucilaginous algae (some diatoms and blue-green algae) during all mine phases compared to the natural case. Despite potential for some slight increases in periphyton productivity, chlorophyll a concentrations are anticipated to remain well below the water quality guideline for periphyton chlorophyll a in British Columbia (100 mg/m<sup>2</sup>; BCMOE 2017) at Halfway Creek through all mine phases. Anticipated changes to the benthic invertebrate community of Halfway Creek due to the Project include greater density of invertebrates, as well as changes to composition of the community. Specific influences on the composition of the Halfway Creek benthic invertebrate community are anticipated to include a greater relative abundance of scrapers, mayflies and Orthocladinae midges in response to slight nutrient enrichment, the effect of which will likely override any influences associated with slightly increased water temperatures (e.g., no decrease in richness anticipated). Changes to periphyton and benthic invertebrate communities associated with the Project are likely to be most prevalent within upper Halfway Creek compared to areas located further downstream, reflecting closer proximity to the mine and natural recovery of the system expected as a result of dilution (nutrient concentrations) or relative amount of stream shading (water temperature influences).

#### **4.4 PERIPHYTON AND BENTHIC INVERTEBRATES MITIGATION**

Mitigation measures were described in detail in other VC or IC Reports, including the Surface Hydrology IC Analysis Report (**Appendix 8-B**), the Surface Water Quality VC Assessment Report (**Appendix 12-B**), and the Fish and Fish Habitat VC Assessment (**Appendix 14-B**). Implementation of these mitigation measures

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<sup>3</sup> The predicted influences of increased water temperature at Halfway Creek as a result of the Project does not take into account the implementation of mitigation measures to limit effects (e.g., maintenance of vegetation 'buffers' adjacent to the creek and/or its tributaries).

will also avoid and reduce potential effects to periphyton and benthic invertebrates. Key mitigation measures include:

- Project Design and Operation
- Water Management Plan
- Erosion and Sediment Control
- Best Management Strategies for Working Around Water
- Water Quality Guidelines and Standards
- Progressive Reclamation and Closure Plan
- Blasting Mitigation and Explosives Management Plan
- Metal Leaching /Acid Rock Drainage Management and Geochemical Monitoring Plan

These mitigations target the physical and chemical stressors of periphyton and benthic invertebrates in creeks downstream of the Project. In particular, potential changes to periphyton and benthic invertebrates are primarily expected to occur through changes in surface hydrology and surface water quality. Thus, the Project incorporates mitigations that reduce or eliminate potential changes to periphyton and benthic invertebrates and thus potential effects on the aquatic environment. No additional mitigation for periphyton and benthic invertebrates is proposed, as mitigation is effectively applied for the surface hydrology IC and water quality VC.

#### **4.5 RESIDUAL CHANGE CHARACTERIZATION**

The analysis of the potential effects to periphyton and benthic invertebrates is based on the assessment of the residual effects to surface hydrology and water quality, which include the implementation of the mitigation measures proposed for these linked assessments. Residual changes remain for periphyton and benthic invertebrates, as assessed through changes in the measurable parameters for physical disturbance, toxicity, and productivity. Residual changes of the Project to periphyton and benthic invertebrates are characterized based on a characterization framework (below) and the environmental context. Environmental context is the extent to which each subcomponent has been affected by past and present environmental processes and conditions, its potential sensitivity to the Project-related residual effect, and its ability to recover from that effect (i.e., resilience). Both periphyton and benthic invertebrates have only previously been affected by natural processes, are sensitive to Project-related residual changes/effects, and have a high resilience (ability to recover from an effect). Additional determination of the influence of the residual changes to periphyton and benthic invertebrates to the significance of the effects to Fish and Fish Habitat is provided in **Section 5.0**.

#### 4.5.1 RESIDUAL CHANGE CHARACTERIZATION FRAMEWORK

Residual changes are characterized based on the criteria defined in **Table 4.5-1** (periphyton) and **Table 4.5-2** (benthic invertebrates), which consider direction, magnitude, geographic extent, timing, frequency, duration, reversibility, and/or probability of occurrence, in terms of the measurable parameters described in **Section 1.5**. Change characteristics are assessed in the context of the mitigation measures and strategies that will be applied to eliminate or minimize the changes to periphyton and benthic invertebrates within the LSA creeks.

After considering the characteristics, a confidence rating will be determined and applied that considers the accuracy and application of analytical tools, and understanding of the effectiveness of mitigation measures, and an understanding of known responses of periphyton and benthic invertebrates to potential Project influences. The level of confidence in the determination will be rated as low, moderate, or high as follows:

**Low** A low level of confidence will be assigned to change predictions with little or no empirical site-specific data and little to no published information. A low level of confidence is also assigned if there is substantial uncertainty due to the overall complexity of interactions or if there little or no empirical site-specific evidence of modifiers of change or compensatory mechanisms.

**Moderate** A moderate level of confidence will be assigned to change predictions that are based on published literature and empirical site-specific data from other projects of a similar scale with similar indicators; however, baseline data may not be entirely sufficient for the Coffee Creek Project. A moderate level of confidence is also assigned if there is some uncertainty due to the overall complexity of interactions or if there is some uncertainty regarding empirical site-specific evidence of modifiers of change or compensatory mechanisms.

**High** A high level of confidence will be assigned to change predictions that have direct, site-specific quantitative data to support the prediction and there is some certainty regarding empirical site-specific evidence of modifiers of change or compensatory mechanisms.

**Table 4.5-1 Change Characteristics Considered for Periphyton**

Residual Change Characteristic	Definition	Rating
Direction	Long term direction of the residual change.	<ul style="list-style-type: none"> <li>Negative – a reduction in biomass (chlorophyll-a or AFDM)</li> <li>Positive – an increase in biomass (chlorophyll-a or AFDM)</li> <li>Neutral – no change from baseline in biomass (chlorophyll-a or AFDM)</li> <li>Altered – an alteration to the periphyton community composition</li> </ul>

Residual Change Characteristic	Definition	Rating
Magnitude	Size or severity of the residual change.	<ul style="list-style-type: none"> <li>• Negligible – no predicted measurable change to periphyton biomass, community composition, or stream trophic status.</li> <li>• Low – small measurable change to periphyton biomass, community composition, or stream trophic status.</li> <li>• Moderate – moderate measurable change to periphyton biomass, community composition, or stream trophic status.</li> <li>• High – large measurable change to periphyton biomass, community composition, or stream trophic status.</li> </ul>
Geographic Extent	Spatial scale over which the residual change is expected to occur.	<ul style="list-style-type: none"> <li>• Site-specific – changes restricted to a watercourse, or reach of a watercourse, within the project footprint</li> <li>• Local – changes restricted to watersheds within the LSA</li> </ul>
Frequency	How often the residual change is expected to occur.	<ul style="list-style-type: none"> <li>• Infrequent – change occurs rarely, at irregular intervals throughout the life of the Project</li> <li>• Frequent – change occurs on a regular basis at regular intervals throughout the life of the Project</li> <li>• Continuous – change occurs continuously</li> </ul>
Duration	Length of time over which the residual change is expected to persist.	<ul style="list-style-type: none"> <li>• Short-term – change lasts less than one open-water season.</li> <li>• Long-term – change lasts longer than one open-water season.</li> <li>• Permanent</li> </ul>
Reversibility	Whether or not the residual change can be reversed once the activity causing the residual change ceases. Irreversible change are considered to be permanent.	<ul style="list-style-type: none"> <li>• Fully reversible – periphyton productivity, community composition, and trophic level will recover through natural or assisted processes.</li> <li>• Partially reversible (e.g., habitat can be rehabilitated)</li> <li>• Irreversible – change to periphyton productivity, community composition, and trophic level is permanent.</li> </ul>
Probability of occurrence	Likelihood that the predicted residual change will occur.	<ul style="list-style-type: none"> <li>• Likely</li> <li>• Unlikely</li> <li>• Uncertain</li> </ul>

**Table 4.5-2 Change Characteristics Considered for Benthic Invertebrates**

Residual Change Characteristic	Definition	Rating
Direction	Identifies the long term direction of the residual effect.	<ul style="list-style-type: none"> <li>Negative – a reduction in density or taxon richness</li> <li>Positive – an increase in density or taxon richness</li> <li>Neutral – no change from baseline density or taxon richness</li> <li>Alteration – altered community composition</li> </ul>
Magnitude	Size or severity of the residual change.	<ul style="list-style-type: none"> <li>Negligible – no measurable adverse change to effect to density, taxon richness, or community composition</li> <li>Low – small measurable change to density, taxon richness, or community composition</li> <li>Moderate – moderate measurable change to density, taxon richness, or community composition</li> <li>High – large measurable change to density, taxon richness, or community composition</li> </ul>
Geographic Extent	Spatial scale over which the residual change is expected to occur.	<ul style="list-style-type: none"> <li>Site-specific – effects restricted to a watercourse within the project footprint</li> <li>Local – effects restricted watersheds in the LSA</li> </ul>
Frequency	How often the residual change is expected to occur.	<ul style="list-style-type: none"> <li>Infrequent – change occurs rarely, at irregular intervals throughout the life of the Project</li> <li>Frequent – change occurs on a regular basis at regular intervals throughout the life of the Project</li> <li>Continuous – change occurs continuously</li> </ul>
Duration	Length of time over which the residual change is expected to persist.	<ul style="list-style-type: none"> <li>Short-term – change lasts less than one open-water season.</li> <li>Long-term – change lasts longer than one open water season.</li> <li>Permanent</li> </ul>
Reversibility	Whether or not the residual change can be reversed once the activity causing the residual change ceases. Irreversible changes are considered to be permanent.	<ul style="list-style-type: none"> <li>Fully reversible – density, taxon richness, or community composition will recover through natural processes</li> <li>Partially reversible – change to density, taxon richness, or community composition will partially recover through natural processes</li> <li>Irreversible – change to density, taxon richness, or community composition is permanent</li> </ul>
Probability of occurrence	Likelihood that the predicted residual change will occur.	<ul style="list-style-type: none"> <li>Likely</li> <li>Unlikely</li> <li>Uncertain</li> </ul>

#### 4.5.2 SUMMARY OF RESIDUAL CHANGES - PHYSICAL DISTURBANCE

The Coffee Project footprint is located within the headwaters of Latte, YT-24, and Halfway creeks and therefore construction of the mine will eliminate headwater habitat for periphyton and benthic invertebrates. However, this loss is largely compensated by the re-distribution of flows in accordance with the water balance model (**Appendix 12-C-3**). Although upper Latte Creek will receive less water, the predicted magnitude of change is low and therefore only minor change to periphyton is expected (subtle change in



species composition only) and no changes to benthic invertebrate community characteristics (density, taxon richness, or community composition) are expected in Latte Creek, or at any creek or river further downstream (**Table 4.5-3** and **Table 4.5-4**). Downstream of the Project, both YT-24 Creek and Halfway Creek will receive more water and therefore the amount of available habitat to periphyton and benthic invertebrates will increase (**Table 4.5-3** and **Table 4.5-4**). Predicted changes in flows (increases in YT-24 and Halfway creeks) may manifest as changes in periphyton community composition (an increase in mucilaginous algae which include some diatoms and blue-greens) due to scouring and associated short-term augmentation of suspended solids (**Table 4.5-3**). However, no substantial changes in benthic invertebrate community density, richness, or compositional features are expected at either YT-24 Creek or Halfway Creek (**Table 4.5-4**). Overall confidence level associated with this analysis is considered moderate due to the overall complexity of the interactions.

**Table 4.5-3 Change Characteristics Ratings for Physical Disturbances to Periphyton**

Residual Change Characteristic	Rating	Rationale for Rating
Direction	Altered, differs by location	Upper Latte Creek: expect alteration to community composition towards more filamentous algae in response to slower flows. YT-24 Creek and Halfway Creek: expect positive response in mucilaginous algae in response to faster flows, but negative response in biomass due to potential scouring.
Magnitude	Low to moderate, differs by location	Upper Latte Creek: expect low alteration to community composition due to small decreases in flow. YT-24 Creek and Halfway Creek: moderate to high increases in flow rates are expected to result in low to moderate changes in periphyton biomass (chlorophyll a and AFDM). Overall reduction in watershed area across LSA is negligible. For specific watercourses, watershed area reduction was low for Latte Creek and moderate for, YT-24 and Halfway creeks.
Geographic Extent	Local	Potential changes to periphyton due to changes in physical disturbances are confined to Upper Latte Creek, YT-24 Creek, and Halfway Creek.
Frequency	Infrequent	Greatest potential for influences on periphyton under flow abstraction and augmentation scenarios is likely restricted to natural periods of extreme low-flow and high-flow, respectively.
Duration	Short-term	Greatest potential for physical habitat alteration (and influences on periphyton) under flow abstraction and augmentation scenarios likely to occur during construction/early operation, and are expected to be minimal after reaching a new equilibrium.
Reversibility	Fully reversible	Periphyton are likely to recover quickly following extreme low and high flow events.
Probability of Occurrence	Likely	Some alteration is likely. However, due to the complex interactions between flow rates, nutrient concentrations, and light, there is uncertainty regarding periphyton responses to physical change.

**Table 4.5-4 Change Characteristics Ratings for Physical Disturbances to Benthic Invertebrates**

Residual Change Characteristic	Rating	Rationale for Rating
Direction	Altered	Water abstraction at Latte Creek and flow augmentation at YT-24 and Halfway creeks are not expected to be of sufficient severity to substantially alter habitat from baseline conditions.
Magnitude	Low	Predicted changes to benthic invertebrate communities are expected to be minor and limited to a seasonal basis (i.e., late summer and spring in the case of flow abstraction and augmentation, respectively).
Geographic Extent	Local	Any influences on benthic invertebrate communities are likely to be confined to upper portions of Latte, Halfway, and YT-24 creeks.
Frequency	Infrequent	Greatest potential for influences on benthic invertebrates under flow abstraction and augmentation scenarios are likely restricted to natural periods of extreme low-flow and high-flow, respectively.
Duration	Short-term	Greatest potential for physical habitat alteration (and influences on benthic invertebrates) under flow abstraction and augmentation scenarios likely to occur during construction/early operation, and to be minor after reaching a new equilibrium.
Reversibility	Fully reversible	Benthic invertebrate communities are likely to recover quickly following extreme low and high flow events.
Probability of Occurrence	Unlikely	Water abstraction at Latte Creek and flow augmentation at YT-24 and Halfway creeks are not expected to be substantial and fall within the variability that occurs naturally on an annual and/or seasonal basis except during extreme events. Therefore, the degree to which flow changes at LSA creeks associated with the Project will physically affect channel features and/or sedimentation, and the resulting influence on benthic invertebrate communities, is uncertain.

**4.5.3 SUMMARY OF RESIDUAL CHANGES - TOXICITY**

No changes to periphyton or to benthic invertebrates are expected in Latte Creek (or further downstream) or in YT-24 Creek due to metal toxicity (e.g., uranium and arsenic concentrations, respectively, predicted to occur at concentrations greater than guidelines; **Table 4.5-5** and **Table 4.5-6**). Increases in the concentrations of uranium in Halfway Creek have the potential to change periphyton (biomass and community composition) and the benthic invertebrate community (density, taxon richness, and community composition; **Table 4.5-5** and **Table 4.5-6**). However, this is not expected to occur based on site-specific water quality characteristics (slightly basic pH, high alkalinity, and high hardness in winter months, and slightly basic pH and high dissolved organic carbon in summer months) that are likely to limit uranium bioavailability. Limited uranium toxicity has been demonstrated in toxicity tests conducted using water collected from Halfway Creek. Overall confidence level associated with the analysis is considered high for Latte Creek (and further downstream) and for YT-24 Creek. Confidence is considered moderate for Halfway Creek due to uncertainty over the influence of site-specific water quality characteristics that limit uranium bioavailability and toxicity.

**Table 4.5-5 Change Characteristics Ratings for Toxicity to Periphyton**

Residual Change Characteristic	Rating	Rationale for Rating
Direction	Negative, altered	Potential for changes in water quality (elevated uranium concentrations) to negatively affect periphyton biomass or alter community composition at Halfway Creek.
Magnitude	Low	Presence of high pH, alkalinity, and hardness in winter months and high pH and dissolved organic carbon in summer months are expected to limit the influence uranium on periphyton biomass and/or community composition in Halfway Creek.
Geographic Extent	Site-specific	Potential changes to periphyton biomass or community composition are confined to Halfway Creek.
Frequency	Frequent	Potential influence of uranium on periphyton in Halfway Creek would be expected to occur on a regular basis throughout all Project phases.
Duration	Long-term	Potential influence of uranium on periphyton in Halfway Creek would be expected to be highest during open-water seasons, and occur annually during all phases of the Project.
Reversibility	Partially reversible	Potential changes in periphyton biomass or community composition would be expected to recover naturally over time (post-closure) and with greater distance downstream of the Project (e.g., dilution, natural attenuation related to geochemical processes resulting in lower metal concentrations).
Probability of Occurrence	Unlikely	Toxic effects to periphyton are unlikely. However, due to limited information on the influence of the site-specific modification of metal bioavailability/toxicity in water of Halfway Creek, there is some uncertainty as to whether Project-related changes in uranium concentrations will alter periphyton.

**Table 4.5-6 Change Characteristics Ratings for Benthic Invertebrate Toxicity**

Residual Change Characteristic	Rating	Rationale for Rating
Direction	Negative, altered	Potential for changes in water quality (elevated uranium concentrations) to negatively affect benthic invertebrate density and taxon richness, or alter community composition.
Magnitude	Low	Potential changes to benthic invertebrate density, taxon richness, or community composition would likely be ameliorated by site-specific water quality conditions (high pH, alkalinity, and hardness in winter and high dissolved organic carbon in summer).
Geographic Extent	Site-specific	Potential changes to benthic invertebrate density, taxon richness, or community composition would be restricted to Halfway Creek.
Frequency	Frequent	Potential for changes in benthic invertebrate density, taxon richness, or community composition associated with elevated metal concentrations would be expected to occur on a regular basis throughout all Project phases.
Duration	Long term	Potential changes in benthic invertebrate density, taxon richness, or community composition may persist over more than one open-water season.
Reversibility	Partially reversible	Potential changes in benthic invertebrate density, taxon richness, or community composition in Halfway Creek would be expected to recover naturally with greater distance downstream of the Project (e.g., dilution, natural attenuation related to geochemical processes resulting in lower metal concentrations).

Residual Change Characteristic	Rating	Rationale for Rating
Probability of Occurrence	Unlikely	Toxic effects to benthic invertebrates re unlikely. However, due to limited information on the influence of the site-specific modification of metal bioavailability/toxicity in water of Halfway Creek, there is some uncertainty as to whether Project-related changes in uranium concentrations will alter benthic invertebrates.

#### 4.5.4 SUMMARY OF RESIDUAL CHANGES - PRODUCTIVITY

No nutrient- or temperature-related changes to periphyton or to benthic invertebrate productivity are expected in Latte Creek (or further downstream) or in YT-24 Creek (**Table 4.5-7** and **Table 4.5-8**). Some stimulation of periphyton productivity (biomass, community composition) and benthic invertebrate productivity (density, community composition) is expected in Halfway Creek due to changes in nutrient concentrations (and a potential water temperature increase due to altered land use and water discharge; **Table 4.5-7** and **Table 4.5-8**). However, the productivity changes are expected to be at a magnitude that does not alter the trophic status of Halfway Creek. Productivity stimulation is expected to be fully reversible as nutrient concentrations will decrease to baseline following the cessation of mining operations. Overall confidence level associated with this analysis is considered moderate due to uncertainty over some influences and the overall complexity of the interactions (e.g., the combined influences of nitrogen, phosphorus, and temperature).

**Table 4.5-7 Change Characteristics Ratings for Periphyton Productivity**

Residual Change Characteristic	Rating	Rationale for Rating
Direction	Positive, altered	Slight increase in nitrate, nitrite, and/or phosphorus concentrations, and a slight increase in water temperature at Halfway Creek may result in increased periphyton production, as well as alterations to community composition.
Magnitude	Low	While concentrations of nutrients (nitrate, nitrite, and total phosphorus) are anticipated to increase, projected concentration increases are small and preclude a change of trophic status at Halfway Creek. Although changes in temperature are expected, the magnitude remains uncertain.
Geographic Extent	Site-specific	Potential influences on periphyton associated with higher nutrient concentrations and/or water temperature are likely to be confined to upper portions of Halfway Creek.
Frequency	Frequent	Potential for changes in periphyton production or community composition associated with elevated nutrient concentrations occurs on a regular basis throughout all Project phases. Elevated nutrient concentrations likely to follow seasonal trends. However, changes in total phosphorus are mostly limited to a few years in the post-closure phase in Halfway Creek.
Duration	Long-term	Potential changes in periphyton biomass or community composition due to nutrient concentrations are anticipated to last beyond one open-water season, but changes to total phosphorus concentrations Halfway Creek are limited to a few consecutive open-water seasons during operation.

Residual Change Characteristic	Rating	Rationale for Rating
Reversibility	Fully reversible	Potential changes in periphyton density or community composition are expected to recover naturally over time (post-closure) and with greater distance downstream of the Project (e.g., dilution, natural attenuation related to geochemical processes resulting in lower nutrient concentrations).
Probability of Occurrence	Likely	Minor changes in nutrient concentrations and/or water temperatures at Halfway Creek due to Project activities are likely, but are expected to have modest influence on productivity and to result in no change in trophic status of any watercourse.

**Table 4.5-8 Change Characteristics Ratings for Benthic Invertebrate Productivity**

Residual Change Characteristic	Rating	Rationale for Rating
Direction	Positive, altered	Slight increase in nitrate, nitrite, and/or phosphorus concentrations, and slight increase in water temperature at Halfway Creeks may result in increased benthic invertebrate abundance and richness, as well as changes in community composition.
Magnitude	Low	Nitrate and phosphorus concentrations at affected watercourses are predicted to remain below water quality guidelines and also have a low potential for altering trophic status of the watercourse.
Geographic Extent	Site-specific	Potential influences on benthic invertebrate communities associated with higher nutrient concentrations and/or water temperature are likely to be confined to upper portion of Halfway Creek.
Frequency	Frequent	Potential for changes in benthic invertebrate density, taxon richness, or community composition associated with elevated nutrient concentrations are predicted to occur on a regular basis throughout all Project phases. Elevated nutrient concentrations likely to follow seasonal trends. However, changes in total phosphorus are mostly limited to a few years in the post-closure phase in Halfway Creek.
Duration	Long term	Potential changes in benthic invertebrate density, taxon richness, or community composition may persist over more than one open-water season. However, changes to total phosphorus concentrations in Halfway Creek are limited to a few consecutive open-water seasons during operation.
Reversibility	Fully reversible	Potential changes in benthic invertebrate density, taxon richness, or community composition expected to recover naturally over time (post-closure) and with greater distance downstream of the Project (e.g., dilution, natural attenuation related to geochemical processes resulting in lower nutrient concentrations).
Probability of Occurrence	Likely	Minor changes in nutrient concentrations and/or water temperatures Halfway Creek due to Project activities are likely, but are expected to have modest influence on benthic invertebrate communities/productivity and to result in no change in trophic status of any watercourse.



## 5.0 RELATIONSHIP TO FISH AND FISH HABITAT ASSESSMENT

The residual changes to periphyton and benthic invertebrates summarized in the above sections may affect the Fish and Fish Habitat VC (see **Figure 1.4-1**). The VC report for Fish and Fish Habitat (**Appendix 14-B**) was completed prior to this report and as such, this report provides additional analysis of the potential effects from changes to phytoplankton and benthic invertebrates relevant to Fish and Fish Habitat. Potential effects to Fish and Fish Habitat may include the creation of barriers to fish movements, changes in habitat suitability due to flow changes in local creeks, contaminant toxicity associated with changes in water quality, changes in stream productivity, and direct or indirect mortality of fish. This Periphyton and Benthic Invertebrate Analysis Report provides additional perspective on how fish may be affected by changes in habitat suitability, contaminant toxicity, and stream productivity.

In the assessment of habitat suitability for Fish and Fish Habitat, it was determined that residual adverse effects are predicted to be associated with low magnitude reductions in fish habitat suitability at low flows in Latte Creek, and low to high increases in fish habitat suitability in Halfway and YT-24 creeks (resulting in a predominantly positive effect). The findings of this Periphyton and Benthic Invertebrate Analysis Report predict that there will be some changes associated with physical disturbance in headwater habitats. However, these changes are predicted to be low to moderate in magnitude, short term and fully reversible. Therefore, the findings are considered to be consistent with the effects predicted in the Fish and Fish Habitat VC report.

In the assessment of contaminant toxicity for Fish and Fish Habitat, it was predicted that residual effects to Fish and Fish Habitat associated with contaminant toxicity are limited to Latte, Halfway and YT-24 creeks where water quality change from baseline conditions will be greatest. However, given the magnitude of predicted change to water quality and the limited, seasonal fish use of these watersheds, this residual effect was deemed not significant. Potential changes to aquatic biota were considered in the Fish and Fish Habitat Report; however, this Periphyton and Benthic Invertebrate Analysis Report provides a more thorough analysis. Negative changes to periphyton and benthic invertebrate toxicity are not expected in Latte Creek (and downstream) or in YT-24 Creek. Negative changes to periphyton and benthic invertebrate toxicity are also not expected in Halfway Creek, but the confidence rating is low. This result suggests a smaller geographic extent of change than was determined in the assessment of contaminant toxicity for Fish and Fish Habitat. Changes in contaminant concentrations in Halfway Creek may manifest in changes to benthic invertebrate density, taxon richness, or community composition which could ultimately affect fish growth and population densities. However, the magnitude of change is predicted to be low. Both the available scientific literature (e.g. McPhail 2007) and the results of the Arctic Grayling stomach analyses in the Project area indicated that Arctic Grayling are opportunistic feeders that consume a wide variety of invertebrates. Therefore, a small (low magnitude) benthic invertebrate community shift should not result in food limitation for fish, and the findings of change to periphyton and benthic invertebrates are considered consistent with the effects predicted in the Fish and Fish Habitat VC report.

The assessment of changes to stream productivity in the Fish and Fish Habitat VC Report predicted only minor changes to stream productivity associated with changing nutrient concentrations. In terms of stream productivity, positive effects on periphyton and benthic invertebrates (predicted in both reports) could result in positive effects to fish. This is especially the case for Halfway Creek where the magnitude of change is predicted to be moderate, albeit most prominent in the upper watershed where fish have not been documented. Increases in stream productivity are expected to provide more food for fish and thus could increase growth rates and/or fish densities in Halfway Creek. The fish species in Halfway Creek (Arctic Grayling and juvenile Chinook salmon) feed almost exclusively on invertebrates. Given the low densities of fish in Halfway Creek, there is potential for this creek to support greater densities of fish during the summer rearing/feeding period. Due to the predicted low to moderate magnitude of change and limited geographical extent (i.e. most prominent in the upper watersheds where fish are not present) this positive effect is considered not significant to Fish and Fish Habitat, which is consistent with the predictions of the Fish and Fish Habitat VC report.

## **6.0 EFFECTS MONITORING AND ADAPTIVE MANAGEMENT**

### **6.1 AQUATIC ENVIRONMENTAL MONITORING**

Potential changes to periphyton and benthic invertebrates associated with the Coffee Project will be minimized by mitigation measures described in Section 4.4. Aquatic environmental monitoring programs will be developed that include monitoring of key indicators and measurable parameters associated with both periphyton and benthic invertebrates. The fundamental objective of the Aquatic Environmental Monitoring Program (AEMP) will be to monitor key aquatic environmental receptors using sensitive indicators and measurable parameters in a statistically robust manner to confirm predicted changes to the environment and identify unanticipated effects relative to baseline or reference conditions. AEMP will serve to:

- Determine/identify any Project-related changes or effects;
- Monitor and evaluate the effectiveness of mitigation measures;
- Identify unanticipated changes or effects;
- Provide an early warning of undesirable change in the environment; and
- Inform adaptive management measures.

The AEMP approach will be fully described in the Fish and Aquatic Habitat Monitoring Plan (currently under development for Project licensing). The AEMP will outline how periphyton, benthic invertebrate, and fish will be monitored during all phases of the Project along with supporting water quality, sediment quality and fish habitat data. Monitoring program design will include clear statements of objectives, conceptual models of exposure and potential effects, rationale for the selection of monitoring components, rationale for the selection of monitoring indicators/measurable parameters, clearly defined questions/hypotheses, spatial boundaries, statistical design (including levels of replication), detailed data collection methodology, detailed data interpretation methodology, and how findings will be used to inform adaptive management. The AEMP will include some prescribed monitoring elements, such those required for any waterbodies that receive mine effluent as stipulated under the Metal Mining Effluent Regulations.

### **6.2 ADAPTIVE MANAGEMENT**

Adaptive monitoring and management is an approach that seeks to improve both environmental monitoring and management in response to findings, typically the findings of environmental monitoring programs. Consideration of potential triggers for adaptation in advance provides a level of security in long term environmental planning. Adaptive management also allows for the incorporation of improvements in science or engineering into monitoring or management actions. Adaptive management will be incorporated into the Fish and Aquatic Habitat Monitoring Plan, and will specifically include predetermined thresholds and monitoring and/or management responses to threshold exceedance. If any unanticipated change or effects are detected additional adaptive responses will be developed in collaboration/consultation with relevant agencies and First Nations.

## 7.0 CONCLUSIONS

Periphyton and benthic invertebrates were identified as components of interest in the assessment of the Coffee Gold Project due to their importance as intermediates along a potential pathway of effects to the Valued Component of Fish and Fish Habitat. Three key drivers of potential change to periphyton and benthic invertebrates were identified – the “Indicators” of physical disturbance, toxicity, and productivity. These Indicators were subject to analyses to identify potential residual changes following mitigation, and subsequently to characterize those changes.

Project-related changes to periphyton and benthic invertebrates that were identified were associated with physical disturbance and productivity. Potential project-related changes to periphyton and benthic invertebrates due to toxicity were considered unlikely, with some uncertainty around this conclusion remaining for Halfway Creek only. Physical disturbance includes the presence of the Project footprint within the headwaters of Latte, YT-24, and Halfway Creeks. However, this loss of headwaters is largely compensated by the re-distribution of flows. Although upper Latte Creek will receive less water, the predicted magnitude of change is low and therefore only minor change to periphyton is expected and no changes to benthic invertebrates are expected in Latte Creek, or in any creek or river further downstream of Latte Creek. Both YT-24 Creek and Halfway Creek will receive more water and therefore the amount of available habitat to periphyton and benthic invertebrates downstream of the project will increase. Predicted increases in flows YT-24 and Halfway creeks may manifest as changes in periphyton community composition (an increase in mucilaginous algae which include some diatoms and blue-greens) due to scouring and associated short-term augmentation of suspended solids. However, no substantial changes in benthic invertebrate community density, richness, or composition are expected at either YT-24 Creek or Halfway Creek. Overall, Project-related changes to periphyton and benthic invertebrates associated with physical disturbance are predicted to be low to moderate in magnitude, short term, and fully reversible and are consistent with the effects predicted in the Fish and Fish Habitat VC report.

Concentrations of uranium and arsenic are predicted to occur at concentrations greater than guidelines at Latte and Halfway creeks, and at YT-24 Creek, respectively. No associated changes to periphyton or to benthic invertebrates are expected in Latte Creek (or further downstream) or in YT-24 Creek due to metal toxicity. Increases in the concentrations of uranium in Halfway Creek have the potential to change periphyton (biomass and community composition) and the benthic invertebrate community (density, taxon richness, and community composition). Although this is not expected to occur based on site-specific water quality characteristics (slightly basic pH, high alkalinity, and high hardness in winter months, and slightly basic pH and high dissolved organic carbon in summer months) that are likely to limit uranium bioavailability, some uncertainty remains. Changes to benthic invertebrate density, taxon richness, or community composition could ultimately affect fish growth and population densities. However, the magnitude of change is predicted to be low. Both the available scientific literature (e.g. McPhail 2007) and the results of the Arctic Grayling stomach analyses in the Project area indicated that Arctic Grayling are opportunistic feeders that

consume a wide variety of invertebrates. Therefore, a small (low magnitude) benthic invertebrate community shift should not result in food limitation and the findings of change to periphyton and benthic invertebrates are considered consistent with the effects predicted in the Fish and Fish Habitat VC report.

Nutrient- or temperature-related changes to periphyton or to benthic invertebrate productivity are not expected in Latte Creek (or further downstream) or in YT-24 Creek. However, some stimulation of periphyton productivity (biomass, community composition) and benthic invertebrate productivity (density, community composition) is expected in Halfway Creek due to changes in nutrient concentrations (and a potential water temperature increase due to altered land use and water discharge), but at a magnitude that does not alter the trophic status of Halfway Creek. Productivity stimulation is expected to be fully reversible as nutrient concentrations will decrease to baseline following the cessation of mining operations. Increases in stream productivity are expected to provide more food for fish and thus could increase growth rates and/or fish densities in Halfway Creek. Due to the predicted low to moderate magnitude of change and limited geographical extent (i.e., most prominent in upper Halfway Creek where fish are not present) this effect is considered not significant to Fish and Fish Habitat, which is consistent with the predictions of the Fish and Fish Habitat VC report.



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**APPENDIX A**  
**Periphyton Data**



**Table A.1 Periphyton Chlorophyll-a and Ash-Free Dry Mass Data, Collected for Coffee Gold Project, 2017**

Station	Replicate	Date Sampled	Surface Area	Ash Mass		Ash-Free Dry Mass <sup>a</sup>	Chlorophyll-a
			m <sup>2</sup>	g	g	g/m <sup>2</sup>	mg/m <sup>2</sup>
CF10.0	CF10.0-1	5-Aug-2017	0.0024	0.14	0.017	7.0	0.27
	CF10.0-2	5-Aug-2017	0.0024	0.72	0.060	25	2.9
	CF10.0-3	5-Aug-2017	0.0024	0.32	0.022	9.3	6.0
	CF10.0-4	5-Aug-2017	0.0024	0.54	0.024	10	1.4
	CF10.0-5	5-Aug-2017	0.0024	0.29	0.018	7.4	1.9
	CF10.0-6	5-Aug-2017	0.0024	0.24	0.018	7.4	5.3
CF8.0	CF8.0-1	4-Aug-2017	0.0024	0.076	0.0043	1.8	0.30
	CF8.0-2	4-Aug-2017	0.0024	0.025	0.0024	1.0	0.78
	CF8.0-3	4-Aug-2017	0.0024	0.076	0.0085	3.6	2.8
	CF8.0-4	4-Aug-2017	0.0024	0.15	0.0078	3.3	0.60
	CF8.0-5	4-Aug-2017	0.0024	0.040	0.0021	0.88	0.95
	CF8.0-6	4-Aug-2017	0.0024	0.023	0.0018	0.76	1.6
CF3.9	CF3.9-1	3-Aug-2017	0.0024	0.080	0.0051	2.1	0.60
	CF3.9-2	3-Aug-2017	0.0024	0.025	0.0023	0.97	1.6
	CF3.9-3	3-Aug-2017	0.0024	0.068	0.0090	3.8	5.6
	CF3.9-4	3-Aug-2017	0.0024	0.36	0.021	8.9	1.9
	CF3.9-5	3-Aug-2017	0.0024	0.45	0.035	15	2.2
	CF3.9-6	3-Aug-2017	0.0024	0.42	0.018	7.6	2.9
LC9.9	LC9.9-1	5-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.015
	LC9.9-2	5-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.23
	LC9.9-3	5-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.16
	LC9.9-4	5-Aug-2017	0.0024	0.0023	<0.0010	<0.42	0.051
	LC9.9-5	5-Aug-2017	0.0024	0.0013	<0.0010	<0.42	<0.0042
	LC9.9-6	5-Aug-2017	0.0024	0.0042	<0.0010	<0.42	0.0044
LC2.7	LC2.7-1	4-Aug-2017	0.0024	0.014	<0.0010	<0.42	1.6
	LC2.7-2	4-Aug-2017	0.0024	0.17	0.0084	3.5	0.97
	LC2.7-3	4-Aug-2017	0.0024	0.035	0.0047	2.0	1.4
	LC2.7-4	4-Aug-2017	0.0024	0.031	0.0025	1.1	0.91
	LC2.7-5	4-Aug-2017	0.0024	0.085	0.0039	1.6	0.61
	LC2.7-6	4-Aug-2017	0.0024	0.090	0.0057	2.4	1.3
HF6.3	HF6.3-1	6-Aug-2017	0.0024	0.061	0.0052	2.2	2.1
	HF6.3-2	6-Aug-2017	0.0024	0.0024	0.012	5.1	1.6
	HF6.3-3	6-Aug-2017	0.0024	0.0014	<0.0010	<0.42	0.076
	HF6.3-4	6-Aug-2017	0.0024	0.0033	0.0075	3.2	2.1
	HF6.3-5	6-Aug-2017	0.0024	0.0015	0.0062	2.6	0.29
	HF6.3-6	6-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	1.0
HF0.2	HF0.2-1	6-Aug-2017	0.0024	0.0045	0.021	8.9	2.7
	HF0.2-2	6-Aug-2017	0.0024	0.0012	0.0044	1.8	0.55
	HF0.2-3	6-Aug-2017	0.0024	0.0040	0.022	9.4	0.50
	HF0.2-4	6-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.011
	HF0.2-5	6-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	1.5
	HF0.2-6	6-Aug-2017	0.0024	0.0020	0.0014	0.59	0.62

Station	Replicate	Date Sampled	Surface Area	Ash Mass		Ash-Free Dry Mass <sup>a</sup>	Chlorophyll-a
			m <sup>2</sup>	g	g	g/m <sup>2</sup>	mg/m <sup>2</sup>
YT5.0	YT5.0-1	7-Aug-2017	0.0024	0.0092	<0.0010	<0.42	5.2
	YT5.0-2	7-Aug-2017	0.0024	0.0063	<0.0010	<0.42	1.0
	YT5.0-3	7-Aug-2017	0.0024	0.0021	<0.0010	<0.42	0.78
	YT5.0-4	7-Aug-2017	0.0024	0.013	<0.0010	<0.42	0.84
	YT5.0-5	7-Aug-2017	0.0024	0.0022	<0.0010	<0.42	3.1
	YT5.0-6	7-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	2.1
YT0.2	YT0.2-1	7-Aug-2017	0.0024	0.0017	<0.0010	<0.42	0.23
	YT0.2-2	7-Aug-2017	0.0024	0.0023	<0.0010	<0.42	0.13
	YT0.2-3	7-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.11
	YT0.2-4	7-Aug-2017	0.0024	0.0015	<0.0010	<0.42	0.065
	YT0.2-5	7-Aug-2017	0.0024	0.0014	<0.0010	<0.42	0.040
	YT0.2-6	7-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.041
IDI.9	IDI.9-1	2-Aug-2017	0.0024	0.029	0.0014	0.59	0.66
	IDI.9-2	2-Aug-2017	0.0024	0.028	0.0018	0.76	1.4
	IDI.9-3	2-Aug-2017	0.0024	0.090	0.0063	2.6	1.1
	IDI.9-4	2-Aug-2017	0.0024	0.12	0.0050	2.1	1.4
	IDI.9-5	2-Aug-2017	0.0024	0.034	0.0018	0.76	1.2
	IDI.9-6	2-Aug-2017	0.0024	0.083	0.0077	3.2	1.6
LaC4.8	LaC4.8-1	3-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.019
	LaC4.8-2	3-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	0.087
	LaC4.8-3	3-Aug-2017	0.0024	0.0077	0.0012	0.50	1.5
	LaC4.8-4	3-Aug-2017	0.0024	<0.0010	<0.0010	<0.42	1.7
	LaC4.8-5	3-Aug-2017	0.0024	0.017	0.0028	1.2	0.028
	LaC4.8-6	3-Aug-2017	0.0024	-	-	-	<0.0042

<sup>a</sup> Ash-Free Dry Mass calculated using the Method Detection Limit (MDL) for Ash Mass where results were below MDL.

**APPENDIX B**  
**Benthic Invertebrate Data**

**Table B.1 Benthic Invertebrate Community CABIN Data, Collected for the Coffee Gold Project, 2017**

Species	Coffee Creek			Latte Creek		Halfway Creek		YT-24 Creek		Independence Creek	Los Angeles Creek
	CF10.0	CF8.0	CF3.9	LC9.9	LC2.7	HF6.3	HF0.2	YT5.0	YT0.2	ID1.9	LaC4.8
Order: Collembola	0	0	0	0	0	0	1	0	0	0	0
Hypogastruridae	0	0	0	0	0	0	0	0	1	0	0
Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0	0
Ameletidae	0	0	0	0	0	0	0	0	0	0	0
<i>Ameletus</i>	0	0	0	2	0	18	6	0	0	0	0
Baetidae	0	0	7	31	68	421	2	0	11	0	33
<i>Acentrella</i>	196	196	227	0	11	0	2	0	1	270	1800
<i>Baetis</i>	11	12	0	216	54	4	28	1	19	20	0
<i>Baetis bicaudatus</i>	13	8	0	211	64	29	23	0	25	75	100
<i>Baetis tricaudatus</i>	0	0	3	0	0	0	0	0	0	0	0
Ephemerellidae	18	20	157	0	0	0	0	0	0	0	0
<i>Drunella doddsii</i>	2	6	17	0	0	0	0	0	0	0	0
<i>Ephemerella aurivillii</i>	0	0	3	0	0	0	0	0	0	0	0
Heptageniidae	7	24	13	0	7	4	1	0	0	20	167
<i>Cinygmula</i>	113	112	77	4	50	64	16	0	0	40	817
<i>Epeorus</i>	0	2	0	0	7	0	0	0	0	0	0
Order: Plecoptera	0	0	0	0	0	0	0	0	0	0	0
Capniidae	2	10	3	2	4	7	22	4	10	0	67
<i>Capnia</i>	0	0	0	0	0	4	2	0	0	0	0
Chloroperlidae	0	12	0	0	0	0	0	0	0	0	17
<i>Haploperla</i>	4	8	0	0	68	11	0	0	0	0	0
<i>Suwallia</i>	4	6	30	2	0	0	0	0	0	15	0
Nemouridae	0	2	0	133	82	307	203	97	292	10	1033
<i>Nemoura</i>	2	0	0	9	0	4	7	3	1	5	217
<i>Ostrocerca</i>	0	0	3	7	0	4	8	15	7	10	33
<i>Zapada</i>	0	0	0	0	4	4	0	1	0	0	0
Perlodidae	0	0	0	0	21	0	0	0	0	0	0
<i>Skwala</i>	9	12	3	0	0	0	0	0	0	0	0

Species	Coffee Creek			Latte Creek		Halfway Creek		YT-24 Creek		Independence Creek	Los Angeles Creek
	CF10.0	CF8.0	CF3.9	LC9.9	LC2.7	HF6.3	HF0.2	YT5.0	YT0.2	ID1.9	LaC4.8
Order: Trichoptera	0	0	0	0	0	0	0	0	0	0	0
Glossosomatidae	2	0	0	0	0	0	0	0	0	0	0
<i>Glossosoma</i>	2	0	3	0	0	0	0	0	0	0	0
Limnephilidae	7	4	37	2	7	4	0	0	0	0	0
<i>Ecclisomyia</i>	0	2	0	0	0	0	0	0	0	10	0
Order: Coleoptera	0	0	0	0	0	0	1	0	0	0	0
Order: Diptera	0	0	0	0	0	0	1	0	0	0	0
Ceratopogonidae	0	0	0	0	0	0	0	0	0	0	0
<i>Alluaudomyia</i>	0	0	0	0	4	0	0	0	0	0	0
Chironomidae	18	140	40	2	29	18	6	2	3	30	0
<i>Arctodiamesa</i>	0	0	0	0	0	0	0	15	0	0	0
<i>Pseudokiefferiella</i>	0	0	0	4	4	14	21	20	2	0	0
<i>Diamesa</i>	0	0	0	7	11	68	11	25	3	0	17
<i>Pagastia</i>	0	0	0	0	4	0	0	0	0	5	17
<i>Pseudodiamesa</i>	0	0	0	0	0	0	4	0	0	0	0
Subfamily: Orthoclaadiinae	0	0	0	0	7	0	0	0	0	0	0
<i>Corynoneura</i>	0	4	7	0	0	0	0	0	0	0	0
<i>Diplocladius cultriger</i>	0	0	0	0	0	11	0	6	1	0	0
<i>Eukiefferiella</i>	13	10	117	16	36	25	10	21	14	230	17
<i>Heterotrissocladius</i>	0	0	3	0	0	0	0	0	0	0	0
<i>Hydrobaenus</i>	0	0	0	2	0	0	2	0	0	0	0
<i>Limnophyes</i>	0	0	0	0	0	4	1	0	1	15	0
<i>Metriocnemus</i>	0	0	0	2	0	0	1	0	0	0	0
<i>Orthocladus</i>	0	0	7	0	0	0	0	0	0	0	0
<i>Orthocladus complex</i>	11	32	77	0	0	4	1	0	13	60	17
<i>Parametriocnemus</i>	0	4	0	0	0	0	0	0	0	0	0
<i>Parorthocladus</i>	0	0	27	0	0	11	0	1	0	5	0
<i>Rheocricotopus</i>	0	0	3	0	4	0	1	0	0	5	0
<i>Tvetenia</i>	16	30	137	13	43	4	8	1	5	180	50



Species		Coffee Creek			Latte Creek		Halfway Creek		YT-24 Creek		Independence Creek	Los Angeles Creek
		CF10.0	CF8.0	CF3.9	LC9.9	LC2.7	HF6.3	HF0.2	YT5.0	YT0.2	ID1.9	LaC4.8
Insects	Deuterophlebiidae	0	0	0	0	0	0	0	0	0	0	0
	<i>Deuterophlebia</i>	9	18	0	0	0	0	0	0	0	0	0
	Empididae	0	0	0	0	0	0	0	0	0	0	0
	<i>Clinocera</i>	0	0	0	2	0	0	0	0	0	0	0
	<i>Clinocerinae</i> Unknown Genus A	18	0	10	0	0	0	0	0	1	55	17
	Muscidae	0	0	0	0	0	0	0	0	0	0	0
	<i>Limnophora</i>	0	0	0	2	0	0	0	0	0	0	0
	Simuliidae	24	204	0	2	89	0	3	1	0	65	184
	Gymnopsis	0	0	0	16	0	29	1	5	6	0	0
	Helodon	0	4	0	7	36	11	0	0	0	30	0
	Prosimulium	0	0	0	9	14	0	2	0	1	15	17
	Prosimulium/Helodon	56	112	0	69	364	89	3	6	9	435	1200
	Simulium	0	2	0	0	18	0	0	0	3	25	83
	Tipulidae	0	0	0	0	0	0	0	0	0	0	0
	Dicranota	4	2	0	2	0	7	0	1	2	0	0
	Ormosia	0	0	0	0	0	0	1	0	0	0	0
	Tipula	0	0	0	0	0	0	1	0	0	0	17
	Order: Lepidoptera	0	0	3	0	0	0	0	0	0	0	0
	Order: Hymenoptera	0	0	0	0	4	0	0	0	0	0	0

Species		Coffee Creek			Latte Creek		Halfway Creek		YT-24 Creek		Independence Creek	Los Angeles Creek
		CF10.0	CF8.0	CF3.9	LC9.9	LC2.7	HF6.3	HF0.2	YT5.0	YT0.2	ID1.9	LaC4.8
Arachnids	Class: Arachnida	0	0	0	0	0	0	0	0	0	0	0
	Order: Trombidiformes	0	0	3	0	7	0	2	0	0	0	0
	Feltriidae	0	0	0	0	0	0	0	0	0	0	0
	<i>Feltria</i> sp.	0	0	3	0	0	0	0	0	0	0	0
	Hydryphantidae	0	0	0	0	0	0	0	0	0	0	0
	<i>Wandesia</i>	0	0	0	0	0	0	0	0	0	0	17
	Sperchontidae	0	0	0	0	0	0	0	0	0	0	0
	<i>Sperchon</i>	9	4	10	0	0	0	5	0	0	15	17
	Order: Oribatei	0	0	0	2	4	0	0	0	1	0	0
	Order: Amphipoda	0	0	0	0	0	0	1	0	0	0	0
	Crangonyctidae	0	0	0	0	0	0	0	0	0	0	0
<i>Crangonyx</i>	0	0	0	0	11	0	0	0	0	0	0	
Oligochaete Worms	Class: Oligochaeta	0	0	0	0	0	0	0	0	0	0	0
	Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0	0
	Lumbriculidae	71	0	127	9	0	21	0	1	2	15	17
	Order: Tubificida	0	0	0	0	0	0	0	0	0	0	0
	Naididae	0	0	0	7	0	0	0	0	0	0	0
	Tubificinae with hair chaetae	2	2	3	0	0	0	0	0	0	0	0
	Tubificinae without hair chaetae	22	0	27	0	0	4	28	0	3	175	0
Phylum: Nemata		0	2	3	2	4	4	0	1	1	0	
Phylum: Platyhelminthes		0	0	0	0	0	0	0	0	0	0	
Turbellaria	0	0	0	0	0	0	1	0	0	0	0	
<b>Total Number of Individuals</b>	<b>665</b>	<b>1,004</b>	<b>1,187</b>	<b>792</b>	<b>1,136</b>	<b>1,205</b>	<b>436</b>	<b>226</b>	<b>437</b>	<b>1,835</b>	<b>5,971</b>	
<b>Total Number of Taxa</b>	<b>23</b>	<b>25</b>	<b>27</b>	<b>26</b>	<b>26</b>	<b>25</b>	<b>30</b>	<b>17</b>	<b>24</b>	<b>23</b>	<b>21</b>	

**Table B.2 Benthic Invertebrate Community Hess Sampler Data, Collected for the Coffee Gold Project, 2017**

Species	Future Mine-exposed					Future Reference				
	HF6.3-1	HF6.3-2	HF6.3-3	HF6.3-4	HF6.3-5	129-1	129-2	129-3	129-4	129-5
Order: Collembola	0	1	1	1	3	0	0	0	0	0
Hypogastruridae	0	0	0	1	0	0	0	0	0	0
Order: Ephemeroptera	0	0	0	0	0	0	0	0	0	0
Ameletidae	0	0	0	0	0	0	0	0	0	0
<i>Ameletus</i>	11	3	7	4	8	0	0	0	0	0
Baetidae	4	1	2	0	0	1	2	1	0	0
<i>Baetis</i>	22	21	45	41	25	8	4	20	4	18
<i>Baetis bicaudatus</i>	24	52	27	64	10	16	0	10	20	12
Heptageniidae	2	3	0	0	1	10	4	4	12	18
<i>Cinygmula</i>	3	5	7	6	1	26	0	8	50	56
Order: Plecoptera	0	0	0	0	0	0	0	0	0	0
Capniidae	3	0	3	0	0	0	0	3	6	0
<i>Capnia</i>	0	0	1	0	0	0	0	0	0	0
Chloroperlidae	0	0	0	0	0	0	0	0	0	0
<i>Haploperla</i>	2	0	0	1	1	0	0	0	0	2
Nemouridae	80	142	144	68	18	342	265	241	526	632
<i>Nemoura</i>	3	11	0	0	1	0	0	0	0	2
<i>Ostrocerca</i>	10	10	7	3	3	2	4	7	8	12
Perlodidae	0	0	0	0	0	1	1	1	0	0
Order: Trichoptera	0	0	0	0	0	0	0	0	0	0
Limnephilidae	4	0	2	2	6	0	0	0	0	0
<i>Ecclisomyia</i>	1	1	3	0	3	0	0	0	0	0
Uenoidae	0	0	0	0	0	0	0	0	0	0
<i>Neothremma</i>	0	0	0	1	0	0	0	0	0	0
Order: Diptera	0	0	1	0	0	0	0	0	0	0
Chironomidae	5	3	9	4	9	10	0	10	20	8
Tribe: Tanytarsini	0	0	0	0	0	0	0	0	0	2
<i>Micropsectra</i>	0	0	0	0	0	0	0	0	2	0
Tribe: Diamesini	0	0	0	0	0	0	0	0	0	0
<i>Diamesa</i>	33	16	20	14	3	6	3	2	2	4
<i>Pseudodiamesa</i>	0	0	0	0	3	0	0	0	0	0

Species	Future Mine-exposed					Future Reference					
	HF6.3-1	HF6.3-2	HF6.3-3	HF6.3-4	HF6.3-5	129-1	129-2	129-3	129-4	129-5	
Insects	Orthoclaadiinae	0	0	1	0	0	1	1	0	0	0
	<i>Diplocladius</i>	3	1	0	0	0	0	0	0	0	0
	<i>Diplocladius cultriger</i>	0	0	1	0	1	0	0	0	0	0
	<i>Eukiefferiella</i>	5	6	3	4	0	13	12	2	18	12
	<i>Hydrobaenus</i>	1	0	1	0	0	1	0	0	2	0
	<i>Limnophyes</i>	0	0	0	0	2	6	1	1	10	0
	<i>Metriocnemus</i>	0	0	0	1	1	0	0	0	0	0
	<i>Orthoclaadius complex</i>	1	0	1	0	0	0	0	0	0	0
	<i>Parorthoclaadius</i>	1	0	0	0	0	0	0	0	0	0
	<i>Pseudosmittia</i>	0	0	0	0	0	0	0	1	0	0
	<i>Tvetenia</i>	0	0	0	0	0	3	5	13	8	10
	Empididae	0	0	0	0	0	0	0	0	0	0
	<i>Clinocerinae</i> Unknown Genus A	0	1	0	0	0	0	0	0	0	0
	Muscidae	0	0	0	0	0	0	0	0	0	0
	<i>Limnophora</i>	0	0	2	1	5	0	0	1	2	0
	Simuliidae	7	3	7	0	1	27	2	4	8	16
	<i>Gymnopais</i>	11	12	18	2	0	4	0	2	0	0
	<i>Helodon</i>	0	0	1	0	0	1	0	0	0	0
	<i>Prosimulium/Helodon</i>	0	6	2	0	0	2	2	1	2	4
	<i>Simulium</i>	0	0	1	0	0	0	0	0	0	0
	Stratiomyidae	0	0	0	0	0	0	0	0	0	0
	<i>Nemotelus</i>	0	0	0	0	0	1	0	0	0	0
	Syrphidae	0	0	0	0	0	0	0	1	0	0
	Tipulidae	0	0	0	0	0	1	0	1	0	0
	<i>Dicranota</i>	7	1	6	3	3	4	0	1	0	0
	<i>Ormosia</i>	0	0	0	0	0	1	0	0	0	0
	<i>Tipula</i>	0	0	0	0	0	2	1	2	2	2
Order: Lepidoptera	0	0	0	0	1	0	0	0	0	2	

Species		Future Mine-exposed					Future Reference				
		HF6.3-1	HF6.3-2	HF6.3-3	HF6.3-4	HF6.3-5	129-1	129-2	129-3	129-4	129-5
Arachnids	Order: Trombidiformes	0	1	0	0	0	0	0	2	2	0
	Sperchontidae	0	0	0	0	0	0	0	0	0	0
	<i>Sperchon</i>	0	0	1	0	0	5	2	8	6	6
	Order: Oribatida	1	1	1	0	2	1	1	0	0	0
	Order: Amphipoda	0	0	0	0	0	0	0	0	0	0
	Crangonyctidae	0	0	0	0	0	0	0	0	0	0
	<i>Crangonyx</i>	0	0	0	0	0	1	0	1	0	0
Mollusca	Class: Gastropoda	0	1	0	0	0	0	0	0	0	0
Oligochaete Worms	Class: Oligochaeta	0	0	0	0	0	0	0	0	0	52
	Order: Lumbriculida	0	0	0	0	0	0	0	0	0	0
	Lumbriculidae	27	6	13	9	3	260	21	10	12	34
	<i>Rhynchelmis</i>	0	0	0	0	0	1	0	0	10	0
	Order: Tubificida	0	0	0	0	0	0	0	0	0	0
	Enchytraeidae	0	0	0	0	0	0	0	0	0	0
	<i>Mesenchytraeus</i>	0	0	0	0	1	0	0	0	0	0
	Tubificinae with hair chaetae	0	0	0	0	0	0	2	0	0	0
	Tubificinae without hair chaetae	0	0	0	0	0	10	0	0	14	2
<b>Total Number of Organisms</b>		<b>271</b>	<b>308</b>	<b>338</b>	<b>230</b>	<b>115</b>	<b>767</b>	<b>333</b>	<b>358</b>	<b>746</b>	<b>906</b>
<b>Total Number of Taxa</b>		<b>18</b>	<b>19</b>	<b>22</b>	<b>15</b>	<b>20</b>	<b>24</b>	<b>15</b>	<b>23</b>	<b>20</b>	<b>16</b>





**GOLDCORP COFFEE GOLD MINE**

Project Proposal Submission for Screening  
December 6, 2017

 **GOLDCORP**