

REPORT

Erosion and Sediment Control Plan

Coffee Gold Mine

Submitted By:

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REVISION TRACKING LOG

Revision Tracking Log			
Version	Date	Section Updated	Description of Update
0	November 2023	-	First submission of the Erosion and Sediment Control Plan
1	September 2025	Appendix A	Updated Table of Concordance in response to QML IR1
2			

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
CCME	Canadian Council of Ministers of The Environment
GMP	Good Management Practice
EMR	Yukon Department of Energy, Mines and Resources
EQS	Effluent Quality Standards
GMPs	Good Management Practices
H&S	Health and Safety
HLF	Heap Leach Facility
LNG	Liquefied Natural Gas
LOM	Life of Mine
NAR	Northern Access Route
OIC	Order in Council
PLS	Pure Live Seed
Project	Coffee Gold Mine
Newmont	Goldcorp Kaminak, a subsidiary of Newmont Corporation (Newmont)
RECP	Rolled Erosion Control Product
ROM	Run of Mine
RSA	Reagent Storage Area
RSC	Revised Statutes of Canada
SER	Sustainability and External Relations
SY	Statute of the Yukon
TAC	Transportation Association of Canada
TSS	Total Suspended Solids
WRSF	Waste Rock Storage Facility
YESAB	Yukon Environmental and Socio-economic Assessment Board
YWB	Yukon Water Board

LIST OF SYMBOLS AND UNITS OF MEASURE

Symbol, Unit of Measure	Definition
%	percent
H	horizontal distance
ha	hectare
km	kilometre
L	litre
m	metre
m ²	square metre
masl	metres above sea level
mg	milligram
MJ	megajoule
mm	millimetre
Mm ³	million cubic metres
NTU	Nephelometric Turbidity Units
Mt	million tonnes
PLS/m ²	pure live seed/square metre
t/d	tonnes per day
V	vertical distance

INFORMATION REQUIREMENTS FOR QUARTZ MINE LICENSE, WATER LICENSE 1, AND YWB REQUIREMENTS

Information Requirement	Location in this Plan
Master Table of Concordance	Appendix A
Revision Log	Page i
Monitoring plan to include physical stability of slopes and dams, stability of water conveyance capacity and spillways, and development of surface erosion on structures	Section 8: Monitoring Strategies
Provide an overview of the project description, the areas where erosion may be a concern, and the objectives of this plan.	Section 1.2: Scope and Objectives
Describe the monitoring protocols for identifying and responding to all instances of sedimentation or erosion	Section 8: Monitoring Strategies
Identify all areas where erosion or sedimentation may be a concern, a characterization of materials, if the areas can be avoided, and the level of concern associated with each area.	Section 4: Overall Approach to Erosion and Sediment Control Section 5: Erosion and Sediment Sources
Provide a detailed description of the methods of sedimentation and erosion prevention and control that will be used, the specific situations that they will be used in, and the implementation procedures that will be followed. Measures may include but are not limited to, ditching and damming, use of filter fences, re-contouring of surface features, revegetation, and sheeting.	Section 6: Erosion and Sedimentation Control Good Management Practices Section 7: Sediment Mitigation Measures Appendix B Applicable Erosion and Sediment Control Good Management Practices
Provide designs for sediment control ponds including layout, sizing, material and construction specifications, and erosion control. Designs for both permanent and temporary facilities must be included. Provide designs for sediment control and removal facilities for both construction and operation phases, including retention times and removal efficiencies.	Water Management Plan
Provide flood design events, inflow hydrographs, erosion control, sediment removal for WRSFs	Section 5.3 Waste Rock Placement Water Management Plan
Describe erosion control for WRSF clearing, stripping, and grubbing operations	Section 5.1 Mine Construction
Surface water management of waste rock and stockpiles is to include surface water management and erosion control	Water Management Plan
Sediment and erosion control during road construction and road operations.	Access Route Construction Management Plan Access Route Operational Management Plan
A summary of any timing windows that may restrict the scheduling of instream works	Section 2.1: <i>Fisheries Act</i>
A site plan indicating: <ul style="list-style-type: none"> the location of instream works and infrastructure to be removed/installed the locations where erosion and sediment control mitigation features will be installed water diversions (if applicable) areas of dewatering (if applicable) on-site settling features proposed upstream and downstream monitoring locations 	Figure 1-2: Mine Site General Arrangement

¹ Guidance provided in Plan Requirement Guidance for Quartz Mining Projects (YWB and EMR 2013).

Information Requirement		Location in this Plan	
Provide details of the proposed monitoring program, including who will be responsible for implementing the monitoring program; the proposed frequency, method and duration of sampling at upstream and downstream locations; parameters to be tested (generally turbidity and TSS); and a commitment to follow CCME Water Quality Guidelines or proposed alternative water quality limits with rationale and supporting evidence.		Section 8: Monitoring Strategies	
YWB EMR Plan Requirements Applicable to the Erosion and Sediment Control Plan			
Information Requirement	Location in this Plan	Referenced From	
Provide flood design events, inflow hydrographs, erosion control, sediment removal.	Section 5.3 Waste Rock Placement	Waste Rock and Overburden Management Plan	

1.0 INTRODUCTION

1.1 Project Summary

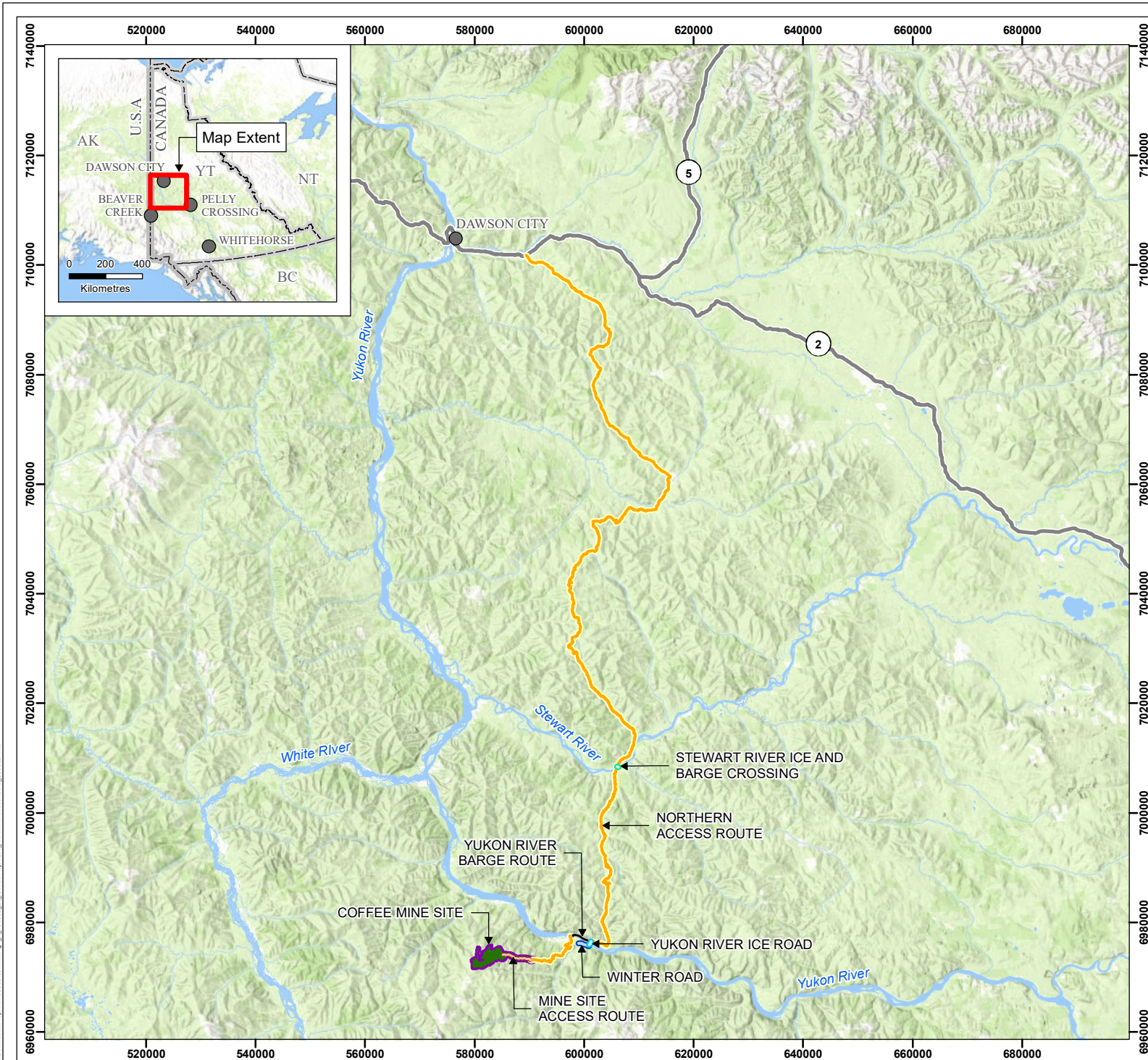
The proposed Coffee Gold Mine (the Project) is an open-pit gold mine owned by Goldcorp Kaminak Ltd., a wholly owned subsidiary of Newmont Corporation (Newmont), located on the south side of the Yukon River in the White Gold District of west-central Yukon. The Project site is approximately 130 km south of the City of Dawson, 140 km west of Pelly Crossing, 95 km north-east of Beaver Creek, and 340 km northwest of Whitehorse. The Project is located wholly within the traditional territory of Tr'ondëk Hwëch'in, partially within the traditional territory of Selkirk First Nation and First Nation of Na-cho Nyäk Dun, and partially within the asserted territory of White River First Nation. The Project contains several gold occurrences within an exploration concession covering an area of more than 600 km². The Mine Site will be accessed by road from Dawson via a 16-km stretch of Klondike Highway and 192-km all-season road, referred to as the Northern Access Route (NAR) (Figure 1-1). The NAR includes seasonal barge crossings on both the Stewart and Yukon rivers, with ice bridges and a seasonal winter road in the winter months.

The Project is comprised of four open pits: Supremo, Latte, Double Double, and Kona. Waste rock is proposed to be permanently stored in the Alpha Waste Rock Storage Facility (WRSF) (Figure 1-2). The ore production rate is proposed to be up to approximately 9.0 million tonnes (Mt) per year, producing an estimated total of 67 Mt of heap leach feed over the 10-year Operation Phase. The conceptual-level estimate for waste material to be moved over the life of mine (LOM) is up to approximately 330 Mt based on an average strip ratio of 5.0:1. The ore will be crushed and transported to the Heap Leach Facility (HLF) via overland conveyor or trucks for nine months of the year. During the three coldest months of winter, run-of-mine (ROM) ore will be stockpiled in the ROM stockpile. Gold will be extracted from gold-bearing leach solution by a six tonnes per day (t/d) adsorption, desorption, recovery carbon plant with mercury retorting to produce a final gold doré product. A total of 2.6 million ounces of gold is planned to be recovered over a 10-year mine life.

The Project phases are defined as follows:

- Construction Phase: Q2 Year –3 to end of Year –1 (30 months)
- Operation Phase: Year –1 to end of Year 9 (10 years)
- Reclamation and Closure Phase: Year 10 to end of Year 21, including a 6-year Post-Mining Closure Stage and a 5-year Active Closure Stage (11 years)
- Post-Closure Phase: Year 21 onwards as determined to be required.

These phases broadly describe the activities occurring within a particular time period; however, some activities will continue from one phase to another as mine site development advances with operational activities (e.g., Open Pits, WRSF). When areas that support mine operations are no longer required, they will be progressively reclaimed. The overall Project schedule is the general expected scenario for mine construction and operation; detailed activities are subject to change depending on detailed mine planning and the timing of receipt of authorizations.



COFFEE GOLD MINE

Coffee Project Location and Northern Access Route

Legend

- Stewart River Ice and Barge Crossing
- Yukon River Barge Route
- Yukon River Ice Road
- Winter Road
- Mine Site Access Route
- Northern Access Route
- Project Area
- Project Footprint
- Highway
- Waterbody

- 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.
 2. Contains information licensed under the Open Government Licence - Yukon Territory
 3. Basemap: ESRI World Topographic Map
 4. Inset Basemap: ESRI World Topographic Map

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COFFEE GOLD MINE

General Arrangement - Mine Site

Legend

- Double Double Pit
- Kona Pit
- Latte Pit
- Supremo Pit

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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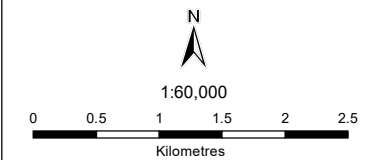
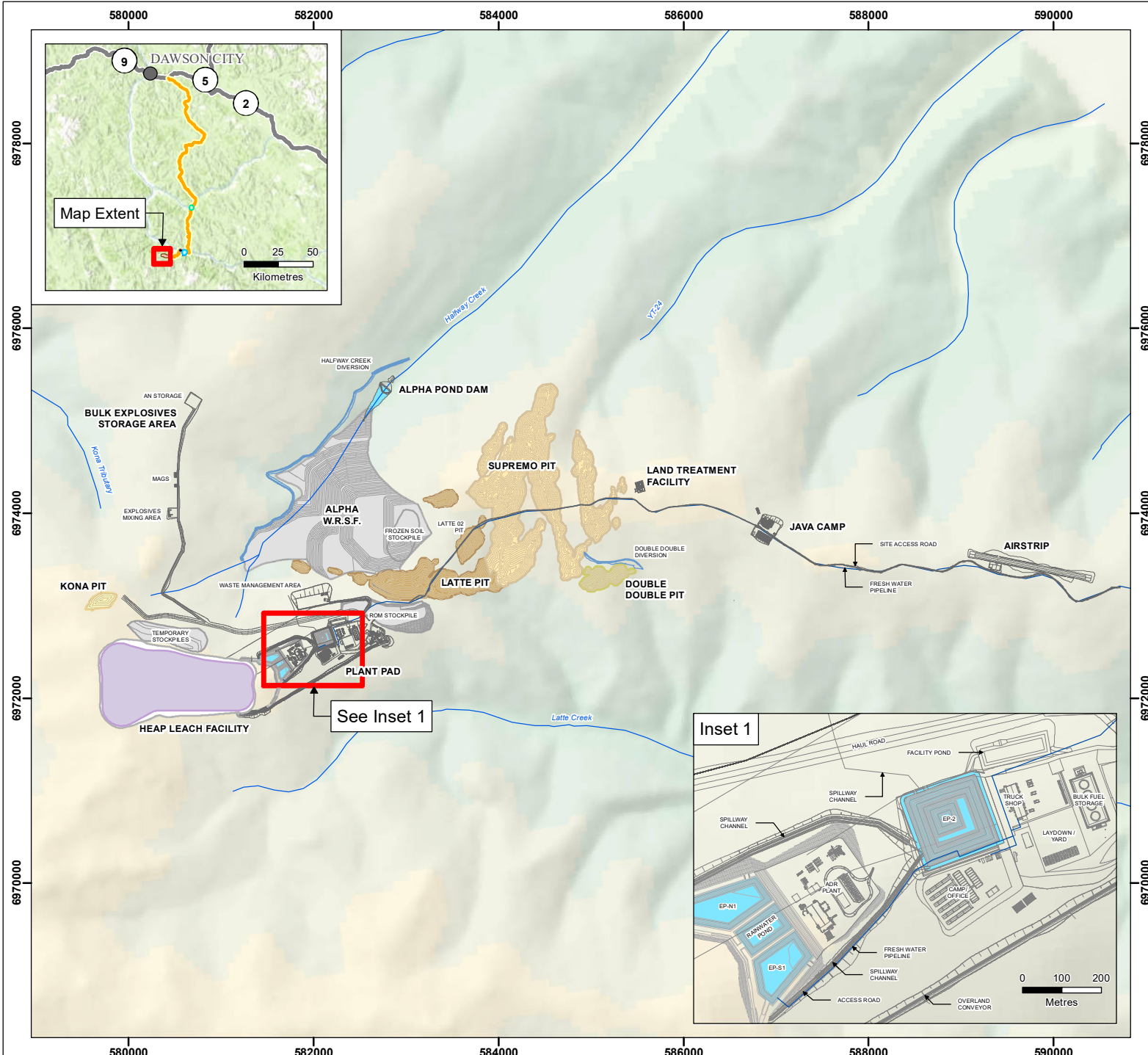


Figure 1.2	Date: Oct 6, 2023	Drawn by: AS	Reviewed: CH
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1.2 Scope and Objectives

Construction, operation, and closure of the Project have the potential to cause erosion and sedimentation associated with ground disturbances such as vegetation clearing, earthworks (cuts and fills), excavations, and slope failures. The erosion and sedimentation may affect the surrounding environment if not properly mitigated. Sediment in water can directly affect aquatic organisms through several mechanisms, including physiologically (e.g., clogging gills) and behaviorally (e.g., reduced ability to see predators or prey). In addition, larger particles may settle on to stream beds, altering substrate composition, permeability, and stability, and potentially affecting aquatic vegetation, benthic invertebrates, or fish.

The purpose of an Erosion and Sediment Control Plan is to enable a site to effectively address its erosion prevention and sediment management needs. The loss of soil to erosion, its subsequent presence as suspended solids in runoff, and its potential deposition in receiving bodies are important considerations for many aspects of a site's water and overall environmental management, including:

- Meeting water quality regulations and permit conditions
- Minimizing impacts to aquatic and riparian life
- Preservation of overburden (either in-situ or stockpiled)
- Preservation of conveyance capacity and storage capacity in water infrastructure
- Prevention of undesirable hydraulic behavior in channels
- Maintaining geotechnical stability of slopes and channel banks.

This Erosion and Sediment Control Plan (the Plan) is intended to identify and demonstrate how appropriate management techniques will reduce the potential for any erosion- and sediment-related adverse effects to the environment and describes the measures that will be undertaken to minimize water erosion and prevent sediment mobilization into the receiving environment, specifically areas with fish and aquatic biota values that can be affected by increased turbidity or sediment deposition generated by Project activities.

Where areas need to be disturbed for Project development (e.g., roads, building pads, Alpha WRSF) an emphasis will be put on water management and erosion control measures that prevent sediment mobilization. Once sediment is in suspension, it is more challenging to address via sediment control measures. As such, most of the erosion and sedimentation should be prevented or minimized through proper planning, sequencing, and design of the Project.

This Plan addresses the concepts and general plans for erosion and sediment control based on the designs for the Mine Site. During the Construction and Operation Phases, site-specific plans will be required for some of the more sensitive works. General erosion and sediment control for the NAR to the proposed Mine Site is included under separate cover in the Access Route Construction Management Plan and the Access Route Operational Management Plan.

This Plan has been written to meet the guidance provided in the Plan Requirement Guidance for Quartz Mining Projects (YWB and EMR 2013).

This Plan is provided in conjunction with several other plans to meet the requirements for quartz mine applications for a Quartz Mining License and a Water Use Licence under the *Quartz Mining Act* and the

Waters Act, respectively. Other applicable regulations related to erosion and sediment control management and monitoring are detailed in Section 2.

Commitments that were made during the YESAB screening process related to the Erosion and Sediment Control Plan are incorporated into the plan where possible and are summarized in the Erosion and Sediment Control Plan Table of Concordance (Appendix A). The Table of Concordance includes commitments made during the assessment process only, as there were no Decision Document conditions related to erosion and sediment control at the site.

1.3 Incorporation of Traditional Knowledge and Consultation Feedback

Consultation during preparation of the YESAB Project Proposal identified erosion and sediment control as a valued component that should have a range of mitigation measures implemented in order to minimize change (Goldcorp 2017). First Nations identified sediment and erosion control as important to human health, fish, and wildlife as sedimentation in creeks and rivers can adversely affect the organisms that live in, drink from, or travel through those aquatic systems. Specific concerns included:

- Concerns about erosion were raised with respect to the open pit mine bench heights and the bench face steepness (angle of repose).
- Stability and geometry of the WRSF should be optimized to limit erosion, particularly during freshet.
- Requests to use local plants and native species to control soil erosion. Erosion objectives need to also consider biodiversity and vegetation targets, including managing for invasive species.
- Concerns around river bank erosion for the barge and possible effects to downstream water quality.

First Nation engagement and consultation is ongoing, and feedback that is received or concerns that are heard during consultation regarding erosion and sediment control at the Project will be incorporated into this plan, where applicable.

1.4 Synergies with Newmont Internal Standards and Requirements and Other Project Documents

As an important part of Newmont's internal governance process, Newmont has implemented Global Policies and Standards (Global Standards) that are reviewed and preliminarily approved by a Global Policies & Standards Committee. The Global Standards provides the framework and standards for Newmont sustainability management and ensures a consistency of approach for implementing these global policies across the Company.

The Global Standards apply to all directors, officers and employees of Newmont Corporation, its subsidiaries, and any other entities that it controls. A variance request process for existing or future conditions is in place. The process provides an alternative mechanism for those instances where a Newmont site/operation cannot logistically or feasibly conform to a requirement established in a Standard due to special conditions or unique hardships. The Global Standards are intended to be fully integrated into all core business functions, and they emphasize sustainability, responsibility, and accountability at all organizational levels.

The list of Global Standards is provided in Table 1-1.

Table 1-1 Newmont Global Standards

Global Standards	
Air Emissions Management Standard	Land Acquisition and Involuntary Resettlement Standard
Biodiversity Management Standard	Local Procurement and Employment Standard
Closure and Reclamation Management Standard	People Policy
Code of Conduct	Product Stewardship Standard
Community Investment and Development Standard	Social Baseline and Impact Assessment Standard
Cultural Resource and Management Standard	Stakeholder Relationship Management Standard
Drug and Alcohol Policy (Coffee-Specific)	Tailings Storage Facility and Heap Leach Facility Environmental Standard
Hazardous Materials Management Standard	Tailings Storage Facilities Technical and Operations Standard
Health and Safety Policy	Waste Management Standard
Human Resources Standard	Waste Rock and Ore Stockpile Management Standard
Human Rights Standard	Water Management Standard
Indigenous Peoples Standard	

The Newmont Internal Sediment and Erosion Control Guidance document was developed as a reference for designing a comprehensive program to minimize the impacts of mining and processing on the aquatic ecosystem and in waters downstream. The sediment and erosion control measures outlined in this plan will be implemented in alignment with the Newmont standards and guidance documents.

While this Plan can be reviewed in isolation to inform a review of the specific actions for erosion and sediment control management and monitoring, this plan should be viewed in concert with the following additional management plans in order to attain a holistic understanding of the Project:

- Access Route Construction Management Plan (ARCMP)
- Access Route Operational Management Plan (AROMP)
- Air Quality and Greenhouse Gas Management Plan
- Reclamation and Closure Plan
- Environmental Monitoring and Adaptive Management Plan
 - Fish and Aquatic Life Monitoring Plan
 - Surface Water Quality Monitoring Plan
- General Mine Development Plan
- Waste Rock and Overburden Management Plan (WROMP)
- Vegetation Protection Plan
- Water Management Plan.

1.5 Roles and Responsibilities of Key Personnel

Newmont has committed to providing the necessary human, material, and financial resources to implement and maintain the Erosion and Sediment Control Plan and associated monitoring plan. The Environment Department will be responsible for implementation of the monitoring components outlined in the Plan. Personnel that are responsible for the inspections of physical integrity and stability of sediment and control pond components, slopes, and dams will have all required qualifications to conduct such inspections. Key Project personnel responsible for being familiar with the contents of this Plan are outlined in Table 1-2.

Table 1-2 Key Project Personnel

Role	Responsibility
Mine General Manager	Overall responsibility for Mine Site management.
Operations Manager	Responsible for mine planning and production, mine technical monitoring, and mine regulatory compliance.
Health and Safety (H&S) Manager	Responsible for conducting regular safety site inspections and implementing the appropriate controls in a timely manner. The H&S Manager shall maintain records of all safety inspections as well as any actions taken because of these inspections throughout the life of the Project. Where safety inspections show the potential for environmental effects, the H&S Manager will work in collaboration with the Environment Department.
Sustainability and External Relations (SER)	Responsible for recording and addressing any complaints received from nearby land users, or other interested parties regarding erosion and sediment-related impacts off-site. The SER department shall maintain records of all complaints received as well as any actions taken because of these complaints.
Environmental Manager	Responsible for permitting, environmental monitoring and regulatory compliance.

2.0 REGULATORY AND GUIDANCE DOCUMENTS

There is no specific federal and territorial erosion and sediment control legislation; however, some acts and regulations contain provisions that pertain to erosion control. As well, specific legislation includes provisions to protect receiving environments in terms of deposition of waste and alteration of habitat. Newmont will also adhere to territorial guidance documents, which have been produced, and that are not regulatory in nature, but set out goals and expectations as well as provide regionally important information.

2.1 *Fisheries Act*

Several sections of the *Fisheries Act* (RSC, 1985, c. F-14) influence erosion and sediment control planning:

- Section 35 prohibits any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction of fish habitat.
- Section 36(3) prohibits the deposit/entry of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Fisheries and Oceans Canada sets out Standards and codes of practice that require projects near water to comply with the fish protection provisions of the *Fisheries Act* (RSC, 1985, c. F-14). If the standards and codes of practice do not apply to the project, or are not applicable to the proposed works, a project review could be requested. Newmont will time all work in or around water in accordance with the guidelines provided in the Freshwater Timing Windows Identified for the Yukon (Canada 2014) to reduce harmful impacts to fish and fish habitat. The timing windows for instream work in the Project area, listed by fish species are provided in Table 2-1.

Table 2-1 Instream Works Timing Windows¹

Species	Timing Windows ²	
	Start Date	Finish Date
Chinook Salmon	June 10	July 5
Chum Salmon	June 1	Aug 15
Lake Trout, Whitefish Species	Apr 15	Sept 1
Arctic Grayling	July 1	April 15

¹This table indicates the time that work should **occur** to reduce the risk identified for Yukon.

²Timing Windows for Yukon drainage downstream of Hootalinqua (including Mainstem to border, and Pelly, White, Stewart and all tributaries).

2.2 *Quartz Mining Act*

Mines that are subject to the Yukon *Quartz Mining Act* (SY 2003, c.14; amended by SY 2008, c.19; SY 2013, c.18; SY 2016, c.5; SY 2016, c.12) require a licence to operate. Environmental management and protection plans (this Plan and the other relevant plans listed in Section 1.4) are submitted as part of the application process.

In addition, the Quartz Mining Land Use Regulations (OIC 2003/64) has several sections that pertain to environmental planning and protection:

- Section 1(1) presents a definition of adverse effects.
- Section 9(1) (e) requires a description of activities to be undertaken and procedures to mitigate adverse environmental effects.
- Schedule 1 includes operating conditions that specify requirements for vegetation removal and re-establishment, erosion control, and management of impacts to permafrost, release of sediment, and management of waste rock.

2.3 Waters Act

The Yukon *Waters Act* (SY 2003, c.19; amended by SY 2007, c.6) sets out how water is to be managed in Yukon. Sections of the *Waters Act* that influence erosion and sediment control planning include:

- Section 1 provides a definition of waste. Any substance that, if added to water, would degrade or alter, or form part of a process of degradation or alteration of the quality of the water to an extent that is detrimental to its use by people or by any animal, fish, or plant.
- Section 7 is a general prohibition regarding the deposition of waste in water.
- The Waters Regulation (OIC 2003/58) also includes several sections that pertain to erosion and sediment control planning:
 - Section 4 – Sets out criteria for use of water and waste deposit without a licence (i.e., if the criteria cannot be met, then a licence would be required. In particular, the criteria that water use or deposit of waste would have no potential for significant adverse environmental effects.
 - Schedule 2 – Presents classifications of undertakings
 - Schedule 5 – Identifies licensing criteria for industrial undertakings, including:
 - Training of intermittent water courses
 - Construction of watercourse crossings
 - Deposit of waste above the ordinary water mark.

2.4 Guidance Documents

The following non-legislative documents also provide relevant guidance for erosion and sediment control planning:

- Sediment and Erosion Control Plan Guidelines (YWB 2018) — This document outlines the minimum information requirements of a Sediment and Erosion Control Plan, describes the applicable water quality limits, and sets out expectations for discussion of the sediment and erosion monitoring program.
- Type A and B Quartz Mining Undertakings (YWB 2012) — This information package provides a framework for expectations of licence applications and describes the principles that will be applied during the deliberation process. This document also provides a list of additional guidance documents that can be referred to during the development of a quartz mining licence application.
- Preferred Practices for Works Affecting Yukon Waters (Government of Yukon 2019) — This document provides Yukon-specific “preferred practices” that prescribe practical work-site guidelines to help developers protect water resources. The guidance document provides

information that can be used across a broad range of work activities to control erosion, sedimentation, and contamination. Guidelines on vegetation management and revegetation and techniques for preserving natural vegetation and encouraging natural revegetation are included.

- Plan Requirement for Quartz Mining Projects (YWB 2013) — this guidance document outlines expectations of environmental and operational plan content requirements.
- Yukon Revegetation Manual: Practical Approaches and Methods (Matheus and Omtzigt 2013) — This manual describes methods for planning and implementing revegetation projects in Yukon, written in collaboration with practitioners, planners, and managers in industry and the government. The manual addresses a range of revegetation sites and application techniques, from borrow pits and mine sites, to highway rights-of-way, and transmission lines and pipeline corridors.
- Canadian Environmental Quality Guidelines (Canadian Council of Ministers of the Environment (CCME) 2014) – These guidelines provide contaminant concentrations that are protective of most receiving waters, e.g., suspended sediments, total dissolved solids and should be followed when monitoring the receiving environment.
- National Guide to Erosion and Sediment Control on Roadway Projects (Transportation Association of Canada (TAC) 2005) – Outlines a risk-based approach to erosion and sediment control planning and response.
- Government of Canada, Freshwater Timing Windows Identified for the Yukon table (Canada 2014) – These guidelines provide timing windows during which work in or around water is acceptable in order to reduce the risk of harm to fish and fish habitat, listed by river drainages and species.

3.0 MINE PHASES REQUIRING EROSION AND SEDIMENT CONTROL

Erosion and sediment control requirements vary depending on the mine component and Project phase. For example, operation of the open pit and WRSF require different management than mine construction and road building. The different phases of the mine: Construction, Operation, and Reclamation and Closure also require different management strategies.

The following subsections highlight phases of the Project that require erosion and sediment control to minimize environmental impacts. Figure 1-2 provides an overview of the Project and the location of infrastructure, Open Pits, and the WRSF. Erosion and sediment control for the NAR is discussed in the Access Route Construction Management Plan (ARCMP) for construction activities, and in the Access Route Operational Management Plan (AROMP) for maintenance activities.

3.1 Mine Construction

For the purpose of this Plan, mine construction includes the construction of the HLF, process plant, reagent storage area, laboratory, camp, truck shop, warehouse building, power plant and fuel storage tanks, event ponds, soil stockpiles, crusher area, run-of-mine (ROM) stockpile, water management ponds and open pits, as well as associated access roads. Each of these activities will require stripping of vegetation and overburden (assumed to be approximately 30 cm) within the full activity footprint, and stockpiling materials until they are needed for site reclamation and revegetation. This work will expose soil, which can then erode and be a source of sediment. In some cases, the exposed soil will be covered with infrastructure (e.g., road base, building pads), and will be hardened from further erosion. In some instances, exposed soils will need to be stabilized to prevent erosion (e.g., cut-and-fill slopes along access roads, pond dam slopes, and outer slopes of stockpiles).

3.2 Open Pit Development

The Project will be an open pit operation and the mining areas will be exposed to snow accumulations and rainfall. Due to the nature of the pits, water on high walls and internal roads will be directed into the pit. These waters may be high in sediment and, in some cases, may have to be treated (by settling and/or flocculants) before they are pumped out of the pits. The sedimentation ponds will provide another opportunity where suspended sediments can be treated before release into the environment (refer to the Water Management Plan additional information). Some water management and erosion control will be implemented early in the pit development, as described in Section 5.2, until the pits are big enough that internal sumps can be constructed to manage and contain runoff water.

3.3 Mine Operation

During mine operations, erosion and sediment issues will be primarily associated with access roads, ore stockpiles, WRSF, frozen material stockpiles, and pit expansions.

3.3.1 Waste Rock Placement

The Alpha WRSF is generally a source of erodible materials. The WRSF site was selected to provide adequate capacity for waste rock over the planned Life of Mine (LOM) and to meet geotechnical and mine design criteria. The WRSF will be constructed above or within existing seasonal and permanent watercourses and will be free draining to allow surface water to pass beneath it. Erosion from the WRSF

will have a short and direct link to the aquatic receiving environment; therefore, measures will be taken to manage water in order to minimize erosion at these facilities. Surface water will be controlled by a series of channels and berms to segregate water that has contacted mine waste and mine related infrastructure (contact water) from water which has not (non-contact water). Contact water will be collected and routed to the Alpha sedimentation pond to allow suspended sediment to settle out of the water prior to discharging into the environment. Pond effluent will meet the discharge guidelines for total suspended solids. A Water Management Plan has been developed to proactively manage suspended sediment and contact water throughout the construction and operation phases of the mine, including the development and operation of the WRSF, soil stockpiles and other storage areas. Further details on water management at the site are provided in the Water Management Plan.

3.3.2 Stockpiles

In addition to the WRSF, there will be additional soil and rock stockpiles:

- The soil stockpiles located to the north of the HLF, which will contain organic material and upper overburden. The soil stockpiles will temporarily store the material until it is needed for reclamation and revegetation activities.
- Frozen soil storage area will be used to store ice-rich frozen soils (refer to WROMP).
- ROM Stockpile will be used to temporarily store ore from the open pits, particularly during the winter months of January through March each year. The stockpile will be located directly east of the primary crusher.

3.4 Reclamation and Closure

Erosion and sediment control during mine operations will be designed to support the post-mining reclamation and closure efforts and will include progressive reclamation once activities cease in each area. Erosion control and vegetation establishment during mining operations will expedite the development of stable land-forms, which will be mostly vegetated by the time the Project enters the Reclamation and Closure Phase. Soil management and revegetation done during operations will also provide valuable information on the success of long-term vegetation establishment that is critical to reclamation success.

During the Reclamation and Closure Phase, erosion control will focus on re-establishment of vegetation after surface infrastructure has been decommissioned and will be based off of successful revegetation conducted during mine operations.

4.0 OVERALL APPROACH TO EROSION AND SEDIMENT CONTROL

If erosion and sediment control is required after proper planning and design of the Project is implemented, a risk-based and hierarchical approach will be used to implement erosion and sediment control measures during the Project phases. The first step is to understand the risks and potential consequences of erosion to allocate the appropriate level of erosion and sediment control. This risk assessment is followed by a hierarchical approach to erosion and sediment control by first implementing clean water runoff controls where possible, followed by various erosion control measures. Sediment controls will also be implemented but will be considered as secondary method after water management and erosion prevention controls have been implemented.

General mitigations for erosion and sediment control include:

- Minimizing surface disturbance, including clearing and grubbing, to reduce erosion and hence the need for sediment control.
- Preventing sediment mobilization into the receiving environment by managing runoff from disturbed areas, including where disturbance is short term and temporary, through grading slopes, ditching, and settling ponds.
- Establishing vegetation on disturbed areas as soon as practical to prevent long-term erosion.
- Administering routine geotechnical inspections to evaluate the stability of the Mine Site, water management system, and all exposed slopes and excavations.
- Monitoring and maintaining the erosion and sediment control measures to protect vegetation and watercourses adjacent to the Project footprint.

4.1 Risk

The level of erosion and sediment control required is based on the potential consequences, including:

- Ecological risk related to impacts on the receiving environment
- Project consequences or impacts to Project schedule related to the need to respond to repairs; or
- Compliance with regulatory criteria associated with deposition of sediment in the receiving environment.

Understanding the risks and consequences assists in erosion control planning and allows for the appropriate level of response or intervention. That is, where there is low potential of erosion and low consequence, minimal erosion and sediment controls may be implemented, whereas in locations that have a high potential for erosion and high consequence, a multi-layered approach to erosion and sediment control will be prescribed.

4.1.1 Risk-based Planning and Response

The National Guide to Erosion and Sediment Control on Roadway Projects (TAC 2005) outlines a risk-based approach to erosion and sediment control planning and response. The amount and complexity of the erosion and sediment controls will increase with increasing risk of erosion and potential consequences associated with sediment release (Table 4-1). This risk-based approach will be used for the Project when developing site-specific erosion and sediment control plans as construction and operations proceed.

Additionally, pre-disturbance inspections will be conducted before stripping of existing soil and vegetation occurs to identify and implement sediment control measures as required.

Table 4-1 Risk-based Approach to Erosion and Sediment Control Planning and Response

Erosion Potential	Consequence of Erosion and Sedimentation	Level of Erosion and Sediment Control					
		Procedural GMPs	ESC Plan and Structural GMPs	Water Management GMPs	Staged Construction and Progressive Rehabilitation	More Intensive Sediment Controls	Monitor Water Quality
Low	Low	Recommended	-	-	-	-	-
	High	Required	Required	-	-	-	-
Moderate	Low	Required	-	-	-	-	-
	High	Required	Required	Recommend	Recommend	Recommend	Recommend
High	Low	Required	Required	Required	Required	Required	Recommend
	High	Required	Required	Required	Required	Required	Required
Reference in Manual Section		7.2	7.3, 7.4, 8.0	7.3	7.2, 7.2.1	7.5	9.9

Source: Transportation Association of Canada 2005

4.1.2 Factors Affecting Erosion

The factors that affect erosion are outlined in the revised universal soil loss equation (Wall et al. 2002):

$$A = R \times K \times L \times S \times C \times P$$

Where:

A = the potential, long-term average annual soil loss (tonnes/ha/year)

R = the rainfall factor (MJ·mm/ha·hour)

K = the soil erodibility factor (tonne·ha·hour/ha·MJ·mm)

L and **S** = the slope length and steepness factors, respectively (dimensionless)

C = the cropping-management factor (dimensionless)

P = the support practice factor (dimensionless)

These factors are further detailed below, as they can be influenced by planning and erosion and sediment control practices.

4.1.2.1 Precipitation

The Project area is in the Klondike Plateau ecoregion, which receives 300 to 500 mm of precipitation annually. The wettest portion of the year is June to August, when 50 mm to 90 mm of precipitation can occur each month (Smith et al. 2004). Site-specific monitoring has shown that the average annual

precipitation is 370 mm, with approximately 32% as snow between October and April at the valley bottom stations. Since much of the Project is located at higher elevations, it is expected that more of the precipitation will occur as snowfall. June through August are the wettest months, with peak rainfalls occurring in July (Lorax 2016). In addition to rainfall, the spring snow melt runoff (i.e., freshet) creates another challenging period for erosion and sediment control, due to high volumes of runoff that can occur in a short period of time, as well as rain-on-snow events. Areas of exposed soils will therefore need to be minimized or protected during periods of increased runoff or precipitation. As shown on Figure 4-1 to Figure 4-3, areas that are prone to very high sediment transport include:


- Northeast of the Alpha WRSF in the area of the Alpha Pond, within the Halfway Creek catchment
- Southwest corner of the Alpha WRSF, within the Halfway Creek catchment
- South area of the Latte pit.

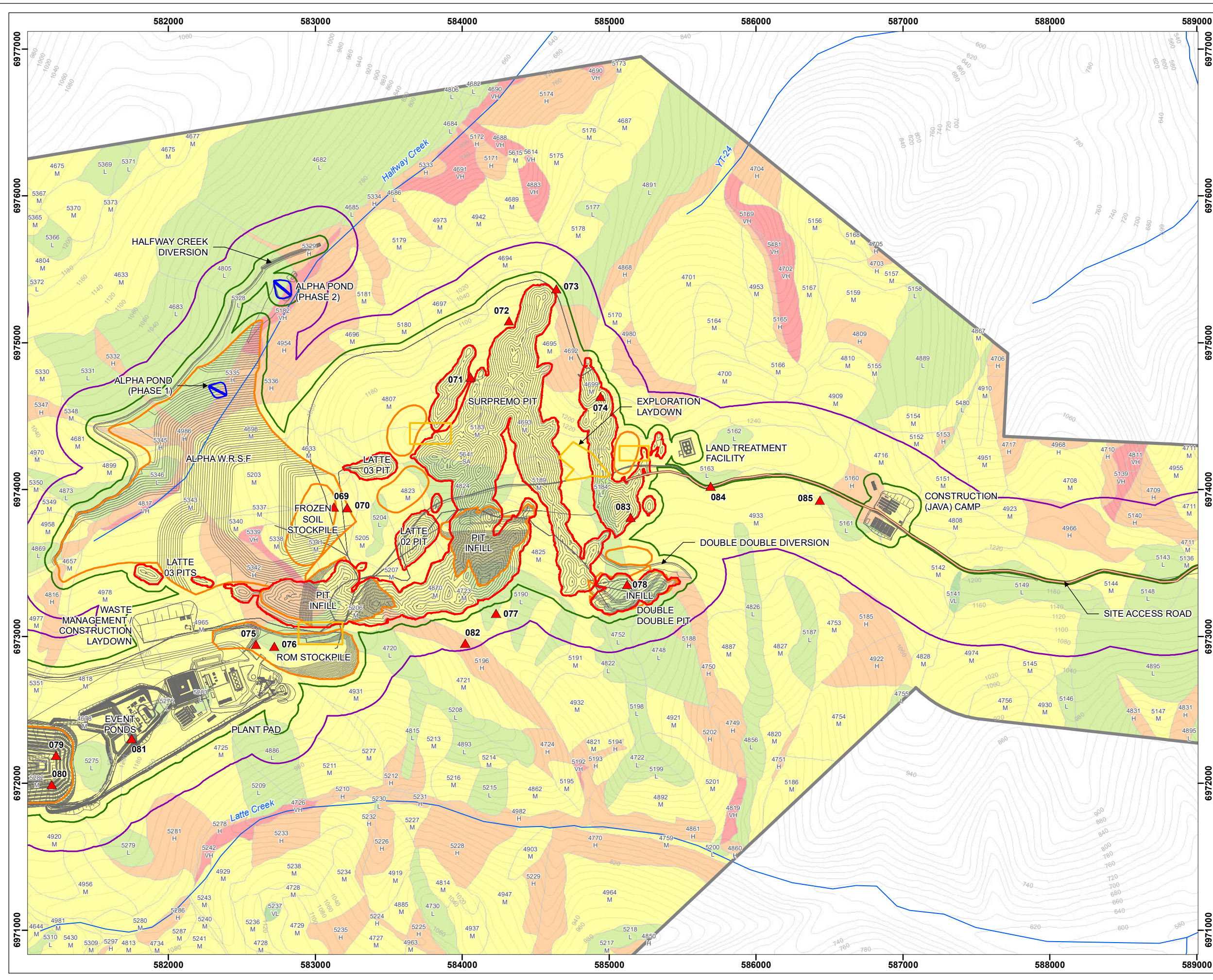
The mitigations that will be carried out with a focus on these areas are described within Section 7.

4.1.2.2 Soils

Terrain mapping and erosion predictions around the Mine Site indicate that most of the Project infrastructure is located in areas with moderate erosion potential (Figure 4-1 to Figure 4-3, Table 4-2), although there are areas of high and very high erosion potential within the footprint of the Alpha WRSF. Soil mapping has found that the much of the Mine Site is situated in areas with permafrost, particularly on north-facing slopes (see the WROMP). Terrain stability mapping at the Mine Site is shown on Figure 4-4 to Figure 4-6. Erosion and sediment control during the construction of the Alpha WRSF will be an important part of the water management of this facility to protect downstream water quality. In areas identified as having a high potential for erosion, risks will be identified, and sediment and erosion control measures will be implemented as described in Section 7. High erosion potential areas will be avoided, where possible.

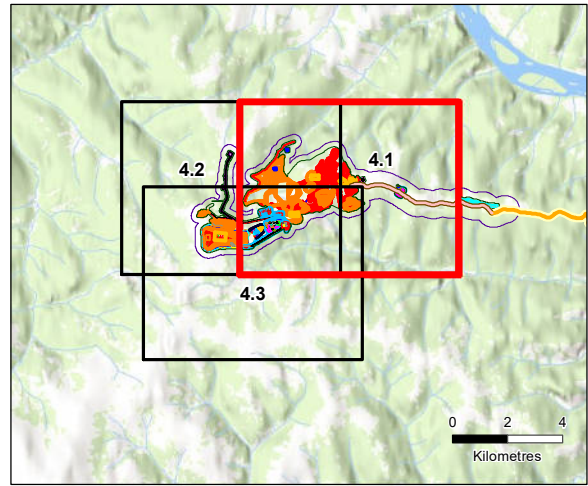
Table 4-2 Description of Soil Erosion Characteristics

Very low	 <p>Increasing silt and/or organic content Increasing slope gradient Increasing ground ice content Increasing severity of pre-existing gullying</p>	Bedrock; planar weathered bedrock; planar fluvial deposits without permafrost.
Low		Gently to moderately sloping weathered bedrock; gently to moderately sloping, permafrost free colluvial mantles; gently to moderately sloping, permafrost-free fluvial deposits.
Moderate		Planar to gently sloping organic material; gently to moderately sloping colluvial veneers with shallow or near-surface permafrost; gently sloping colluvial blankets with shallow or near-surface permafrost; moderately steep to steeply sloping, permafrost-free veneers and thin veneers; fluvial deposits with shallow or near-surface permafrost.
High		Moderately steeply sloping colluvial veneers; moderately to moderately steeply sloping colluvial blankets with shallow to near-surface permafrost; gently sloping colluvial complexes; ridgetop saddles with silt-rich colluvial veneer.
Very High		Steeply sloping colluvial mantles with shallow or near-surface permafrost; moderate to steeply sloping colluvial complexes.



COFFEE GOLD MINE

Soil Erosion Potential



Legend

Project Area	Palmer Environmental Detailed Field Site and ID
Project Footprint	Soil Erosion Potential
Open Pit	Very Low (VL)
Waste Dump / Stockpile	Low (L)
Proposed Construction Laydown	Moderate (M)
Pond	High (H)
Mine Site Access Route	Very High (VH)
Contour (m)	Study Area Boundary
Site Feature	
Watercourse	

LABEL FORMAT

UNIQUE POLYGON IDENTIFIER
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SOIL EROSION POTENTIAL

- Notes**
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 3. Inset Basemap: ESRI World Topographic Map
 4. Soil Erosion Potential: Palmer Environmental, 2016

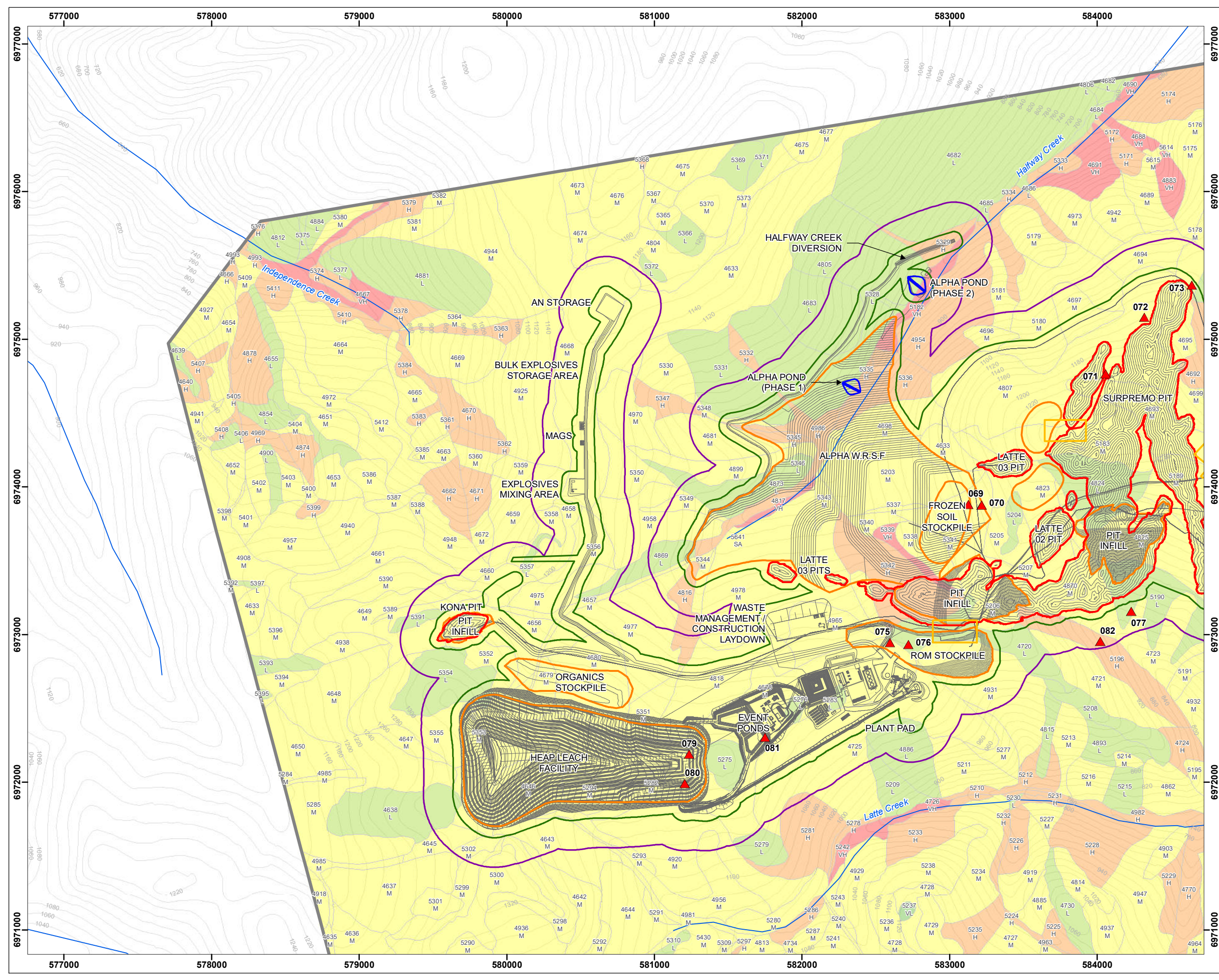
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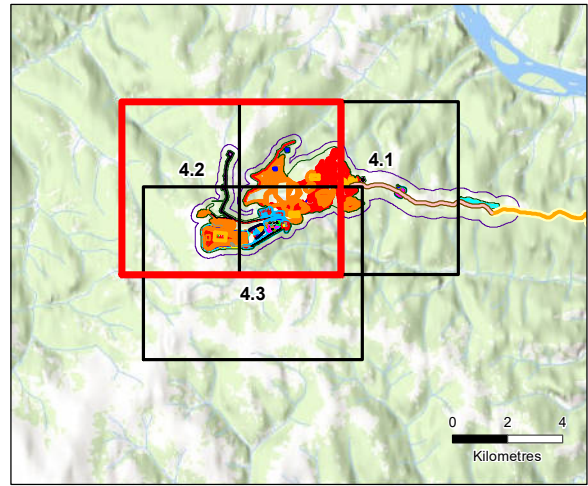
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Figure 4.1	Date: Oct 5, 2023	Drawn by: AS	Reviewed: KP
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COFFEE GOLD MINE
Soil Erosion Potential



Legend

Project Area	Palmer Environmental Detailed Field Site and ID
Project Footprint	Soil Erosion Potential
Open Pit	Very Low (VL)
Waste Dump / Stockpile	Low (L)
Proposed Construction Laydown	Moderate (M)
Pond	High (H)
Contour (m)	Very High (VH)
Site Feature	Study Area Boundary
Watercourse	

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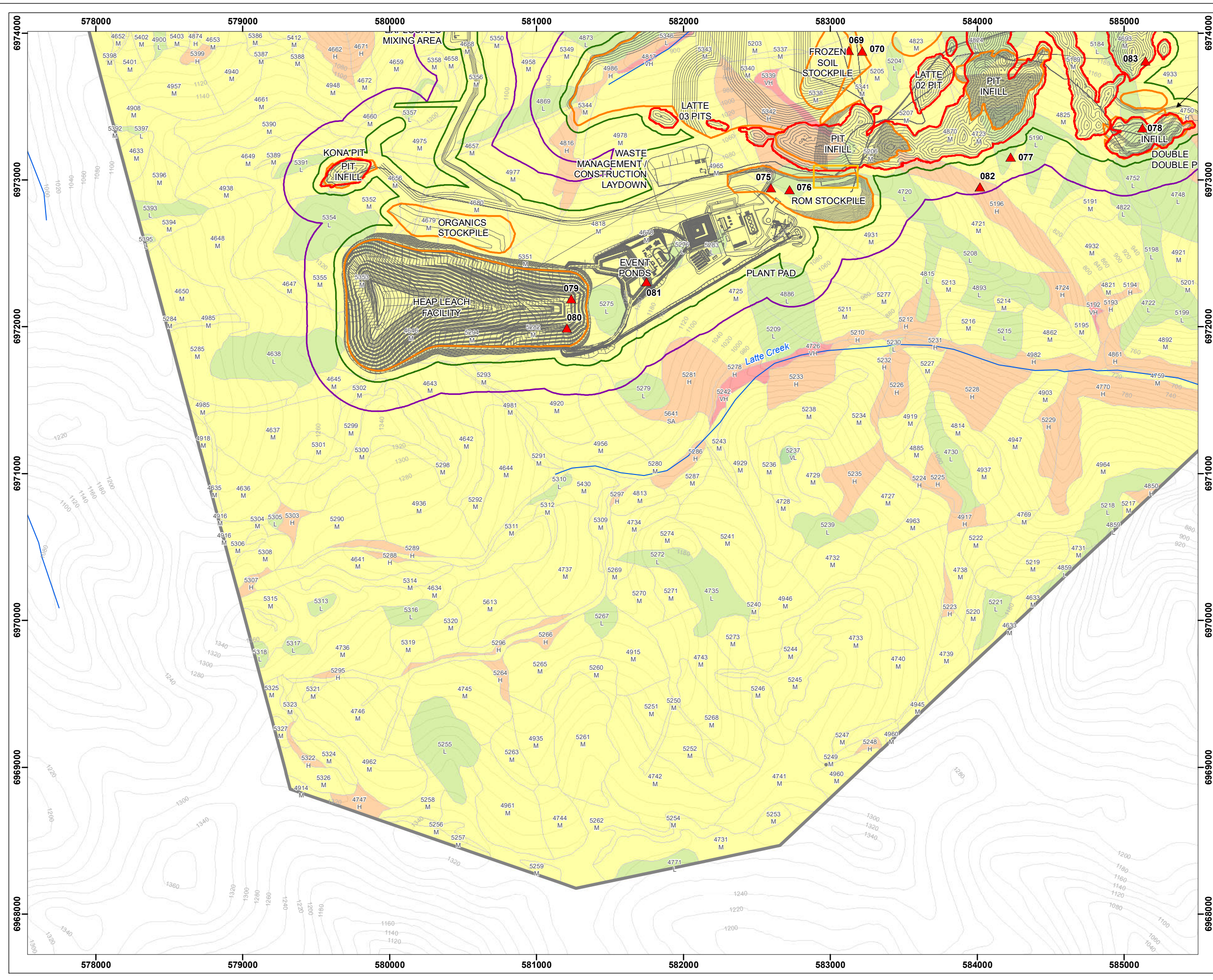
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SOIL EROSION POTENTIAL

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 4. Soil Erosion Potential: Palmer Environmental, 2016

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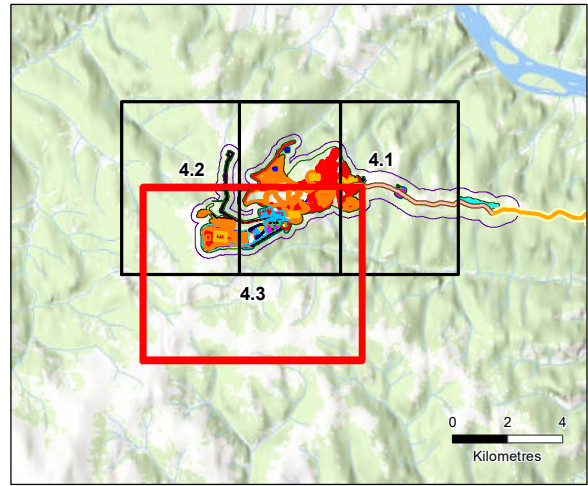
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COFFEE GOLD MINE

Soil Erosion Potential



Legend

Project Area	Palmer Environmental Detailed Field Site and ID
Project Footprint	
Open Pit	Soil Erosion Potential
Waste Dump / Stockpile	Very Low (VL)
Proposed Construction Laydown	Low (L)
Mine Site Access Route	Moderate (M)
Contour (m)	High (H)
Site Feature	Very High (VH)
Watercourse	Study Area Boundary

LABEL FORMAT

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SOIL EROSION POTENTIAL

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 4. Soil Erosion Potential: Palmer Environmental, 2016

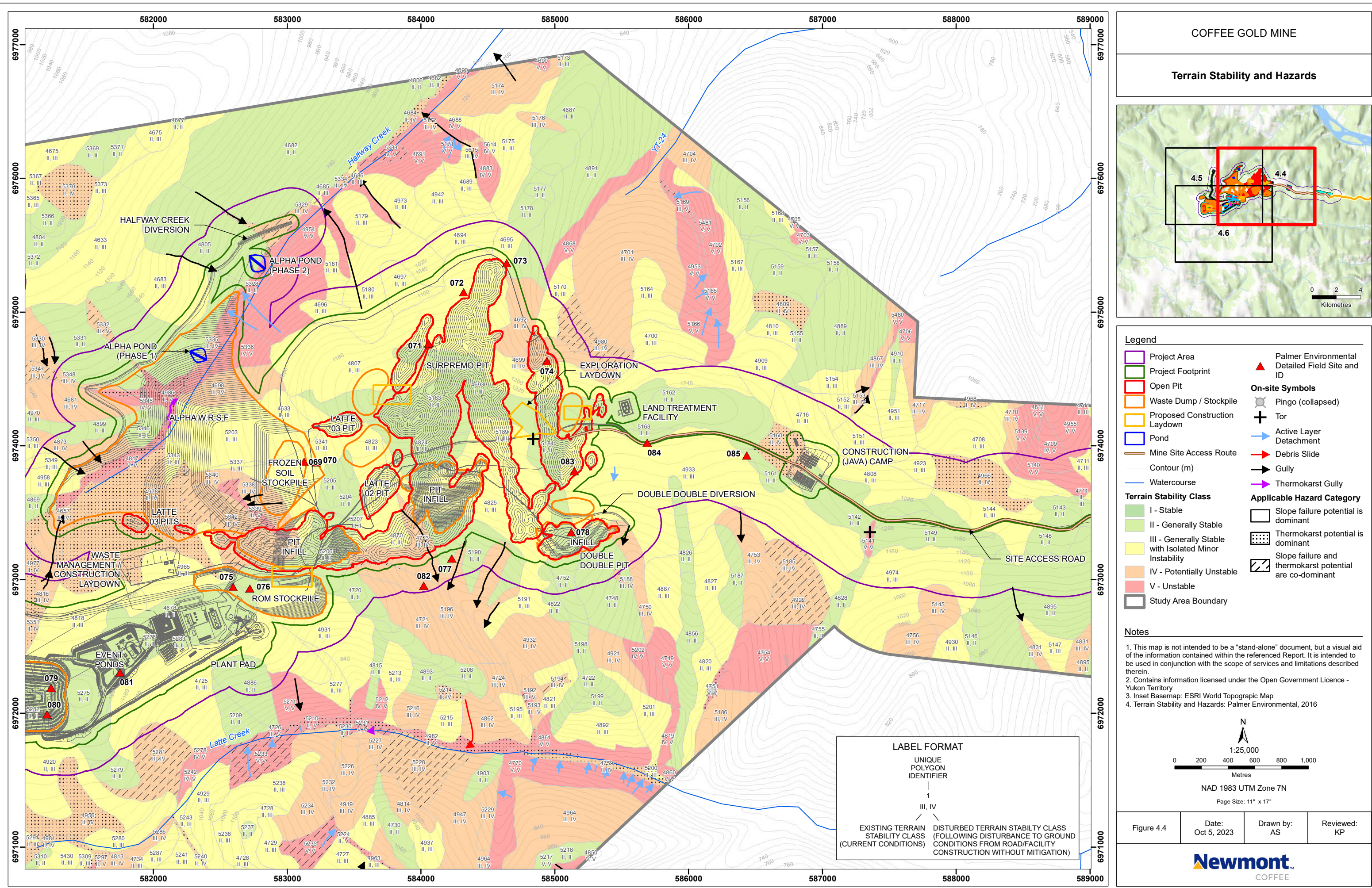
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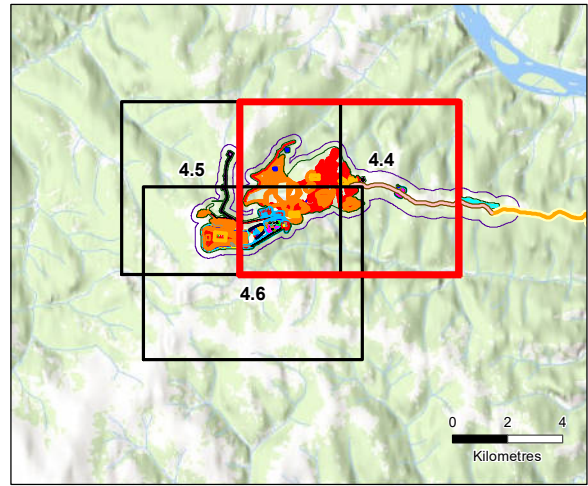
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COFFEE GOLD MINE

Terrain Stability and Hazards

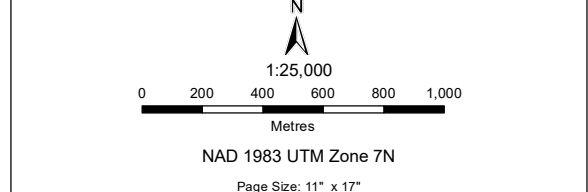


Legend

Project Area	Palmer Environmental Detailed Field Site and ID
Project Footprint	On-site Symbols
Open Pit	Pingo (collapsed)
Waste Dump / Stockpile	Tor
Proposed Construction Laydown	Active Layer Detachment
Pond	Debris Slide
Mine Site Access Route	Gully
Contour (m)	Thermokarst Gully
Watercourse	Applicable Hazard Category
I - Stable	Slope failure potential is dominant
II - Generally Stable	Thermokarst potential is dominant
III - Generally Stable with Isolated Minor Instability	Slope failure and thermokarst potential are co-dominant
IV - Potentially Unstable	
V - Unstable	
Study Area Boundary	

Notes

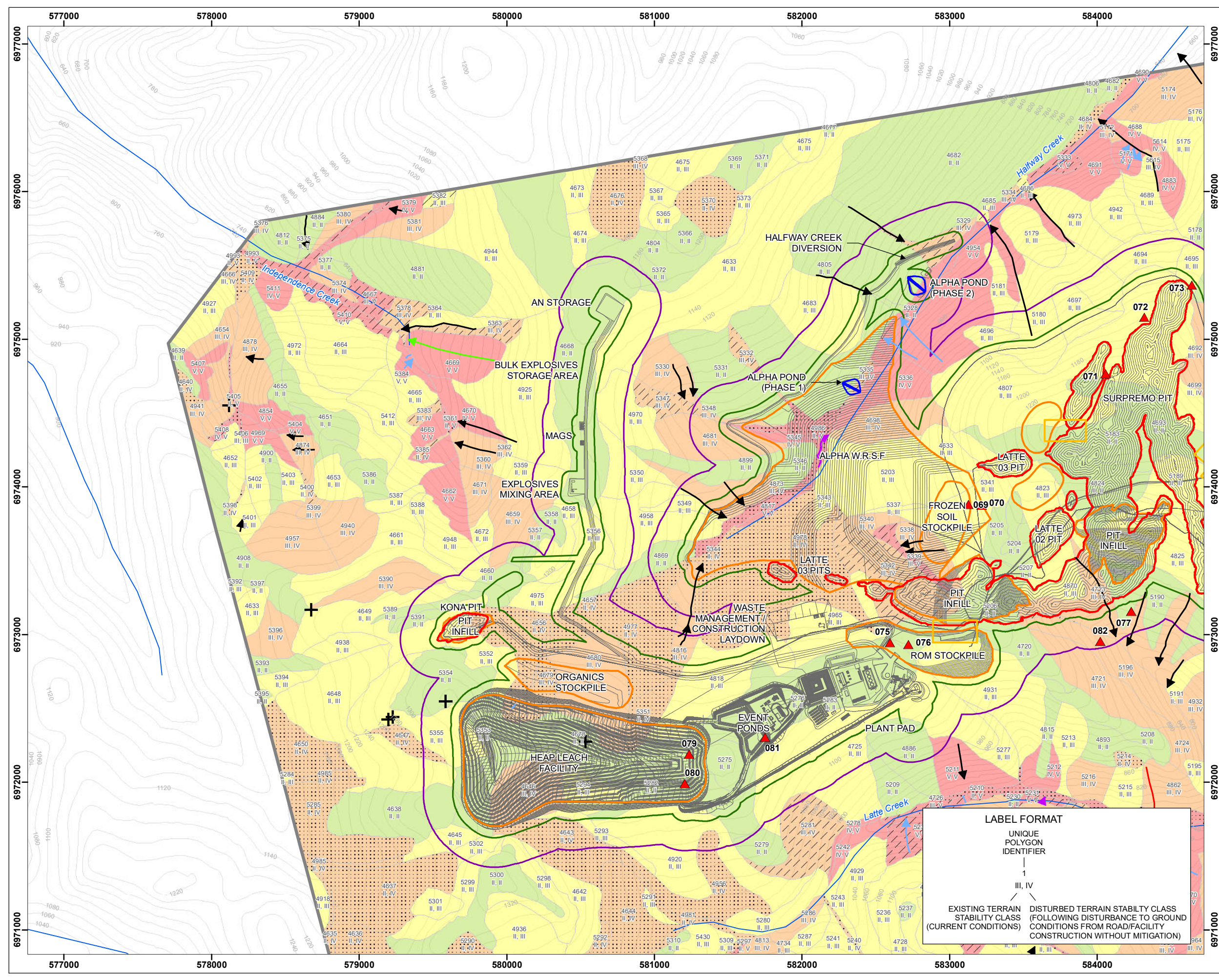
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3. Inset Basemap: ESRI World Topographic Map
4. Terrain Stability and Hazards: Palmer Environmental, 2016



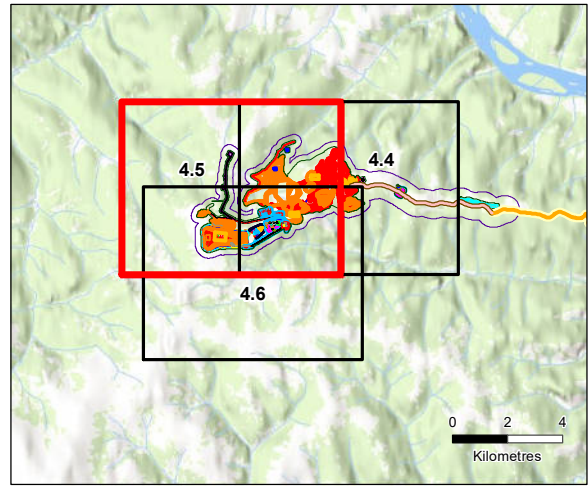
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COFFEE GOLD MINE
Terrain Stability and Hazards

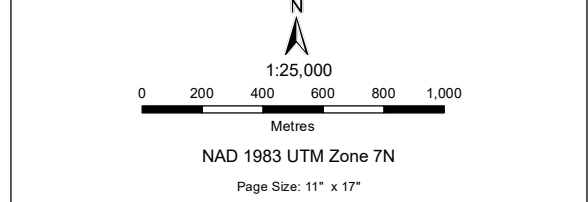


Legend

Project Area	Palmer Environmental Detailed Field Site and ID
Project Footprint	On-site Symbols
Open Pit	Tor
Waste Dump / Stockpile	Active Layer Detachment
Proposed Construction Laydown	Debris Slide
Pond	Gully
Contour (m)	Slump
Site Feature	Thermokarst Gully
Watercourse	Applicable Hazard Category
Terrain Stability Class	Slope failure potential is dominant
I - Stable	Thermokarst potential is dominant
II - Generally Stable	Slope failure and thermokarst potential are co-dominant
III - Generally Stable with Isolated Minor Instability	
IV - Potentially Unstable	
V - Unstable	
Study Area Boundary	

Notes

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- Inset Basemap: ESRI World Topographic Map
- Terrain Stability and Hazards: Palmer Environmental, 2016



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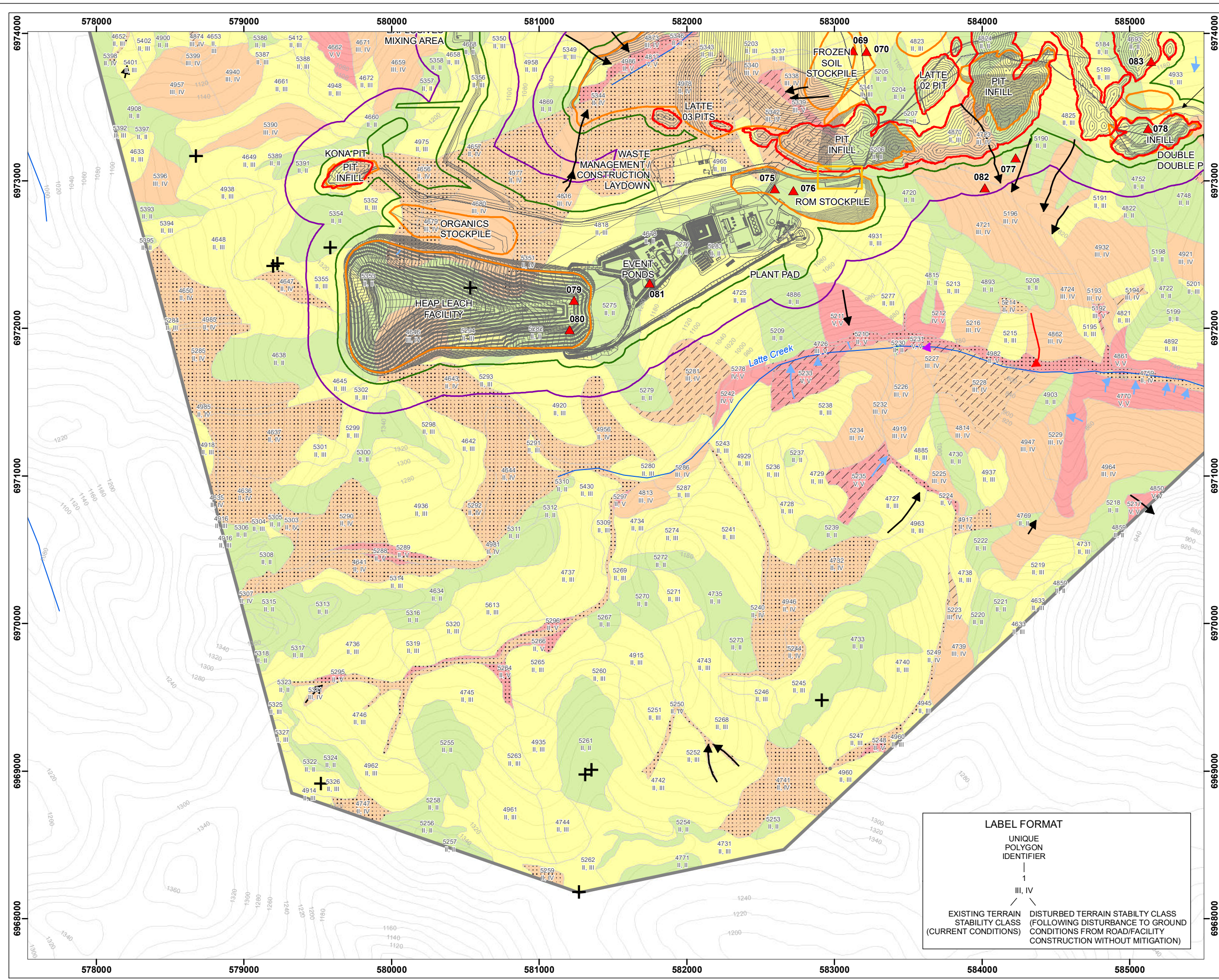
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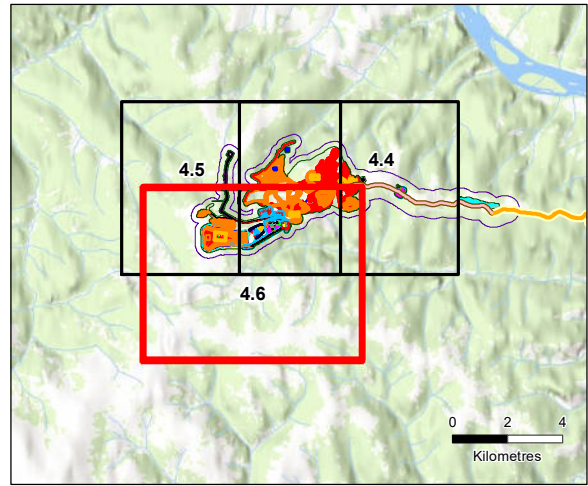
III, IV

EXISTING TERRAIN STABILITY CLASS (CURRENT CONDITIONS) | DISTURBED TERRAIN STABILITY CLASS (FOLLOWING DISTURBANCE TO GROUND CONDITIONS FROM ROAD/FACILITY CONSTRUCTION WITHOUT MITIGATION)

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COFFEE GOLD MINE
Terrain Stability and Hazards



Legend

Project Area	Palmer Environmental Detailed Field Site and ID
Project Footprint	On-site Symbols
Open Pit	Tor
Waste Dump / Stockpile	Active Layer Detachment
Proposed Construction Laydown	Debris Slide
Mine Site Access Route	Gully
Contour (m)	Thermokarst Gully
Site Feature	Applicable Hazard Category
Watercourse	Slope failure potential is dominant
Terrain Stability Class	Thermokarst potential is dominant
I - Stable	Slope failure and thermokarst potential are co-dominant
II - Generally Stable	
III - Generally Stable with Isolated Minor Instability	
IV - Potentially Unstable	
V - Unstable	
Study Area Boundary	

Notes

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4. Terrain Stability and Hazards: Palmer Environmental, 2016

LABEL FORMAT

UNIQUE POLYGON IDENTIFIER	
EXISTING TERRAIN STABILITY CLASS (CURRENT CONDITIONS)	DISTURBED TERRAIN STABILITY CLASS (FOLLOWING DISTURBANCE TO GROUND CONDITIONS FROM ROAD/FACILITY CONSTRUCTION WITHOUT MITIGATION)
III, IV	III, IV

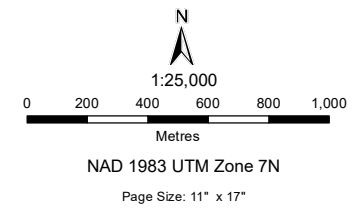


Figure 4.6	Date: Oct 5, 2023	Drawn by: AS	Reviewed: KP
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4.1.2.3 *Length and Slopes*

Wherever there are cut or fill slopes (e.g., road cuts), or constructed landforms (e.g., soil stockpiles, WRSF), these areas tend to have the highest risk of erosion due to the steepness of slopes. Implementing erosion control practices that can reduce slope length and steepness will significantly reduce the erosion potential.

4.1.2.4 *Cropping or Vegetation Cover*

Establishing vegetation on exposed soils is a critical step in reducing erosion potential and providing long-term stability to slopes. Where there are exposed soils, seeding and planting will play an important role in reducing erosion.

4.1.2.5 *Supporting Practices*

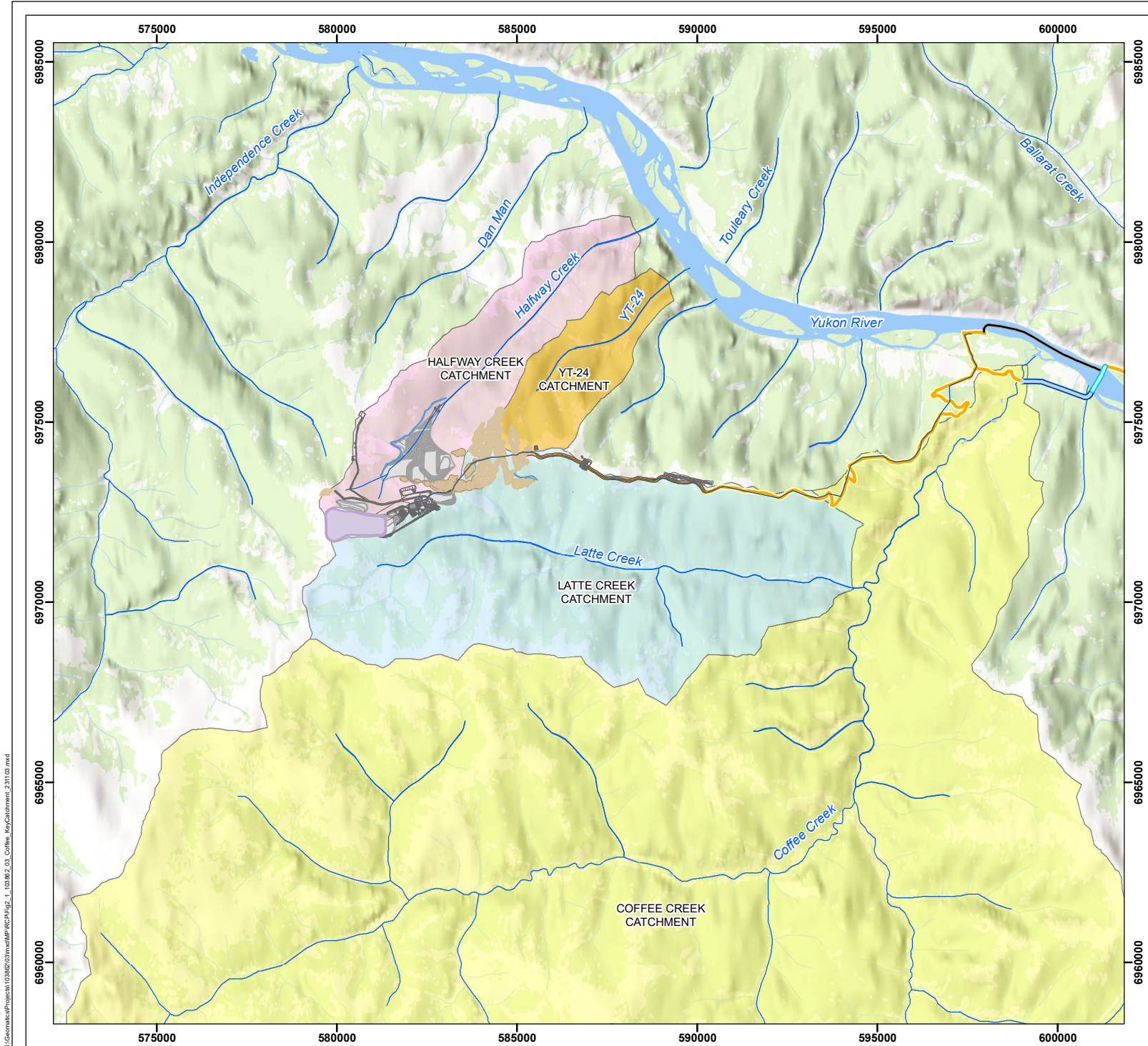
These are measures that are commonly associated with erosion and sediment control Good Management Practices (GMPs), which support soil by covering or reinforcing soils to minimize erosion. These are short-term measures designed to reduce erosion until vegetation has become established and can include such things as rolled erosion control products (RECPs) (e.g., geotextile or woven blankets), mulch covers, or tackifiers in hydroseed mixtures. A variety of these supporting practices will be used at the Project.

4.1.3 *Receptors*

The primary environmental receptors associated with the Project are the adjacent watercourses and the potential effects of sedimentation on water quality and aquatic habitat in those watercourses. Impacts to these receptors could have both an ecological or regulatory consequence. The drainages within the Project footprint are small, high-gradient headwater streams; however, they all flow into fish-bearing waters downstream of the Project footprint. The catchments within the Project area are shown on Figure 4-7.

Mitigations to protect the Halfway Creek receptor include the Alpha Pond and Dam. During construction, there will be no expected discharge to YT24 or Latte Creek; however, there will be discharge to these receptors during the Closure Phase. This will include pit discharge, for which the pits will act as sedimentation ponds prior to discharge.

Key Project interactions with sediment include surface water hydrology and surface water quality. Chronic sediment mobilization or changes in hydrology from development projects has the potential to change physical habitats in downstream areas; therefore, the site monitoring plan will include sediment monitoring for the effect that the Project may ultimately have on fish and aquatic life, including fish habitat, benthic invertebrates, and periphyton. These receptors are most at risk during seasonal flow changes.



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COFFEE GOLD MINE

Coffee Mine Key Catchments

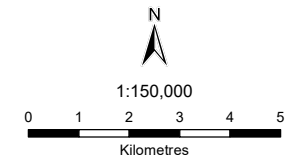
Legend

- Yukon River Barge Route
- Yukon River Ice Road
- Winter Road
- Mine Site Access Route
- Northern Access Route
- Double Double Pit
- Kona Pit
- Latte Pit
- Supremo Pit
- Watercourse
- Waterbody

Pre-Mine Catchment Area

- Halfway Creek Catchment
- Latte Creek Catchment
- Yt-24 Catchment
- Coffee Creek Catchment

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NAD 1983 UTM Zone 7N
Page Size: 8 1/2" x 11"

Figure 4-7	Date: Nov 3, 2023	Drawn by: AS	Reviewed: KP
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4.2 Employee Training Program

Employees will participate in a training program that provides an overview of erosion and sediment control concepts and describes the potential downstream effects of earthworks. Employees will become familiar with erosion and sediment sources at the Mine and will be trained to recognize the potential risks and to minimize the occurrence of sediment release. Annual refresher training will be provided to all employees. Additionally, preventative measures will be incorporated into standard operating procedures, such as minimizing slope of side-cast materials and covering side-cast materials and temporary stockpiles if they are planned to remain in place for more than one day.

5.0 EROSION AND SEDIMENT SOURCES

5.1 Mine Construction

Mine construction activities will be primarily associated with the construction of the HLF, process plant, reagent storage area (RSA), laboratory, camp, truck shop, warehouse building, power plant, liquefied natural gas (LNG) storage and bulk fuel storage, event ponds, soil stockpiles, crusher area, ROM stockpile, water management ponds and open pits, as well as associated access roads. Most of these areas will be constructed to have positive drainage, with low gradients, so that there will be a low potential for erosion once the pads are constructed. Surface drainages (i.e., small seeps and springs) may be encountered during mine construction activities and may be intercepted for general erosion control, as required.

The camp area and Plant Site (which includes the process plant, reagent storage area, laboratory, truck shop and warehouse building, power plant, LNG storage and bulk fuel storage) will be situated on the top of the ridge to the east of the heap leach pad on competent bedrock and/or engineered fill (Figure 1-2). There will therefore be little water from upslope areas entering the area, and erosion and sediment control in these areas will focus on managing rainfall and snow melt runoff.

To mitigate sedimentation and erosion during mine construction activities, the site will first be cleared in a manner that minimizes the clearing area within specifically timed periods (Section 6.1). During soils stripping activities, diversions and perimeter controls will be established to contain surface runoff and prevent overland flows from entering the work area. Specific locations for the structures will be provided in construction management plans that will be developed prior to the start of construction. The soil materials will be characterized and segregated according to soil type and ice content (Section 6.2) and stockpiles will be managed by implementing the GMPs that are described in Section 6.3 and in the WROMP.

To minimize sediment in the ditches and erosion of the ditches, the GMPs outlined in Section 6.5 will be applied, and will include:

- Addition of riprap to diversions
- Implementation of intercept ditches to divert water and reduce the volume being transporting within the ditches
- Implementation of energy dissipaters for channels with grades greater than 10% or in areas with higher concentration of ice rich permafrost
- Conduct permanent erosion control (vegetation) on exposed fill slopes

- Assessment of the gradients of the ditches along the haul and access roads and installation of armour and/or permanent check dams, as required to minimize erosion of the ditches. General details on armour and check dams can be found in Appendix B.

Water management for the Plant Site area, which includes the camp, associated facilities, and ROM ore stockpile, will consist of the Facility sedimentation pond (Section 7.1). The rock pad foundation for the Plant Site area will be graded to convey contact water to the Facility Pond, which will be excavated below natural ground beneath the pad. A drainage ditch will be constructed along the perimeter of the ROM ore stockpile to facilitate drainage of runoff and stockpile seepage towards Facility Pond. Water conveyance structures and sedimentation ponds are detailed in the Water Management Plan.

5.2 Open Pit Excavation

The open pit mining sequence is planned to begin with the Latte pit, Double Double pit, and Supremo pit. Smaller pit sections (Kona, and Latte Phase 2 and 3) will be mined toward the end of mine life. Erosion in pits is generally associated with erosion of the pit high walls and pit ramps/haul roads, which are exposed to rainfall. The pits themselves will provide a form of sediment control as the pit elevations will be below the surrounding undisturbed terrain. In addition, the high walls and in-pit haul roads direct runoff into the pit; therefore, there is low potential for erosion in the areas adjacent to the pit.

As shown on Figure 4-1 to Figure 4-3, the south area of the Latte pit is identified as being prone to very high sediment transport. Erosion will be minimized by reducing the amount of water running into the pits by diverting runoff from up-slope areas, with special consideration given to these areas, and minimizing the amount of water that needs to be contained or managed. This will include diversions and perimeter controls during soil stripping (Section 6.2). Specific locations for the diversions will be provided in construction management plans that will be developed prior to the start of construction. In addition, clearing and grubbing will be carried out for the pits within specifically timed periods to minimize permafrost exposure as well as to fall outside of the bird nesting season (Section 6.1). Additional details regarding the water management around the open pit are provided in the Water Management Plan.

The management of water in the pit and discharge of water with high concentrations of total suspended solids (TSS) and other contaminants (e.g., metals, blasting residue) is discussed in the Water Management Plan.

5.3 Waste Rock Placement

The Alpha WRSF is located north of the Latte Pit and west of the Supremo Pit, within the upper reaches of the Halfway Creek drainage basin. It is designed with an ultimate capacity of approximately 250 Mt footprint. Construction of the Alpha WRSF will commence in Year -1, and it will remain in active operation until the end of mine life in Year 9.

The Alpha WRSF will be built in a series of 40 m lifts in a bottom-up approach. An access ramp will be developed along the east side of the WRSF, with the possibility of a second ramp developed from the west to support movement of material from Kona Pit. The toe of each lift is planned to be set back a minimum of 60 m from the crest of the previous bench, with progressive regrading to achieve a final overall slope angle of 3.0H:1V. The lowest elevation of the dump will be 815 masl, and the highest point will be 1,150 masl,

although the final configuration will be subject to minor revisions during detailed design. The dump will be constructed using conventional dump and push techniques.

The Alpha sedimentation pond will be located within Halfway Creek catchment to mitigate sediment loading from mine infrastructure (including Alpha WRSF) into the Halfway Creek receiving environment. An additional sedimentation pond may be constructed higher up within Halfway Creek catchment as a contingency during early Operations Phase depending on operational requirements. The Alpha sedimentation pond is further described in the Water Management Plan.

Wind erosion on heavily trafficked areas will be addressed by dust mitigations covered in the Air Quality and Greenhouse Gas Management Plan, which will include:

- Roadways construction using lower silt content and higher moisture content material to minimize the fine fraction of particulate matter available to be released as fugitive dust
- Maximum speed limits appropriate to road design for all mobile equipment on site access and haul roadways to minimize the entrainment of fugitive road dust in the turbulent plume created by vehicle passage
- Apply water to unpaved road surfaces, as necessary.

As shown on Figure 4-1 to Figure 4-3, the area northeast of the Alpha WRSF within the area of the Alpha Pond as well as within the southwest corner of the Alpha WRSF are prone to very high soil erosion potential. Mitigations to address these areas will be carried out through construction sequencing, as well as through diversion channels in addition to the Alpha sedimentation pond to manage the sediment generated from the Alpha WRSF. Specific locations for the diversions, with consideration given to the areas that are identified as prone to very high sediment transport, will be provided in construction management plans that will be developed prior to the start of construction.

In addition, the clearing and stripping for the Alpha WRSF area will be undertaken in as short a period as practicable in advance of waste rock placement near the toe of the WRSF to minimize the exposure period of the de-vegetated ground thus limiting the potential thawing and erosion of the areas. Specific procedures for implementing perimeter diversion channels are provided in Section 6.5, and additional details are provided in the Water Management Plan.

5.4 ROM Stockpile

Ore transported from the Open Pits will either report directly to the crusher system, or onto the ROM stockpile. Given that the crusher system and HLF may not be operated during periods of extreme cold each year, the ROM stockpile will be used for temporary storage of ore from the Open Pits when necessary. The stockpile pad has been designed with a maximum capacity of 3.0 Mt of ROM ore contained within a design footprint of 13.0 ha. Pad construction will be completed using graded waste rock filled from an average elevation of 1,125 masl up to 1,150 masl, resulting in an overall height of approximately 25 m for pad fill material.

The ROM stockpile will be constructed in an area that is expected to be mostly permafrost-free. Erosion and sediment control measures for the ROM Stockpile will include runoff collection trenches and sediment ponds that will be constructed along the down-gradient boundary of the ROM stockpile footprint prior to site preparation (i.e., clearing and grubbing) activities. Clearing and stripping of organics will be undertaken in

as short of a time period as practicable in advance of the initial waste rock foundation pad to limit potential erosion of exposed areas.

The ROM stockpile will be oriented to reduce wind erosion, and material drop heights will be minimized to reduce dust emissions associated with ore handling, where practical. Specific procedures for implementing perimeter diversion channels are provided in Section 6.5, and additional details are provided in the Water Management Plan.

5.5 Soil Stockpiles

All organic and overburden material (including Type I frozen soils, <5% ice) will be placed in the soil stockpiles that are located immediately north of the heap leach pad and around the pit limits. The soil stockpiles will be used for stockpiling material until it is needed for site reclamation and revegetation activities. The soil stockpiles have a cumulative footprint of 35.9 ha and a maximum capacity of 5.1 million cubic metres (Mm³) with side slopes at the angle of repose (approximately 1.7H:1V (horizontal to vertical)). The soil stockpiles will be oriented to reduce wind erosion.

Sediment and erosion control measures will be put in place as described in (Section 6.3) and will include downslope areas of the soil stockpiles during development. Seeding mitigations will be established on the stockpiles to form a vegetative mat to support sediment control and prevent erosion. Procedures to implement seeding for erosion and sediment control are described in Section 6.8, and include the use of native seeds to the extent possible. The use of approved, non-native seeds in reclamation seed mixes may also be required. Sediment control fencing will be implemented downslope and will remain in place until the seeding erosion and sediment mitigations have taken effect.

5.6 Frozen Soils

Frozen soil that is not immediately re-used as fill (type II, II and IV) (TetraTech 2016) will be placed in a designated frozen soil storage area located within the Alpha WRSF (Figure 1-2). The frozen soils will be segregated by type, defined primarily by ice content and grain size, in the frozen soil storage area to permit recovery of materials that can be utilized in reclamation. If excess to closure requirements, some of the frozen soil may be co-disposed of in thin horizontal lifts within the WRSF.

For the earliest excavated frozen soils, there may not be a suitable amount of waste rock in the Alpha WRSF to act as an effective filter and containing berm, depending on the timing of excavation in comparison with open pit or waste rock development. If that is the case, a small waste rock berm will be constructed around the perimeter of this storage area to enhance stability and provide drainage of the stored materials.

The storage area berms are designed to be flow-through structures that will allow for excess pore water resulting from the thaw of ice-rich materials to drain while providing stability and containing the fine-grained materials that may otherwise be thaw-unstable. Coarse waste rock material will be used to construct the berms. Water released from thawing of the frozen soils in the frozen soil storage area will be filtered through the waste rock and flow down to the sedimentation dam beneath the Alpha WRSF, where further filtering and sedimentation will occur before release to the receiving environment. Additional details on the frozen soils storage area and material segregation criteria are provided in the WROMP, and details regarding the Alpha sedimentation dam are provided in the Water Management Plan.

Exposure of frozen material, if excavated in the summer, will lead to thaw, and the associated thaw may result in wet, muddy, soft ground, and poor-quality surfaces for traffic movement, along with local slumping and other construction challenges. The effects related to exposure of moderate or ice-rich material have been considered in the planning, design, and construction of Mine Site infrastructure. When ice-rich, fine-grained soils (Type IV) are excavated and stockpiled, they may become unstable while thawing and may stand at only very gentle slopes of a few degrees. Water draining from the thawing soil will also be managed, along with any associated sediment load. All excess cut soils for use at closure will be transported by truck from the excavation sites to the appropriate closest storage/stockpile area.

Temporary water conveyance and storage infrastructure will be implemented as required at the frozen soil storage area to convey runoff away from the area and manage sedimentation from the area. Specific locations of the conveyance structures will be provided in construction management plans that will be developed prior to construction, and additional details regarding the conveyance structures are described in the Water Management Plan.

5.7 Reclamation

During mine reclamation, surface infrastructure will be decommissioned. At that time, erosion control will focus on re-establishment of vegetation in disturbed areas along the access roads, building pads, and ROM ore pad. These areas will be scarified, and topsoil will be applied. Erosion and sediment control measures may be required to stabilize areas until plants become established, and soils are stabilized. These measures include:

- Protecting newly applied organics with erosion protection products
- Shortening slope lengths
- Seeding with native plant species.

Seed mixes and rates will be tested during mine operations as part of the reclamation research program and used to inform the establishment of permanent vegetation. Reclamation research is further described in the Reclamation and Closure Plan.

6.0 EROSION AND SEDIMENTATION CONTROL GOOD MANAGEMENT PRACTICES

The following sections generally describe erosion control GMPs that will be used, as required, to minimize erosion at the Project during project activities and at specific infrastructure locations. Details of erosion and sediment control techniques (e.g., check dams, silt fencing, etc.) and how they should be installed are included in Appendix B. Newmont will refer to or utilize the principles outlined in Section 2.1 of the Preferred Practices for Works Affecting Yukon Waters (YG 2019) to inform the development of mitigations of construction activities that will be developed as part of the construction management plans. Installation of erosion and sediment control measures will also follow the Newmont Internal guidance document titled “Sediment and Erosion Control Plan Guidance”.

6.1 Clearing and Grubbing

Erosion control during vegetation clearing should minimize exposed soils and, where possible, keep root systems intact. Procedures for vegetation clearing and grubbing include:

- Minimize new clearings and clearly mark clearing limits for machine operators; and
- Where practical, time new clearance to occur after peak rainfall periods (i.e., complete clearing in the fall and winter). This will also minimize exposure of permafrost and allow clearing to occur outside the bird nesting season (see the Vegetation Protection Plan) and is especially important in erosion sensitive areas (i.e., steep slopes).

6.2 Stripping Soil

During stripping operations, the following procedures should be followed:

- In steep areas, establish up-slope or up-gradient diversions to prevent surface and overland flows from entering work area.
- Establish perimeter controls to contain surface runoff, and direct runoff into ditches and catchment ponds.
- Identify soil types (including organics, topsoil, subsoil, and frozen soils) specified in the WROMP and store in the appropriate locations.
- Identify other types of frozen material to be taken to the Frozen Soil Storage Area per the requirements of the WROMP.
- Do not mix the soil into the mineral soil.

6.3 Organic and Overburden Stockpile Management

Soil stockpiles will be contoured and seeded with native grass species to prevent erosion and loss of topsoil. Additionally, the following guidance will be implemented:

- Ensure outer slopes of topsoil are 2H:1V or less
- Grade/roughen slopes to slow water velocities and promote infiltration (Appendix B – Slope Texturing/Grading)
- Sediment control fencing at downslope toe
- Seed with grass seed

- Ensure outer perimeter controls are in place until slopes are vegetated.

6.4 Frozen Materials Stockpile

Frozen soils will be placed in appropriate stockpile areas to prevent or limit erosion by wind or rainfall. Specific management strategies have been developed for the various types of frozen soil that will be segregated per the criteria defined in the WROMP and stored in the frozen soil storage area. These management strategies, described within the WROMP, will consider the thaw behavior of the materials and adequate drainage, and will include:

- Type I (<5% ice, coarse or fine) – Used as general fill or if excess to a local fill requirement, stored for reclamation. Not suitable for structural fill.
- Type II (5-15% ice, coarse) – Exposed and readily thawed and drained and then used as general fill within embankments and pads or stockpiled. If excess volumes, co-disposed of in a WRSF.
- Type III (5-15% ice, fine) – Separated and stockpiled. If excess volumes, co-disposed of in a WRSF.
- Type IV (>15% ice) – Segregated at excavation site. Stockpiled in ice-rich storage area.

Temporary water conveyance and storage infrastructure will be implemented as required at the frozen soil storage area to convey runoff away from the area and manage sedimentation in the area. Specific locations of the conveyance structures will be provided in construction management plans that will be developed prior to construction, and additional details regarding the conveyance structures are described in the Water Management Plan.

6.5 Ditches and Slope Drains

Ditches (e.g., interception ditches on slopes, cross ditches, roadside ditches) are designed to convey concentrated flows and are susceptible to erosion if water velocities become too high. Ditches must be constructed to accommodate expected flows and minimize erosion within the ditches. Site water management and the specifications for water conveyance ditches and drains are detailed in the Water Management Plan. To minimize erosion in ditches, the following procedures will be implemented:

- Addition of riprap to diversions and spillway channels to limit erosion potential.
- Use of offtake drains and ditches (intercept ditch) to divert water into flat and stable, well vegetated areas where topography allows, to reduce the volume of water being transported in ditches.
- Use of cross drains, culverts, or rock check dams to slow water down.
- Addition of riprap aprons to the outlet of culverts to reduce velocity.
- Use of energy dissipaters for channels with grades greater than 10% or in areas with higher concentration of ice rich permafrost. Energy dissipaters will also be used where concentrated flows or discharges enter natural stream channels.
- Use of rock check dams in ditches to slow water and capture sediment (specific locations of check dams will depend on slopes and will need to be identified after the roads and ditches have been constructed).
- Seed ditches with native grass seed mix.
- Seed cut slopes above ditches with native grasses.

Slope drains may be used where ditch drains require water to flow down a slope (natural or fill slope) at a high gradient, on highly erodible soils, or where water would flow over unprotected soils. The location and use of slope drains needs to be evaluated on a site-by-site basis; however, they will be used at locations where concentrated water flows are directed onto unprotected slopes. Slope drains are usually plastic culvert material (open, U-shaped, or closed) or rock-lined channels that convey water down a steep gradient into an armoured outlet. This configuration prevents erosion of the slope and the channel bed where water enters a natural or man-made drainage. Installation guides for slope drains are provided in Appendix B.

6.6 Embankments and Slopes

For the purposes of this document, embankments do not include open pit highwalls or the outer slopes of the Alpha WRSF. Embankments are defined as road fill embankments, and slopes are defined as side slopes of road cuts and other cut slopes not directly associated with mining pits or the WRSF.

Erosion control on slopes or embankments may include:

- Coir logs or straw wattles to reduce slope length
- Track walking slopes to minimize rill erosion and create seed pockets that will help seeds germinate
- Spreading topsoil on slopes and application of native seed
- Using RECP or mulch to protect steep slopes.

6.7 Progressive Reclamation

Certain activities can be undertaken during mine operations to facilitate faster reclamation at the cessation of mining. Scarifying compacted areas no longer required for operations and spreading topsoil and seed with native seed mix and, where appropriate, planting seedlings to promote vegetation establishment.

6.8 Seeding and Mulching

6.8.1 Seeding

Native seeds will be collected and used to the greatest extent possible. While use of native seeds in erosion control and reclamation will be the priority, the use of approved, non-native seeds in reclamation seed mixes may be required. Seeding will be done following the recommendations in the Yukon Revegetation Manual: Practical Approaches and Methods (Matheus and Omtzigt 2013; Table 6-1), which provides some general guidance on seeding areas for reclamation:

- Natural recolonization from surrounding seed sources can be used in small areas that have been cleared but not been stripped.
- Seeding is recommended in larger areas where the centre of the area is too far from natural seed sources, which can result in poor recruitment in the middle of the disturbed area.
- Seeding is recommended in areas where soil conditions are poor.
- Hydroseeding is recommended in steep areas where there is a significant risk of erosion.

The combination of seeds used will vary depending on location and slope. Seeding guidelines, including the use of native and non-native cultivars, and methods of seeding, are described in Chapter 4 of the Yukon Revegetation Manual (Matheus and Omtzigt 2013). Chapter 5 of the Manual provides a summary of recommended seed combinations for low- to mid-elevation, steep slopes, wet sites (e.g., riparian areas

where the water table is close to the surface), permafrost, alpine, and subalpine locations, as well as road rights-of-way. These guidelines will be used in selecting the seed mixtures used for on-site erosion control and reclamation activities; however, it is anticipated that the reclamation revegetation research trials will develop site specific seeding recommendations.

Due to the short growing season, seeding should be done primarily in May and June, to promote germination and give new plants time to grow and build the necessary energy reserves to promote winter survival. The Yukon Revegetation Manual indicates that seeding should be avoided in July or August, so it is important to plan activities for spring planting and provide soil cover through other means for periods when soils will be exposed for long periods before seeding can be accomplished. For example, if a site is disturbed in September, soils should be stabilized or supported through the winter and spring runoff, until seeding can be completed.

Table 6-1 Seeding Application Rates

Method	Site Conditions	Application Rate (PLS/m ²)
Broadcast Seeding	Default rate, no/few surface organics in place	1,500
	Good surface with organics in place	750
	Steep slopes with high erosion potential	2,250 – 3,000
	Disturbed permafrost sites	>1,500
	Alpine and subalpine	750 – 1,000
	Wet sites	<1,500
	Nursey crop to facilitate natural revegetation	500 – 1,000
Seed Drill	Reduce the above rates by 50%, but not lower than 500 PLS/m ²	
Hydroseeding	All sites	2,250 to 3,000

Source: Matheus and Omtzigt (2013)

PLS – Pure Live Seed

The Yukon Revegetation Manual (indicates that frost-seeding can also be used successfully in the Yukon. This method involves sowing seeds after the ground starts to freeze, so that seeds do not germinate. Frost seeding (and fertilizing) is generally done in October, but can be done as early as September, depending on weather, elevation, and aspect. This method works best on sites with shallow to flat slopes, where there will be minimal loss of seed during the spring snow melt.

6.8.2 Soil Cover and Support

The selection of soil covering and supporting methods will depend on steepness of slopes and timing of disturbance (e.g., if soil needs to be covered through winter).

6.8.2.1 Mulching

Commercially available mulch products can be spread on shallow slopes after seeding, to provide protection from splash erosion during rain events. Straw, provided it is free of weeds and invasive species, or commercially produced mulch fibre, bonded fibre matrix, and hydromulch may be used. An advantage of the commercially available mulch products is that many suppliers have specific blends that have been

customized for different slope applications. As a result, mulches can now be used on much steeper slopes than they were previously. Some applications can be used on slopes with a gradient up to 1:1.

6.8.2.2 *Rolled Erosion Control Products*

On steeper slopes or where long-term cover is required, RECPs can be used. The type of RECP and durability will be specified once individual site conditions have been determined. Materials with non-degradable monofilament weave should not be selected as these can create entanglement issues for wildlife and will eventually have to be removed and/or replaced. Proper installation methods for RECPs are outlined in Appendix B.

7.0 SEDIMENT MITIGATION MEASURES

The sediment mitigation measures presented here are intended to provide a high-level description of the procedures that would be implemented to meet the erosion and sediment control objectives of this plan. Refinements will be made to these procedures based on actual site conditions as well as necessary adjustments to optimize the mitigation effectiveness. Specific details that will be developed will include specific locations, situations, implementation, and equipment/materials that will be determined during construction and operations. These details will be provided in specific construction management plans that will be developed prior to the start of construction and will be based on the information presented within this plan.

Additional refinements may be made based on the outcomes of the monitoring and inspections that focus on the erosion and sediment control prescriptions. The construction management plans will include specific implementation details that will be carried out in response to the situations that are outlined in Section 8.1.1.

7.1 Sedimentation Ponds

Surface runoff within the Mine Site will be directed to the Alpha Pond or the Facility Pond located downstream of proposed mining areas. The Alpha Pond will be located within Halfway Creek catchment to mitigate sediment loading from mine infrastructure (including Alpha WRSF) into the Halfway Creek receiving environment. It will consist of an embankment (dam), a storage basin, an outlet, and an emergency spillway. The dam will be constructed primarily of ROM rock or locally sourced material. The dam will be equipped with a filter system, with a finer material layer, transition material layer, and outer / bulk rock fill shell. This filter system will be designed to retain sediment while still allowing some controlled seepage through the dams.

The Facility Pond will provide sediment control from the plant pad and will provide makeup water to the plant or will be used for dust suppression. Inflows in excess of plant makeup demand will be pumped towards the Alpha Pond for further sediment control prior to discharge to Halfway Creek. The Facility Pond pump and pond volume were designed to manage up to the 10-year flood event. The Facility Pond will be equipped with an emergency spillway, designed to convey up to the 200-year flood event. The spillway from the Facility Pond will be directed towards Alpha Pond, enabling a secondary capture point prior to discharge to the environment. Additional details of the sedimentation ponds, including water management throughout the different phases of mining, are provided in the Water Management Plan.

Temporary settling ponds may be used to contain runoff from large, disturbed areas until permanent erosion control measures are in place. Water quality monitoring for turbidity and TSS will help to identify when and where temporary settling ponds will be required. Temporary settling ponds will be temporary sumps or may be constructed from portable materials (e.g., Aqua Dams or WaterGates).

7.2 Silt Fences

Silt fences will be used as temporary sediment containment structures. These will typically be used as perimeter controls (i.e., borders of disturbed areas to minimize sediment movement out the work area) and at the toe of embankments. When properly installed, silt fences can be used to shorten slope length and create small sediment containment areas on slopes and at the toe of slopes (Appendix B). Silt fences are best used in conjunction with erosion control methods and are not to be used in channels and ditches where there are concentrated flows.

7.3 Temporary Check Dams

Temporary check dams can be used in ditch lines to slow water and allow sediment to settle out of suspension. Temporary check dams can be constructed using rock or synthetic materials (Appendix B).

7.4 Other Methods to Take Sediment out of Suspension

If monitoring data show that TSS remains above guidance downstream of sediment control structures, then other methods of sediment removal may be used. These methods may include:

- Use of synthetic permeable barriers to slow water down and promote sedimentation
- Use of sediment filter bags
- Use of flocculants in sediment ponds to increase sedimentation rates.

8.0 MONITORING STRATEGIES

During the Operation Phase of the Project, each department will be responsible for implementation of erosion and sediment control methods in their respective areas (referred to as the “owning department”). Monitoring of erosion and sediment control will be the responsibility of the site Environment Department and will include assessment of the physical condition of slopes and water quality. Environment Department personnel responsible for the inspections will have all required qualifications. They will advise owning departments of needs for implementing erosion and sediment control, carrying out maintenance of erosion and sediment control GMPs, and assessing overall performance by monitoring water quality.

Details regarding the erosion and sediment control monitoring strategies, including specific monitoring locations, will be described in the construction management plans that will be developed for the project (discussed in Section 7), and are also provided in the Fish and Aquatic Life Monitoring Plan.

8.1 Inspections and Monitoring During Construction and Operations

During the active construction period, inspections of erosion and sediment control will focus on assessing the physical characteristics of the site and erosion and sediment control prescriptions. During Project operations, inspections will also focus on monitoring the stability of slopes, dams, and erosion control measures, assessing areas for signs of active erosion (e.g., rills and gully formation), and monitoring vegetation establishment. Capacity of sediment controls (e.g., sedimentation ponds, ditch check dams) will also be inspected during the snow-free period to determine if maintenance is required.

Inspections will include assessments of:

- Slopes and soils for the presence of rills and gullies
- Water conveyance capacity and spillway stability
- Stability of erosion control measures (e.g., is RECP being undermined, has slumping occurred)
- Storage capacity and function of sediment controls (e.g., check dams, silt fence, sedimentation ponds)
- Revegetation success (e.g., % vegetation cover, signs of seed loss).

Surface runoff within the Mine Site will be directed to the Alpha and Facility sedimentation ponds located downstream of proposed mining areas, where the TSS load will settle prior to water discharge. Turbidity measurements, pH measurements, and TSS samples will be collected from the sedimentation pond discharge points and compared to the Effluent Quality Standards (EQS) that have been defined for the site to assess the overall performance of the erosion and sediment control measures. Details regarding the defined EQS are provided in the Water Management Plan.

Surface water quality monitoring will be carried out at the site to verify geochemical source terms and to ensure that the water management system is effective. Water quality monitoring will be carried out at selected stations on Latte Creek, Coffee Creek, YT-24, Halfway Creek, and on the Yukon River. Water quality in the receiving environment downstream of the mine will reflect the ultimate effects of the mine on the relevant intermediate and valued components (ICs and VCs, respectively) from the environmental assessment. Further details on surface water quality monitoring are provided in the Surface Water Quality Monitoring Plan.

8.1.1 Frequency

Inspections will be done at a minimum frequency of weekly during the Construction Phase in the active areas of work. In the Operations Phase, inspections of all erosion and sediment controls measures will be conducted via three types of visual inspections: Routine inspections, annual inspections, and event-driven inspections. These types of inspections are described in Section 7 of the Physical Monitoring Plan. Inspections will also be conducted during and after the spring snow melt, after heavy rainfall events, and after extreme wind events.

The following situations will trigger the need for a response:

- Presence of deep rills and gullies on slopes
- Accumulations of significant sediment in ditches
- Undermining erosion and sediment control prescriptions
- Loss of substantial capacity of the sedimentation ponds
- Water discharges from sedimentation ponds that exceed licence criteria for TSS
- Substantial failure of vegetative mat that was established on the soil stockpiles.

Should any of these conditions be identified during inspections, additional sediment and erosion control measures will be implemented as required, and inspection frequency may increase until the trigger conditions subside. Additional details will be provided in construction management plans and/or SOPs that will be developed prior to the start of construction.

8.2 Inspections and Monitoring During Closure

During the Reclamation and Closure Phase, inspections will include assessment of erosion (e.g., rills and gullies formed between inspection periods) and success of permanent erosion control and the establishment of vegetation, which will be supported by the Reclamation Research Program (refer to Section 2.3.1 of the Reclamation and Closure Plan). Annual inspections of permanent water conveyance channels on the Alpha WRSF for signs of erosion will also be conducted.

8.3 Instream Monitoring

Instream monitoring and sampling, including turbidity and TSS, will be conducted at selected stations at downstream locations. Water quality sampling will be undertaken in accordance with the British Columbia Field Sampling Manual (BC MoE, 2013) and any relevant updates to that methodology. In addition, weekly in-situ turbidity monitoring may be carried out in areas adjacent to erosion and sediment control prescriptions until they are established to inform the initial effectiveness of the mitigation. Specific details regarding the locations and frequency of the in-situ monitoring will be provided in construction management plans and/or SOPs that will be developed prior to the start of construction.

Additional monitoring may be required for instream work being completed in watercourses downstream or outside of site controls. Turbidity and TSS monitoring will be carried out directly upstream and 10 to 20 m downstream of the work area. Turbidity and TSS measurements downstream of instream work will be compared against the background upstream location to confirm that mitigations are working to ensure downstream turbidity and TSS is not greater than 10% higher than upstream turbidity or if any further mitigation is required for sediment and erosion control to achieve this objective.

The results will also be compared to water quality objectives based on the Canadian Water Quality Guidelines for the Protection of Aquatic Life (Table 8-1; CCME 2014). If concentrations exceed criteria, then investigations will be undertaken to identify the source of sediment, and a site-specific corrective action plan will be prepared by the site Environment Department.

Table 8-1 Water Quality Objective for Suspended Sediment and Turbidity (based on CCME water quality guidelines for the protection of aquatic life - Freshwater)

Parameter	Water	Maximum Allowable Increase in Turbidity
Suspended Sediment	All water during clear flows	- 25 mg/L above background (short-term exposure) ¹ - 5 mg/L above background (longer-term exposure) ²
	During high flows or in turbid waters (25 – 250 mg/L)	25 mg/L above background ³
Turbidity	All water during clear flows	- 8 NTU above background (short-term exposure) ¹ - 2 NTU above background (longer-term exposure) ²
	During high flows or in turbid waters (8 – 80 NTUs)	8 NTU above background ⁴
¹ Short-term exposure (e.g., 24-h period) ² Longer-term exposures (e.g., inputs lasting between 24 h and 30 d) ³ Should not increase more than 10% of background levels when background is >250 mg/L. ⁴ Should not increase more than 10% of background levels when background is >80 NTUs.		

The frequency of monitoring will depend on site activities. During construction within the wetted perimeter or completing tasks that are at risk of sediment release, samples and field screening of downstream water will be conducted once every two hours. If the turbidity exceeds the water quality objectives outlined in Table 8-1, all work will cease until levels can be brought down to acceptable levels.

8.4 Reporting

The results of the erosion and sediment control inspections will be documented internally. Corrective actions will be developed and implemented based on inspection findings and the status of the actions will be tracked in an internal database. Outstanding corrective actions will be followed up with the Environment Manager (or designate) on a frequency determined by the severity of the conditions and no less frequently than weekly. Water quality results will be reported as per the requirements of the Water Management Plan and the Water Licence and Quartz Mining Licence.

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APPENDIX A

Erosion and Sediment Control Plan Table of Concordance

Proponent Commitments

Mitigation Name	Reference	Proponent Committed Mitigation	Management Plan	Commitment Incorporated	Section Location	Notes
SECP	SIR1-2.8-R29 (YOR 2017-0211-323-1)	Goldcorp will implement various management practices to minimize erosion and sedimentation, manage water, and protect water quality:	Erosion and Sediment Control Plan	Yes	ESCP Section 6.8.1: Seeding	
		• Seeding				
SECP		• Clearing and grubbing				ESCP Section 6.1: Clearing and Grubbing
SECP		• Stripping soil				ESCP Section 6.2: Stripping Soil
SECP		• Organic and overburden stockpile management				ESCP Section 6.3: Organic and Overburden Stockpile Management
SECP		• Ditches and slope drains				ESCP Section 6.5: Ditches and Slope Drains
SECP		• Embankment and slopes				ESCP Section 6.6: Embankments and slopes
SECP		• Progressive reclamation				ESCP Section 6.7: Progressive Reclamation
SECP		• Rolled erosion control products				ESCP Section 6: Erosion and Sedimentation Control Good Management Practices
SECP		• Sedimentation ponds				ESCP Section 7.1: Sedimentation Ponds
SECP		• Sediment fences				ESCP Section 7.2: Silt Fences
SECP		• Temporary check dams				ESCP Section 7.3: Temporary Check Dams
SECP		• Other methods to take sediment out of sedimentation				ESCP Section 7.4: Other Methods to Take Sediment out of Suspension
SECP	SIR1-20.1-R279 (YOR 2017-0211-326-2)	In the event of a sediment pond accident or malfunction that have caused channel scouring and sediment deposition, channel banks will be stabilized to limit further erosion and channel avulsion. Sediment deposits, if deemed necessary, will be dredged. An assessment of the design criteria, inspection schedule, operating standards, and mode of failure should be reviewed. Monitoring may need to be increased in frequency and spatial scope. Remediation could include construction of temporary diversions and settling ponds and associated pumping systems, where necessary.	Water Management Plan	Yes	WMP Section 4.3.10.4: Sediment Pond Malfunction	
SECP	SIR1-20.1-R279 (YOR 2017-0211-326-2)	Mitigation to prevent sediment release accident include the following:	Erosion and Sediment Control Plan	Yes	ESCP Section 4.2: Employee Training Program	
		• Ensuring that all employees are adequately trained to recognize and minimize the risk of sediment release, including minimizing the slope of side-cast materials and covering side-cast materials and temporary stockpiles if they will remain in place for more than one day.				
SECP		• Managing runoff from exposed slopes, including areas where disturbance is short-term and temporary.				ESCP Section 4: Overall Approach to Erosion and Sediment Control
SECP		• Undertaking routine geotechnical inspections to evaluate the stability of the Mine Site, water management system, and all exposed slopes and excavations.				ESCP Section 4: Overall Approach to Erosion and Sediment Control
SECP		• Effectively minimizing and controlling any sediment released from the mine property.	ESCP Section 4: Overall Approach to Erosion and Sediment Control			
SECP	SIR2-2.3-R2-9 (YOR 2017-0211-411-1)	The soil stockpile will be contoured and seeded with native grass species to prevent erosion and loss of topsoil. Additionally, the following guidance will be implemented (SIR22.3-R2-9):	Erosion and Sediment Control Plan	Yes	ESCP Section 6.3: Organic and Overburden Stockpile Management	
		• Ensure outer slopes of topsoil are 2H:1V or less;				
SECP		• Grade/roughen slopes to slow water velocities and promote infiltration;				ESCP Section 6.3: Organic and Overburden Stockpile Management
SECP		• Sediment control fencing at downslope toe;				ESCP Section 6.3: Organic and Overburden Stockpile Management
SECP		• Seed with grass seed; and				ESCP Section 6.3: Organic and Overburden Stockpile Management
SECP		• Ensure outer perimeter controls are in place until slopes are vegetated.	ESCP Section 6.3: Organic and Overburden Stockpile Management			
SECP	SIR1-Appendix 2-A (YOR 2017-0211-327-1)	Prior to construction of each phase, any vegetation and topsoil (assumed to be 30 cm) should be stripped within the full footprint and stockpiled for reclamation purposes.	Erosion and Sediment Control Plan	Yes	ESCP Section 3.1: Mine Construction	

Proponent Commitments

Mitigation Name	Reference	Proponent Committed Mitigation	Management Plan	Commitment Incorporated	Section Location	Notes
Dust Suppression	SIR1-2.1-R39 (YOR 2017-0211-323-1)	A water truck will be used for dust suppression during the Operation Phase and monitoring of fugitive dust and water quality will occur over the life of the mine. Mine suppression products will only be selected if they pose no environmental risk. Water will be sourced from the raincoat ponds, Alpha Pond, Facilities Pond, or the Open Pit sumps, as operations needs dictate.	AQ and GHG Management Plan; EMAMP	Yes	AQ and GHG Management Plan Section 5.0: Dust Control Measures EMAMP - Appendix I: Air Quality and Greenhouse Gas Monitoring Plan Section 3.0: Monitoring Methodology	Water for dust suppression will be sourced from the Alpha Pond, Facility Pond, or the Open Pit sumps, as operations needs dictate.
Dust Suppression	SIR1-11.1-R231 (YOR 2017-0211-326-2)	The Erosion and Sediment Control Plan will identify several mitigation measures to reduce the likelihood of dust accumulating on vegetation near the Project. On the Mine Site, material stockpiles will be designed and oriented to reduce wind erosion and material drop heights will be minimized to reduce dust emissions associated with ore handling.	Erosion and Sediment Control Plan; AQ and GHG Management Plan	Yes	ESCP Section 5.3: Waste Rock Placement; Section 5.4: ROM Stockpile AQ and GHG Management Plan Section 5.0: Dust Control Measures	
Dust Suppression	SIR3-R3-62 (YOR 2017-0211-501-1)	Goldcorp has committed to implementing a soil and vegetation monitoring program to ensure that the proposed mitigation measures are successful in limiting increases in trace metal concentrations in soil and vegetation. If monitoring shows an exceedance of Project-specific thresholds, additional mitigations will be employed to minimize effects to vegetation health. Additionally, as described in Section 6.2 of the Wildlife Protection Plan (Appendix 31-F of the Project Proposal), if vegetation sampling shows an exceedance of Project-specific thresholds, additional monitoring of trace metals levels in small mammal tissues may be initiated.	EMAMP	Yes	EMAMP - Appendix H: Vegetation Monitoring Plan Section 4.0: Trace Metals Monitoring EMAMP - Appendix G: Wildlife Monitoring Plan Section 2.2: Key Monitoring Components	
Dust Suppression	SIR6-R6-7 (YOR 2017-0211-7131)	The conveyor system will be operated in a way meets the dust management practices that have been outlined in the Project Proposal. Example mitigations and monitoring include reducing transfer drop height, using water as a dust suppressant, and routine inspections.	AQ and GHG Management Plan	Yes	AQ GHG Management Plan Section 5.0: Dust Control Measures	

APPENDIX B

Applicable Erosion and Sediment Control Good Management Practices

GMP Installation Guides

The following GMP installation guides are intended to provide general installation guidance and can be adapted to suit location conditions. Installation guides provided are:

1. Check Dams
2. Energy Dissipaters
3. Rolled Erosion Control Blanket Installation
4. Offtake drains
5. Silt Fence
6. Temporary Sediment Traps and Basins
7. Slope drains
8. Slope Texturing / Grading/Surface Roughening.

Images have been purchased from Erosion Draw (<http://www.salixaec.com/EDwhatis.html>).

1. CHECK DAMS

DESCRIPTION AND PURPOSE

- Small dam constructed of rock placed across steep channel
- Decreases flow velocities to reduce erosion caused by storm runoff
- Sediment laden runoff is detained allowing sediment to settle out.

APPLICATIONS

- Temporary or permanent measure
- Reduces long steep grade to intervals of gentle grades between successive structures
- Reduces flow velocities and kinetic energy to decrease erosion potential caused by runoff
- Sediment laden runoff is retained behind structure allowing sediment to settle out
- May be used in channels that drain 4 ha (10 ac) or less
- May be used in steep channels where storm water runoff velocity is less than 1.5 m/s (5 fps).

ADVANTAGES

- Cheaper than using riprap armouring or gabion structures in a ditch
- Easy to construct.

LIMITATIONS

- Not appropriate for high flow velocity >1.5 m/sec; (use gabion structures for flow velocity >1.5 m/sec)
- Not appropriate for channels draining areas larger than 4 ha (10 ac)
- Not to be placed in grass lined channels unless erosion is anticipated
- Susceptible to failure if water undermines or outflanks structure.

CONSTRUCTION

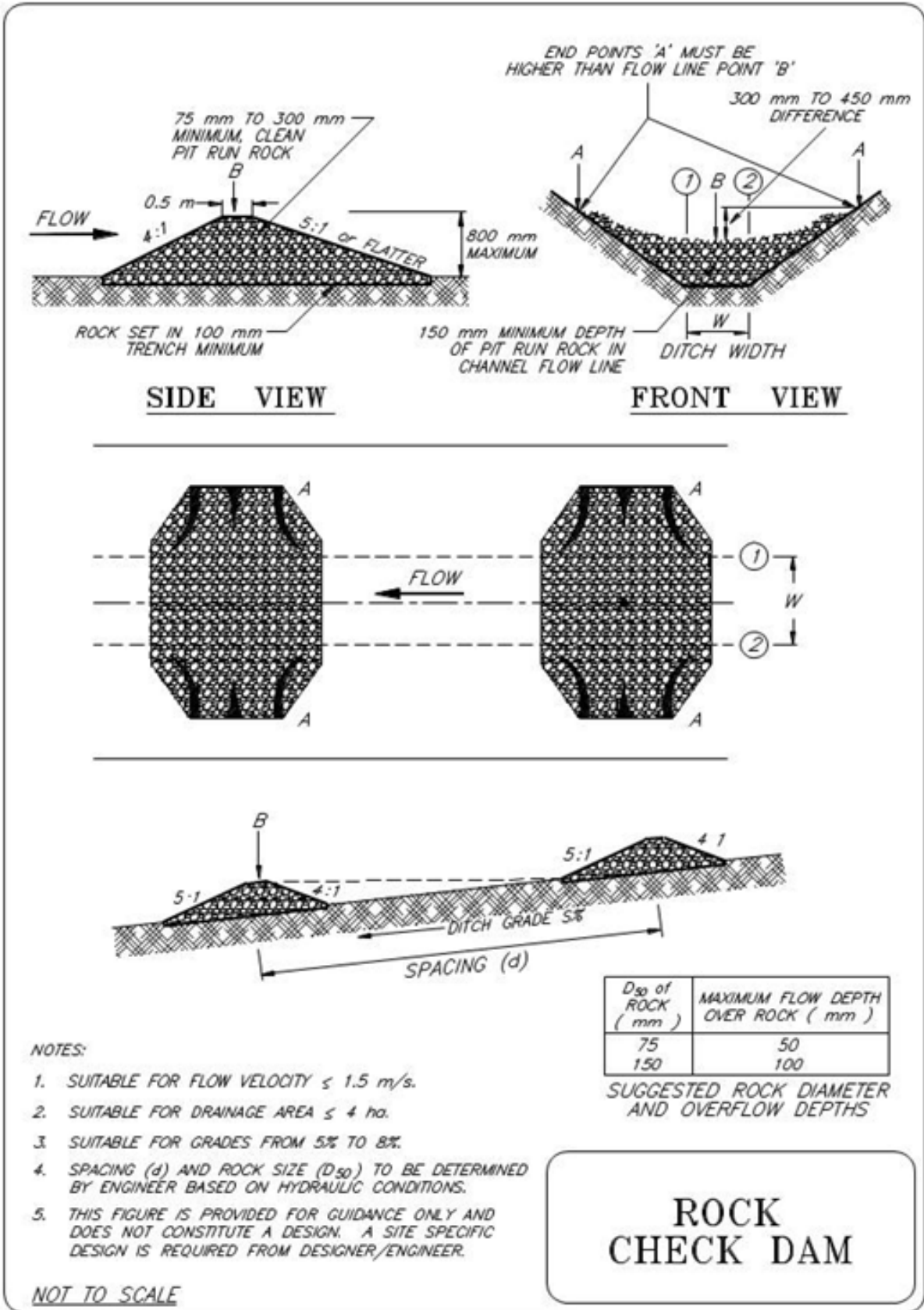
- Excavate a trench key a minimum of 0.15 m in depth at the rock check structure location
- Place non-woven geotextile fabric over footprint area of rock check
- Construct structure by machine or hand
- Structure will extend from one side of the ditch or channel to the other
- Structure will be constructed so that centre of the crest is depressed to form a centre flow width which is a minimum of 0.30 m lower than the outer edges
- Height of structures will be less than 0.8 m in height to avoid impounding large volumes of runoff
- Downstream slope of the check dam will be 5H:1V (minimum)
- Upstream slope of the check dam will be 4H:1V (minimum).

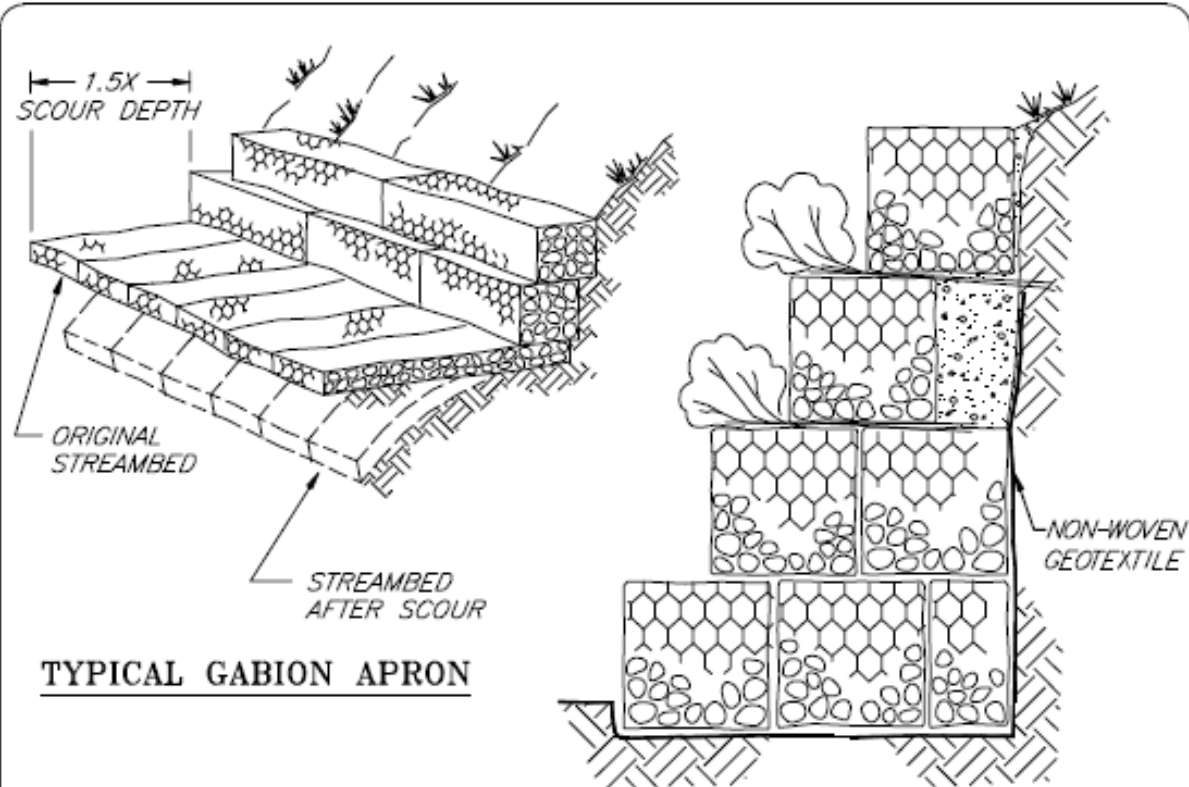
CONSTRUCTION CONSIDERATIONS

- Should be designed with roadside design clear zone requirements in mind
- Height and spacing between structures will be designed to reduce steep channel slope to intervals of flatter gradient
- Rock check structures will be constructed of free draining aggregate
- Aggregate will have a mean diameter (D50) of between 75 mm and 150 mm and must be large enough to remain in place during high velocity flow situations. Maximum rock diameter will not exceed 150 mm if the structure is to be used as a sediment trap
- If rock check structures are to be placed in channels with significant high flows, they must be properly designed for stone size and structure spacing.

INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plans
- Remove sediment build up before it reaches one half the check structure height
- Erosion repairs will be made as early as feasible to prevent failure of the structure
- Replace dislodged aggregate immediately with heavier aggregate or gabion structures.

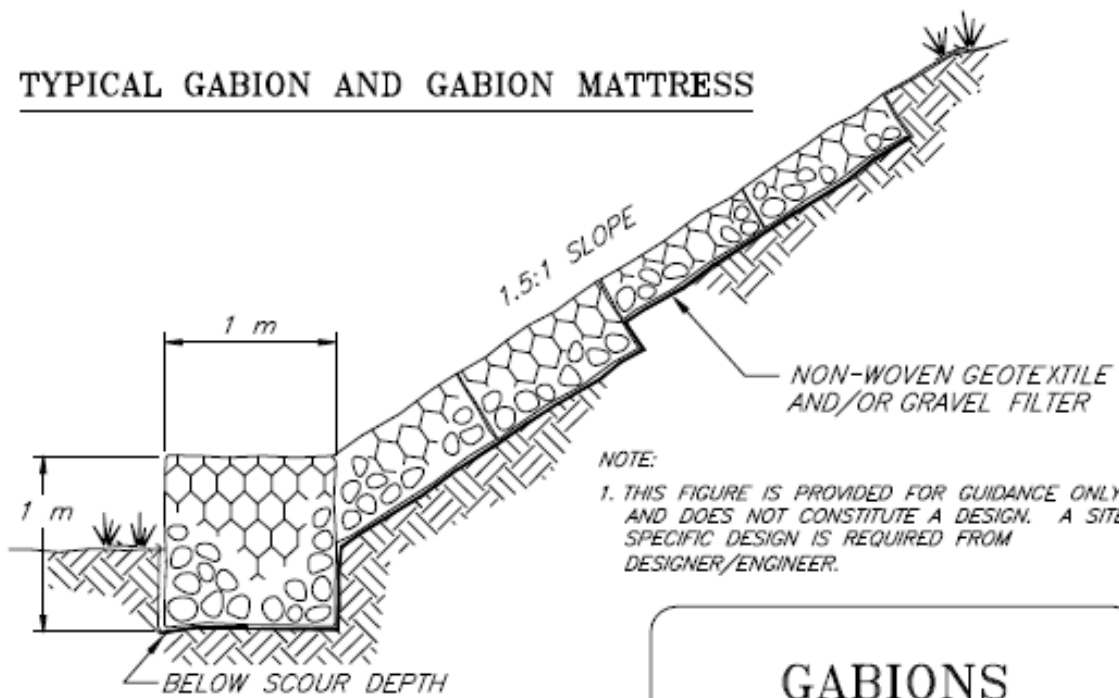




TYPICAL GABION APRON

TYPICAL VEGETATED ROCK GABION

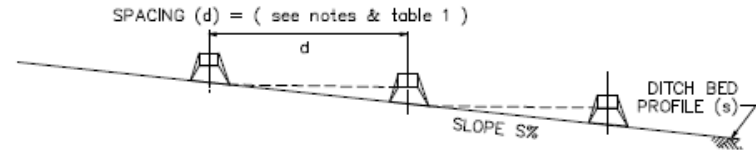
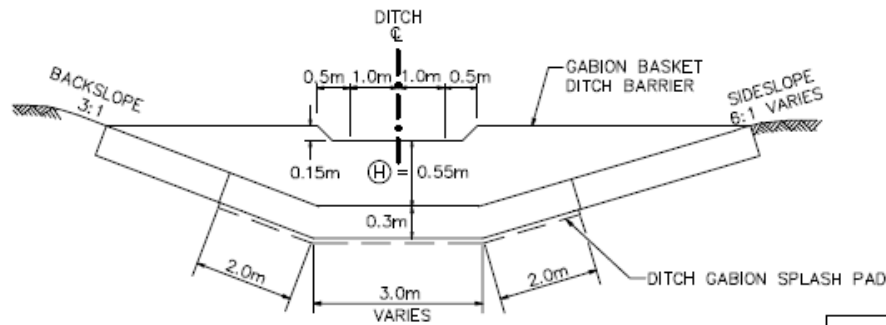
TYPICAL GABION AND GABION MATTRESS



NOTE:
1. THIS FIGURE IS PROVIDED FOR GUIDANCE ONLY AND DOES NOT CONSTITUTE A DESIGN. A SITE SPECIFIC DESIGN IS REQUIRED FROM DESIGNER/ENGINEER.

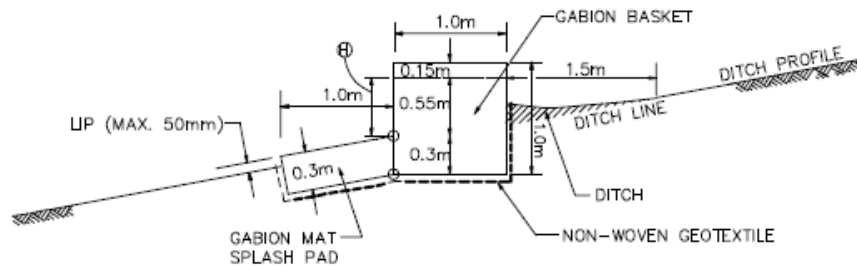
**GABIONS
(SLOPE AND BANK)**

FILE- GABIONS



SUGGESTED SPACING (d)		REMARKS
S (%)	(m)	
5-7	30	OPTION TO INSTALL A GRADE BREAK (s.d. WEAVE BARRIER) BETWEEN STRUCTURES.
7-8	25	A DOUBLE GABION FOLLOWS EVERY 2 SINGLE GABIONS.
>8%	≤15	DESIGN BY ENGINEER REQUIRED.

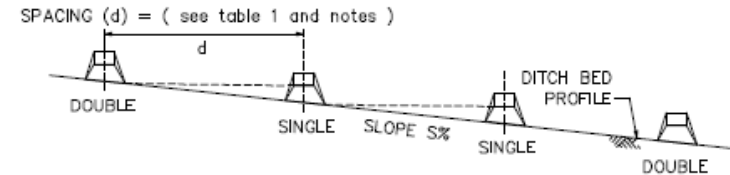
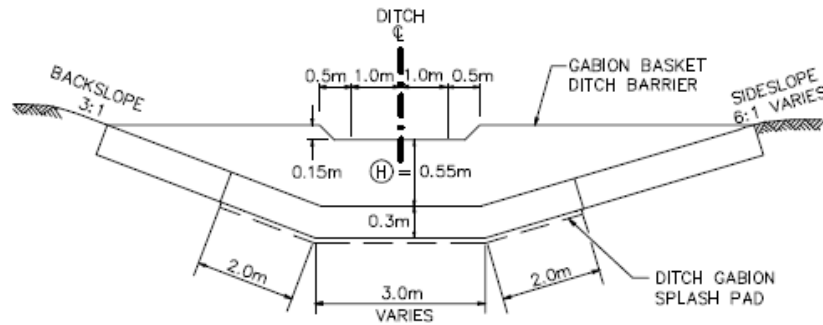
TABLE 1



NOTES:

- SUITABLE FOR MEDIUM TO STEEP GRADES AND CHANNELS LEADING TO WATER COURSE $4\% < S < 10\%$.
- i) SPACING TO BE DETERMINED BY ENGINEER BASED ON HYDRAULIC CONDITIONS.
ii) USE IN CONJUNCTION WITH DOUBLE GABIONS OR OTHER BARRIER STRUCTURES.
- SOIL COVERING BETWEEN STRUCTURES SUGGESTED FOR STEEP GRADE SOIL DITCH.
- THIS FIGURE IS PROVIDED FOR GUIDANCE ONLY AND DOES NOT CONSTITUTE A DESIGN. A SITE SPECIFIC DESIGN IS REQUIRED FROM DESIGNER/ENGINEER.

**GABIONS
SINGLE GABION
DROP STRUCTURE FOR
DITCH CHANNEL**

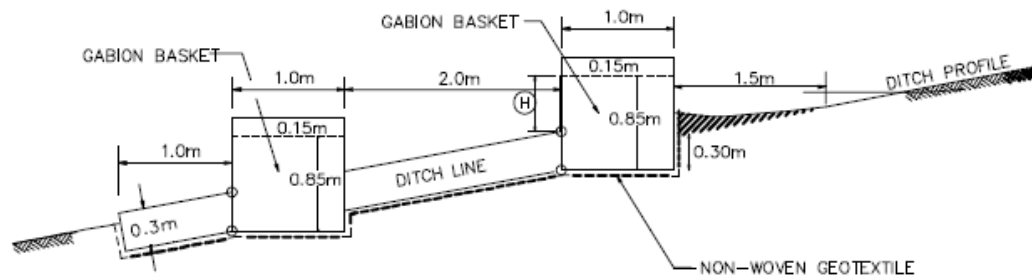


SUGGESTED SPACING (d)		REMARKS
S (%)	(m)	
6-8	25	INTER-SPACED WITH 2 SINGLE GABIONS BETWEEN STRUCTURES *SEE NOTES
	35*	
>8%	≤15	DESIGN BY ENGINEER REQUIRED

TABLE 1

NOTES:

- SUITABLE FOR STEEP GRADES (6%<S<12%) AND CHANNELS LEADING TO WATER COURSE
- i) SPACING (d) TO BE DETERMINED BY ENGINEER BASED ON HYDRAULIC CONDITIONS.
ii) USE IN CONJUNCTION WITH SINGLE GABION AND/OR OTHER GRADE BREAK STRUCTURES.
- SUGGESTED TWO SINGLE GABIONS AT INTERVAL BETWEEN DOUBLE GABIONS.
- SOIL COVERING BETWEEN STRUCTURES SUGGESTED FOR STEEP GRADE SOIL DITCH.
- IF d* = 35 m at 7 to 8% GRADE
 - GRADE BREAK (s.a. PERMEABLE WEAVE BARRIER) SHOULD BE PLACED BETWEEN STRUCTURES.
 - LONG SPACING ALLOWABLE WHEN HYDRAULIC CONDITIONS NOT SEVERE.
- THIS FIGURE IS PROVIDED FOR GUIDANCE ONLY AND DOES NOT CONSTITUTE A DESIGN. A SITE SPECIFIC DESIGN IS REQUIRED FROM DESIGNER/ENGINEER.



**GABIONS
DOUBLE GABION
"ENERGY DISSIPATOR"
DROP STRUCTURE
FOR DITCH CHANNEL**

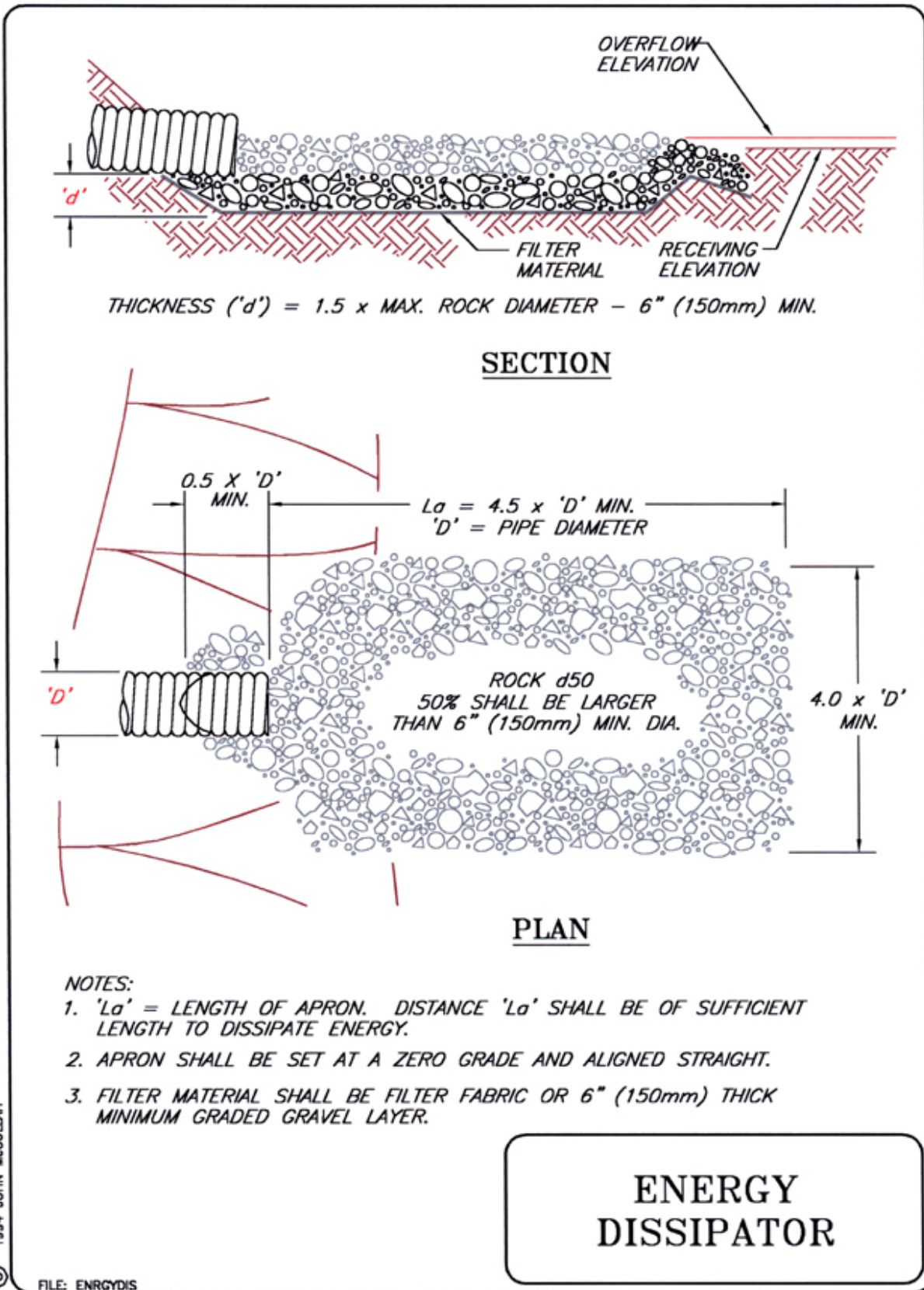
2. ENERGY DISSIPATERS

CONSTRUCTION SPECIFICATIONS

- Ensure that the subgrade for the filter and riprap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.
- The riprap and gravel filter must conform to the specified grading limits shown on the plans.
- Filter cloth, when used, must meet design requirements, and be properly protected from punching or tearing during installation. Repair any damaged fabric by removing the riprap and placing another piece of filter cloth over the damaged area. All connecting joints will overlap a minimum of 1 foot (0.3 m). If the damage is extensive, replace the entire filter cloth.
- Riprap may be placed by equipment but take care to avoid damaging the filter.
- The minimum thickness of the riprap will be 1.5 times the maximum stone diameter.
- Riprap may be field stone or rough quarry stone. It should be hard, angular, highly weather-resistant and well graded.
- Construct the apron on zero grade with no overfall at the end. Make the top of the riprap at the downstream end level with the receiving area or slightly below it.
- Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.
- Immediately after construction, stabilize all disturbed areas with vegetation.

INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plan.
- Inspect riprap outlet structures after heavy rains to see if any erosion around or below the riprap has taken place or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.



3. ROLLED EROSION CONTROL BLANKET INSTALLATION

CONSTRUCTION SPECIFICATIONS

Site Preparation

- Proper site preparation is essential to ensure complete contact of the protection matting with the soil.
- Grade and shape area of installation.
- Remove all rocks, clods, vegetative or other obstructions so that the installed blankets, or mats will have direct contact with the soil.
- Prepare seedbed by loosening 2-3 inches (50.8-76.2 mm) of topsoil above final grade.
- Incorporate amendments, such as lime and fertilizer, into soil according to soil test and the seeding plan.

Seeding

- Seed area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all check slots and other areas disturbed during installation must be reseeded.
- Where soil filling is specified, seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Anchoring

U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats to the ground surface. Wire staples will be a minimum of 11 gauge. Metal stake pins will be 3/16-inch (4.8 mm) diameter steel with a 1 1/2-inch (38.1 mm) steel washer at the head of the pin. Wire staples and metal stakes will be driven flush to the soil surface. All anchors will be 6-8 inches (0.2-0.5 m) long and have sufficient ground penetration to resist pullout. Longer anchors may be required for loose soils.

Installation on Slopes

- Begin at the top of the slope and anchor its blanket in a 6 inch (0.2 m) deep x 6 inch (0.2 m) wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket downslope in the direction of the water flow.
- The edges of adjacent parallel rolls must be overlapped 2-3 inches (51-76 mm) and be stapled every 3 feet (0.9 m).
- When blankets must be spliced, place blankets end over end (shingle style) with 6-inch (0.2 m) overlap. Staple through overlapped area, approximately 12 inches (0.3 m) apart.
- Lay blankets loosely and maintain direct contact with the soil - do not stretch.
- Blankets shall be stapled sufficiently to anchor blanket and maintain contact with the soil. Staples shall be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 to 2:1, require 2 staples per square yard. Moderate slopes, 2:1 to 3:1, require 1-2 staples per square yard (1 staple 3' o.c.). Gentle slopes require 1 staple per square yard.

Installation in Channels

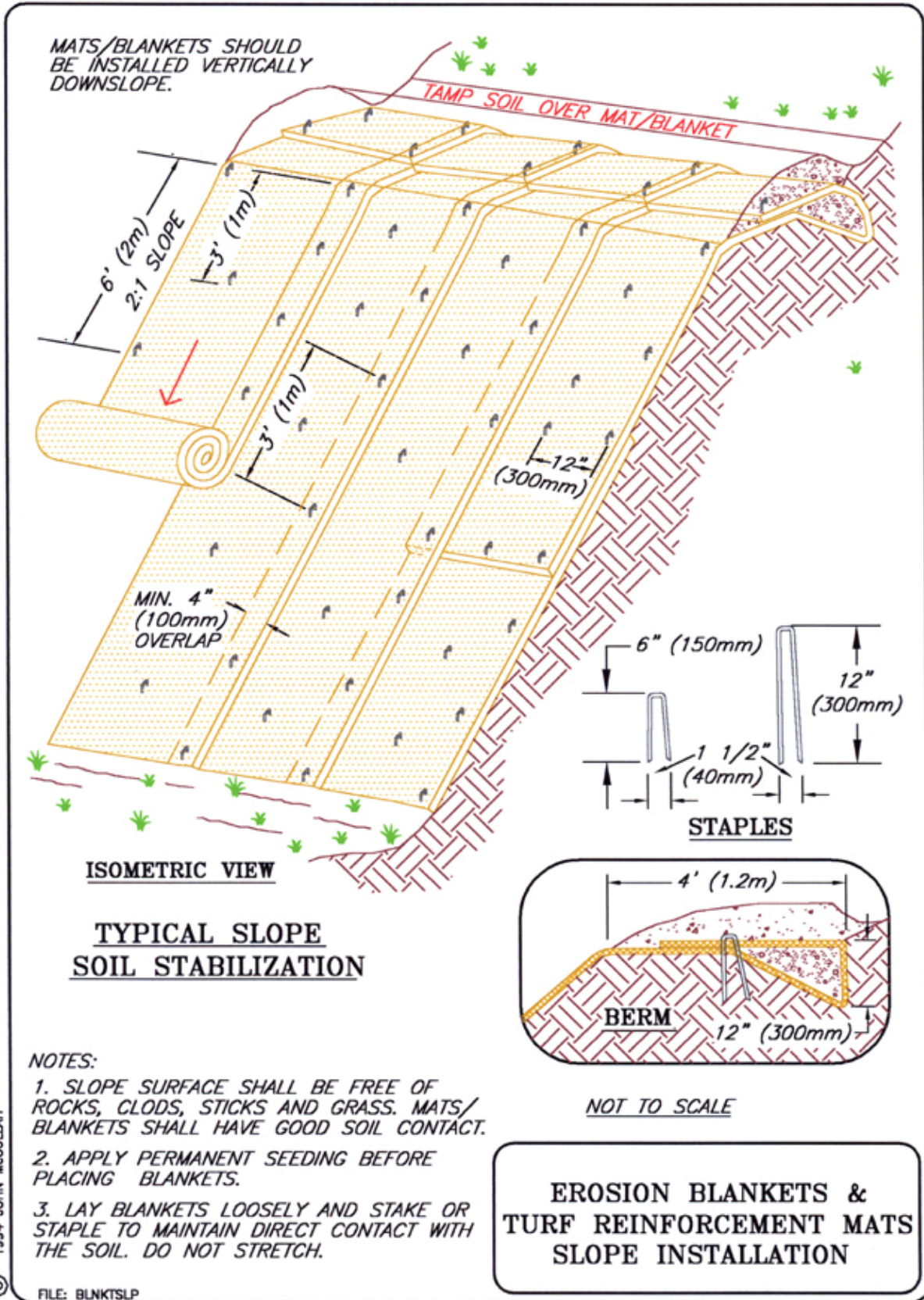
- Dig initial anchor trench 12 inches (0.3 m) deep and 6 inches (0.2 m) wide across the channel at the lower end of the project area
- Excavate intermittent check slots, 6 inches (0.2 m) deep and 6 inches (0.2 m) wide across the channel at 25–30-foot (7.6-9.1 m) intervals along the channel
- Cut longitudinal channel anchor slots 4 inches (101 mm) deep and 4 inches (101 mm) wide along each side of the installation to bury edges of matting. Whenever possible extend matting 2-3 inches (51-76 mm) above the crest of channel side slopes
- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 1-foot (.3 m) intervals. Note: matting will initially be upside down in anchor trench
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 inches (7.6 cm)
- Secure these initial ends of mats with anchors at 1-foot (0.3 m) intervals, backfill and compact soil
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench
- Unroll adjacent mats upstream in similar fashion, maintaining a 3-inch (76 mm) overlap
- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 1-inch (25.4 mm) intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench
- Alternate method for noncritical installations: place two rows of anchors on 6-inch (0.2 m) centers at 25-30 feet (7.6-9.1 m) intervals in lieu of excavated check slots
- Shingle-lap spliced ends by a minimum of 1 foot (0.3 m) with upstream mat on top to prevent uplifting by water or begin new rolls in a check slot. Anchor overlapped area by placing two rows of anchors, 1-foot (0.3 m) apart on 1-foot (0.3 m) intervals
- Place edges of outside mats in previously excavated longitudinal slots, anchor using prescribed staple pattern, backfill and compact soil
- Anchor, fill and compact upstream end of mat in a 12-inch (0.3 m) x 6 inch (0.2 m) terminal trench
- Secure mat to ground surface using U-shaped wire staples geotextile pins or wooden stakes
- Seed and fill turf reinforcement matting with soil, if specified.

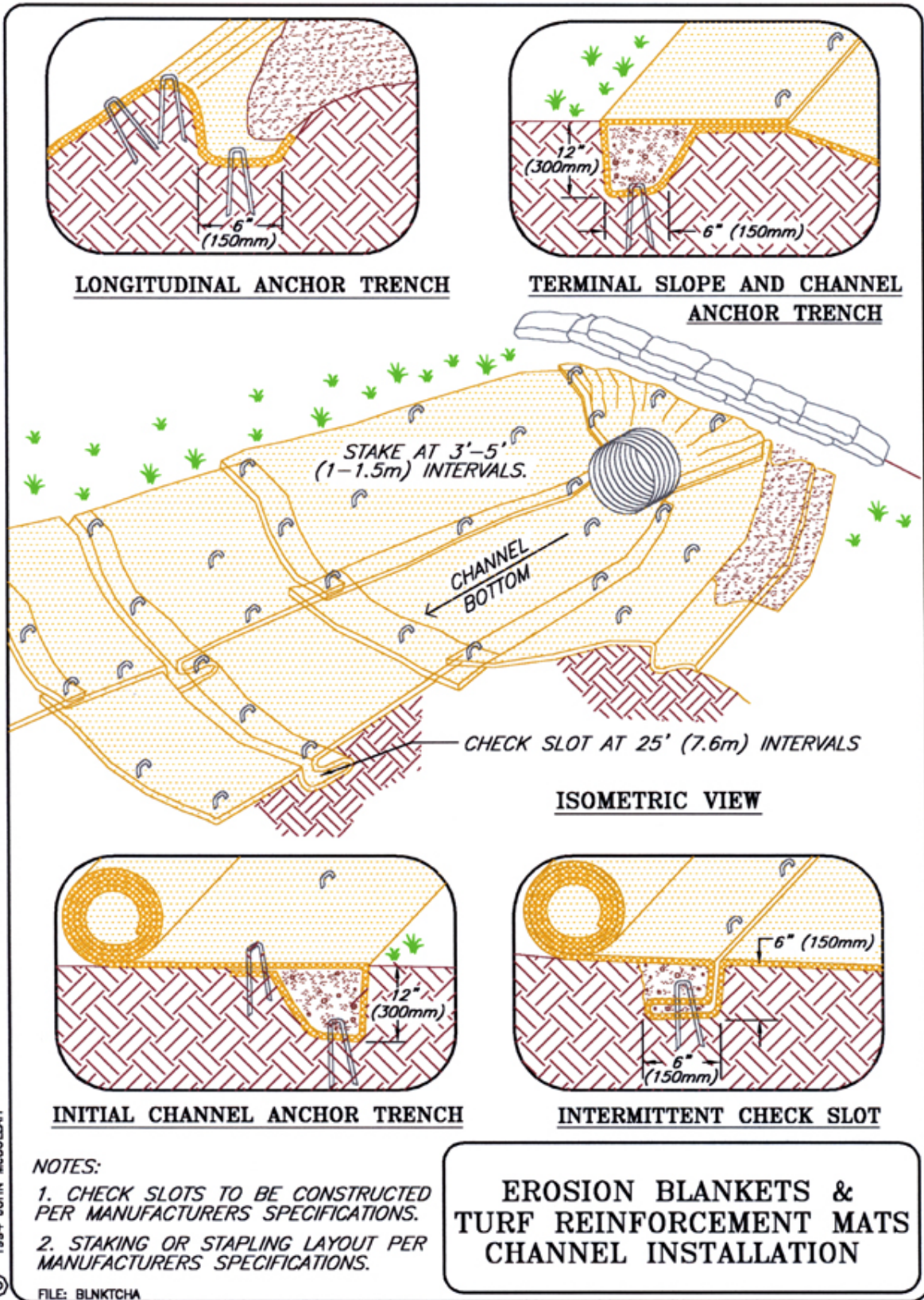
Soil Filling if Specified for Turf Reinforcement

- After seeding, spread and lightly rake 1/2-3/4 inches (12.7-19.1 mm) of fine topsoil into the mat apertures to completely fill mat thickness. Use backside of rake or another flat implement
- Spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment
- Do not drive tracked or heavy equipment over mat
- Avoid any traffic over matting if loose or wet soil conditions exist
- Use shovels, rakes or brooms for fine grading and touch up
- Smooth out soil filling, just exposing top netting of matrix.

INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plans
- Inspect installation after significant rainstorms to check for erosion and undermining. Any failure will be repaired immediately
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or drainageway.





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4. OFFTAKE DRAINS

DESCRIPTION AND PURPOSE

- Channels or swales commonly located along the crest of cuts slopes to intercept and convey runoff away from flowing down a newly excavated bare soil slope and to minimize erosion of slope from overlanding sheet flow.
- Can be tied to outfall to slope drains (or downdrains) which carry water from higher slope elevations to lower elevation of a slope.

APPLICATIONS

- Permanent measure.
- Effective method of intercepting runoff to avoid excessive sheet flow over slope and causing erosion, especially on cut slopes in highly erodible soils (sand and silt).
- Can be used in conjunction with slope drains which was installed down a large cut slope.
- May be lined with vegetation, rip rap, erosion control blankets, or some other erosion protection measure, but this requirement may be appropriate only at highly sensitive and high risk environmental areas.
- Can be used in conjunction with sediment control measures, such as check structures or permeable synthetic barriers as normal channel design, but this requirement may be appropriate only at highly sensitive and high-risk environmental areas.

LIMITATIONS

- Ditch may require lining to minimize soil erosion from concentrated flow.
- Ditch may require design by qualified personnel if flow velocities and/or volumes are large.
- Channel must be graded to maintain adequate depth, positive drainage to avoid ponding and breaching of channel flow, which may lead to overtopping of the channel to result flow to cause in downslope erosion.
- Removal of sediment build up and ditch maintenance may be difficult due to limited access space as offtake ditches are commonly constructed at crest of slopes.

CONSTRUCTION

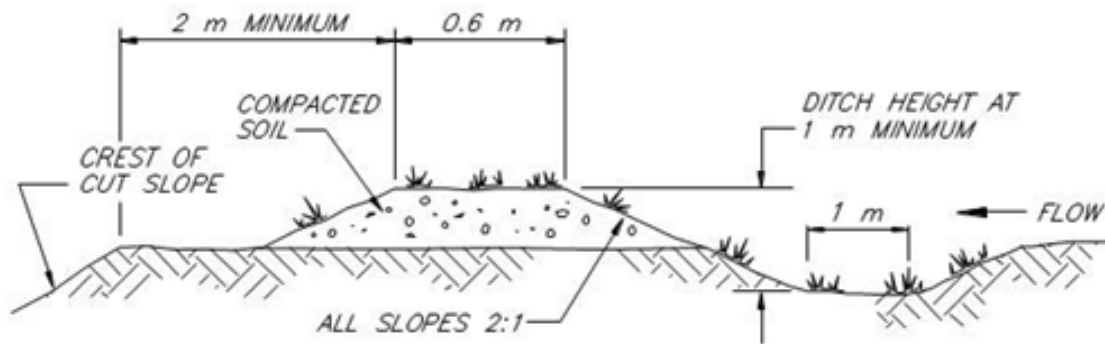
- Use backhoe to form ditch a minimum offset distance of 2 m between crest of highway slope and top of offtake ditch sideslope, thus providing a dyke width of 1 m.
- Place and compact excavated soil to form a dyke between crest of highway slope and offtake ditch channel to provide adequate depth (1 m) of the offtake ditch.
- The consequence of failure on this dyke will determine the level of compaction effort required.
- Side slopes of ditch will not be steeper than 2H:1V (depending upon material type).
- Depth of ditch (from base of ditch to top of embankment) will be a minimum of 1 m in depth; width of ditch will be 1 m minimum.
- Ditch grade will be graded a minimum of 1% to promote positive drainage and outfall.

Construction Considerations

- Channel will be graded towards nearest outfall (draw) or drainage pipe.

INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plans.
- Repair any damage to channel immediately.



TYPICAL OFFTAKE DITCH

NOTES:

1. THE DITCH BEHIND THE DYKE SHALL HAVE POSITIVE GRADE TO A STABILIZED OUTLET.
2. THE DYKE SHALL BE ADEQUATELY COMPACTED TO PREVENT FAILURE.
3. FOR SENSITIVE HIGH RISK AREAS, THE DITCH SHALL BE STABILIZED WITH TEMPORARY OR PERMANENT SEEDING OR RIPRAP.
4. THIS FIGURE IS PROVIDED FOR GUIDANCE ONLY AND DOES NOT CONSTITUTE A DESIGN. A SITE SPECIFIC DESIGN IS REQUIRED FROM DESIGNER/ENGINEER.

**OFFTAKE DITCH
(INTERCEPT DITCH)**

Frery Safix-Applied Earthcare – EROSION DRAW 3.0
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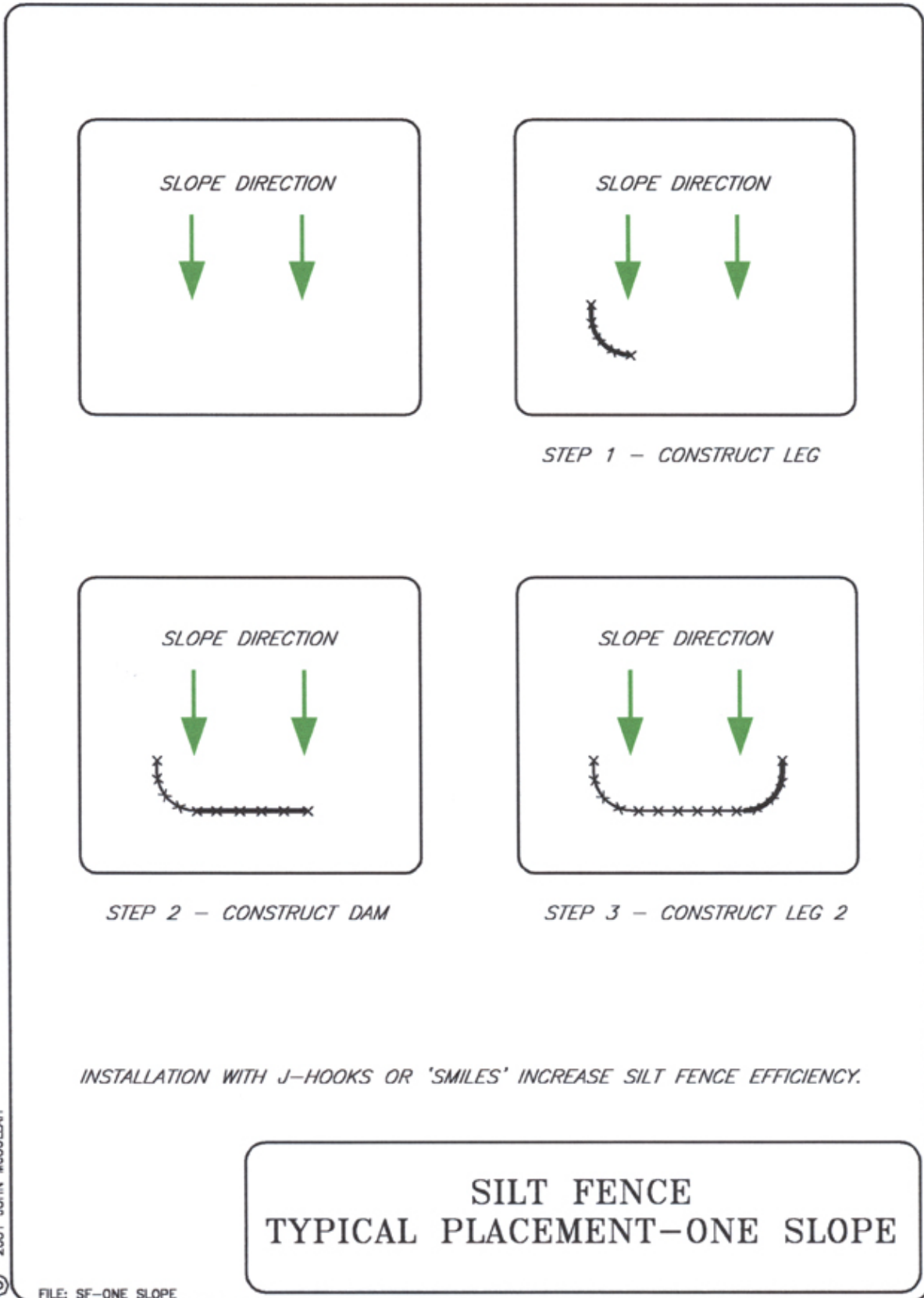
5. SILT FENCE

CONSTRUCTION SPECIFICATIONS

- Slice the soil and mechanically install the fabric into the soil.
- The height of a silt fence shall not exceed 36 inches (0.9 m). Storage height and ponding height shall never exceed 18 inches (0.5 m).
- To minimize erosion, install silt fence at the head of a slope to slow velocity and to create a large storage area.
- The fence line shall follow the contour as closely as possible.
- Turn the ends of the fence uphill.
- Steel or wood support posts will be utilized, properly spaced and driven into compacted soil.
- Post spacing shall not exceed 6 feet (1.8 m).
- The filter fabric is stapled or wired directly to the posts. Filter fabric shall not be stapled to existing trees.
- Fabric should be attached to the posts with three diagonal ties
- Silt fences placed at the toe of a slope shall be set at least 6 feet (1.8 m) from the toe in order to increase ponding volume.

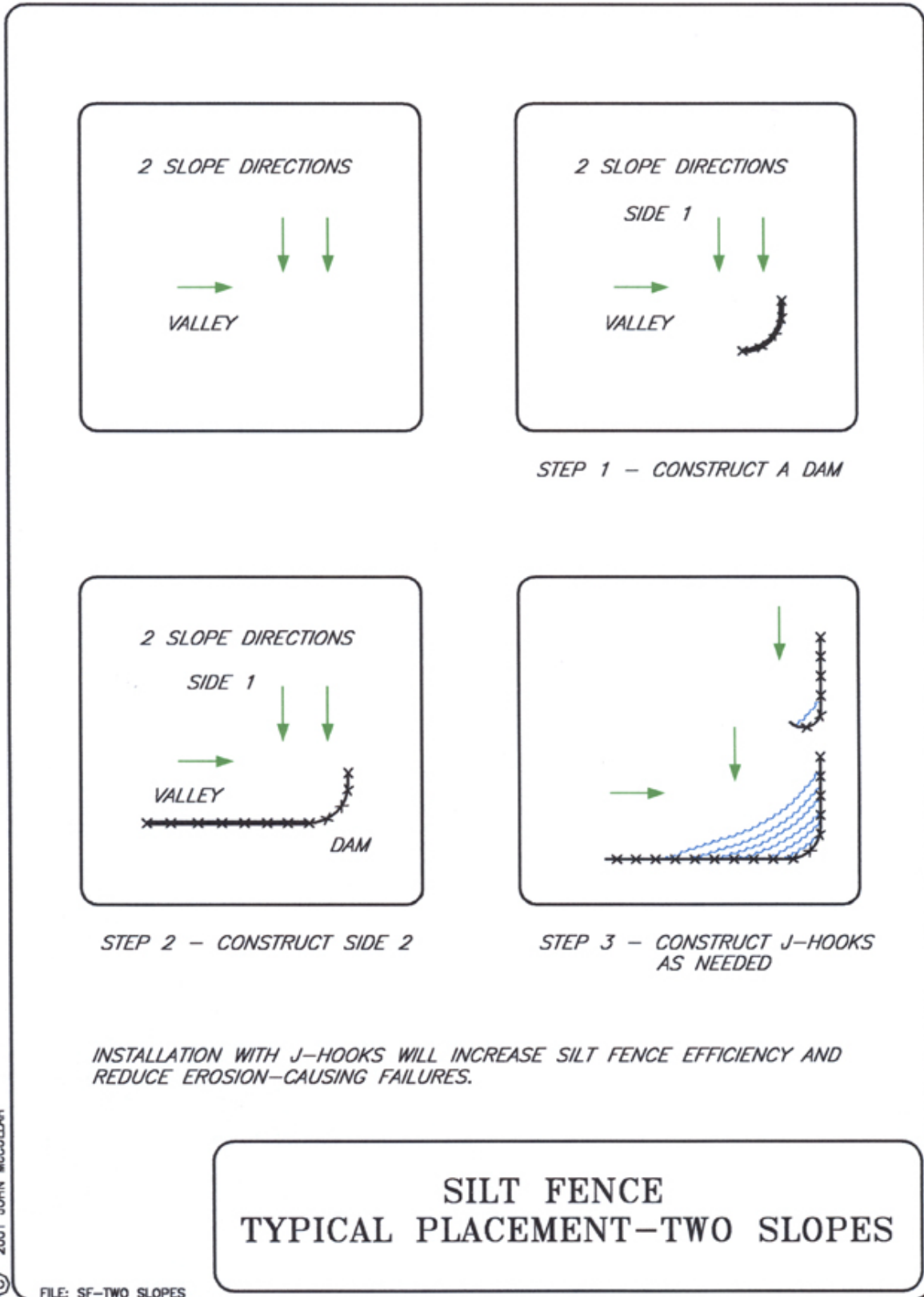
INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plans.
- Silt fences and filter barriers shall be inspected weekly after each significant storm (1 inch (25.4 mm) in 24 hours. Any required repairs shall be made immediately.
- Sediment should be removed when it reaches 1/3 height of the fence or 9 inches (0.3 m) maximum.
- The removed sediment shall conform to the existing grade and be vegetated or otherwise stabilized.
- Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized and any sediment stored behind the silt fence has been removed.



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FILE: SF-ONE SLOPE



6. TEMPORARY SEDIMENT TRAPS AND BASINS

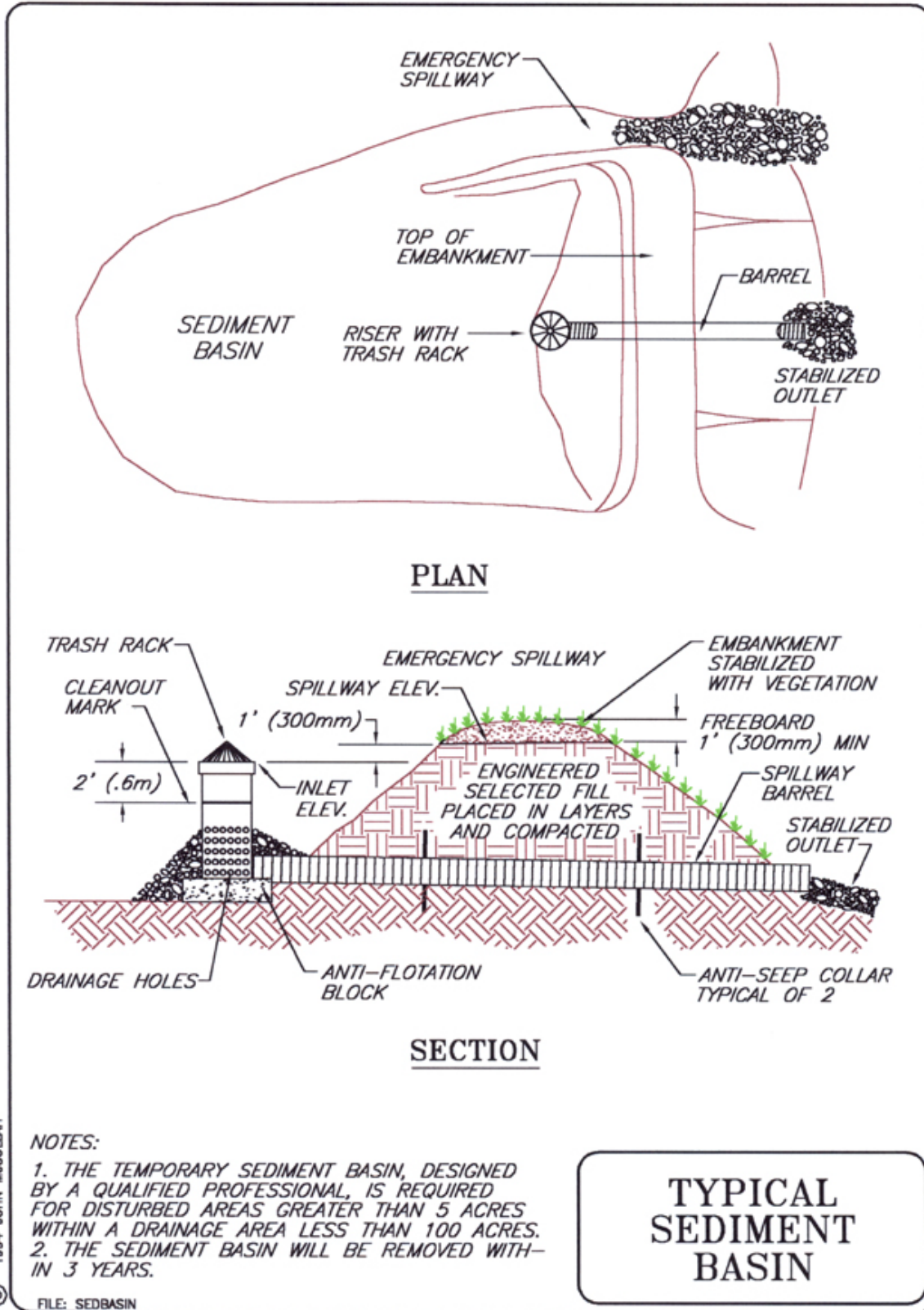
CONSTRUCTION SPECIFICATIONS

- Construct the basin by excavating or building an embankment before any clearing or grading work begins.
- Areas under the embankment and any structural works shall be cleared, grubbed, and stripped of any vegetation and rootmat as shown on the erosion and sediment control plan.
- In order to facilitate cleanout and restoration, the basin area shall be cleared, grubbed and stripped of any vegetation.
- A cut-off trench shall be excavated along the centerline of the earth fill embankments. The minimum depth shall be 2 feet (0.6 m) The cut-off trench shall extend up both abutments to the riser crest elevation.
- Fill material for the embankment should be clean mineral soil free of roots, woody vegetation, oversized stones, rocks or other objectionable material.
- The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling.
- Fill material shall be placed in 6 inch (0.2 m) lifts, continuous layers over the entire length of the fill. Compacting shall be obtained by routing the hauling equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment, or by the use of a compactor.
- The embankment should be constructed to an elevation of 10 percent higher than the design height to allow for settlement if compacting is achieved with hauling equipment. If compactors are used for compacting, the overbuild may be reduced to not less than 5 percent.
- The principle spillway riser shall be securely attached to the discharge pipe by welding all around. All connections shall be watertight.
- The pipe and riser shall be placed on a firm, smooth soil foundation. The connection between the riser and the riser base shall be watertight. Pervious materials such as sand, gravel or crushed stone shall not be used as backfill around the pipe or anti-seep collars.
- The fill material around the pipe spillway shall be placed in 4-inch (101 mm) layers and compacted under the shoulders and around the pipe to at least the same density as the adjacent embankment. A minimum of 2 feet (0.6 m) of compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment.
- Steel base plates shall have at least 2 1/2 feet (0.8 m) of compacted earth, stone, or gravel over them to prevent flotation.
- The emergency spillway shall not be installed in fill. Elevations, design width, and entrance and exit channel slopes are critical to the successful operation of the emergency spillway.
- Baffles shall be constructed of 4 inch (101 mm) by 4 inch (101 mm) posts and of 4 foot (1.2 m) by 8 foot (2.4 m) - 1/2inch (12.7 mm) exterior plywood. The posts shall be set at least 3 feet (0.9 m) into the ground, no further apart than 8 feet (2.4 m) center to center and shall reach a height 6 inches (.2 m) below the riser crest elevation.
- The embankment and emergency spillway shall be stabilized with vegetation immediately following construction.

- Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized.
- Local and state requirements shall be met concerning fencing and signs warning the public of hazards of soft sediment and floodwater.

INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plans.
- All damages caused by soil erosion or construction equipment shall be repaired before the end of each working day.
- Remove sediment when the sediment storage zone is half full. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment or in or adjacent to a stream or floodplain.
- When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposit shall be leveled or otherwise disposed of in accordance with the approved erosion and sediment control plan.



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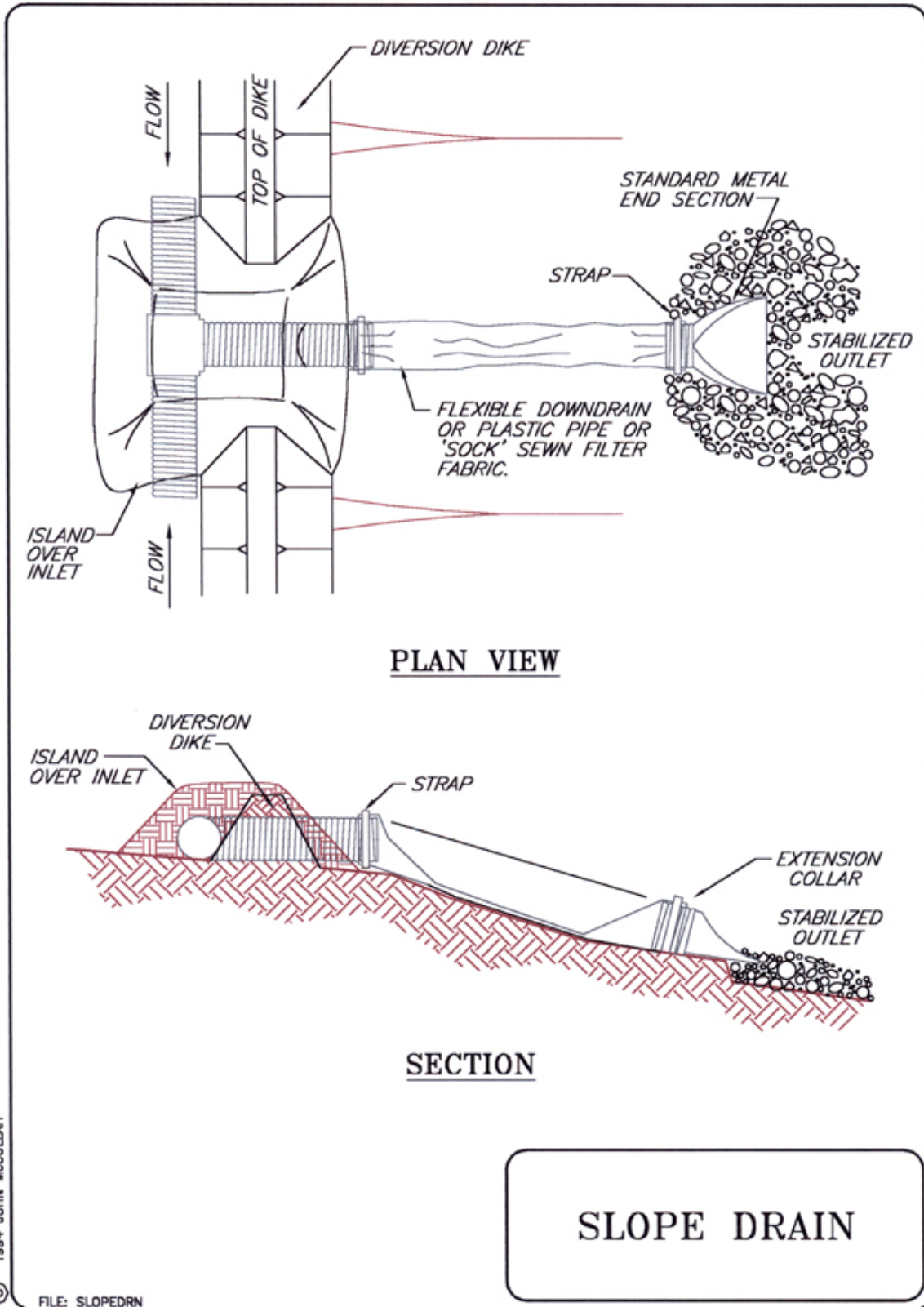
7. SLOPE DRAINS

CONSTRUCTION SPECIFICATIONS

- A common failure of slope drains is caused by water saturating the soil and seeping along the pipe. Proper backfilling around and under the pipe haunches with stable soil material and hand compacting in 6 inch (.2 m) lifts to achieve firm contact between the pipe and the soil at all points will reduce this type of failure.
- Place slope drains on undisturbed soil or well-compacted fill at locations and elevations shown on the plans.
- Slightly slope the section of pipe under the dike toward its outlet.
- Compact the soil under and around the entrance section in lifts not to exceed 6 inches.
- Ensure that fill over the drain at the top of the slope has a minimum depth of 1.5 feet (0.5 m) and a minimum top width of 4 feet (1.2 m). The sides should have a 3:1 slope.
- Ensure that all slope drain connections are watertight.
- Ensure that all fill material is well-compacted. Securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet (3.1 m) apart.
- Extend the drain beyond the toe of the slope and adequately protect the outlet from erosion.
- Make the settled, compacted dike ridge no less than 1 foot (0.3 m) higher than the top of the pipe inlet.
- Immediately stabilize all disturbed areas following construction.

INSPECTION AND MAINTENANCE

- Inspection frequency will be in accordance with the Erosion and Sediment Control Plans
- Inspect the slope drain and supporting diversions after every significant rainfall and promptly make necessary repairs. When the protected area has been permanently stabilized, temporary measures may be removed, materials disposed of properly, and all disturbed areas stabilized appropriately.



8. SLOPE TEXTURING / GRADING / SURFACE ROUGHENING

CONSTRUCTION SPECIFICATIONS

Cut Slope Roughening

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 feet (0.6 m) high in soft materials or more than 3 feet (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening

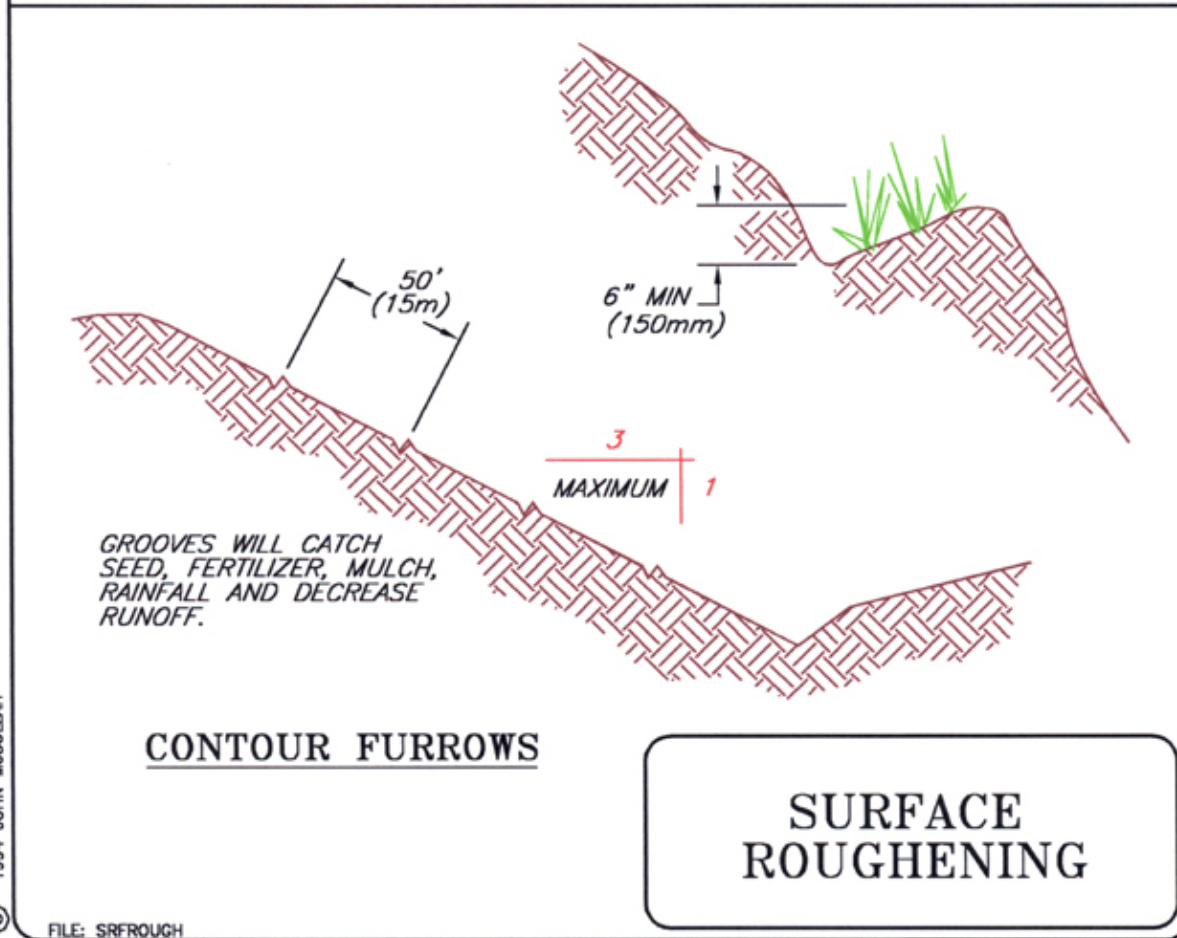
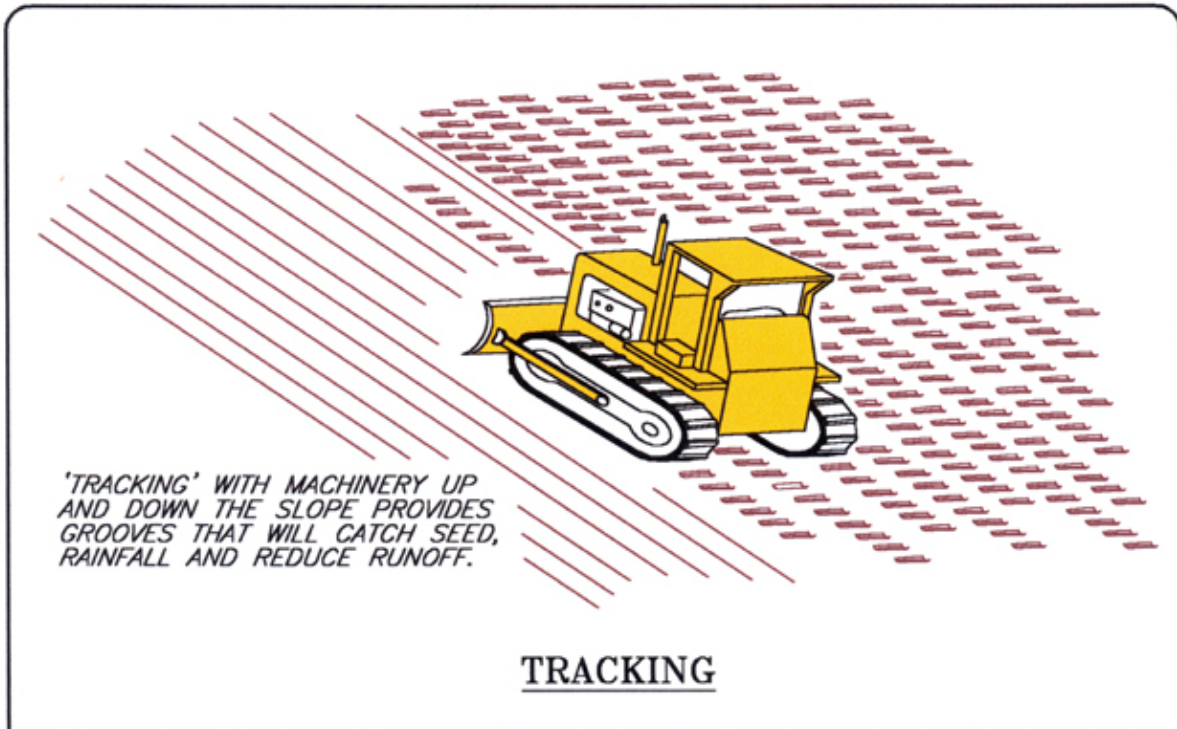
- Place fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 inches (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 inches (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Apply seed, fertilizer and straw mulch then track or punch in the mulch with the bulldozer.
- Do not blade or scrape the final slope face.

Cuts, Fills, and Graded Areas

- Make mowed slopes no steeper than 3:1.
- Roughen these areas to shallow grooves by normal tilling, disking, harrowing, or use a cultipacker-seeder. Make the final pass of any such tillage on the contour.
- Make grooves formed by such implements close together (less than 10 inches (0.3 m)), and not less than 1 inch (25.4 mm) deep.
- Excessive roughness is undesirable where mowing is planned.

Roughening with Tracked Machinery

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Immediately seed and mulch roughened areas to obtain optimum seed germination and growth.



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FILE: SRFROUGH

