

July 28, 2021

Mr. Kevin Fisher Community Services | Rural Land Development, Land Development Branch Yukon Government 307 Black Street Whitehorse, YT Y1A 2N1

SLR Project No.: 234.30005.00000

Dear Mr. Kevin Fisher,

RE: Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment for Lot 12, Block 14, Government Reserve Addition, 8395 CLSR, Dawson, YT

SLR is pleased to present the results of a soil sampling program and a subsequent Limited Human Health and Ecological Risk Assessment (HHERA) related to soil exposure for Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT, herein referred to as "the site".

SUMMARY OF KEY FINDINGS

The key findings of the Limited HHERA are as follows:

- On May 17, 2021, 8 (+1 duplicate) surficial soil samples were collected from site. One soil sample contained total chromium at concentrations exceeding the applicable Yukon Contaminated Sites Regulation (YT CSR) residential (RL) standards. Chromium (VI) was below the detection limit in the three samples analyzed. Concentrations of other metals were below the YT CSR RL standards in each of the samples;
- The Limited HHERA was based on results from 10 (+1 duplicate) soil samples which included the 8 (+1 duplicate) collected in 2021 and 2 collected during an investigation carried out in 2019;
- Total chromium (total), chromium (VI) and chromium (III) (calculated as total chromium minus chromium (VI)) were evaluated in the receptor-specific contaminant of potential concern (COPC) screening. Chromium (total) was identified as a COPC for protection of drinking water for human health, and chromium (III) was identified as a COPC for protection of groundwater to freshwater surface water used by aquatic life;
- Groundwater at the site is not expected to be used as drinking water and the drinking water pathway was considered incomplete and no risks were identified;
- Although chromium (III) exceeded the YT CSR standard for the protection of groundwater to freshwater surface water, a review of the physicochemical properties of chromium (III) and reference to the recently updated British Columbia Contaminated Sites Regulation (BC CSR) chromium (III) standard for this pathway, resulted in a conclusion that the exposure was expected to be insignificant, and no risks were identified; and

• Overall, no complete and significant pathways were identified and the Limited HHERA concluded that risks to human and environmental receptors related to chromium in site soil are expected to be acceptable under the conditions evaluated.

1.0 BACKGROUND AND OBJECTIVES

SLR was contracted to conduct soil sampling for the purpose of determining if soil chromium concentrations measured in excess of the YT CSR soil standards for residential lands present unacceptable risk. SLR understands that the Community Services Department wishes to complete this assessment prior to divestiture of the site for residential use.

Elevated chromium concentrations previously identified in soil samples collected from the site in 2019¹ were presumed to be related to natural background concentrations in the area or to fill material that contained elevated background concentrations.

2.0 SCOPE OF WORK

In May 2021, SLR undertook the following sampling activities in support of the Limited HHERA:

- Collected 8 (+1 duplicate) surface soil samples using a hand trowel from randomly selected locations across the site;
- Submitted the 8 (+1 duplicate) samples to Bureau Veritas Laboratories (BVL) for analysis of total metals to better understand site-wide metal concentrations in the fill material;
- Based on the total metal results, selected 3 samples for hexavalent chromium (Cr VI) analysis; and
- Compiled and compared soil analytical results to applicable YT CSR soil standards.

SLR then conducted the following tasks as part of the Limited HHERA:

- Reviewed background information;
- Conducted a receptor-specific screening which compared soil chromium concentrations to the human and environmental YT CSR standards;
- Identified potential human and environmental receptors of concern and evaluated potential exposure pathways;
- Developed a conceptual site model (CSM) which detailed our understanding of chromium contamination, fate and transport mechanisms, receptors of concern and exposure pathways;
- Made conclusions on potential risk; and
- Reviewed uncertainties associated with the Limited HHERA.

3.0 REGULATORY STANDARDS

The site is currently owned by the Yukon Government and is therefore under jurisdiction of Yukon Territory Acts and Regulations thus, Yukon CSR standards were applied to assess site data. The YT CSR establishes clean-up standards, processes for identifying, investigating, and assessing contaminated sites, and permits for managing contaminated material within the Yukon. Work at contaminated sites in Yukon is subject to the YT CSR and the protocols established under it.

¹ Phase I and Limited Phase II Environmental Site Assessment. Lot 12, Block 14, Government Reserve Addition, 8395 CLSR, Dawson City, Yukon. Golder Associates. 30 April 2020

For the purposes of this assessment, the YT CSR Generic Numerical Soil Standards (Schedule 1) and Matrix Numerical Soil Standards (Schedule 2) for residential land use (RL) have been used to evaluate soil analytical results. The Schedule 2 soil standards are comprised of various site-specific factors derived to be protective of human health and the environment. The following site-specific factors are applicable to the site:

Human Health Protection

- Intake of Contaminated Soil; and
- Groundwater Used for Drinking Water²

Environmental Protection

- Toxicity to Soil Invertebrates and Plants; and
- Groundwater Flow to Surface Water Used by Aquatic Life (Freshwater)

4.0 SOIL SAMPLING AND ASSESSMENT

On May 17, 2021, 8 (+1 duplicate) soil samples were collected from site at 5 to 10 cm depths (Drawing 1). Samples were collected in laboratory prepared jars and stored in a cooler with ice. The samples were submitted to Bureau Veritas Laboratories (BVL) to be analyzed for total metals.

Detectable concentrations of metals were found in all nine samples but only one sample (TURNER-SS4) contained total chromium at a concentration that exceeded applicable YT CSR soil standards. Based on the results, the three samples with the highest total chromium results (TURNER-SS3, TURNER-SS4, and TURNER-SS5) were selected for chromium (VI) analysis. Chromium (VI) concentrations were below the detection limit.

It is of note that chromium (VI) was not analyzed in each of the samples, including those collected in 2019 which contained the highest total chromium concentrations measured at the site. However, based on the fact that chromium (VI) was less than the analytical detection in the three samples analyzed, it is unlikely that it is present in other samples collected from the site.

The analytical results are presented in Table A (following the text) along with the sample results from 2019. The sampling locations and results are presented on Drawing 1 and the laboratory Certificate of Analysis is provided in Appendix A.

5.0 LIMITED HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

The following sections present the methods and results of the evaluation of potential human health and ecological/environmental risks associated with exposure to chromium in surface soil. The site setting and analytical dataset are described as are the manners by which the contaminants of potential concern (COPCs), receptors of concern and potential exposure pathways were evaluated. This information was used to develop the conceptual site model which formed the basis of evaluating potential risk associated with chromium at the site.

5.1 SITE SETTING

The site is a rectangular parcel of land approximately 464.36 m² in size. It is generally flat and is currently vacant (Photo 1). It is in a residential area and Turner Street is to the northeast. Groundwater at the site is not expected to be used as a potable water source as municipal water services the area. The confluence of the Klondike and Yukon Rivers is located 110 m west of the site.

² Although drinking water standards may be applicable at the site, it is unlikely groundwater will be used for this purpose due to the availability of a municipal water supply.

5.2 DATASET

The soil dataset consisted of 10 soil samples (+1 duplicate) collected from the top 10 cm of soil in 2019 and 2021. The results are presented in attached Table 1.

5.3 CONTAMINANTS OF POTENTIAL CONCERN

Chemicals with concentrations above standards were identified as contaminants of potential concern (COPCs) since adverse effects may result from exposure above these levels. Chemicals with concentrations below standards are not expected to be associated with potential adverse effects and were eliminated from further consideration. For this Limited HHERA, maximum measured site soil concentrations and the site-specific YT CSR standards were used to identify COPCs. Specifically, receptor-specific (i.e., human or environmental) standards were used to identify receptor-specific COPCs. If no standard was available, the parameter was not retained as a COPC.

As stated in Section 4.0, total chromium was the only parameter measured in site soils at concentrations greater than YT CSR RL standards. However, since the CSR Schedule 2 standards have been developed for various oxidation states (i.e., chromium (VI), chromium (III)) as well as total chromium, the COPC screening was completed accordingly.

Although analytical results were available for total chromium and chromium (VI), chromium (III) was not specifically analyzed. For this assessment, it has been assumed that the chromium (III) concentration in a given sample can be calculated as the total chromium concentration minus the chromium (VI) concentration³. Since chromium (VI) concentrations were less than the analytical detection limit, the chromium (III) concentrations were assumed to equivalent to the total chromium concentrations.

Standards and results specific to each of the chromium parameters (i.e., chromium (III), (VI) and total) are presented in Table 2 below.

		Human Health	RL Standards		Environmer	ntal RL Standards			
COPC	Maximum Concentration (mg/kg)	Intake of Contaminated Soil Water		Human Health COPC?	Toxicity to Soil Invertebrates and Plants	Groundwater Flow to Freshwater Surface Water Used by Aquatic Life	Environmental COPC?		
Chromium (Total)	109	ns	60	Yes	300	ns	No		
Chromium (III)	109*	ns	ns	No	ns	65	Yes		
Chromium (VI)	<0.08	100	ns	No	ns	60	No		

Table 1: COPC Screening

Notes:

RL – Residential Land Use

mg/kg – milligram per kilogram

< - less than analytical detection limit indicated.

*Calculated concentration.

ns – no standard

³ This is approach is based on the Trivalent Chromium in Solids calculation method described in the British Columbia Environmental Laboratory Manual. 2020 Edition.

The maximum concentration of total chromium exceeded the human health standard for groundwater used for drinking water and was retained as a COPC for this exposure pathway. Since human health standards are not available for chromium (III) and the maximum concentration of chromium (VI) is well below the intake of contaminated soil standard, neither of these parameters were retained for the protection of human health.

The maximum concentrations of total chromium and chromium (VI) were below standards protective of soil invertebrate and plants and groundwater flow to surface water used by freshwater aquatic life. Therefore, total chromium and chromium (VI) were both dismissed as COPCs. The maximum calculated concentration of chromium (III) was greater than the YT CSR Schedule 2 standard for groundwater flow to freshwater surface water used by aquatic life and was retained as a COPC.

5.4 RECEPTORS OF CONCERN

Human and environmental receptors using the site and potentially exposed to residual contamination across the site were identified based on current and expected future land uses.

HUMAN RECEPTORS

As the site is currently vacant and access is unrestricted, trespassers may visit the site. These individuals are not expected to spend extended periods of time on the property but would come into direct contact with site soils.

An overhead powerline historically ran over the site but has since been relocated off-site. Maintenance on this utility may be required at some point in the future and utility workers may need to access the site to do so. Although the time on the site would be limited, direct contact with site soils may occur.

It is SLR's understanding that the site will be redeveloped as a residential property. Future residents are expected to have full access to the site and have the potential to be exposed to contaminants through direct contact with soils.

Since municipal water is supplied to the area, groundwater is not currently being used for drinking water nor is expected to be in the future. Therefore, people relying on groundwater as a potable water source in the area were not considered to be receptors of concern.

ENVIRONMENTAL RECEPTORS

Under current conditions, the site is more than 50 m² of undeveloped land which and is considered potential terrestrial habitat⁴. Potential terrestrial environmental receptors include soil invertebrates, plants and small mammals (e.g. squirrels). Each of these receptors would have direct contact with site soils. As the site is located within an urban setting, large wildlife receptors are unlikely to use the site. Based on the urban location of the site and disturbed nature (Photo 1), the site is unlikely to provide habitat for terrestrial species at risk.

Although no surface water bodies were identified on the site, the Klondike River, which flows into the Yukon River, is located 110 metres west of the site. The Klondike and Yukon Rivers provide habitat for fish, aquatic invertebrates, and aquatic dependent wildlife. A search of GeoYukon mapping indicated occurrences of species of conservation concern in the nearby Yukon River (Appendix B). Various aquatic species (including plants, invertebrates, fish, wildlife) are considered environmental receptors of concern with the potential to contact groundwater discharging to the river.

⁴ British Columbia Ministry of Environment and Climate Change Strategy. Protocol 13 for Contaminated Sites. Screening Level Risk Assessment. Version 5.0. May 13, 2021. *per* Environment Yukon. Protocol for the Contaminated Sites Regulation under the Environment Act. Protocol no.12: Risk Assessment Methods. December 20, 2017.

5.5 EXPOSURE PATHWAY ASSESSMENT

Exposure pathways describe the movement of contaminants from sources, such as soil or groundwater, to potential human or ecological receptors. A COPC only presents a potential risk to a receptor if an exposure pathway exists (or is likely to exist) and if the exposure leads to a dose of concern (Health Canada, 2012). Pathways are considered incomplete if there are no COPCs or no contact with the impacted media and insignificant if there are COPCs, but the exposure is limited or infrequent. The following sections evaluate potential exposure pathways for both human and environmental receptor of concern.

HUMAN EXPOSURE PATHWAYS

The maximum concentration of total chromium exceeded the groundwater use for drinking water standard and total chromium was retained as a COPC. However, as discussed in Section 5.1.4, groundwater at the site is not expected to be used for drinking water and, although groundwater quality has not been characterized at the site, this pathway is considered incomplete.

Chromium (VI) concentrations were below the standard protective of human intake of contaminated soil. Consequently, direct exposure pathways between chromium (VI) and human receptors are incomplete as results were all less than detection limit.

Under the YT CSR, there are no human intake of contaminated soil standards listed for total chromium or chromium (III). The value listed for total chromium in Part 1 of Schedule 3.1 of the British Columbia Contaminated Sites Regulation (BC CSR) (updated February 2021) is 100 mg/kg. Although total chromium was measured at a concentration (109 mg/kg) greater than this standard in a single sample (10161-02 collected in 2019), overall exposure by human receptors is expected to be insignificant based on the following factors:

- A second sample (Turner-SS1) was collected in the immediate vicinity of 10161-02 in 2021. The concentration of total chromium in this sample, 40.5 mg/kg, was well below the standard suggesting the impacts at 10161-02 are limited in extent; and
- Reliance on a maximum concentration as a metric to evaluate potential exposure tends to be
 overly conservative. Therefore, a YT acceptable statistical approach was taken to determine a
 more reasonable, yet still conservative, site wide exposure concentration by which to screen
 human exposure. A 95% Upper Confidence Limit of the Mean (UCLM) concentration⁵ was
 generated from the total chromium data, resulting in a value of 68 mg/kg. Based on this
 concentration, human exposure to total chromium on the site is expected to be insignificant.

ENVIRONMENTAL EXPOSURE PATHWAYS

The maximum concentration of total chromium was less than the standard protective of soil invertebrates and plants and total chromium was not retained as a COPC for these receptors. Therefore, an incomplete exposure pathway was identified.

Since the soil invertebrate and plant standard is not necessarily protective of small mammals, the maximum site concentration of total chromium was compared to the Ontario Ministry of Environment⁶ RL standard protective of mammals and birds (160 mg/kg). Since the maximum site concentration is well below this

⁵ Statistics were calculated using US EPA ProUCL Version 5.1 software. Per the recommendation of CCME (2016), the non-parametric Bias-Corrected Accelerated Bootstrap (BCA) UCLM method results were relied upon. For samples with duplicate data, the higher of the parent and duplicate results was retained in the dataset. Results are presented in Appendix C.

⁶ Standards Development Branch. Ontario Ministry of the Environment. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15, 2011.

standard, an incomplete exposure pathway was identified for small mammals that may be present on the site.

The maximum concentration of chromium (VI) was less than the standard protective of groundwater flow to freshwater aquatic life. Since chromium (VI) was dismissed as a COPC for these receptors, an incomplete exposure pathway was identified.

The maximum assumed concentration of chromium (III) exceeded the YT CSR Schedule 2 soil standard for groundwater flow to freshwater aquatic life and thus, chromium (III) was identified as a COPC. The YT CSR chromium (III) standard for this pathway is 65 mg/kg, the exact derivation methods used by YT are not known although it is presumed they were based on historic BC CSR standards. By contrast, the equivalent current standard listed in Part 1 of Schedule 3.1 of the BC CSR is 300,000 mg/kg. Review of the derivation methods for the BC CSR standards⁷ identify the following:

- 1) The soil standards have been developed to protect groundwater flow to surface water used by aquatic life have been derived using methods "to ensure the substance concentrations in groundwater discharging and in contact with the receptors are less than or equal to the substance specific numerical water standards for the water use associated with the respective receptor". The BC CSR Schedule 3.2 water standards for the protection of aquatic life are 90 µg/L and 10 µg/L for chromium (III) and chromium (VI), respectively. It is of note that the YT CSR Schedule 3 water standards are the same as those listed by BC; and
- 2) The physiochemical properties, specifically the distribution coefficients $(K_d)^8$, of chromium (VI) and (III) are significantly different. At the soil pH (6.5) upon which the BC standards were derived, the Kd of chromium (VI) is 20 L/kg while that for chromium (III) is 990,000 L/kg. As such, chromium (III) release from the soil matrix and subsequently migration to the aquatic receiving environment is expected to be significantly lower than that of chromium (VI).

Based on these two items, it is expected that the more current BC CSR chromium (III) soil standard of 300,000 mg/kg for the protection of groundwater flow to freshwater aquatic life is adequately protective, and the exposure pathway between chromium (III) in site soil and the downgradient aquatic life receptors is insignificant.

5.6 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) combines information regarding the presumed source of impacts, chemicals of concern, potential receptors and exposure pathways into an overall summary of potential site-related exposures.

The conceptual site model for human and environmental receptors presented in Drawing 2 illustrates the following:

- Exposure pathways considered to be complete and identified for further evaluation in the risk assessment; and
- Exposure pathways considered to be inoperable or insignificant and further evaluation is not required.

⁷ British Columbia Ministry of Environment and Climate Change Strategy. Protocol 28 for Contaminated Sites. 2016 Standard Derivation Methods. Version 2.0. February 1, 2021.

⁸ The distribution coefficient is a measure of the amount of substance adsorbed to onto soil per amount of water. Higher values indicate greater adsorption and lower mobility within the soil matrix.

As indicated in Drawing 2, none of the pathways evaluated in this Limited HHERA were found to be complete, thus risks associated with chromium in soil are not expected.

5.7 UNCERTAINTY ANALYSIS

Uncertainty is inherent in all the stages of the risk assessment that include site characterization, COPC screening, receptor identification and exposure pathway evaluations. Overall, the uncertainty associated with the findings of the Limited HHERA is low and the confidence in the findings are high. The uncertainties relating to this limited HHERA are presented in Table 3.

HHERA Component	Assumptions	Uncertainty	Discussion
	Soil data are representative of current site conditions.	Low	Even though the elevated concentrations were not delineated, no Areas of Potential Environmental Concern (APECs) were identified, and it was presumed that the chromium results were related to background conditions (either at the site or in fill). In general, soil samples were collected from areas known or suspected to be impacted (biased sampling). It is unlikely that the available results do not adequately represent soil quality at the site or that contaminants were omitted from inclusion in the risk assessment.
Site Characterization	Chromium (VI) speciation was completed on 3 samples as part of the additional soil characterization activities (2021). Concentrations were below the analytical detection limit. It is assumed these results are representative of chromium (VI) concentrations in other site samples.	Low	The principal source of chromium (VI) in the environment is anthropogenic pollution and it rarely occurs naturally (CCME, 1999). ⁹ Since the Phase I did not identify any APECs at the site and noted that the elevated chromium may have been related to either natural background in the area or possible fill material with elevated background concentrations from to the source bedrock, it is unlikely that other soil samples collected from the site contained elevated concentrations of chromium (VI) and that risks were underestimated.
	Soil screening for groundwater pathways is adequate and groundwater sampling is not needed	Low	As indicated in Section 5.5, soil concentrations are well below standards protective of groundwater flow to surface water supporting aquatic life and groundwater in the area is not, and will not be, used for potable water. Therefore, the lack of groundwater data is not expected to have led to an underestimate of risk.

Table 2:Uncertainties

⁹ Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Chromium. 1999.

HHERA Component	Assumptions	Uncertainty	Discussion
Receptor of Concern Selection	Human and environmental receptors of concern are representative of those expected to use the site were selected based on current and likely future exposure scenarios.	Low	Based on SLR's understanding, the site is expected to be redeveloped into a residential property. It is unlikely that any receptors were inadvertently omitted from the HHERA. However, future site development specifics such as how much of the site will be covered or accessible is uncertain. This uncertainty is unlikely to affect the outcome of this limited HHERA.
	Groundwater from the site will not be used as potable water.	Low	As the potable water is assumed to be supplied by municipal water distribution, it is highly unlikely that groundwater at the site will be used as a potable water source.
Exposure Pathway Evaluation	BC and Ontario standards are adequately protective	Low	The Yukon CSR is understood to have been based on the BC CSR. The BC CSR standards were updated in 2021 using the current science and risk assessment approaches. The Ontario standards are also developed and updated using a rigorous scientific process. Consequently, it is unlikely that reliance on these standards in this HHERA has led to an underestimate of risk.

6.0 CONCLUSIONS

Based on the available information and under the conditions evaluated, risks to human and environmental receptors related to chromium in site soil are expected to be acceptable.

7.0 STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Community Services, of the Rural Land Development, Land Development Branch of the Yukon Government, hereafter referred to as the "Client". It is intended for the sole and exclusive use of Community Services of the Rural Land Development, Land Development Branch of the Yukon Government. Other than by the Client and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted unless payment for the work has been made in full and express written permission has been obtained from SLR.

This report has been prepared for specific application to this site and conditions existing at the time work for the report was completed. Any conclusions or recommendations made in this report reflect SLR's professional opinion based on limited investigations including: visual observation of the site, surface and subsurface investigation at discrete locations and depths, and laboratory analysis of specific chemical parameters. The results cannot be extended to previous or future site conditions, portions of the site that were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters and materials that were not addressed. Substances other than those addressed by the investigation may exist within the site; and substances addressed by the investigation may exist in areas of the site not investigated in concentrations that differ from those reported. SLR does not warranty information from third party sources used in the development of investigations and subsequent reporting.

Nothing in this report is intended to constitute or provide a legal opinion. SLR expresses no warranty to the accuracy of laboratory methodologies and analytical results. SLR expresses no warranty with respect to the toxicity data presented in various references or the validity of toxicity studies on which it was based.

Scientific models employed in the evaluations were selected based on accepted scientific methodologies and practices in common use at the time and are subject to the uncertainties on which they are based.

SLR makes no representation as to the requirements of compliance with environmental laws, rules, regulations or policies established by federal, provincial or local government bodies. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

The Client may submit this report to the Yukon Environment and/or related Yukon environmental regulatory authorities or persons for review and comment purposes.

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8.0 CLOSURE

We trust the information satisfies your needs. Please contact the undersigned if you have any questions.

Yours sincerely, SLR Consulting (Canada) Ltd.

Carly Tateson Environmental Scientist 867 689 4601 ctateson@slrconsulting.com

Enc. Table A Drawings 1 and 2 Photo 1 Appendix A - Analytical Lab Report Appendix B – GeoYukon Map Appendix C – Chromium Statistics

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SLR

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Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment

Community Services | Rural Land Development, Land Development Branch Yukon Government Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT SLR Project No.: 234.30005.00000



	Physioch	emical																м	letals																		
TABLE A: SOIL - METALS	Moisture	pH (lab)	aluminum	antimony	arsenic	barium	beryllium	bismuth	boron	cadmium	calcium	chromium (III+VI)	chromium (VI)	cobalt	copper	iron	lead	lithium	magnesium	manganese	mercury	molybdenum	nickel	phosphorus	potassium	selenium	silver	sodium	strontium	thallium	tin	titanium	tungsten	uranium	vanadium	zinc	zirconium
	%	pH Units	μg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	μg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
Reported Detection Limit	0.3		100	0.1	0.2	0.1	0.2	0.1	1	0.05	100	0.5	0.08	0.1	0.5	100	0.1	0.5	100	0.2	0.05	0.1	0.5	10	100	0.5	0.05	100	0.1	0.05	0.1	1	0.5	0.05	1	1	0.5
Yukon CSR Schedule 1 PL/RL				20		500	4							50								10	100			3	20				50				200		
Yukon CSR Schedule 2 PL/RL - GW flow to fresh SW used by aquatic life					20					2 - 150 *			60		90 - 30000 *		150 - 40000 *																		1	50 - 3000 '	
Yukon CSR Schedule 2 PL/RL - GW used for drinking water					15				1	L.5 - 1000 *		60			250 - 350000 *		100 - 4000 *																		1	50 - 15000	*
Yukon CSR Schedule 2 PL/RL - Intake of contam soil					100					3			100		15000		500				15															10000	
Yukon CSR Schedule 2 PL/RL - Tox to soil inverts and plants					50					70		300			150		1000				100															450	

Sample Depth Range Field ID Location Code Sample Date (m) 10161-02 10161-02 2019-Oct-25 0.05 - 109 -10161-03 10161-03 2019-Oct-25 0.05 82.9 SS1 TURNER-SS1 2021-May-17 0.05-0.1 7.79 13,700 1.01 12.5 403 0.49 0.16 2.1 0.187 7380 40.5 - 11.4 33.3 27,300 16.1 12.5 6770 481 0.092 1.64 42 708 595 2021-May-17 0.05-0.1 7.74 12,600 1.15 11.4 366 0.46 0.18 3.4 0.326 8140 43.4 - 11 24,300 13.1 7070 444 0.161 1.3 42.9 733 658 SS2 TURNER-SS2 33.1 53.3
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 SS3 TURNER-SS3 12.2 6830 416 0.114 1.18 43.9 800 651 15 28.3 24.300 23.2 11.3 7970 390 <0.05 0.82 46 727 476 SS4 TURNER-SS4 19 26.4 22,700 8.16 8.03 13,600 1.03 11.2 370 0.45 0.15 2.1 0.226 8430 49.8 - 11.5 19.3 12.6 7970 443 0.112 1.3 49.4 649 486 0 **SS5** TURNER-DUP-A 34.7 25,800 2021-May-17 0.05-0.1 TURNER-SS5 13
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Standards / Guidelines Descriptions:

• Yukon CSR Schedule 1 PL/RL:Yukon Contaminated Sites Regulation Schedule 1 Generic Numerical Soil Standards, Park/Residential (September 2002)

• Yukon CSR Schedule 2 PL/RL - GW flow to fresh SW used by aquatic life:Yukon Contaminated Sites Regulation Schedule 2 Matrix Numerical Soil Standards, Groundwater flow to surface water used by freshwater aquatic life - Park/Residential (September 2002)

Yukon CSR Schedule 2 PL/RL - GW used for drinking water: Yukon Contaminated Sites Regulation Schedule 2 Matrix Numerical Soil Standards, Groundwater used for drinking water - Park/Residential (September 2002)

• Yukon CSR Sched 2 PL/RL - Intake of contam soil:Yukon Contaminated Sites Regulation Schedule 2 Matrix Numerical Soil Standards, Intake of contaminated soil - Park/Residential (September 2002)

Yukon CSR Schedule 2 PL/RL - Tox to soil inverts and plants: Yukon Contaminated Sites Regulation Schedule 2 Matrix Numerical Soil Standards, Toxicity to soil invertebrates and plants - Park/Residential (September 2002)

Notes:	*)	/ukon CSR pH-Dependent S	tandards	
m - metres	Cd - DW	Cu - DW	Pb - DW	Zn - DW
mbg - metres below grade	1.5 @ pH < 6.5	250 @ pH < 5.0	100 @ pH < 6	6.C 150 @ pH < 5.0
< - less than reported detection limit	3 @ pH 6.5< 7.0	400 @ pH 5.0<5.5	250 @ pH 6.0	0< 200 @ pH 5.0<5.5
'-' - sample not analyzed for parameter indicated	15 @ pH 7.0<7.5	1,500 @ pH 5.5<6.0	4,000 @ pH	≥€300 @ pH 5.5<6.0
 formatting of cells indicates exceedances of like-formatted standards 	200 @ pH 7.5<8.0	15,000 @ pH 6.0<6.5		1,000 @ pH 6.0<6.5
 where many exceedance formats are used, highlighted results reflect the least stringent standard/guideline 	1,000 @ pH≥8.0	350,000 @ pH ≥ 6.5		7,500 @ pH 6.5<7.0
exceeded				15,000 @ pH ≥ 7.0
samples collected from the same location, date and depth interval are blind field duplicate / parent sample				
pairs	Cd - AWF	Cu - AWF	Pb - AWF	Zn - AWF
 laboratory analytical reports detail detection limits, testing protocols and QA/QC procedures 	2 @ pH < 7.0	90 @ pH < 5.0	150 @ pH < !	5.5 150 @ pH < 6.0
** Chromium (III) was calculated on the assumption that chromium (total) is comprised only of chromium (VI) and chromium (III)	2.5 @ pH 7.0<7.5	100 @ pH 5.0<5.5	250 @ pH 5.	5< 300 @ pH 6.0<6.5
	25 @ pH 7.5<8.0	200 @ pH 5.5<6.0	2,000 @ pH	6.(1,500 @ pH 6.5<7.0
	150 @ pH ≥ 8.0	1,500 @ pH 6.0<6.5	40,000 @ pH	l ≥ 3,000 @ pH ≥ 7.0
		30,000 @ pH ≥ 6.5		



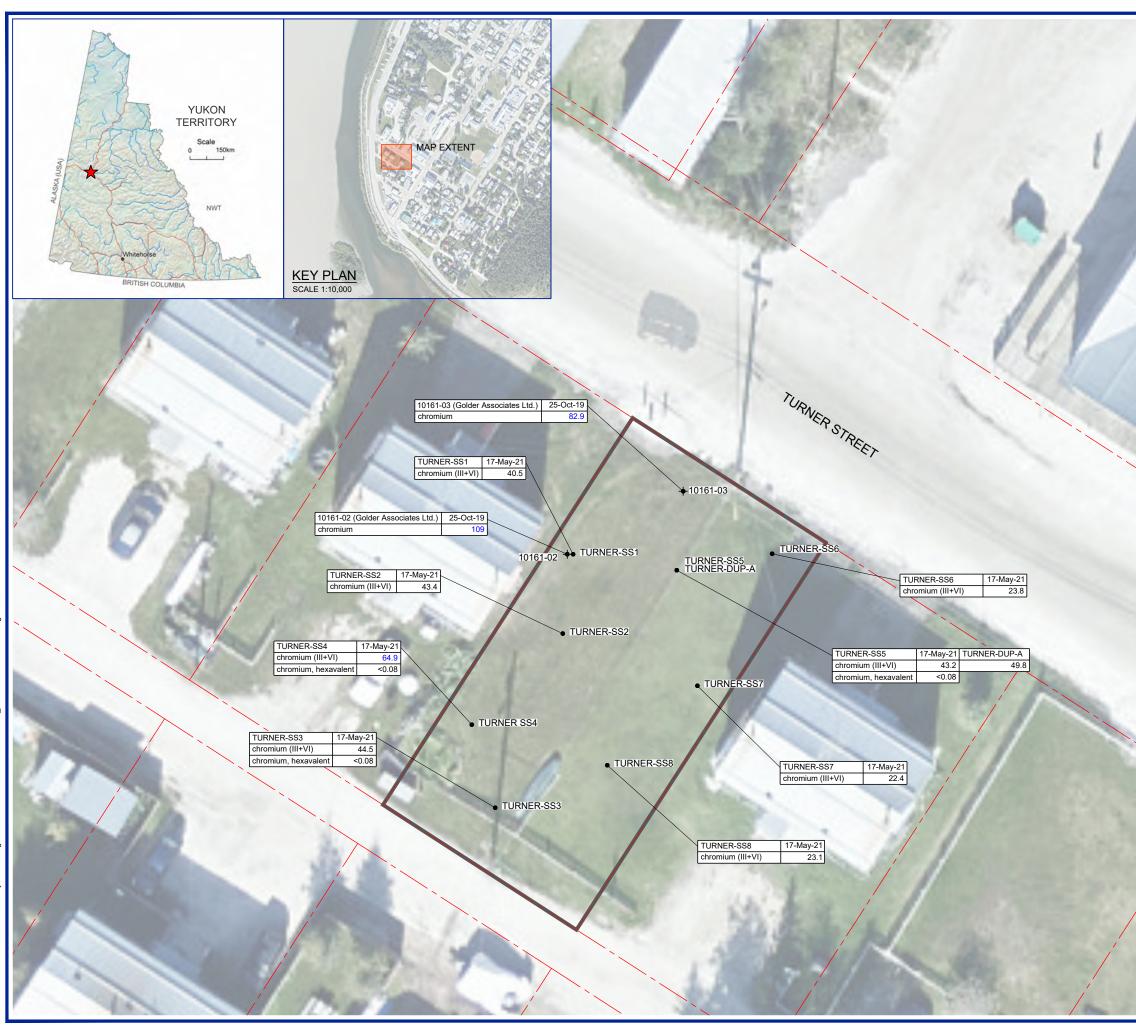
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
0.75	0.176	193	42.5	0.067	0.56	475	<0.5	1.47	51.5	76.1	3.79
0.7	0.245	180	44.3	0.071	1.84	405	<0.5	1.34	47.1	130	2.5
<0.5	0.134	143	29.8	0.065	0.86	414	<0.5	0.903	46.8	76.6	2.97
<0.5	0.111	144	34	<0.05	0.38	386	<0.5	1.2	50.9	54.5	1.29
0.65	0.162	183	42.5	0.069	1.04	386	<0.5	1.35	50.6	115	2.66
0.68	0.16	180	40.6	0.067	1.53	386	<0.5	1.31	46	99.2	2.48
0.82	0.174	149	34.7	0.078	0.58	327	<0.5	1.3	40.2	96.7	1.87
0.88	0.138	183	37.4	0.064	0.32	443	<0.5	1.18	42.8	75.7	2.81
1.21	0.168	192	39.5	0.076	0.34	443	<0.5	1.53	44.9	77	2.75



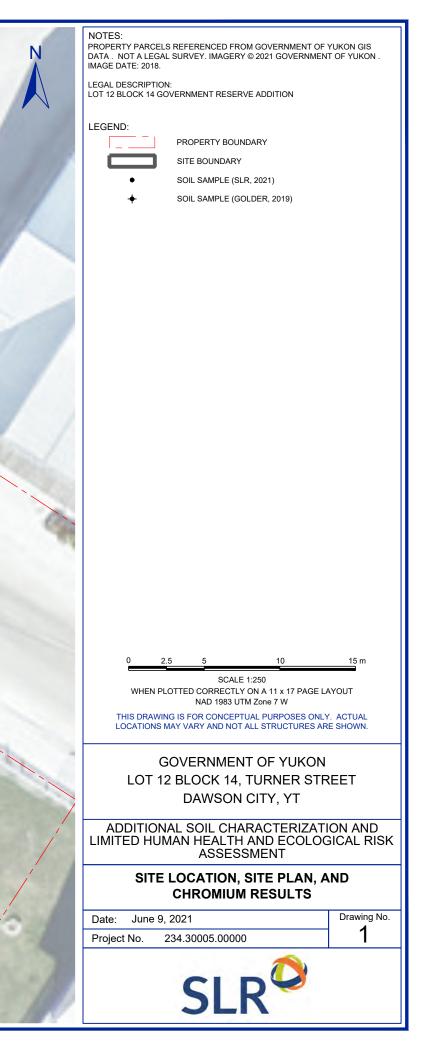
Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment

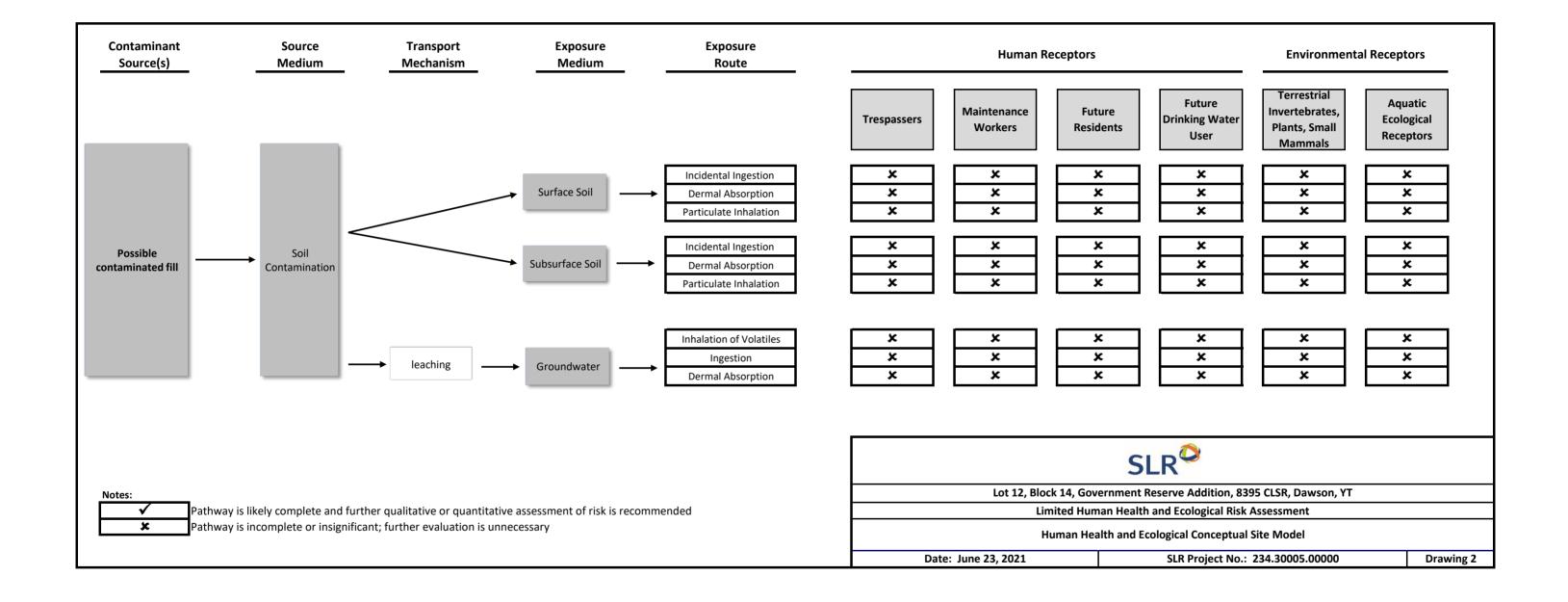
Community Services | Rural Land Development, Land Development Branch Yukon Government Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT SLR Project No.: 234.30005.00000





Cadfile name: N1Vancouver/CAD/Project Drawinds/234/234.30005/234.30005.00000\S_234.30005-00000-A1.dwc







Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment

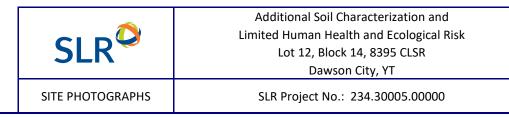
Community Services | Rural Land Development, Land Development Branch Yukon Government Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT SLR

Project No.: 234.30005.00000





Photo 1: Looking southwest at site from Turner Street.



Appendix A Analytical Lab Report

Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment

Community Services | Rural Land Development, Land Development Branch Yukon Government Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT SLR Project No.: 234.30005.00000

SLR



Your P.O. #: WHR41 Your Project #: 234.30005 Site Location: TURNER STREET Your C.O.C. #: 631899-03-01

Attention: Carly Tateson

SLR CONSULTING (CANADA) LTD 6131 6th Avenue Whitehorse, YT CANADA Y1A 1N2

> Report Date: 2021/06/04 Report #: R3028410 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C134286 Received: 2021/05/20, 16:50

Sample Matrix: Soil # Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Hexavalent Chromium (1, 2)	3	2021/06/03	2021/06/03	AB SOP-00063	SM 23 3500-Cr B m
Elements by ICPMS (total)	9	2021/05/26	2021/05/26	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture (1)	3	N/A	2021/06/02	AB SOP-00002	CCME PHC-CWS m
pH (2:1 DI Water Extract)	9	2021/05/26	2021/05/26	BBY6SOP-00028	BCMOE BCLM Mar2005 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Calgary Environmental

(2) Some soil samples may react with the Cr(VI) spike reducing it to Cr(III). These samples are highly unlikely to contain native hexavalent chromium. Thus a failed spike recovery does not invalidate a negative result on the native sample.



Your P.O. #: WHR41 Your Project #: 234.30005 Site Location: TURNER STREET Your C.O.C. #: 631899-03-01

Attention: Carly Tateson

SLR CONSULTING (CANADA) LTD 6131 6th Avenue Whitehorse, YT CANADA Y1A 1N2

> Report Date: 2021/06/04 Report #: R3028410 Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C134286 Received: 2021/05/20, 16:50

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager. Nahed Amer, Customer Solutions Representative Email: Nahed.AMER@bureauveritas.com Phone# (604) 734 7276

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF CHEMICAL ANALYSES OF SOIL

BV Labs ID		ZV4896	ZV4897	ZV4898		
Sampling Date		2021/05/17 20:25	2021/05/17 20:30	2021/05/17 20:50		
COC Number		631899-03-01	631899-03-01	631899-03-01		
	UNITS	TURNER-SS3	TURNER-SS4	TURNER-SS5	RDL	QC Batch
Elements	UNITS	TURNER-SS3	TURNER-SS4	TURNER-SS5	RDL	QC Batch
Elements Hex. Chromium (Cr 6+)	UNITS mg/kg		TURNER-SS4	TURNER-SS5 <0.080	RDL 0.080	QC Batch



PHYSICAL TESTING (SOIL)

BV Labs ID		ZV4896	ZV4897		ZV4898		
Sampling Date		2021/05/17 20:25	2021/05/17 20:30		2021/05/17 20:50		
COC Number		631899-03-01	631899-03-01		631899-03-01		
	UNITS	TURNER-SS3	TURNER-SS4	QC Batch	TURNER-SS5	RDL	QC Batch
Physical Properties							
Physical Properties Moisture	%	15	19	A241847	13	0.30	A241848



CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		ZV4894	ZV4895	ZV4896	ZV4897	ZV4898	ZV4899		
Sampling Date		2021/05/17	2021/05/17	2021/05/17	2021/05/17	2021/05/17	2021/05/17		
		20:15	20:20	20:25	20:30	20:50	20:45		
COC Number		631899-03-01	631899-03-01	631899-03-01	631899-03-01	631899-03-01	631899-03-01		
	UNITS	TURNER-SS1	TURNER-SS2	TURNER-SS3	TURNER-SS4	TURNER-SS5	TURNER-SS6	RDL	QC Batch
Physical Properties									
Soluble (2:1) pH	рН	7.79	7.74	7.24	6.44	7.98	7.29	N/A	A235257
Total Metals by ICPMS		•	•			•	•		
Total Aluminum (Al)	mg/kg	13700	12600	12800	14100	12100	9940	100	A235254
Total Antimony (Sb)	mg/kg	1.01	1.15	0.98	0.68	1.89	1.13	0.10	A235254
Total Arsenic (As)	mg/kg	12.5	11.4	10.7	7.96	10.6	12.8	0.20	A235254
Total Barium (Ba)	mg/kg	403	366	296	335	352	363	0.10	A235254
Total Beryllium (Be)	mg/kg	0.49	0.46	0.44	0.38	0.44	0.42	0.20	A235254
Total Bismuth (Bi)	mg/kg	0.16	0.18	0.15	0.12	0.15	0.17	0.10	A235254
Total Boron (B)	mg/kg	2.1	3.4	2.0	1.6	2.4	2.4	1.0	A235254
Total Cadmium (Cd)	mg/kg	0.187	0.326	0.169	0.158	0.225	0.311	0.050	A235254
Total Calcium (Ca)	mg/kg	7380	8140	5210	5620	8050	5760	100	A235254
Total Chromium (Cr)	mg/kg	40.5	43.4	44.5	64.9	43.2	23.8	0.50	A235254
Total Cobalt (Co)	mg/kg	11.4	11.0	11.2	10.2	10.3	9.49	0.10	A235254
Total Copper (Cu)	mg/kg	33.3	33.1	28.3	26.4	33.3	29.0	0.50	A235254
Total Iron (Fe)	mg/kg	27300	24300	24300	22700	23600	22700	100	A235254
Total Lead (Pb)	mg/kg	16.1	53.3	23.2	8.16	22.5	16.8	0.10	A235254
Total Lithium (Li)	mg/kg	12.5	13.1	12.2	11.3	12.0	12.6	0.50	A235254
Total Magnesium (Mg)	mg/kg	6770	7070	6830	7970	6710	5100	100	A235254
Total Manganese (Mn)	mg/kg	481	444	416	390	396	441	0.20	A235254
Total Mercury (Hg)	mg/kg	0.092	0.161	0.114	<0.050	0.137	0.079	0.050	A235254
Total Molybdenum (Mo)	mg/kg	1.64	1.30	1.18	0.82	1.36	1.76	0.10	A235254
Total Nickel (Ni)	mg/kg	42.0	42.9	43.9	46.0	41.2	32.3	0.50	A235254
Total Phosphorus (P)	mg/kg	708	733	800	727	666	798	10	A235254
Total Potassium (K)	mg/kg	595	658	651	476	517	636	100	A235254
Total Selenium (Se)	mg/kg	0.75	0.70	<0.50	<0.50	0.68	0.82	0.50	A235254
Total Silver (Ag)	mg/kg	0.176	0.245	0.134	0.111	0.160	0.174	0.050	A235254
Total Sodium (Na)	mg/kg	193	180	143	144	180	149	100	A235254
Total Strontium (Sr)	mg/kg	42.5	44.3	29.8	34.0	40.6	34.7	0.10	A235254
Total Thallium (Tl)	mg/kg	0.067	0.071	0.065	<0.050	0.067	0.078	0.050	A235254
Total Tin (Sn)	mg/kg	0.56	1.84	0.86	0.38	1.53	0.58	0.10	A235254
RDL = Reportable Detection	Limit								
N/A - Not Applicable									

N/A = Not Applicable



CSR/CCME METALS IN SOIL WITH HG (SOIL)

BV Labs ID		ZV4894	ZV4895	ZV4896	ZV4897	ZV4898	ZV4899		
Sampling Date		2021/05/17	2021/05/17	2021/05/17	2021/05/17	2021/05/17	2021/05/17		
sampling bate		20:15	20:20	20:25	20:30	20:50	20:45		
COC Number		631899-03-01	631899-03-01	631899-03-01	631899-03-01	631899-03-01	631899-03-01		
	UNITS	TURNER-SS1	TURNER-SS2	TURNER-SS3	TURNER-SS4	TURNER-SS5	TURNER-SS6	RDL	QC Batch
Total Titanium (Ti)	mg/kg	475	405	414	386	386	327	1.0	A235254
Total Tungsten (W)	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	A235254
Total Uranium (U)	mg/kg	1.47	1.34	0.903	1.20	1.31	1.30	0.050	A235254
Total Vanadium (V)	mg/kg	51.5	47.1	46.8	50.9	46.0	40.2	1.0	A235254
Total Zinc (Zn)	mg/kg	76.1	130	76.6	54.5	99.2	96.7	1.0	A235254
Total Zirconium (Zr)	mg/kg	3.79	2.50	2.97	1.29	2.48	1.87	0.50	A235254
RDL = Reportable Detectio	n Limit								

Page 6 of 13 Bureau Veritas Laboratories Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386



BV Labs ID ZV4900 ZV4901 ZV4902 2021/05/17 2021/05/17 2021/05/17 Sampling Date 20:40 20:35 20:50 COC Number 631899-03-01 631899-03-01 631899-03-01 UNITS TURNER-SS7 TURNER-SS8 TURNER-DUP-A RDL QC Batch **Physical Properties** Soluble (2:1) pH pН 7.92 7.38 8.03 N/A A235257 Total Metals by ICPMS Total Aluminum (Al) mg/kg 10400 11400 13600 100 A235254 Total Antimony (Sb) 1.03 0.10 A235254 mg/kg 0.91 0.99 Total Arsenic (As) 0.20 A235254 mg/kg 11.4 11.7 11.2 Total Barium (Ba) mg/kg 419 409 370 0.10 A235254 Total Beryllium (Be) 0.45 mg/kg 0.38 0.41 0.20 A235254 Total Bismuth (Bi) mg/kg 0.14 0.16 0.15 0.10 A235254 Total Boron (B) mg/kg 1.9 2.0 2.1 1.0 A235254 Total Cadmium (Cd) mg/kg 0.189 0.129 0.226 0.050 A235254 Total Calcium (Ca) mg/kg 6940 6590 8430 100 A235254 Total Chromium (Cr) mg/kg 22.4 23.1 49.8 0.50 A235254 Total Cobalt (Co) mg/kg 9.25 9.75 11.5 0.10 A235254 Total Copper (Cu) mg/kg 29.6 31.9 34.7 0.50 A235254 Total Iron (Fe) mg/kg 23800 24300 25800 100 A235254 Total Lead (Pb) 8.92 9.93 19.3 0.10 A235254 mg/kg Total Lithium (Li) 10.9 11.7 12.6 0.50 A235254 mg/kg Total Magnesium (Mg) 4990 4970 7970 100 A235254 mg/kg Total Manganese (Mn) 483 443 mg/kg 456 0.20 A235254 Total Mercury (Hg) <0.050 <0.050 0.112 0.050 A235254 mg/kg Total Molybdenum (Mo) mg/kg 2.02 2.28 1.30 A235254 0.10 Total Nickel (Ni) mg/kg 25.9 27.5 49.4 0.50 A235254 Total Phosphorus (P) mg/kg 764 766 649 10 A235254 Total Potassium (K) mg/kg 555 588 486 100 A235254 Total Selenium (Se) mg/kg 0.88 1.21 0.65 0.50 A235254 Total Silver (Ag) mg/kg 0.138 0.168 0.162 0.050 A235254 Total Sodium (Na) mg/kg 183 192 183 100 A235254 Total Strontium (Sr) A235254 mg/kg 37.4 39.5 42.5 0.10 Total Thallium (TI) mg/kg 0.064 0.076 0.069 0.050 A235254 Total Tin (Sn) mg/kg 0.32 0.34 1.04 0.10 A235254 RDL = Reportable Detection Limit N/A = Not Applicable

CSR/CCME METALS IN SOIL WITH HG (SOIL)



BV Labs ID		ZV4900	ZV4901	ZV4902		
Sampling Date		2021/05/17 20:40	2021/05/17 20:35	2021/05/17 20:50		
COC Number		631899-03-01	631899-03-01	631899-03-01		
	UNITS	TURNER-SS7	TURNER-SS8	TURNER-DUP-A	RDL	QC Batch
Total Titanium (Ti)	mg/kg	443	443	386	1.0	A235254
Total Tungsten (W)	mg/kg	<0.50	<0.50	<0.50	0.50	A235254
Total Uranium (U)	mg/kg	1.18	1.53	1.35	0.050	A235254
Total Vanadium (V)	mg/kg	42.8	44.9	50.6	1.0	A235254
Total Zinc (Zn)	mg/kg	75.7	77.0	115	1.0	A235254
Total Zirconium (Zr)	mg/kg	2.81	2.75	2.66	0.50	A235254
RDL = Reportable Detection	Limit					

CSR/CCME METALS IN SOIL WITH HG (SOIL)



GENERAL COMMENTS

Version 2: Report reissued to include results for Chromium VI on below samples as per client request received 2021/05/31. Turner-SS3 Turner-SS4 Turner-SS5

Results relate only to the items tested.



QUALITY ASSURANCE REPORT

SLR CONSULTING (CANADA) LTD Client Project #: 234.30005 Site Location: TURNER STREET Your P.O. #: WHR41 Sampler Initials: CT

			Matrix	Spike	Spiked	Blank	Method	Blank	RPD		QC Sta	indard
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A235254	Total Aluminum (Al)	2021/05/26	NC	75 - 125	102	75 - 125	<100	mg/kg	1.1	40	102	70 - 130
A235254	Total Antimony (Sb)	2021/05/26	88	75 - 125	102	75 - 125	<0.10	mg/kg	NC	30	114	70 - 130
A235254	Total Arsenic (As)	2021/05/26	93	75 - 125	104	75 - 125	<0.20	mg/kg	1.2	30	96	70 - 130
A235254	Total Barium (Ba)	2021/05/26	89	75 - 125	99	75 - 125	<0.10	mg/kg	2.3	40	103	70 - 130
A235254	Total Beryllium (Be)	2021/05/26	82	75 - 125	99	75 - 125	<0.20	mg/kg	NC	30	113	70 - 130
A235254	Total Bismuth (Bi)	2021/05/26	90	75 - 125	102	75 - 125	<0.10	mg/kg	NC	30		
A235254	Total Boron (B)	2021/05/26	86	75 - 125	104	75 - 125	<1.0	mg/kg	NC	30		
A235254	Total Cadmium (Cd)	2021/05/26	92	75 - 125	103	75 - 125	<0.050	mg/kg	NC	30	89	70 - 130
A235254	Total Calcium (Ca)	2021/05/26	125	75 - 125	104	75 - 125	<100	mg/kg	0.58	30	99	70 - 130
A235254	Total Chromium (Cr)	2021/05/26	90	75 - 125	102	75 - 125	<0.50	mg/kg	11	30	104	70 - 130
A235254	Total Cobalt (Co)	2021/05/26	89	75 - 125	101	75 - 125	<0.10	mg/kg	3.5	30	101	70 - 130
A235254	Total Copper (Cu)	2021/05/26	90	75 - 125	101	75 - 125	<0.50	mg/kg	0.54	30	101	70 - 130
A235254	Total Iron (Fe)	2021/05/26	NC	75 - 125	103	75 - 125	<100	mg/kg	6.2	30	105	70 - 130
A235254	Total Lead (Pb)	2021/05/26	89	75 - 125	101	75 - 125	<0.10	mg/kg	13	40	111	70 - 130
A235254	Total Lithium (Li)	2021/05/26	81	75 - 125	98	75 - 125	<0.50	mg/kg	3.9	30	100	70 - 130
A235254	Total Magnesium (Mg)	2021/05/26	NC	75 - 125	106	75 - 125	<100	mg/kg	1.2	30	107	70 - 130
A235254	Total Manganese (Mn)	2021/05/26	82	75 - 125	104	75 - 125	<0.20	mg/kg	3.5	30	108	70 - 130
A235254	Total Mercury (Hg)	2021/05/26	92	75 - 125	103	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
A235254	Total Molybdenum (Mo)	2021/05/26	90	75 - 125	99	75 - 125	<0.10	mg/kg	17	40	107	70 - 130
A235254	Total Nickel (Ni)	2021/05/26	89	75 - 125	101	75 - 125	<0.50	mg/kg	12	30	107	70 - 130
A235254	Total Phosphorus (P)	2021/05/26	82	75 - 125	97	75 - 125	<10	mg/kg	2.0	30	97	70 - 130
A235254	Total Potassium (K)	2021/05/26	96	75 - 125	104	75 - 125	<100	mg/kg	12	40	97	70 - 130
A235254	Total Selenium (Se)	2021/05/26	93	75 - 125	104	75 - 125	<0.50	mg/kg	NC	30		
A235254	Total Silver (Ag)	2021/05/26	87	75 - 125	97	75 - 125	<0.050	mg/kg	NC	40	92	70 - 130
A235254	Total Sodium (Na)	2021/05/26	109	75 - 125	108	75 - 125	<100	mg/kg	5.0	40	102	70 - 130
A235254	Total Strontium (Sr)	2021/05/26	98	75 - 125	103	75 - 125	<0.10	mg/kg	5.6	40	109	70 - 130
A235254	Total Thallium (TI)	2021/05/26	91	75 - 125	104	75 - 125	<0.050	mg/kg	NC	30	90	70 - 130
A235254	Total Tin (Sn)	2021/05/26	92	75 - 125	102	75 - 125	<0.10	mg/kg	4.0	40	98	70 - 130
A235254	Total Titanium (Ti)	2021/05/26	NC	75 - 125	98	75 - 125	<1.0	mg/kg	9.2	40		
A235254	Total Tungsten (W)	2021/05/26	88	75 - 125	104	75 - 125	<0.50	mg/kg	NC	40		
A235254	Total Uranium (U)	2021/05/26	89	75 - 125	100	75 - 125	<0.050	mg/kg	3.9	30	102	70 - 130



QUALITY ASSURANCE REPORT(CONT'D)

SLR CONSULTING (CANADA) LTD Client Project #: 234.30005 Site Location: TURNER STREET Your P.O. #: WHR41 Sampler Initials: CT

			Matrix	Spike	Spiked	Blank	Method E	lank RF		D	QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A235254	Total Vanadium (V)	2021/05/26	91	75 - 125	104	75 - 125	<1.0	mg/kg	11	30	106	70 - 130
A235254	Total Zinc (Zn)	2021/05/26	88	75 - 125	103	75 - 125	<1.0	mg/kg	3.9	30	106	70 - 130
A235254	Total Zirconium (Zr)	2021/05/26	99	75 - 125	106	75 - 125	<0.50	mg/kg	4.3	40		
A235257	Soluble (2:1) pH	2021/05/26			100	97 - 103			0.17	N/A		
A241847	Moisture	2021/06/02					<0.30	%	5.2	20		
A241848	Moisture	2021/06/02					<0.30	%	1.4	20		
A243265	Hex. Chromium (Cr 6+)	2021/06/03	109	75 - 125	112	80 - 120	<0.080	mg/kg	NC	35		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

David Huang, M.Sc., P.Chem., QP, Scientific Services Manager

1 Jermica felk

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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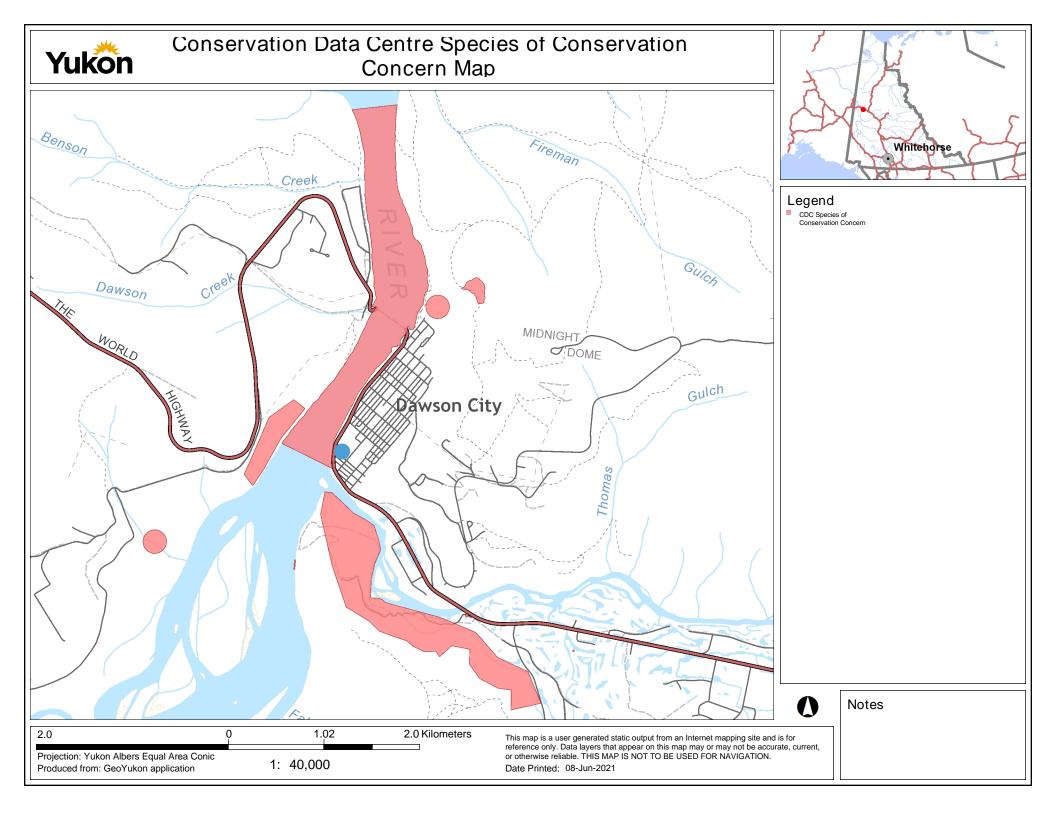
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Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment

Community Services | Rural Land Development, Land Development Branch Yukon Government Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT SLR Project No.: 234.30005.00000

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Appendix C Chromium Statistics

Additional Soil Characterization and Limited Human Health and Ecological Risk Assessment

Community Services | Rural Land Development, Land Development Branch Yukon Government Lot 12, Block 14, Government Reserve Addition, 8395 CLSR in Dawson, YT SLR Project No.: 234.30005.00000



APPENDIX C. CHROMIUM STATISTICS

Nonparametric UCL Statistics for Uncensored Full Data Sets

User Selected Options	i
Date/Time of Computation	ProUCL 5.16/24/2021 8:37:32 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Total Chromium

General Statistics

Total Number of Observations 10

Minimum 22.4 Maximum 109 SD 28.13 Coefficient of Variation 0.558 Mean of logged Data 3.788

Number of Distinct Observations10Number of Missing Observations1Mean50.43Median43.95Std. Error of Mean8.894Skewness1.094SD of logged Data0.542

Nonparametric Distribution Free UCL Statistics Data appear Normal Distributed at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL	Ū	95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	66.73	95% Adjusted-CLT UCL (Chen-1995)	68.35
		95% Modified-t UCL (Johnson-1978)	67.25
Nonpara	ametric Distribu	ution Free UCLs	
95% CLT UCL	65.06	95% Jackknife UCL	66.73
95% Standard Bootstrap UCL	64.18	95% Bootstrap-t UCL	76.15
95% Hall's Bootstrap UCL	83.34	95% Percentile Bootstrap UCL	65.18
95% BCA Bootstrap UCL	67.98		
90% Chebyshev(Mean, Sd) UCL	77.11	95% Chebyshev(Mean, Sd) UCL	89.2
97.5% Chebyshev(Mean, Sd) UCL	106	99% Chebyshev(Mean, Sd) UCL	138.9

Suggested UCL to Use

Data appear Normal, May want to try Normal Distribution

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.