FINAL REPORT: LONG-TERM MONITORING (YEAR 2) – GORDON LAKE GROUP OF SITES

Prepared for:
Public Services and Procurement Canada on behalf of
Crown-Indigenous Relations and Northern Affairs Canada

Prepared by:
Stantec Consulting Ltd.
40 Highfield Park Drive, Suite 102
Dartmouth, NS B3A 0A3

File: 121414585

March 31, 2021

Executive Summary

Public Services and Procurement Canada (PSPC), on behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), was responsible for the environmental remediation of several former mine and advanced exploration sites collectively known as the Gordon Lake Group (GLG) of Sites (GLG Sites or the Sites).

The nine sites are located on or near Gordon Lake, approximately 80 kilometres (km) northeast of Yellowknife, Northwest Territories (NT). Remedial work, which occurred over several field seasons, was completed in 2019 and the Project has now transitioned to long-term monitoring. Stantec Consulting Ltd. (Stantec) was retained by PSPC, on behalf of CIRNAC, to complete Year 2 of the Phase I Long-Term Monitoring (LTM) Plan for the Sites.

The purpose of the Phase I LTM Plan is to verify that the selected remedial/risk management measures implemented during the remediation program remain protective of human health and the environment by monitoring the potential for residual risks remaining at the nine former mine and mineral exploration sites following the completion of the Gordon Lake remediation program.

The Phase I LTM Plan will provide sufficient data to characterize post-remediation conditions. Consistent with other northern contaminated sites, this is accomplished with a monitoring program conducted for a period of five years following remediation.

LTM components for the GLG project include areas that pose a potential risk following the completion of the remediation program. These components were assessed to evaluate the progress toward site closure and include the following:

- Monitoring of backfilled or covered areas with potential high risk for erosion/washout to downgradient water, both physical and chemical.
- Performance monitoring of the Tailings and Soil Containment Area (TSCA) to verify that conditions of the TSCA are stable, both chemically and physically.
- Visual monitoring of mine opening closures that were backfilled and/or capped to verify stability.
- Monitoring of moderate risk waste rock left in place to verify no visual signs of ARD.
- Visual monitoring of vegetation growth to verify growth and/or stability.

During Phase I of the LTM, exit criteria will be considered met and monitoring can be concluded in the absence of major erosion concerns, contaminants of concerns reflect stable or decreasing trends and/or remain below applicable guidelines, and the TSCA remains stable over three consecutive biennial monitoring events.

Data from ongoing monitoring is required to develop a trend analysis and evaluate overall program management. Stantec recommends continued long-term monitoring in Year 3 in accordance with the Phase I schedule with the following deviations:

- Additional work is required at the Kidney Pond Portal to rectify slumping and erosion concerns. This area should be monitored in Year 3 to confirm backfilling is stable and sufficient to eliminate the hazard and control erosion.
- The backfill material at Murray Deep Trench was not accounted for in Year 1 or 2 and should be monitored in Year 3 to confirm no significant erosion or settlement is present.
- The West Bay Open Pit barrier openings between the fence and ground surface should be addressed as it is not fulfilling its intended purpose. Stantec recommends a chain link skirting be attached to eliminate the potential risk of access to the Open Pit hazard to humans and/or animals.
- Verify no visual signs of ARD downgradient of the waste rock areas that were not accounted for in Year 1 and 2 (i.e. GOO_WR_01). The remaining waste rock monitoring areas are recommended to continue with the LTM schedule (quinquennially).
- Remove blockage identified in MW1.
- Review piezometer water levels bi-annually to provide insight into whether seasonal trends are influencing water level and determine that there is no unusual water level rise that could have an impact on TSCA slopes stability. In addition, the lake levels should be monitored at frequencies sufficient to enable evaluation of their influence on the water levels.

The statements made in this Executive Summary text are subject to the limitations included in Section 6.0 and are to be read in conjunction with the remainder of this report.

Abbreviations

AHJ	authorities having jurisdiction
ARD	acid rock drainage
BGM	bituminous geomembrane
CCME	Canadian Council of Ministers of the Environment
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
COC	contaminant of concern
CPCM	Construction and Post-Construction Monitoring
DNV	Delta Engineering and Nahanni Construction, in Joint Venture
FAL	Freshwater Aquatic Life
FCSAP	Federal Contaminated Sites Action Plan
FIGQG	Federal Interim Groundwater Quality Guidelines
GLG	Gordon Lake Group
km	kilometre
LTM	long-term monitoring
m	metre
NT	Northwest Territories
PHC	petroleum hydrocarbon
PSPC	Public Services and Procurement Canada
RAP	remedial action plan
R/RM	remedial/risk management
SSRT	site-specific remedial target
Stantec	Stantec Consulting Ltd.
WL	Water Licence

Table of Contents

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

The Gordon Lake Group (GLG) of sites (GLG Sites or the Sites) encompasses nine former mine and advanced exploration sites located approximately 80 kilometres (km) northeast of Yellowknife, NT, northwest of the East Arm of Great Slave Lake. The GLG Sites fall within the Akaitcho Territory and are also located in the Mowhì Gogha De Niitlèè boundary within the Wek'èezhìi management area of the Tlicho settlement area. All nine sites fall under the custodial responsibility of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), and site remediation has been coordinated by Public Services and Procurement Canada (PSPC). The area is asserted as a traditional use area for Métis people of the Great Slave Lake area, who are represented by the Northwest Territory Métis Nation and the North Slave Métis Alliance. The GLG Sites include:

- Burnt Island (mine site)
- Camlaren (mine site)
- Goodrock (mine site)
- Kidney Pond (mine site)
- Murray Lake (advanced exploration site)
- Storm Property (advanced exploration site)
- Treacy (mine site)
- Try Me (advanced exploration site)
- West Bay (mine site)

Figure A1, Appendix A, shows the relative location of each site around Gordon Lake.

Delta Engineering and Nahanni Construction, in Joint Venture (DNV) was contracted to complete the remediation of the Sites (which occurred between 2017 and 2019) and Stantec Consulting Ltd. (Stantec) was engaged to provide construction contract supervision.

Upon completion of construction/remedial activities at the Sites in 2019, Stantec was retained to complete monitoring associated with Year 1 of the Phase I Long-Term Monitoring (LTM) Plan for the Sites. In 2020, Stantec completed monitoring associated with Year 2 of the Phase I LTM Plan.

This report documents the results of monitoring completed during Year 2 (i.e. 2020) of the Phase I LTM Plan for the Gordon Lake Project.

1.1 PURPOSE

The purpose of the Phase I LTM Plan is to verify that the selected remedial/risk management measures implemented during the remediation program remain protective of human health and the environment by monitoring the potential for residual risks remaining at the nine Sites following the completion of the Gordon Lake remediation program.

The Phase I LTM Plan will provide sufficient data to characterize post-remediation conditions. Consistent with other northern contaminated sites, this is accomplished with a monitoring program conducted for a period of five years following remediation. At the completion of this phase, results will be evaluated within a Performance Assessment Report to determine if monitoring is concluded (i.e. site closure), or if additional monitoring is required at a reduced frequency. Should monitoring results indicate remedial activities have failed to meet LTM objectives or monitoring endpoints, additional remedial effort may be required. The current Phase I LTM contains only those requirements of the initial phase of LTM (Year 1-5). The design of the next phase of monitoring, if deemed necessary, will be founded on an adaptive management approach.

Within federal LTM Guidance (Environmental Sciences Group [ESG] and Franz Environmental [Franz], 2013), “adaptive management” specific to the LTM phase refers to a process that should be used to adjust the monitoring program design, the level of effort for sampling, and/or the remedial strategy throughout the post-remediation monitoring period as the monitoring data are collected.

Adaptive management is a cyclic process which is perpetuated by the acquisition of LTM data. Through the structured review and analysis of collected data and examination of monitoring event outcomes, the Phase I LTM Plan has the ability to improve and adapt to unforeseen changes to site conditions, which can lead to less frequent monitoring requirements. The identification of transient increases to contaminant of concern (COC) concentrations as a result of construction activities that reduce to steady-state conditions is a key element of monitoring during the adaptive management phase.

This Phase I LTM Plan will be further developed as the monitoring program proceeds, depending on the specific conditions observed during monitoring. Due to the nature of the adaptive management approach, the overall schedule of the Phase I LTM Plan will depend heavily on results of early steady-state monitoring events. Although monitoring results and observations will be reviewed after each monitoring event, at the end of five years a Performance Assessment report will be prepared. This report will outline the findings of the first five years of monitoring, anticipated to include the transient stage and early steady-state conditions, and provide recommendations on LTM activities to be executed moving forward as appropriate.

In addition to the Phase I LTM Plan, an Operations, Maintenance and Surveillance (OMS) Plan was developed for the Project during the final construction phase of the Project, at the end of the Construction and Post Construction Monitoring (CPCM) period. As a result, the OMS Plan is based significantly on the content outlined in the Phase I LTM Plan. The surveillance (i.e. monitoring) requirements outlined in the Phase I LTM Plan were incorporated together with operations and maintenance requirements of the Project to form the OMS Plan.

Operations and maintenance requirements presented in the OMS Plan focus on the Tailings and Soil Containment Area (TSCA) at Camlaren – the primary engineered facility constructed as part of the remediation program. Other remedial components are included as part of LTM activities, but only remediation components associated with mine openings require planned operations and maintenance activities. For further details, refer to the OMS Plan (Stantec 2020a).

1.2 OBJECTIVES

The LTM Plan has been broken up into two phases; an initial phase (i.e. Phase I) which covers the first five years after remediation (including post-construction) in accordance with Federal Contaminated Sites Action Plan (FCSAP) Long-Term Monitoring Planning Guidance (ESG and Franz, 2013), and then reconsideration to develop an LTM which covers activities for year six onward as necessary. Both phases incorporate adaptive management which allows for continual evaluation of the remedial strategies and monitoring plans to confirm the continued achievement of the established remedial objectives of the GLG Project.

The Phase I LTM Plan provides a comprehensive monitoring plan based on the initial versions of the CPCM and LTM plans, Water Licence (WL) requirements, and FCSAP guidance.

2.0 BACKGROUND

The GLG Sites were active between the late 1930s and 2008 with several companies involved in the mining operations at the Sites. Activities ranged from open-pit mining to exploratory drilling and were generally undertaken independently between the mine sites. With the mine sites abandoned, several environmental concerns arose from materials and debris left on-site including:

- Petroleum hydrocarbon (PHC) and/or metal impacted soil/tailings, sediment/submerged tailings, and surface water;
- Tailings and waste rock piles with the potential to produce acid rock drainage (ARD); and
- Hazardous and non-hazardous debris and physical hazards (mine openings and trenches).

These concerns were remediated over several field seasons between 2017 and 2019, and the LTM Plan is now in place to monitor the effectiveness of these efforts. The Phase I LTM components for each site are outlined in Tables B-1, B-2, and B-3 (Appendix B). Site-specific identification information is displayed in Table 2.1 and a summary of the Year 2 Phase I Hazard Components are summarized in Table 2.2.

Table 2.1 Site Identification Information

	Burnt Island	Camlaren	Goodrock	Kidney Pond	Murray Lake	Storm Property	Treacy	Try Me	West Bay
FCSI No. of Contaminated Site	23547	162	351	24120	24158	24145	24141	24155	C1037001
Exact Site Name as listed in IDEA	Burnt Island Mine Site	Camlaren Mine	Goodrock Mine	Kidney Pond / Knights Bay	Murray Lake Exploration Site	Storm Property	Treacy Mine	Try Me Exploration Site	West Bay / Black Ridge
Reporting Organization	CIRNAC	CIRNAC	CIRNAC	CIRNAC	CIRNAC	CIRNAC	CIRNAC	CIRNAC	CIRNAC
Legal description or metes and bounds	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Approximate Site Area (ha)	12.9	12	2.67	10	3.2	2.4	0.5	2.5	2.5
Centre of Site Coordinates Lat/Long (degrees, min, sec)	63º3’49” N 113º10’6” W	62º59’8” N 113º12’19” W	63º01’51” N 113º08’1” W	62º57’20” N 113º20’9” W	63º00’45” N 113º24’30” W	63º00’21” N 113º07’29” W	63º56’28” N 113º20’14” W	63º04’09” N 113º28’32” W	62º55’1” N 113º14’4” W
Centre of Site Coordinates UTM	6994531 m N 390423 m E	6985896 m N 388258 m E	6990816 m N 392056 m E	6982742 m N 381430 m E	6989573 m N 278251 m E	6988017 m N 392413 m E	6981182 m N 381894 m E	6995654 m N 374744 m E	6978287 m N 386523 m E
NWT Contaminated / Waste Site Database Number	220	205	466	474	490	471	475	488	211/302

FCSI = Federal Contaminated Sites Inventory

IDEA = Interdepartmental Data Exchange Application

Table 2.2 Hazard Components of Year 2 Phase I LTM

Hazard Category	Monitoring Objective
Mine Openings	Verify backfill material is stable with no significant resulting erosion or settlement at Kidney Pond Portal.
Moderate Risk Waste Rock	Verify no visual signs of ARD downgradient of remaining impacts at GOO_WR_01

2.1 PROJECT ENVIRONMENT

This section provides a summary description of the project environment. This information is drawn from the Gordon Lake Gap Assessment Report (Stantec, 2016a).

2.1.1 Climate

Gordon Lake is in Northern Canada and although it is south of the Arctic Circle, it is subject to extreme weather. According to historical averages provided by the Government of Canada's Climate Normals Station Data (1981-2010) Station ID 2204100 (located in Yellowknife, NT), Gordon Lake's temperatures typically reach subzero daily averages for seven months of the year (October to April). Temperatures in this area have historically reached below -50°C in these winter months. In the remaining five months of the year, the average daily temperature is above the freezing point. The daily average temperature is below 10°C for the months of May and September, while between June and August, the daily average temperature ranges from 13-17°C. The total average annual precipitation is 288.6 millimeters (mm) (Station ID 2204100). Rainfall averages (approximately 170.7 mm) are higher than snowfall averages (156 centimeters (cm) or approximately 117.9 mm precipitation); snowfall can occur during any month of the year but has a very low likelihood in the months of June to August (EC, 2015).

2.1.2 Hydrology

The watershed surrounding the GLG sites is difficult to define as the area is encompassed by a vast number of smaller water bodies. The Cameron River system, which is located near the West Bay site, has been defined as the location to which the Lake's water outlets. Seven months of the year, typically subzero temperatures cause the surface water to freeze. This may cause a flux in precipitation infiltration, which results in either surface water runoff or a greater accumulation on the surface (Humphries, 2005).

2.1.3 Surficial Geology and Mineralization

The GLG Sites lie within the Slave Province, an Archean granite-greenstone terrane located in the northwestern Canadian Shield. The supracrustal rocks of this terrane comprise sedimentary and volcanic rocks intruded by granitic bodies that have undergone multiple phased deformation events and date between 2.71 and 2.65 Ga ($1x10^9$ years ago) (Mortensen *et al*., 1988). The Sites occur within the Burwash Formation, part of the Duncan Lake Group, assigned to the Yellowknife Supergroup (Bleeker and Villeneuve, 1995). The metasedimentary rocks of the Burwash Formation are dominantly low to high grade metamorphosed turbidite (metaturbite) sequences of well-preserved mudstone grading to greywacke. The GLG Sites are situated on two members of the Burwash Formation, Atl and Atm, low-grade and medium-grade metaturbites, respectively.

The Slave Province is recognized for its province-wide zoning of three major gold deposit types; gold hosted in 1) quartz veins, 2) shear zones, and 3) iron formations. Most gold deposits formed before the intrusion of the major granitic bodies (Ferguson *et al.*, 2005). The GLG Sites feature mainly gold-sulphide bearing white-smoky quartz veins hosted in metaturbites of the Burwash Formation. Sulphide minerals associated with these deposit types include pyrite, pyrrhotite, marcasite, chalcopyrite, arsenopyrite, galena, and sphalerite.

This region was last covered by the Late Wisconsin glaciation event until about 11,000 years before present (BP) and was completely ice-free by 10,000 BP (Dyke and Prest, 1987). Paleo ice flow was generally to the southwest (Kerr, 1990) as apparent by orientation of drumlins and eskers (Othof *et al.*, 2014).

Retreating ice-sheets deposited fine-grained glaciolacustrine sediments below 320 to 350 metre (m) elevation in the Great Bear and Great Slave basins. In the Gordon Lake area, re-worked glacial and glaciofluvial sediments are the dominant surficial material with till thickness and distribution increasing westerly and northwesterly. Till thickness varies but is generally greater than 2 m occurring as silt to gravel blankets, following bedrock topography, and may include patches of till veneer or drumlinoids.

With respect to permafrost, the Gordon Lake area is located within the extensive discontinuous permafrost zone, where permafrost can be found on 50% to 90% of the land (Heginbottom *et al.*, 1995). Within the extensive discontinuous permafrost zone, ground ice content in the upper 10 m of ground is believed to range from low to medium (<10 % to approximately 20% by volume) and consist mainly of frozen pore water (i.e. interstitial ice), ice lenses and ice veins (i.e. segregated ice and reticulated ice). Ice wedges, which are a type of patterned ground resulting from thermal contraction and cracking of the ground surface (ACGR, 1988), might occur locally.

The distribution of the permafrost in the area is related to several interconnected factors such as the local climate, ground surface topography, material types and textures, vegetation coverage and drainage conditions. Similarly, the variation in the amount of ground ice present within the permafrost is found to be directly related to factors such as the nature of the surficial deposits and characteristics of the local terrain.

No data is currently available on the local distribution of the permafrost in the Gordon Lake area; however, our knowledge of northern environments suggests that peat bogs and fine-grained deposits (e.g., silty to clayey lacustrine and/or glaciolacustrine sediments) are likely the only terrain units containing permafrost in the area. Bedrock outcrops and well- to rapidly-drained, coarse-grained deposits such as till and glaciofluvial deposits are likely free of permafrost. Where permafrost is present, the active layer (i.e. the portion of soil that thaws each summer and refreezes in the winter) would typically range between 0.5 m and 1.5 m deep and would vary greatly depending on local ground conditions. `

2.1.4 Bedrock Geology

Most of the bedrock in the Gordon Lake Area is Archean (over 2.5 billion years old) or Paleoproterozoic 1.6 – 2.5 billon years old) in age (ECG, 2008). The bedrock surface is often highly fractured (frost shattered) and subject to extensive frost heave. The borrow assessment completed at the GLG sites identified discontinuous veneers of till and glaciofluvial deposits. The till veneers generally consist of sandy material with variable amounts of angular to sub-rounded gravel to bolder size fragments. The glaciofluvial material, mainly eskers and/or outwash deposits, are predominately sandy material, with localized gravel. Coarse fragments were generally located at the surface (i.e. 0 to 30 cm in depth) and their frequency decreases rapidly with depth. The material is well sorted and contains very low amounts of fines (i.e. silt and clays).

2.1.5 Biological Environment

The GLG sites are located in the Taiga Shield - Great Slave Upland Low Subarctic (LS) Ecoregion of the Northwest Territories (ECG, 2008). The total area of this ecoregion in the NWT is approximately 15,431 km^2 or 13.5% of the Taiga Shield LS Ecoregion (ECG, 2008). This Ecoregion is known for having a bedrock-dominated landscape that is sloped towards the southwest, which supports scattered black spruce woodland growth on the bedrock outcrops. In areas of till veneers and blankets, it is common to have dense black spruce forests occur. In areas of outwash, white spruce woodlands are common and Jack pine can be found in areas of lower elevation (ECG, 2008).

2.2 SUMMARY OF REMEDIAL/RISK MANAGEMENT ACTIVITIES

Although the GLG sites where remedial/risk management (R/RM) activities were completed are separated geographically, the remedial approaches selected were common amongst most of the GLG sites.

The history of each site and areas requiring remediation was previously presented in the Remedial Action Plan (RAP; Stantec, 2016b). Figures included in Appendix A illustrate current site conditions (i.e. following remediation) and display areas included in the Phase I LTM Plan. Table B-1, Appendix B lists area-specific details such as hazard category, physical description and remedial approach. Table 2.3 (below) summarizes the R/RM options for each identified hazard component.

Table 2.3 Summary of Remediation/Risk Management Options per Hazard Component

Hazard Component	Selected R/RM Option
Surficial Mine Openings	Backfill and/or engineered cap. Institutional/administrative controls.
Non-Hazardous Waste	Demolition waste: Burn unpainted wood, and consolidate remainder at TSCA Debris: Consolidate at TSCA
Hazardous Waste	Containerize for off-site disposal.
Impacted Soil and Tailings (Metal and co-mingled)	Excavate and dispose of at the TSCA

Table 2.3 Summary of Remediation/Risk Management Options per Hazard Component

Hazard Component	Selected R/RM Option
Impacted Soil (PHC)	Excavate and dispose of at the TSCA
High Risk Impacting Waste Rock	Excavate and dispose of at the TSCA
Excavation Areas (including remedial excavations, mine openings, tailings cover and sumps)	Backfilling and/or covering and/or regrading (depending on the hazard component).

2.2.1 Target Contaminants of Concern for Long-Term Monitoring

COCs were identified during previous assessment work in comparison to generic environmental quality guidelines. Site-Specific Remedial Targets (SSRTs) were developed based on representative exposure conditions for receptors. The SSRTs represent the target levels for maximum allowable concentration of COCs monitored. The SSRTs are specific to terrestrial (i.e. soil) COCs and are thresholds for significant risk. During the Project, the SSRTs were applied to the results of the confirmatory soil samples as outlined in the CPCM Plan. The soil SSRTs pertinent to LTM objectives focus on metals COCs and are summarized in Table 2.4.

Table 2.4 Site-Specific Remedial Targets for Soil

COC	SSRT (mg/kg)
Arsenic	69
Cobalt	130
Lead	332
Mercury, inorganic	13

2.2.1.1 Other Guidelines

Other reference guidelines that are to be used during the Phase I LTM Plan include Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG online tables) and Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (FIGQG) further detailed below.

CCME Canadian Environmental Quality Guidelines

The CCME CEQG provide limits for contaminants in surface water and are intended to maintain, improve, and/or protect environmental quality and human health at contaminated sites in general. Environmental water quality guidelines are derived using toxicological data to determine the threshold level to the most sensitive receptors. The latest updates of these CCME CEQG are now kept on-line through the CCME website. The analytical results of samples collected as part of the Phase I LTM Plan will be compared to the CCME Freshwater Aquatic Life (FAL) long-term guidelines (CCME, 1999, on-line summary tables).

Federal Interim Groundwater Quality Guidelines

Developed under the FCSAP, the FIGQG are a tiered approach to evaluating groundwater quality. The FIGQG are based on the consideration of several exposure pathway scenarios and receptors. For the purposes of the GLG Phase I LTM, monitoring results will be compared to the Tier 1 FIGQG for agriculture land use for coarse grained soil types. Groundwater was not identified as having receptors of concern for the GLG Project; however, groundwater migration to surface water is a pathway of concern and is therefore addressed within the surface water receptor risk.

2.3 SURVEILLANCE NETWORK PROGRAM

As outlined in Annex A, Part B of the WL, continued sampling of SNP stations is required at the GLG Sites. SNP Stations 2016-7, 2016-8, and 2016-11 are associated with post-construction monitoring (and would be considered further during adaptive management) and have been carried forward into LTM:

- SNP Station 2016-7: Groundwater sampling at the TSCA at Camlaren
- SNP Station 2016-8: Water discharge sampling from the TSCA at Camlaren
- SNP Station 2016-11: Surface water sampling in areas proximate (within 30 m) to significant excavation areas including TSCA at Camlaren, Burnt Island, Kidney Pond, Treacy, and West Bay

Over time, the sampling requirements of the SNP program may be adjusted or reduced (e.g. frequency, parameters, number of samples, etc.) based on the results of the monitoring activities. The adjustments or reductions in sampling requirements would be completed in consultation with the MVLWB. SNP Stations 2016-7 and 8 will be tailored specifically to long-term TSCA performance monitoring. Approximate SNP monitoring locations have been included on the figures presented in Appendix A, however discussion is presented under a separate cover.

3.0 PHASE I LTM PLAN SCOPE

The scope of the Phase I LTM Plan includes the following activities:

1. Monitoring to confirm the effectiveness of the R/RM strategies
2. Performance monitoring of the engineered facility (TSCA)
3. Surveillance Network Program

Data collection methods during monitoring will consist of intrusive and non-intrusive activities, including visual observations. Tables B-2 and B-3 in Appendix B include data collection details such as monitoring driver, frequency, and parameters. Details pertaining to monitoring methodology and data collection are included in the following sections.

3.1 GENERAL METHODS

3.1.1 Visual Monitoring

Non-intrusive visual monitoring activities will include taking photos from established locations to track physical changes, collecting measurements of component features being inspected, and recording observations pertaining to the established decision rules.

Field personnel will use field logs to record details such as date, field personnel, weather, site component, GPS coordinates, observations, photographs taken, and other relevant information. Field notes will include measurements and observations associated with erosion, turbidity, settlement, physical deformations/cracking/depressions (including depths), vegetation health, proximity to site features, and other relevant information.

A photograph log will be maintained to identify photographs taken and the components that each log is meant to document. The information in the photograph log will include: the photograph's unique identifier, the date and time the photograph was taken, the location the photograph was taken from, the direction the camera was facing, and a brief description of the contents of the photograph.

The visual monitoring should be conducted at a similar time of year to be seasonally consistent for comparison purposes (e.g. vegetation growth in August). Photographic logs and detailed observation records will be collected and used to support management decisions regarding monitoring requirements / modifications. Photo reference points are presented graphically in Appendix A.

3.1.2 Soil Sampling Methodology

If soil sampling is required, it will be a combination of surface and subsurface samples. In general, soil samples will be collected to characterize soil quality to verify that no risk is posed to the surrounding environment from the remaining material.

Grab samples will be collected using clean gloves. A hand shovel, pickaxe and/or hand auger will be used as needed. To limit cross-contamination, samples will be chosen that did not come into direct contact with equipment. After sample collection, the equipment will be cleaned using a solution of distilled water and a biodegradable soap (or similar) and subsequently rinsed with distilled water. Sample locations will be recorded using a designated GPS unit. Samples will be placed into laboratory supplied jars and selectively analyzed for the COCs presented in Table 2.4.

3.1.3 Surface Water Sampling Methodology

If surface water sampling is required (i.e. areas of water drainage or seepage), samples will be collected as grab samples. To limit cross-contamination, sample bottles will not come into contact with any surface that may potentially contaminate the sample. Each sample will be collected using clean gloves and the sample bottle completed submerged to obtain a representative sample.

A multi-probe will be used to record field parameters (including temperature, conductivity, pH, oxidation reduction potential (ORP), dissolved oxygen (DO), total dissolved solids (TDS)) for sample locations, as required or applicable. It should be noted that sample locations may be adjusted based on field conditions (e.g. water availability, dry conditions, seepage locations, etc.). If the sample(s) deviates from predetermined locations, the location it will be recorded using a designated GPS unit. Samples will be placed into laboratory supplied jars and selectively analyzed for the COCs presented in Table B-3, Appendix B. Seasonally-consistent monitoring should be undertaken for comparison purposes between years.

3.1.4 Groundwater Sampling Methodology

Groundwater samples will be collected from monitoring wells using an appropriate sampling method (e.g. peristaltic pump). In addition to water elevation measurements, a YSI multi-probe will be used to record field parameters (including temperature, conductivity, pH, ORP, DO, TDS) for sample locations, as required or applicable. It should be noted that groundwater sample locations may be dry depending on seasonal variation. Samples will be placed into laboratory supplied jars and selectively analyzed for the COCs presented in Table B-3, Appendix B. Seasonally-consistent monitoring should be undertaken for comparison purposes between years.

3.1.5 Overall Monitoring Requirements

Overall monitoring details include the following:

- Checking equipment calibration and calibrate as needed
- Following Quality Assurance/Quality Control (QA/QC) procedures
- Taking photographs regularly and as needed
- Recording actual sample locations (and other relevant points) using a GPS unit
- Using a total station survey to record locations, elevations or details requiring additional accuracy if needed

The samples will be collected using Standard Operating Procedures (SOPs) and quality management protocols in accordance with CCME *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment* (CCME, 2016), and other relevant guidance. Appropriate equipment and tools (e.g. pump, surface water sampling tools, etc.) will be selected based on field conditions and professional judgment.

3.1.6 Quality Assurance/Quality Control (QA/QC)

Best practice Standard Operating Procedures (SOPs), as part of a Quality Management System (QMS), includes work procedures and instructions that are developed for technical work. QMS and associated SOPs allow control of the quality of work throughout the project program. Selected SOPs will be reviewed by field personnel prior to mobilizing to site. Best practices will be applied, and the SOPs will be modified as required to reflect conducting work in a remote environment in the north. However, overall these SOPs will provide guidance to conduct field processes in accordance with industry standards.

During sampling, efforts will be made to reduce the potential for cross-contamination to obtain representative samples. As a check on the field methodology, laboratory analytical methods, and sample precision, the following quality control procedures will be followed:

- A new pair of disposable nitrile gloves will be used for each sample
- Soil, groundwater, and surface water samples will be placed into laboratory-supplied sample containers
- Samples will be preserved according to laboratory specifications
- Samples will be stored in ice-packed coolers for shipment to laboratory
- Each sample will be provided with a unique identifier
- Samples will be controlled using laboratory chain of custody forms
- Samples will be analyzed within laboratory recommended hold times
- Blind field duplicate (BFD) samples will be submitted for 10% of all soil and water samples, as well as trip blanks and field blanks, as appropriate
- Samples will be submitted to an accredited laboratory (Canadian Association for Laboratory Accreditation (CALA) or Standards Council of Canada (SCC)) who use CCME-recognized methods to conduct laboratory analyses.
- The chosen laboratory will conduct routine internal QA/QC tests, which include method blanks, control standards samples, certified reference material standards, method spikes, replicates, duplicates and instrument blanks.

3.2 ESTABLISHING MONITORING DECISION RULES

Decision rules are quantitative pass/fail conditions that form the basis of concluding that a specified condition has been and/or is being met. These rules also aid in Adaptive Management for monitoring activities and improve decision-making. Decision rules are predominantly based on statistically significant trends (increasing, decreasing, or stable) at the steady-state phase. Steady state is defined as the point in which the transient effects from remedial and construction activities are no longer physically or chemically observed, which will also be statistically defined for each data set. Phase I LTM decision rules for the monitoring requirements for the GLG Project are provided in sections below.

3.3 ESTABLISHING LTM EXIT CRITERIA

To evaluate the progress toward site closure, action levels are established that represent the attainment of a desired condition. These site closure action levels are associated with specific monitoring objectives and are used to determine when monitoring can be concluded. Exit criteria are provided for each monitoring objective in Table B-2, Appendix B, and can be summarized as follows:

- Visual monitoring of backfilled or covered areas with potential high risk for erosion/washout to downgradient water.
- Performance monitoring of the TSCA to verify that conditions of the TSCA are stable, both chemically and physically.
- Visual monitoring of mine openings backfilled and/or capped to verify stability.
- Monitoring of moderate risk waste rock left in place to verify no visual signs of ARD.

- Through monitoring and statistical analysis of COC concentrations downgradient of remedial components and residual waste locations, it can be determined if exit criteria have been met. Overall it should be shown that risk to human health and the surrounding environment continues to be reduced to acceptable levels.

3.4 DATA ANALYSIS

Physical changes occurring over time at each of the areas to be monitored will be captured by a photo log for each monitoring event. Through the comparison of these event-specific photographic logs, one will be better able to identify physical changes occurring over extended periods of time. Additionally, measurements of quantifiable physical changes such as settlement, slumping, erosion, and vegetation will be collected and compared to previously collected data.

Analytical results from media sampled during monitoring events will be tabulated and statistically analyzed. Trend analysis will be completed from three consecutive bi-annual monitoring events to determine statistical significance and distinguish steady-state phase from transient phase. These analyses will help determine if the expected outcomes and objectives of remedial activities will be achieved and if closure is likely.

3.4.1 Statistical Analysis

Although there are several potential methodologies for statistical trend analysis, the most likely approaches that will be adopted are the Mann-Kendall test and regression analysis. To determine the more appropriate methodology of the two, distribution fit testing will be conducted using an appropriate program (e.g. ProUCL); if a distribution does not fit the given data set then the Mann-Kendall test will be used, otherwise regression analysis will be used.

Methodology for statistical analysis will be revisited annually (at a minimum) for consideration of applicability of the statistical methodology. For a given dataset (e.g. COC, media, etc.), the statistical approach may change over time as additional data is obtained to further characterize the nature of the data if it is determined that an alternate statistical approach is better suited to interpret the data set.

3.5 BACKFILLED/COVERED AREA MONITORING

Excavation areas, as described in the MVLWB WL conditions, are considered hazard components that are part of the remediation program and will result in disturbance to areas of the site. Such areas include backfilled remedial excavations with high potential for erosion risk (i.e. in close proximity to water bodies), the hotspot covered at Goodrock (GOO_HS_01), and tailings cover (Burnt Island). Activities that included backfilling, regrading and covering could potentially result in effects such as erosion and washout over time.

During Phase I LTM, if no significant erosion or washout of backfill or cover material is observed over three consecutive biennial monitoring events, the action level will be considered met and monitoring can be concluded. The following conditions will result in the action level not being considered met:

- If backfill or cover material has settled, eroded, or washed out resulting in rills greater than 10 cm.
- If erosion/washout concerns are identified in water downgradient of backfilled excavations.
- If erosion/washout exposes the tailings underlying the cover at Burnt Island.
- If erosion/washout exposes the soil underlying the cover at the Goodrock hotspot.

These scenarios will constitute a trigger for action, and review and/or modification of the remedial / reclamation approach will be required. Monitoring associated with SNP Station 2016-11 includes total suspended solids (TSS) and aligns with the backfilled remedial excavations with potentially high erosion risk.

It should be noted that there are no exit criteria associated with performance monitoring; however, the frequency of monitoring will be adjusted (e.g. decreased) after the Phase I LTM is completed to a minimum of once every 5 years. The performance monitoring associated with the TSCA is expected to continue until deemed no longer necessary, which will be based on long-term results of performance monitoring (i.e. data obtained over decades).

3.6 MINE OPENING MONITORING

Each mine opening remediated either through backfilling and/or capping, or through installation of a barrier, will be visually inspected for backfill settlement and structural stability of the engineered cap / barrier.

If quinquennial inspections indicate that the backfill material has not settled more than a total of 0.5 m (from the original elevation) and the cap is structurally stable (e.g. no deformation or cracking observed), the action levels will be considered met (i.e. no action required). Otherwise, the action levels will not be considered met and this will constitute a trigger for action, and review and/or modification of the remedial design components will be required.

It should be noted that there are no exit criteria associated with mine openings unless otherwise authorized by authorities having jurisdiction (AHJs).

3.7 MONITORING OF MODERATE RISK WASTE ROCK LEFT IN PLACE

Each of the waste rock areas classified as having moderate risk (i.e. that have been identified but not remediated) will be visually assessed for signs of ARD-related impacts. The action levels will be considered met when quinquennial visual inspections of these areas indicate ARD is not impacting the downgradient environment. If action levels are not met (i.e. visual signs of ARD are observed) during a single monitoring event, this will constitute an immediate trigger for action as visual signs of ARD (e.g. new loss in vegetation, stressed vegetation, discoloration, etc.) would not be expected to recover once observed. If potentially impacted areas are identified, the action will be to collect surface water and/or soil samples in the area to determine if resulting ARD is negatively impacting the surrounding environment (i.e. downgradient).

The West Bay waste rock piles were previously classified as high risk and a remedial design to address potential risk was considered. Additional data indicated that a remedial design would not be required to address potential risk resulting from these waste rock piles. However, it was recommended that follow-up water quality monitoring be conducted in accordance with LTM requirements. Therefore, the West Bay waste rock piles have similar requirements to moderate risk waste rock as well as surface water monitoring to verify chemistry of water bodies downgradient of remaining impacts. Additional details are provided in Tables B-2 and B-4, Appendix B.

For areas that require monitoring, only soil samples will be collected from areas with no downgradient surface water body in close proximity (i.e. approximately 30 m; with the exception of West Bay, as noted above and in Section 3.12). Surface water samples will be collected from areas of water drainage or seepage observed in the field. COC concentration data will be collected and used to establish trends from which management decisions can be made. Action levels will be considered met when surface water COC concentrations remain stable or below those observed after construction is completed and/or remain below applicable guidelines. A trigger for action and review and/or modification of the monitoring frequency and/or remedial design components may be required if COC concentrations, after having obtained sufficient data to establish a trend, are observed to be increasing and/or above applicable guidelines for three consecutive bi-annual monitoring events. Any soil collected will be compared to the soil SSRTs for metals.

3.8 VEGETATION MONITORING

The long-term vegetation monitoring proposed in the Phase I LTM Plan will be implemented with the objective of evaluating vegetation sustainability success (MVLWB, 2014; GNWT, 2015). The areas to be monitored include the TSCA at Camlaren, Camlaren Mine Area South shoreline, Zenith Island, Kidney Pond Portal area, Kidney Pond Exploration Camp area, and Treacy Mill Area. The vegetated locations will be monitored to record observations regarding vegetation health to confirm stable or increasing growth. Except for performance monitoring associated with the TSCA, specific action levels/exit criteria have not been specified for vegetated areas as there was no specific requirement to do so.

The following plant species were planted at the GLG sites: green alder (*Alnus* viridis), kinnikinnick (*Arctostaphylos* uva-ursi), wild rose (*Rosa* sp.), raspberry (*Rubus* idaeus), soapberry (*Shpherdia* canadensis), lingonberry (*Vaccinium* vitis-idaea), fireweed (*Chamerion* angustifolium), common yarrow (*Achillea* millefolium), slender wild rye (*Elymus* trachycaulus), fox-tailed Barley (*Hordeum* jubatum), sedge (*Carex* sp.), rush (*Juncus* sp.), field horsetail (*Equisetum* arvense), and willows (*Salix* sp.) (Flat River Consulting, 2018).

3.8.1 TSCA Vegetation

Tree species that typically develop deeper roots (more than 0.3 m depth) were not proposed for planting on the TSCA and will require removal if they become naturally established (e.g. black spruce, white spruce, tamarack, poplar, and white birch). These species can potentially grow roots deep enough through the capping materials and penetrate the liner thereby posing a risk to liner integrity. In addition, the tree species have a higher likelihood of blowing over, which would result in the roots pulling up and exposing the lower layers of the capping material to erosion forces, and potentially could expose the liner if enough capping material is pulled up.

During the bi-annual monitoring activities at the TSCA, vegetation monitoring will be completed simultaneously as part of the performance monitoring (e.g. erosion). The vegetation at the TSCA will be visually monitored for vegetative health to confirm stable or increasing growth. Photographs will also be collected for reference purposes.

3.8.2 Other Vegetation Areas

The other areas (Camlaren South Muir Island Shoreline, Zenith Island, Kidney Pond Portal area, Kidney Pond Dock site, and Treacy Mill Area) that were vegetated at the GLG Sites will be monitored for verification purposes. The vegetated locations will be monitored on a biennial basis (simultaneously with erosion inspections) to record observations regarding vegetation health to confirm stable or increasing growth. Photographs will also be collected for reference purposes.

3.9 RISK MANAGEMENT APPROACH (LAND USE)

Confirmation that the land uses defined in the risk management evaluation are maintained (i.e. traditional use duration, frequency, food collection, and areas frequented) is required. This is an administrative land use monitoring process that the proponent can undertake through its ongoing land stewardship process. Should proposed land use be changed to a more restrictive (i.e. higher use) form, then the risks associated with the COCs left in place would need to be revisited through an update to the risk assessment, with appropriate mitigation actions undertaken for any significant risks determined at that stage as appropriate.

3.10 TAILINGS AND SOIL CONTAINMENT AREA

The TSCA is an engineered mine waste containment facility that encompasses the Camlaren mine tailings formerly part of the TCA, as well as impacted material (soil, tailings, waste rock) and non-hazardous debris (metal, wood, etc.) from the other GLG Sites. Impacted material and non-hazardous waste from the GLG Sites were transported to Camlaren in the winter of 2018 (majority from February 4 to March 13, 2018). Some of the waste was transported via helicopter in the summer of 2018. Construction of the TSCA was completed between July and September 2018.

The detailed design for the TSCA was presented in the updated Design Basis Report (DBR) dated September 11, 2018. The mine waste was stabilized by regrading slopes and provision of the engineered cover, as follows:

- Slopes were stabilized by regrading of the perimeter dams between 3.1H:1V and 3.3H:1V;
- The engineered cover consisted of Bituminous Geomembrane (BGM) and an overlying 0.5 m thick sand layer to prevent water infiltration;
- Erosion protection consisted of providing vegetation (willow branches) along the top of the TSCA and a coarse sand with rockfill and coco mats on the slopes;
- Lined runoff surface ditches were constructed on the northwest and south perimeters to control drainage away from the TSCA and prevent any pooling against the embankment;
- Implementation of an instrumentation and monitoring program for the long-term performance of the TSCA.

The TSCA is the primary engineered facility constructed as part of the GLG remediation program and monitoring associated with this facility is detailed in the Phase I LTM Plan and the OMS Plan (refer to Section 1.1).

3.10.1 Performance Monitoring

Bi-annual inspections will be conducted to assess the TSCA performance; the inspection will include a thorough visual inspection of the top cover, slopes, toes, ditches and instrumentation for signs of erosion, settlement, seepage, structural failure and/or compromised liner and/or cap integrity. If bi-annual visual inspections of the TSCA confirm no or acceptable signs of erosion, settlement, seepage, structural failure and/or compromised liner and/or cap integrity outlined below, the action levels will be considered met (i.e. no action required). The actions are triggered if the total threshold values outlined below are exceeded during the LTM program as compared to the original baseline measurements:

- Differential settlement of greater than 0.5 m (including for instrumentation stick-ups).
- Slopes slumping with horizontal cracks/movement of greater than 0.3 m.
- Slopes or cover erosion resulting in greater than 25% loss of material thickness.
- Frost heave effects greater than 0.2 m.
- Vegetation (primarily tree species) observed that typically develop roots deeper than 0.3 m. See Section 3.8.1 for additional details.
- Animal activities, such as burrowing, resulting in depth greater than 0.3 m.
- Erosion control coconut matting (full semi-circle, approximate length of 5 m) is no longer deemed effective.
- Ditch erosion exposes any amount of bituminous geomembrane (BGM; i.e. visible liner).
- Ditch blockage of any debris/object that impedes flow or causes ponding.
- Seepage at the toe of the facility. Seepage will also require sampling via the SNP monitoring and should be quantified, if possible.

These scenarios will constitute a trigger for action, and review and/or modification of the remedial / reclamation approach will be required. Potential mitigative actions are summarized in Table B-2, Appendix B.

In addition to the bi-annual inspections noted above, annual geotechnical inspections of the TSCA will be conducted by a qualified geotechnical engineer registered in NT. Analysis of instrumentation data will also be performed as part of these inspections. The results of the geotechnical inspections will be reported separately, but key information from these inspections will be incorporated into annual LTM reports.

3.10.2 TSCA Instrumentation

TSCA instrumentation includes two thermistors, two standpipe monitoring wells, and three locations for vibrating wire piezometers with double-nested vibrating wire sensors. In addition, there are four monitoring wells outside of the TSCA footprint installed as part of the TSCA perimeter monitoring for the SNP sampling. The locations of instrumentation are illustrated on Figures A2.1 and A2.2 and Table 3.1 provides a general overview of the TSCA instrumentation.

Table 3.1 Overview of TSCA Instrumentation

ID	Type of Installation	Northing	Easting	Ground Surface Elevation (m)
VT1	Thermistor String	6986005	388351	298.89
VT2	Thermistor String	6986055	388352	298.84
VB1	Vibrating Wire Piezometers	6985957	388335	298.11
VB2	Vibrating Wire Piezometers	6986026	388381	297.99
VB3	Vibrating Wire Piezometers	6986079	388353	298.48
MW1	Monitoring Well	6986005	388356	298.73
MW2	Monitoring Well	6986051	388352	298.96
MW3*	Monitoring Well	6986073	388393	292.41
MW4*	Monitoring Well	6985962	388376	294.52
MW5*	Monitoring Well	6985922	388236	296.58
MW6*	Monitoring Well	6986066	388238	295.45
*Monitoring well outside of the TSCA footprint				

3.10.2.1 Thermistors

Thermistor sensors are installed at 0.5 m intervals to monitor thermal conditions with depth throughout the TSCA mine waste. The temperature readings will facilitate the establishment of long-term trends and whether permafrost will establish in the deposited waste. The temperature in the waste is also used for calibration of the vibrating wire piezometers. Table 3.2 provides installation details for thermistors.

Table 3.2 Thermistors Installation Details

ID	Serial Number	Borehole Depth (m)	Depth of lowest thermistor (m)	Elevation of lowest Thermistor (m)
VT1	4773	5.9	5.8	293.09
VT2	4774	7.0	7	291.84

3.10.2.2 Vibrating Wire Piezometers

Vibrating wire piezometers are installed to measure pore pressures. The top piezometer measures pore pressures in tailings, the bottom piezometer measures pore pressures at the bottom of the borehole near bedrock or native soil. Table 3.3 provides installation details for vibrating wire piezometers.

Table 3.3 Vibrating Wire Piezometers Installation Details

ID	Serial Number	Borehole Depth (m)	Depth of piezometer (m)	Elevation of Piezometer (m)
VB1	52115	6.4	4.95	293.16
	52116		5.95	292.16
VB2	52117	6.1	4.8	293.19
	52118		5.8	292.19
VB3	52119	7.0	5.7	292.78
	52120		6.7	291.78

3.10.3 TSCA Groundwater Monitoring

Groundwater elevation within the TSCA will be recorded using the three vibrating wire piezometers and two groundwater monitoring wells. Thermal conditions within the TSCA will be recorded using installed ground thermistors (primarily to calibrate the vibrating wire piezometer readings affected by temperature). A water level tape will also be used to record the depths to grade and top of casing/piping as potential settlement will be noted. This recorded data will be collected / downloaded during each monitoring event with current groundwater elevations being verified by taking manual measurements.

Groundwater level is an exogenous variable that will likely influence contaminant concentration; therefore, tests are required to be completed for both contaminant concentration with time as well as water level with time.

Groundwater monitoring wells (i.e. up-gradient and downgradient) will be sampled and analyzed for COCs presented in Table B-3, Appendix B to verify that contaminants contained within the engineered structure remain isolated from the surrounding environment. Groundwater monitoring downgradient of the TSCA is anticipated to demonstrate a transient increase in contaminant concentrations resulting from the construction disturbance, and then to fall back to a steady-state. Action levels will be considered met if groundwater COC concentrations within the TSCA remain stable or below those observed after construction is completed and/or remain below applicable guidelines. Although the focus will be on

contaminant concentrations downgradient of the TSCA, the contaminant concentrations in monitoring wells within the TSCA will also be monitored for reference purposes. Groundwater COC concentrations will also be used as indicators for potential COCs in the downgradient surface water. A trigger for action and review and/or modification of the monitoring frequency and/or remedial design components may be required if COC concentrations, after having obtained sufficient data to establish a trend, are observed to be increasing and/or above applicable guidelines for three consecutive bi-annual monitoring events.

Action levels will be considered met when groundwater elevations within the TSCA remain stable or below those observed after construction is completed. Although the focus will be on the groundwater elevations within the TSCA, the groundwater elevations in monitoring wells downgradient of the TSCA will also be monitored for reference purposes. Action levels will be considered to not be met if groundwater elevations within the TSCA increase above those observed after construction is completed. A trigger for action and review and/or modification of the monitoring frequency and/or remedial design components may be required if groundwater level trends within the TSCA, after having obtained sufficient data to establish a trend, are observed to be increasing for three consecutive bi-annual monitoring events after construction. Table 3.4 provides installation details from monitoring wells including screen horizons.

Table 3.4 Monitoring Wells Installation Details

Borehole ID	Northing	Easting	Borehole Depth	Top of Screen		Bottom of Screen	
				Depth	Elevation	Depth	Elevation
MW#1	6986005	388356	5.3	2.1	291.33	5.2	286.13
MW#2	6986051	388352	7.1	4	287.86	7	280.86
MW#3*	6986073	388393	7.2	5.7	279.51	7.2	272.31
MW#4*	6985962	388376	3.8	2.3	288.42	3.8	284.62
MW#5*	6985922	388236	4.8	3.2	288.58	4.75	283.83
MW#6*	6986066	388238	5.4	3.9	286.15	5.4	280.75

*Monitoring well outside of the TSCA footprint and part of the SNP sampling

3.10.4 TSCA Surface Water Sampling

SNP Station 2016-8 includes locations of potential discharge from the TSCA that are expected to discharge towards Gordon Lake. These stations encompass monitoring requirements to assess TSCA performance and identify associated potential environmental impacts. Section 3.11 provides specific information regarding SNP sampling.

3.10.5 Settlement

Monitoring of differential settlements is part of bi-annual inspections and should be evaluated visually by inspecting the TSCA top cover for any depressions exceeding 0.5 m (trigger level). In the event of a depression, the area should be clearly marked for future monitoring and the BGM liner should be tested for any failures. It is also recommended that settlement be monitored by measuring the instrumentation stick-ups of pipes and casings. As-built instrumentation stick-ups are listed in Table 3.5.

Table 3.5 Instrumentation Stick-Up Details

ID	Type of Installation	Pipe		Casing	
		Stickup Length (m)	Top Elevation (m)	Stickup Length (m)	Top Elevation (m)
VT1	Thermistor String	0.20	299.09	1.00	299.89
VT2	Thermistor String	0.35	299.19	1.00	299.84
VB1	Vibrating Wire Piezometer	0.73	298.84	1.00	299.11
VB2	Vibrating Wire Piezometer	0.60	298.59	0.87	298.86
VB3	Vibrating Wire Piezometer	0.62	299.10	0.99	299.47
MW1	Monitoring Well	0.87	299.60	1.00	299.73
MW2	Monitoring Well	0.87	299.83	0.96	299.92

3.11 SNP MONITORING

SNP monitoring includes the TSCA as well as areas downgradient of significant remedial excavations as established by MVLWB as presented in Annex A, Part B of the WL issued for the Project. SNP Stations 2016-7, 2016-8 and 2016-11 are applicable to the Phase I LTM. SNP Stations 2016-7 and 2016-8 are associated with the TSCA (groundwater and discharge monitoring) and encompass monitoring requirements to assess TSCA performance and identify associated potential environmental impacts. SNP Station 2016-11 is associated with surface water sampling downgradient of significant remedial excavations.

The decision rules for the SNP monitoring have been developed to consider the TSCA performance / monitoring requirements and the significant construction activities completed at the GLG Sites. For the purpose of establishing decision rules associated with SNP monitoring, decisions will be predominantly based on statistically significant trends (increasing, decreasing, or stable). COC concentration data will be collected and used to establish trends from which management decisions can be made. In general, a trigger for action and review and/or modification of the monitoring frequency and/or remedial design components may be required if COC concentrations, after having obtained sufficient data to establish a trend, are observed to be increasing and/or above applicable guidelines for three consecutive bi-annual monitoring events.

It should be noted that SNP Station 2016-11 will be monitored bi-annually to account for seasonality. The frequency with be re-evaluated after four sampling events (prior to Year 3) in correlation with erosion monitoring. Downgradient surface water sampling may be completed if potential concerns are identified. SNP Stations 2016-7 and 2016-8 have been adjusted to a bi-annual frequency to align the SNP monitoring as practically as possible. Furthermore, the action levels and exit criteria for SNP Stations 2016-7, 2016-8, and 2016-11 are intended to be similar for consistent decision-making.

Any exogenous variables that will likely influence contaminant concentrations will be evaluated (e.g., seasonality, water level, total suspended solids), including considerations for both contaminant concentration with time as well as influencing exogenous variables with time. Potential mitigative actions are summarized in Table B-2, Appendix B.

Specific SNP monitoring details are summarized in Table 3.6 with additional details outlined in Table B-3, Appendix B. SNP stations have been included on the figures in Appendix A as approximate locations based on previous sampling and anticipated locations (e.g. TSCA discharge locations).

Table 3.6 SNP Sampling Locations

Description	SNP Station	Location	LTM Sampling Frequency	Parameters
Station 7 Monitoring Well Locations at TSCA	2016-7a	Camlaren	Adjusted from monthly to bi-annually*	• Nutrients[a] • Standard[b] • Major Ions[c] • Solids[d] • Total Metals[e] • Hydrocarbons[f]
	2016-7b	Camlaren		
	2016-7c	Camlaren		
	2016-7d	Camlaren		
Station 8 Discharge Locations at TSCA	2016-8a	Camlaren	Adjusted from monthly to bi-annually*	• Ammonia as N • Nitrate as N • Nitrite as N • TSS • TDS • Extractable Petroleum Hydrocarbons • Standard[b] • Major Ions[c] • Total Metals[e]
	2016-8b	Camlaren		
	2016-8c	Camlaren		
Station 11 Surface Water Sample Locations (downgradient of significant excavation areas)	2016-11a	Burnt Island	Bi-annual monitoring to account for seasonality* Re-evaluate frequency after 4 sampling events (prior to Year 3) in correlation with erosion monitoring. The confirmatory sampling was meant to be specific for post-construction for the short-term. The backfilled areas will continue to be monitored as planned and downgradient surface water sampling may be completed if potential concerns are identified.	• Ammonia as N • Nitrate as N • Nitrite as N • TSS • TDS • Extractable Petroleum Hydrocarbons • Standard[b] • Major Ions[c] • Total Metals[e]
	2016-11b1	Camlaren		
	2016-11b2	Camlaren		
	2016-11b3	Camlaren		
	2016-11b4	Camlaren		
	2016-11c	Zenith Island		
	2016-11d	Kidney Pond		
	2016-11e	Tracey		
	2016-11f	West Bay		

Notes:

* Adjusted to align the SNP monitoring as practically as possible. The action levels and exit criteria for SNP Stations 2016-7, 8, and 11 are intended to be similar for consistent decision-making.

a. Total ammonia (NH_3 + NH_4+ -N), Total Nitrate + Nitrite (NO_3 + NO_2), Total Phosphorous, Orthophosphate, and Total Organic Carbon.

b. pH, Temperature, and Conductivity. These parameters should be measured both in the field as well as in the laboratory.

c. Alkalinity, Calcium, Chloride, Hardness, Magnesium, Potassium, Sodium, and Sulphate (SO_4).

d. Total Suspended Solids (TSS) and Total Dissolved Solids (TDS).

e. Full = Total elemental analysis by ICP-Metal Scan of: ICP-MS 24 element scan: includes all elements in Total Metals plus Antimony, Arsenic, Barium, Bismuth, Cesium, Chromium, Lithium, Thallium, Titanium, Uranium, & Vanadium.

f. Extractable Hydrocarbons, and Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX).

3.12 SURFACE WATER SAMPLING – WEST BAY

Surface water samples for West Bay were incorporated into the Phase I LTM to monitor any effects from the waste rock piles (refer to Section 3.7). Sample locations and parameters analyzed are outlined in Table 3.7.

Table 3.7 Surface Water Sampling

LTM Station	Sampling Frequency	Parameters
PIT1	Quinquennially	• Ammonia as N • Nitrate as N • Nitrite as N • TSS • TDS • Extractable Petroleum Hydrocarbons • Standard[a] • Major Ions[b] • Total Metals[c]
PIT2		
WET1		
WET2		
GL1		
GL2		
GL3		
PIT1		
PIT2		

Notes:
a. pH, Temperature, and Conductivity. These parameters should be measured both in the field as well as by the laboratory.
b. Alkalinity, Calcium, Chloride, Hardness, Magnesium, Potassium, Sodium, and Sulphate (SO_4).
c. Full = Total elemental analysis by ICP-Metal Scan of: ICP-MS 24 element scan: includes all elements in Total Metals plus Antimony, Arsenic, Barium, Bismuth, Cesium, Chromium, Lithium, Thallium, Titanium, Uranium, & Vanadium.

4.0 YEAR TWO RESULTS

Year 2 LTM site visits were conducted at the GLG Sites on July 16 and 17, and September 3 and 4, 2020 by Stantec for the purpose of data collection to assess hazard components of the LTM and support characterization of post-remediation conditions. The results are outlined in the sections below. Daily field reports are presented in Appendix C.

4.1 VISUAL MONITORING

4.1.1 Backfilled/Covered Area Monitoring

Backfilled/covered areas identified for LTM are to be monitored biennially (i.e. Years 1, 3, 5) as outlined in Table B-2 (Appendix B). Monitoring was completed in Year 1 and no major concerns were identified. No backfilled/covered area monitoring was required in Year 2.

Surface water monitoring was completed downgradient of backfilled remedial excavations with potentially high erosion risk (associated with SNP Station 2016-11) and included total suspended solids (TSS). Refer to Section 4.3 for results of the SNP sampling.

4.1.2 Mine Opening Monitoring

Closures of mine openings identified for LTM are to be monitored quinquennially (i.e. Years 1 and 5) as outlined in Table B-2 (Appendix B). Monitoring was completed in Year 1 and deficiencies were identified which were considered triggers for adaptive management. These were therefore included in Year 2 monitoring. The results of Year 2 monitoring are presented in Table 4.1.

Closures of mine openings identified for LTM were visually inspected for settlement, erosion and structural stability (e.g. deformation, cracking) where applicable.

Detailed Inspection Records and a Photographic Log are presented in Appendix D and Appendix E, respectively.

Table 4.1 Summary of Mine Opening Monitoring Results

Site Name	Hazard Name	Area Description	Figure in Appendix A / Photograph ID in Appendix E	Year 1 Monitoring Results	Year 2 Monitoring Results
Kidney Pond	Portal	The portal opening and mine tunnel were closed with granular fill.	A4.3 / Kidney Pond-3	Slumping and minor erosion of granular fill was identified following remediation. Fill was manually placed in slump area and wattles installed for erosion control during the July 2019 site visit. Slumping was noted to be more severe during the September site visit.	Severe slumping of granular fill was identified in July 2020 and portal entrance exposed.

4.1.3 Moderate Risk Waste Rock Left in Place Monitoring

Moderate risk waste rock left in place is to be monitored quinquennially (i.e. Years 1 and 5) as outlined in Table B-2 (Appendix B). Visual inspections for ARD-related impacts were completed in Year 1 at all locations except GOO_WR_01 due to time and logistical limitations. A visual inspection was planned for this location in Year 2 but was not completed, due to an oversight. It is recommended that this visual inspection occur in Year 3.

4.1.4 Vegetation Monitoring

To evaluate vegetation success, visual inspections are conducted for areas in which vegetation efforts were completed by Flat River Consulting in 2018, including the TSCA at Camlaren, the Camlaren south shoreline, Zenith Island, Kidney Pond Portal area and Treacy Mill area.

Except for performance monitoring associated with the TSCA, monitoring criteria has not been specified for vegetated areas. The vegetated locations are to be monitored on a biennial basis (simultaneously with erosion inspections) to record information regarding vegetation health and confirm stable or increasing growth. Vegetation monitoring was completed in Year 1 and increased growth was observed for select species in monitoring areas.

Directed vegetation monitoring was not required in Year 2, but performance monitoring of the TSCA is completed biannually (simultaneously with chemical monitoring) and includes evaluation of vegetative growth. A photographic log is presented in Appendix E and a summary of results is presented in Table 4.2.

Table 4.2 Summary of Results - Vegetation Monitoring

Site Name	Revegetation Efforts Completed by Flat River Consulting (Flat River Consulting, 2018)	Monitoring Results (Photograph ID, Appendix E)
TSCA	• Smiles: 11m ECM placed on slopes held in place with metal stakes. • Willow stakes: willow stems were cut and planted on the down gradient side of the Smiles and in trenches in the northeast corner of the TSCA. • Transplants: grass was planted in the Smiles on the north slope. • Seeds: Broken alder cones, lingonberry, soapberry, common yarrow, rose, fireweed, bearberry, raspberry, juniper, gooseberry and slender wild seeds were spread across the TSCA. • Slash: salvaged trees and shrubs randomly spread perpendicular to the shallow sloped top of the cell.	• Smiles in good condition (TSCA-2, 4, 5, and 7). • Less than half of the willow plants show some initial growth. • No significant vegetation on crest and slope of the berm. • No deep root species were identified at the TSCA.

4.1.5 Risk Management Approach (Land Use) Monitoring

There have been no changes in land uses as those defined in the risk management evaluation.

4.2 TAILINGS AND SOIL CONTAINMENT AREA

LTM activities at the TSCA were conducted in July 2020 and included a visual inspection of the top cover, slopes, toes, ditches, and instrumentation for signs of erosion, settlement, seepage, structural failure and/or compromised liner and/or cap integrity. In addition to TSCA LTM activities, a bi-annual geotechnical inspection was completed on September 3, 2020. The following sections include results from both the July 2020 LTM site visit and the geotechnical inspection.

4.2.1 Performance Monitoring

4.2.1.1 July 2020

During the July 2020 site visit, a visual inspection of the TSCA top cover, slopes, toes, ditches and instrumentation was completed to identify potential signs of erosion, settlement, seepage and/or structural failure.

Erosion channels were identified on the west side of the TSCA as well as an area of moist sand on the north side indicating a potential seepage point. No other deficiencies were observed regarding TSCA performance. Detailed Inspection Records and a Photographic Log are presented in Appendix D and Appendix E, respectively. A summary of monitoring results based on the threshold values outlined in Section 3.10.1 is provided in Table 4.3.

Table 4.3 TSCA Performance Monitoring Summary

Threshold Description	Observations
Differential settlement of greater than 0.5 m (including for instrumentation stick-ups).	No concerns identified.
Slopes slumping with horizontal cracks/movement of greater than 0.3 m.	No concerns identified.
Slopes or cover erosion resulting in greater than 25% loss of material thickness.	No concerns identified.
Frost heave effects greater than 0.2 m	No concerns identified.
Vegetation (primarily tree species) observed that typically develop roots deeper than 0.3 m.	No concerns identified.
Animal activities, such as burrowing, resulting in depth greater than 0.3 m.	No concerns identified.
Erosion control coconut matting (full semi-circle, approximate length of 5 m) is no longer deemed effective.	No major concerns identified. Some erosion channels observed on west side of TSCA.
Ditch erosion exposes any amount of BGM (i.e. visible liner).	No concerns identified.
Ditch blockage of any debris/object that impedes flow or causes ponding.	No concerns identified.
Seepage	Moist sand identified on north side of the TSCA as potential seepage area (refer to photographs TSCA-6 and 7 in Appendix E).

4.2.1.2 September 2020 Geotechnical Inspection

No significant issues or concerns with respect to dam safety were observed by Stantec at the time of the geotechnical inspection on September 3, 2020. The following observations were made:

- In general, the TSCA cover and slopes were stable except for localized surface erosion and minor settlements in some areas.
- The toe drains on the north and the southeast corner were dry, and no seepage was observed at the time of inspection. Also, no sign of fines accumulation was observed in the toe drains.

- The perimeter ditch on the north was clear and no blockages were observed. There was standing water in the south perimeter ditch, due to an undulating invert.
- A localized depression covering an area of 10 m by 5 m was observed at the top of the cover towards the north perimeter. The depth of the depression was approximately 0.2 m to 0.3 m below surrounding grade level. Additionally, two (2) depressions about 0.15 m deep were observed in the same general area.
- Surface cracks were observed at the top of cover close to the northern perimeter adjacent to the depression zone.
- Surface erosion (50-130 mm) was noted on the north and northwest slopes, as the finer material was washed out exposing coarse material.
- New, deeper erosion (up to 120 mm) was observed on the west slopes. The BGM liner was exposed in two (2) places.
- No significant vegetation has established itself on the slopes. Some early growth in willow plants was observed but a significant number of the plants have died.
- Two (2) shallow (up to 150 mm) holes made by a burrowing animal were noted on the south slope and were refilled.

Observations and recommended actions based on the geotechnical inspection are presented in Table 4.4. For reference, the 2020 Geotechnical Inspection is included in Appendix F.

Table 4.4 Summary of Observations / Issues and Corresponding Recommendations

#	Observation / Issue	LTM Plan Adaptive Management Triggered[1]	Recommendation	Comment
1	Three (3) depressions up to 0.3 m deep at top of TSCA cover near the north perimeter.	No	Continue to monitor these depressions.	Inspection item for 2021.
2	Animal burrows at the south slope.	No	Repaired.	Resolved.
3	Erosion at the slope on north face.	No	Continue to monitor this area.	Inspection item for 2021.
4	Erosion at the slope on northwest and west face.	Yes[2]	Repair the erosion, provide additional cover, perform trade-off study for the long-term best option.	Should be addressed in the Summer 2021.
5	Slow vegetation growth, loose coco-mats.	Yes[3]	Refasten coco-mats, consider other alternatives for erosion control or vegetation.	Should be addressed in the Summer 2021.
6	Some settlement is expected within the first 2-3 years following construction. This should be quantified.	No	Continue bi-annual inspection schedule. The next inspection should be performed after freshet in Spring/Summer 2021. Special attention should be paid to monitoring settlement of the top cover. Measurements of stick-ups and instrumentation casings should be included in the bi-annual monitoring.	Inspection item for 2021.

Table 4.4 Summary of Observations / Issues and Corresponding Recommendations

#	Observation / Issue	LTM Plan Adaptive Management Triggered[1]	Recommendation	Comment
7	Possible long-term settlement.	No	Resurvey the entire covered area if settlement continues.	Review action plan following 2021 inspection.
8	Piezometric trigger levels, instrumentation monitoring.	N/A - Trigger levels not established	Review piezometric levels plus thermistors bi-annually. More frequent monitoring would provide better interpretation data. Establish piezometric trigger levels for the purpose of dam safety and an action plan to mitigate levels if triggers are reached. Update the LTM Plan and OMS Plan accordingly. Automated remote monitoring system is also recommended.	Should be addressed before the Summer 2021.
9	VT1 and MW1.	No	VT1 thermistor's wires are switched, these should be corrected. The blockage in MW1 should be removed.	As soon as possible.
10	Repair undulating bottom of the South Ditch.	No	This can be done by filling the depressions and providing the liner patch over the filled area.	Should be addressed in the Summer 2021.
11	Exposed liner at the West Ditch.	Yes[4]	Provide additional rip rap at the West Ditch.	Should be addressed in the Summer 2021.
12	Protect instrumentation from potential damage by wildlife.	Not part of LTM Plan	Install wooden boxes with cover over the instrumentation.	Should be addressed in the Summer 2021.
13	Classify Dam in accordance with CDA.	Not part of LTM Plan	It is recommended that the Dam be classified as per CDA (refer to Table 2.1 in CDA 2007 [2013 Edition]). Re-evaluate classification assessment report (dated Feb 28, 2020). Refer to classification report for additional recommendations.	This is non-compliance with the CDA guidelines and should be performed as soon as possible.
14	Insufficient piezometers in critical areas.	Not part of LTM Plan	Additional piezometers are recommended in critical areas for slope stability in the north and to better understand the phreatic surface within the TSCA.	Should be addressed in the Summer 2021.

Notes:
[1]As per Section 3.2.2 and Table B-2 (Appendix B) of the LTM Plan
[2]Slopes or cover erosion >25% loss of material thickness
[3]Coco matting (~5 m) is no longer deemed effective / Vegetative health observed to be decreasing
[4]Exposure of any amount of BGM in the ditches (i.e. visible liner)

4.2.2 TSCA Instrumentation

TSCA instrumentation includes two (2) thermistors, two (2) standpipe monitoring wells, and three (3) locations for vibrating wire piezometers with double nested vibrating wire sensors. In addition, there are four (4) monitoring wells outside of the TSCA footprint installed as part of the TSCA perimeter monitoring for the SNP sampling (refer to Section 3.10.2 for further details). Instrumentation data is discussed in detail in the 2020 Geotechnical Inspection Report (Appendix F), and a summary is provided below.

4.2.2.1 Thermistors

Data from the thermistors and VWPs were downloaded on September 4, 2020.

Temperature data from VT1 was not recorded between December 23, 2018 and October 18, 2019 as the thermistor was damaged. The VT1 thermistor was repaired in September 2019 but based on a review of the data following repair, it was determined that the wires may have been switched.

The VT2 profiles indicate a range of temperature near the surface ranging from approximately -25°C in the winter season to 20°C in the summer season. The monthly average temperatures below surface generally indicate an active zone to about 5 m below the ground surface or to elevation 294.0 m. Within the active zone, the temperature profiles fluctuate seasonally but are gradual between the surface temperature and the constant temperature zone below 5 m, where the temperature is near or just above the freezing point. The temperature profiles for VT1 are similar based on limited data from September 2018 to December 2018.

4.2.2.2 Vibrating Wire Piezometers

Piezometer readings in terms of total heads for each VWP at three (3) locations (VB1, VB2 and VB3) were analyzed for a period between September 13, 2018 and September 4, 2020. At each location, the top piezometer measures pore pressures in the tailings, the bottom piezometer measures pore pressures at the bottom of the borehole near the bedrock or native soil. In general, the top and bottom piezometers showed similar trends throughout this period.

A review of the piezometric data for two (2) full seasons show the piezometric levels are cyclic over a 12-month period. The levels are lowest in the spring or early summer from May to June and then rise during the summer and fall reaching the peak in October to November. From the peak levels the piezometric levels gradually decrease until May/June when another cycle starts again.

We note that negative pore pressures were observed in VB2 during May/June.

In VB2 there appears to be downward vertical gradient. The difference in the total head measured by the two piezometers at VB2 is generally constant (i.e. two piezometric lines are parallel). In addition, the small increases and decreases recorded in both the upper and lower piezometers mirror each other almost exactly which is unusual.

In 2018, there was a similar slight gradient in other VWP locations, however it was not observed during 2019. A downward gradient indicates a downward flow of water from within the TSCA toward the underlying foundation soils and bedrock. This situation could result in contaminant transport from the TSCA to the groundwater in the area beneath and around the TSCA.

4.2.2.3 Monitoring Wells

4.2.2.3.1 Water Levels

Since installation in September 2018, there have been five measurements of water levels within the monitoring wells: September 2018, July 2019, September 2019, July 2020, and September 2020.

In the two monitoring wells installed in the TSCA, the readings appear consistent with that from the VWPs, showing seasonal fluctuations. A water level in MW1 was not able to be obtained in September 2020; there appeared to be a blockage (ice or dirt) that should be removed.

The maximum recorded water level in the TSCA, 296.4 m, was recorded in MW1 in September 2019. Table 4.5 presents the water level monitoring results from the two piezometers installed within the TSCA impoundment, MW1 and MW2.

Water levels in MW3 to MW6 are showing a different pattern and are more influenced by the fluctuating water levels in the lake.

Table 4.5 presents the water level monitoring data from the two piezometers installed within the TSCA impoundment (i.e.MW1 and MW2) and the four piezometers installed outside the TSCA impoundment (i.e. MW3, MW4, MW5 and MW6).

Table 4.5 Groundwater Levels in Monitoring Wells

Monitoring Well	14-Sept-18	16-Sept-18	July 8-10, 2019	September 10-11, 2019	17-Jul-20	3-Sept-20
MW1	295.94	295.90	Frozen	296.35 m	295.30 (ice)	Blockage at 295.70
MW2	Dry	-	293.37 m	293.87 m	293.61	293.94
MW3*	290.97	290.35	291.07 m	291.06 m	291.25	291.17
MW4*	290.57	292.56	292.85 m	292.86 m	293.35	292.95
MW5*	-	292.34	292.82 m	293.12 m	293.05	292.60
MW6*	-	290.90	294.15 m	294.07 m	294.16	294.12
*Monitoring well outside the TSCA footprint						

The following is a summary regarding the latest observed piezometric data:

- Due to the placement of a cover system over the TSCA, it was anticipated that piezometric levels would likely decrease with time. However, both the VWP and the GW piezometers indicate slightly increased water levels in the fall of 2019 and fall 2020. There seems to be a seasonality in fluctuating water levels within 1-2 m for each piezometer. The highest water levels appear to be in the fall 2019 and 2020, the lowest water level appear to be in May – June 2019 and 2020. The water levels need to be further monitored to confirm this trend. The increase in piezometric levels could be caused by increase in the local groundwater level, which may have a seasonal variation and/or could be influenced by changes in overall water levels in the lake.
- However, the increase in water levels in the TSCA could also indicate damage to the TSCA cover and surface water infiltration. Continued monitoring of these piezometers may assist in further evaluating this. Additionally, a review of historical groundwater data from this area could also be useful to evaluate if this increase is seasonal or due to changed infiltration conditions.
- The seasonal fluctuations in the groundwater levels could be influenced by overall changes in the lake water levels and the groundwater system, groundwater recharge after the spring freshet, or increased infiltration if the geomembrane has leaks.
- The difference in head at piezometer VB2 is indicative of a downward seepage gradient. However, a similar gradient is not seen at VB1 or VB3. This may indicate the potential for higher seepage flows from the TSCA to the underlying foundation and surrounding area due to more permeable foundation conditions at VB2 than at the two other piezometer locations. A downward gradient at this location could also indicate that the rising piezometric levels are due to increased surface water infiltration, not a groundwater level increase (as a groundwater level increase would be associated with decrease of downward gradient). Finally, these could be also the error in readings caused by the faulty piezometer.
- The gradient difference in the total head measured by the two piezometers at VB2 is more or less constant (i.e. two piezometric lines are parallel). In addition, the small increases and decreases recorded in both the upper and lower piezometers mirror each other almost exactly at VB2 which is unusual. This phenomenon is hard to explain and should be further researched.
- Continued monitoring of the piezometers and monitoring wells over several seasons will provide insight into whether seasonal trends are influencing the water levels. In addition, the lake levels should be monitored at frequencies sufficient to enable evaluation of their influence on the water levels.

Currently, overall piezometric levels are acceptable and do not trigger any action. The water levels and pore pressures should continue to be monitored to assess the performance of the TSCA. It is recommended that the water levels are reviewed and assessed bi-annually, to confirm that there is no unusual water level rise that could have impact on TSCA slopes stability.

4.2.2.3.2 Groundwater Monitoring and Sampling

Groundwater monitoring and sampling activities were completed at monitoring well MW2 inside the TSCA on July 17 and September 3, 2020. MW1 could not be monitored or sampled because of blockage(s) during the July and September monitoring events. As outlined in Section 2.2.1.1, the groundwater analytical results were compared to the FIGQGs. Analytical results are presented in Table G-1 in Appendix G and laboratory certificates of analysis (COAs) are included in Appendix H. A summary of the groundwater levels and analytical results at the TSCA is outlined in Table 4.6 below.

Table 4.6 Summary of TSCA Groundwater Results

Monitoring Well ID	Date (Y/M/D)	Depth to Product (m)	Depth to Water (m)	Depth to Bottom (m)	Analytical Results
MW1	2020/07/17	-	-	4.44	No sample collected
	2020/09/03	-	-	-	No sample collected
MW2	2020/07/17	-	6.32	8.13	Concentrations of chloride, nitrite (July only), nitrite (as N) (July only), sulfate, total dissolved solids (July only), dissolved iron, dissolved manganese, total aluminum (July only), total arsenic, total cadmium, total chromium (July only), total cobalt, total copper (July only), total iron, total lead (July only), total manganese, total nickel, total selenium, total uranium and total zinc detected in samples CAM_GW_MW2_2020_01 and/or CAM_GW_MW2_2020_02 exceeded FIGQG.
	2020/09/03	-	5.98	8.09	

In situ field data is presented in Table G-3, Appendix G.

The potential for statistical analysis was evaluated and although a trend can technically be obtained from three data points, more data points are preferred to more accurately interpret a given dataset. It was determined that sufficient data is not available to identify an increasing or decreasing chemical concentration in post construction groundwater analysis.

In addition to MWs 1 and 2, SNP monitoring includes groundwater monitoring downgradient of the TSCA (SNP Station 2016-7). MWs 3-6 (i.e. SNP Station 2016-7) are applicable to the Phase I LTM and encompass monitoring requirements to assess TSCA performance and identify associated potential environmental impacts. Section 4.3 outlines the results of the SNP sampling.

4.2.3 TSCA Surface Water Sampling

There was no surface water present at any of the locations associated with SNP Station 2016-8 in July or September 2020, therefore no samples were collected.

4.2.4 Settlement

Settlement was monitored by visual observation. During the 2019 inspection, a ground depression up to 0.3 m deep was observed at the top of cover of the TSCA near the North perimeter. The same depression was observed during the 2020 inspection. The depression area was approximately 10 m by 5 m and was bounded by surface cracks in an oval shape. There was no change to the dimension, or the depth of area as compared to the 2019 observations. There were two additional smaller depressions observed in 2020 that were about 0.15 m deep, observed near VB2.

The depressions could be caused by settlements related to consolidation of tailings or melting of the ice that may have been present within waste rock placed during construction in 2018. As described in the DBR, this type of settlement was anticipated. The identified settlement does not meet the trigger level identified in the OMS.

These areas of settlement should be monitored in upcoming bi-annual inspections. To facilitate monitoring, a settlement plate could be installed to the BGM liner with a fixed stick up, that could be measured during inspections. The settled area should be refilled to prevent water accumulation.

No settlement was observed at perimeter slopes and the areas close to the toe drain during the inspection.

4.3 SNP MONITORING

SNP monitoring and sampling activities were completed between July 16-17, and September 3-4, 2020. SNP Stations 2016-7, 2016-8 and 2016-11 are applicable to the Phase I LTM, which include the TSCA and areas downgradient of significant remedial excavations. SNP Stations 2016-7 and 2016-8 encompass monitoring requirements to assess TSCA performance and identify associated potential environmental impacts. Station 2016-7 includes the monitoring wells around the TSCA, and Station 2016-8 includes locations of potential discharge from the TSCA that are expected to discharge towards Gordon Lake. SNP Station 2016-11 encompasses monitoring requirements downgradient of significant remedial excavations to identify associated potential environmental impacts.

Refer to the Surveillance Network Program Monthly Reports for July and September 2020 for analytical results, laboratory COAs, and a more detailed discussion of SNP sampling results. A summary is provided in the following sections.

4.3.1 Groundwater

SNP Station 2016-7 includes the groundwater monitoring wells located downgradient of the TSCA (MW3, MW4, MW5 and MW6). As an indicator associated with TSCA performance, groundwater levels are anticipated to remain stable or below those observed after construction completion. Groundwater levels are presented in Table 4.5 (Section 4.2.2.3.1).

In addition to water level stability, groundwater monitoring is anticipated to demonstrate a transient increase in contaminant concentrations resulting from the construction disturbance, and then to fall back to a steady state. As outlined in Section 2.2.1.1, the groundwater analytical results were compared to the FIGQGs. A summary of the results is outlined in Table 4.7 below.

In situ field data is presented in Table G-3, Appendix G. Analytical results are presented in Table G-2 (Appendix G) and laboratory COAs are included in Appendix H.

Table 4.7 SNP Groundwater Monitoring Results

SNP Station (Monitoring Well ID)	Date (Y/M/D)	Exceedances
SNP2016-7A (MW3)	2020/07/17	Concentrations of sulfate, dissolved iron, dissolved manganese, total arsenic, total iron, and total manganese indicated in sample CAM_GW_SNP_7A_2020_01 exceeded FIGQG.
	2020/09/03	Concentrations of sulfate, dissolved iron, dissolved manganese, total arsenic, total iron, and total manganese indicated in sample CAM_GW_SNP_7A_2020_02 exceeded FIGQG.
SNP2016-7B (MW4)	2020/07/17	Concentrations of PHC F2, nitrite, nitrite (as N), sulfate, dissolved iron, dissolved manganese, total aluminum, total arsenic, total copper, total iron, and total manganese indicated in sample CAM_GW_SNP_7B_2020_01 exceeded FIGQG.
	2020/09/03	Concentrations of PHC F2, sulfate, dissolved iron, dissolved manganese, total aluminum, total arsenic, total iron, and total manganese indicated in sample CAM_GW_SNP_7B_2020_02 exceeded FIGQG.
SNP2016-7C (MW5)	2020/07/17	Concentrations of sulfate, dissolved iron, dissolved manganese, total aluminum, total arsenic, total cadmium, total iron, and total manganese indicated in sample CAM_GW_SNP_7C_2020_01 exceeded FIGQG.
	2020/09/03	Concentrations of sulfate, dissolved iron, dissolved manganese, total arsenic, total cadmium, total iron, and total manganese indicated in sample CAM_GW_SNP_7C_2020_02 exceeded FIGQG.
SNP2016-7D (MW6)	2020/07/17	Concentrations of dissolved iron, dissolved manganese, total arsenic, total iron, and total manganese indicated in sample CAM_GW_SNP_7D_2020_01 exceeded FIGQG.
	2020/09/03	Concentrations of nitrite, nitrite (as N), sulfate, total and dissolved manganese indicated in sample CAM_GW_SNP_7D_2020_02 exceeded FIGQG.

The sulfate concentrations in groundwater exceeded FIGQG at three locations in July (7A, 7B, 7C) and all locations in September. For metals, the following parameters exceeded the referenced guidelines:

- Total arsenic concentrations exceeded the FIGQG and CCME guidelines in groundwater samples from all locations in July and three of the locations in September (7A, 7B, 7C).
- Total cadmium concentrations exceeded the FIGQG in groundwater samples from 7C.

- The concentration of copper detected in the groundwater sample collected from 7B in July exceeded the FIGQG and CCME guidelines.
- Concentrations of dissolved and total iron exceeded the FIGQG and CCME guidelines from all locations in July and three of the locations in September (7A, 7B, 7C).
- The FIGQG guidelines for dissolved and total manganese were exceeded by all groundwater samples from both monitoring events.

Statistical analysis was evaluated and although a trend can technically be obtained from three data points, more data points are preferred to more accurately interpret a given dataset. It was determined that sufficient data is not available to identify an increasing or decreasing chemical concentration in post construction groundwater analysis.

4.3.2 Surface Water Sampling

SNP Station 2016-8 includes locations of potential discharge from the TSCA that are expected to discharge towards Gordon Lake. There was no surface water present at any of the locations associated with SNP Station 2016-8 in July or September 2020, therefore no samples were collected.

Monitoring associated with SNP Station 2016-11 includes total suspended solids (TSS) and aligns with the backfilled remedial excavations with potentially high erosion risk. A summary of the analytical TSS results in the surface water samples is provided in Table 4.8. As outlined in Section 2.2.1.1, surface water analytical results were compared to the CCME CEQGs (FAL). Full analytical results are included in the 2020 SNP report issued for the Project (Stantec, 2020b). No exceedances of the applied guidelines were noted. In situ field data is presented in Table G-4 (Appendix G).

Table 4.8 SNP Surface Water Sampling Results

Station ID	Location	Sample Date (Y/M/D)	Sample ID	TSS (mg/L)
SNP2016-11A	Burnt Island	2020/07/16	BUR_SW_SNP_11A_2020_01	1.7
		2020/09/04	BUR_SW_SNP_11A_2020_02	7.3
SNP2016-11B1	Camlaren	2020/07/16	CAM_SW_SNP_11B1_2020_01	<1.0
		2020/09/04	CAM_SW_SNP_11B1_2020_02	<1.0
SNP2016-11B2	Camlaren	2020/07/16	CAM_SW_SNP_11B2_2020_01	<1.0
		2020/09/04	CAM_SW_SNP_1B2_2020_02	<1.0
SNP2016-11B3	Camlaren	2020/07/16	CAM_SW_SNP_11B3_2020_01	<1.0
		2020/09/04	CAM_SW_SNP_1B3_2020_02	<1.0
SNP2016-11B4	Camlaren	2020/09/04	CAM_SW_SNP_11B4_2020_01	<1.0
		2020/09/04	CAM_SW_SNP_1B4_2020_02	<1.0
SNP2016-11C	Zenith Island	2020/07/16	CAM_SW_SNP_11C_2020_01	<1.0
		2020/09/04	CAM_SW_SNP_11C_2020_02 DUP1_SW_SNP_2020_02	<1.0 3.1

Table 4.8 SNP Surface Water Sampling Results

Station ID	Location	Sample Date (Y/M/D)	Sample ID	TSS (mg/L)
SNP2016-11D	Kidney Pond	2020/07/16	KID_SW_SNP_11D_2020_01	8.9
		2020/09/04	KID_SW_SNP_11D_2020_02	2.3
SNP2016-11E	Treacy	2020/07/17	TRE_SW_SNP_11E_2020_01	<1.0
		2020/09/04	TRE_SW_SNP_11E_2020_02	1.4
SNP2016-11F	West Bay	2020/07/17	WES_SW_SNP_11F_2020_01 DUP1_SW_SNP_2020_01	<1.0 <1.0
		2020/09/04	WES_SW_SNP_11F_2020_02	1.4

4.4 SURFACE WATER SAMPLING – WEST BAY

Surface water at West Bay is to be sampled quinquennially (i.e. Years 1 and 5) as outlined in Table B-2 (Appendix B). In Year 1, samples were collected at the open pit, lakeshore near GD-37 and inland near GD-37. Results were compared to CCME FAL long-term guidelines and exceedances were reported at the open pit and inland near GD-37. These locations will be sampled again in Year 5 of LTM.

4.5 QUALITY ASSURANCE AND QUALITY CONTROL

Best practices as per relevant SOPs were applied during sampling, including the following:

- A new pair of disposable nitrile gloves was used for each sample
- Samples were placed into laboratory-supplied sample containers and preserved according to laboratory specifications
- Samples were stored in ice-packed coolers for shipment to laboratory
- Each sample was provided with a unique identifier and was controlled using laboratory chain of custody forms
- Samples were analyzed within laboratory recommended hold times (exceptions are noted below)
- Blind field duplicate (BFD) samples were submitted for 10% of all samples, and trip blanks and field blanks were analyzed, as appropriate
- Laboratory analysis of samples collected during the field program was performed by Bureau Veritas Laboratories (BV Labs). BV Labs is accredited by the Standards Council of Canada for the analyses performed and its methodologies conform to Standard CAN-P-4E (ISO/IEG 17025:2005
- BV Labs conducted routine internal QA/QC tests, which included method blanks, control standards samples, certified reference material standards, method spikes, replicates, duplicates and instrument blanks.

Results of quality control calculations (i.e. matrix spike, spiked blank, method blank and RPD calculations) for the laboratory QA/QC samples are presented in the laboratory analytical reports provided in Appendix H. Recovery and/or RPD values were within the control limits and overall quality control was said to meet acceptability criteria. The following samples were analyzed past the method specified hold times:

COA C050319V3R

- The following samples were analyzed past the method specified hold time for Orthophosphate by Konelab. As noted on the laboratory report "Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised".
  - CAM_GW_MW2_2020_01
  - DUP1_GW_2020_01
- The following samples were also analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. As noted on the laboratory report "Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised".
  - CAM_GW_MW2_2020_01
  - DUP1_GW_2020_01
- The reportable detection limit (RDL) for the following sample was raised due to concentration over linear range, sample dilution was required:
  - CAM_GW_MW2_2020_01

COA C064167V2R

- The following samples were analyzed past the method specified hold time for Orthophosphate by Konelab. As noted on the laboratory report "Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised".
  - CAM_GW_MW2_2020_02
  - DUP1_GW_2020_02
- The following samples were analyzed past the method specified hold time for Nitrogen (Nitrite - Nitrate) by IC. As noted on the laboratory report "Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised".
  - CAM_GW_MW2_2020_01
  - DUP1_GW_2020_01
- The reportable detection limit (RDL) for the following sample was raised due to concentration over linear range, sample dilution was required
  - CAM_GW_MW2_2020_02

5.0 RECOMMENDATIONS

Based on the discussion provided in Section 4.0, Stantec recommends continued long-term monitoring in Year 3 in accordance with Tables B-1 through B-4 (Appendix B). The recommended deviations are discussed below, and Table 5.1 outlines the objectives of Year 3 (i.e. 2021) LTM plan.

- Additional work is required at the Kidney Pond Portal to rectify slumping and erosion concerns. This area should be monitored in Year 3 to confirm backfilling is stable and sufficient to eliminate the hazard and control erosion.
- The backfill material at Murray Deep Trench was not accounted for in Year 1 or 2 and should be monitored in Year 3 to confirm no significant erosion or settlement is present
- The West Bay Open Pit barrier openings between the fence and ground surface should be addressed as it is not fulfilling its intended purpose. Stantec recommends a chain link skirting be attached to eliminate the potential risk of access to the Open Pit hazard to humans and/or animals.
- Verify no visual signs of ARD downgradient of the waste rock areas that were not accounted for in Year 1 and Year 2 (i.e. GOO_WR_01). The remaining waste rock monitoring areas are recommended to continue with the LTM schedule outlined in Table B-2 (quinquennially).
- Remove blockage identified in MW1
- Review piezometer water levels bi-annually to provide insight into whether seasonal trends are influencing water level and determine that there is no unusual water level rise that could have an impact on TSCA slopes stability. In addition, the lake levels should be monitored at frequencies sufficient to enable evaluation of their influence on the water levels.

Table 5.1 Year 3 Phase I LTM Components

Hazard Category	Monitoring Objective
Tailings	Verify cover material is stable with no significant resulting erosion or washout.
Mine Openings	Verify backfill material is stable with no significant resulting erosion or settlement at Kidney Pond Portal.
Vegetation	Verify vegetation growth and/or stability.
Chemical Monitoring	Verify excavation backfill material is stable with no significant resulting erosion or washout into downgradient water by examining SNP surface water results
TSCA Performance	Verify stability of cover material and slopes (includes differential settlement, slope slumping, frost heave, vegetation growth and animal activities). Inspect toe of facility and identify potential seepage. Visually monitor vegetative health to confirm stable or increasing growth. Verify TSCA permeability functionality to prevent infiltration. Verify chemical integrity of the TSCA via groundwater sampling. Verify chemical integrity of the TSCA via surface water sampling.
Adaptive Management	Complete a trend analysis of COC and water level data to evaluate management of the LTM.

In addition to the recommendations noted above, additional recommendations specific to the TSCA were presented in the 2020 Geotechnical Inspection Report (Appendix F).

6.0 CLOSURE

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report was prepared by Becky Weir, B. Tech., and reviewed by Evelyn Bostwick, M.Eng., P.Eng.

Stantec Consulting Ltd.

Digitally signed by Becky Weir
Date: 2021.03.31 13:47:08 -06'00'

Becky Weir, B.Tech.
Environmental Technician

Digitally signed by Evelyn Bostwick, M.Eng., P.Eng.
Date: 2021.03.31 16:25:29 -03'00'

Evelyn Bostwick, M.Eng., P.Eng.
Principal, Environmental Services

V:\1214\Active\121414585\05_Report _Deliverable\Deliverable\2_Ltm_2020_Report_Year_2\Fnl_Rpt_121414585_Ltm_Year2_2020_20210331.Docx

7.0 REFERENCES

ACGR, 1998, Associate Committee on Geotechnical Research). 1988. Glossary of Permafrost and Related Ground Ice Terms. National Research Council of Canada, Associate Committee on Geotechnical Research, Technical Memorandum 142.

Bleeker, W., and Villeneuve, M. 1995, Structural studies along the Slave portion of the SNORCLE transect. In Slave – Northern Cordilera Lithospheric Evaluation (SNORCLE) Transect and Cordilleran Tectonics Workshop, 8-9 April, Calgary. Compiled by F. Cook and P Erdmer. Lithoprobe Report 44, pp8-13.

CCME, 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment. Volume 3 – Suggested Operating Procedures.

CRC, 2006. Practical Handbook of Environmental Site Characterization and Groundwater Monitoring, Second Edition

Dyke, A.S. and Prest, V.K., 1987. Paleogeography of northern North America 11 000 - 8400 years ago; Geological Survey of Canada, Map 1703A.

Environment Canada (EC), 2015. Canadian Climate Normals 1981-2010

Ecosystem Classification Group. 2008. Ecological Regions of the Northwest Territories – Taiga Shield. Department of Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, NT, Canada. viii + 146 pp.

Federal Contaminated Sites Action Plan (FCSAP), 2012. Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites.

Ferguson, M.E., Waldron, J.W.F., and Bleeker, W. 2005. The Archean deep-marine environment: turbidite architecture of the Burwash Formation, Slave Province, Northwest Territories. NRC Research Press Web site at http://cjes.nrc.ca.

Flat River Consulting, 2018. Gordon Lake Group of Mines: Revegetation As-Built Report Draft. Report prepared for Nahanni Construction Limited by Flat River Consulting, dated December 2018.

Government of Northwest Territories (GNWT), 2015. Northern Land Use Guidelines- Pits and Quarries.

Heginbottom, J.A., Dubreuil, M.A. and Harker, P.A.C. 1995. Permafrost, 1995. In The national atlas of Canada. Edition 5. National Atlas Information Service, Geomatics Canada and Geological Survey of Canada. Ottawa, ON. Map.

Humphries, W. 2005. The Gordon Lake Field Guide. Retrieved from the Sandy Point Lodge Website: www.spl.yk.com/Gordon%20Lake%20Guide.pdf

Kerr, D.E., 1990, Surficial Geology of the Yellowknife River basin, parts of NTS 85I, J, O, P and 86A: NWT Geology Division; Indian and Northern Affairs Canada, EGS 1990-03.

McKenzie Valley Land and Water Board (MVLWB), 2013. Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories. In collaboration with Aboriginal Affairs and Northern Development Canada (AANDC), dated November 2013.

Mortensen, J. K., Thorpe, R. I., Padgham, W. A., King, J. E., and Davis, W. J. 1988. U-Pb zircon ages for felsic volcanism in Slave Province, N.W.T. In Radiogenic age and isotopic studies: Report 2. Geological Survey of Canada, Paper 88-2, pp. 85-95.

Olthof, I., Kerr, D.E., Wolfe, S.A., and Eagles, S., 2014. Predictive Surficial Materials and Surficial Geology from LANDSAT-7, Upper Carp Lake, NTS 85-P, Northwest Territories; Geological Survey of Canada, Open File 7601. doi:10.4095/293970

SLR, 2014. Human Health and Ecological Risk Assessment (HHERA), Gordon Lake Mine Sites. Report prepared by SLR for PWGSC, dated March 2014.

Stantec, 2016a. Final Report: Gordon Lake Group Gap Assessment Report. Report prepared by Stantec for PWGSC, dated March 2016.

Stantec, 2016b. Final Report: Gordon Lake Group Remedial Action Plan. Report prepared by Stantec for PWGSC, dated March 31, 2016.

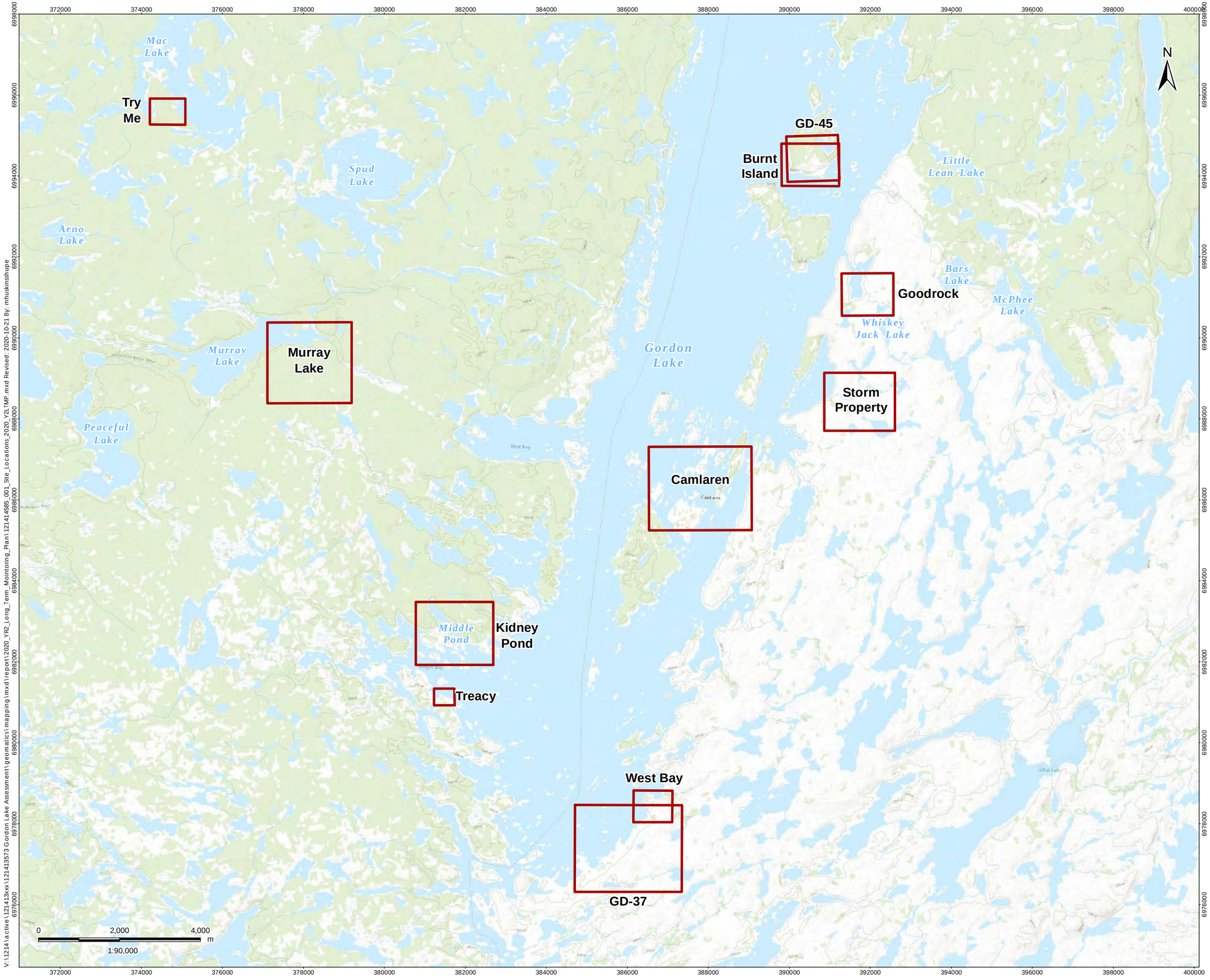
Stantec, 2020a. Final Report: Operations, Maintenance and Surveillance Plan – Gordon Lake Group of Sites. Report prepared by Stantec for PSPC and CIRNAR, dated March 31, 2020.

Stantec, 2020b. 2020 Surveillance Network Program Report for the Gordon Lake Sites - July and September Monitoring Events for the Gordon Lake Group Remediation Project, NT. Report prepared by Stantec for CIRNAC and the MVLWB, dated October 2, 2020.

.

APPENDIX A

Figures



Stantec

Legend

Site Location

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

October 2020

NAD 1983 UTM Zone 12N

121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A1

Title

Gordon Lake Group - Site Locations

V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_001_Site_Locations_2020_YR2_LTMP.mxd Revised: 2020-10-21 By: mhuskinsthupe

390000
390500
391000
6994500
6994000
N
OLD MILL AREA
SNP Station
2016-11a
SHAFT AREA
TAILINGS
IMPOUNDMENT
WASTE
ROCK AREA
Gordon Lake
0
100
200
m
1:4,000
bing
© 2020 Microsoft Corporation © 2020 Maxar ©CNES (2020) Distribution Airbus DS
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\121414\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_002_SiteOverview_2020_YR2LTMP.mxd mhuskinsthupe

Stantec

Legend
- Surface Water Sample
- Watercourse
- Waterbody
- Map Extent

Burnt Island
Gordon Lake
KEY MAP

NAD 1983 UTM Zone 12N
October 2020
121414585

Client/Project
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A1.1

Title
Burnt Island
Site Overview

390400

390500

6994500

N

Covered Tailings Area

0 10 20 m

1:500

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\1214\active\121414585_149_Burntisland_2020_YR2_Long_Term_Monitoring_Plan\121414585_149_BurntIsland_2020_YR2LTMP.mxd mhuskinshupe

V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_149_BurntIsland_2020_YR2LTMP.mxd mhuskinshupe

Stantec

Legend

Trail

Tailings

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A1.2

Title

Burnt Island - Tailings Impoundment Area
Summary of Long Term Monitoring Components

390600

6994500

N

Backfilled and Capped Mine Shaft

0 5 10 m

1:300

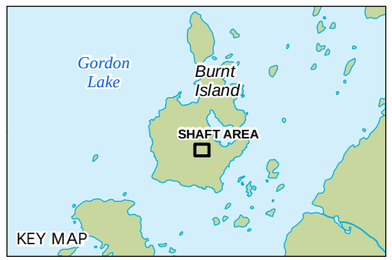
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

Y:\121414\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_149_BurntIsland_2020_YR2LTMP.mxd mhuskinshupe

Stantec

Legend

Mine Opening



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A1.3

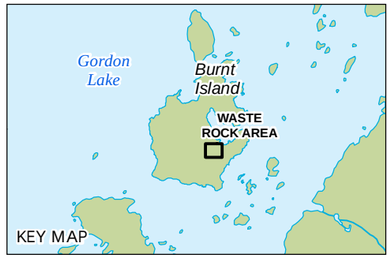
Title

Burnt Island - Shaft Area
Summary of Long Term Monitoring Components

390700
390800
390900
6994600
6994400
N
Backfilled Portal
0 10 20 30 40 m
1:700
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\12141\active\121413xx\121414585_149_Burntisland_2020_YR2_LTMP.mxd mhuskinshupe
V:\12141\active\121413xx\121414585\73 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585

Stantec

Legend
- Trail
- Mine Opening
- Waterbody



NAD 1983 UTM Zone 12N
October 2020
121414585

Client/Project
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A1.4

Title
Burnt Island - Waste Rock Area
Summary of Long Term Monitoring Components

390800
390900
6994700
6994600
N
BUR_SO_07
SNP Station
2016-11a
BUR_WR_01
TTT
1
0
10
20
m
1:600
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\12141\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020 YR2 Long Term Mointoring Plan\121414585_149 BurntIsland_2020 YR2LTMP.mxd mhuskinsshupe

Stantec

Legend
- Surface Water Sample Location
- TTT Moderately Risked Waste Rock Trench
- Moderate Risk Impacting Material
- Remedial Excavation
- Trail
- Waterbody
- Aerial Viewpoint

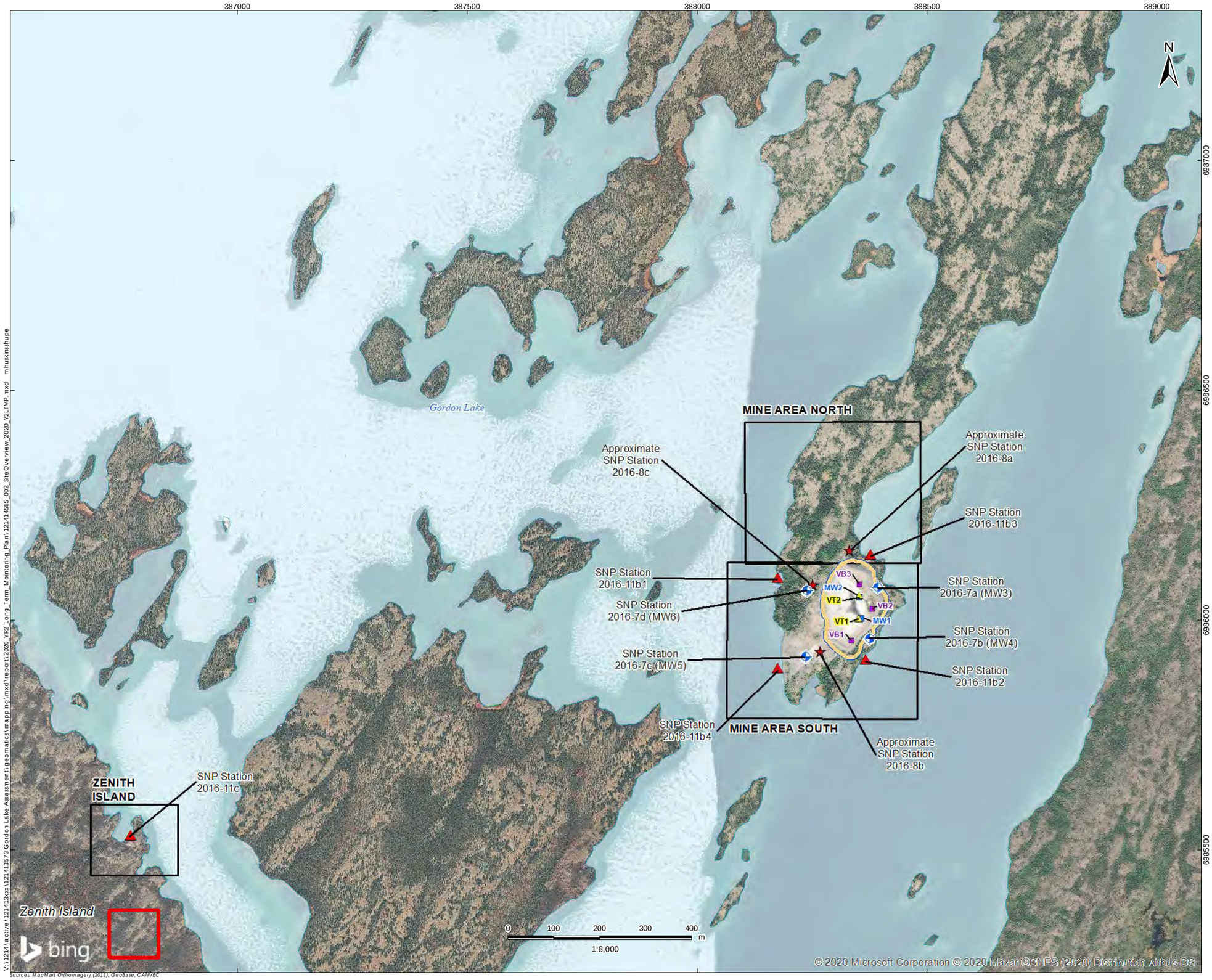
NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A1.5

Title
Burnt Island - Old Mill Area
Summary of Long Term Monitoring Components

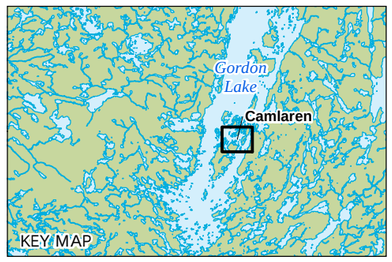


V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_002_SiteOverview_2020_YR2LTMP.mxd mhuskinsshupe

Stantec

Legend

- Approximate Discharge
- Surface Water Sample
- Groundwater Sample
- TSCA Monitoring Well
- TSCA Thermistor
- TSCA Vibrating Wire
- Approximate Camp
- Approximate Location of
- Watercourse
- Waterbody
- Map Extent



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A2.1

Title

Camlaren
Site Overview

388100 388150 388200 388250 388300 388350 388400 388450

6986100 6986050 6986000 6985950 6985900 6985850 6985800

CAM_SO_01
Approximate SNP Station 2016-8c
SNP Station 2016-11b1
SNP Station 2016-7d (MW6)
SNP Station 2016-7a (MW3)
VB3
VT2
MW2
TSCA
CAM_SO_04
CAM_SO_03
CAM_SO_05
CAM_SO_07
CAM_SO_06
CAM_SO_09
VB2
VT1
MW1
VB1
SNP Station 2016-7b (MW4)
SNP Station 2016-11b2
SNP Station 2016-7c (MW5)
Approximate SNP Station 2016-8b
SNP Station 2016-11b4
CAM_SO_10
CAM_SO_12
CAM_SO_08
CAM_SO_11
Gordon Lake
1 2 3 4 5 6 7 8 9

N

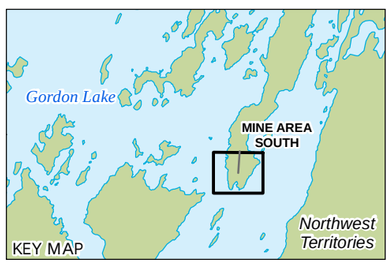
0 10 20 30 40 m
1:1,300

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\1214\active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_150_Camlaren_2020_Y2LTMP.mxd mhuskinsthupe

Stantec

Legend
- Approximate Discharge Location
- Surface Water Sample Location
- Groundwater Sample Location
- TSCA Monitoring Well
- TSCA Thermistor
- TSCA Vibrating Wire Piezometer
- Backfilled Remedial Excavation
- Remedial Excavation
- Tailings and Soil Containment Area (TSCA)
- Excavated Waste Rock
- Trail
- Waterbody
- Aerial Viewpoint
- Viewpoint



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A2.2

Title
Camlaren - Mine Area South
Summary of Long-Term Monitoring Components

388150 388200 388250 388300 388350 388400 388450

6986400 6986350 6986300 6986250 6986200 6986150

N

Gordon Lake

CAM_SO_18

CAM_SO_14

CAM_SO_19

Approximate SNP Station 2016-8a

CAM_SO_20

SNP Station 2016-11b3

CAM_SO_01

0 10 20 30 40 m

1:1,200

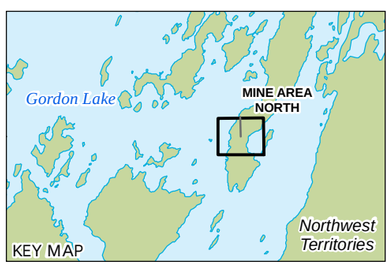
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\121414\active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_150_Camlaren_2020_Y2LTMP.mxd mhuskinsthupe

Stantec

Legend

- Approximate Discharge Location
- Surface Water Sample Location
- Backfilled Remedial Excavation
- Remedial Excavation
- Tailings and Soil Containment Area (TSCA)
- Waterbody



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A2.3

Title

Camlaren - Mine Area North
Summary of Long-Term Monitoring Components

386700
386750
386800
386850
6985600
6985550
6985500
6985450

N

1
2
3
4

Gordon Lake

CAM_SO_23

SNP Station
2016-11c

Zenith Island

Backfilled and
Capped Shaft

0 10 20 m
1:600

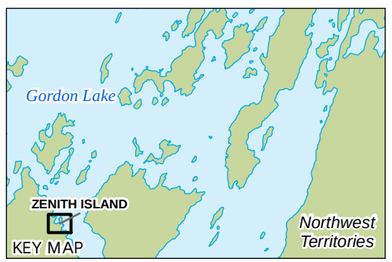
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\12141\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_150_Camlaren_2020_Y2LTMP.mxd mhuskinsthupe

Stantec

Legend

- Surface Water Sample Location
- Backfilled Remedial Excavation
- Mine Opening
- Excavated Waste Rock
- Waterbody
- Aerial Viewpoint
- Viewpoint



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A2.4

Title

Camlaren - Zenith Island
Summary of Long-Term Monitoring
Components

391500
392000
392500
6991500
6991000
CAMP AREA
MILL AREA
Gordon Lake
Whiskey Jack Lake
N
0
100
200
m
1:4,000
bing
© 2020 Microsoft Corporation © 2020 Maxar ©CNES (2020) Distribution Airbus DS
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\121414active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Moinitoring_Plan\121414585_002_SiteOverview_2020_YR2LTMP.mxd mhuskinsshupe

Stantec

Legend
- Watercourse
- Waterbody
- Map Extent

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A3.1

Title

Goodrock
Site Overview

391700
391800
391900
6991500
6991400
6991300
Gordon Lake
TTT
GOO_WR_01
N
0 10 20 30 40 m
1:1,000
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_152_Goodrock_2020_Y2LTMP.mxd mhudkinshupe

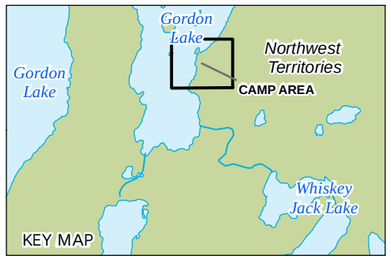
Stantec

Legend

TTT Moderately Risked Waste Rock Trench

Moderate Risk Impacting Material

Water body



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A3.2

Title

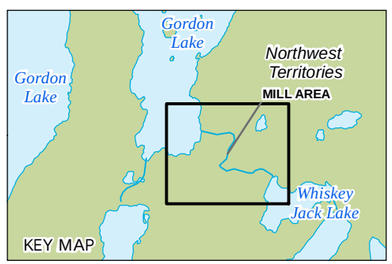
Goodrock Mine - Camp Area Summary of Long-Term Monitoring Components

391700
391800
391900
392000
392100
392200
6991200
6991100
6991000
6990900
6990800
N
Gordon Lake
GOO_HS_01
GOO_WR_02
Backfilled and Capped North Mine Shaft
Backfilled South Pit
TTT
Whiskey Jack Lake
0 10 20 30 40 50 60 70 80 m
1:2,000
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\1214\active\121413sx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020 YR2_Long_Term_Monitoring_Plan\121414585_152_Goodrock_2020_Y2LTMP.mxd mhudkinsthupe

Stantec

Legend

- TTT Moderately Risked Waste Rock Trench
- Moderate Risk Impacting Material
- Mine Opening
- Covered Hotspot
- Watercourse
- Water body



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A3.3

Title

Goodrock Mine - Mill Area Summary of Long-Term Monitoring Components

381000
381500
382000
6983000
6982500
6982000

Sentinel Lake
Kidney Pond
Middle Pond
Gordon Lake
PORTAL AREA
EXPLORATION CAMP
SNP Station 2016-11d

N

0 100 200 m
1:5,300

bing
© 2020 Microsoft Corporation © 2020 Maxar ©CNES (2020) Distribution Airbus DS

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_002_SiteOverview_2020_Y2LTMP.mxd mhuskinshupe

Stantec

Legend
- Surface Water Sample Location
- Watercourse
- Waterbody
- Map Extent

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A4.1

Title
Kidney Pond
Site Overview

382350
382400
382450
6982350
6982300
N
Gordon Lake
KID_WR_04
TTT
TTT
TTT
TTT
TTT
0
10
20
m
1:500
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_153_Kidney_2020_Y2LTMP.mxd mhuskinsthupe

Stantec

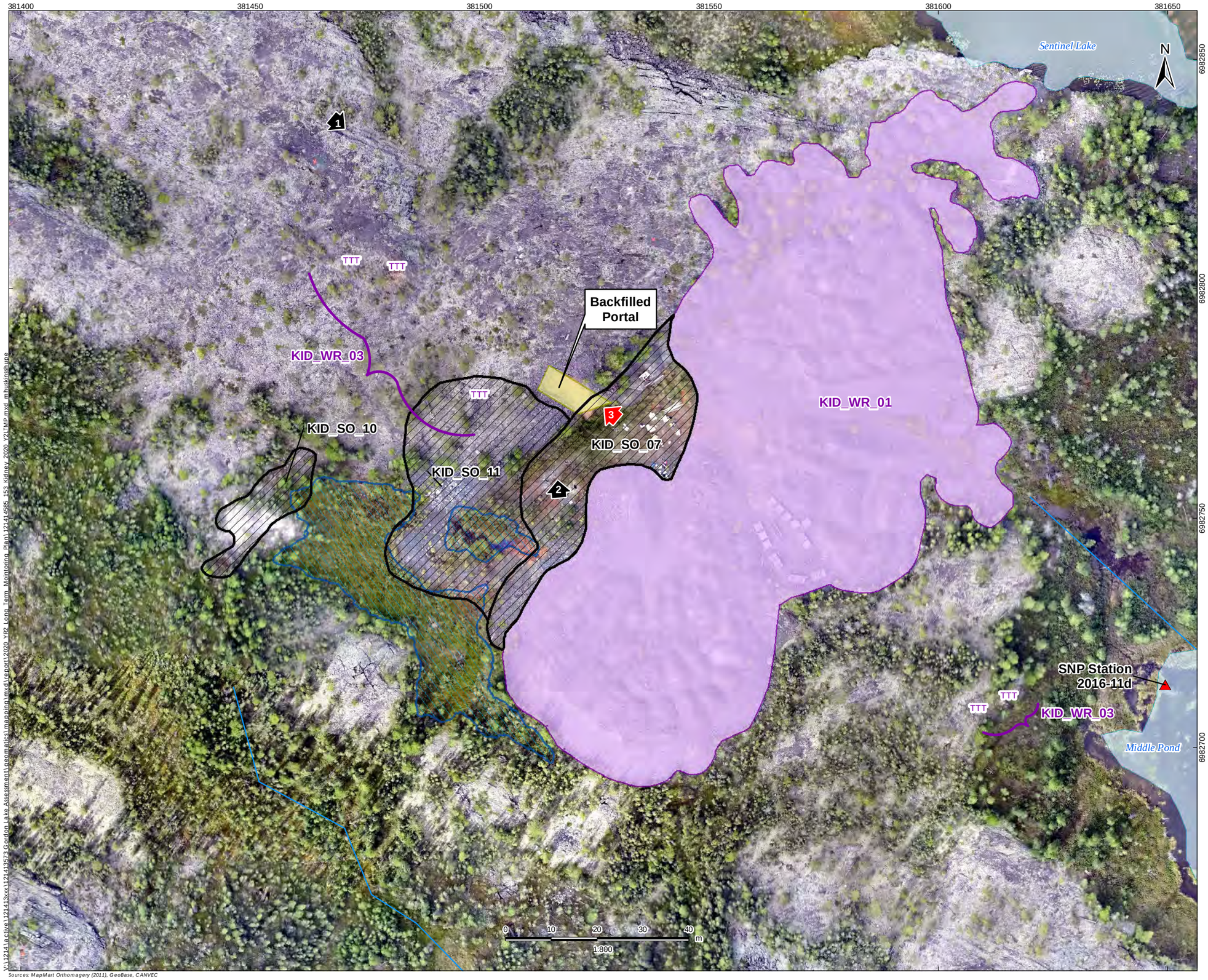
Legend
TTT Moderately Risked Waste Rock Trench
Moderate Risk Impacting Material
Waterbody

NAD 1983 UTM Zone 12N
October 2020
121414585

Client/Project
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A4.2

Title
Kidney Pond - Exploration Camp
Summary of Long-Term Monitoring Components

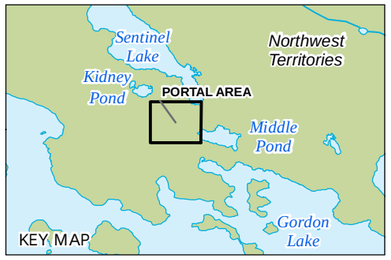


Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

Stantec

Legend

- Surface Water Sample Location
- TTT Moderately Risked Waste Rock Trench
- Moderate Risk Impacting Material
- Backfilled Remedial Excavation
- Wet Area
- Mine Opening
- Excavated and Covered Waste Rock
- Overland Drainage
- Waterbody
- Aerial Viewpoint
- Viewpoint



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A4.3

Title

Kidney Pond - Portal Area
Summary of Long-Term Monitoring Components

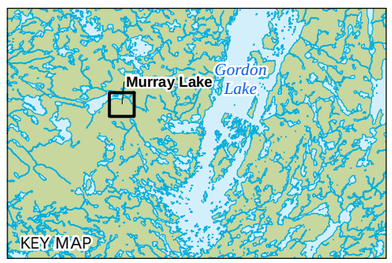
V:\1214\active\121414585_kidney_2020_Y2LTMP.mxd mbuskinshyne

V:\1214\active\121413xx\121413573 Gordon Lake Asesment\geomatics\mapping\mxd\report\2020 YR2_Long_Term_Monitoring_Plan\121414585_002_SiteOverview_2020_YR2_LTMP.mxd mhuskins/shupe

Stantec

Legend

- Watercourse
- Waterbody
- Map Extent



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

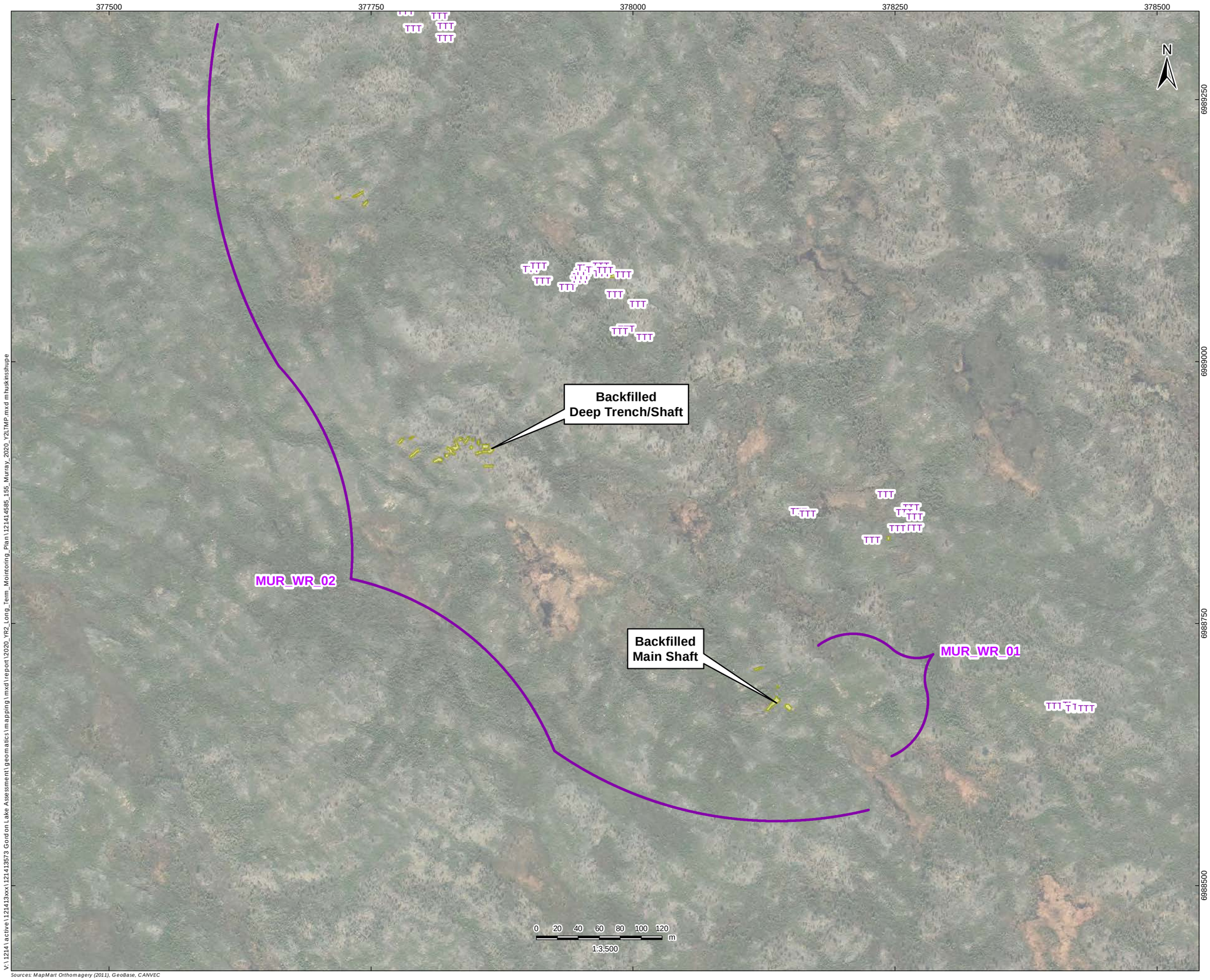
Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A5.1

Title

Murray Lake
Site Overview

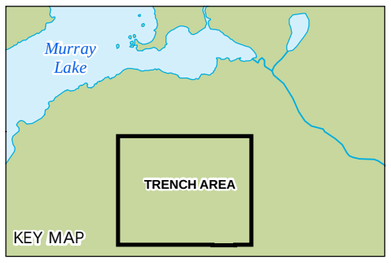


V:\1214\active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_155_Murray_2020_Y2LTMP.mxd mhuskinsthupe

Stantec

Legend

- TTT Moderately Risked Waste Rock Trench
- Moderate Risk Impacting Material
- Mine Opening
- Watercourse
- Waterbody



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A5.2

Title

Murray Lake - Trench Area
Summary of Long-Term Monitoring
Components

391000
391500
392000
392500
6989000
6988689
6988378

Gordon Lake

SHAFT AREA

N

0 100 200 m
1:5,500

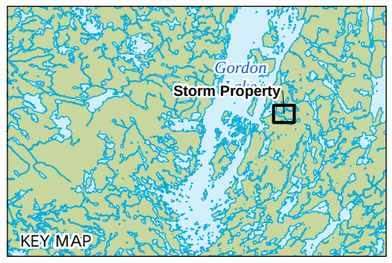
bing

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\1214\active\121413xxx\121413573 Gordon Lake Assesment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_002_SiteOverview_2020_YR2LTMP.mxd mhuskinsshupe

Stantec

Legend
- Watercourse
- Waterbody
- Map Extent



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A6.1

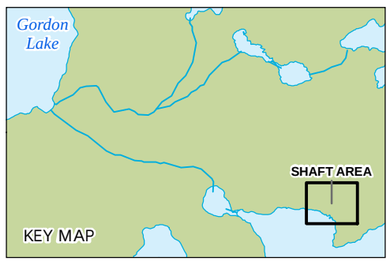
Title

Storm Property
Site Overview

392300
392400
392500
6988000
6988100
N
Backfilled
North Mine Shaft
Backfilled
South Mine Shaft
STO_WR_01
STO_WR_02
TTT
TTT
TTT
TTT
0
10
20
30
40
m
1:800
Sources: MapMart Orthomagery (2011), GeoBase, CANVEC
V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020 YR2 Long Term Monitoring Plan\121414585_156 Storm 2020 Y2LTMP.mxd mhuskinsthype

Stantec

Legend
TTT Moderately Risked Waste Rock Trench
Moderate Risk Impacting Material
Mine Opening
Watercourse
Waterbody



NAD 1983 UTM Zone 12N
October 2020
121414585

Client/Project
Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.
A6.2

Title
Storm Property - Shaft Area
Summary of Long-Term Monitoring
Components

V:\1214\active\121413xx\121413573 Gordon Lake Asesment\geomatics\mapping\mxd\report\2020 YR2_Long_Term_Monitoring_Plan\121414585_002_SiteOverview_2020_YR2_LTMP.mxd mhuskins/shupe

Stantec

Legend

- Surface Water Sample Location
- Watercourse
- Waterbody
- Map Extent

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A7.1

Title

Treacy Site Overview

381350
381400
381450
6981200
6981150

N

1
2
3

Gordon Lake

TRE_SO_01

Backfilled
West Trench

Backfilled
East Trench

SNP Station
2016-11e

TRE_SO_02

0 10 20 m
1:400

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\121414active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Monitoring_Plan\121414585_157_Treacy_2020_YR2LTMP.mxd mhuskinsthupe

Stantec

Legend

- Surface Water Sample Location
- Backfilled Remedial Excavation
- Mine Opening
- Excavated Waste Rock
- Waterbody
- Aerial Viewpoint
- Viewpoint

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A7.2

Title

Treacy - Mill Area
Summary of Long-Term Monitoring
Components

374500

375000

6995500

N

Mac Lake

MAIN
CAMP

0 75 150 m

1:3,000

bing

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\121414\active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Mointoring_Plan\121414585_002_SiteOverview_2020_YR2_LTMP.mxd mhuskins/shupe

Stantec

Legend

- Watercourse
- Waterbody
- Map Extent

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A8.1

Title

Try Me
Site Overview

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\121414\active\121414xx\121414585\13573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020 YR2 Long Term Mointoring Plan\121414585_138_TryMe_2020_Y2LTMP.mxd mhuskinsshupe

Stantec

Legend

- Mine Opening
- Watercourse
- Water body

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A8.2

Title

Try Me - Main Camp
Summary of Long-Term Monitoring Components

386000
386500
387000
6978500
6978000

Gordon Lake

SNP Station
2016-11f

SOUTH
AREA

0 100 200 m
1:4,000

bing

© 2020 Microsoft Corporation © 2020 Maxar ©CNES (2020) Distribution Airbus DS

Sources: MapMart Orthomagery (2011), GeoBase, CANVEC

V:\1214\active\121413xx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2020_YR2_Long_Term_Maintoring_Plan\121414585_002_SiteOverview_2020_YR2LTMP.mxd mhuskinsshupe

N

Stantec

Legend
- Surface Water Sample Location
- Watercourse
- Waterbody
- Map Extent

NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

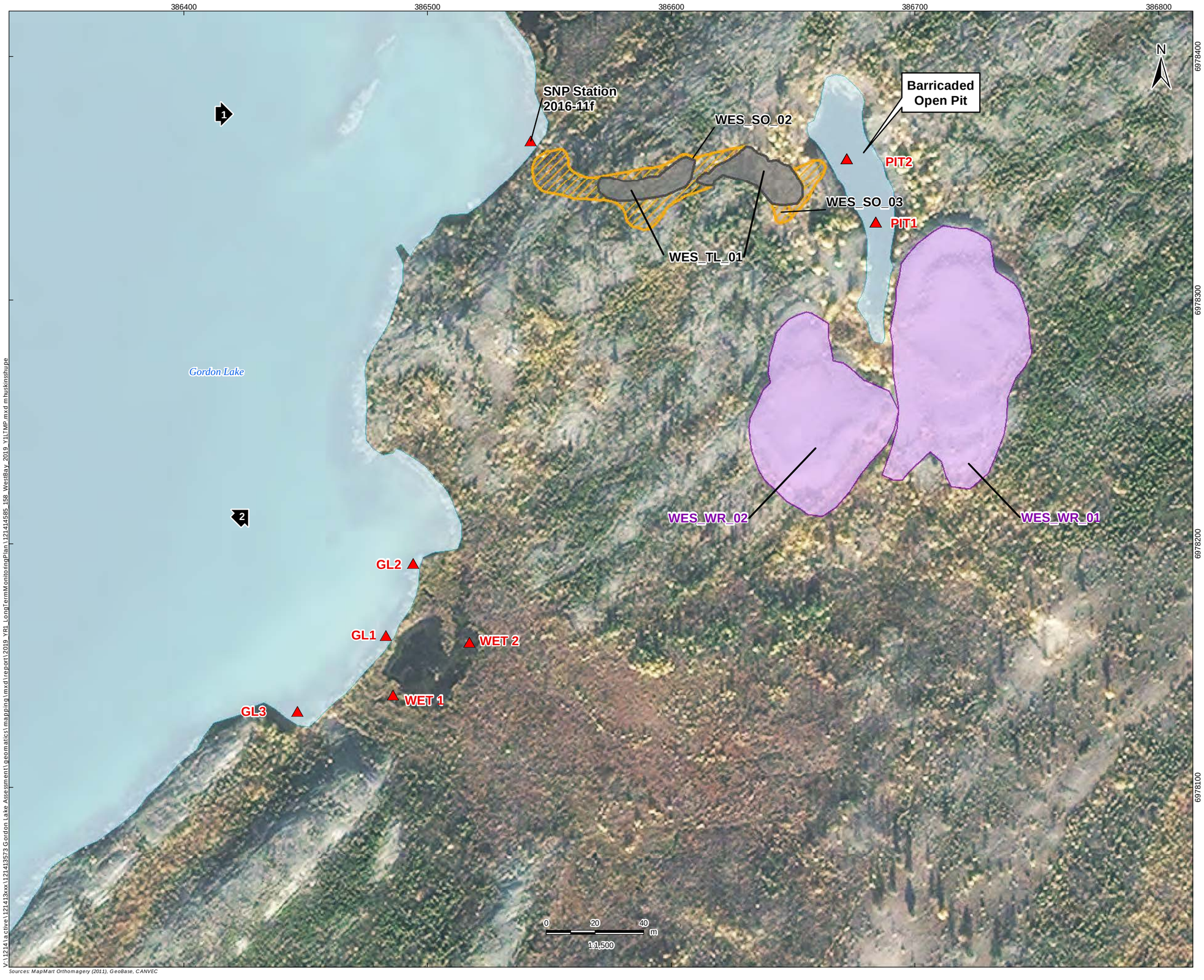
Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A9.1

Title

West Bay
Site Overview

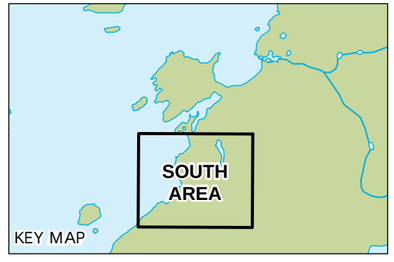


V:\1214\active\121413xxx\121413573 Gordon Lake Assessment\geomatics\mapping\mxd\report\2019 YR1_LongTermMonitoringPlan\121414585_158_WestBay_2019_Y1LTMP.mxd mhuskinsshupe

Stantec

Legend

- Surface Water Sample Location
- Remedial Excavation
- Tailings Excavation
- Waste Rock Requiring Monitoring
- Watercourse
- Water body
- Aerial Viewpoint



NAD 1983 UTM Zone 12N

October 2020
121414585

Client/Project

Public Services and
Procurement Canada
Phase I Long-Term Monitoring Year 2 Report

Figure No.

A9.2

Title

West Bay - South Area
Summary of Long-Term Monitoring
Components

APPENDIX B

LTM Tables

TABLE B-1 **Phase I Long Term Monitoring Hazard Components**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Pre-Remediation Physical Description	Remedial Activity Approach (Approach exceptions)	Carried forward into LTM?
Burnt Island	Co-Mingled Impacted Soil	BUR_SO_07	Co-mingled metal and hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
Burnt Island	PHC Impacted Soil	BUR_SO_01	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Burnt Island	PHC Impacted Soil	BUR_SO_02	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Burnt Island	PHC Impacted Soil	BUR_SO_03	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Burnt Island	PHC Impacted Soil	BUR_SO_04	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Burnt Island	PHC Impacted Soil	BUR_SO_05	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Burnt Island	Mine Openings	Portal	The portal opening was 4.7 m x 4.7 m in dimension with approximately 2.3 m of bedrock above the portal entrance (i.e. crown pillar). It was partially blocked by a wooden wall and the mine tunnel declined from the portal opening.	Backfill	Yes
Burnt Island	Abandoned Infrastructure	South Sump	Surficial opening containing debris.	Collect material in sumps, burn(as appropriate) and landfill. Regrade.	No- no risk remains and low erosion risk
Burnt Island	Tailings	Tailings	Small isolated tailings area.	Cover in place	Yes
Burnt Island	Mine Openings	Mine Shaft	3.8 m x 3.8 m shaft partially filled with the collapsed wooden cap and drill stem pipe. Depth is approximately 36 m.	Backfill and seal with engineered cap	Yes
Burnt Island	Waste Rock	BUR_WR_01	Waste rock resulting from trenching in the area. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Camlaren	Co-Mingled Impacted Soil	CAM_SO_09	Co-mingled metal and hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
Camlaren	Metals Impacted Soil	CAM_HS_01	Hotspot impacted with metals	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Camlaren	Metals Impacted Soil	CAM_SO_04	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes
Camlaren	Metals Impacted Soil	CAM_SO_06	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes
Camlaren	Metals Impacted Soil	CAM_SO_07	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes
Camlaren	Metals Impacted Soil	CAM_SO_08	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes
Camlaren	Metals Impacted Soil	CAM_SO_10	This area is impacted with metals.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
Camlaren	Metals Impacted Soil	CAM_SO_11	This area is impacted with metals.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
Camlaren	Metals Impacted Soil	CAM_SO_12	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes

TABLE B-1 **Phase I Long Term Monitoring Hazard Components**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Pre-Remediation Physical Description	Remedial Activity Approach (Approach exceptions)	Carried forward into LTM?
Camlaren	Metals Impacted Soil	CAM_SO_15	This area is impacted with metals.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Camlaren	Metals Impacted Soil	CAM_SO_18	This area is impacted with metals.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
Camlaren	Metals Impacted Soil	CAM_SO_20	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes
Camlaren	Metals Impacted Soil	CAM_SO_21	This area is impacted with metals. Area of cobalt exceedance at North Cabin - already vegetated and minor exceedances, therefore previously recommended that it be left in place (discussed in the RAP, Section 5.2.2.1).	Do nothing	No- no risk remains and not backfilled
Camlaren	Metals Impacted Soil	CAM_SO_22	This area is impacted with metals. Area of cobalt exceedance at North Cabin - already vegetated and minor exceedances, therefore previously recommended that it be left in place (discussed in the RAP, Section 5.2.2.1).	Do nothing	No- no risk remains and not backfilled
Camlaren	Metals Impacted Soil	CAM_SO_23	This area is impacted with metals.	Excavate and consolidate into TSCA	Yes
Camlaren	PHC Impacted Soil	CAM_SO_01	This area is impacted with hydrocarbons.	Excavate and consolidate into TSCA	Yes
Camlaren	PHC Impacted Soil	CAM_SO_03	This area is impacted with hydrocarbons.	Excavate and consolidate into TSCA	Yes
Camlaren	PHC Impacted Soil	CAM_SO_05	This area is impacted with hydrocarbons.	Excavate and consolidate into TSCA	Yes
Camlaren	PHC Impacted Soil	CAM_SO_14	This area is impacted with hydrocarbons.	Excavate and consolidate into TSCA	Yes
Camlaren	PHC Impacted Soil	CAM_SO_16	This area is impacted with hydrocarbons.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Camlaren	PHC Impacted Soil	CAM_SO_19	This area is impacted with hydrocarbons.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
Camlaren	Abandoned Infrastructure	Wooden Culvert	Approximately 4.8 m long, 1 m wide x 1 m deep.	Remove and recontour	No- no risk remains and low erosion risk
Camlaren	Waste Rock	CAM_WR_02B	Waste rock found north of the Shaft.	Excavate and consolidate into TSCA	No- no risk remains
Camlaren	Waste Rock	CAM_WR_02A	Waste rock at Zenith Island was found to have a high acid generating potential.	Excavate and consolidate into TSCA	No- no risk remains
Camlaren	Waste Rock	CAM_WR_01A	Waste rock at south Muir Island that is intermingled in soil and previously determined to be non-PAG	Excavate and consolidate into TSCA	No- no risk remains
Camlaren	Waste Rock	CAM_WR_03	Waste rock resulting from trenching in the area.	Excavate and consolidate into TSCA	No- no risk remains
Camlaren	Waste Rock	CAM_WR_01B	Waste rock found along the perimeter of the TSCA.	Incorporate into the TSCA	No- no risk remains
Camlaren	Tailings	CAM_TL_01	Tailings in AEC 6 are contained within the tailings dyke on-site. However, an overflow ditch on the northwest corner of the dyke may allow for the tailings to impact soil, surface water and sediment down-gradient of the dyke (including Gordon Lake).	Upgrade tailings containment area (TCA) to tailings and soil containment area (TSCA) through consolidation of material in the area and construction of TSCA design (including engineered cover with BGM, covering coco matting, etc.).	No- now covered under TSCA
Camlaren	Mine Openings	Crown Pillar Opening	Stope 3 m deep from the top of the bedrock. Stope is connected to the mined out crown pillar that extends to underwater mine shafts that are at least 105 m extending to a depth of 305 m.	Construct barrier	No- barrier construction removed from specifications
Camlaren	Mine Openings	Mine Shaft Cap	Cap consists of a concrete pad measuring 4.4 m x 3.7 m approximately 150 mm in thickness. Shaft is reportedly backfilled with debris.	Marked prior to remediation and no further action	No- marked and no further action required

TABLE B-1 **Phase I Long Term Monitoring Hazard Components**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Pre-Remediation Physical Description	Remedial Activity Approach (Approach exceptions)	Carried forward into LTM?
Camlaren	Mine Openings	Shaft	Capped with timbers 2.8 m x 3.0 m. Backfilled with waste rock. Some minor subsidence in the center of the shaft.	Backfill and seal with engineered cap	Yes
Camlaren	n/a	TSCA	TSCA constructed to contain impacted soil, tailings, and other waste collected during remedial activities.	TSCA containing waste from various sites. Construction	Yes
Goodrock	Metals Impacted Soil	GOO_HS_01	Originally was to be disposed into TSCA, then decided to be left in place due to size. Following further risk assessment, was recommended to be covered in place.	Cover in place	Yes
Goodrock	Mine Openings	South Pit	3 m x 6 m in size, with water present. Steep slopes are present.	Backfill	Yes
Goodrock	Mine Openings	North Mine Shaft	3 m x 4 m in size, with water present.	Backfill and seal with engineered cap	Yes
Goodrock	Waste Rock	GOO_WR_01	Scattered waste rock near Camp Area trenches. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Goodrock	Waste Rock	GOO_WR_02	Scattered waste rock near Mill Area trenches. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Kidney Pond	Co-Mingled Impacted Soil	KID_SO_07	Co-mingled metal and hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	Yes
Kidney Pond	Co-Mingled Impacted Soil	KID_SO_11	Co-mingled metal and hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	Yes
Kidney Pond	Metals Impacted Soil	KID_SO_05	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	Metals Impacted Soil	KID_SO_06	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	Metals Impacted Soil	KID_HS_01	Hotspot impacted with metals	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	PHC Impacted Soil	KID_SO_01	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	PHC Impacted Soil	KID_SO_02	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	PHC Impacted Soil	KID_SO_03	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	PHC Impacted Soil	KID_SO_04	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Kidney Pond	PHC Impacted Soil	KID_SO_10	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	Yes
Kidney Pond	Waste Rock	KID_WR_01	Waste rock within AEC has been determined to be potentially acid generating.	Excavate and consolidate into TSCA	Yes

TABLE B-1 **Phase I Long Term Monitoring Hazard Components**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Pre-Remediation Physical Description	Remedial Activity Approach (Approach exceptions)	Carried forward into LTM?
Kidney Pond	Waste Rock	KID_WR_02	Waste rock within AEC has been determined to be potentially acid generating.	Excavate and consolidate into TSCA	No- no risk remains
Kidney Pond	Mine Openings	Portal	Approximately 6 m wide by 2.7 m high. 2.5 to 3.0 m of bedrock above the adit entrance.	Backfill and seal with engineered cap (however not sealed with engineered cap)	Yes
Kidney Pond	Waste Rock	KID_WR_03	Scattered waste rock near Portal Area trenches. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Kidney Pond	Waste Rock	KID_WR_04	Scattered waste rock near Exploration Camp trenches. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Murray Lake	Mine Openings	Main Shaft	Structural and safety hazard; fall-in risk for people & wildlife on site (assumed an average depth of 1.5 m based on previous reports and photos)	Backfill	Yes
Murray Lake	Mine Openings	Deep Trench/Shaft	Structural and safety hazard; fall-in risk for people & wildlife on site	Backfill	Yes
Murray Lake	Abandoned Infrastructure	Sumps	Surficial opening containing debris.	Collect material in sumps, burn(as appropriate) and landfill. Regrade.	No- no risk remains and low erosion risk
Murray Lake	Waste Rock	MUR_WR_01	Scattered waste rock near Trench Area Main Shaft. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Murray Lake	Waste Rock	MUR_WR_02	Scattered waste rock near Trench Area various trenches. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Storm Property	Mine Openings	South Mine Shaft	Open shaft at the center of the site (~3mx3m). Tripping/falling hazard	Backfill	Yes
Storm Property	Mine Openings	North Mine Shaft	Deep shaft open to the surface (~6m x8m), filled with water and algae; ore pile; metal spool nearby. Tripping/ falling/drowning hazard; cutting hazard	Backfill	Yes
Storm Property	Waste Rock	STO_WR_01	Waste rock piles near Shaft Area North Shaft and South Shaft. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Storm Property	Waste Rock	STO_WR_02	Scattered waste rock near Shaft Area trenches. Waste rock identified as potentially acid generating and classified as moderate risk.	Leave in place	Yes
Treacy	Metals Impacted Soil	TRE_SO_01	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	Yes
Treacy	Metals Impacted Soil	TRE_SO_03	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
Treacy	PHC Impacted Soil	TRE_SO_02	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	Yes
Treacy	Trenches	East Trench	Filled with water, wood debris; falling or drowning hazard, high metals concentration in water hazard	Backfill	Yes
Treacy	Trenches	West Trench	Contains tailings - high metals concentration hazard (20m^2)	Backfill	Yes
Treacy	Waste Rock	TRE_WR_01	Three ore piles in the Mill Area. Tripping hazard, potentially acid-generating	Excavate and consolidate into TSCA	No- no risk remains

TABLE B-1 **Phase I Long Term Monitoring Hazard Components**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Pre-Remediation Physical Description	Remedial Activity Approach (Approach exceptions)	Carried forward into LTM?
Treacy	Tailings	TRE_TL_01	Located at the base of the west trench in AEC 5. Approximately 10 m3 of tailing that may be potentially acid generating.	Excavate and consolidate into TSCA	No- no risk remains
Try Me	Mine Openings	Shaft	The shaft is approximately 2.0 m x 1.6 m with a depth of 4.5 m. Water was observed at the entrance of the shaft. Dense vegetation is present on the east side of the mine opening. Loose waste rock is present in the area above the opening, and scattered down the steep slope to the entrance of the shaft.	Backfill and seal with engineered cap	Yes
West Bay	Co-Mingled Impacted Soil	WES_SO_03	Co-mingled metal and hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
West Bay	Metals Impacted Soil	WES_SO_06	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
West Bay	Metals Impacted Soil	WES_SO_02	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
West Bay	Metals Impacted Soil	WES_SO_04	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
West Bay	Metals Impacted Soil	WES_SO_08	Metal impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
West Bay	PHC Impacted Soil	WES_SO_05	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
West Bay	PHC Impacted Soil	WES_SO_07	Hydrocarbon impacted soil exceeding the applicable regulatory criteria and/or the site specific threshold levels are present within these AECs.	Excavate and consolidate into TSCA	No- no risk remains and low erosion risk
West Bay	Tailings	WES_TL_01	Approximately 650 m^3 of metal impacted tailings	Excavate and consolidate into TSCA	No- no risk remains and not backfilled
West Bay	Mine Openings	Open Pit	12 m deep pit. Walls >50 degrees. Water is present in the pit.	Perimeter barricade	Yes
West Bay	Waste Rock	WES_WR_01	East waste rock pile south of open pit. Waste rock identified as potentially acid generating however classified as moderate risk following further assessment.	Leave in place (considered moderate risk after further assessment)	Yes
West Bay	Waste Rock	WES_WR_02	West waste rock pile south of open pit. Waste rock identified as potentially acid generating however classified as moderate risk following further assessment.	Leave in place (considered moderate risk after further assessment)	Yes
Borrow Sources (GD-18, GD-37 and GD-45)	Borrow Source Development	GD-18, GD-37 and GD-45	Development of borrow material required to facilitate remedial activities.	Borrow source development, as needed	No- inspected and considered closed

TABLE B-2 **Phase I Long Term Monitoring Plan Details**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Phase I LTM Figure No.	Monitoring Driver	Phase I Long Term Monitoring Objectives	Triggers for Adaptive Management	Potential Mitigative Actions	Phase I LTM Frequency	Phase I LTM Duration	Target Dates	Exit Criteria
Burnt Island	Mine Openings	Portal	A1.4	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Burnt Island	Tailings	Tailings	A1.2	Aesthetic	Verify cover material is stable with no significant resulting erosion or washout.	Erosion/washout which exposes any tailings and/or rills >10cm.	Re-covering/re-grading as needed.	Biennially	Years 1, 3 and 5	Snow-free periods.	Absence of major erosion/tailings exposure concerns over three consecutive monitoring events.
Burnt Island	Mine Openings	Mine Shaft	A1.3	Physical	Verify the backfill material is stable with no significant resulting erosion or settlement. Verify the structural stability of the mine opening cap.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Burnt Island	Waste Rock	BUR_WR_01	A1.5	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Camlaren	Metals Impacted Soil	CAM_SO_04	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Metals Impacted Soil	CAM_SO_06	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Metals Impacted Soil	CAM_SO_07	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Metals Impacted Soil	CAM_SO_08	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Metals Impacted Soil	CAM_SO_12	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Metals Impacted Soil	CAM_SO_20	A2.3	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Metals Impacted Soil	CAM_SO_23	A2.4	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	PHC Impacted Soil	CAM_SO_01	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	PHC Impacted Soil	CAM_SO_03	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	PHC Impacted Soil	CAM_SO_05	A2.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	PHC Impacted Soil	CAM_SO_14	A2.3	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water.	Erosion/washout concerns in nearby water and/or rills >10cm.	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Camlaren	Mine Openings	Shaft	A2.4	Physical	Verify backfill material is stable with no significant resulting erosion or settlement. Verify the structural stability of the mine opening cap.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.

TABLE B-2 **Phase I Long Term Monitoring Plan Details**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Phase I LTM Figure No.	Monitoring Driver	Phase I Long Term Monitoring Objectives	Triggers for Adaptive Management	Potential Mitigative Actions	Phase I LTM Frequency	Phase I LTM Duration	Target Dates	Exit Criteria
Camlaren	n/a	TSCA	A2.2	TSCA Performance	Verify stability of cover material and slopes (includes differential settlement, slope slumping, frost heave, vegetation growth and animal activities). Inspect toe of facility and identify potential seepage. Visually monitor vegetative health to confirm stable or increasing growth.	Differential settlement - Differential settlement >0.5 m. Slope Slumping - Horizontal cracks/movement >0.3 m. Surface Erosion - Slopes or cover erosion >25% loss of material thickness. Frost Heave - Effects >0.2 m. Vegetative Cover - Tree species with roots >0.3 m. Animal activities - Animal activities (such as burrowing) >0.3 m depth. Erosion Control - Coco matting (~5 m) is no longer deemed effective. Ditch Erosion- Exposure of any amount of BGM (i.e. visible liner). Ditch Blockage- Any debris/object that impedes flow or causes ponding. Seepage is identified at the toe of the facility. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Differential settlement - Completing repairs, trouble-shooting of source, and/or increasing monitoring frequency as needed. Slope Slumping - Completing repairs, trouble-shooting of source, and/or increasing monitoring frequency as needed. Surface Erosion - Completing repairs, trouble-shooting of source, and/or increasing monitoring frequency as needed. Frost Heave - Completing repairs, trouble-shooting of source (e.g. ponding/settlement), and/or increasing monitoring frequency as needed. Vegetative Cover - Remove tree species and/or repairs as needed. Animal activities- Completing repairs, trouble-shooting of source, and/or increasing monitoring frequency as needed. Erosion Control - Replacing coco matting (~5 m), trouble-shooting of source, and/or increasing monitoring frequency as needed. May consider revegetation/reseeding or ways to increase vegetative health for the purpose of erosion control. Ditch Erosion- Completing repairs, trouble-shooting of source, and/or increasing monitoring frequency as needed. Ditch Blockage- Completing repairs, trouble-shooting of source (e.g. removal of blockage), and/or increasing monitoring frequency as needed. Sample seepage identified at the toe of facility and groundwater/surface water in vicinity (see SNP program details for SNP Station 2016-8/7/11). In the event that COCs consistently exceed the trigger levels and impact the down-gradient surface water, a mitigation action will be recommended, which may involve repairs if the cause can be identified or otherwise consider treatment options.	Bi-Annually (Spring and Summer)	Years 1 to 5	Frost-free periods at the tail end of spring freshet and summer.	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Camlaren	n/a	TSCA	A2.2	TSCA Groundwater (elevations and contaminant concentrations)	Verify TSCA permeability functionality to prevent infiltration.	Groundwater elevations (masl) within the TSCA show an increasing trend for 3 consecutive monitoring events (after having obtained sufficient data to establish a trend).	Trouble-shooting of cover system performance. Potential increased monitoring and/or completing repairs as needed.	Bi-Annually (Spring and Summer)	Years 1 to 5	Frost-free periods at the tail end of spring freshet and summer.	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Camlaren	n/a	TSCA	A2.2		Verify chemical integrity of the TSCA via groundwater sampling. Refer to SNP Program for sampling details (SNP Station 2016-7).	Groundwater contaminant concentrations down-gradient of the TSCA show an increasing trend and/or exceed applicable guidelines for three consecutive monitoring events (after having obtained sufficient data to establish a trend).	Reviewing and/or modifying the monitoring frequency and/or remedial design components may be required. Trouble-shooting of TSCA performance. Completing repairs as needed.	Bi-Annually (Spring and Summer)	Years 1 to 5	Frost-free periods at the tail end of spring freshet and summer.	Groundwater contaminant concentrations down-gradient of the TSCA show a stable or decreasing trend and/or remain below applicable guidelines for three consecutive monitoring events (after having obtained sufficient data to establish a trend).
Camlaren	n/a	TSCA	A2.2	TSCA Surface Water	Verify chemical integrity of the TSCA via surface water sampling Refer to SNP Program for sampling details (SNP Station 2016-8 and 11).	Surface water contaminant concentrations down-gradient of the TSCA show an increasing trend and/or exceed applicable guidelines for three consecutive monitoring events (after having obtained sufficient data to establish a trend).	Reviewing and/or modifying the monitoring frequency and/or remedial design components may be required. Trouble-shooting of TSCA performance. Completing repairs as needed.	Bi-Annually (Spring and Summer)	Years 1 to 5	Frost-free periods at the tail end of spring freshet and summer.	Surface water contaminant concentrations down-gradient of the TSCA show a stable or decreasing trend and/or remain below applicable guidelines for three consecutive monitoring events (after having obtained sufficient data to establish a trend).
Goodrock	Metals Impacted Soil	GOO_HS_01	A3.3	Risk	Verify cover material is stable with no significant resulting erosion or washout.	Erosion/washout which exposes any soil and/or rills >10cm.	Re-covering/re-grading as needed.	Biennially	Years 1, 3 and 5	Snow-free periods.	Absence of major erosion/soil exposure concerns over three consecutive monitoring events.
Goodrock	Mine Openings	South Pit	A3.3	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Goodrock	Mine Openings	North Mine Shaft	A3.3	Physical	Verify backfill material is stable with no significant resulting erosion or settlement. Verify the structural stability of the mine opening cap.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Goodrock	Waste Rock	GOO_WR_01	A3.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Goodrock	Waste Rock	GOO_WR_02	A3.3	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Kidney Pond	Co-Mingled Impacted Soil	KID_SO_07	A4.3	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.

TABLE B-2 **Phase I Long Term Monitoring Plan Details**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Phase I LTM Figure No.	Monitoring Driver	Phase I Long Term Monitoring Objectives	Triggers for Adaptive Management	Potential Mitigative Actions	Phase I LTM Frequency	Phase I LTM Duration	Target Dates	Exit Criteria
Kidney Pond	Co-Mingled Impacted Soil	KID_SO_11	A4.3	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Kidney Pond	PHC Impacted Soil	KID_SO_10	A4.3	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Kidney Pond	Waste Rock	KID_WR_01	A4.3	Erosion	Verify excavation backfill and large area of regraded material is stable with no significant resulting erosion or washout, especially into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring..
Kidney Pond	Mine Openings	Portal	A4.3	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Kidney Pond	Waste Rock	KID_WR_03	A4.3	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Kidney Pond	Waste Rock	KID_WR_04	A4.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Murray Lake	Mine Openings	Main Shaft	A5.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Murray Lake	Mine Openings	Deep Trench/Shaft	A5.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Murray Lake	Waste Rock	MUR_WR_01	A5.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Murray Lake	Waste Rock	MUR_WR_02	A5.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Storm Property	Mine Openings	South Mine Shaft	A6.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Storm Property	Mine Openings	North Mine Shaft	A6.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Storm Property	Waste Rock	STO_WR_01	A6.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Storm Property	Waste Rock	STO_WR_02	A6.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts.	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.).	Sampling of down-gradient soil and surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Summer	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring.
Treacy	Metals Impacted Soil	TRE_SO_01	A7.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Treacy	PHC Impacted Soil	TRE_SO_02	A7.2	Erosion	Verify excavation backfill material is stable with no significant resulting erosion or washout into down-gradient water. Visually monitor vegetative health to confirm stable or increasing growth.	Erosion/washout concerns in nearby water and/or rills >10cm. Vegetative health observed to be decreasing (and potential erosion concerns as detailed above).	Reviewing SNP surface water results (SNP Station 2016-11 especially for TSS) and increasing frequency and/or adjusting sampling locations if needed. Trouble-shooting of source and sediment/erosion control measures as needed. May consider revegetation or ways to increase vegetative health for the purpose of erosion control.	Biennially	Years 1, 3 and 5	Frost-free periods	Absence of major erosion concerns over three consecutive monitoring events.
Treacy	Trenches	East Trench	A7.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
Treacy	Trenches	West Trench	A7.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.

TABLE B-2 **Phase I Long Term Monitoring Plan Details**
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

Site Name	Hazard Category	Hazard Name	Phase I LTM Figure No.	Monitoring Driver	Phase I Long Term Monitoring Objectives	Triggers for Adaptive Management	Potential Mitigative Actions	Phase I LTM Frequency	Phase I LTM Duration	Target Dates	Exit Criteria
Try Me	Mine Openings	Shaft	A8.2	Physical	Verify backfill material is stable with no significant resulting erosion or settlement. Verify the structural stability of the mine opening cap.	Major subsidence (<0.5m) of backfill is observed and/or structural concerns (e.g. deformation, cracking, etc.).	Investigation to identify cause and/or safety concerns. Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction.
West Bay	Mine Openings	Open Pit	A9.2	Physical	Verify barrier is structurally sound and remains effective.	Barrier is no longer effective due to deterioration or damage.	Completing repairs as needed.	Quinquennially	Years 1 and 5	Frost-free periods	Exit criteria are not applicable for mine openings unless otherwise authorized by authorities having jurisdiction. Opportunity to re-inspect while completing TSCA performance monitoring will be taken as needed.
West Bay	Waste Rock	WES_WR_01	A9.2	Chemical	Verify no visual signs of ARD down-gradient of remaining impacts. Verify chemistry of surrounding water bodies via surface water sampling for metals/general chemistry: • Runoff from waste rock (if available) • Pit lake (2 locations) • Wetland (2 locations) • Gordon Lake (3 locations) (locations consistent with previous supplemental assessment sample locations)	Down-gradient environment indicates signs of ARD (e.g. new loss of vegetation, stressed vegetation, discoloration, etc.). Surface water contaminant concentrations down-gradient of the waste rock areas show an increasing trend and/or exceed applicable guidelines for three consecutive monitoring events (after having obtained sufficient data to establish a trend).	Increased monitoring frequency or sampling of down-gradient soil and/or surface water for metals. Trouble-shooting potential sources and addressing waste rock if needed.	Quinquennially	Years 1 and 5	Frost-Free Periods	Future exit criteria as well as triggers for action/monitoring frequency will based on long-term results of monitoring. Surface water contaminant concentrations surrounding the waste rock show a stable or decreasing trend and/or remain below applicable guidelines for three consecutive monitoring events (after having obtained sufficient data to establish a trend).
West Bay	Waste Rock	WES_WR_02	A9.2	Chemical							

TABLE B-3 Phase I Long Term Monitoring SNP Stations
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

SNP Station #	Description	Approximate Anticipated Location	Northing (Y_UTMZ12)	Easting (X_UTMZ12)	Phase I LTM Figure No.	Applicable Sites	Sampling Frequency	Sampling Parameters	Rationale	Current Status
2016-7	Groundwater monitoring around the perimeter of the TSCA	7a: northeast of TSCA (near toe drain)	6986073	388393	A2.1	Camlaren	Adjusted from monthly to bi-annually to align the SNP monitoring as practically as possible. The action levels and exit criteria for SNP Stations 2016-7, 8, and 11 are intended to be similar for consistent decision-making.	Nutrients[a], Standard[b], Major Ions[c], Solids[d], Metals[e], Hydrocarbons[f]	To monitor the quality of Groundwater surrounding the TSCA to ensure the facility is functioning properly.	Active
		7b: southeast of TSCA	6985962	388376						
		7c: southwest of TSCA	6985922	388236						
		7d: west of TSCA	6986066	388238						
2016-8	Discharge from the TSCA (Between TSCA and expected discharge towards Gordon Lake)	8a: north	6986153	388330	A2.1	Camlaren	Adjusted from monthly to bi-annually to align the SNP monitoring as practically as possible. The action levels and exit criteria for SNP Stations 2016-7, 8, and 11 are intended to be similar for consistent decision-making.	Ammonia as N, Nitrate as N, Nitrite as N, TSS, TDS, Extractable Petroleum Hydrocarbons, Standard[b], Major Ions[c], Total Metals[e]	To monitor the quality of Water Discharge off of the TSCA, to ensure the Engineered Structure is functioning properly.	Active when Water is present
		8b: southwest	6985933	388266						
2016-11	Confirmatory surface water samples from Burnt Island, Camlaren/Zenith Island, Kidney Pond, Treacy, and West Bay, as outlined in the Remedial Action Plan section 7.3.4.1. Goodrock was removed as it was determined to not be a significant concern. Downgradient from areas with significant remedial work (including TSCA)	11a: Burnt Island	6994592	390881	A1.1	Various	Assumed to be bi-annual monitoring to account for seasonality. The action levels and exit criteria for SNP Stations 2016-7, 8, and 11 are intended to be similar for consistent decision-making. Re-evalutate frequency after 4 sampling events (prior to Year 3) in correlation with erosion monitoring. The confirmatory sampling was meant to be specific for post-construction for the short-term. The backfilled areas will continue to be monitored as planned and down-gradient surface water sampling may be completed if potential concerns are identified.	Ammonia as N, Nitrate as N, Nitrite as N, TSS, TDS, Extractable Petroleum Hydrocarbons, Standard[b], Major Ions[c], Total Metals[e]	To monitor the performance of the remedial activities.	Active during post-remedial monitoring
		11b1: Camlaren (northwest of TSCA)	6986093	388174	A2.1					
		11b2: Camlaren (southeast of TSCA)	6985917	388365						
		11b3: Camlaren (northeast of TSCA)	6986145	388376						
		11b4: Camlaren (southwest of TSCA)	6985898	388174						
		11c: Zenith Island (added as Goodrock was removed)	6985533	386768	A2.1					
		11d: Kidney Pond	6982714	381650	A4.1					
		11e: Treacy	6981168	381411	A7.1					
		11f: West Bay	6978365	386542	A9.1					

Notes:

a Total Ammonia (NH3 + NH4+ - N), Total Nitrate + Nitrite (NO3 + NO2), Total Phosphorous (TP), Orthophosphate (OP), and Total Organic Carbon (TOC).
b pH, Temperature (T), and Conductivity (Cond). These parameters should be measured both in the field as well as in the laboratory.
c Alkalinity (Alk), Calcium (Ca), Chloride (Cl), Hardness, Magnesium (Mg), Potassium (K), Sodium (Na), and Sulphate (SO4).
d Total Suspended Solids (TSS) and Total Dissolved Solids (TDS).
e Full = Total elemental analysis by ICP-Metal Scan of: ICP-MS 24 element scan: includes all elements in Total Metals plus Antimony (Sb), Arsenic (As), Barium (Ba), Bismuth (Bi), Cesium (Cs), Chromium (Cr), Lithium (Li), Thallium (TI), Titanium (Ti), Uranium (U), & Vanadium (V).
f Extractable Hydrocarbons (ExtHC), and Benzene, Toluene, Ethyl-benzene, and Xylene (BTEX).
g Total Cyanide (TCN), Weak Acid Dissociable Cyanide (WAD CN), and Thiocyanate (SCN).
h Quantity of Water in cubic metres (m^3).

TABLE B-4 Phase I Long Term Monitoring Stations
Public Services and Procurement Canada
Gordon Lake Group of Sites
Stantec Consulting Ltd. Project No. 121414585

LTM Station	Description	Approximate Anticipated Location	Northing (Y_UTMZ12)	Easting (X_UTMZ12)	Phase I LTM Figure No.	Applicable Sites	Sampling Frequency	Sampling Parameters	Rationale	Current Status
Open Pit	Surface water monitoring around the Open Pit near WES_WR_01 and WES_WR_02	PIT1: South end of Open Pit	6978306	386690	A9.2	West Bay	Bi-annually to align the SNP monitoring as practically as possible.	Nutrients[a], Standard[b], Major Ions[c], Solids[d], Metals[e]	To monitor the quality of surface water adjacent to moderate risk waste rock left in place.	Active
		PIT2: North end of Open Pit	6978308	386639						
Wetland	Surface water monitoring down gradient of WES_WR_01 and WES_WR_02	WET1: South pond inland from West Bay	6978202	386483	A9.2	West Bay	Bi-annually to align the SNP monitoring as practically as possible.	Ammonia as N, Nitrate as N, Nitrite as N, TSS, TDS, Standard[b], Major Ions[c], Total Metals[e]	To monitor the quality of surface water downstream of moderate risk waste rock left inplace to test buffer of natural vegetation.	Active when Water is present
		WET2: North pond inland from West Bay	6978202	386483						
Gordon Lake	Confirmatory surface water samples from West Bay in Gordon Lake	GL1: Center of West Bay	6978092	386429	A9.2	West Bay	Bi-annually to align the SNP monitoring as practically as possible.	Ammonia as N, Nitrate as N, Nitrite as N, TSS, TDS, Standard[b], Major Ions[c], Total Metals[e]	To monitor the performance of the remedial activities.	Active
		GL2: North end of West Bay	6978090	386479	A9.2					
		GL3: South end of West Bay	6978201	386483	A9.2					

Notes:

a Total Ammonia (NH3 + NH4+ - N), Total Nitrate + Nitrite (NO3 + NO2), Total Phosphorous (TP), Orthophosphate (OP), and Total Organic Carbon (TOC).

b pH, Temperature (T), and Conductivity (Cond). These parameters should be measured both in the field as well as in the laboratory.

c Alkalinity (Alk), Calcium (Ca), Chloride (Cl), Hardness, Magnesium (Mg), Potassium (K), Sodium (Na), and Sulphate (SO4).

d Total Suspended Solids (TSS) and Total Dissolved Solids (TDS).

e Full = Total elemental analysis by ICP-Metal Scan of: ICP-MS 24 element scan: includes all elements in Total Metals plus Antimony (Sb), Arsenic (As), Barium (Ba), Bismuth (Bi), Cesium (Cs), Chromium (Cr), Lithium (Li), Thallium (TI), Titanium (Ti), Uranium (U), & Vanadium (V).

APPENDIX C

Daily Reports

Daily Resident Engineer Report			
Client:	PSPC	**Report Date:**	July 16, 2020
Project:	Gordon Lake Remediation Project	**Contractor:**	n/a
Camp:	n/a	**Site Superintendent:**	n/a
PWGSC Project Number:	R.057573.025	**Day Shift Hours:**	0700 - 1730
Stantec Project Number:	121414585	**Night Shift Hours:**	n/a
Weather:	Sunny 20 degrees C	**Report by:**	ML (Stantec)

Camp Supervision and Review of License and Permit Compliance

LUP, WL and Other Permit Observations or Non Conformances:

SNP and LTMP in accordance with WL.

Workers On-Site:

Company	Total # of Workers	# of Aboriginal Workers	Note: CIRNAC was onsite (2 team members) as individual party for inspections / monitoring at the various sites.
Ek'edia	1	1	

Stantec Personnel:

Name	Position
ML	DR
GO	DR

Logistics Details (flights, etc.,) and Equipment Maintenance:

Acasta provided a Bell 407 for transportation to Gordon Lake sites. Departed Yellowknife at 08:30, arrived at Camlaren at 09:00. Departed Camlaren at 13:00 and arrived at Zenith at 13:05. Departed Zenith at 13:30 and arrived at Kidney at 13:40. Departed Kidney at 14:30 and arrived at Burnt Island at 14:40. Departed Burnt Island at 15:40 and arrived at Goodrock at 15:55. Departed Goodrock at 16:10 and arrived in Yellowknife at 16:40. Times are approximate.
Passengers: Two members from CIRNAC, two members from Stantec, one wildlife monitor.

Safety Considerations

Notes from Daily Safety Meetings:
Pre-shift helicopter safety review, COVID-19 precautions, reviewed health and safety plan onsite, performed site-specific hazard assessment during tailgate meeting.

Sampling Completed:

Surface Water Samples	7	SNP surface water samples	CAM-SW-SNP-11B1-2020-01; CAM-SW-SNP-11B2-2020-01; CAM-SW-SNP-11B3-2020-01; CAM-SW-SNP-11B4-2020-01; CAM-SW-SNP-11C-2020-01; BUR-SW-SNP-11A-2020-01; KID-SW-SNP-11D-2020-01
Groundwater Samples	0		
Soil Samples	0		
Other	0		

QA and Specialist Services:	
QA and/or Specialist:	None
Activity Completed:	None

Communications / Submissions:

Summary of Findings

Burnt Island
Collected SNP SW sample.

Camlaren
Collected 4 SNP SW samples. Download data from data loggers at thermistors and vibration piezometers.
The data logger at VT#2 had a display field that read "Battery missing or tab installed. Check now."

Zenith
Collected SNP SW sample.

Goodrock
Inspected area downgradient of waste rock for signs of ARD, took photos. If time permits, may measure pH of pooled water on next trip.

Kidney Pond
Collected surface water SNP sample. Inspected portal for subsidence, which was evident.
Complete inspection form for KID_WR_03 and GPS center point of wasterock area

Daily Photo Record

Photo 1

Willow growth at TSCA.

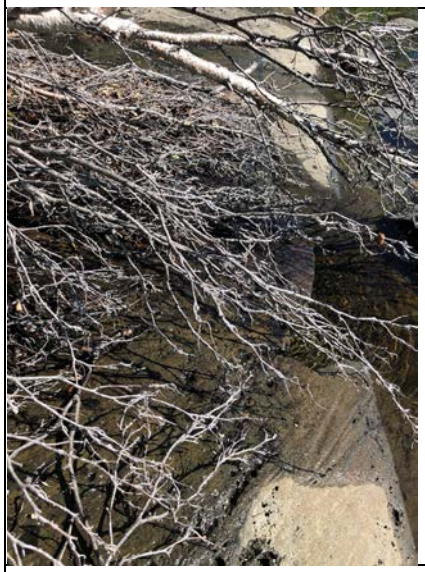


Photo 2

Potential seepage water east of TSCA.

Daily Photo Record	
	**Photo 3** Subsidence at Kidney Portal. CIRNAC painted the line shown in 2019.

Daily Resident Engineer Report			
Client:	PSPC	**Report Date:**	July 17, 2020
Project:	Gordon Lake Remediation Project	**Contractor:**	n/a
Camp:	n/a	**Site Superintendent:**	n/a
PWGSC Project Number:	R.057573.025	**Day Shift Hours:**	0700 - 1730
Stantec Project Number:	121414585	**Night Shift Hours:**	n/a
Weather:	Sunny 20 degrees C	**Report by:**	ML (Stantec)

Camp Supervision and Review of License and Permit Compliance

LUP, WL and Other Permit Observations or Non Conformances:

SNP and LTMP in accordance with WL.

Workers On-Site:

Company	Total # of Workers	# of Aboriginal Workers	Note:
Ek'edia	1	1	

Stantec Personnel:

Name	Position
ML	DR
GO	DR

Logistics Details (flights, etc.,) and Equipment Maintenance:

Acasta provided a Bell 407 for transportation to Gordon Lake sites. Departed Yellowknife at 08:10, arrived at Camlaren at 08:40. Departed Camlaren at 14:00 and arrived at Zenith at 14:05. Departed Zenith at 14:20 and arrived at Burnt Island at 14:30. Departed Burnt Island at 14:55 and arrived at Goodrock at 15:00. Departed Goodrock at 15:10 and arrived at West Bay at 15:20. Departed West Bay at 15:50 and arrived at Kidney at 16:00. Departed Kidney at 16:15 and arrived at Treacy at 16:20. Departed Treacy at 16:40 and arrived in Yellowknife at 17:10. Times are approximate.

GW samples were collected using bailers as battery to power compressor/controller was dead upon arrival to site.

Safety Considerations

Notes from Daily Safety Meetings:

COVID-19 precautions, reviewed previous days identified hazards, performed site-specific hazard assessment during tailgate meeting.

Sampling Completed:

Surface Water Samples	3	SNP surface water samples	WES-SW-SNP-11F-2020-01; TRE-SW-SNP-11E-2020-01; DUP1-SW-SNP-2020-01
Groundwater Samples	6	SNP, LTM groundwater samples	CAM-GW-SNP-7B-2020-01; DUP1-GW-SNP-2020-01; CAM-GW-MW2-2020-01; CAM-GW-SNP-7A-2020-01; CAM-GW-SNP-7D-2020-01; CAM-GW-SNP-7C-2020-01;
Soil Samples	0		
Other	2	Field and Trip Blanks	FB-SW-SNP-2020-01; TB-SW-SNP-2020-01

QA and Specialist Services:

QA and/or Specialist:	None
Activity Completed:	None

Communications / Submissions:

Summary of Findings
Burnt Island Collected surface water quality data. Camlaren Collected 5 SNP GW samples plus a duplicate. MW1 was dry. Collected surface water quality data. The data logger at VT#2 had a display field that read "Battery missing or tab installed. Check now." Test pit dug at toe of north slope of TSCA (near MWs); moist but not enough water to collect sample. May be seepage on east side (near SNP station) and going into lake but not possible to sample. Zenith Collected surface water quality data. Goodrock Collected water quality data at area downgradient of waste rock (pooled area with relatively neutral pH). Kidney Pond Collected surface water quality data. Treacy Collected SNP surface water sample and water quality data. West Bay Collected SNP surface water sample and water quality data.

Daily Photo Record

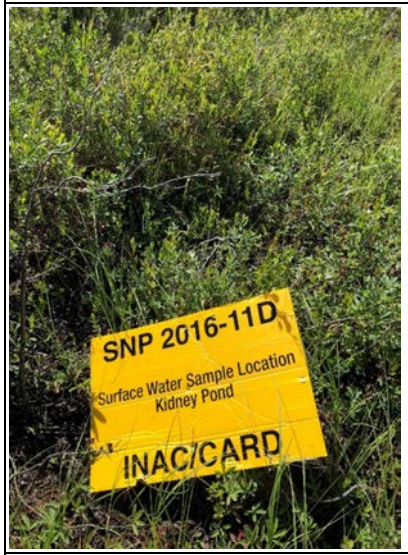


Photo 1

Displaced SNP signage.

Photo 2

Groundwater monitoring and sampling.

Daily Photo Record	
	**Photo 3** TSCA minor erosion gully.
	**Photo 4** TSCA vegetation.

Daily Resident Engineer Report			
Client:	PSPC	**Report Date:**	September 3, 2020
Project:	Gordon Lake Remediation Project	**Contractor:**	n/a
Camp:	n/a	**Site Superintendent:**	n/a
PWGSC Project Number:	R.057573.025	**Day Shift Hours:**	07:00 to 19:00
Stantec Project Number:	121414585	**Night Shift Hours:**	n/a
Weather:	Clear, 3C, wind 10km/h N	**Report by:**	BW (Stantec)

Camp Supervision and Review of License and Permit Compliance

LUP, WL and Other Permit Observations or Non Conformances:

SNP and LTMP in accordance with WL

Workers On-Site:

Company	Total # of Workers	# of Aboriginal Workers	Note: CIRNAC was onsite completing inspections at the TSCA.
Ek'edia	1	1	
Stantec	3	0	
CIRNAC	2	-	

Stantec Personnel:

Name	Position
BW	Field Lead
SK	Geotechnical
MA	Field Crew

Logistics Details (flights, etc.,) and Equipment Maintenance:

Acasta provided transportation to Gordon Lake sites. Departed Yellowknife at 08:35 after approximately one hour delay due to mechanical issue. Arrived at Camlaren at 09:15. CIRNAC arrived at Camlaren at 11:00 after approximately 45 minute delay due to mechanical issue. CIRNAC departed Camlaren at 14:45. Field crew departed Camlaren at 15:00 and arrived at Kidney Pond; departed Kidney Pond at 16:55 and arrived in Yellowknife at 17:30.

Safety Considerations

Notes from Daily Safety Meetings:

Completed safety briefing prior to departing Yellowknife, including Acasta COVID symptom check, orientation video and mask requirements. Completed a review of Stantec health and safety procedures and LMRA onsite with field crew

Sampling Completed:

Surface Water Samples	5	SNP surface water samples	CAM_SW_SNP_11B1, CAM_SW_SNP_11B2, CAM_SW_SNP_11B3, CAM_SW_SNP_11B4 and KID_SW_SNP_11D
Groundwater Samples	0	SNP groundwater samples	CAM_GW_7A_2020_02, CAM_GW_7B_2020_02, CAM_GW_7C_2020_02, CAM_GW_7D_2020_02 and CAM_GW_MW2_2020_02
Soil Samples	0		
Other	0		

QA and Specialist Services:	
QA and/or Specialist:	None
Activity Completed:	None

Communications / Submissions:

A predetermined check-in procedure was determined with the Stantec project team prior to the field visit and was completed at 12:00 via satellite phone.

Summary of Findings (including notes on Wildlife)

General notes

- Stantec geotechnical engineer inspected the TSCA at Camlaren including hand dug test pits to determine cover thickness at areas of potential concern. The cover on the west embankment is not sufficient, in some areas it is less than 200 mm, in one spot the liner was exposed. This is a trigger for repairs. Remedial options to be discussed.
- CIRNAC representatives were onsite at Camlaren to complete inspections and shadow geotechnical inspection.
- The ditches of the TSCA were inspected and clear of debris.
- Monitoring wells are all in excellent condition (reference Photo 5 and Photo 6).
- A visual inspection of Kidney Pond Portal subsidence was completed by Stantec. Cover material has subsided exposing approximately 2.0m and the portal entry is visible (reference Photo 3).
- Vegetation growth was observed at Kidney Pond (reference Photo 4).

Daily Photo Record	
	**Photo 1** Aerial view of the TSCA. Facing northwest.
	**Photo 2** Aerial view of Kidney Portal area. Facing east.

Daily Photo Record	
	**Photo 3** Slumping at Kidney Portal. Facing northwest.
	**Photo 4** Vegetation growth at Kidney Portal sand cover.

Daily Photo Record	
	**Photo 5** MW#4. Facing southeast towards Gordon Lake.
	**Photo 6** MW#1. Facing southeast towards Gordon Lake.

Daily Photo Record

Photo 7

Potential animal digging along south side of TSCA.

Photo 8

Exposed liner on the west side of the TSCA.

Daily Photo Record

Photo 9

West side showing erosion and exposed liner on the west side of the TSCA.

Daily Resident Engineer Report			
Client:	PSPC	**Report Date:**	September 4, 2020
Project:	Gordon Lake Remediation Project	**Contractor:**	n/a
Camp:	n/a	**Site Superintendent:**	n/a
PWGSC Project Number:	R.057573.025	**Day Shift Hours:**	07:00 to 19:00
Stantec Project Number:	121414585	**Night Shift Hours:**	n/a
Weather:	Clear, 7C, wind 6km/h NE	**Report by:**	RP (Stantec)

Camp Supervision and Review of License and Permit Compliance

LUP, WL and Other Permit Observations or Non Conformances:

SNP sampling and LTM in accordance with WL and LTMP

Workers On-Site:

Company	Total # of Workers	# of Aboriginal Workers
Ek'edia	1	1
Stantec	2	0
CIRNAC	0	0

Stantec Personnel:

Name	Position
BW	Field Lead
RP	Field Crew

Logistics Details (flights, etc.,) and Equipment Maintenance:

Acasta provided transportation to Gordon Lake sites. Departed Yellowknife at 08:10 and arrived at Burnt Island at 08:50. Crew then moved to Camlaren at 09:25, moved to Zenith at 11:04, moved to West Bay at 11:35 and moved Treacy at 12:10. Field crew departed Treacy at 13:46 and arrived in Yellowknife at 14:10.

Safety Considerations

Notes from Daily Safety Meetings:

Completed safety briefing prior to departing Yellowknife, including Acasta COVID symptom check, orientation video and mask requirements. Completed a review of Stantec health and safety procedures and LMRA onsite with field crew

Sampling Completed:

Surface Water Samples	5	SNP surface water samples	BUR_SW_SNP_11A_2020_02, CAM_SW_SNP_11C_2020_02, TRE_SW_SNP_11E_2020_02, WES_SW_SNP_11F_2020_02 and DUP1_SW_SNP_2020_02
Groundwater Samples	0		
Soil Samples	0		
Other	0		

QA and Specialist Services:	
QA and/or Specialist:	None
Activity Completed:	None

Communications / Submissions:

A predetermined check-in procedure was determined with the Stantec project team prior to the field visit and was completed at 12:00 via satellite phone.

Summary of Findings (including notes on Wildlife)

General notes:

- VB#1, VB#2, VB#3, VT#1 and VT#2 data loggers at the TSCA were downloaded and their batteries replaced.
- Vegetation growth was observed at the rough and loose revegetation area at Zenith Portal (reference Photo 3).
- Vegetation growth was observed at the trench at Treacy (reference Photo 6).
- Fish were observed while flying over Gordon Lake.

Daily Photo Record	
	**Photo 1** Aerial of Burnt Island. Facing North.
	**Photo 2** Downloading data loggers from vibration well #1. Facing southwest.

Daily Photo Record	
	**Photo 3** Rough and loose revegetation plot at Zenith. Facing southeast.
	**Photo 4** Aerial of West Bay. Facing northeast.

Daily Photo Record	
	**Photo 5** Aerial of Treacy. Facing east.
	**Photo 6** Vegetation growth at Treacy trench. Facing west.

APPENDIX D

Inspection Records

Erosion and Settlement Inspection Form			
Project Details			
Mine Site:	Kidney Pond	Date (mm/dd/yy):	16-Jul-20
Weather:	20ºC, clear	Time:	12:00
Rainfall in Last 24 Hours (circle one)	YES / **NO**	Inspected by:	ML
Backfilled Excavation Locations			
Excavation ID	**Kidney Portal**		
Location Description	Sand backfill		
GPS Coordinates:	N: 698276 E: 381558		
Condition of Backfilled Excavation (circle one)	GOOD / **POOR**		
If POOR - Why?	Approximately 2m of subsidence of backfill material on portal. Rock face and top of portal entrance exposed.		
Evidence of Environmental Concern	YES / **NO**		
If YES - outline concern (e.g. erosion, rutting, settlement, cracking, slumping, ponding, drainage paths, signs of contamination)			
Additional Work Required? (circle one)	**YES** / NO		
Additional Work Completed? (circle one)	YES / **NO**		
Description of Additional Work Completed			
Follow-up Monitoring Required? (circle one)	**YES** / NO		
If YES, provide details on what follow up is required.	Year 3 inspection and repair required in addition to LTM requirement for year 5.		

Seepage and Leachate Inspection

Project Details

Client:	PSPC	Stantec Project Number:	121414585
Project:	Gordon Lake Remediation Program	PWGSC Project Number:	R.057573.050
Location:	Gordon Lake, NWT	Weather:	20C, sun
Contractor:	n/a	Rainfall in Last 24 Hours:	No
Project Manager:	Allen MacGarvie	Active Storm Runoff?	No
Inspected by:	ML	Date:	16-Jul-20
Inspection Type:	Regular (year 2)	Time:	12:00
Inspection Site:	TSCA	Inspection Location:	TCSA

Inspection Details

Required Information	Description	Notes
Seepage or Leachate Observed?:	**yes**/no	
Location of Observed Seepage:	Moist sand at north toe of TSCA, east and west of MW3. Pooled water at the south toe drain.	Water may be related to recent heavy rainfall and runoff from adjacent bedrock outcrop.
Water Visual Observations:		
Water Monitoring Parameters Recorded?:	yes/**no**	
Water pH:		
Water Temperature:		
Water Conductivity:		
General Observations:		

Follow-Up

Describe Recommended Follow-Up:		
Parties Involved/Informed:		

Erosion and Settlement Inspection Form			
Project Details			
Mine Site:	TSCA	Date (mm/dd/yy):	16-Jul-20
Weather:	20ºC, clear	Time:	12:00
Rainfall in Last 24 Hours (circle one)	YES / **NO**	Inspected by:	ML
Backfilled Excavation Locations			
Excavation ID	**TSCA**		
Location Description	Camlaren		
GPS Coordinates:			
Condition of Backfilled Excavation (circle one)	**GOOD** / POOR		
If POOR - Why?	No riffles observed near slash potentially due to wind action. Erosion gullies observed on west bank of TSCA		
Evidence of Environmental Concern	YES / **NO**		
If YES - outline concern (e.g. erosion, rutting, settlement, cracking, slumping, ponding, drainage paths, signs of contamination)			
Additional Work Required? (circle one)	**YES** / NO		
Additional Work Completed? (circle one)	YES / **NO**		
Description of Additional Work Completed			
Follow-up Monitoring Required? (circle one)	**YES** / NO		
If YES, provide details on what follow up is required.	Year 3 inspection and repair required in addition to LTM requirement for year 3.		

APPENDIX E

Photographic Log

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Burnt Island**

Photograph ID: 1

Photo Location:
Burnt Island near SNP Station 2016-11a

Direction:
Looking east

Survey Date:
9/4/2020

Comments:
Viewpoint 1 (Figure A1.5, Appedix A)

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Camlaren TSCA**

Photograph ID: 1 **Photo Location:** Camlaren TSCA **Direction:** Looking west **Survey Date:** 9/4/2020 **Comments:** Viewpoint 1 (Figure A2.2, Appendix A)	
Photograph ID: 2 **Photo Location:** Southeast bank of TSCA and south drain **Direction:** Looking southeast **Survey Date:** 9/4/2020 **Comments:** Viewpoint 2 (Figure A2.2, Appendix A)	

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Camlaren TSCA**

Photograph ID: 3 **Photo Location:** Pooled water identified in south toe drain **Direction:** **Survey Date:** 7/16/2020 **Comments:**	
Photograph ID: 4 **Photo Location:** East bank of TSCA near SNP Station 2016-7b (MW4) **Direction:** Looking northeast **Survey Date:** 7/16/2020 **Comments:** Viewpoint 3 (Figure A2.2, Appendix A)	

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Camlaren TSCA**

Photograph ID: 5	
Photo Location: Northeast bank of TSCA near SNP Station 2016-7a (MW3)	
Direction: Looking northwest	
Survey Date: 7/16/2020	
Comments: Viewpoint 4 (Figure A2.2, Appendix A)	

Photograph ID: 6	
Photo Location: Wet sand identified as potential seepage point on north bank of TSCA	
Direction: Looking north	
Survey Date: 7/16/2020	
Comments: Viewpoint 5 (Figure A2.2, Appendix A)	

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Camlaren TSCA**

Photograph ID: 7

Photo Location:
Wet sand identified as potential seepage point on north bank of TSCA

Direction:
Looking northwest

Survey Date:
7/16/2020

Comments:
Viewpoint 6 (Figure A2.2, Appendix A)

Photograph ID: 8

Photo Location:
Northwest bank of TSCA and northwest drain

Direction:
Looking south

Survey Date:
7/16/2020

Comments:
Viewpoint 7 (Figure A2.2, Appendix A)

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Camlaren TSCA**

Photograph ID: 9 **Photo Location:** Surface of TSCA and VT1, MW1 and VB2 **Direction:** Looking north **Survey Date:** 7/16/2020 **Comments:** Viewpoint 8 (Figure A2.2, Appendix A)	
Photograph ID: 10 **Photo Location:** MW1 and VT1 with metal guard **Direction:** Looking south **Survey Date:** 9/3/2020 **Comments:** Viewpoint 9 (Figure A2.2, Appendix A)	

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Zenith Island**

Photograph ID: 1

Photo Location:
Zenith Island near SNP Station 2016-11c

Direction:
Looking south

Survey Date:
9/4/2020

Comments:
Viewpoint 1 (Figure A2.4, Appendix A)

Photograph ID: 2

Photo Location:
Zenith Island near SNP Station 2016-11c

Direction:
Looking northeast

Survey Date:
9/4/2020

Comments:
Viewpoint 2 (Figure A2.4, Appendix A)

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Zenith Island**

Photograph ID: 3 **Photo Location:** Revegetation efforts on Zenith Shaft **Direction:** Looking southeast **Survey Date:** 9/4/2020 **Comments:** Viewpoint 3 (Figure A2.4, Appendix A)	
Photograph ID: 4 **Photo Location:** Zenith Island near SNP Station 2016-11c **Direction:** Looking north **Survey Date:** 9/4/2020 **Comments:** Viewpoint 4 (Figure A2.4, Appendix A)	

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Kidney Pond**

Photograph ID: 1 **Photo Location:** Kidney Pond near SNP Station 2016-11d **Direction:** Looking southeast **Survey Date:** 9/4/2020 **Comments:** Viewpoint 1 (Figure A4.3, Appendix A)	
Photograph ID: 2 **Photo Location:** Kidney Portal at Kidney Pond **Direction:** Looking north **Survey Date:** 9/4/2020 **Comments:** Viewpoint 2 (Figure A4.3, Appendix A)	

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Kidney Pond**

Photograph ID: 3

Photo Location:
Kidney Portal slumping (note exposed portal entrance)

Direction:
Looking northwest

Survey Date:
9/3/2020

Comments:
Viewpoint 3 (Figure A4.3, Appendix A)

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Treacy**

Photograph ID: 1	
Photo Location: Treacy near SNP Station 2016-11e	
Direction: Looking southwest	
Survey Date: 9/4/2020	
Comments: Viewpoint 1 (Figure A7.2, Appendix A)	

Photograph ID: 2	
Photo Location: Treacy near SNP Station 2016-11e	
Direction: Looking southeast	
Survey Date: 9/4/2020	
Comments: Viewpoint 2 (Figure A7.2, Appendix A)	

Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**Treacy**

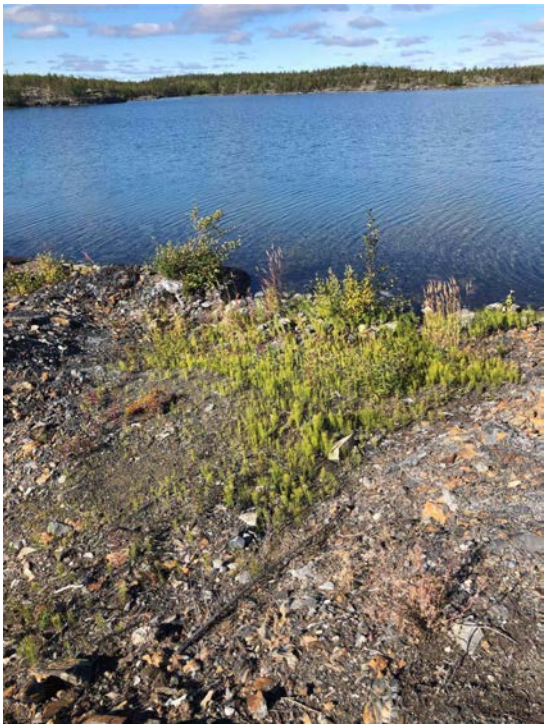
Photograph ID: 3

Photo Location:
Vegetation growth at Treacy

Direction:
Looking northwest

Survey Date:
9/4/2020

Comments:
Viewpoint 3 (Figure A7.2, Appendix A)



Stantec

Photographic Log

Client:	**Public Services and Procurement Canada**	**Project:**	**121414585**
Site Name:	**Gordon Lake Group of Sites**	**Site Location:**	**West Bay**

Photograph ID: 1

Photo Location:
West Bay near SNP Station 2016-11f

Direction:
Looking east

Survey Date:
9/4/2020

Comments:
Viewpoint 1 (Figure A9.2, Appendix A)

Photograph ID: 2

Photo Location:
West Bay near SNP Station 2016-11f

Direction:
Looking northeast

Survey Date:
9/4/2020

Comments:
Viewpoint 2 (Figure A9.2, Appendix A)

APPENDIX F

Geotechnical Inspection Report

FINAL REPORT: Annual 2020 Geotechnical Inspection Report

Tailings and Soil Containment Area,
Camlaren Mine Site, NT

March 30, 2021

Prepared for:

Public Services and Procurement Canada on behalf of Crown-Indigenous Relations and Northern Affairs Canada

Prepared by:

Stantec Consulting Ltd.
40 Highfield Park Drive, Suite 102
Dartmouth, NS B3A 0A3

File. 121414585

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

On behalf of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Stantec Consulting Ltd. (Stantec) was retained by Public Services and Procurement Canada (PSPC) to perform an annual geotechnical inspection of the engineered Tailings and Soil Containment Area (TSCA) at Camlaren, one of the Gordon Lake Sites.

The inspection was carried out by Stantec on September 3, 2020 by a professional engineer, who was accompanied by representatives of CIRNAC. The scope of the inspection included a walk over of the facility to collect visual observations regarding construction quality and potential deficiencies. The route of the walk over included the crest of the TSCA, the top of the TSCA, and along the downstream toe of the TSCA around its entire perimeter. The inspection checklist included overall performance monitoring items as listed in the Design Basis Report (DBR) and the Phase I Long-Term Monitoring (LTM) Plan, which focus on slope stability, settlement, erosion, seepage, vegetation, and animal activities. Observations were recorded on the TSCA inspection checklist, which is included in Appendix B. Photographs were also taken to record key observations and provide a record of general conditions. These are included in the TSCA inspection checklist.

1.1 BACKGROUND

The Gordon Lake Remediation Project involved the remediation of nine former mine and advanced exploration sites located approximately 80 kilometres north of Yellowknife, Northwest Territories (NT). The nine sites, referred to collectively as the Gordon Lake Group (GLG) Sites, are located on Crown Land on or near Gordon Lake. Remedial work at the GLG Sites occurred between 2017 and 2019.

Camlaren Mine (one of the GLG Sites) is a former gold mine located on Muir Island in the southern portion of Gordon Lake. In 1980, a milling plant was erected. Tailings from the mine were deposited in the Camlaren tailings area (i.e. the Tailings Containment Area, or TCA), which was operated into the 1980s and then abandoned.

Closure of the Camlaren TCA was performed in 2018, as part of the wider mine closure and remediation works for the GLG Sites. The TSCA is an engineered mine waste containment facility that encompasses the Camlaren mine tailings formerly part of the TCA, as well as impacted material (soil, tailings, waste rock) and non-hazardous debris (metal, wood, etc.) from the other GLG Sites. Impacted material and non-hazardous waste from the GLG Sites were transported to Camlaren in the winter of 2018 (majority from February 4 to March 13, 2018). Some of the waste was transported via helicopter in the summer of 2018. The construction of the TSCA was conducted between (approximately) July 10 and September 15, 2018.

As part of LTM, an annual inspection was completed in 2019, the results of which are presented in the Stantec report titled Annual 2019 Geotechnical Inspection Report - Tailings and Soil Containment Area, Camlaren Mine Site, NT (Stantec, 2019).

2.0 TSCA SITE DESCRIPTION

2.1 DESIGN OF THE FACILITY

The design for the TSCA was presented in the following Design Basis Report (DBR):

- Stantec Consulting Ltd., September 11, 2018, Updated Report: Gordon Lake Group Design Basis, Submitted to PWGSC and INAC, File No: 121414585 (Stantec, 2018a)

Construction details were presented in the as-built report dated December 21, 2018 titled FINAL - 2018 As-Built Construction – Camlaren TSCA, Part of GLG (Stantec, 2018b). An overview of construction details is presented below, based on the as-built report.

Engineering and construction details of the TSCA involved stabilization of the mine waste by regrading slopes and provision of the engineered cover, as follows:

- Slopes were stabilized by regrading of the perimeter dams between 3.1H:1V and 3.3H:1V;
- The engineered cover consisted of Bituminous Geomembrane (BGM) and an overlying 0.5 m thick sand layer to prevent water infiltration;
- Erosion protection consisted of providing vegetation (willow branches) along the top of the TSCA and a coarse sand with rockfill and coco mats on the slopes;
- Lined runoff surface ditches were constructed on the northwest and south perimeters to control drainage away from the TSCA and prevent any pooling against the embankment;
- Implementation of an instrumentation and monitoring program for the long-term performance of the TSCA.

The TSCA is oval-shaped in plan-view, about 200 m (south to north) by 130 m (east to west) covering an area of approximately 2.5 hectares (ha). The top of the TSCA is cone shaped sloping with grades of about 4% outward shedding the surface runoff towards the perimeters. The TSCA has three embankments: North, East and West that form a uniform structure (i.e. there is no distinct geomorphological or structural boundary). The embankments on average are about 2 to 4 m high and up to 5 m high at the highest section on the north.

The composite BGM cover was placed over the entire TSCA and slopes. At the embankment toes, the BGM was placed on the prepared bedrock foundation and covered with sand/bentonite mixture. In naturally low topography areas, the BGM liner was not secured to bedrock but instead rockfill toe drains were constructed to relieve any pore pressures, if they were to develop within the TSCA at any point of time.

Perimeter ditches were constructed on the northwest perimeter – Northern Ditch (Ditch 1 on the design drawings issued as part of the DBR) and on the south perimeter – Southern Ditch (Ditch 2 on the design drawings issued as part of the DBR). The ditches were lined with the BGM and covered with riprap. The BGM extended from the slopes into the ditches as one unit, to prevent any water backflow into the TSCA.

A summary of construction activities for the TSCA facility are provided in the 2018 As-Built Construction – Camlaren TSCA, Part of GLG (Stantec, 2018b).

General characteristics of the TSCA are summarized in Table 1.

Table 1 TSCA Characteristics

TSCA General Properties	
TSCA Area	2.5 ha
TSCA Peak Elevation	300.54 m
TSCA Top Slope	3 - 4%
Berm Composition	Sand fill dam with BGM composite cover
Composite BGM Cover	BGM liner placed on sand bedding and covered with 0.5 m of sand cover
Discharge Facilities	Perimeter ditches, Northern Ditch - Ditch 1 and Southern Ditch – Ditch 2
Dam Classification	To be determined
Design for extreme conditions	The TSCA was designed to withstand seismic loads and extreme weather conditions resulting from 1 in 1,000 year event

The characteristics of the three embankments that form the TSCA are presented in Table 2, below.

Table 2 TSCA Dam Characteristics

Dam Name	North Embankment	East Embankment	South Embankment
Dam (Embankment) Composition	Sand fill dam with BGM Composite Cover	Sand fill dam with BGM Composite Cover	Sand fill dam with BGM Composite Cover
Embankment Purpose	Main tailings containment dam converted into solid mine waste containment embankment.	East tailings containment dam converted into solid mine waste containment embankment	South tailings containment dam converted into solid mine waste containment embankment
Nominal Height (m)	5 m	4-4.5 m	2 m
Berm Crest Elevation	297.75 m	297.5-297.75 m	297.75 m
Nominal Length (m)	160 m	160 m	60 m
Downstream Slope	3H:1V	3H:1V	3H:1V
Chainages (m)	0 to 0+160	0+160 to 0+330	0+330 to 0+390

2.2 EMBANKMENT CLASSIFICATION

Stantec completed a review of the TSCA structure to determine whether it meets the definition of dam in accordance with Canadian Dam Association (CDA), Dam Safety Guidelines 2007 (2013 Edition) and other applicable CDA technical bulletins. Findings were summarized in a report titled Camlaren TSCA Embankment Classification Assessment (Stantec, 2020a).

It was determined that the TSCA embankments should be considered dam structures since a breach of the perimeter containment, regardless of the triggering mechanism, will likely trigger flow of the contents beyond the perimeter containment. The findings of the Embankment Classification Assessment report (Stantec, 2020a) were supported by a series of slope stability and failure run out analyses. The study indicated that for a breach scenario the contained tailings would flow beyond the perimeter containment structure reaching the lake.

This study did not include dam classification in terms of dam hazard consequence category as per CDA. This would require dam breach assessment, and evaluation of the potential downstream losses in terms of life losses, environment and/or cultural/heritage losses. It is recommended that the structure be classified as per CDA classification procedure.

2.3 SITE MANAGEMENT

2.3.1 Operations, Maintenance and Surveillance

Stantec prepared the Operations, Maintenance, and Surveillance (OMS) manual for the TSCA, in 2019. This manual was developed for the TSCA assuming that it was a landform structure. The OMS should be updated any time there is a change in the status, classification, condition, or operation of the TSCA (Stantec, 2020b).

2.3.2 Construction and Maintenance Records

Records of the construction and ongoing maintenance of the TSCA are maintained by CIRNAC, in accordance with the procedures set out in the OMS manual. Recommendations proposed during annual inspections should be logged and addressed in a timely manner.

2.3.3 TSCA Surveillance

Currently, it is assumed in the OMS manual that TSCA surveillance will be carried out through bi-annual inspections by a qualified geotechnical engineer registered in NT. As part of the inspections, instrumentation monitoring shall be performed.

Bi-annual inspections will be performed for the first five years and following extreme weather events. The inspections will be carried out in a similar manner as dam safety inspections (DSI) in accordance with the CDA. Bi-annual inspections will focus on visual observations to detect any deficiencies in the TSCA performance. The trigger levels and potential action plan were developed in the GLG Long-Term Monitoring Plan (Stantec, 2018c; Section 3.3.2) and the OMS manual.

Triggers for corrective actions include:

- Differential settlement of greater than 0.5 m (including for instrumentation stick-ups).
- Slopes slumping with horizontal cracks/movement of greater than 0.3 m.
- Slopes or cover erosion resulting in greater than 25% loss of material thickness.

- Frost heave effects greater than 0.2 m.
- Vegetation (primarily tree species) observed that typically develop roots deeper than 0.3 m.
- Animal activities, such as burrowing, resulting in depth greater than 0.3 m.
- Erosion control coco matting (full semi-circle, approximate length of 5 m) is no longer deemed effective.
- Ditch erosion exposes the BGM (i.e. visible liner).
- Ditch blockage of debris/object that impedes flow or causes ponding.

It is also recommended that trigger criteria will be established with regard to the piezometric levels. At this stage, based on previous slope stability analyses, it is assumed that the trigger levels should be established at 296.0 m at all piezometers, or as an average value across TSCA.

These scenarios will constitute a trigger for action, and review and/or modification of the remedial / reclamation approach will be required.

After satisfactory TSCA performance is documented during the first five years, inspections can be carried out at a lesser frequency (as specified in the OMS manual).

2.3.4 TSCA Instrumentation

TSCA instrumentation is comprised of two (2) thermistors (VT), two (2) standpipe monitoring wells (MW), three (3) locations for vibrating wire piezometers (VWPs) with double nested vibrating wire sensors (VB), and four (4) monitoring wells outside of the TSCA footprint installed as part of the Long-term Monitoring Program. A summary of the instrumentation is presented in Table 3 and locations are depicted on Drawing 1 (Appendix A). Installation details for the instrumentation are provided in the OMS manual (Stantec, 2020b).

Table 3 Overview of TSCA Instrumentation

ID	Type of Installation	Northing	Easting	Ground Surface Elevation (m)	Borehole Depth (m)
MW1	Monitoring Well	6986005	388356	298.73	5.3
MW2	Monitoring Well	6986051	388352	298.96	7.1
MW3*	Monitoring Well	6986073	388393	292.41	7.2
MW4*	Monitoring Well	6985962	388376	294.52	3.8
MW5*	Monitoring Well	6985922	388236	296.58	4.8
MW6*	Monitoring Well	6986066	388238	295.45	5.4
VB1	Vibrating Wire Piezometers	6985957	388335	298.11	6.4
VB2	Vibrating Wire Piezometers	6986026	388381	297.99	6.1
VB3	Vibrating Wire Piezometers	6986079	388353	298.48	7.0
VT1	Thermistor String	6986005	388351	298.89	5.9
VT2	Thermistor String	6986055	388352	298.84	7.0

*Monitoring well outside of the TSCA footprint

3.0 2020 INSPECTION

3.1 VISUAL OBSERVATIONS

No significant issues or concerns with respect to dam safety were observed by Stantec at the time of the inspection on September 3, 2020. The inspection checklist and photo log are attached in Appendix B.

The following observations were made during the inspection of the TSCA:

- In general, the TSCA cover and slopes were stable except for localized surface erosion and minor settlements in some areas.
- The toe drains on the north and the southeast corner were dry, and no seepage was observed at the time of inspection. Also, no sign of fines accumulation was observed in the toe drains.
- The perimeter ditch on the north was clear and no blockages were observed. There was standing water in the south perimeter ditch, due to an undulating invert.
- Instrumentation was in good condition, except VT1 and MW1. Repairs to VT1 were commissioned by DNV in September 2019. Based on a review of the data from VT1, it is suspected that some of the wires were switched. In addition, MW1 has an ice or dirt blockage in the pipe, which prevents water level measurements.
- A localized depression covering an area of 10 m by 5 m was observed at the top of the cover towards the north perimeter. The depth of the depression was approximately 0.2 m to 0.3 m below surrounding grade level. Additionally, two (2) depressions about 0.15 m deep were spotted in the same general area.
- Surface cracks were observed at the top of cover close to the northern perimeter adjacent to the depression zone.
- Surface erosion (50-130 mm) was noted on the north and northwest slopes, as the finer material was washed out exposing coarse material.
- New, deeper erosion (up to 120 mm) was observed on the west slopes. The BGM liner was exposed in two (2) places.
- No significant vegetation has established itself on the slopes. Some early growth in willow plants was observed but a significant number of the plants have died.
- Two (2) shallow (up to 150 mm) holes made by a burrowing animal were noted on the south slope and were refilled.

3.2 INSTRUMENTATION READINGS

Data from the thermistors and VWPs were downloaded by Stantec on September 4, 2020.

3.2.1 Thermistors

Figures 1 and 2 show the monthly average temperature profiles in depth through the TSCA mine waste at VT1 and VT2 locations.

Temperature data from VT1 was not recorded between December 23, 2018 and October 18, 2019 as the thermistor was damaged. The VT1 thermistor was repaired in September 2019 but based on a review of the data following repair, it was determined that the wires may have been switched. Therefore, these data are not presented herein, until further clarification is received from CIRNAC. Figure 1 shows temperature data from 2018.

The VT2 profiles indicate a range of temperature near the surface ranging from approximately -25°C in the winter season to 20°C in the summer season. The monthly average temperatures below surface generally indicate an active zone to about 5 m below the ground surface or to elevation 294.0 m. Within the active zone the temperature profiles fluctuate seasonally but are gradual between the surface temperature and the constant temperature zone below 5 m, where the temperature is near or just above the freezing point. The temperature profiles for VT1 are similar based on limited data from September 2018 to December 2018.

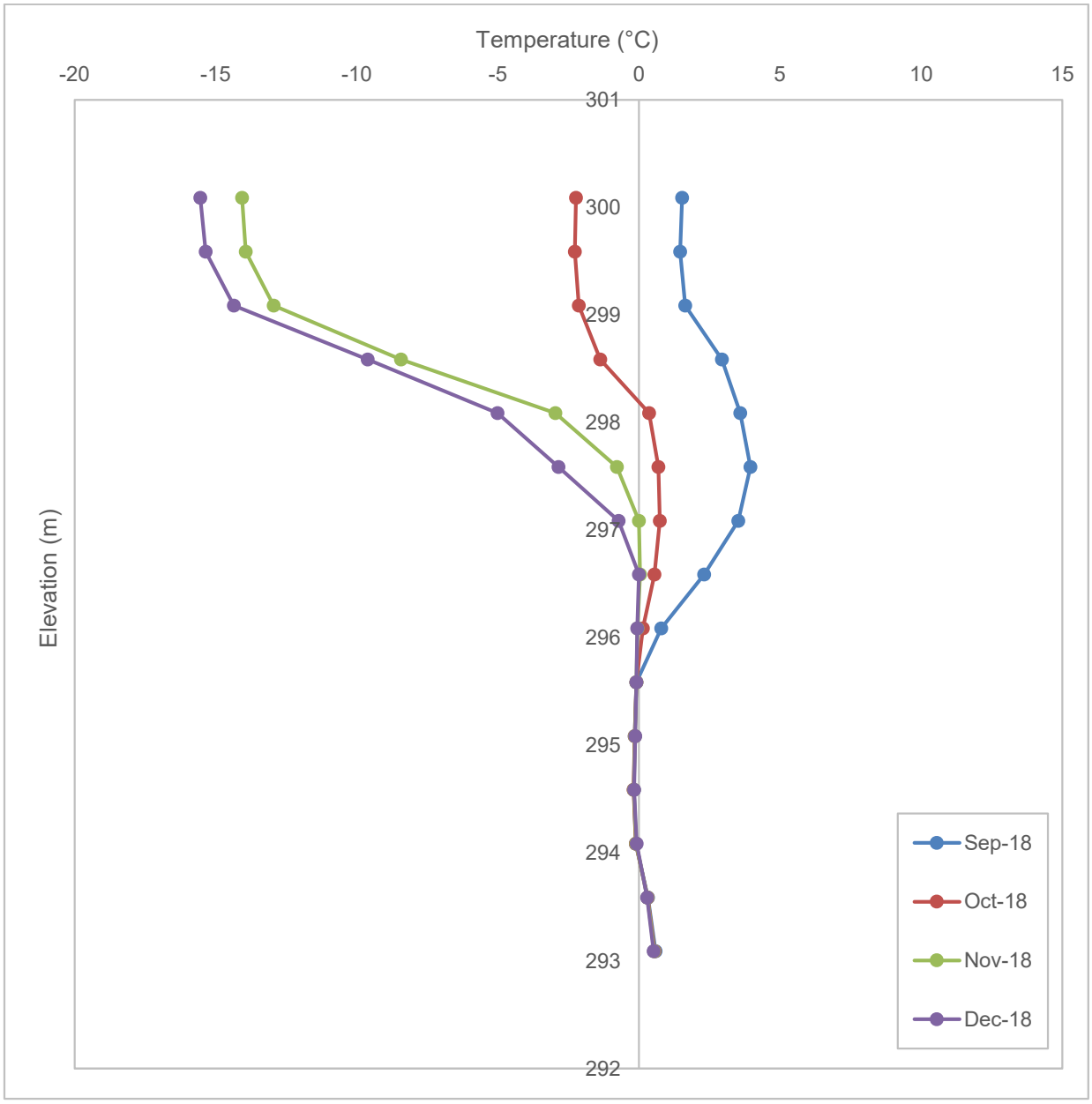


Figure 1 VT1 2018 Monthly Average Temperature Profiles

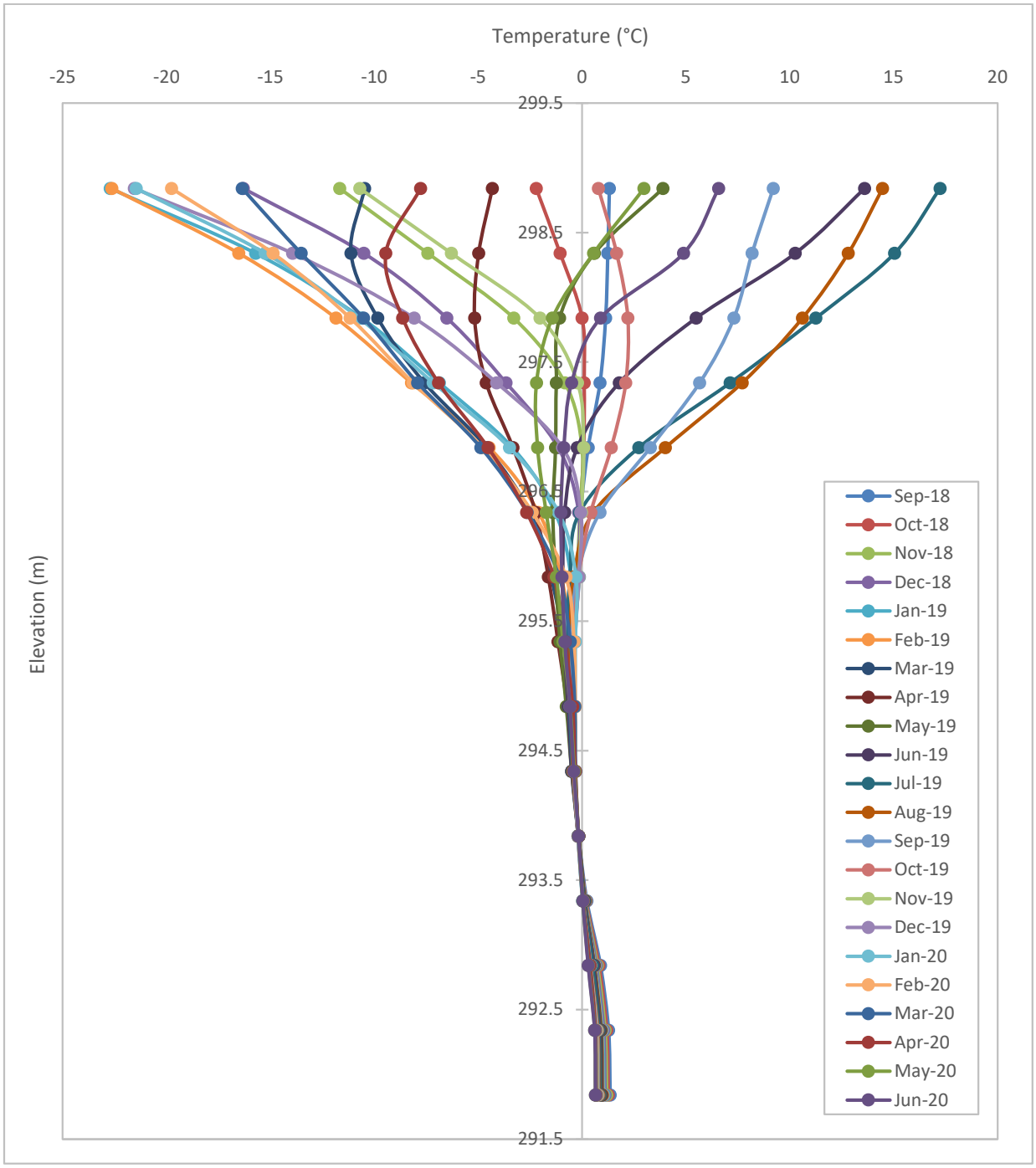


Figure 2 VT2 September 2018 - June 2020 Monthly Average Temperature Profiles

Monitoring of thermistors should be completed during bi-annual inspections. The temperature readings will facilitate the establishment of long-term trends, whether permafrost will be established in the deposited waste. The temperature in the waste is also used for calibration of the VWPs. There is no direct concern to dam safety related to permafrost. However, the permafrost and active zone development will have an impact on the pore pressures and interpretation of the long term piezometric levels.

3.2.2 Vibrating Wire Piezometers

Figures 3, 4 and 5 illustrate the piezometer readings in terms of total heads for each VWP at three (3) locations (VB1, VB2 and VB3) for the period between September 14, 2018 and September 4, 2020. At each location, the top piezometer measures pore pressures in the tailings, the bottom piezometer measures pore pressures at the bottom of the borehole near the bedrock or native soil. In general, the top and bottom piezometers showed similar trends throughout this period.

A review of the piezometric data for two (2) full seasons show the piezometric levels are cyclic over a 12-month period. The levels are lowest in the spring or early summer from May to June and then rise during the summer and fall reaching the peak in October to November. From the peak levels the piezometric levels gradually decrease until May/June when another cycle starts again.

We note that negative pore pressures were observed in VB2 during May/June.

In VB2 there appears to be downward vertical gradient. The difference in the total head measured by the two piezometers at VB2 is more or less constant (i.e. two piezometric lines are parallel). In addition, the small increases and decreases recorded in both the upper and lower piezometers mirror each other almost exactly which is unusual.

In 2018, there was a similar slight gradient in other VWP locations, however it was not observed during 2019. A downward gradient indicates a downward flow of water from within the TSCA toward the underlying foundation soils and bedrock. This situation could result in contaminant transport from the TSCA to the groundwater in the area beneath and around the TSCA.

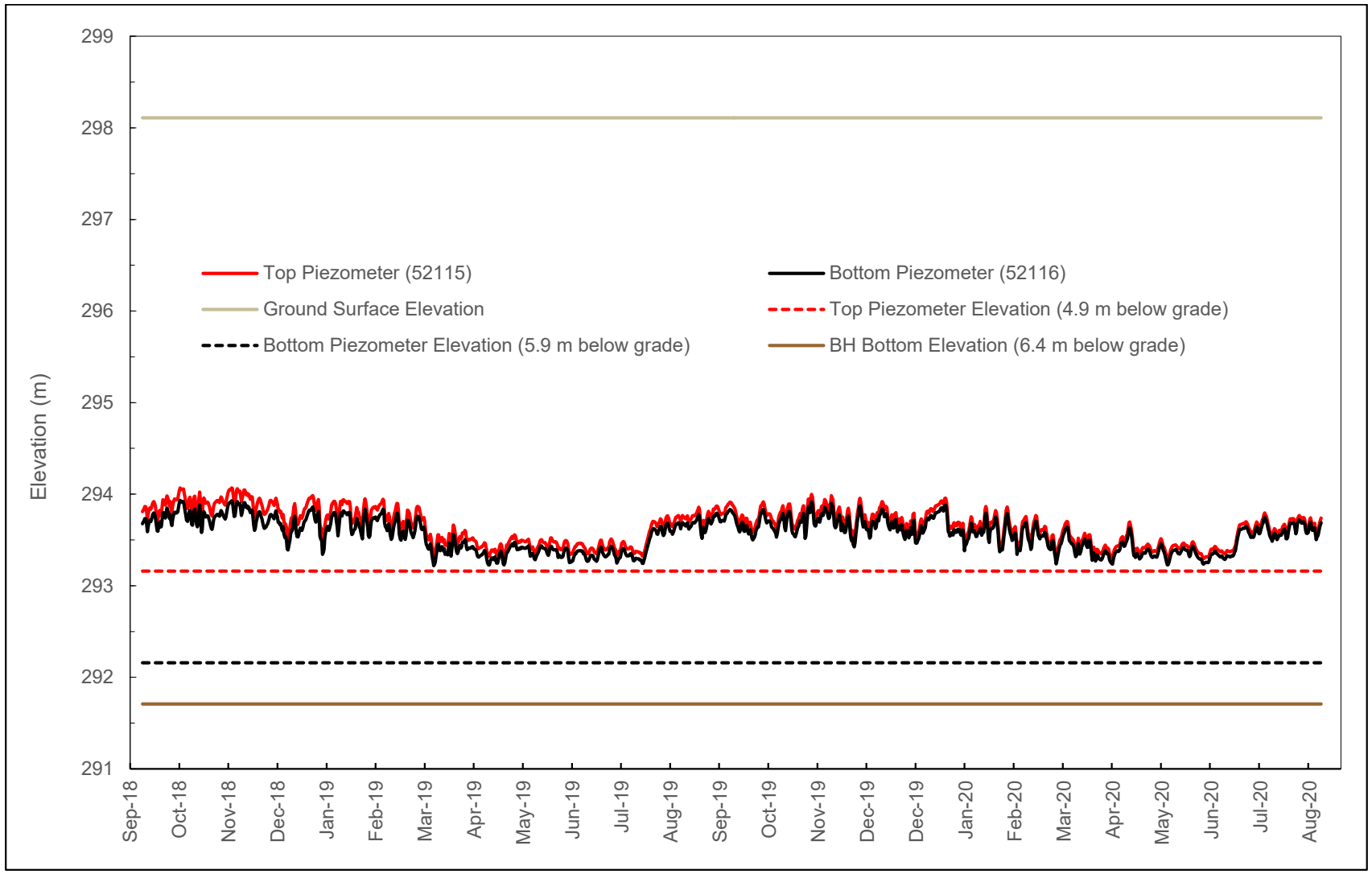


Figure 3 Piezometer Readings in VB1

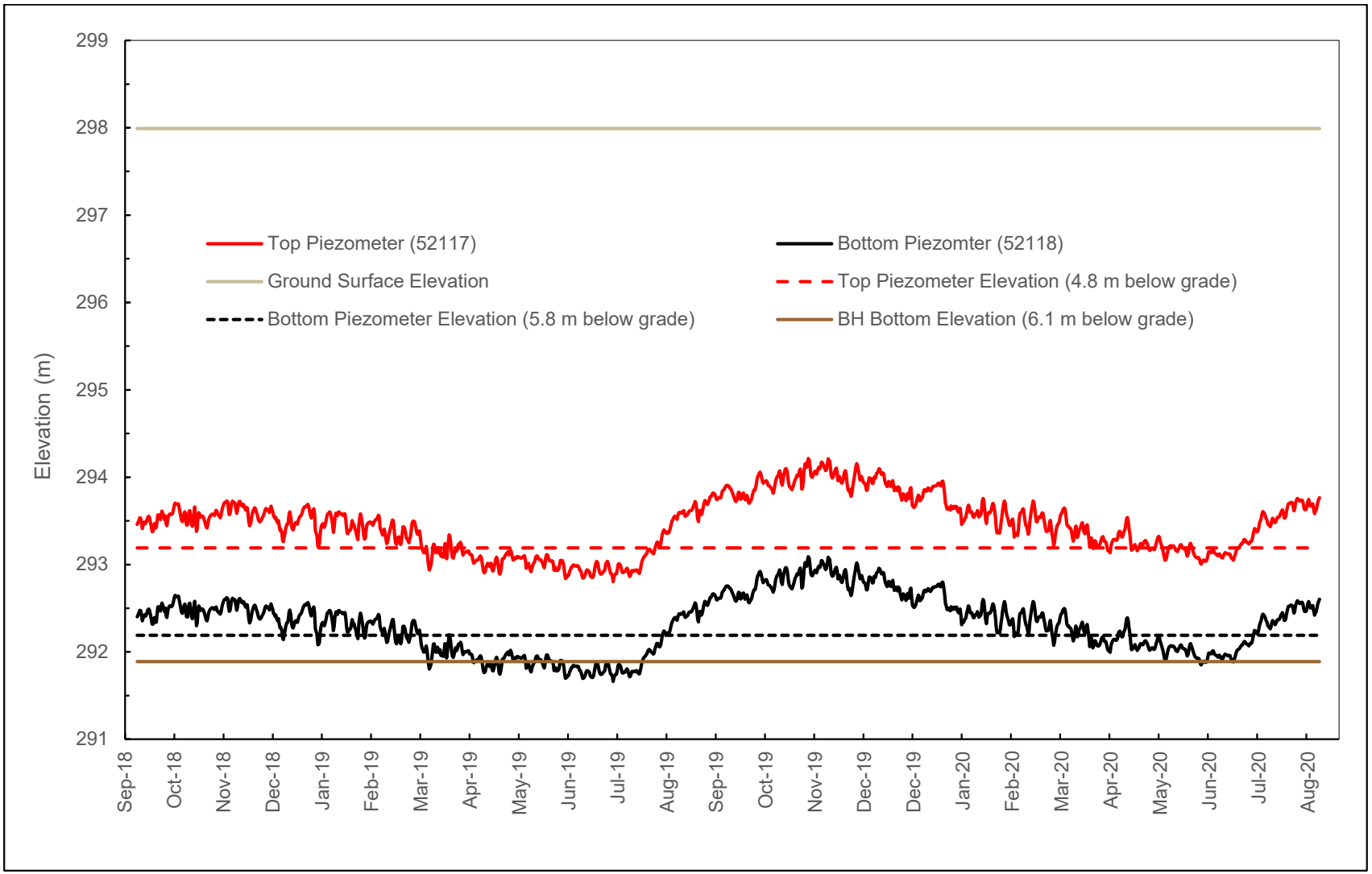


Figure 4 Piezometer Readings in VB2

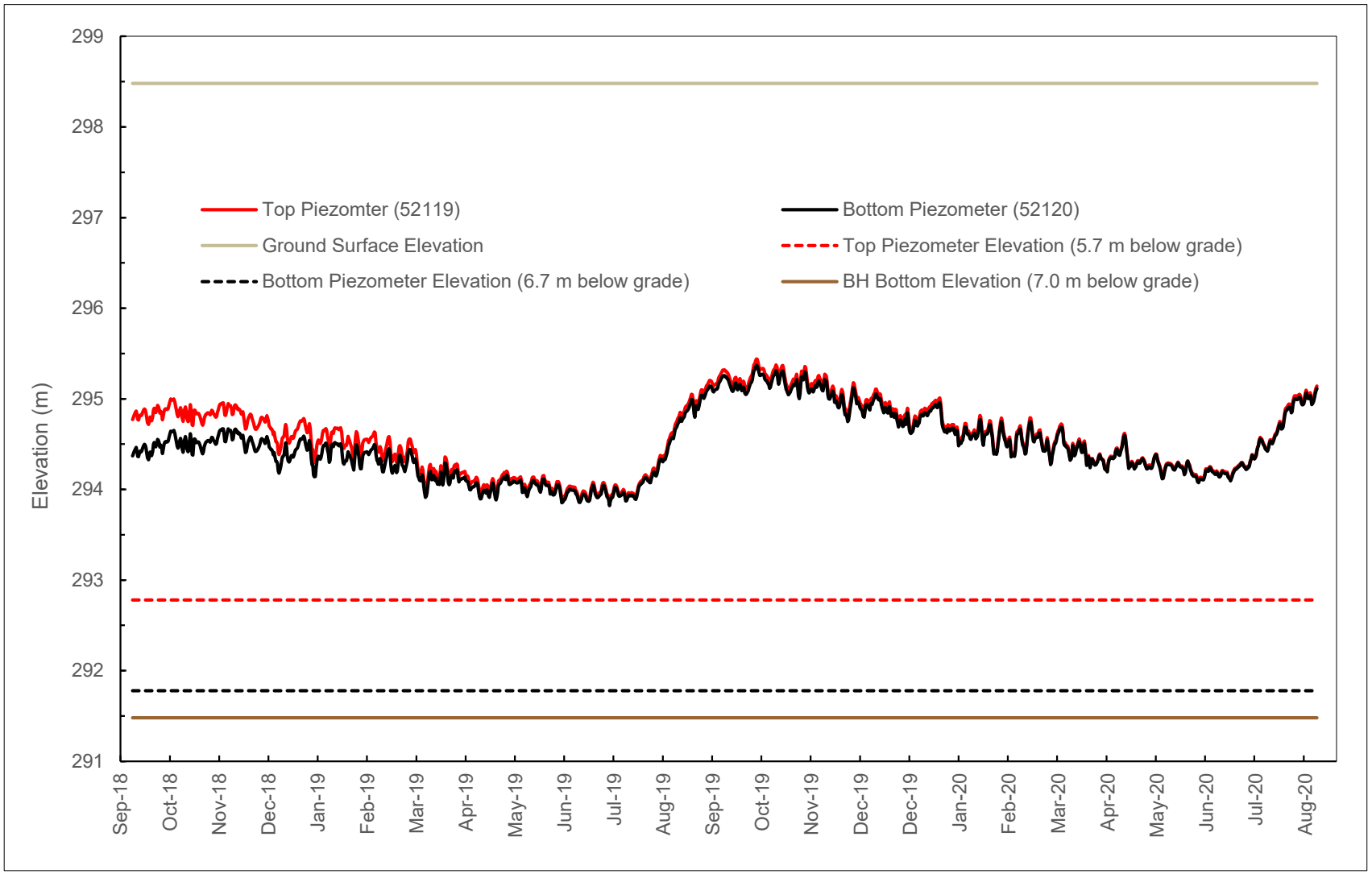


Figure 5 Piezometer Readings in VB3

The VWPs should be monitored during bi-annual inspection and groundwater levels should be reviewed and evaluated regarding the cover performance.

3.2.3 Monitoring Wells

Monitoring wells are measured manually. Since installation in September 2018, there have been five measurements: September 2018, July 2019, September 2019, July 2020, and September 2020.

In the two monitoring wells installed in the TSCA, the readings appear consistent with that from the VWPs, showing seasonal fluctuations. A water level in MW1 was not able to be obtained in September 2020. There could be a blockage (ice or dirt) in this monitoring well which should be removed.

The maximum recorded water levels in the TSCA, 296.4 m, was recorded in MW1 in September 2019. Table 4 presents the water level monitoring results from the two piezometers installed within the TSCA impoundment, MW1 and MW2.

Water levels in MW3 to MW6 are showing a different pattern and are more influenced by the fluctuating water levels in the lake.

Table 4 Groundwater Levels in Monitoring Wells

Monitoring Well	September 14, 2018	September 16, 2018	July 8-10, 2019	September 10-11, 2019	July 17, 2020	September 3, 2020
MW1	295.94	295.90	Frozen	296.35 m	295.30 (ice)	Blockage at 295.70
MW2	Dry	-	293.37 m	293.87 m	293.61	293.94
MW3*	290.97	290.35	291.07 m	291.06 m	291.25	291.17
MW4*	290.57	292.56	292.85 m	292.86 m	293.35	292.95
MW5*	-	292.34	292.82 m	293.12 m	293.05	292.60
MW6*	-	290.90	294.15 m	294.07 m	294.16	294.12
*Monitoring well outside the TSCA footprint						

The following is a summary regarding the latest observed piezometric data:

- Due to the placement of a cover system over the TSCA, it was anticipated that piezometric levels would likely decrease with time. However, both the VWP and the GW piezometers indicate slightly increased water levels in the fall of 2019 and fall 2020. There seems to be a seasonality in fluctuating water levels within 1-2 m for each piezometer. The highest water levels appear to be in the fall 2019 and 2020, the lowest water level appear to be in May – June 2019 and 2020. The water levels need to be further monitored to confirm this trend. The increase in piezometric levels could be caused by increase in the local groundwater level, which may have a seasonal variation and/or could be influenced by changes in overall water levels in the lake.

- However, the increase in water levels in the TSCA could also indicate damage to the TSCA cover and surface water infiltration. Continued monitoring of these piezometers may assist in further evaluating this. Additionally, a review of historical groundwater data from this area could also be useful to evaluate if this increase is seasonal or due to changed infiltration conditions.
- The seasonal fluctuations in the groundwater levels could be influenced by overall changes in the lake water levels and the groundwater system, groundwater recharge after the spring freshet, or increased infiltration if the geomembrane has leaks.
- The difference in head at piezometer VB2 is indicative of a downward seepage gradient. However, a similar gradient is not seen at VB1 or VB3. This may indicate the potential for higher seepage flows from the TSCA to the underlying foundation and surrounding area due to more permeable foundation conditions at VB2 than at the two other piezometer locations. A downward gradient at this location could also indicate that the rising piezometric levels are due to increased surface water infiltration, not a groundwater level increase (as a groundwater level increase would be associated with decrease of downward gradient). Finally, these could be also the error in readings caused by the faulty piezometer.
- The gradient difference in the total head measured by the two piezometers at VB2 is more or less constant (i.e. two piezometric lines are parallel). In addition, the small increases and decreases recorded in both the upper and lower piezometers mirror each other almost exactly at VB2 which is unusual. This phenomenon is hard to explain and should be further researched.
- Continued monitoring of the piezometers and monitoring wells over several seasons will provide insight into whether seasonal trends are influencing the water levels. In addition, the lake levels should be monitored at frequencies sufficient to enable evaluation of their influence on the water levels.

Currently, overall piezometric levels are acceptable and do not trigger any action. The water levels and pore pressures should continue to be monitored to assess the performance of the TSCA. It is recommended that the water levels are reviewed and assessed bi-annually, to confirm that there is no unusual water level rise that could have impact on TSCA slopes stability.

3.3 GROUND SETTLEMENT

During the 2019 inspection, a ground depression up to 0.3 m deep was observed at the top of cover of the TSCA near the North perimeter. The same depression was observed during the 2020 inspection. The depression area was approximately 10 m by 5 m and was bounded by surface cracks in an oval shape. There was no change to the dimension, or the depth of area as compared to the 2019 observations. There were two additional smaller depressions about 0.15 m deep observed near VB2.

The depressions could be caused by settlements related to consolidation of tailings or melting of the ice within waste rock, which could have been placed during construction in 2018. As described in the DBR, this type of settlement was anticipated. The identified settlement does not meet the trigger level identified in the OMS.

These areas of settlement should be monitored in upcoming bi-annual inspections. To facilitate monitoring, a settlement plate could be installed to the BGM liner with a fixed stick up, that could be measured during inspections. The settled area should be refilled to prevent water accumulation.

No settlement was observed at perimeter slopes and the areas close to the toe drain during the inspection.

Monitoring of differential settlements is part of bi-annual inspections and should be evaluated visually by inspecting the TSCA top cover for any depressions exceeding 0.5 m (trigger level). In the event of the depression, the area should be clearly marked for future monitoring and the BGM liner should be tested for any failures.

Settlements can also be evaluated by surveying the entire cover, which could be performed 2 to 3 years after construction if substantial settlements are observed. It is also recommended that as part of the bi-annual inspections, settlements are monitored by measuring the instrumentation stick ups of pipes and casings.

Alternatively, because of the remote area, Stantec recommends also to install an inSAR radar system for remote deformation monitoring. In the long term, this type of system will provide real benefit and savings in terms of required inspections.

3.4 EROSION

No erosion was observed at the top of cover of TSCA and the perimeter slopes on the east and south. However, erosion channels were observed on the north, west and northwest perimeter slopes, including:

- Erosion channels on the north slope near MW3, the channel was eroded through the coco-matting.
- Erosion channels on the northwest slope. These channels were in general 130 mm deep. Given the cover thickness in this area (i.e. 300 mm), this erosion triggers LTM adaptive management as per Table B-2 of the LTM Plan (i.e. slopes or cover erosion >25% loss of material thickness) (Stantec, 2018c).
- Multiple erosion channels on the west slope. These channels were in general 120 mm deep. Given the cover thickness in this area (i.e. 200-300 mm) this erosion triggers LTM adaptive management as per Table B-2 of the LTM Plan (i.e. slopes or cover erosion >25% loss of material thickness) (Stantec, 2018c).
- Liner was exposed in two locations on the west slope. An area approximately 200 m by 600 m was exposed in both cases. The eroded cover in this area was 50-100 mm thick. This erosion triggers LTM adaptive management as per Table B-2 of the LTM Plan (i.e. slopes or cover erosion >25% loss of material thickness) (Stantec, 2018c).

In addition, it was observed that vegetation growth on the top and slopes of the TSCA has progressed very slowly. Many of the willow branches are dead and some coco-mats are being blown away by the wind. The willow branches and coco-mats not performing as originally intended constitutes a trigger for adaptive management as per Table B-2 of the LTM plan (Stantec, 2018c). If vegetation does not establish itself by next year (i.e. 2021), other erosion control methods should be considered.

3.5 COVER THICKNESS INVESTIGATION

Five (5) shallow test pits were dug with a shovel to investigate the cover thickness in the area of the west and northwest embankment (Table 5). The location of test pits is illustrated on Drawing 1 in Appendix A.

Table 5 Summary of Test Pits

Test Pit ID	General Location	Test Pit Depth (mm)	Confirmed BGM Liner at Bottom
TP1	NW, mid-slope	400	Yes
TP2	NW, mid-slope	230	Yes
TP3	W, mid-slope, near exposed liner	110	Yes
TP4	N, mid-slope	600	No
TP5	W, mid-slope	250	Yes
TP6	W, mid-slope	170-220	Yes

Test pit results indicate that the cover material in some areas along the west and northwest slopes does not meet the 0.5 m specification. This was previously noted in the As-Built report, and recommendations were made to place additional cover material based on the thickness determined by survey results (Stantec, 2018b).

As described in Section 3.4, erosion channels have been observed, indicating that erosion has played a role in further reducing the thickness of the cover in some areas. Some of this erosion has triggered LTM adaptive management as per Table B-2 of the LTM Plan (refer to Section 3.4). Several factors may be contributing to accelerated erosion, including use of sandy cover materials, steep slopes, and ineffective revegetation efforts. Based on the triggers identified in Section 3.4, it is recommended that additional fill be placed on the west and northwest slopes.

Special erosion control may be required to control erosion in this area (e.g. geosynthetic solutions). Another option would be to flatten the west slopes by filling the ditch and moving the ditch further to the west or converting a ditch to a French drain. These and other options could be considered, a preliminary trade-off study may be required to evaluate all options with regard to long-term performance and economics.

3.6 ANIMAL BURROWS

Two animal burrows were identified on the south slope of the TSCA. Based on visual assessment, the holes were approximately 0.15 m deep. It was determined that the BGM was not damaged due to animal burrowing, and the burrows were filled in with granular material.

3.7 DITCHES

Both perimeter ditches appear to be performing well and there was no significant erosion or sediment accumulation in the ditches. In some locations, there was insufficient rip rap at the West Ditch, which resulted in exposed liner. Additional rip rap should be placed in these areas.

At the time of the inspection there was no rainfall and there was no flowing water in the ditches. There was standing water in two (2) spots in the south ditch. This was caused by depressions created in the ditch invert, which could be caused by freeze/thaw of the soils under the liner. It is recommended to monitor the situation, if the depressions get deeper, it recommended to fill the depressions with low permeability soil and place a piece of BGM liner over the top and seal it to the underlying BGM around the edges.

4.0 RECOMMENDATIONS

Following the 2020 inspection, we have summarized our recommendations in Table 6.

Table 6 Summary of Observations / Issues and Corresponding Recommendations

#	Observation / Issue	LTM Plan Adaptive Management Triggered[1]	Recommendation	Comment
1	Three (3) depressions up to 0.3 m deep at top of TSCA cover near the north perimeter.	No	Continue to monitor these depressions.	Inspection item for 2021.
2	Animal burrows at the south slope.	No	Repaired.	Resolved.
3	Erosion at the slope on north face.	No	Continue to monitor this area.	Inspection item for 2021.
4	Erosion at the slope on northwest and west face.	Yes[2]	Repair the erosion, provide additional cover, perform trade-off study for the long-term best option.	Should be addressed in the Summer 2021.
5	Slow vegetation growth, loose coco-mats.	Yes[3]	Refasten coco-mats, consider other alternatives for erosion control or vegetation.	Should be addressed in the Summer 2021.
6	Some settlement is expected within the first 2-3 years following construction. This should be quantified.	No	Continue bi-annual inspection schedule. The next inspection should be performed after freshet in Spring/Summer 2021. Special attention should be paid to monitoring settlement of the top cover. Measurements of stick-ups and instrumentation casings should be included in the bi-annual monitoring.	Inspection item for 2021.
7	Possible long-term settlement.	No	Resurvey the entire covered area if settlement continues.	Review action plan following 2021 inspection.

Table 6 Summary of Observations / Issues and Corresponding Recommendations

#	Observation / Issue	LTM Plan Adaptive Management Triggered[1]	Recommendation	Comment
8	Piezometric trigger levels, instrumentation monitoring.	N/A - Trigger levels not established	Review piezometric levels plus thermistors bi-annually. More frequent monitoring would provide better interpretation data. Establish piezometric trigger levels for the purpose of dam safety and an action plan to mitigate levels if triggers are reached. Update the LTM Plan and OMS Plan accordingly. Automated remote monitoring system is also recommended.	Should be addressed before the Summer 2021.
9	VT1 and MW1.	No	VT1 thermistor's wires are switched, these should be corrected. The blockage in MW1 should be removed.	As soon as possible.
10	Repair undulating bottom of the South Ditch.	No	This can be done by filling the depressions and providing the liner patch over the filled area.	Should be addressed in the Summer 2021.
11	Exposed liner at the West Ditch.	Yes[4]	Provide additional rip rap at the West Ditch.	Should be addressed in the Summer 2021.
12	Protect instrumentation from potential damage by wildlife.	Not part of LTM Plan	Install wooden boxes with cover over the instrumentation.	Should be addressed in the Summer 2021.
13	Classify Dam in accordance with CDA.	Not part of LTM Plan	It is recommended that the Dam be classified as per CDA (refer to Table 2.1 in CDA 2007 [2013 Edition]). Re-evaluate classification assessment report (dated Feb 28, 2020). Refer to classification report for additional recommendations.	This is non-compliance with the CDA guidelines and should be performed as soon as possible.
14	Insufficient piezometers in critical areas.	Not part of LTM Plan	Additional piezometers are recommended in critical areas for slope stability in the north and to better understand the phreatic surface within the TSCA.	Should be addressed in the Summer 2021.

Notes:
[1]As per Section 3.2.2 and Table B-2 (Appendix B) of the LTM Plan
[2]Slopes or cover erosion >25% loss of material thickness
[3]Coco matting (~5 m) is no longer deemed effective / Vegetative health observed to be decreasing
[4]Exposure of any amount of BGM in the ditches (i.e. visible liner)

5.0 CLOSURE

This document entitled FINAL Report: Annual 2020 Geotechnical Inspection Report – Tailings and Soil Containment Area, Camlaren Mine Site, NT was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Public Services and Procurement Canada and Crown-Indigenous Relations and Northern Affairs Canada (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Note: The TSCA geotechnical inspection was performed in line with the required annual frequency to meet the Mackenzie Valley Land and Water Board (MVLWB) requirements in accordance with the agreed upon scope of work and Stantec’s proposal dated July 10, 2020. In that proposal, it was indicated that the Geotechnical Inspection report would focus on the basic TSCA requirements and Dam Inspection Form similar to that previously submitted to meet the requirements of the MVLWB (not full requirements of the Canadian Dam Association (CDA) and Engineer of Record).

Prepared by _____

Kris Hojka, M.Sc., P.Eng.

Reviewed by _____

Paul Deering, P.Eng., P.Geo.

Approved by _____ Digitally signed by Allen MacGarvie Date: 2021.03.30 13:18:28 -04'00'

Allen MacGarvie, C.E.T., PMP

v:\1214\active\121414585\05_report_deliverable\deliverable\2_geotech_inspection_2020\fnl_rpt_121414585_geotech_inspection_report_20210330.docx

6.0 REFERENCES

Canadian Dam Association (CDA), 2007, revised 2013. CDA Dam Safety Guidelines 2007 (2013 Edition).

Stantec Consulting Ltd. (Stantec), 2018a. Updated Report Gordon Lake Group Design Basis. Report prepared for Public Works and Government Services Canada and Indigenous and Northern Affairs Canada dated September 11, 2018.

Stantec, 2018b. FINAL - 2018 As-Built Construction – Camlaren TSCA, Part of GLG. Report prepared for Public Works and Government Services Canada and Indigenous and Northern Affairs Canada dated December 21, 2018.

Stantec, 2018c. Final Report: Phase I Long Term Monitoring Plan – Gordon Lake Group of Sites. Report prepared for Public Services and Procurement Canada on behalf of Crown-Indigenous Relations and Northern Affairs Canada dated December 19, 2018.

Stantec, 2019. Annual 2019 Geotechnical Inspection Report - Tailings and Soil Containment Area, Camlaren Mine Site, NT. Report prepared for Public Services and Procurement Canada on behalf of Crown-Indigenous Relations and Northern Affairs Canada dated April 3, 2020.

Stantec, 2020a. Camlaren TSCA Embankments - Classification Assessment. Report prepared for Public Services and Procurement Canada (PSPC) – Northern Contaminated Sites dated February 28, 2020.

Stantec, 2020b. Final Report: Operations, Maintenance and Surveillance Plan – Gordon Lake Group of Sites. Report prepared for Public Services and Procurement and Canada and Crown-Indigenous Relations and Northern Affairs dated March 31, 2020.

APPENDIX A

Drawing

Approximate Locations of Test Pits
Sept. 3, 2020

coco matting starts approx. here going east

TP1
TP2
TP3
TP4
TP5
TP6

NTS

Stantec

COORDINATE LISTING		
	NORTHING	EASTING
MW1	6986005.642	388355.990
MW2	6986051.515	388352.131
MW3	6986075.304	388306.132
MW4	6985959.345	388372.302
MW5	6985921.607	388235.566
MW6	6986071.579	388253.710
VB1	6985957.036	388334.863
VB2	6986026.390	388380.877
VB3	6986079.395	388352.537
VT1	6986004.930	388351.303
VT2	6986055.144	388352.342

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
GORDON LAKE REMEDIATION PROJECT

CAMLAREN
TAILINGS AND SOIL CONTAINMENT AREA
AS-BUILT CONSTRUCTION SITE PLAN

R.057573

APPENDIX B

TSCA Inspection Checklist

Gordon Lake Group of Sites
File – 121414585

October 2020
Camlaran TSCA

2020 TSCA Safety Inspection Checklist

Inspection Details				
TSCA Safety Inspector(s)	Steffen Karl, P.Eng.			
Inspection Timing	Date	3 September 2020	Time	9:15 am
Weather (precip/temp/sun)	Cloudy, +6°C			
Weather preceding Inspection	Cloudy, +6°C			
Previous Dam Safety Inspection	Date	10 September 2019	HPC (CDA)	Assumed to be low
Next Dam Safety Inspection	Scheduled for 2021			

Basic Information			
TSCA Purpose	Final storage for mine waste collected from the Gordon Lake Group of Sites and contained in this engineered facility – Tailings and Soil Containment Area (TSCA)		
Owner	INAC		
Catchment Area	TSCA area only, 2.5 ha	Nominal Berms Height	5 m
Pond Area	N/A	Nominal Length	200 m
Berm Crest Elevation	297.5 m	Nominal Width	150 m
TSCA Peak Elevation	300.6 m	Berms Slopes	3:1
Water level during visit	N/A	TSCA Slope	4%1
Berm Composition	Sand fill dam with BGM composite cover		
Composite BGM Cover	BGM liner placed on sand bedding and covered with 0.5 to 0.6 m of sand cover		
Discharge Facilities	Perimeter ditches, northern and southern		

Berm Crests	
Cracking	None.
Deviation of Alignment	None.
Narrowing of crest width	None.
Sinkholes / Potholes / Rutting	Surface erosion of crest and slope on North and Northwestern and Western perimeter.
Low Areas	None.
Vegetation	No significant vegetation on crest and slope of the berm. The slopes and crest covered with willow branches to control erosion and promote vegetation. Majority of willow branches appear dead. Less than half of willow plants show some initial growth.
Animal burrows	None.

Gordon Lake Group of Sites
File – 121414585

October 2020
Camlaran TSCA

2020 TSCA Safety Inspection Checklist

TSCA Top Surface	
Erosion Protection	Sand cover and willow branches to control erosion and promote vegetation.
Depressions, sinkholes	A ground depression of about 0.2 to 0.3 m deep at TSCA top near northern perimeters. The size approximately 12 m E-W and 5 m N-S. 10 m W of MW#2. Surface crack zone consisting of several cracks adjacent to the depression area Looks similar to 2019. Seems to stabilize. Recommendations: install settlement plate, backfill the depression zone with granular material up to surround level. Two (2) small depressions (new) near VB#2, approximately 0.15 m.
Excess vegetation	None.
Animal burrows	None.
Rubbish/Driftwood	None.

Downstream Slopes (all around TSCA)	
Erosion Protection (quality, evidence of erosion)	Coarse Sand with cobble size stones covered with coco mats placed in semi-circles to mitigate potential erosion. Surface erosion observed on North and Northwestern slopes. In 2020 severe erosion also shown on W slope, with liner exposed in 2 location. Coco matting wind-blown with anchors pulled out at many locations, especially SE slope.
Uniform Slope/Evidence of Slides	Slopes smooth regular. No evidence of slides.
Vegetation (hydrophilic, excessive)	No vegetation.
Animal burrows	2 animal burrows at the south mid-slope. Filled with granular material while on site.

Downstream Toes	
Toe Submerged	No.
Soft Toe	No.
Boils or concentrated seeps	None.
Seepage areas (seepage clear?)	No seepage observed in the downstream of toe drain.
Staining	No.
Vegetation (hydrophilic, excessive)	No.

Perimeter Ditches	
Control Mechanism	None.
Flow During Inspection	Inactive.
Material	Rockfill riprap.
Seepage into ditches	None.
Cracks	None.

2020 TSCA Safety Inspection Checklist

Erosion / Spalling	None.
Staining	None.
Blockages	Standing water in the South Ditch, due to uneven bottom
Energy Dissipation	No issue observed.

Monitoring and Instrumentation
Monitoring wells and instrumentation including vibrating wire piezometers and thermistors appeared in good condition.

Other	
Wildlife (beavers, etc)	None.
Public Access	None.
Additional Notes	Review of instrumentation data is recommended in light of the long-term performance.

Gordon Lake Group of Sites
File – 121414585

October 2020
Camlaran TSCA

2020 TSCA Safety Inspection Checklist

Photo 1: Camlaren TSCA from the air

2020 TSCA Safety Inspection Checklist

Photo 2: **Northern slope of the TSCA, looking West, protected with coco-mats and willow branches in segments to mitigate potential erosion. MW3 in the far right. Photo taken in July 2020.**

2020 TSCA Safety Inspection Checklist

Photo 3: Eastern slope of the TSCA, looking south, protected with coco-mats and willow branches in segments to mitigate potential erosion.

2020 TSCA Safety Inspection Checklist

Photo 4: Exposed geofabric at TSCA toe.

2020 TSCA Safety Inspection Checklist

Photo 5: Ditch 1 – West Perimeter. Rip Rap stone lining ditch. Slope erosion.

2020 TSCA Safety Inspection Checklist

Photo 6: South Perimeter and south ditch. Animal burrow.

2020 TSCA Safety Inspection Checklist

Photo 7: TSCA ponded water in South Ditch.

2020 TSCA Safety Inspection Checklist

Photo 8: TSCA exposed liner at West Ditch.

2020 TSCA Safety Inspection Checklist

Photo 9: Willow branches cover the top of the TSCA to mitigate potential erosion.

2020 TSCA Safety Inspection Checklist

Photo 10: Northwest TSCA Perimeter Slope. Surface Erosion.

2020 TSCA Safety Inspection Checklist

Photo 11: North TSCA Perimeter Slope. Surface Erosion.

2020 TSCA Safety Inspection Checklist

Photo 12: Northern TSCA Perimeter Slope. Vegetation growth.

2020 TSCA Safety Inspection Checklist

Photo 13: TSCA West Slope - test pit.

2020 TSCA Safety Inspection Checklist

Photo 14: TSCA top towards North Perimeter, surface crack zone around depression area.

2020 TSCA Safety Inspection Checklist

Photo 15: TSCA West Slope exposed liner.

APPENDIX G

Analytical and In Situ Data Tables

Table G-1
Summary of Groundwater Analytical Results - Camlaren
Gordon Lake Group of Sites, NT
PSPC

Sample Location			Monitoring Well 1		Monitoring Well 2			
Sample Date			**10-Sep-19**	**10-Sep-19**	**9-Jul-19**	**10-Sep-19**	**17-Jul-20**	**3-Sep-20**
Sample ID			**CAM_GW_MW1_2019_02**	**DUP1_GW_2019_02**	**CAM_GW_MW2_2019_01**	**CAM_GW_MW2_2019_02**	**CAM_GW_MW2_2020_01**	**CAM_GW_MW2_2020_02**
Sampling Company			**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**
Laboratory			**BV**	**BV**	**BV**	**BV**	**BV**	**BV**
Laboratory Work Order			**B977474**	**B977474**	**B956373**	**B977474**	**C050319**	**C064167**
Laboratory Sample ID			**WM4537**	**WM4543**	**WB9161**	**WM4538**	**YC6489**	**YK0722**
Sample Type	**Units**	**FIGQG**		**Field Duplicate**				
BTEX and Petroleum Hydrocarbons								
Benzene	µg/L	88[A]	6.2	6.0	<0.40	0.52	<0.40	<0.40
Toluene	µg/L	83[A]	9.1	8.8	3.1	6.2	4.4	2.7
Ethylbenzene	µg/L	3,200[A]	0.42	0.57	<0.40	0.45	<0.40	<0.40
Xylene, m & p-	µg/L	$_{s1}$[A]	1.8 ST	1.9 ST	<0.80	0.96	<0.80	<0.80
Xylene, o-	µg/L	$_{s1}$[A]	1.0	1.2	<0.40	0.45	<0.40	<0.40
Xylenes, Total	µg/L	3,900[A]	2.8	3.2	<0.89	1.4	<0.89	<0.89
PHC F1 (C6-C10 range)	µg/L	n/v	<100	<100	<100	<100	<100	<100
PHC F1 (C6-C10 range) minus BTEX	µg/L	810[A]	<100	<100	<100	<100	<100	<100
PHC F2 (>C10-C16 range)	mg/L	1.3[A]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
General Chemistry								
Alkalinity (P as CaCO3)	mg/L	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	n/v	<1.0	<1.0	950	1,000	1,000	960
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	n/v	<1.0	<1.0	780	820	820	790
Ammonia	mg/L	0.021-231$_{e,d,var2}$[A]	-	-	12.9	-	-	-
Ammonia (as N)	mg/L	0.0173-190$_{e,d,var3}$[A]	0.70	0.69	11 CD	10 CD	8.1 CD	8.3 CD
Ammonium	mg/L	n/v	-	-	14	-	-	-
Anion Sum	meq/L	n/v	38	38	55	59	200	140
Cation Sum	meq/L	n/v	35	34	56	52	190	130
Chloride	mg/L	100[A]	12	11	**130[A]**	**140[A]**	**720 CD[A]**	**490 CD[A]**
Electrical Conductivity, Lab	µS/cm	n/v	2,900	2,900	4,400	4,600	15,000	12,000
Hardness (as CaCO3)	mg/L	n/v	1,400	1,400	1,700	1,400	2,000	1,800
Hardness Total (as CaCO3)	mg/L	n/v	1,340	1,390	1,740	1,590	1,820	1,580
Ion Balance	%	n/v	4.8	4.9	0.84	6.4	0.82	2.7
Nitrate	mg/L	13[A]	0.044	0.72	<0.044	<0.044	<0.22	<0.22
Nitrate (as N)	mg/L	$_{s12}$[A]	0.010	0.16	<0.010	<0.010	<0.050 MI	<0.050 MI
Nitrate + Nitrite (as N)	mg/L	100[A]	<0.014	0.16	<0.014	<0.014	0.25	<0.071
Nitrite	mg/L	0.20$_{s13}$[A]	<0.033	<0.033	<0.033	<0.033	**0.81[A]**	<0.16
Nitrite (as N)	mg/L	0.06[A]	<0.010	<0.010	<0.010	<0.010	**0.25 MI[A]**	<0.050 MI
Orthophosphate (as P)	mg/L	n/v	-	-	0.0047	-	0.0050	<0.0030
pH, lab	S.U.	6.5-9[A]	**3.41[A]**	**3.34[A]**	7.03	6.84	7.75	7.15
Phosphorus, Total	mg/L	n/v	-	-	0.67 CD	-	0.25	0.15
Sulfate	mg/L	100[A]	**1,800 CD[A]**	**1,800 CD[A]**	**1,700 CD[A]**	**1,900 CD[A]**	**7,700 CD[A]**	**5,300 CD[A]**
Total Dissolved Solids	mg/L	3,000[A]	3,000	3,000	**3,800[A]**	**3,300[A]**	**9,200 VV[A]**	>8000 G
Total Dissolved Solids (Calculated)	mg/L	n/v	2,500	2,500	3,500	3,600	13,000	9,100
Total Organic Carbon	mg/L	n/v	-	-	31 CD	-	20	26 AS
Total Suspended Solids	mg/L	n/v	24	23	890	150	200 VV	61
Metals, Dissolved								
Calcium	mg/L	n/v	380	380	440	370	400	390
Iron	mg/L	0.3[A]	**130[A]**	**120[A]**	**60[A]**	**30[A]**	**25[A]**	**28[A]**
Magnesium	mg/L	n/v	110	100	130	120	240	190
Manganese	mg/L	0.2[A]	**14[A]**	**14[A]**	**11[A]**	**3.4[A]**	**6.0[A]**	**4.8[A]**
Potassium	mg/L	n/v	16	15	53	65	130	120
Sodium	mg/L	n/v	25	25	430	480	3,400 CD	2,100 CD

Table G-1
Summary of Groundwater Analytical Results - Camlaren
Gordon Lake Group of Sites, NT
PSPC

Sample Location			Monitoring Well 1		Monitoring Well 2			
Sample Date			10-Sep-19	10-Sep-19	9-Jul-19	10-Sep-19	17-Jul-20	3-Sep-20
Sample ID			CAM_GW_MW1_2019_02	DUP1_GW_2019_02	CAM_GW_MW2_2019_01	CAM_GW_MW2_2019_02	CAM_GW_MW2_2020_01	CAM_GW_MW2_2020_02
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV	BV	BV	BV	BV	BV
Laboratory Work Order			B977474	B977474	B956373	B977474	C050319	C064167
Laboratory Sample ID			WM4537	WM4543	WB9161	WM4538	YC6489	YK0722
Sample Type	Units	FIGQG		Field Duplicate				
Metals, Total								
Aluminum	µg/L	$5/100_{e,d,var1}$[A]	**20,900**[A]	**21,800**[A]	**31,000**[A]	**241**[A]	**5,420**[A]	52
Antimony	µg/L	2,000[A]	<2.5	<2.5	2.22	<2.5	<5.0	<2.5
Arsenic	µg/L	5[A]	3.97	3.91	**13.0**[A]	**36.2**[A]	**52.5**[A]	**49.2**[A]
Barium	µg/L	500[A]	21.9	23.1	243	53.4	63	34.9
Beryllium	µg/L	5.3[A]	1.40	1.47	<0.10	<0.50	<1.0	<0.50
Bismuth	µg/L	n/v	<5.0	<5.0	<1.0	<5.0	<10	<5.0
Boron	µg/L	500[A]	<250	<250	175	<250	<500	<250
Cadmium	µg/L	0.09_c[A]	**4.71**[A]	**5.08**[A]	**0.387**[A]	**0.129**[A]	**1.62**[A]	**0.135**[A]
Calcium	mg/L	n/v	383	395	443	421	372	355
Cesium	µg/L	n/v	<1.0	<1.0	0.61	<1.0	<2.0	<1.0
Chromium	µg/L	$8.9_{d,e}$[A]	<5.0	<5.0	**116**[A]	<5.0	**20**[A]	<5.0
Cobalt	µg/L	50[A]	**1,070**[A]	**1,160**[A]	**129**[A]	**68.6**[A]	**145**[A]	**156**[A]
Copper	µg/L	4_d*[A]	**42.3**[A]	**44.9**[A]	**52.3**[A]	<2.5	**9.7**[A]	<2.5
Iron	µg/L	300[A]	**130,000**[A]	**136,000**[A]	**24,000**[A]	**66,700**[A]	**38,400**[A]	**21,700**[A]
Lead	µg/L	$7_{d,\#}$[A]	4.7	4.8	**50.9**[A]	1.3	**13.3**[A]	1.2
Lithium	µg/L	n/v	123	120	93.8	22	49	44
Magnesium	mg/L	n/v	94.3	98.4	155	130	217	169
Manganese	µg/L	200[A]	**12,700**[A]	**13,300**[A]	**9,800**[A]	**4,030**[A]	**4,820**[A]	**4,150**[A]
Mercury	µg/L	0.026_e[A]	-	-	-	-	***<0.50***	***<0.25***
Molybdenum	µg/L	73[A]	<5.0	<5.0	9.3	<5.0	11	22.0
Nickel	µg/L	$150_{d,**}$[A]	**3,000**[A]	**3,160**[A]	**203**[A]	113	**455**[A]	**455**[A]
Potassium	mg/L	n/v	14.1	15.2	60.4	62.8	114	94.1
Selenium	µg/L	1[A]	<0.50	<0.50	0.31	<0.50	**4.6**[A]	**1.36**[A]
Silicon	µg/L	n/v	19,100	19,800	51,700	11,800	15,400	10,800
Silver	µg/L	0.25[A]	0.16	0.18	0.109	<0.10	<0.20	<0.10
Sodium	mg/L	n/v	22.3	23.2	532	483	2,950	1,870
Strontium	µg/L	n/v	902	939	3,970	4,600	4,020	4,050
Sulfur	mg/L	n/v	572	599	682	610	2,350	1,620
Thallium	µg/L	0.8[A]	0.139	0.148	0.672	<0.050	0.17	0.052
Tin	µg/L	n/v	<25	<25	<5.0	<25	<50	<25
Titanium	µg/L	100[A]	<25	<25	**332**[A]	<25	62	<25
Uranium	µg/L	10[A]	2.53	2.70	4.89	6.56	**34.4**[A]	**33.6**[A]
Vanadium	µg/L	100[A]	<25	<25	63.2	<25	<50	<25
Zinc	µg/L	10[A]	**3,000**[A]	**3,160**[A]	**39.0**[A]	***<25***	**704**[A]	**390**[A]
Zirconium	µg/L	n/v	<0.50	<0.50	11.7	4.10	4.3	3.83

Table G-1
Summary of Groundwater Analytical Results - Camlaren
Gordon Lake Group of Sites, NT
PSPC

Sample Location			Monitoring Well 1		Monitoring Well 2			
Sample Date			10-Sep-19	10-Sep-19	9-Jul-19	10-Sep-19	17-Jul-20	3-Sep-20
Sample ID			CAM_GW_MW1_2019_02	DUP1_GW_2019_02	CAM_GW_MW2_2019_01	CAM_GW_MW2_2019_02	CAM_GW_MW2_2020_01	CAM_GW_MW2_2020_02
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV	BV	BV	BV	BV	BV
Laboratory Work Order			B977474	B977474	B956373	B977474	C050319	C064167
Laboratory Sample ID			WM4537	WM4543	WB9161	WM4538	YC6489	YK0722
Sample Type	Units	FIGQG		Field Duplicate				

Notes:

FIGQG	Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (Government of Canada, June 2016 (version 4) revised November 2016)
A	Table 1 Federal Interim Groundwater Guidelines - Generic Guidelines for Agricultural Use - (Tier 1) Lowest Guideline - Coarse
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
c	Hardness dependent guideline; if hardness of receiving surface water is available can be calculated as 10{0.83(log[hardness])-2.46}
e	Guideline is the lowest of all applicable pathways.
d	The freshwater aquatic life guidelines vary depending on water pH, hardness etc. Therefore, see Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME 1999) to determine the appropriate water quality guideline applicable to the site and calculate the groundwater guidelines using formulas provided in Appendix B.
s1	Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.
s12	Added for Nitrate-N as guideline only present for Nitrate. Divided the Nitrate guideline by 4.4.
s13	Guidelines only provided for Nitrite (as N). Nitrite guideline (as NO2) is calculated by multiplying the Nitrite (as N) guideline by 3.29.
*	The CWQG for copper is related to water hardness. When the water hardness is 0 to < 82 mg/L, the CWQG is 2 µg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (µg/L) = 0.2 * e{0.8545[ln(hardness)]-1.465}. At hardness >180 mg/L, the CWQG is 4 µg/L. If the hardness is unknown, the CWQG is 2 µg/L
#	The CWQG for lead is related to water hardness. When the hardness is 0 to ≤ 60 mg/L, the CWQG is 1 µg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (µg/L)= e{1.273[ln(hardness)]-4.705}. unknown, the CWQG is 1 µg/L. At hardness >180 mg/L, the CWQG is 7 µg/L. If the hardness is
**	The CWQG for nickel is related to water hardness. When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 25 µg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (µg/L) = e{0.76[ln(hardness)]+1.06}. At hardness >180 mg/L, the CWQG is 150 µg/L. If the hardness is unknown, the CWQG is 25 µg/L
VAR1	Variable, 5 µg/L if pH < 6.5 and 100 µg/L if pH > 6.5
VAR2	Ammonia is pH and temperature dependent, see CCME guidelines for further instructions.
VAR3	CCME provides the guideline as ammonia (as NH3), and was converted to ammonia (as N) by multiplying the guideline by 0.8224. Ammonia is pH and temperature dependent, see CCME guidelines for further instructions.
AS	Detection limit raised due to sample matrix.
CD	Detection limits raised due to dilution to bring analyte within the calibrated range.
G	Result exceeded calibration range.
MI	Detection limit was raised due to matrix interferences.
MS	Matrix spike exceeds acceptance limits due to matrix interference.
ST	Tentatively identified result and may be potentially biased high due to matrix interference.
VV	Detection limit raised based on sample volume used for analysis.
XY	Qualifying ion outside of acceptance criteria. Results are tentatively identified and potentially biased high.

Table G-2 (7A)
Groundwater Analytical Results for SNP Station 7A - Northeast of TSCA (near toe drain)
Gordon Lake Group of Sites, NT
PSPC

Sample Location				CAM_GW_SNP_7A									
Sample Date				16-Sep-18	16-Sep-18	9-Jul-19	10-Sep-19	17-Jul-20	17-Jul-20	3-Sep-20	3-Sep-20	3-Sep-20	
Sample ID				CAM_GW_SNP_7A_2018_01	DUP1_GW_SNP_2018_01	CAM_GW_SNP_7A_2019_01	CAM_GW_SNP_7A_2019_02	CAM_GW_SNP_7A_2020_01	CAM_GW_SNP_7A_2020_01	CAM_GW_SNP_7A_2020_02	CAM_GW_SNP_7A_2020_02	DUP1_GW_2020_02	
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	
Laboratory				MAXX	MAXX	BV	BV	BV	BV	BV	BV	BV	
Laboratory Work Order				B880158	B880158	B956373	B977474	C050319	C050319	C064167	C064167	C064167	
Laboratory Sample ID				UI5096	UI5101	WB9158	WM4539	YC6485	YC6485	YK0718	YK0718	YK0723	
Sample Type	Units	FIGQG	CCME		Field Duplicate				Lab Replicate		Lab Replicate	Field Duplicate	
BTEX and Petroleum Hydrocarbons													
Benzene	µg/L	88[A]	370[C]	<0.40	0.43 ST	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	
Toluene	µg/L	83[A]	2[C]	0.49	0.50	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	
Ethylbenzene	µg/L	3,200[A]	90[C]	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	
Xylene, m & p-	µg/L	[A] $_{s1}$	n/v	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	
Xylene, o-	µg/L	[A] $_{s1}$	n/v	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	
Xylenes, Total	µg/L	3,900[A]	n/v	<0.89	<0.89	<0.89	<0.89	<0.89	-	<0.89	-	<0.89	
PHC F1 (C6-C10 range)	µg/L	n/v	n/v	<100	<100	<100	<100	<100	<100	<100	<100	<100	
PHC F1 (C6-C10 range) minus BTEX	µg/L	810[A]	n/v	<100	<100	<100	<100	<100	-	<100	-	<100	
PHC F2 (>C10-C16 range)	mg/L	1.3[A]	n/v	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10	-	<0.10	
General Chemistry													
Alkalinity (P as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	
Alkalinity, Bicarbonate (as CaCO3)	mg/L	n/v	n/v	780	800	710	1,100	680	-	730	-	750	
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	
Alkalinity, Hydroxide (as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0	
Alkalinity, Total (as CaCO3)	mg/L	n/v	n/v	640	650	580	890	560	-	600	-	610	
Ammonia	mg/L	0.021-231$_{e,d,var2}$[A]	[C] $_{TBC}$	3.93	3.89	2.84	-	-	-	-	-	-	
Ammonia (as N)	mg/L	0.0173-190$_{e,d,var3}$[A]	[C] $_{TBC2}$	3.2 CD	3.2 CD	2.3 CD	0.64	1.4	-	1.4	-	1.4	
Ammonium	mg/L	n/v	n/v	4.2	4.1	3.0	-	-	-	-	-	-	
Anion Sum	meq/L	n/v	n/v	24	23	21	20	18	-	19	-	21	
Cation Sum	meq/L	n/v	n/v	23	23	23	20	20	-	24	-	23	
Chloride	mg/L	100[A]	640[B] 120[C]	31	31	23	24	18	-	20	-	20	
Electrical Conductivity, Lab	µS/cm	n/v	n/v	2,000	2,000	1,800	1,800	1,600	-	1,600	-	1,600	
Hardness (as CaCO3)	mg/L	n/v	n/v	840	840	890	790	760	-	890	-	880	
Hardness, Total (as CaCO3)	mg/L	n/v	n/v	815	868	836	771	744	-	738	-	745	
Ion Balance	%	n/v	n/v	2.0	0.60	3.7	0.3	4.8	-	10	-	6.2	
Nitrate	mg/L	13[A]	550[B] 13[C]	0.20	0.11	0.059	<0.044	0.13	-	0.082	-	<0.044	
Nitrate (as N)	mg/L	3$_{s12}$[A]	124[B] 3.0[C]	0.046	0.025	0.013	<0.010	0.028	-	0.019	-	<0.010	
Nitrate + Nitrite (as N)	mg/L	100[A]	n/v	0.046	0.025	<0.014	<0.014	0.028	-	0.019	-	<0.014	
Nitrite	mg/L	0.20$_{s13}$[A]	0.197[C]	<0.033	<0.033	<0.033	<0.033	<0.033	-	<0.033	-	<0.033	
Nitrite (as N)	mg/L	0.06[A]	0.06[C]	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	-	<0.010	
Orthophosphate (as P)	mg/L	n/v	n/v	0.0039	0.0038	0.0036	-	0.0030	-	0.0032	-	0.0031	
pH, lab	S.U.	6.5-9[A]	6.5-9.0[C]	7.17	7.50	7.47	7.52	7.82	-	7.53	-	7.55	
Phosphorus, Total	mg/L	n/v	n/v	0.013	0.025	0.10	-	0.073	-	0.067	-	0.073	
Sulfate	mg/L	100[A]	n/v	**500 CD[A]**	**460 CD[A]**	**440 CD[A]**	93	**320 CD[A]**	-	**330 CD[A]**	-	**370 CD[A]**	
Total Dissolved Solids	mg/L	3,000[A]	n/v	1,400	1,400	1,300	1,200	1,100	-	1,100	-	1,100	
Total Dissolved Solids (Calculated)	mg/L	n/v	n/v	1,400	1,300	1,300	1,000	1,100	-	1,200	-	1,200	
Total Organic Carbon	mg/L	n/v	n/v	32 CD	35 CD	31 CD	-	19 AS	-	21	-	21	
Total Suspended Solids	mg/L	n/v	[C] $_{SN}$	62	57	45	55	55 VV	-	64 VV	-	60	
Metals, Dissolved													
Calcium	mg/L	n/v	n/v	240	240	250	220	220	-	250	-	250	
Iron	mg/L	0.3[A]	0.3[C]	**0.45[AC]**	**0.48[AC]**	**2.7[AC]**	0.092	**20[AC]**	-	**27[AC]**	-	**26[AC]**	
Magnesium	mg/L	n/v	n/v	61	61	64	58	55	-	64	-	63	
Manganese	mg/L	0.2[A]	n/v	**2.6[A]**	**2.6[A]**	**3.9[A]**	**5.8[A]**	**4.5[A]**	-	**5.3[A]**	-	**5.2[A]**	
Potassium	mg/L	n/v	n/v	21	22	22	18	18	-	22	-	22	
Sodium	mg/L	n/v	n/v	120	120	100	93	78	-	92	-	90	

Table G-2 (7A)
Groundwater Analytical Results for SNP Station 7A - Northeast of TSCA (near toe drain)
Gordon Lake Group of Sites, NT
PSPC

Sample Location				CAM_GW_SNP_7A									
Sample Date				**16-Sep-18**	**16-Sep-18**	**9-Jul-19**	**10-Sep-19**	**17-Jul-20**	**17-Jul-20**	**3-Sep-20**	**3-Sep-20**	**3-Sep-20**
Sample ID				**CAM_GW_SNP_7A_2018_01**	**DUP1_GW_SNP_2018_01**	**CAM_GW_SNP_7A_2019_01**	**CAM_GW_SNP_7A_2019_02**	**CAM_GW_SNP_7A_2020_01**	**CAM_GW_SNP_7A_2020_01**	**CAM_GW_SNP_7A_2020_02**	**CAM_GW_SNP_7A_2020_02**	**DUP1_GW_2020_02**
Sampling Company				**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**
Laboratory				**MAXX**	**MAXX**	**BV**	**BV**	**BV**	**BV**	**BV**	**BV**	**BV**
Laboratory Work Order				**B880158**	**B880158**	**B956373**	**B977474**	**C050319**	**C050319**	**C064167**	**C064167**	**C064167**
Laboratory Sample ID				**UI5096**	**UI5101**	**WB9158**	**WM4539**	**YC6485**	**YC6485**	**YK0718**	**YK0718**	**YK0723**
Sample Type	**Units**	**FIGQG**	**CCME**		**Field Duplicate**				**Lab Replicate**		**Lab Replicate**	**Field Duplicate**
Metals, Total												
Aluminum	µg/L	$5/100_{e,d,var1}$ [A]	$5/100_{VAR1}$ [C]	65	73	**288** [AC]	28.6	62.2	-	48.3	46.0	37.8
Antimony	µg/L	2,000 [A]	n/v	6.25	6.5	1.82	<0.50	<0.50	-	<0.50	<0.50	<0.50
Arsenic	µg/L	5 [A]	5 [C]	**21.9** [AC]	**22.3** [AC]	3.89	**17.6** [AC]	**14.0** [AC]	-	**15.0** [AC]	**15.2** [A]	**15.4** [A]
Barium	µg/L	500 [A]	n/v	166	171	415	325	315	-	329	330	335
Beryllium	µg/L	5.3 [A]	n/v	<0.10	<0.50	<0.10	<0.10	<0.10	-	<0.10	<0.10	<0.10
Bismuth	µg/L	n/v	n/v	<1.0	<5.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0
Boron	µg/L	500 [A]	29,000 [B] 1,500 [C]	105	<250	104	91	76	-	80	80	82
Cadmium	µg/L	0.09_c [A]	7.6_{STB} [B] 0.37_{LTG} [C]	0.037	<0.050	0.024	0.017	0.024	-	0.019	0.020	0.016
Calcium	mg/L	n/v	n/v	233	243	233	214	213	-	212	-	214
Cesium	µg/L	n/v	n/v	<0.20	<1.0	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20
Chromium	µg/L	$8.9_{d,e}$ [A]	n/v	1.5	<5.0	2.4	<1.0	1.3	-	1.6	1.5	1.7
Cobalt	µg/L	50 [A]	n/v	21.0	20.2	30.4	16.4	10.7	-	12.6	12.9	12.9
Copper	µg/L	$4_{e,d,TBC1}$ [A]	4* [C]	2.24	<2.5	**5.12** [AC]	<0.50	1.46	-	0.94	0.84	0.77
Iron	µg/L	300 [A]	300 [C]	**461** [AC]	**476** [AC]	**2,010** [AC]	**27,400** [AC]	**18,500** [AC]	-	**20,100** [AC]	**20,500** [AC]	**21,400** [AC]
Lead	µg/L	$7_{e,d,TBC1}$ [A]	7# [C]	0.21	<1.0	0.88	<0.20	0.31	-	0.20	<0.20	<0.20
Lithium	µg/L	n/v	n/v	28.5	30	24.9	16.2	16.0	-	16.9	17.1	17.0
Magnesium	mg/L	n/v	n/v	56.4	63.3	62.0	57.3	51.9	-	50.5	-	50.8
Manganese	µg/L	200 [A]	n/v	**2,460** [A]	**2,700** [A]	**4,030** [A]	**5,640** [A]	**4,050** [A]	-	**4,170** [A]	**4,210** [A]	**4,420** [A]
Mercury	µg/L	0.026_e [A]	0.026 [C]	-	-	-	-	***<0.050***	-	***<0.050***	***<0.050***	***<0.050***
Molybdenum	µg/L	73 [A]	73 [C]	17.7	17.5	24.3	3.6	3.2	-	2.2 MS	2.2	2.0
Nickel	µg/L	$150_{e,d,TBC1}$ [A]	150** [C]	16.4	18.7	36.6	5.2	4.1	-	3.1	3.1	2.6
Potassium	mg/L	n/v	n/v	21.7	22.3	22.0	17.8	17.6	-	17.3	-	17.8
Selenium	µg/L	1 [A]	1 [C]	0.56	0.55	0.22	0.35	0.17	-	0.17	0.15	0.18
Silicon	µg/L	n/v	n/v	7,490	7,670	6,960	11,500	7,790	-	8,920	9,010	9,320
Silver	µg/L	0.25 [A]	0.25 [C]	<0.020	<0.10	0.057	<0.020	0.021	-	<0.020	0.025	<0.020
Sodium	mg/L	n/v	n/v	122	131	106	88.6	73.3	-	70.6	-	70.5
Strontium	µg/L	n/v	n/v	1,300	1,330	1,440	1,240	1,320	-	1,420	1,430	1,440
Sulfur	mg/L	n/v	n/v	172	172	175	30.8	113	-	104	-	114
Thallium	µg/L	0.8 [A]	0.8 [C]	0.030	<0.050	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010
Tin	µg/L	n/v	n/v	<5.0	<25	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0
Titanium	µg/L	100 [A]	n/v	<5.0	<25	6.1	<5.0	<5.0	-	<5.0	<5.0	<5.0
Uranium	µg/L	10 [A]	33 [B] 15 [C]	**43.7** [ABC]	**41.6** [ABC]	4.60	8.57	7.44	-	7.05	7.10	7.20
Vanadium	µg/L	100 [A]	n/v	<5.0	<25	<5.0	<5.0	<5.0	-	<5.0	<5.0	<5.0
Zinc	µg/L	10 [A]	37_{EQ1} [B] 7.0_{EQ2} [C]	**10.1** [AC]	***<25***	**11.5** [AC]	<5.0	5.7	-	<5.0	<5.0	<5.0
Zirconium	µg/L	n/v	n/v	5.05	4.89	5.82	4.62	2.79	-	3.28 MS	3.26	3.18

See Notes on last page

Table G-2 (7B)
Groundwater Analytical Results for SNP Station 7B - Southeast of TSCA
Gordon Lake Group of Sites, NT
PSPC

Sample Location				CAM_GW_SNP_7B						
Sample Date				16-Sep-18	9-Jul-19	10-Sep-19	17-Jul-20	17-Jul-20	17-Jul-20	3-Sep-20
Sample ID				CAM_GW_SNP_7B_2018_01	CAM_GW_SNP_7B_2019_01	CAM_GW_SNP_7B_2019_02	CAM_GW_SNP_7B_2020_01	DUP1_GW_2020_01	DUP1_GW_2020_01	CAM_GW_SNP_7B_2020_02
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	BV	BV	BV	BV	BV	BV
Laboratory Work Order				B880158	B956373	B977474	C050319	C050319	C050319	C064167
Laboratory Sample ID				UI5097	WB9159	WM4540	YC6486	YC6490	YC6490	YK0719
Sample Type	Units	FIGQG	CCME					Field Duplicate	Lab Replicate	
BTEX and Petroleum Hydrocarbons										
Benzene	µg/L	88[A]	370[C]	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40
Toluene	µg/L	83[A]	2[C]	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40
Ethylbenzene	µg/L	3,200[A]	90[C]	4.5	<0.40	1.2	4.3	3.9	-	3.5
Xylene, m & p-	µg/L	[A] $_{s1}$	n/v	5.3	<0.80	1.7	7.1	6.4	-	5.4 XY
Xylene, o-	µg/L	[A] $_{s1}$	n/v	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40
Xylenes, Total	µg/L	3,900[A]	n/v	5.3	<0.89	1.7	7.1	6.4	-	5.4
PHC F1 (C6-C10 range)	µg/L	n/v	n/v	130	<100	<100	270	270	-	170
PHC F1 (C6-C10 range) minus BTEX	µg/L	810[A]	n/v	120	<100	<100	260	250	-	160
PHC F2 (>C10-C16 range)	mg/L	1.3[A]	n/v	**1.8[A]**	<0.10	0.42	**1.9[A]**	**2.2[A]**	-	**1.9[A]**
General Chemistry										
Alkalinity (P as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	n/v	n/v	270	80	230	220	220	-	260
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Alkalinity, Total (as CaCO3)	mg/L	n/v	n/v	220	66	190	180	180	-	210
Ammonia	mg/L	0.021-231$_{e,d,var2}$[A]	[C] $_{TBC}$	0.341	0.142	-	-	-	-	-
Ammonia (as N)	mg/L	0.0173-190$_{e,d,var3}$[A]	[C] $_{TBC2}$	0.28	0.12	0.26	0.71	0.70	-	0.51
Ammonium	mg/L	n/v	n/v	0.36	0.15	-	-	-	-	-
Anion Sum	meq/L	n/v	n/v	19	3.4	10	10	10	-	9.2
Cation Sum	meq/L	n/v	n/v	20	3.4	8.5	11	11	-	10
Chloride	mg/L	100[A]	640[B] 120[C]	4.1	6.8	6.7	5.6	5.5	-	4.7
Electrical Conductivity, Lab	µS/cm	n/v	n/v	1,600	330	820	960	980	-	830
Hardness (as CaCO3)	mg/L	n/v	n/v	920	150	390	500	490	-	440
Hardness, Total (as CaCO3)	mg/L	n/v	n/v	874	145	408	484	475	-	386
Ion Balance	%	n/v	n/v	2.4	0.74	8.0	3.5	3.6	-	4.7
Nitrate	mg/L	13[A]	550[B] 13[C]	<0.044	3.7	1.3	2.2	1.9	-	<0.044
Nitrate (as N)	mg/L	3$_{s12}$[A]	124[B] 3.0[C]	<0.010	0.84	0.28	0.49	0.43	-	<0.010
Nitrate + Nitrite (as N)	mg/L	100[A]	n/v	<0.014	0.85	0.29	1.0	0.98	-	<0.014
Nitrite	mg/L	0.20$_{s13}$[A]	0.197[C]	<0.033	0.037	0.036	**1.7[AC]**	**1.8[A]**	-	<0.033
Nitrite (as N)	mg/L	0.06[A]	0.06[C]	<0.010	0.011	0.011	**0.52[AC]**	**0.55[AC]**	-	<0.010
Orthophosphate (as P)	mg/L	n/v	n/v	<0.0030	0.0039	-	<0.0030	<0.0030	-	<0.0030
pH, lab	S.U.	6.5-9[A]	6.5-9.0[C]	6.99	6.53	6.86	7.54	7.53	-	7.34
Phosphorus, Total	mg/L	n/v	n/v	<0.0030	0.11	-	0.019	0.020	-	0.02
Sulfate	mg/L	100[A]	n/v	**690 CD[A]**	88	**290 CD[A]**	**310 CD[A]**	**310 CD[A]**	-	**230 CD[A]**
Total Dissolved Solids	mg/L	3,000[A]	n/v	1,300	280	610	640	690	-	520
Total Dissolved Solids (Calculated)	mg/L	n/v	n/v	1,200	210	570	640	630	-	560
Total Organic Carbon	mg/L	n/v	n/v	14	17	-	13 AS	13	-	15
Total Suspended Solids	mg/L	n/v	[C] $_{SN}$	39	99	4.7	25	24	-	22
Metals, Dissolved										
Calcium	mg/L	n/v	n/v	280	50	130	160	160	-	140
Iron	mg/L	0.3[A]	0.3[C]	**15[AC]**	**0.54[AC]**	0.11	**7.8[AC]**	**7.7[AC]**	-	**13[AC]**
Magnesium	mg/L	n/v	n/v	51	5.6	18	25	25	-	20
Manganese	mg/L	0.2[A]	n/v	**12[A]**	**1.5[A]**	**8.8[A]**	**6.8[A]**	**6.7[A]**	-	**8.5[A]**
Potassium	mg/L	n/v	n/v	5.2	2.2	3.2	5.1	5.1	-	5.1
Sodium	mg/L	n/v	n/v	6.8	8.2	9.0	8.5	8.4	-	7.4

Table G-2 (7B)
Groundwater Analytical Results for SNP Station 7B - Southeast of TSCA
Gordon Lake Group of Sites, NT
PSPC

Sample Location				CAM_GW_SNP_7B						
Sample Date				16-Sep-18	9-Jul-19	10-Sep-19	17-Jul-20	17-Jul-20	17-Jul-20	3-Sep-20
Sample ID				CAM_GW_SNP_7B_2018_01	CAM_GW_SNP_7B_2019_01	CAM_GW_SNP_7B_2019_02	CAM_GW_SNP_7B_2020_01	DUP1_GW_2020_01	DUP1_GW_2020_01	CAM_GW_SNP_7B_2020_02
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	BV	BV	BV	BV	BV	BV
Laboratory Work Order				B880158	B956373	B977474	C050319	C050319	C050319	C064167
Laboratory Sample ID				UI5097	WB9159	WM4540	YC6486	YC6490	YC6490	YK0719
Sample Type	Units	FIGQG	CCME					Field Duplicate	Lab Replicate	
Metals, Total										
Aluminum	µg/L	$5/100_{e,d,var1}$ [A]	$5/100_{VAR1}$ [C]	53	**3,370** [AC]	59	**122** [AC]	**119** [AC]	**121** [AC]	**130** [AC]
Antimony	µg/L	2,000 [A]	n/v	<2.5	<0.50	<1.0	<1.0	<0.50	<0.50	<0.50
Arsenic	µg/L	5 [A]	5 [C]	**14.5** [AC]	0.64	2.95	**12.0** [AC]	**11.5** [AC]	**11.5** [AC]	**40.2** [AC]
Barium	µg/L	500 [A]	n/v	101	37.7	52.6	50.2	51.1	49.9	57.9
Beryllium	µg/L	5.3 [A]	n/v	<0.50	<0.10	<0.20	<0.20	<0.10	<0.10	<0.10
Bismuth	µg/L	n/v	n/v	<5.0	<1.0	<2.0	<2.0	<1.0	<1.0	<1.0
Boron	µg/L	500 [A]	29,000 [B] 1,500 [C]	<250	<50	<100	<100	<50	<50	<50
Cadmium	µg/L	0.09_c [A]	7.6_{STB} [B] 0.37_{LTG} [C]	<0.050	0.041	**0.095** [A]	0.045	0.038	0.034	0.016
Calcium	mg/L	n/v	n/v	273	46.4	134	155	152	-	126
Cesium	µg/L	n/v	n/v	<1.0	<0.20	<0.40	<0.40	<0.20	<0.20	<0.20
Chromium	µg/L	$8.9_{d,e}$ [A]	n/v	<5.0	**12.7** [A]	<2.0	<2.0	1.7	1.6	1.9
Cobalt	µg/L	50 [A]	n/v	21.8	31.5	**89.6** [A]	11.5	11.6	11.6	8.89
Copper	µg/L	$4_{e,d,TBC1}$ [A]	4* [C]	<2.5	**13.9** [AC]	**5.2** [AC]	**4.6** [AC]	3.28	3.29	1.75
Iron	µg/L	300 [A]	300 [C]	**13,700** [AC]	**1,070** [AC]	**3,710** [AC]	**8,370** [AC]	**8,030** [AC]	**8,010** [AC]	**11,000** [AC]
Lead	µg/L	$7_{e,d,TBC1}$ [A]	7# [C]	<1.0	2.15	<0.40	<0.40	0.36	0.36	0.39
Lithium	µg/L	n/v	n/v	<10	6.2	<4.0	<4.0	3.0	2.9	3.2
Magnesium	mg/L	n/v	n/v	46.8	7.22	17.7	23.8	23.2	-	17.3
Manganese	µg/L	200 [A]	n/v	**11,900** [A]	**1,430** [A]	**8,530** [A]	**6,300** [A]	**6,160** [A]	**6,180** [A]	**7,290** [A]
Mercury	µg/L	0.026_e [A]	0.026 [C]	-	-	-	***<0.10***	***<0.050***	***<0.050***	***<0.050***
Molybdenum	µg/L	73 [A]	73 [C]	<5.0	<1.0	<2.0	<2.0	1.4	1.4	2.1
Nickel	µg/L	$150_{e,d,TBC1}$ [A]	150** [C]	43.8	56.4	75.8	25.4	24.7	24.7	22.9
Potassium	mg/L	n/v	n/v	4.59	2.56	3.12	4.99	4.91	-	4.57
Selenium	µg/L	1 [A]	1 [C]	<0.50	0.16	<0.20	<0.20	0.14	0.12	0.14
Silicon	µg/L	n/v	n/v	7,690	12,800	6,670	6,940	6,680	6,780	8,510
Silver	µg/L	0.25 [A]	0.25 [C]	<0.10	0.050	0.045	<0.040	<0.020	<0.020	<0.020
Sodium	mg/L	n/v	n/v	6.29	8.58	8.28	7.86	7.83	-	6.16
Strontium	µg/L	n/v	n/v	805	184	406	472	473	470	449
Sulfur	mg/L	n/v	n/v	226	30.4	79.7	107	106	-	69.0
Thallium	µg/L	0.8 [A]	0.8 [C]	<0.050	<0.010	<0.020	<0.020	<0.010	<0.010	<0.010
Tin	µg/L	n/v	n/v	<25	<5.0	<10	<10	<5.0	<5.0	<5.0
Titanium	µg/L	100 [A]	n/v	<25	7.0	<10	<10	<5.0	<5.0	<5.0
Uranium	µg/L	10 [A]	33 [B] 15 [C]	2.21	0.34	1.44	1.11	1.13	1.13	1.08
Vanadium	µg/L	100 [A]	n/v	<25	<5.0	<10	<10	<5.0	<5.0	<5.0
Zinc	µg/L	10 [A]	37_{EQ1} [B] 7.0_{EQ2} [C]	***<25***	**24.7** [AC]	***<10***	<10	5.3	5.4	<5.0
Zirconium	µg/L	n/v	n/v	<0.50	1.13	<0.20	0.38	0.33	0.35	0.59

See Notes on last page

Table G-2 (7C)
Groundwater Analytical Results for SNP Station 7C - Southwest of TSCA
Gordon Lake Group ofSites, NT
PSPC

Sample Location				CAM_GW_SNP_7C						
Sample Date				16-Sep-18	10-Jul-19	10-Sep-19	17-Jul-20	17-Jul-20	3-Sep-20	3-Sep-20
Sample ID				CAM_GW_SNP_7C_2018_01	CAM_GW_SNP_7C_2019_01	CAM_GW_SNP_7C_2019_02	CAM_GW_SNP_7C_2020_01	CAM_GW_SNP_7C_2020_01	CAM_GW_SNP_7C_2020_02	CAM_GW_SNP_7C_2020_02
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	BV	BV	BV	BV	BV	BV
Laboratory Work Order				B880158	B956373	B977474	C050319	C050319	C064167	C064167
Laboratory Sample ID				UI5098	WB9162	WM4541	YC6487	YC6487	YK0720	YK0720
Sample Type	Units	FIGQG	CCME					Lab Replicate		Lab Replicate
BTEX and Petroleum Hydrocarbons										
Benzene	µg/L	88[A]	370[C]	<0.40	<0.40	<0.40	<0.40	-	<0.40	-
Toluene	µg/L	83[A]	2[C]	0.69	<0.40	<0.40	<0.40	-	<0.40	-
Ethylbenzene	µg/L	3,200[A]	90[C]	<0.40	<0.40	<0.40	<0.40	-	<0.40	-
Xylene, m & p-	µg/L	[A] $_{s1}$	n/v	<0.80	<0.80	<0.80	<0.80	-	<0.80	-
Xylene, o-	µg/L	[A] $_{s1}$	n/v	<0.40	<0.40	<0.40	<0.40	-	<0.40	-
Xylenes, Total	µg/L	3,900[A]	n/v	<0.89	<0.89	<0.89	<0.89	-	<0.89	-
PHC F1 (C6-C10 range)	µg/L	n/v	n/v	120	<100	<100	<100	-	<100	-
PHC F1 (C6-C10 range) minus BTEX	µg/L	810[A]	n/v	120	<100	<100	<100	-	<100	-
PHC F2 (>C10-C16 range)	mg/L	1.3[A]	n/v	<0.10	0.12	<0.10	<0.10	-	<0.10	-
General Chemistry										
Alkalinity (P as CaCO3)	mg/L	n/v	n/v	-	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	n/v	n/v	-	430	690	410	-	490	-
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	n/v	-	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	n/v	n/v	-	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	n/v	n/v	-	350	570	340	-	400	-
Ammonia	mg/L	0.021-231$_{e,d,var2}$[A]	[C] $_{TBC}$	0.056	0.797	-	-	-	-	-
Ammonia (as N)	mg/L	0.0173-190$_{e,d,var3}$[A]	[C] $_{TBC2}$	0.046	0.66	0.015	0.20	-	0.084	0.088
Ammonium	mg/L	n/v	n/v	0.060	0.84	-	-	-	-	-
Anion Sum	meq/L	n/v	n/v	-	18	19	9.6	-	18	-
Cation Sum	meq/L	n/v	n/v	-	19	18	11	-	22	-
Chloride	mg/L	100[A]	640[B] 120[C]	25	11	10	7.7	-	8.8	-
Electrical Conductivity, Lab	µS/cm	n/v	n/v	-	1,500	1,600	910	-	1,600	-
Hardness (as CaCO3)	mg/L	n/v	n/v	-	820	780	420	-	920	-
Hardness, Total (as CaCO3)	mg/L	n/v	n/v	847	771	818	415	-	774	-
Ion Balance	%	n/v	n/v	-	3.0	3.7	5.2	-	8.2	-
Nitrate	mg/L	13[A]	550[B] 13[C]	2.9	0.12	0.085	0.071	-	0.11	-
Nitrate (as N)	mg/L	3$_{s12}$[A]	124[B] 3.0[C]	0.65	0.027	0.019	0.016	-	0.025	-
Nitrate + Nitrite (as N)	mg/L	100[A]	n/v	0.65	0.037	0.019	0.029	-	0.025	-
Nitrite	mg/L	0.20$_{s13}$[A]	0.197[C]	<0.033	0.034	<0.033	0.042	-	<0.033	-
Nitrite (as N)	mg/L	0.06[A]	0.06[C]	<0.010	0.01	<0.010	0.013	-	<0.010	-
Orthophosphate (as P)	mg/L	n/v	n/v	0.0077	0.0041	-	0.0030	-	0.0031	-
pH, lab	S.U.	6.5-9[A]	6.5-9.0[C]	-	7.82	7.56	7.89	-	7.32	-
Phosphorus, Total	mg/L	n/v	n/v	<0.0060 IV	0.29	-	0.17	-	0.061	-
Sulfate	mg/L	100[A]	n/v	**810 CD[A]**	**500 CD[A]**	**360 CD[A]**	**130[A]**	-	**480 CD[A]**	-
Total Dissolved Solids	mg/L	3,000[A]	n/v	-	1,200	1,200	490 VV	-	1,100	-
Total Dissolved Solids (Calculated)	mg/L	n/v	n/v	-	1,100	1,100	550	-	1,200	-
Total Organic Carbon	mg/L	n/v	n/v	19	44 CD	-	15	-	12	-
Total Suspended Solids	mg/L	n/v	[C] $_{SN}$	-	310	17	55 VV	-	47	-
Metals, Dissolved										
Calcium	mg/L	n/v	n/v	-	270	260	130	130	300	-
Iron	mg/L	0.3[A]	0.3[C]	-	0.13	0.22	**18[AC]**	**19[AC]**	**20[AC]**	-
Magnesium	mg/L	n/v	n/v	-	34	32	23	23	40	-
Manganese	mg/L	0.2[A]	n/v	-	**3.3[A]**	**5.0[A]**	**3.0[A]**	**3.0[A]**	**5.3[A]**	-
Potassium	mg/L	n/v	n/v	-	13	12	10	10	17	-
Sodium	mg/L	n/v	n/v	-	43	39	31	31	44	-

Table G-2 (7C)
Groundwater Analytical Results for SNP Station 7C - Southwest of TSCA
Gordon Lake Group ofSites, NT
PSPC

Sample Location				CAM_GW_SNP_7C						
Sample Date				16-Sep-18	10-Jul-19	10-Sep-19	17-Jul-20	17-Jul-20	3-Sep-20	3-Sep-20
Sample ID				CAM_GW_SNP_7C_2018_01	CAM_GW_SNP_7C_2019_01	CAM_GW_SNP_7C_2019_02	CAM_GW_SNP_7C_2020_01	CAM_GW_SNP_7C_2020_01	CAM_GW_SNP_7C_2020_02	CAM_GW_SNP_7C_2020_02
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	BV	BV	BV	BV	BV	BV
Laboratory Work Order				B880158	B956373	B977474	C050319	C050319	C064167	C064167
Laboratory Sample ID				UI5098	WB9162	WM4541	YC6487	YC6487	YK0720	YK0720
Sample Type	Units	FIGQG	CCME					Lab Replicate		Lab Replicate
Metals, Total										
Aluminum	µg/L	$5/100_{e,d,var1}$ [A]	$5/100_{VAR1}$ [C]	**2,550** [AC]	**4,020** [AC]	21.1	**130** [AC]	-	20.3	-
Antimony	µg/L	2,000 [A]	n/v	3	1.49	<1.0	0.73	-	<1.0	-
Arsenic	µg/L	5 [A]	5 [C]	**18.8** [AC]	**6.77** [AC]	**26.1** [AC]	**42.6** [AC]	-	**21.0** [AC]	-
Barium	µg/L	500 [A]	n/v	118	83.8	61.4	81.3	-	117	-
Beryllium	µg/L	5.3 [A]	n/v	<0.50	<0.10	<0.20	<0.10	-	<0.20	-
Bismuth	µg/L	n/v	n/v	<5.0	<1.0	<2.0	<1.0	-	<2.0	-
Boron	µg/L	500 [A]	29,000 [B] 1,500 [C]	<250	<50	<100	61	-	<100	-
Cadmium	µg/L	0.09_c [A]	7.6_{STB} [B] 0.37_{LTG} [C]	**0.149** [A]	0.057	**0.147** [A]	**0.336** [A]	-	**0.110** [A]	-
Calcium	mg/L	n/v	n/v	271	251	276	129	-	253	-
Cesium	µg/L	n/v	n/v	<1.0	<0.20	<0.40	<0.20	-	<0.40	-
Chromium	µg/L	$8.9_{d,e}$ [A]	n/v	6.5	**12.4** [A]	<2.0	1.6	-	<2.0	-
Cobalt	µg/L	50 [A]	n/v	14.1	16.7	15.7	8.45	-	11.6	-
Copper	µg/L	$4_{e,d,TBC1}$ [A]	4* [C]	**13.7** [AC]	**15.9** [AC]	1.1	1.57	-	<1.0	-
Iron	µg/L	300 [A]	300 [C]	**4,100** [AC]	**2,730** [AC]	**9,780** [AC]	**20,300** [AC]	-	**13,500** [AC]	-
Lead	µg/L	$7_{e,d,TBC1}$ [A]	7# [C]	**14.1** [AC]	**17.8** [AC]	0.92	1.06	-	<0.40	-
Lithium	µg/L	n/v	n/v	15	11.4	<4.0	3.8	-	5.2	-
Magnesium	mg/L	n/v	n/v	41.4	34.7	31.0	22.6	-	34.3	-
Manganese	µg/L	200 [A]	n/v	**733** [A]	**3,360** [A]	**4,980** [A]	**2,630** [A]	-	**4,440** [A]	-
Mercury	µg/L	0.026_e [A]	0.026 [C]				***<0.050***	-	***<0.10***	-
Molybdenum	µg/L	73 [A]	73 [C]	<5.0	4.4	5.0	9.8	-	<2.0	-
Nickel	µg/L	$150_{e,d,TBC1}$ [A]	150** [C]	35.4	41.4	21.0	6.6	-	10.3	-
Potassium	mg/L	n/v	n/v	24.7	12.8	11.5	10.1	-	14.5	-
Selenium	µg/L	1 [A]	1 [C]	**1.66** [AC]	0.49	0.64	0.30	-	0.29	-
Silicon	µg/L	n/v	n/v	10,600	11,700	8,890	8,510	-	8,870	-
Silver	µg/L	0.25 [A]	0.25 [C]	**1.28** [AC]	**0.342** [AC]	<0.040	0.061	-	<0.040	-
Sodium	mg/L	n/v	n/v	90.1	47.1	35.1	29.9	-	35.3	-
Strontium	µg/L	n/v	n/v	1,090	1,070	1,120	760	-	1,430	-
Sulfur	mg/L	n/v	n/v	275	199	124	41.4	-	162	-
Thallium	µg/L	0.8 [A]	0.8 [C]	0.071	0.028	<0.020	<0.010	-	<0.020	-
Tin	µg/L	n/v	n/v	<25	<5.0	<10	<5.0	-	<10	-
Titanium	µg/L	100 [A]	n/v	<25	40.9	<10	<5.0	-	<10	-
Uranium	µg/L	10 [A]	33 [B] 15 [C]	8.74	9.27	7.19	2.48	-	7.48	-
Vanadium	µg/L	100 [A]	n/v	<25	6.2	<10	<5.0	-	<10	-
Zinc	µg/L	10 [A]	37_{EQ1} [B] 7.0_{EQ2} [C]	**29** [AC]	**7.4** [C]	***<10***	<5.0	-	<10	-
Zirconium	µg/L	n/v	n/v	1.40	2.60	1.26	0.74	-	0.55	-

See Notes on last page

Table G-2 (7D)
Groundwater Analytical Results for SNP Station 7D - West of TSCA
Gordon Lake Group of Sites, NT
PSPC

Sample Location				CAM_GW_SNP_7D						
Sample Date				16-Sep-18	9-Jul-19	10-Sep-19	17-Jul-20	17-Jul-20	3-Sep-20	3-Sep-20
Sample ID				CAM_GW_SNP_7D_2018_01	CAM_GW_SNP_7D_2019_01	CAM_GW_SNP_7D_2019_02	CAM_GW_SNP_7D_2020_01	CAM_GW_SNP_7D_2020_01	CAM_GW_SNP_7D_2020_02	CAM_GW_SNP_7D_2020_02
Sampling Company				STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory				MAXX	BV	BV	BV	BV	BV	BV
Laboratory Work Order				B880158	B956373	B977474	C050319	C050319	C064167	C064167
Laboratory Sample ID				UI5099	WB9160	WM4542	YC6488	YC6488	YK0721	YK0721
Sample Type	Units	FIGQG	CCME					Lab Replicate		Lab Replicate
BTEX and Petroleum Hydrocarbons										
Benzene	µg/L	88[A]	370[C]	<0.40	<0.40	<0.40	<0.40	-	<0.40	-
Toluene	µg/L	83[A]	2[C]	0.90	<0.40	<0.40	<0.40	-	<0.40	-
Ethylbenzene	µg/L	3,200[A]	90[C]	<0.40	<0.40	<0.40	<0.40	-	<0.40	-
Xylene, m & p-	µg/L	[A] $_{s1}$	n/v	0.94	<0.80	<0.80	<0.80	-	<0.80	-
Xylene, o-	µg/L	[A] $_{s1}$	n/v	0.50	<0.40	<0.40	<0.40	-	<0.40	-
Xylenes, Total	µg/L	3,900[A]	n/v	1.4	<0.89	<0.89	<0.89	-	<0.89	-
PHC F1 (C6-C10 range)	µg/L	n/v	n/v	<100	<100	<100	<100	-	<100	-
PHC F1 (C6-C10 range) minus BTE	µg/L	810[A]	n/v	<100	<100	<100	<100	-	<100	-
PHC F2 (>C10-C16 range)	mg/L	1.3[A]	n/v	<0.10	<0.10	<0.10	<0.10	-	<0.10	-
General Chemistry										
Alkalinity (P as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	n/v	n/v	320	260	280	200	-	230	-
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	n/v	n/v	260	210	230	160	-	190	-
Ammonia	mg/L	0.021-231 $_{e,d,var2}$ [A]	[C] $_{TBC}$	0.130	3.92	-	-	-	-	
Ammonia (as N)	mg/L	0.0173-190 $_{e,d,var3}$ [A]	[C] $_{TBC2}$	0.11	3.2 CD	0.040	0.093	-	0.11	-
Ammonium	mg/L	n/v	n/v	0.14	4.2	-	-	-	-	
Anion Sum	meq/L	n/v	n/v	9.5	6.3	6.5	4.8	-	6.3	-
Cation Sum	meq/L	n/v	n/v	9.3	7.1	6.6	5.1	-	6.6	-
Chloride	mg/L	100[A]	640[B] 120[C]	14	2.5	2.2	2.0	-	1.5	-
Electrical Conductivity, Lab	µS/cm	n/v	n/v	850	580	600	500	-	590	-
Hardness (as CaCO3)	mg/L	n/v	n/v	430	320	310	240	-	320	-
Hardness, Total (as CaCO3)	mg/L	n/v	n/v	428	323	277	228	-	279	-
Ion Balance	%	n/v	n/v	1.1	5.5	0.71	2.4	-	2.0	-
Nitrate	mg/L	13[A]	550[B] 13[C]	0.93	0.87	1.1	0.38	-	4.9	-
Nitrate (as N)	mg/L	[A] $_{s12}$	124[B] 3.0[C]	0.21	0.20	0.24	0.086	-	1.1	-
Nitrate + Nitrite (as N)	mg/L	100[A]	n/v	0.22	0.20	0.24	0.086	-	1.7	-
Nitrite	mg/L	0.20 $_{s13}$ [A]	0.197[C]	0.037	<0.033	<0.033	<0.033	-	**1.9[AC]**	-
Nitrite (as N)	mg/L	0.06[A]	0.06[C]	0.011	<0.010	<0.010	<0.010	-	**0.57[AC]**	-
Orthophosphate (as P)	mg/L	n/v	n/v	<0.0030	0.0069	-	<0.0030	-	0.0062	0.0057
pH, lab	S.U.	6.5-9[A]	6.5-9.0[C]	7.90	7.72	7.67	7.91	-	7.59	-
Phosphorus, Total	mg/L	n/v	n/v	0.017	0.16	-	0.044	0.041	0.0088	-
Sulfate	mg/L	100[A]	n/v	**190[A]**	98	87	75	-	**110[A]**	-
Total Dissolved Solids	mg/L	3,000[A]	n/v	580	380	370	270	-	350	-
Total Dissolved Solids (Calculated)	mg/L	n/v	n/v	540	360	350	270	-	360	-
Total Organic Carbon	mg/L	n/v	n/v	18	7.7	-	4.1 AS	-	4.1	-
Total Suspended Solids	mg/L	n/v	[C] $_{SN}$	35 VV	75	15	7.9	-	1.1	-
Metals, Dissolved										
Calcium	mg/L	n/v	n/v	140	100	100	81	-	110	-
Iron	mg/L	0.3[A]	0.3[C]	<0.060	**1.6[AC]**	<0.060	**0.58[AC]**	-	<0.060	-
Magnesium	mg/L	n/v	n/v	20	16	13	9.6	-	11	-
Manganese	mg/L	0.2[A]	n/v	0.16	**2.0[A]**	**1.6[A]**	**1.1[A]**	-	**0.52[A]**	-
Potassium	mg/L	n/v	n/v	6.1	3.5	2.6	2.0	-	2.1	-
Sodium	mg/L	n/v	n/v	14	6.0	4.4	3.3	-	3.8	-

Table G-2 (7D)
Groundwater Analytical Results for SNP Station 7D - West of TSCA
Gordon Lake Group of Sites, NT
PSPC

Sample Location				CAM_GW_SNP_7D						
Sample Date				**16-Sep-18**	**9-Jul-19**	**10-Sep-19**	**17-Jul-20**	**17-Jul-20**	**3-Sep-20**	**3-Sep-20**
Sample ID				**CAM_GW_SNP_7D_2018_01**	**CAM_GW_SNP_7D_2019_01**	**CAM_GW_SNP_7D_2019_02**	**CAM_GW_SNP_7D_2020_01**	**CAM_GW_SNP_7D_2020_01**	**CAM_GW_SNP_7D_2020_02**	**CAM_GW_SNP_7D_2020_02**
Sampling Company				**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**	**STANTEC**
Laboratory				**MAXX**	**BV**	**BV**	**BV**	**BV**	**BV**	**BV**
Laboratory Work Order				**B880158**	**B956373**	**B977474**	**C050319**	**C050319**	**C064167**	**C064167**
Laboratory Sample ID				**UI5099**	**WB9160**	**WM4542**	**YC6488**	**YC6488**	**YK0721**	**YK0721**
Sample Type	**Units**	**FIGQG**	**CCME**					**Lab Replicate**		**Lab Replicate**
Metals, Total										
Aluminum	µg/L	$5/100_{e,d,var1}$ [A]	$5/100_{VAR1}$ [C]	8.7	**2,140 [AC]**	55	93.8	-	16.9	-
Antimony	µg/L	2,000 [A]	n/v	1.60	5.59	1.89	0.91	-	3.36	-
Arsenic	µg/L	5 [A]	5 [C]	3.58	**15.4 [AC]**	**18.6 [AC]**	**11.6 [AC]**	-	2.90	-
Barium	µg/L	500 [A]	n/v	50.3	63.5	29.5	29.4	-	39.5	-
Beryllium	µg/L	5.3 [A]	n/v	<0.10	<0.10	<0.10	<0.10	-	<0.10	-
Bismuth	µg/L	n/v	n/v	<1.0	<1.0	<1.0	<1.0	-	<1.0	-
Boron	µg/L	500 [A]	29,000 [B] 1,500 [C]	65	62	<50	<50	-	<50	-
Cadmium	µg/L	0.09_{c} [A]	7.6_{STB} [B] 0.37_{LTG} [C]	**0.102 [A]**	0.051	0.081	0.048	-	0.053	-
Calcium	mg/L	n/v	n/v	140	103	94.4	77.0	-	95.1	-
Cesium	µg/L	n/v	n/v	<0.20	<0.20	<0.20	<0.20	-	<0.20	-
Chromium	µg/L	$8.9_{d,e}$ [A]	n/v	<1.0	8.8	<1.0	1.3	-	<1.0	-
Cobalt	µg/L	50 [A]	n/v	2.45	13.6	3.16	2.65	-	0.82	-
Copper	µg/L	$4_{e,d,TBC1}$ [A]	4* [C]	**4.81 [AC]**	**29.7 [AC]**	2.04	1.89	-	2.03	-
Iron	µg/L	300 [A]	300 [C]	<10	**1,230 [AC]**	**831 [AC]**	**909 [AC]**	-	56	-
Lead	µg/L	$7_{e,d,TBC1}$ [A]	7# [C]	<0.20	**15.7 [AC]**	0.47	0.64	-	<0.20	-
Lithium	µg/L	n/v	n/v	8.9	<2.0	<2.0	<2.0	-	<2.0	-
Magnesium	mg/L	n/v	n/v	18.8	16.0	10.2	8.68	-	9.98	-
Manganese	µg/L	200 [A]	n/v	146	**2,140 [A]**	**991 [A]**	**983 [A]**	-	**543 [A]**	-
Mercury	µg/L	0.026_{e} [A]	0.026 [C]				<0.050	-	<0.050	-
Molybdenum	µg/L	73 [A]	73 [C]	2.5	6.3	4.1	2.3	-	3.9	-
Nickel	µg/L	$150_{e,d,TBC1}$ [A]	150** [C]	10.9	34	8.1	4.7	-	3.8	-
Potassium	mg/L	n/v	n/v	6.14	3.61	1.97	1.98	-	2.12	-
Selenium	µg/L	1 [A]	1 [C]	**1.42 [AC]**	0.70	0.67	0.22	-	0.88	-
Silicon	µg/L	n/v	n/v	6,250	8,880	5,430	4,250	-	4,880	-
Silver	µg/L	0.25 [A]	0.25 [C]	<0.020	0.231	0.028	<0.020	-	<0.020	-
Sodium	mg/L	n/v	n/v	13.4	5.85	3.53	2.91	-	3.23	-
Strontium	µg/L	n/v	n/v	461	372	313	267	-	373	-
Sulfur	mg/L	n/v	n/v	60.3	37.9	30.5	23.8	-	35.5	-
Thallium	µg/L	0.8 [A]	0.8 [C]	0.027	0.040	0.025	0.012	-	0.022	-
Tin	µg/L	n/v	n/v	<5.0	<5.0	<5.0	<5.0	-	<5.0	-
Titanium	µg/L	100 [A]	n/v	<5.0	29.1	<5.0	<5.0	-	<5.0	-
Uranium	µg/L	10 [A]	33 [B] 15 [C]	6.52	6.38	3.47	2.65	-	3.86	-
Vanadium	µg/L	100 [A]	n/v	<5.0	<5.0	<5.0	<5.0	-	<5.0	-
Zinc	µg/L	10 [A]	37_{EQ1} [B] 7.0_{EQ2} [C]	<5.0	**26.9 [AC]**	<5.0	5.0	-	<5.0	-
Zirconium	µg/L	n/v	n/v	0.30	1.11	0.16	0.16	-	<0.10	-

See Notes on last page

Notes:

FIGQG	Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (Government of Canada, June 2016 (version 4) revised November 2016)
A	Table 1 Federal Interim Groundwater Guidelines - Generic Guidelines for Agricultural Use - (Tier 1) Lowest Guideline - Coarse
CCME	Canadian Council of Ministers of the Environment
B	Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater Aquatics Short Term
C	Canadian Environmental Quality Guidelines, Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater Aquatics Long Term
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard; right-justified in cell for improved readability.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit; right-justified in cell for improved readability.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
c	Hardness dependent guideline; if hardness of receiving surface water is available can be calculated as 10{0.83(log[hardness])-2.46}
e	Guideline is the lowest of all applicable pathways.
d	The freshwater aquatic life guidelines vary depending on water pH, hardness etc. Therefore, see Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME 1999) to determine the appropriate water quality guideline applicable to the site and calculate the groundwater guidelines using formulas provided in Appendix B.
s1	Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.
s12	Added for Nitrate-N as guideline only present for Nitrate. Divided the Nitrate guideline by 4.4.
s13	Guidelines only provided for Nitrite (as N). Nitrite guideline (as NO2) is calculated by multiplying the Nitrite (as N) guideline by 3.29.
EQ1	The short-term benchmark is for dissolved zinc and is calculated using the following equation: Benchmark = exp(0.833[ln(hardness mg·L-1)] + 0.240[ln(DOC mg·L-1)] + 0.526). The value in the table is for surface water of 50 mg CaCO3·L−1 hardness and 0.5 mg·L−1 dissolved organic carbon (DOC). The benchmark equation is valid between hardness 13.8 and 250.5 mg CaCO3·L−1 and DOC 0.3 and 17.3 mg·L−1.
EQ2	The long-term CWQG is for dissolved zinc and is calculated using the following equation: CWQG = exp(0.947[ln(hardness mg·L-1)] - 0.815[pH] + 0.398[ln(DOC mg·L-1)] + 4.625). The value in the table is for surface water of 50 mg CaCO3·L−1 hardness, pH of 7.5 and 0.5 mg·L−1 DOC. The CWQG equation is valid between hardness 23.4 and 399 mg CaCO3·L−1, pH 6.5 and 8.13 and DOC 0.3 to 22.9 mg·L−1.
LTG	The CWQG for cadmium (i.e. long-term guideline) of 0.09 µg·L-1 is for waters of 50 mg CaCO3·L-1 hardness. The CWQG for cadmium is related to water hardness (as CaCO3): At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation (CWQG (µg/L) = 10{0.83(log[hardness]) – 2.46 }); At hardness > 280 mg/L, the CWQG is 0.37 µg/L.
STB	The short-term benchmark concentration of 1.0 µg·L-1 is for waters of 50 mg CaCO3·L-1 hardness. The short-term benchmark for cadmium is related to water hardness (as CaCO3): When the water hardness is 0 to < 5.3 mg/L, the short-term benchmark is 0.11 µg/L, At hardness ≥ 5.3 to ≤ 360 mg/L, the short-term benchmark is calculated using this equation (Short-term benchmark (µg/L) = 10{1.016(log[hardness]) – 1.71 }); At hardness > 360 mg/L, the short-term benchmark is 7.7 µg/L.
*	The CWQG for copper is related to water hardness. When the water hardness is 0 to < 82 mg/L, the CWQG is 2 µg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (µg/L) = 0.2 * e{0.8545[ln(hardness)]-1.465}. At hardness >180 mg/L, the CWQG is 4 µg/L. If the hardness is unknown, the CWQG is 2 µg/L
#	The CWQG for lead is related to water hardness. When the hardness is 0 to ≤ 60 mg/L, the CWQG is 1 µg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (µg/L)= e{1.273[ln(hardness)]-4.705}. At hardness >180 mg/L, the CWQG is 7 µg/L. If the hardness is unknown, the CWQG is 1 µg/L
**	The CWQG for nickel is related to water hardness. When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 25 µg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (µg/L) = e{0.76[ln(hardness)]+1.06}. At hardness >180 mg/L, the CWQG is 150 µg/L. If the hardness is unknown, the CWQG is 25 µg/L
SN	see Narrative
TBC1	To be calculated (equation).
VAR1	Variable, 5 µg/L if pH < 6.5 and 100 µg/L if pH > 6.5
VAR2	Ammonia is pH and temperature dependent, see CCME guidelines for further instructions.
ST	Tentatively identified result and may be potentially biased high due to matrix interference.
AS	Detection limit raised due to sample matrix.
CD	Detection limits raised due to dilution to bring analyte within the calibrated range.
MI	Detection limit was raised due to matrix interferences.
VV	Detection limit raised based on sample volume used for analysis.
G	Result exceeded calibration range.
MS	Matrix spike exceeds acceptance limits due to matrix interference.
XY	Qualifying ion outside of acceptance criteria. Results are tentatively identified and potentially biased high.

Table G-3
In Situ Groundwater Data
Gordon Lake Group of Sites, NT
PSPC

Site	Sample Type	Media	Monitoring Well	Sample Station	Date (YMD)	Depth to Product (m)	Depth to Water (m)	Depth to Bottom (m)	Temperature (°C)	Conductivity (mS/cm)	Conductivity (µS/cm)	SPC (mS/cm)	DO (mg/L)	pH	ORP	Tubidity (NTU)
TSCA	Verification Sampling	Groundwater	1	CAM_GW_MW1_2019_01	20190708	-	Frozen	4.48	-	-	-	-	-	-	-	-
TSCA	Verification Sampling	Groundwater	1	CAM_GW_MW1_2019_02; DUP1_GW_2019_02	20191010	-	3.39	4.36	3.50	1.578	-	2.673	0.45	4.22	228.9	0.0
TSCA	Verification Sampling	Groundwater	1	CAM_GW_MW1_2020_01	20200717	-	Dry	4.435	-	-	-	-	-	-	-	-
TSCA	Verification Sampling	Groundwater	1	CAM_GW_MW1_2020_02	20200903	-	Dry	-	-	-	-	-	-	-	-	-
TSCA	Verification Sampling	Groundwater	2	CAM_GW_MW2_2019_01	20190709	-	6.55	8.09	2.95	-	2322	-	187.10	8.12	-13.7	-
TSCA	Verification Sampling	Groundwater	2	CAM_GW_MW2_2019_02	20191010	-	6.05	8.09	5.94	2.95	-	4.630	0.98	6.45	-12.1	17.6
TSCA	Verification Sampling	Groundwater	2	CAM_GW_MW2_2020_01	20200717	-	6.315	8.130	2.5	5.626	5,626	9.824	3.21	6.48	-33.9	-
TSCA	Verification Sampling	Groundwater	2	CAM_GW_MW2_2020_02	20200903	-	5.977	8.091	2.6	9.113	9,113	15.966	1.05	6.55	-24.6	-
Camlaren	Compliance Sampling	Groundwater	3	CAM_GW_SNP_7A_2019_01	20190709	-	2.42	7.88	3.38	-	1,690	-	57.00	8.89	-126.9	-
Camlaren	Compliance Sampling	Groundwater	3	CAM_GW_SNP_7A_2019_02	20191010	-	2.24	7.88	8.58	1.19	-	1.733	0.50	7.17	-105.2	1.5
Camlaren	Compliance Sampling	Groundwater	3	CAM_GW_SNP_7A_2020_01	20200717	-	2.055	7.925	4.9	1.127	1,127.0	1.864	3.03	7.12	-109.4	-
Camlaren	Compliance Sampling	Groundwater	3	CAM_GW_SNP_7A_2020_02 DUP1_GW_2020_02	20200903	-	2.135	7.902	6.2	1.078	1,078.0	1.687	49.0	7.60	-142.2	-
Camlaren	Compliance Sampling	Groundwater	4	CAM_GW_SNP_7B_2019_01; DUP1_GW_2019_01	20190709	-	2.48	4.62	7.26	-	349	-	52.00	8.64	-158.2	-
Camlaren	Compliance Sampling	Groundwater	4	CAM_GW_SNP_7B_2019_02	20191010	-	2.69	4.62	9.26	0.546	-	0.781	0.60	6.49	21.0	3.0
Camlaren	Compliance Sampling	Groundwater	4	CAM_GW_SNP_7B_2020_01	20200717	-	2.205	4.625	8.5	0.649	649.0	0.954	3.78	6.49	-8.4	-
Camlaren	Compliance Sampling	Groundwater	4	CAM_GW_SNP_7B_2020_02	20200903	-	2.601	4.624	8.5	0.602	602.0	0.882	29.60	6.94	-41.3	-
Camlaren	Compliance Sampling	Groundwater	5	CAM_GW_SNP_7C_2019_01	20190710	-	5.17	5.53	-	-	-	-	-	-	-	-

Table G-3
In Situ Groundwater Data
Gordon Lake Group of Sites, NT
PSPC

Site	Sample Type	Media	Monitoring Well	Sample Station	Date (YMD)	Depth to Product (m)	Depth to Water (m)	Depth to Bottom (m)	Temperature (°C)	Conductivity (mS/cm)	Conductivity (µS/cm)	SPC (mS/cm)	DO (mg/L)	pH	ORP	Tubidity (NTU)
Camlaren	Compliance Sampling	Groundwater	5	CAM_GW_SNP_7C_2019_02	20191010	-	4.36	5.52	9.00	1.043	-	1.501	0.70	7.06	-56.5	0.8
Camlaren	Compliance Sampling	Groundwater	5	CAM_GW_SNP_7C_2020_01	20200717	-	4.435	5.565	5.9	0.595	595.0	0.952	3.01	6.58	-74.1	-
Camlaren	Compliance Sampling	Groundwater	5	CAM_GW_SNP_7C_2020_02	20200903	-	4.884		9.9	1.115	1,115.0	1.565	4.46	7.12	-63.1	-
Camlaren	Compliance Sampling	Groundwater	6	CAM_GW_SNP_7D_2019_01	20190709	-	5.25	6.15	3.92	-	608	-	50.40	7.91	-166.2	-
Camlaren	Compliance Sampling	Groundwater	6	CAM_GW_SNP_7D_2019_02	20191010	-	2.34	6.15	8.75	0.387	-	0.561	3.75	7.27	-19.0	0.0
Camlaren	Compliance Sampling	Groundwater	6	CAM_GW_SNP_7D_2020_01	20200717	-	2.245	6.105	5.7	0.290	289.7	0.455	3.63	7.31	-41.2	-
Camlaren	Compliance Sampling	Groundwater	6	CAM_GW_SNP_7D_2020_02	20200903	-	2.283	6.156	7.6	0.556	556.0	0.843	1.65	7.56	-14.8	-

Notes:
m - metres
°C - degrees centigrade
mS/cm - millisiemens per centimetre
µS/cm - microsiements per centimetre
DO % - dissolved oxygen percent
pH - Potential hydrogen
ORP - Oxidation reduction potential
NTU - Nephelometric Turbidity Units
- - data not recorded

Table G-4
In Situ Groundwater Data
Gordon Lake Group of Sites, NT
PSPC

Site	Sample Type	Media	Sample ID	Date (YMD)	Temperature (°C)	Conductivity (mS/cm)	Conductivity (µS/cm)	Specific Conductance (µs/cm)	Specific Conductance (mS/cm)	Turbidity (NTU)	TDS (g/L)	DO mg/L	pH	ORP (mV)
Burnt Island	Compliance Sampling	Surface Water	BUR_SW_SNP_11A_2019_01	20190710	13.13		75						7	-212.6
Burnt Island	Compliance Sampling	Surface Water	BUR_SW_SNP_11A_2019_02	20190911	11.84	0.072	-		0.097	0		13.45	8.01	134.8
Burnt Island	Compliance Sampling	Surface Water	BUR_SW_SNP_11A_2020_01	20200716	17.4		85.2	99.8			65	9.13	7.96	90.7
Burnt Island	Compliance Sampling	Surface Water	BUR_SW_SNP_11A_2020_02	20200904	9.3		74.8	107.2			69.55	10.75	8.04	99.6
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B1_2019_01	20190708	12.82	-	87	-	-	-	-	-	6.22	-99.2
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B1_2019_02	20190910	12.25	0.071	-		0.092	0.0		11.58	7.87	63.2
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B1_2020_01	20200716	15.1		80	98.5			64	-24	7.82	9
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B1_2020_02	20200903	12.7		75.7	99			64.35	8.84	7.68	102.3
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B2_2019_01	20190708	12.84	-	135	-	-	-	-	-	6.01	-104.7
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B2_2019_02	20190910	12.76	0.071	-		0.019	0.0		11.63	7.9	52.5
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B2_2020_01	20200716	15.4		529	640			426	8.27	7.35	18.3
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B2_2020_02	20200903	12.8		77.5	101			65.65	8.53	7.71	77.4
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B3_2019_01	20190708	13.16	-	121	-	-	-	-	-	7.99	-104.3
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B3_2019_02	20190910	17.5	0.154	-		0.18	5.6		13.17	8.17	55.4
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B3_2020_01	20200716	16.8		89.9	106.7			69	10.6	7.42	-36
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B3_2020_02	20200903	12.5		59.3	77.9			50.7	12.2	7.77	94.4
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B4_2019_01	20190708	12.81	-	81	-	-	-	-	-	6.01	-28.6
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B4_2019_02 DUP1_SW_SNP_2019_02	20190910	13.12	0.072	-		0.093	0.2		11.7	7.95	0.2
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B4_2020_01	20200716	14.1		477	590			394	2.76	6.84	7.7
Camlaren	Compliance Sampling	Surface Water	CAM_SW_SNP_11B4_2020_02	20200903	13		83	107.6			70.2	9.16	7.86	48.1
Camlaren (Zenith)	Compliance Sampling	Surface Water	CAM_SW_SNP_11C_2019_01	20190708	13.63	-	145					-	10.44	-188.5
Camlaren (Zenith)	Compliance Sampling	Surface Water	CAM_SW_SNP_11C_2019_02	20190910	9.78	0.068	-	-	0.096	11.2	-	12.22	7.66	68.8

Table G-4
In Situ Groundwater Data
Gordon Lake Group of Sites, NT
PSPC

Site	Sample Type	Media	Sample ID	Date (YMD)	Temperature (°C)	Conductivity (mS/cm)	Conductivity (µS/cm)	Specific Conductance (µs/cm)	Specific Conductance (mS/cm)	Turbidity (NTU)	TDS (g/L)	DO mg/L	pH	ORP (mV)
Camlaren (Zenith)	Compliance Sampling	Surface Water	CAM_SW_SNP_11C_2020_01	20200716	16.8		84.3	100.5			65	9.12	8.23	79.5
Camlaren (Zenith)	Compliance Sampling	Surface Water	CAM_SW_SNP_11C_2020_02; DUP_SW_2020_02	20200904	11		72	98.3			63.7	11.41	7.65	128.7
Kidney Pond	Compliance Sampling	Surface Water	KID_SW_SNP_11D_2019_01 DUP1_SW_SNP_2019_01	20190709	13.35	-	80		-	-		-	7.01	-222
Kidney Pond	Compliance Sampling	Surface Water	KID_SW_SNP_11D_2019_02	20190911	9.1	0.147	-		0.21	10.9		7.16	6.8	88.4
Kidney Pond	Compliance Sampling	Surface Water	KID_SW_SNP_11D_2020_01	20200716	9.5		73.7	104.9			68	3.09	6.58	-53.5
Kidney Pond	Compliance Sampling	Surface Water	KID_SW_SNP_11D_2020_02	20200903	11.4		113	159.8			103.35	9.38	7.1	130
Treacy	Compliance Sampling	Surface Water	TRE_SW_SNP_11E_2019_01	20190709	14.5	-	161		-	-		-	7.73	-248.4
Treacy	Compliance Sampling	Surface Water	TRE_SW_SNP_11E_2019_02	20190911	11.81	0.069	-		0.093	0		12	7.9	94.2
Treacy	Compliance Sampling	Surface Water	TRE_SW_SNP_11E_2020_01	20200717	16.6		83.1	99.1			64	8.99	7.77	15.9
Treacy	Compliance Sampling	Surface Water	TRE_SW_SNP_11E_2020_02	20200904	12.4		74.6	98.3			63.7	9.76	7.88	132.7
West Bay	Compliance Sampling	Surface Water	WES_SW_SNP_11F_2019_01	20190710	14.15	-	71		-	-		-	7.29	-230.9
West Bay	Compliance Sampling	Surface Water	WES_SW_SNP_11F_2019_02	20190911	13.2	0.072	-		0.093	1.9		13.62	7.9	110.5
West Bay	Compliance Sampling	Surface Water	WES_SW_SNP_11F_2020_01	20200717	17.3		72.6	85.2			55	9.2	7.96	27.7
West Bay	Compliance Sampling	Surface Water	WES_SW_SNP_11F_2020_02	20200904	11.7		73.1	97.9			63.7	10.46	7.89	125.8

Notes:
m - metres
mS/cm - millisiemens per centimetre
µS/cm - microsiements per centimetre
g/L - grams per litre
DO % - dissolved oxygen percent
mg/L - milligrams per litre
ORP - Oxidation reduction potential
TDB - to be determined
mV - millivolts
NTU - Nephelometric Turbidity Units
- - data not recorded

APPENDIX H

Laboratory COAs

Your Project #: 121414585
Site Location: Gordon Lake
Your C.O.C. #: 26357

Attention: Laya Bou-Karam

STANTEC CONSULTING LTD
PO BOX 1777
4910-53 Street
Yellowknife, NT
CANADA X1A 2P4

Report Date: 2020/10/28
Report #: R2948098
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C050319
Received: 2020/07/18, 08:20

Sample Matrix: Ground Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2020/07/24	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID	6	N/A	2020/07/23	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX	6	N/A	2020/07/24		Auto Calc
Chloride/Sulphate by Auto Colourimetry	3	N/A	2020/07/21	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Chloride/Sulphate by Auto Colourimetry	3	N/A	2020/07/22	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Conductivity @25C	6	N/A	2020/07/24	AB SOP-00005	SM 23 2510 B m
CCME Hydrocarbons in Water (F2; C10-C16) (2)	6	2020/07/21	2020/07/22	AB SOP-00037 AB SOP-00040	CCME PHC-CWS m
Hardness	6	N/A	2020/07/23		Auto Calc
Hardness Total (calculated as CaCO3) (1, 3)	6	N/A	2020/07/23	BBY WI-00033	Auto Calc
Elements by ICP - Dissolved (4)	6	N/A	2020/07/23	AB SOP-00042	EPA 6010d R5 m
Ion Balance	6	N/A	2020/07/23		Auto Calc
Sum of cations, anions	6	N/A	2020/07/23		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	6	2020/07/21	2020/07/23	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (total) (1)	6	2020/07/23	2020/07/23	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	6	N/A	2020/07/24	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite	6	N/A	2020/07/22		Auto Calc
Nitrate + Nitrite-N (calculated)	6	N/A	2020/07/22		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	5	N/A	2020/07/21	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) by IC	1	N/A	2020/07/22	AB SOP-00023	SM 23 4110 B m
pH @25°C (5)	6	N/A	2020/07/24	AB SOP-00005	SM 23 4500-H+B m
Orthophosphate by Konelab (6)	6	N/A	2020/07/21	AB SOP-00025	SM 23 4500-P A,F m
Total Dissolved Solids (Filt. Residue)	6	2020/07/23	2020/07/23	AB SOP-00065	SM 23 2540 C m
Total Dissolved Solids (Calculated)	6	N/A	2020/07/24		Auto Calc
Carbon (Total Organic) (7)	1	N/A	2020/07/24	AB SOP-00087	MMCW 119 1996 m
Carbon (Total Organic) (7)	2	N/A	2020/07/25	AB SOP-00087	MMCW 119 1996 m
Carbon (Total Organic) (7)	3	N/A	2020/07/26	AB SOP-00087	MMCW 119 1996 m
Total Phosphorus	6	2020/07/24	2020/07/25	AB SOP-00024	SM 23 4500-P A,B,F m

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: 121414585
Site Location: Gordon Lake
Your C.O.C. #: 26357

Attention: Laya Bou-Karam

STANTEC CONSULTING LTD
PO BOX 1777
4910-53 Street
Yellowknife, NT
CANADA X1A 2P4

Report Date: 2020/10/28
Report #: R2948098
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C050319
Received: 2020/07/18, 08:20

Sample Matrix: Ground Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Suspended Solids (NFR)	6	2020/07/24	2020/07/24	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

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 BV Labs Vancouver
(2) Silica gel clean up employed.
(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(4) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(5) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
(6) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(7) TOC present in the sample should be considered as non-purgeable TOC.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: 121414585
Site Location: Gordon Lake
Your C.O.C. #: 26357

Attention: Laya Bou-Karam

STANTEC CONSULTING LTD
PO BOX 1777
4910-53 Street
Yellowknife, NT
CANADA X1A 2P4

Report Date: 2020/10/28
Report #: R2948098
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C050319
Received: 2020/07/18, 08:20

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Geraldlyn Gouthro, Key Account Specialist
Email: geraldlyn.gouthro@bvlabs.com
Phone# (780)577-7173
==========

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.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

AT1 BTEX AND F1-F2 IN WATER (GROUND WATER)

BV Labs ID		YC6485	YC6485	YC6486	YC6487		
Sampling Date		2020/07/17	2020/07/17	2020/07/17	2020/07/17		
COC Number		26357	26357	26357	26357		
	UNITS	CAM_GW_SNP_7A_2020_01	CAM_GW_SNP_7A_2020_01 Lab-Dup	CAM_GW_SNP_7B_2020_01	CAM_GW_SNP_7C_2020_01	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	N/A	1.9	<0.10	0.10	9929072
Volatiles							
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	9929376
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	9929376
Ethylbenzene	ug/L	<0.40	<0.40	4.3	<0.40	0.40	9929376
m & p-Xylene	ug/L	<0.80	<0.80	7.1	<0.80	0.80	9929376
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	9929376
Xylenes (Total)	ug/L	<0.89	N/A	7.1	<0.89	0.89	9928642
F1 (C6-C10) - BTEX	ug/L	<100	N/A	260	<100	100	9928642
F1 (C6-C10)	ug/L	<100	<100	270	<100	100	9929376
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	102	103	105	108	N/A	9929376
4-Bromofluorobenzene (sur.)	%	97	98	98	95	N/A	9929376
D4-1,2-Dichloroethane (sur.)	%	87	87	89	86	N/A	9929376
O-TERPHENYL (sur.)	%	121	N/A	104	112	N/A	9929072

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

AT1 BTEX AND F1-F2 IN WATER (GROUND WATER)

BV Labs ID		YC6488	YC6489	YC6490		
Sampling Date		2020/07/17	2020/07/17	2020/07/17		
COC Number		26357	26357	26357		
	UNITS	CAM_GW_SNP_7D_2020_01	CAM_GW_MW2_2020_01	DUP1_GW_2020_01	RDL	QC Batch
Ext. Pet. Hydrocarbon						
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10	2.2	0.10	9929072
Volatiles						
Benzene	ug/L	<0.40	<0.40	<0.40	0.40	9929376
Toluene	ug/L	<0.40	4.4	<0.40	0.40	9929376
Ethylbenzene	ug/L	<0.40	<0.40	3.9	0.40	9929376
m & p-Xylene	ug/L	<0.80	<0.80	6.4	0.80	9929376
o-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	9929376
Xylenes (Total)	ug/L	<0.89	<0.89	6.4	0.89	9928642
F1 (C6-C10) - BTEX	ug/L	<100	<100	250	100	9928642
F1 (C6-C10)	ug/L	<100	<100	270	100	9929376
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	104	104	104	N/A	9929376
4-Bromofluorobenzene (sur.)	%	98	96	96	N/A	9929376
D4-1,2-Dichloroethane (sur.)	%	89	86	89	N/A	9929376
O-TERPHENYL (sur.)	%	106	120	109	N/A	9929072

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ROUTINE WATER (GROUND WATER)

BV Labs ID		YC6485		YC6486		YC6487		
Sampling Date		2020/07/17		2020/07/17		2020/07/17		
COC Number		26357		26357		26357		
	UNITS	CAM_GW_SNP_7A_2020_01	QC Batch	CAM_GW_SNP_7B_2020_01	RDL	CAM_GW_SNP_7C_2020_01	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	18	9928651	10	N/A	9.6	N/A	9928651
Cation Sum	meq/L	20	9928651	11	N/A	11	N/A	9928651
Hardness (CaCO3)	mg/L	760	9928647	500	0.50	420	0.50	9928647
Ion Balance (% Difference)	%	4.8	9928649	3.5	N/A	5.2	N/A	9928649
Dissolved Nitrate (NO3)	mg/L	0.13	9928654	2.2	0.044	0.071	0.044	9928654
Nitrate plus Nitrite (N)	mg/L	0.028	9928655	1.0	0.014	0.029	0.014	9928655
Dissolved Nitrite (NO2)	mg/L	<0.033	9928654	1.7	0.033	0.042	0.033	9928654
Calculated Total Dissolved Solids	mg/L	1100	9928661	640	10	550	10	9928661
Misc. Inorganics								
Conductivity	uS/cm	1600	9932789	960	2.0	910	2.0	9932785
pH	pH	7.82	9932787	7.54	N/A	7.89	N/A	9932781
Anions								
Alkalinity (PP as CaCO3)	mg/L	<1.0	9932786	<1.0	1.0	<1.0	1.0	9932779
Alkalinity (Total as CaCO3)	mg/L	560	9932786	180	1.0	340	1.0	9932779
Bicarbonate (HCO3)	mg/L	680	9932786	220	1.0	410	1.0	9932779
Carbonate (CO3)	mg/L	<1.0	9932786	<1.0	1.0	<1.0	1.0	9932779
Hydroxide (OH)	mg/L	<1.0	9932786	<1.0	1.0	<1.0	1.0	9932779
Dissolved Chloride (Cl)	mg/L	18	9930058	5.6	1.0	7.7	1.0	9930058
Dissolved Sulphate (SO4)	mg/L	320 (1)	9930058	310 (1)	2.0	130	1.0	9930058
Nutrients								
Dissolved Nitrite (N)	mg/L	<0.010	9929918	0.52	0.010	0.013	0.010	9929918
Dissolved Nitrate (N)	mg/L	0.028	9929918	0.49	0.010	0.016	0.010	9929918
Elements								
Dissolved Calcium (Ca)	mg/L	220	9932298	160	0.30	130	0.30	9932298
Dissolved Iron (Fe)	mg/L	20	9932298	7.8	0.060	18	0.060	9932298
Dissolved Magnesium (Mg)	mg/L	55	9932298	25	0.20	23	0.20	9932298
Dissolved Manganese (Mn)	mg/L	4.5	9932298	6.8	0.0040	3.0	0.0040	9932298
Dissolved Potassium (K)	mg/L	18	9932298	5.1	0.30	10	0.30	9932298
Dissolved Sodium (Na)	mg/L	78	9932298	8.5	0.50	31	0.50	9932298

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ROUTINE WATER (GROUND WATER)

BV Labs ID		YC6487		YC6488		
Sampling Date		2020/07/17		2020/07/17		
COC Number		26357		26357		
	UNITS	CAM_GW_SNP_7C_2020_01 Lab-Dup	QC Batch	CAM_GW_SNP_7D_2020_01	RDL	QC Batch
Calculated Parameters						
Anion Sum	meq/L	N/A	9928651	4.8	N/A	9928651
Cation Sum	meq/L	N/A	9928651	5.1	N/A	9928651
Hardness (CaCO3)	mg/L	N/A	9928647	240	0.50	9928647
Ion Balance (% Difference)	%	N/A	9928649	2.4	N/A	9928649
Dissolved Nitrate (NO3)	mg/L	N/A	9928654	0.38	0.044	9928654
Nitrate plus Nitrite (N)	mg/L	N/A	9928655	0.086	0.014	9928655
Dissolved Nitrite (NO2)	mg/L	N/A	9928654	<0.033	0.033	9928654
Calculated Total Dissolved Solids	mg/L	N/A	9928661	270	10	9928661
Misc. Inorganics						
Conductivity	uS/cm	N/A	9932785	500	2.0	9932789
pH	pH	N/A	9932781	7.91	N/A	9932787
Anions						
Alkalinity (PP as CaCO3)	mg/L	N/A	9932779	<1.0	1.0	9932786
Alkalinity (Total as CaCO3)	mg/L	N/A	9932779	160	1.0	9932786
Bicarbonate (HCO3)	mg/L	N/A	9932779	200	1.0	9932786
Carbonate (CO3)	mg/L	N/A	9932779	<1.0	1.0	9932786
Hydroxide (OH)	mg/L	N/A	9932779	<1.0	1.0	9932786
Dissolved Chloride (Cl)	mg/L	N/A	9930058	2.0	1.0	9930058
Dissolved Sulphate (SO4)	mg/L	N/A	9930058	75	1.0	9930058
Nutrients						
Dissolved Nitrite (N)	mg/L	N/A	9929918	<0.010	0.010	9929918
Dissolved Nitrate (N)	mg/L	N/A	9929918	0.086	0.010	9929918
Elements						
Dissolved Calcium (Ca)	mg/L	130	9932298	81	0.30	9932287
Dissolved Iron (Fe)	mg/L	19	9932298	0.58	0.060	9932287
Dissolved Magnesium (Mg)	mg/L	23	9932298	9.6	0.20	9932287
Dissolved Manganese (Mn)	mg/L	3.0	9932298	1.1	0.0040	9932287
Dissolved Potassium (K)	mg/L	10	9932298	2.0	0.30	9932287
Dissolved Sodium (Na)	mg/L	31	9932298	3.3	0.50	9932287

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ROUTINE WATER (GROUND WATER)

BV Labs ID		YC6489			YC6490		
Sampling Date		2020/07/17			2020/07/17		
COC Number		26357			26357		
	UNITS	CAM_GW_MW2_2020_01	RDL	QC Batch	DUP1_GW_2020_01	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	200	N/A	9928651	10	N/A	9928651
Cation Sum	meq/L	190	N/A	9928651	11	N/A	9928651
Hardness (CaCO3)	mg/L	2000	0.50	9928647	490	0.50	9928647
Ion Balance (% Difference)	%	0.82	N/A	9928649	3.6	N/A	9928649
Dissolved Nitrate (NO3)	mg/L	<0.22	0.22	9928654	1.9	0.044	9928654
Nitrate plus Nitrite (N)	mg/L	0.25	0.071	9928655	0.98	0.014	9928655
Dissolved Nitrite (NO2)	mg/L	0.81	0.16	9928654	1.8	0.033	9928654
Calculated Total Dissolved Solids	mg/L	13000	51	9928661	630	10	9928661
Misc. Inorganics							
Conductivity	uS/cm	15000	2.0	9932785	980	2.0	9932785
pH	pH	7.75	N/A	9932781	7.53	N/A	9932781
Anions							
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	9932779	<1.0	1.0	9932779
Alkalinity (Total as CaCO3)	mg/L	820	1.0	9932779	180	1.0	9932779
Bicarbonate (HCO3)	mg/L	1000	1.0	9932779	220	1.0	9932779
Carbonate (CO3)	mg/L	<1.0	1.0	9932779	<1.0	1.0	9932779
Hydroxide (OH)	mg/L	<1.0	1.0	9932779	<1.0	1.0	9932779
Dissolved Chloride (Cl)	mg/L	720 (1)	5.0	9930058	5.5	1.0	9930058
Dissolved Sulphate (SO4)	mg/L	7700 (1)	50	9930058	310 (1)	2.0	9930058
Nutrients							
Dissolved Nitrite (N)	mg/L	0.25 (2)	0.050	9929918	0.55	0.010	9929918
Dissolved Nitrate (N)	mg/L	<0.050 (2)	0.050	9929918	0.43	0.010	9929918
Elements							
Dissolved Calcium (Ca)	mg/L	400	0.30	9932617	160	0.30	9932287
Dissolved Iron (Fe)	mg/L	25	0.060	9932617	7.7	0.060	9932287
Dissolved Magnesium (Mg)	mg/L	240	0.20	9932617	25	0.20	9932287
Dissolved Manganese (Mn)	mg/L	6.0	0.0040	9932617	6.7	0.0040	9932287
Dissolved Potassium (K)	mg/L	130	0.30	9932617	5.1	0.30	9932287
Dissolved Sodium (Na)	mg/L	3400 (1)	5.0	9932617	8.4	0.50	9932287

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.
(2) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

RESULTS OF CHEMICAL ANALYSES OF GROUND WATER

BV Labs ID		YC6485			YC6486		
Sampling Date		2020/07/17			2020/07/17		
COC Number		26357			26357		
	UNITS	CAM_GW_SNP_7A_2020_01	RDL	QC Batch	CAM_GW_SNP_7B_2020_01	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	744	0.50	9928639	484	0.50	9928639
Misc. Inorganics							
Total Organic Carbon (C)	mg/L	19 (1)	2.0	9935700	13 (1)	2.0	9935700
Total Dissolved Solids	mg/L	1100	10	9931774	640	10	9931774
Total Suspended Solids	mg/L	55 (2)	1.5	9933836	25	1.0	9933836
Nutrients							
Total Ammonia (N)	mg/L	1.4	0.015	9934543	0.71	0.015	9934551
Orthophosphate (P)	mg/L	0.0030	0.0030	9929928	<0.0030	0.0030	9929928
Total Phosphorus (P)	mg/L	0.073	0.0030	9934286	0.019	0.0030	9934286

RDL = Reportable Detection Limit
(1) Detection limits raised due to sample matrix.
(2) Detection limit raised based on sample volume used for analysis.

BV Labs ID		YC6487			YC6488	YC6488		
Sampling Date		2020/07/17			2020/07/17	2020/07/17		
COC Number		26357			26357	26357		
	UNITS	CAM_GW_SNP_7C_2020_01	RDL	QC Batch	CAM_GW_SNP_7D_2020_01	CAM_GW_SNP_7D_2020_01 Lab-Dup	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO3)	mg/L	415	0.50	9928639	228	N/A	0.50	9928639
Misc. Inorganics								
Total Organic Carbon (C)	mg/L	15	0.50	9935380	4.1 (1)	N/A	2.0	9935700
Total Dissolved Solids	mg/L	490 (2)	17	9931774	270	N/A	10	9931774
Total Suspended Solids	mg/L	55 (2)	1.5	9933836	7.9	N/A	1.0	9933836
Nutrients								
Total Ammonia (N)	mg/L	0.20	0.015	9934551	0.093	N/A	0.015	9934551
Orthophosphate (P)	mg/L	0.0030	0.0030	9929928	<0.0030	N/A	0.0030	9929928
Total Phosphorus (P)	mg/L	0.17	0.0030	9934286	0.044	0.041	0.0030	9934286

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.
(2) Detection limit raised based on sample volume used for analysis.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

RESULTS OF CHEMICAL ANALYSES OF GROUND WATER

BV Labs ID		YC6489			YC6490		
Sampling Date		2020/07/17			2020/07/17		
COC Number		26357			26357		
	UNITS	CAM_GW_MW2_2020_01	RDL	QC Batch	DUP1_GW_2020_01	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	1820	0.50	9928639	475	0.50	9928639
Misc. Inorganics							
Total Organic Carbon (C)	mg/L	20	0.50	9935380	13	0.50	9932885
Total Dissolved Solids	mg/L	9200 (1)	13	9931774	690	10	9931774
Total Suspended Solids	mg/L	200 (1)	1.5	9933836	24	1.0	9933836
Nutrients							
Total Ammonia (N)	mg/L	8.1 (2)	0.075	9934551	0.70	0.015	9934551
Orthophosphate (P)	mg/L	0.0050	0.0030	9929928	<0.0030	0.0030	9929928
Total Phosphorus (P)	mg/L	0.25	0.0030	9934286	0.020	0.0030	9934286

RDL = Reportable Detection Limit
(1) Detection limit raised based on sample volume used for analysis.
(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YC6485		YC6486		YC6487		
Sampling Date		2020/07/17		2020/07/17		2020/07/17		
COC Number		26357		26357		26357		
	UNITS	CAM_GW_SNP_7A_2020_01	RDL	CAM_GW_SNP_7B_2020_01	RDL	CAM_GW_SNP_7C_2020_01	RDL	QC Batch
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	62.2	3.0	122	6.0	130	3.0	9931957
Total Antimony (Sb)	ug/L	<0.50	0.50	<1.0	1.0	0.73	0.50	9931957
Total Arsenic (As)	ug/L	14.0	0.10	12.0	0.20	42.6	0.10	9931957
Total Barium (Ba)	ug/L	315	1.0	50.2	2.0	81.3	1.0	9931957
Total Beryllium (Be)	ug/L	<0.10	0.10	<0.20	0.20	<0.10	0.10	9931957
Total Bismuth (Bi)	ug/L	<1.0	1.0	<2.0	2.0	<1.0	1.0	9931957
Total Boron (B)	ug/L	76	50	<100	100	61	50	9931957
Total Cadmium (Cd)	ug/L	0.024	0.010	0.045	0.020	0.336	0.010	9931957
Total Cesium (Cs)	ug/L	<0.20	0.20	<0.40	0.40	<0.20	0.20	9931957
Total Chromium (Cr)	ug/L	1.3	1.0	<2.0	2.0	1.6	1.0	9931957
Total Cobalt (Co)	ug/L	10.7	0.20	11.5	0.40	8.45	0.20	9931957
Total Copper (Cu)	ug/L	1.46	0.50	4.6	1.0	1.57	0.50	9931957
Total Iron (Fe)	ug/L	18500	10	8370	20	20300	10	9931957
Total Lead (Pb)	ug/L	0.31	0.20	<0.40	0.40	1.06	0.20	9931957
Total Lithium (Li)	ug/L	16.0	2.0	<4.0	4.0	3.8	2.0	9931957
Total Manganese (Mn)	ug/L	4050	1.0	6300	2.0	2630	1.0	9931957
Total Mercury (Hg)	ug/L	<0.050	0.050	<0.10	0.10	<0.050	0.050	9931957
Total Molybdenum (Mo)	ug/L	3.2	1.0	<2.0	2.0	9.8	1.0	9931957
Total Nickel (Ni)	ug/L	4.1	1.0	25.4	2.0	6.6	1.0	9931957
Total Selenium (Se)	ug/L	0.17	0.10	<0.20	0.20	0.30	0.10	9931957
Total Silicon (Si)	ug/L	7790	100	6940	200	8510	100	9931957
Total Silver (Ag)	ug/L	0.021	0.020	<0.040	0.040	0.061	0.020	9931957
Total Strontium (Sr)	ug/L	1320	1.0	472	2.0	760	1.0	9931957
Total Thallium (Tl)	ug/L	<0.010	0.010	<0.020	0.020	<0.010	0.010	9931957
Total Tin (Sn)	ug/L	<5.0	5.0	<10	10	<5.0	5.0	9931957
Total Titanium (Ti)	ug/L	<5.0	5.0	<10	10	<5.0	5.0	9931957
Total Uranium (U)	ug/L	7.44	0.10	1.11	0.20	2.48	0.10	9931957
Total Vanadium (V)	ug/L	<5.0	5.0	<10	10	<5.0	5.0	9931957
Total Zinc (Zn)	ug/L	5.7	5.0	<10	10	<5.0	5.0	9931957
Total Zirconium (Zr)	ug/L	2.79	0.10	0.38	0.20	0.74	0.10	9931957
Total Calcium (Ca)	mg/L	213	0.050	155	0.10	129	0.050	9929032
Total Magnesium (Mg)	mg/L	51.9	0.050	23.8	0.10	22.6	0.050	9929032

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YC6485		YC6486		YC6487		
Sampling Date		2020/07/17		2020/07/17		2020/07/17		
COC Number		26357		26357		26357		
	UNITS	CAM_GW_SNP_7A_2020_01	RDL	CAM_GW_SNP_7B_2020_01	RDL	CAM_GW_SNP_7C_2020_01	RDL	QC Batch
Total Potassium (K)	mg/L	17.6	0.050	4.99	0.10	10.1	0.050	9929032
Total Sodium (Na)	mg/L	73.3	0.050	7.86	0.10	29.9	0.050	9929032
Total Sulphur (S)	mg/L	113	3.0	107	6.0	41.4	3.0	9929032
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YC6488		YC6489		YC6490		
Sampling Date		2020/07/17		2020/07/17		2020/07/17		
COC Number		26357		26357		26357		
	UNITS	CAM_GW_SNP_7D_2020_01	RDL	CAM_GW_MW2_2020_01	RDL	DUP1_GW_2020_01	RDL	QC Batch
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	93.8	3.0	5420	30	119	3.0	9931957
Total Antimony (Sb)	ug/L	0.91	0.50	<5.0	5.0	<0.50	0.50	9931957
Total Arsenic (As)	ug/L	11.6	0.10	52.5	1.0	11.5	0.10	9931957
Total Barium (Ba)	ug/L	29.4	1.0	63	10	51.1	1.0	9931957
Total Beryllium (Be)	ug/L	<0.10	0.10	<1.0	1.0	<0.10	0.10	9931957
Total Bismuth (Bi)	ug/L	<1.0	1.0	<10	10	<1.0	1.0	9931957
Total Boron (B)	ug/L	<50	50	<500	500	<50	50	9931957
Total Cadmium (Cd)	ug/L	0.048	0.010	1.62	0.10	0.038	0.010	9931957
Total Cesium (Cs)	ug/L	<0.20	0.20	<2.0	2.0	<0.20	0.20	9931957
Total Chromium (Cr)	ug/L	1.3	1.0	20	10	1.7	1.0	9931957
Total Cobalt (Co)	ug/L	2.65	0.20	145	2.0	11.6	0.20	9931957
Total Copper (Cu)	ug/L	1.89	0.50	9.7	5.0	3.28	0.50	9931957
Total Iron (Fe)	ug/L	909	10	38400	100	8030	10	9931957
Total Lead (Pb)	ug/L	0.64	0.20	13.3	2.0	0.36	0.20	9931957
Total Lithium (Li)	ug/L	<2.0	2.0	49	20	3.0	2.0	9931957
Total Manganese (Mn)	ug/L	983	1.0	4820	10	6160	1.0	9931957
Total Mercury (Hg)	ug/L	<0.050	0.050	<0.50	0.50	<0.050	0.050	9931957
Total Molybdenum (Mo)	ug/L	2.3	1.0	11	10	1.4	1.0	9931957
Total Nickel (Ni)	ug/L	4.7	1.0	455	10	24.7	1.0	9931957
Total Selenium (Se)	ug/L	0.22	0.10	4.6	1.0	0.14	0.10	9931957
Total Silicon (Si)	ug/L	4250	100	15400	1000	6680	100	9931957
Total Silver (Ag)	ug/L	<0.020	0.020	<0.20	0.20	<0.020	0.020	9931957
Total Strontium (Sr)	ug/L	267	1.0	4020	10	473	1.0	9931957
Total Thallium (Tl)	ug/L	0.012	0.010	0.17	0.10	<0.010	0.010	9931957
Total Tin (Sn)	ug/L	<5.0	5.0	<50	50	<5.0	5.0	9931957
Total Titanium (Ti)	ug/L	<5.0	5.0	62	50	<5.0	5.0	9931957
Total Uranium (U)	ug/L	2.65	0.10	34.4	1.0	1.13	0.10	9931957
Total Vanadium (V)	ug/L	<5.0	5.0	<50	50	<5.0	5.0	9931957
Total Zinc (Zn)	ug/L	5.0	5.0	704	50	5.3	5.0	9931957
Total Zirconium (Zr)	ug/L	0.16	0.10	4.3	1.0	0.33	0.10	9931957
Total Calcium (Ca)	mg/L	77.0	0.050	372	0.50	152	0.050	9929032
Total Magnesium (Mg)	mg/L	8.68	0.050	217	0.50	23.2	0.050	9929032

RDL = Reportable Detection Limit

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YC6488		YC6489		YC6490		
Sampling Date		2020/07/17		2020/07/17		2020/07/17		
COC Number		26357		26357		26357		
	UNITS	CAM_GW_SNP_7D_2020_01	RDL	CAM_GW_MW2_2020_01	RDL	DUP1_GW_2020_01	RDL	QC Batch
Total Potassium (K)	mg/L	1.98	0.050	114	0.50	4.91	0.050	9929032
Total Sodium (Na)	mg/L	2.91	0.050	2950	0.50	7.83	0.050	9929032
Total Sulphur (S)	mg/L	23.8	3.0	2350	30	106	3.0	9929032
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YC6490		
Sampling Date		2020/07/17		
COC Number		26357		
	UNITS	DUP1_GW_2020_01 Lab-Dup	RDL	QC Batch
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	121	3.0	9931957
Total Antimony (Sb)	ug/L	<0.50	0.50	9931957
Total Arsenic (As)	ug/L	11.5	0.10	9931957
Total Barium (Ba)	ug/L	49.9	1.0	9931957
Total Beryllium (Be)	ug/L	<0.10	0.10	9931957
Total Bismuth (Bi)	ug/L	<1.0	1.0	9931957
Total Boron (B)	ug/L	<50	50	9931957
Total Cadmium (Cd)	ug/L	0.034	0.010	9931957
Total Cesium (Cs)	ug/L	<0.20	0.20	9931957
Total Chromium (Cr)	ug/L	1.6	1.0	9931957
Total Cobalt (Co)	ug/L	11.6	0.20	9931957
Total Copper (Cu)	ug/L	3.29	0.50	9931957
Total Iron (Fe)	ug/L	8010	10	9931957
Total Lead (Pb)	ug/L	0.36	0.20	9931957
Total Lithium (Li)	ug/L	2.9	2.0	9931957
Total Manganese (Mn)	ug/L	6180	1.0	9931957
Total Mercury (Hg)	ug/L	<0.050	0.050	9931957
Total Molybdenum (Mo)	ug/L	1.4	1.0	9931957
Total Nickel (Ni)	ug/L	24.7	1.0	9931957
Total Selenium (Se)	ug/L	0.12	0.10	9931957
Total Silicon (Si)	ug/L	6780	100	9931957
Total Silver (Ag)	ug/L	<0.020	0.020	9931957
Total Strontium (Sr)	ug/L	470	1.0	9931957
Total Thallium (Tl)	ug/L	<0.010	0.010	9931957
Total Tin (Sn)	ug/L	<5.0	5.0	9931957
Total Titanium (Ti)	ug/L	<5.0	5.0	9931957
Total Uranium (U)	ug/L	1.13	0.10	9931957
Total Vanadium (V)	ug/L	<5.0	5.0	9931957
Total Zinc (Zn)	ug/L	5.4	5.0	9931957
Total Zirconium (Zr)	ug/L	0.35	0.10	9931957

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
Package 2	6.5°C
Package 3	5.1°C

Version 2: Lodestar EDD included. No change to data.

Version 3: Select samples included in report as per client request received 2020/10/27.

Sample YC6485 [CAM_GW_SNP_7A_2020_01] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YC6486 [CAM_GW_SNP_7B_2020_01] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YC6487 [CAM_GW_SNP_7C_2020_01] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YC6488 [CAM_GW_SNP_7D_2020_01] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YC6489 [CAM_GW_MW2_2020_01] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YC6490 [DUP1_GW_2020_01] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER) Comments

Sample YC6486 [CAM_GW_SNP_7B_2020_01] Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required.
Sample YC6489 [CAM_GW_MW2_2020_01] Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9929072	VP4	Matrix Spike	O-TERPHENYL (sur.)	2020/07/22		123	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2020/07/22		121	%	60 - 140
9929072	VP4	Spiked Blank	O-TERPHENYL (sur.)	2020/07/22		110	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2020/07/22		101	%	60 - 140
9929072	VP4	Method Blank	O-TERPHENYL (sur.)	2020/07/22		114	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2020/07/22	<0.10		mg/L	
9929072	VP4	RPD [YC6502-03]	F2 (C10-C16 Hydrocarbons)	2020/07/22	NC		%	30
9929376	DO1	Matrix Spike [YC6486-02]	1,4-Difluorobenzene (sur.)	2020/07/23		101	%	50 - 140
			4-Bromofluorobenzene (sur.)	2020/07/23		100	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2020/07/23		89	%	50 - 140
			Benzene	2020/07/23		97	%	50 - 140
			Toluene	2020/07/23		93	%	50 - 140
			Ethylbenzene	2020/07/23		93	%	50 - 140
			m & p-Xylene	2020/07/23		96	%	50 - 140
			o-Xylene	2020/07/23		97	%	50 - 140
			F1 (C6-C10)	2020/07/23		71	%	60 - 140
9929376	DO1	Spiked Blank	1,4-Difluorobenzene (sur.)	2020/07/23		100	%	50 - 140
			4-Bromofluorobenzene (sur.)	2020/07/23		100	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2020/07/23		88	%	50 - 140
			Benzene	2020/07/23		91	%	60 - 130
			Toluene	2020/07/23		88	%	60 - 130
			Ethylbenzene	2020/07/23		88	%	60 - 130
			m & p-Xylene	2020/07/23		91	%	60 - 130
			o-Xylene	2020/07/23		92	%	60 - 130
			F1 (C6-C10)	2020/07/23		81	%	60 - 140
9929376	DO1	Method Blank	1,4-Difluorobenzene (sur.)	2020/07/23		103	%	50 - 140
			4-Bromofluorobenzene (sur.)	2020/07/23		96	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2020/07/23		89	%	50 - 140
			Benzene	2020/07/23	<0.40		ug/L	
			Toluene	2020/07/23	<0.40		ug/L	
			Ethylbenzene	2020/07/23	<0.40		ug/L	
			m & p-Xylene	2020/07/23	<0.80		ug/L	
			o-Xylene	2020/07/23	<0.40		ug/L	
			F1 (C6-C10)	2020/07/23	<100		ug/L	
9929376	DO1	RPD [YC6485-02]	Benzene	2020/07/23	NC		%	30
			Toluene	2020/07/23	NC		%	30
			Ethylbenzene	2020/07/23	NC		%	30
			m & p-Xylene	2020/07/23	NC		%	30
			o-Xylene	2020/07/23	NC		%	30
			F1 (C6-C10)	2020/07/23	NC		%	30
9929918	KD9	Matrix Spike	Dissolved Nitrite (N)	2020/07/21		103	%	80 - 120
			Dissolved Nitrate (N)	2020/07/21		101	%	80 - 120
9929918	KD9	Spiked Blank	Dissolved Nitrite (N)	2020/07/21		104	%	80 - 120
			Dissolved Nitrate (N)	2020/07/21		101	%	80 - 120
9929918	KD9	Method Blank	Dissolved Nitrite (N)	2020/07/21	<0.010		mg/L	
			Dissolved Nitrate (N)	2020/07/21	<0.010		mg/L	
9929918	KD9	RPD	Dissolved Nitrite (N)	2020/07/21	NC		%	20
			Dissolved Nitrate (N)	2020/07/21	0.13		%	20
9929928	ZI	Matrix Spike	Orthophosphate (P)	2020/07/21		98	%	80 - 120
9929928	ZI	Spiked Blank	Orthophosphate (P)	2020/07/21		100	%	80 - 120
9929928	ZI	Method Blank	Orthophosphate (P)	2020/07/21	<0.0030		mg/L	
9929928	ZI	RPD	Orthophosphate (P)	2020/07/21	NC		%	20
9930058	CCQ	Matrix Spike	Dissolved Chloride (Cl)	2020/07/21		NC	%	80 - 120

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Sulphate (SO4)	2020/07/21		NC	%	80 - 120
9930058	CCQ	Spiked Blank	Dissolved Chloride (Cl)	2020/07/21		109	%	80 - 120
			Dissolved Sulphate (SO4)	2020/07/21		101	%	80 - 120
9930058	CCQ	Method Blank	Dissolved Chloride (Cl)	2020/07/21	<1.0		mg/L	
			Dissolved Sulphate (SO4)	2020/07/21	<1.0		mg/L	
9930058	CCQ	RPD	Dissolved Chloride (Cl)	2020/07/21	0.073 (1)		%	20
			Dissolved Sulphate (SO4)	2020/07/21	0.73		%	20
9931774	AP1	Matrix Spike	Total Dissolved Solids	2020/07/23		98	%	80 - 120
9931774	AP1	Spiked Blank	Total Dissolved Solids	2020/07/23		87	%	80 - 120
9931774	AP1	Method Blank	Total Dissolved Solids	2020/07/23	<10		mg/L	
9931774	AP1	RPD	Total Dissolved Solids	2020/07/23	7.4		%	20
9931957	AA1	Matrix Spike [YC6490-04]	Total Aluminum (Al)	2020/07/23		100	%	80 - 120
			Total Antimony (Sb)	2020/07/23		101	%	80 - 120
			Total Arsenic (As)	2020/07/23		107	%	80 - 120
			Total Barium (Ba)	2020/07/23		NC	%	80 - 120
			Total Beryllium (Be)	2020/07/23		96	%	80 - 120
			Total Bismuth (Bi)	2020/07/23		86	%	80 - 120
			Total Boron (B)	2020/07/23		101	%	80 - 120
			Total Cadmium (Cd)	2020/07/23		98	%	80 - 120
			Total Cesium (Cs)	2020/07/23		98	%	80 - 120
			Total Chromium (Cr)	2020/07/23		98	%	80 - 120
			Total Cobalt (Co)	2020/07/23		95	%	80 - 120
			Total Copper (Cu)	2020/07/23		90	%	80 - 120
			Total Iron (Fe)	2020/07/23		NC	%	80 - 120
			Total Lead (Pb)	2020/07/23		95	%	80 - 120
			Total Lithium (Li)	2020/07/23		96	%	80 - 120
			Total Manganese (Mn)	2020/07/23		NC	%	80 - 120
			Total Mercury (Hg)	2020/07/23		100	%	80 - 120
			Total Molybdenum (Mo)	2020/07/23		111	%	80 - 120
			Total Nickel (Ni)	2020/07/23		90	%	80 - 120
			Total Selenium (Se)	2020/07/23		106	%	80 - 120
			Total Silicon (Si)	2020/07/23		NC	%	80 - 120
			Total Silver (Ag)	2020/07/23		95	%	80 - 120
			Total Strontium (Sr)	2020/07/23		NC	%	80 - 120
			Total Thallium (Tl)	2020/07/23		100	%	80 - 120
			Total Tin (Sn)	2020/07/23		100	%	80 - 120
			Total Titanium (Ti)	2020/07/23		102	%	80 - 120
			Total Uranium (U)	2020/07/23		105	%	80 - 120
			Total Vanadium (V)	2020/07/23		102	%	80 - 120
			Total Zinc (Zn)	2020/07/23		87	%	80 - 120
			Total Zirconium (Zr)	2020/07/23		112	%	80 - 120
9931957	AA1	Spiked Blank	Total Aluminum (Al)	2020/07/23		101	%	80 - 120
			Total Antimony (Sb)	2020/07/23		103	%	80 - 120
			Total Arsenic (As)	2020/07/23		102	%	80 - 120
			Total Barium (Ba)	2020/07/23		101	%	80 - 120
			Total Beryllium (Be)	2020/07/23		99	%	80 - 120
			Total Bismuth (Bi)	2020/07/23		95	%	80 - 120
			Total Boron (B)	2020/07/23		104	%	80 - 120
			Total Cadmium (Cd)	2020/07/23		101	%	80 - 120
			Total Cesium (Cs)	2020/07/23		97	%	80 - 120
			Total Chromium (Cr)	2020/07/23		101	%	80 - 120
			Total Cobalt (Co)	2020/07/23		101	%	80 - 120
			Total Copper (Cu)	2020/07/23		100	%	80 - 120

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Iron (Fe)	2020/07/23		103	%	80 - 120
			Total Lead (Pb)	2020/07/23		100	%	80 - 120
			Total Lithium (Li)	2020/07/23		98	%	80 - 120
			Total Manganese (Mn)	2020/07/23		100	%	80 - 120
			Total Mercury (Hg)	2020/07/23		101	%	80 - 120
			Total Molybdenum (Mo)	2020/07/23		105	%	80 - 120
			Total Nickel (Ni)	2020/07/23		100	%	80 - 120
			Total Selenium (Se)	2020/07/23		100	%	80 - 120
			Total Silicon (Si)	2020/07/23		103	%	80 - 120
			Total Silver (Ag)	2020/07/23		100	%	80 - 120
			Total Strontium (Sr)	2020/07/23		101	%	80 - 120
			Total Thallium (Tl)	2020/07/23		100	%	80 - 120
			Total Tin (Sn)	2020/07/23		98	%	80 - 120
			Total Titanium (Ti)	2020/07/23		102	%	80 - 120
			Total Uranium (U)	2020/07/23		103	%	80 - 120
			Total Vanadium (V)	2020/07/23		102	%	80 - 120
			Total Zinc (Zn)	2020/07/23		101	%	80 - 120
			Total Zirconium (Zr)	2020/07/23		101	%	80 - 120
9931957	AA1	Method Blank	Total Aluminum (Al)	2020/07/23	<3.0		ug/L	
			Total Antimony (Sb)	2020/07/23	<0.50		ug/L	
			Total Arsenic (As)	2020/07/23	<0.10		ug/L	
			Total Barium (Ba)	2020/07/23	<1.0		ug/L	
			Total Beryllium (Be)	2020/07/23	<0.10		ug/L	
			Total Bismuth (Bi)	2020/07/23	<1.0		ug/L	
			Total Boron (B)	2020/07/23	<50		ug/L	
			Total Cadmium (Cd)	2020/07/23	<0.010		ug/L	
			Total Cesium (Cs)	2020/07/23	<0.20		ug/L	
			Total Chromium (Cr)	2020/07/23	<1.0		ug/L	
			Total Cobalt (Co)	2020/07/23	<0.20		ug/L	
			Total Copper (Cu)	2020/07/23	<0.50		ug/L	
			Total Iron (Fe)	2020/07/23	<10		ug/L	
			Total Lead (Pb)	2020/07/23	<0.20		ug/L	
			Total Lithium (Li)	2020/07/23	<2.0		ug/L	
			Total Manganese (Mn)	2020/07/23	<1.0		ug/L	
			Total Mercury (Hg)	2020/07/23	<0.050		ug/L	
			Total Molybdenum (Mo)	2020/07/23	<1.0		ug/L	
			Total Nickel (Ni)	2020/07/23	<1.0		ug/L	
			Total Selenium (Se)	2020/07/23	<0.10		ug/L	
			Total Silicon (Si)	2020/07/23	<100		ug/L	
			Total Silver (Ag)	2020/07/23	<0.020		ug/L	
			Total Strontium (Sr)	2020/07/23	<1.0		ug/L	
			Total Thallium (Tl)	2020/07/23	<0.010		ug/L	
			Total Tin (Sn)	2020/07/23	<5.0		ug/L	
			Total Titanium (Ti)	2020/07/23	<5.0		ug/L	
			Total Uranium (U)	2020/07/23	<0.10		ug/L	
			Total Vanadium (V)	2020/07/23	<5.0		ug/L	
			Total Zinc (Zn)	2020/07/23	<5.0		ug/L	
			Total Zirconium (Zr)	2020/07/23	<0.10		ug/L	
9931957	AA1	RPD [YC6490-04]	Total Aluminum (Al)	2020/07/23	1.5		%	20
			Total Antimony (Sb)	2020/07/23	NC		%	20
			Total Arsenic (As)	2020/07/23	0.11		%	20
			Total Barium (Ba)	2020/07/23	2.4		%	20
			Total Beryllium (Be)	2020/07/23	NC		%	20

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Bismuth (Bi)	2020/07/23	NC		%	20
			Total Boron (B)	2020/07/23	NC		%	20
			Total Cadmium (Cd)	2020/07/23	11		%	20
			Total Cesium (Cs)	2020/07/23	NC		%	20
			Total Chromium (Cr)	2020/07/23	6.1		%	20
			Total Cobalt (Co)	2020/07/23	0.22		%	20
			Total Copper (Cu)	2020/07/23	0.26		%	20
			Total Iron (Fe)	2020/07/23	0.14		%	20
			Total Lead (Pb)	2020/07/23	0.59		%	20
			Total Lithium (Li)	2020/07/23	2.9		%	20
			Total Manganese (Mn)	2020/07/23	0.33		%	20
			Total Mercury (Hg)	2020/07/23	NC		%	20
			Total Molybdenum (Mo)	2020/07/23	2.7		%	20
			Total Nickel (Ni)	2020/07/23	0.23		%	20
			Total Selenium (Se)	2020/07/23	9.7		%	20
			Total Silicon (Si)	2020/07/23	1.5		%	20
			Total Silver (Ag)	2020/07/23	NC		%	20
			Total Strontium (Sr)	2020/07/23	0.68		%	20
			Total Thallium (Tl)	2020/07/23	NC		%	20
			Total Tin (Sn)	2020/07/23	NC		%	20
			Total Titanium (Ti)	2020/07/23	NC		%	20
			Total Uranium (U)	2020/07/23	0.20		%	20
			Total Vanadium (V)	2020/07/23	NC		%	20
			Total Zinc (Zn)	2020/07/23	3.0		%	20
			Total Zirconium (Zr)	2020/07/23	4.6		%	20
9932287	MAP	Matrix Spike	Dissolved Calcium (Ca)	2020/07/23		NC	%	80 - 120
			Dissolved Iron (Fe)	2020/07/23		102	%	80 - 120
			Dissolved Magnesium (Mg)	2020/07/23		95	%	80 - 120
			Dissolved Manganese (Mn)	2020/07/23		102	%	80 - 120
			Dissolved Potassium (K)	2020/07/23		99	%	80 - 120
			Dissolved Sodium (Na)	2020/07/23		98	%	80 - 120
9932287	MAP	Spiked Blank	Dissolved Calcium (Ca)	2020/07/23		97	%	80 - 120
			Dissolved Iron (Fe)	2020/07/23		102	%	80 - 120
			Dissolved Magnesium (Mg)	2020/07/23		99	%	80 - 120
			Dissolved Manganese (Mn)	2020/07/23		101	%	80 - 120
			Dissolved Potassium (K)	2020/07/23		100	%	80 - 120
			Dissolved Sodium (Na)	2020/07/23		101	%	80 - 120
9932287	MAP	Method Blank	Dissolved Calcium (Ca)	2020/07/23	<0.30		mg/L	
			Dissolved Iron (Fe)	2020/07/23	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2020/07/23	<0.20		mg/L	
			Dissolved Manganese (Mn)	2020/07/23	<0.0040		mg/L	
			Dissolved Potassium (K)	2020/07/23	<0.30		mg/L	
			Dissolved Sodium (Na)	2020/07/23	<0.50		mg/L	
9932287	MAP	RPD	Dissolved Calcium (Ca)	2020/07/23	0.54		%	20
			Dissolved Iron (Fe)	2020/07/23	0.67		%	20
			Dissolved Magnesium (Mg)	2020/07/23	0.35		%	20
			Dissolved Manganese (Mn)	2020/07/23	0.18		%	20
			Dissolved Potassium (K)	2020/07/23	1.4		%	20
			Dissolved Sodium (Na)	2020/07/23	0.66		%	20
9932298	MAP	Matrix Spike [YC6487-08]	Dissolved Calcium (Ca)	2020/07/23		NC	%	80 - 120
			Dissolved Iron (Fe)	2020/07/23		NC	%	80 - 120
			Dissolved Magnesium (Mg)	2020/07/23		98	%	80 - 120
			Dissolved Manganese (Mn)	2020/07/23		NC	%	80 - 120

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Potassium (K)	2020/07/23		101	%	80 - 120
			Dissolved Sodium (Na)	2020/07/23		99	%	80 - 120
9932298	MAP	Spiked Blank	Dissolved Calcium (Ca)	2020/07/23		99	%	80 - 120
			Dissolved Iron (Fe)	2020/07/23		109	%	80 - 120
			Dissolved Magnesium (Mg)	2020/07/23		100	%	80 - 120
			Dissolved Manganese (Mn)	2020/07/23		103	%	80 - 120
			Dissolved Potassium (K)	2020/07/23		101	%	80 - 120
			Dissolved Sodium (Na)	2020/07/23		103	%	80 - 120
9932298	MAP	Method Blank	Dissolved Calcium (Ca)	2020/07/23	<0.30		mg/L	
			Dissolved Iron (Fe)	2020/07/23	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2020/07/23	<0.20		mg/L	
			Dissolved Manganese (Mn)	2020/07/23	<0.0040		mg/L	
			Dissolved Potassium (K)	2020/07/23	<0.30		mg/L	
			Dissolved Sodium (Na)	2020/07/23	<0.50		mg/L	
9932298	MAP	RPD [YC6487-08]	Dissolved Calcium (Ca)	2020/07/23	0.19		%	20
			Dissolved Iron (Fe)	2020/07/23	0.54		%	20
			Dissolved Magnesium (Mg)	2020/07/23	0.35		%	20
			Dissolved Manganese (Mn)	2020/07/23	0.31		%	20
			Dissolved Potassium (K)	2020/07/23	0.18		%	20
			Dissolved Sodium (Na)	2020/07/23	0.37		%	20
9932617	MAP	Matrix Spike [YC6496-07]	Dissolved Calcium (Ca)	2020/07/23		97	%	80 - 120
			Dissolved Iron (Fe)	2020/07/23		103	%	80 - 120
			Dissolved Magnesium (Mg)	2020/07/23		99	%	80 - 120
			Dissolved Manganese (Mn)	2020/07/23		104	%	80 - 120
			Dissolved Potassium (K)	2020/07/23		99	%	80 - 120
			Dissolved Sodium (Na)	2020/07/23		98	%	80 - 120
9932617	MAP	Spiked Blank	Dissolved Calcium (Ca)	2020/07/23		98	%	80 - 120
			Dissolved Iron (Fe)	2020/07/23		101	%	80 - 120
			Dissolved Magnesium (Mg)	2020/07/23		99	%	80 - 120
			Dissolved Manganese (Mn)	2020/07/23		100	%	80 - 120
			Dissolved Potassium (K)	2020/07/23		101	%	80 - 120
			Dissolved Sodium (Na)	2020/07/23		102	%	80 - 120
9932617	MAP	Method Blank	Dissolved Calcium (Ca)	2020/07/23	<0.30		mg/L	
			Dissolved Iron (Fe)	2020/07/23	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2020/07/23	<0.20		mg/L	
			Dissolved Manganese (Mn)	2020/07/23	<0.0040		mg/L	
			Dissolved Potassium (K)	2020/07/23	<0.30		mg/L	
			Dissolved Sodium (Na)	2020/07/23	<0.50		mg/L	
9932617	MAP	RPD [YC6496-07]	Dissolved Calcium (Ca)	2020/07/23	0.44		%	20
			Dissolved Iron (Fe)	2020/07/23	NC		%	20
			Dissolved Magnesium (Mg)	2020/07/23	0.44		%	20
			Dissolved Manganese (Mn)	2020/07/23	NC		%	20
			Dissolved Potassium (K)	2020/07/23	0.71		%	20
			Dissolved Sodium (Na)	2020/07/23	0.68		%	20
9932779	JLD	Spiked Blank	Alkalinity (Total as CaCO3)	2020/07/24		92	%	80 - 120
9932779	JLD	Method Blank	Alkalinity (PP as CaCO3)	2020/07/24	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2020/07/24	<1.0		mg/L	
			Bicarbonate (HCO3)	2020/07/24	<1.0		mg/L	
			Carbonate (CO3)	2020/07/24	<1.0		mg/L	
			Hydroxide (OH)	2020/07/24	<1.0		mg/L	
9932779	JLD	RPD	Alkalinity (PP as CaCO3)	2020/07/24	NC		%	20
			Alkalinity (Total as CaCO3)	2020/07/24	4.1		%	20
			Bicarbonate (HCO3)	2020/07/24	4.1		%	20

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Carbonate (CO3)	2020/07/24	NC		%	20
			Hydroxide (OH)	2020/07/24	NC		%	20
9932781	JLD	Spiked Blank	pH	2020/07/24		99	%	97 - 103
9932781	JLD	RPD	pH	2020/07/24	0.30		%	N/A
9932785	JLD	Spiked Blank	Conductivity	2020/07/24		100	%	90 - 110
9932785	JLD	Method Blank	Conductivity	2020/07/24	<2.0		uS/cm	
9932785	JLD	RPD	Conductivity	2020/07/24	0.38		%	10
9932786	JLD	Spiked Blank	Alkalinity (Total as CaCO3)	2020/07/24		91	%	80 - 120
9932786	JLD	Method Blank	Alkalinity (PP as CaCO3)	2020/07/24	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2020/07/24	<1.0		mg/L	
			Bicarbonate (HCO3)	2020/07/24	<1.0		mg/L	
			Carbonate (CO3)	2020/07/24	<1.0		mg/L	
			Hydroxide (OH)	2020/07/24	<1.0		mg/L	
9932786	JLD	RPD	Alkalinity (PP as CaCO3)	2020/07/24	NC		%	20
			Alkalinity (Total as CaCO3)	2020/07/24	3.9		%	20
			Bicarbonate (HCO3)	2020/07/24	3.9		%	20
			Carbonate (CO3)	2020/07/24	NC		%	20
			Hydroxide (OH)	2020/07/24	NC		%	20
9932787	JLD	Spiked Blank	pH	2020/07/24		99	%	97 - 103
9932787	JLD	RPD	pH	2020/07/24	0.73		%	N/A
9932789	JLD	Spiked Blank	Conductivity	2020/07/24		100	%	90 - 110
9932789	JLD	Method Blank	Conductivity	2020/07/24	<2.0		uS/cm	
9932789	JLD	RPD	Conductivity	2020/07/24	0.097		%	10
9932885	NMA	Matrix Spike	Total Organic Carbon (C)	2020/07/24		113	%	80 - 120
9932885	NMA	Spiked Blank	Total Organic Carbon (C)	2020/07/24		108	%	80 - 120
9932885	NMA	Method Blank	Total Organic Carbon (C)	2020/07/24	<0.50		mg/L	
9932885	NMA	RPD	Total Organic Carbon (C)	2020/07/24	NC		%	20
9933836	HE1	Matrix Spike	Total Suspended Solids	2020/07/24		101	%	80 - 120
9933836	HE1	Spiked Blank	Total Suspended Solids	2020/07/24		100	%	80 - 120
9933836	HE1	Method Blank	Total Suspended Solids	2020/07/24	<1.0		mg/L	
9933836	HE1	RPD	Total Suspended Solids	2020/07/24	1.1		%	20
9934286	FM0	Matrix Spike [YC6488-07]	Total Phosphorus (P)	2020/07/25		105	%	80 - 120
9934286	FM0	QC Standard	Total Phosphorus (P)	2020/07/25		96	%	80 - 120
9934286	FM0	Spiked Blank	Total Phosphorus (P)	2020/07/25		88	%	80 - 120
9934286	FM0	Method Blank	Total Phosphorus (P)	2020/07/25	<0.0030		mg/L	
9934286	FM0	RPD [YC6488-07]	Total Phosphorus (P)	2020/07/25	6.9		%	20
9934543	NR	Matrix Spike	Total Ammonia (N)	2020/07/24		91	%	80 - 120
9934543	NR	Spiked Blank	Total Ammonia (N)	2020/07/24		100	%	80 - 120
9934543	NR	Method Blank	Total Ammonia (N)	2020/07/24	<0.015		mg/L	
9934543	NR	RPD	Total Ammonia (N)	2020/07/24	NC		%	20
9934551	NR	Matrix Spike [YC6498-05]	Total Ammonia (N)	2020/07/24		98	%	80 - 120
9934551	NR	Spiked Blank	Total Ammonia (N)	2020/07/24		101	%	80 - 120
9934551	NR	Method Blank	Total Ammonia (N)	2020/07/24	<0.015		mg/L	
9934551	NR	RPD [YC6498-05]	Total Ammonia (N)	2020/07/24	NC		%	20
9935380	NMA	Matrix Spike	Total Organic Carbon (C)	2020/07/25		104	%	80 - 120
9935380	NMA	Spiked Blank	Total Organic Carbon (C)	2020/07/25		100	%	80 - 120
9935380	NMA	Method Blank	Total Organic Carbon (C)	2020/07/25	<0.50		mg/L	
9935380	NMA	RPD	Total Organic Carbon (C)	2020/07/25	1.2		%	20
9935700	NMA	Matrix Spike	Total Organic Carbon (C)	2020/07/26		106	%	80 - 120
9935700	NMA	Spiked Blank	Total Organic Carbon (C)	2020/07/26		100	%	80 - 120
9935700	NMA	Method Blank	Total Organic Carbon (C)	2020/07/26	<0.50		mg/L	

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9935700	NMA	RPD	Total Organic Carbon (C)	2020/07/26	NC		%	20

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.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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).

(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

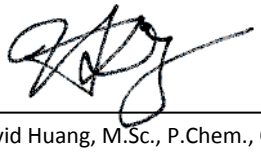
Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C050319
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake
Sampler Initials: MC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



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

Dennis Ngondu, B.Sc., P.Chem., QP, Supervisor, Organics

Harry (Peng) Liang, Senior Analyst

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.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam
A Bureau Veritas Group Company

YK temps

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY #	
Page ___ of ___	COOLER # 1
Page ___ of ___	
Page ___ of ___	COOLER # 2
Page ___ of ___	
Page ___ of ___	Cooler # 3
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	

COOLER OBSERVATIONS:

MAXXAM JOB#: C050319

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT		X	TEMP	7.8	3.4	6.7
INTACT		✓		1	2	3
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT		X	TEMP	8.8	5.9	6.9
INTACT		X		1	2	3
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT		X	TEMP	4.8	3.3	7.1
INTACT		X		1	2	3
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT				1	2	3
ICE PRESENT						

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
Jose Mercado	[signature]	July 18, 2020	8:20 Am

Custody Tracking Form

7a/e

W26357-H

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain Of Custody). Please ensure your form has a barcode or a BV Labs eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples.

First Sample: CAM_GW_SNP_7A_2020_01
Last Sample: DUP1_SW_SNP_2020_01
Sample Count: 18

Relinquished By				Received By			
GEORGE OKYERE		Date	2020/07/17	ARRRIN VILLAMAYOR		Date	2020/07/20
		Time (24 HR)	19:08			Time (24 HR)	06:00
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvlabs.com

Submission Triage Information

Sampled By: Mark Cano & George Okyere

# of Coolers/Pkgs: 3 coolers

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LAB USE ONLY ***

Received At

Labeled By

Verified By

Comments:

C050319

Custody Seal		Cooling	Temperature °C		
Present (Y/N)	Intact (Y/N)	Cooling Media (Y/N)	1	2	3
Y	Y	Y	8	8	5
Y	Y	Y	7	9	2
Y	Y	Y	4	4	5

Received in Yellowknife
By: J. MACCAGNO
8:20 AM
JUL 18 2020

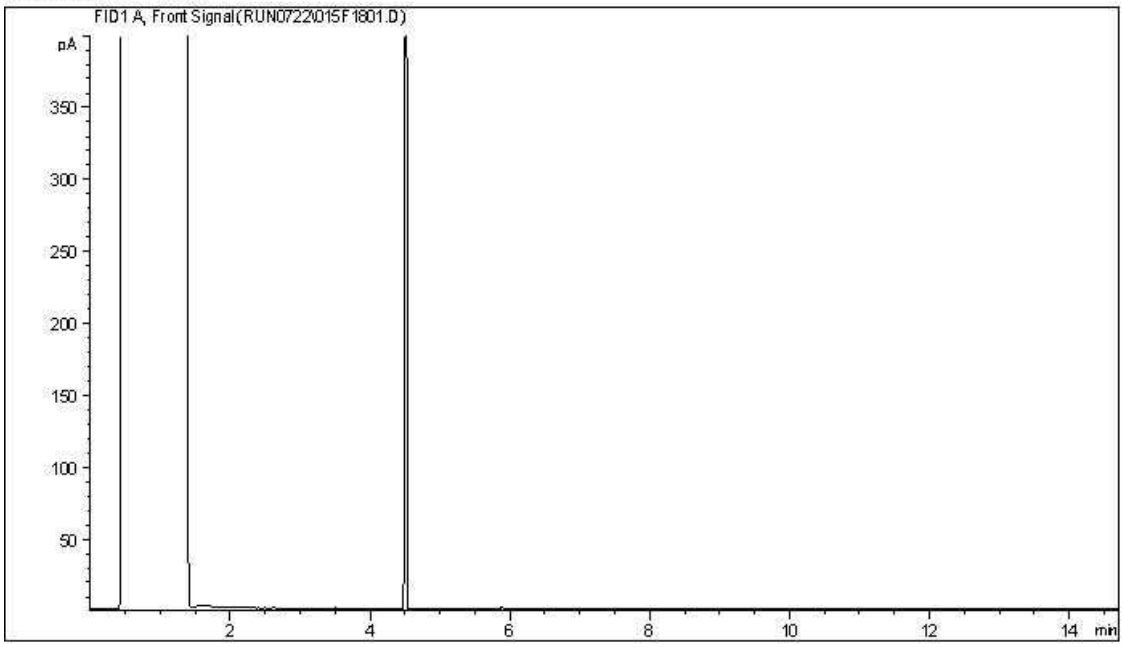
Temp: / /

ICE Y's See Attached

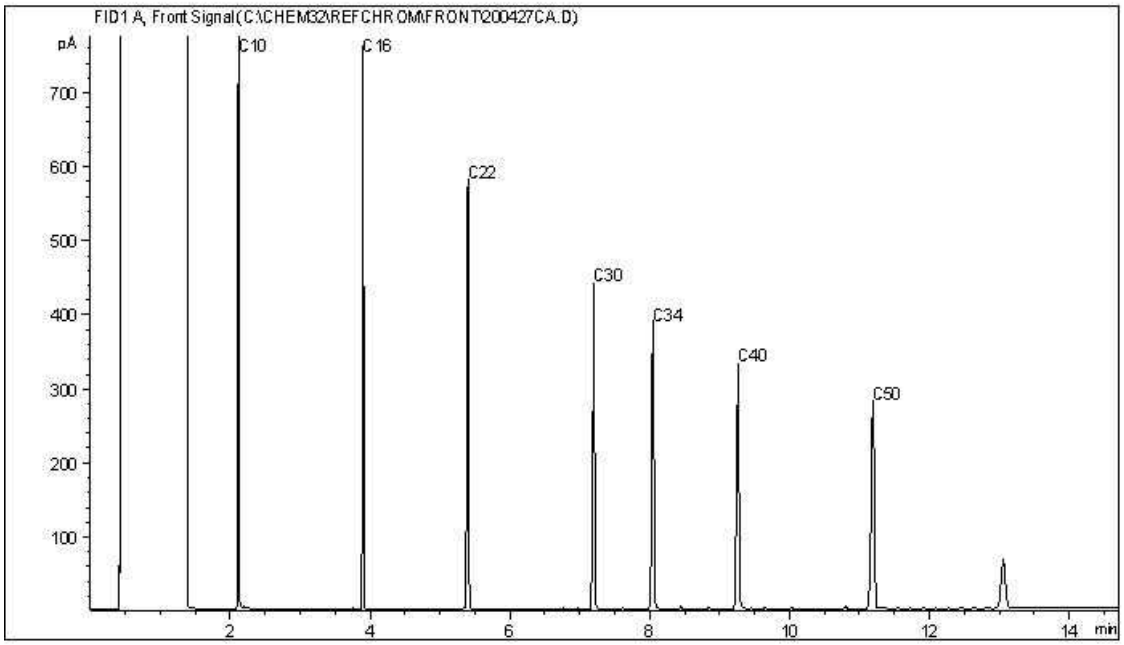
COR FCD-00383 / 1

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



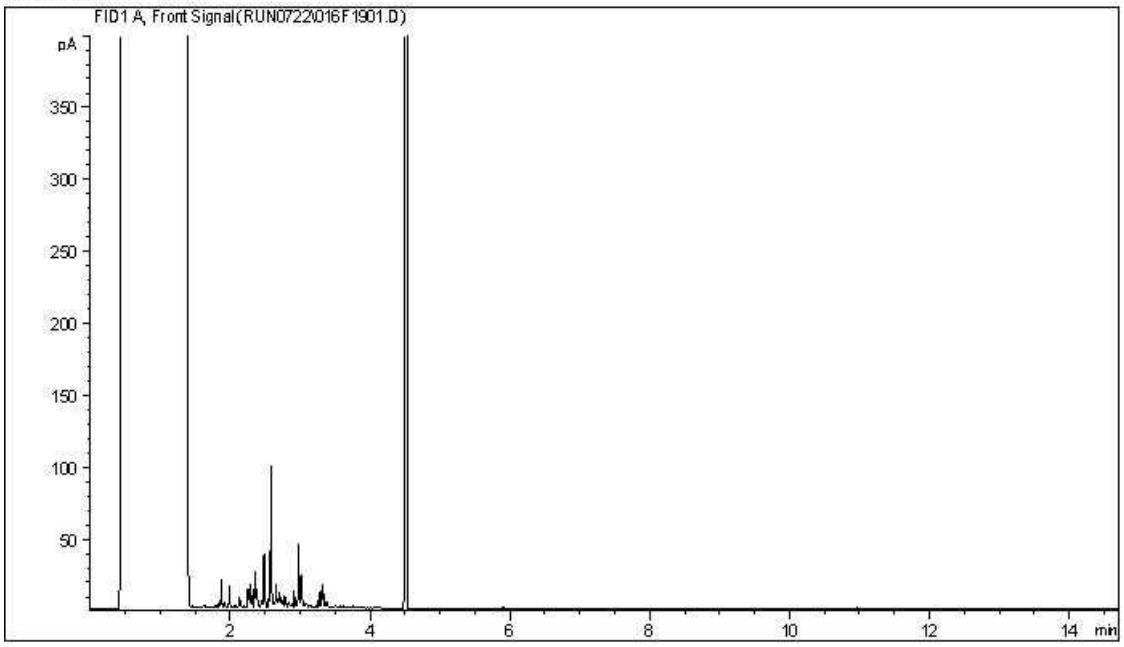
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

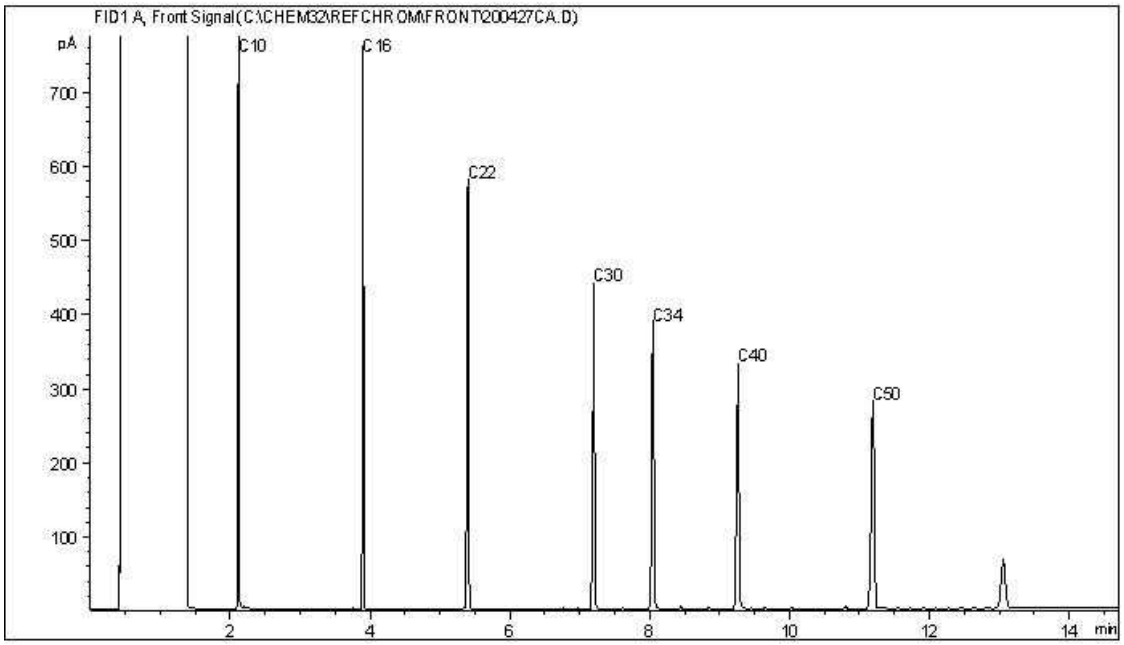
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



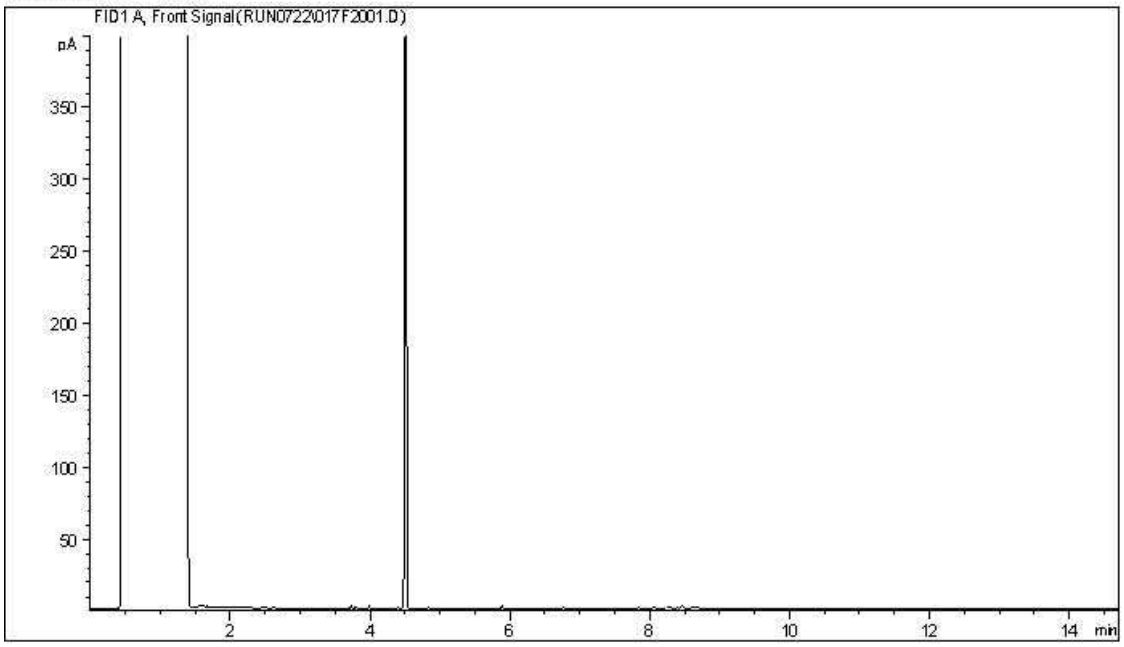
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

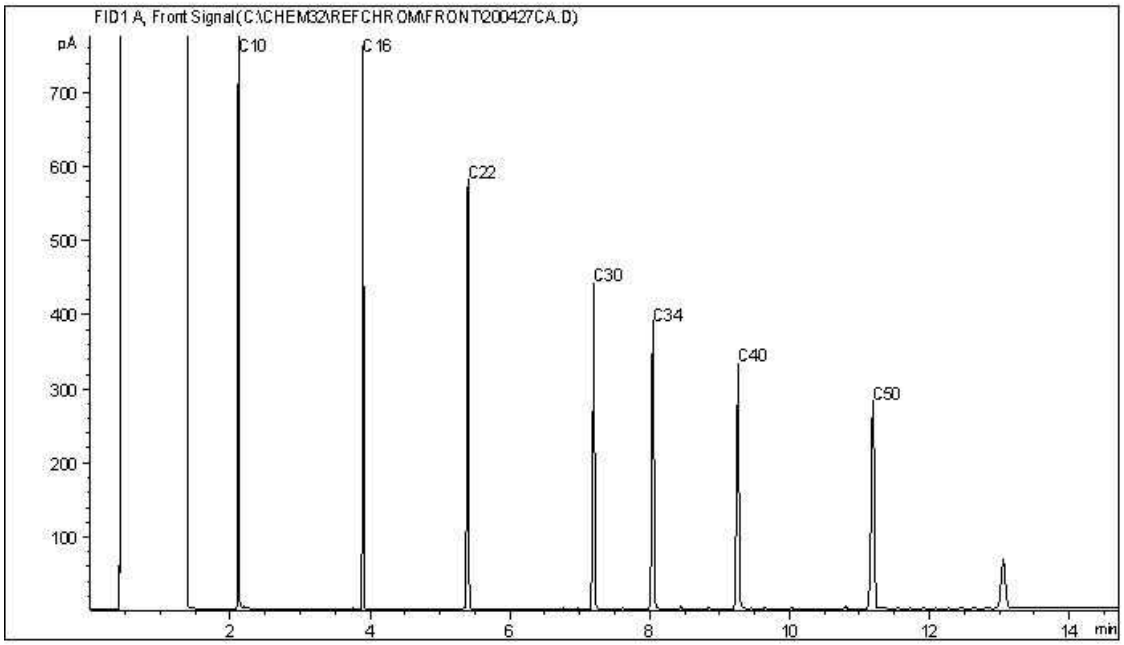
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



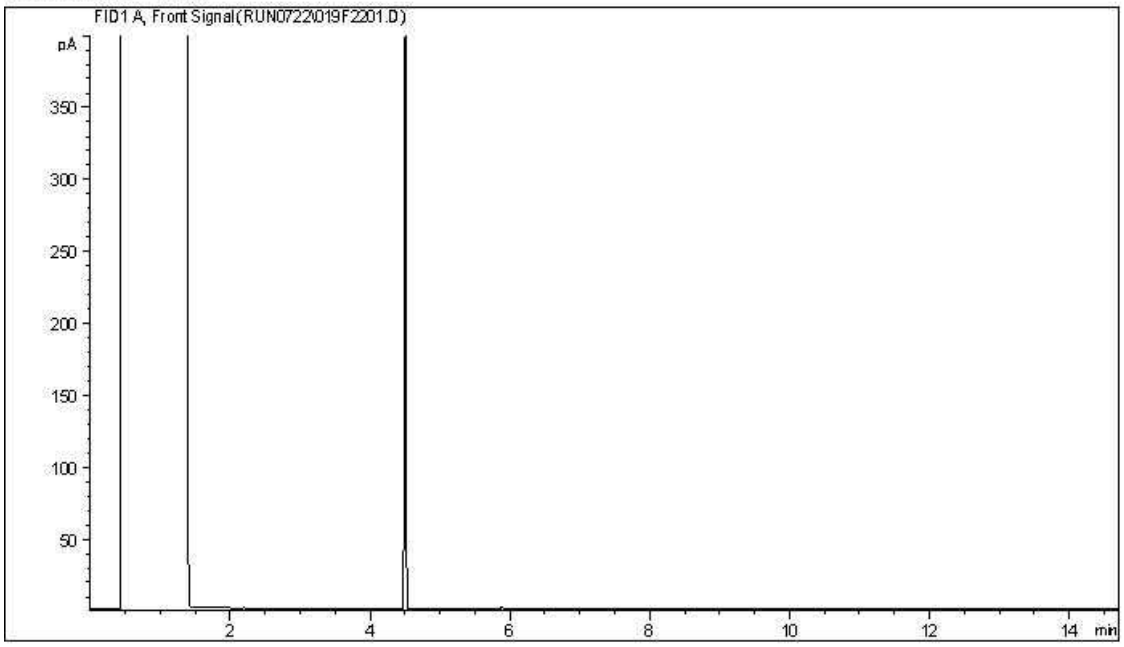
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

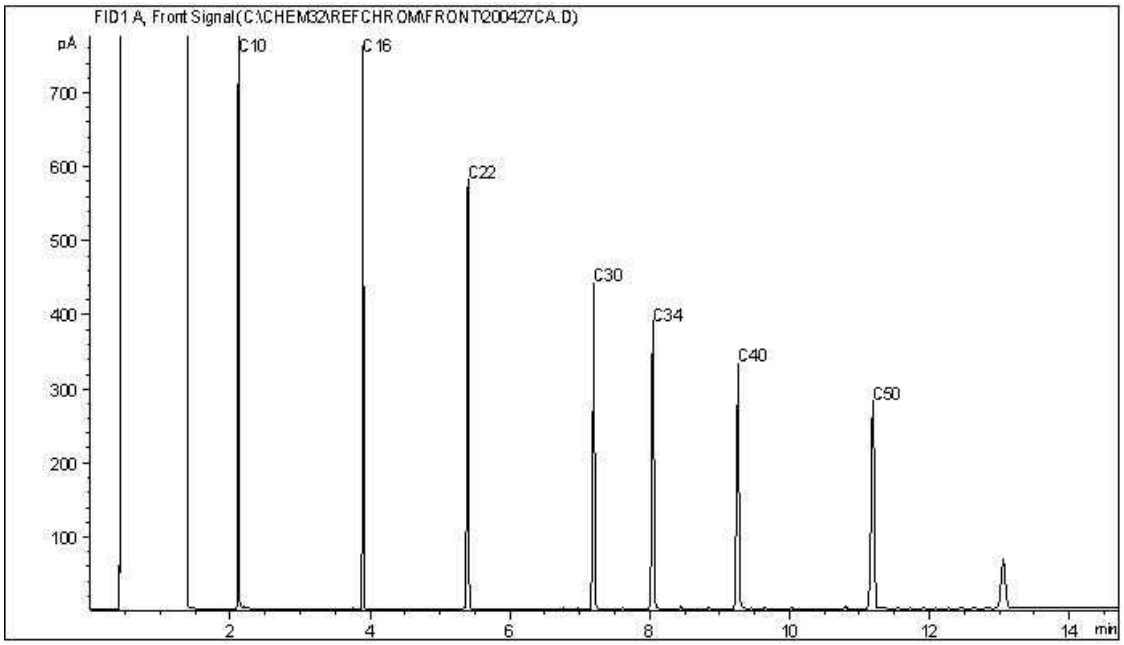
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



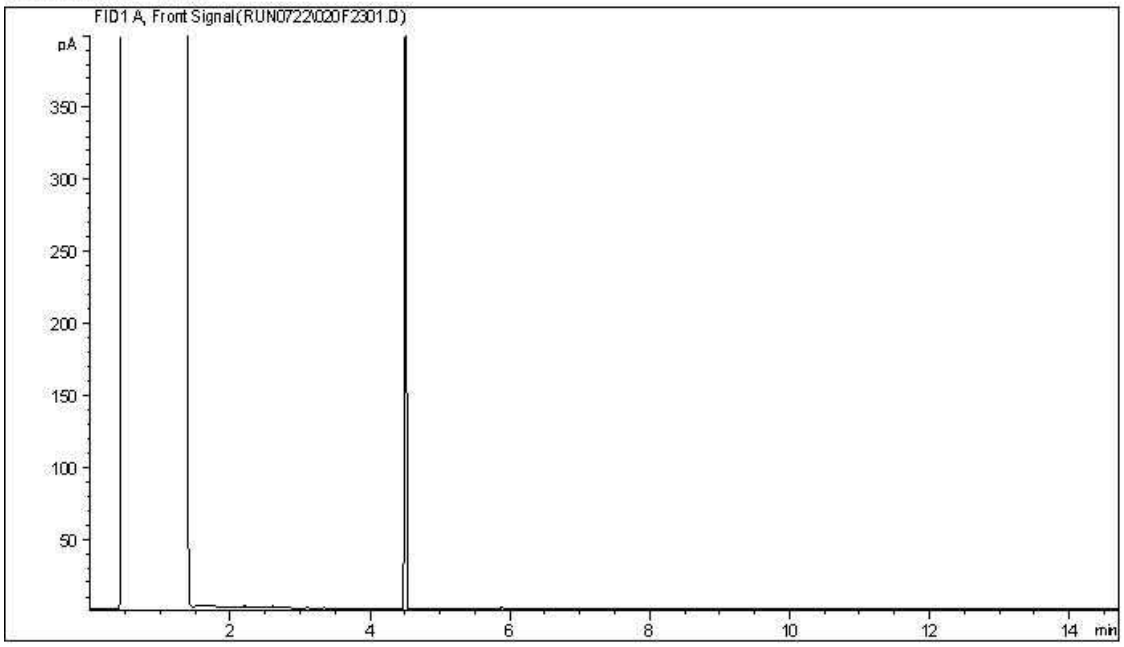
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

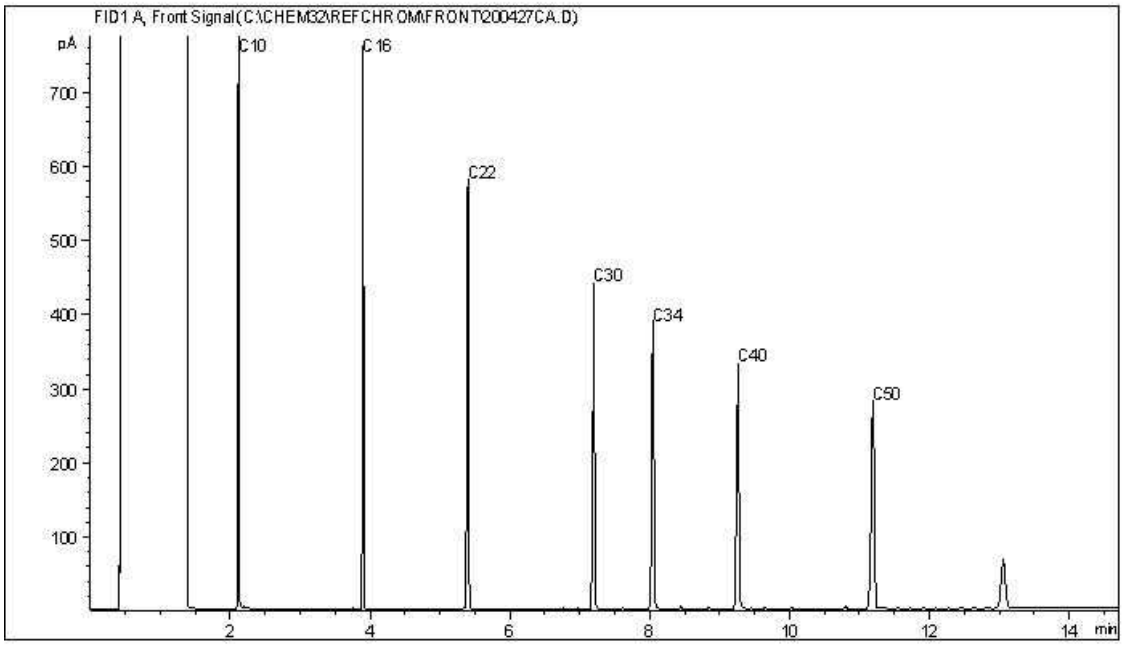
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



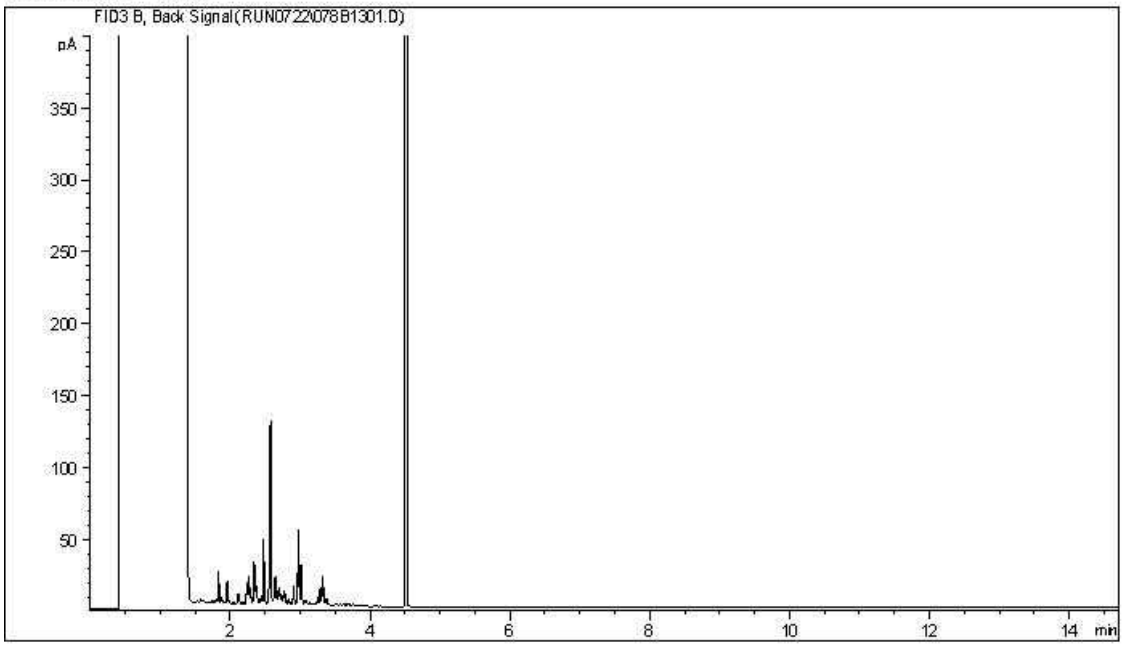
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

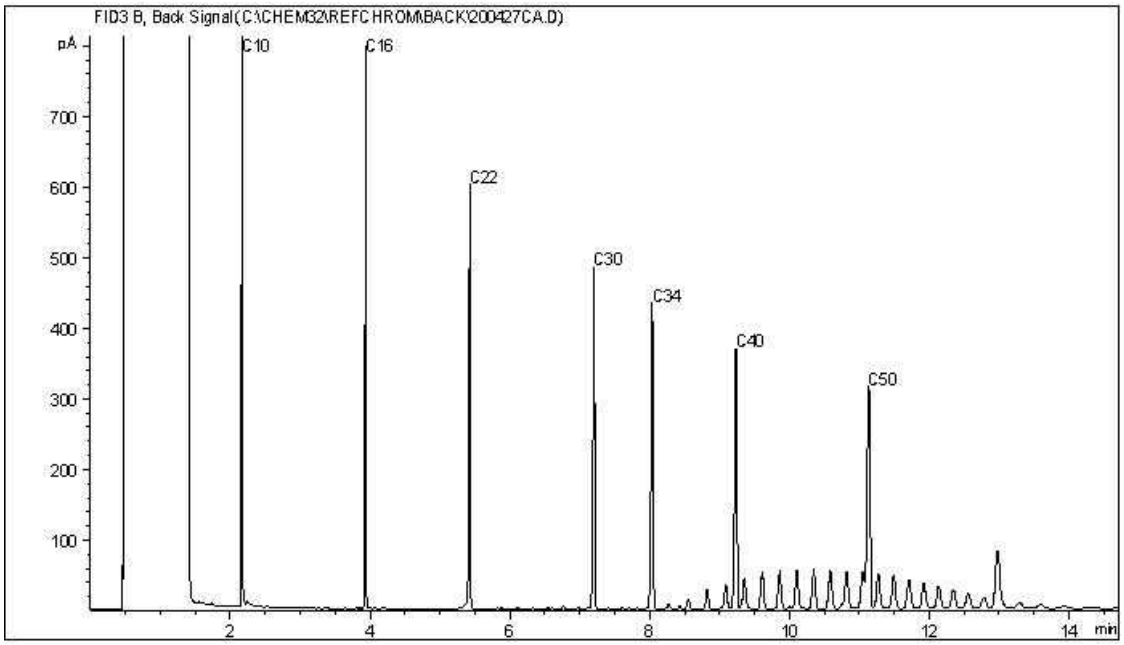
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your Project #: 121414585
Site Location: Gordon Lake
Your C.O.C. #: 28002

Attention: Laya Bou-Karam

STANTEC CONSULTING LTD
PO BOX 1777
4910-53 Street
Yellowknife, NT
CANADA X1A 2P4

Report Date: 2020/10/28
Report #: R2948100
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C064167
Received: 2020/09/04, 16:20

Sample Matrix: Ground Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH	6	N/A	2020/09/10	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID	6	N/A	2020/09/09	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX	6	N/A	2020/09/10		Auto Calc
Chloride/Sulphate by Auto Colourimetry	6	N/A	2020/09/14	AB SOP-00020 / AB SOP-00018	SM23-4500-Cl/SO4-E m
Conductivity @25C	6	N/A	2020/09/10	AB SOP-00005	SM 23 2510 B m
CCME Hydrocarbons in Water (F2; C10-C16) (2)	6	2020/09/09	2020/09/10	AB SOP-00037 AB SOP-00040	CCME PHC-CWS m
Hardness	6	N/A	2020/09/15		Auto Calc
Hardness Total (calculated as CaCO3) (3)	6	N/A	2020/09/11	BBY WI-00033	Auto Calc
Elements by ICP - Dissolved (4)	6	N/A	2020/09/15	AB SOP-00042	EPA 6010d R5 m
Ion Balance	6	N/A	2020/09/15		Auto Calc
Sum of cations, anions	6	N/A	2020/09/15		Auto Calc
Na, K, Ca, Mg, S by CRC ICPMS (total)	6	2020/09/08	2020/09/11		Auto Calc
Elements by CRC ICPMS (total) (1)	6	2020/09/11	2020/09/11	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Ammonia-N (Total)	1	N/A	2020/09/09	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Total)	4	N/A	2020/09/10	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Total)	1	N/A	2020/09/11	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite	6	N/A	2020/09/11		Auto Calc
Nitrate + Nitrite-N (calculated)	6	N/A	2020/09/11		Auto Calc
Nitrogen (Nitrite - Nitrate) by IC	1	N/A	2020/09/09	AB SOP-00023	SM 23 4110 B m
Nitrogen (Nitrite - Nitrate) by IC	5	N/A	2020/09/10	AB SOP-00023	SM 23 4110 B m
pH @25°C (5)	6	N/A	2020/09/10	AB SOP-00005	SM 23 4500-H+B m
Orthophosphate by Konelab (6)	6	N/A	2020/09/09	AB SOP-00025	SM 23 4500-P A,F m
Total Dissolved Solids (Filt. Residue)	6	2020/09/10	2020/09/10	AB SOP-00065	SM 23 2540 C m
Total Dissolved Solids (Calculated)	6	N/A	2020/09/15		Auto Calc
Carbon (Total Organic) (7)	6	N/A	2020/09/11	AB SOP-00087	MMCW 119 1996 m
Total Phosphorus	2	2020/09/10	2020/09/11	AB SOP-00024	SM 23 4500-P A,B,F m
Total Phosphorus	4	2020/09/11	2020/09/12	AB SOP-00024	SM 23 4500-P A,B,F m
Total Suspended Solids (NFR)	6	2020/09/10	2020/09/10	AB SOP-00061	SM 23 2540 D m

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: 121414585
Site Location: Gordon Lake
Your C.O.C. #: 28002

Attention: Laya Bou-Karam

STANTEC CONSULTING LTD
PO BOX 1777
4910-53 Street
Yellowknife, NT
CANADA X1A 2P4

Report Date: 2020/10/28
Report #: R2948100
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C064167
Received: 2020/09/04, 16:20

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, results relate to the supplied samples tested.

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 BV Labs Vancouver
(2) Silica gel clean up employed.
(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
(4) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(5) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas Laboratories endeavours to analyze samples as soon as possible after receipt.
(6) Orthophosphate > Total Phosphorus Imbalance: When applicable, Orthophosphate, Total Phosphorus and dissolved Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.
(7) TOC present in the sample should be considered as non-purgeable TOC.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Your Project #: 121414585
Site Location: Gordon Lake
Your C.O.C. #: 28002

Attention: Laya Bou-Karam

STANTEC CONSULTING LTD
PO BOX 1777
4910-53 Street
Yellowknife, NT
CANADA X1A 2P4

Report Date: 2020/10/28
Report #: R2948100
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C064167
Received: 2020/09/04, 16:20

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Geraldlyn Gouthro, Key Account Specialist
Email: geraldlyn.gouthro@bvlabs.com
Phone# (780)577-7173
==========
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.

BV Labs Job #: C064167
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake

AT1 BTEX AND F1-F2 IN WATER (GROUND WATER)

BV Labs ID		YK0718	YK0718	YK0719	YK0720		
Sampling Date		2020/09/03	2020/09/03	2020/09/03	2020/09/03		
COC Number		28002	28002	28002	28002		
	UNITS	CAM_GW_SNP_7A_2020_02	CAM_GW_SNP_7A_2020_02 Lab-Dup	CAM_GW_SNP_7B_2020_02	CAM_GW_SNP_7C_2020_02	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	N/A	1.9	<0.10	0.10	9991147
Volatiles							
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	9991092
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	9991092
Ethylbenzene	ug/L	<0.40	<0.40	3.5	<0.40	0.40	9991092
m & p-Xylene	ug/L	<0.80	<0.80	5.4 (1)	<0.80	0.80	9991092
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	9991092
Xylenes (Total)	ug/L	<0.89	N/A	5.4	<0.89	0.89	9990420
F1 (C6-C10) - BTEX	ug/L	<100	N/A	160	<100	100	9990420
F1 (C6-C10)	ug/L	<100	<100	170	<100	100	9991092
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	107	105	105	106	N/A	9991092
4-Bromofluorobenzene (sur.)	%	100	98	97	97	N/A	9991092
D4-1,2-Dichloroethane (sur.)	%	97	108	104	96	N/A	9991092
O-TERPHENYL (sur.)	%	87	N/A	111	103	N/A	9991147

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Qualifying ion outside of acceptance criteria. Results are tentatively identified and potentially biased high.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

AT1 BTEX AND F1-F2 IN WATER (GROUND WATER)

BV Labs ID		YK0721	YK0722	YK0723		
Sampling Date		2020/09/03	2020/09/03	2020/09/03		
COC Number		28002	28002	28002		
	UNITS	CAM_GW_SNP_7D_2020_02	CAM_GW_MW2_2020_02	DUP1_GW_2020_02	RDL	QC Batch
Ext. Pet. Hydrocarbon						
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	0.10	9991147
Volatiles						
Benzene	ug/L	<0.40	<0.40	<0.40	0.40	9991092
Toluene	ug/L	<0.40	2.7	<0.40	0.40	9991092
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	0.40	9991092
m & p-Xylene	ug/L	<0.80	<0.80	<0.80	0.80	9991092
o-Xylene	ug/L	<0.40	<0.40	<0.40	0.40	9991092
Xylenes (Total)	ug/L	<0.89	<0.89	<0.89	0.89	9990420
F1 (C6-C10) - BTEX	ug/L	<100	<100	<100	100	9990420
F1 (C6-C10)	ug/L	<100	<100	<100	100	9991092
Surrogate Recovery (%)						
1,4-Difluorobenzene (sur.)	%	106	105	106	N/A	9991092
4-Bromofluorobenzene (sur.)	%	96	97	96	N/A	9991092
D4-1,2-Dichloroethane (sur.)	%	105	99	103	N/A	9991092
O-TERPHENYL (sur.)	%	94	92	93	N/A	9991147

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C064167
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake

ROUTINE WATER (GROUND WATER)

BV Labs ID		YK0718		YK0719		YK0720		
Sampling Date		2020/09/03		2020/09/03		2020/09/03		
COC Number		28002		28002		28002		
	UNITS	CAM_GW_SNP_7A_2020_02	QC Batch	CAM_GW_SNP_7B_2020_02	QC Batch	CAM_GW_SNP_7C_2020_02	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	19	9990437	9.2	9990437	18	N/A	9990437
Cation Sum	meq/L	24	9990437	10	9990437	22	N/A	9990437
Hardness (CaCO3)	mg/L	890	9990426	440	9990426	920	0.50	9990426
Ion Balance (% Difference)	%	10	9990431	4.7	9990431	8.2	N/A	9990431
Calculated Total Dissolved Solids	mg/L	1200	9990468	560	9990468	1200	10	9990468
Misc. Inorganics								
Conductivity	uS/cm	1600	9993627	830	9992382	1600	2.0	9993627
pH	pH	7.53	9993626	7.34	9992381	7.32	N/A	9993626
Anions								
Alkalinity (PP as CaCO3)	mg/L	<1.0	9993619	<1.0	9992378	<1.0	1.0	9993619
Alkalinity (Total as CaCO3)	mg/L	600	9993619	210	9992378	400	1.0	9993619
Bicarbonate (HCO3)	mg/L	730	9993619	260	9992378	490	1.0	9993619
Carbonate (CO3)	mg/L	<1.0	9993619	<1.0	9992378	<1.0	1.0	9993619
Hydroxide (OH)	mg/L	<1.0	9993619	<1.0	9992378	<1.0	1.0	9993619
Dissolved Chloride (Cl)	mg/L	20	9995816	4.7	9995816	8.8	1.0	9995816
Dissolved Sulphate (SO4)	mg/L	330 (1)	9995816	230 (1)	9995816	480 (1)	5.0	9995816
Elements								
Dissolved Calcium (Ca)	mg/L	250	9998299	140	9998299	300	0.30	9998299
Dissolved Iron (Fe)	mg/L	27	9998299	13	9998299	20	0.060	9998299
Dissolved Magnesium (Mg)	mg/L	64	9998299	20	9998299	40	0.20	9998299
Dissolved Manganese (Mn)	mg/L	5.3	9998299	8.5	9998299	5.3	0.0040	9998299
Dissolved Potassium (K)	mg/L	22	9998299	5.1	9998299	17	0.30	9998299
Dissolved Sodium (Na)	mg/L	92	9998299	7.4	9998299	44	0.50	9998299

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ROUTINE WATER (GROUND WATER)

BV Labs ID		YK0721			YK0722		
Sampling Date		2020/09/03			2020/09/03		
COC Number		28002			28002		
	UNITS	CAM_GW_SNP_7D_2020_02	RDL	QC Batch	CAM_GW_MW2_2020_02	RDL	QC Batch
Calculated Parameters							
Anion Sum	meq/L	6.3	N/A	9990437	140	N/A	9990437
Cation Sum	meq/L	6.6	N/A	9990437	130	N/A	9990437
Hardness (CaCO3)	mg/L	320	0.50	9990426	1800	0.50	9990426
Ion Balance (% Difference)	%	2.0	N/A	9990431	2.7	N/A	9990431
Calculated Total Dissolved Solids	mg/L	360	10	9990468	9100	50	9990468
Misc. Inorganics							
Conductivity	uS/cm	590	2.0	9993627	12000	2.0	9993627
pH	pH	7.59	N/A	9993626	7.15	N/A	9993626
Anions							
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	9993619	<1.0	1.0	9993619
Alkalinity (Total as CaCO3)	mg/L	190	1.0	9993619	790	1.0	9993619
Bicarbonate (HCO3)	mg/L	230	1.0	9993619	960	1.0	9993619
Carbonate (CO3)	mg/L	<1.0	1.0	9993619	<1.0	1.0	9993619
Hydroxide (OH)	mg/L	<1.0	1.0	9993619	<1.0	1.0	9993619
Dissolved Chloride (Cl)	mg/L	1.5	1.0	9995504	490 (1)	5.0	9995816
Dissolved Sulphate (SO4)	mg/L	110	1.0	9995504	5300 (1)	50	9995816
Elements							
Dissolved Calcium (Ca)	mg/L	110	0.30	9998299	390	0.30	9998299
Dissolved Iron (Fe)	mg/L	<0.060	0.060	9998299	28	0.060	9998299
Dissolved Magnesium (Mg)	mg/L	11	0.20	9998299	190	0.20	9998299
Dissolved Manganese (Mn)	mg/L	0.52	0.0040	9998299	4.8	0.0040	9998299
Dissolved Potassium (K)	mg/L	2.1	0.30	9998299	120	0.30	9998299
Dissolved Sodium (Na)	mg/L	3.8	0.50	9998299	2100 (1)	2.5	9998299

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ROUTINE WATER (GROUND WATER)

BV Labs ID		YK0723		
Sampling Date		2020/09/03		
COC Number		28002		
	UNITS	DUP1_GW_2020_02	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	21	N/A	9990437
Cation Sum	meq/L	23	N/A	9990437
Hardness (CaCO3)	mg/L	880	0.50	9990426
Ion Balance (% Difference)	%	6.2	N/A	9990431
Calculated Total Dissolved Solids	mg/L	1200	10	9990468
Misc. Inorganics				
Conductivity	uS/cm	1600	2.0	9993627
pH	pH	7.55	N/A	9993626
Anions				
Alkalinity (PP as CaCO3)	mg/L	<1.0	1.0	9993619
Alkalinity (Total as CaCO3)	mg/L	610	1.0	9993619
Bicarbonate (HCO3)	mg/L	750	1.0	9993619
Carbonate (CO3)	mg/L	<1.0	1.0	9993619
Hydroxide (OH)	mg/L	<1.0	1.0	9993619
Dissolved Chloride (Cl)	mg/L	20	1.0	9995816
Dissolved Sulphate (SO4)	mg/L	370 (1)	5.0	9995816
Elements				
Dissolved Calcium (Ca)	mg/L	250	0.30	9998299
Dissolved Iron (Fe)	mg/L	26	0.060	9998299
Dissolved Magnesium (Mg)	mg/L	63	0.20	9998299
Dissolved Manganese (Mn)	mg/L	5.2	0.0040	9998299
Dissolved Potassium (K)	mg/L	22	0.30	9998299
Dissolved Sodium (Na)	mg/L	90	0.50	9998299

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C064167
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake

RESULTS OF CHEMICAL ANALYSES OF GROUND WATER

BV Labs ID		YK0718			YK0719		
Sampling Date		2020/09/03			2020/09/03		
COC Number		28002			28002		
	UNITS	CAM_GW_SNP_7A_2020_02	RDL	QC Batch	CAM_GW_SNP_7B_2020_02	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	738	0.50	9990633	386	0.50	9990633
Dissolved Nitrate (NO3)	mg/L	0.082	0.044	9990444	<0.044	0.044	9990444
Nitrate plus Nitrite (N)	mg/L	0.019	0.014	9990575	<0.014	0.014	9990575
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	9990444	<0.033	0.033	9990444
Misc. Inorganics							
Total Organic Carbon (C)	mg/L	21	0.50	9995223	15	0.50	9995223
Total Dissolved Solids	mg/L	1100	10	9992976	520	10	9992976
Total Suspended Solids	mg/L	64 (1)	1.5	9992979	22	1.0	9992981
Nutrients							
Total Ammonia (N)	mg/L	1.4	0.015	9994144	0.51	0.015	9994144
Orthophosphate (P)	mg/L	0.0032	0.0030	9992045	<0.0030	0.0030	9992045
Total Phosphorus (P)	mg/L	0.067	0.0030	9995558	0.020	0.0030	9995558
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9992784	<0.010	0.010	9992784
Dissolved Nitrate (N)	mg/L	0.019	0.010	9992784	<0.010	0.010	9992784

RDL = Reportable Detection Limit
(1) Detection limit raised based on sample volume used for analysis.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C064167
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake

RESULTS OF CHEMICAL ANALYSES OF GROUND WATER

BV Labs ID		YK0720	YK0720		YK0721		
Sampling Date		2020/09/03	2020/09/03		2020/09/03		
COC Number		28002	28002		28002		
	UNITS	CAM_GW_SNP_7C_2020_02	CAM_GW_SNP_7C_2020_02 Lab-Dup	QC Batch	CAM_GW_SNP_7D_2020_02	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	774	N/A	9990633	279	0.50	9990633
Dissolved Nitrate (NO3)	mg/L	0.11	N/A	9990444	4.9	0.044	9990444
Nitrate plus Nitrite (N)	mg/L	0.025	N/A	9990575	1.7	0.014	9990575
Dissolved Nitrite (NO2)	mg/L	<0.033	N/A	9990444	1.9	0.033	9990444
Misc. Inorganics							
Total Organic Carbon (C)	mg/L	12	N/A	9995223	4.1	0.50	9995223
Total Dissolved Solids	mg/L	1100	N/A	9992976	350	10	9992976
Total Suspended Solids	mg/L	47	N/A	9992981	1.1	1.0	9992981
Nutrients							
Total Ammonia (N)	mg/L	0.084	0.088	9992616	0.11	0.015	9994168
Orthophosphate (P)	mg/L	0.0031	N/A	9992045	0.0062	0.0030	9992045
Total Phosphorus (P)	mg/L	0.061	N/A	9993753	0.0088	0.0030	9995558
Dissolved Nitrite (N)	mg/L	<0.010	N/A	9992784	0.57	0.010	9992784
Dissolved Nitrate (N)	mg/L	0.025	N/A	9992784	1.1	0.010	9992784

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C064167
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake

RESULTS OF CHEMICAL ANALYSES OF GROUND WATER

BV Labs ID		YK0721			YK0722		
Sampling Date		2020/09/03			2020/09/03		
COC Number		28002			28002		
	UNITS	CAM_GW_SNP_7D_2020_02 Lab-Dup	RDL	QC Batch	CAM_GW_MW2_2020_02	RDL	QC Batch
Calculated Parameters							
Total Hardness (CaCO3)	mg/L	N/A	0.50	9990633	1580	0.50	9990633
Dissolved Nitrate (NO3)	mg/L	N/A	0.044	9990444	<0.22	0.22	9990444
Nitrate plus Nitrite (N)	mg/L	N/A	0.014	9990575	<0.071	0.071	9990575
Dissolved Nitrite (NO2)	mg/L	N/A	0.033	9990444	<0.16	0.16	9990444
Misc. Inorganics							
Total Organic Carbon (C)	mg/L	N/A	0.50	9995223	26 (1)	2.0	9995223
Total Dissolved Solids	mg/L	N/A	10	9992976	>8000 (2)	10	9992976
Total Suspended Solids	mg/L	N/A	1.0	9992981	61	1.0	9992981
Nutrients							
Total Ammonia (N)	mg/L	N/A	0.015	9994168	8.3 (3)	0.075	9994139
Orthophosphate (P)	mg/L	0.0057	0.0030	9992045	<0.0030	0.0030	9992045
Total Phosphorus (P)	mg/L	N/A	0.0030	9995558	0.15	0.0030	9993753
Dissolved Nitrite (N)	mg/L	N/A	0.010	9992784	<0.050 (4)	0.050	9992784
Dissolved Nitrate (N)	mg/L	N/A	0.010	9992784	<0.050 (4)	0.050	9992784

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Detection limits raised due to sample matrix.
(2) Sample exceeds operating range of this method.
(3) Detection limits raised due to dilution to bring analyte within the calibrated range.
(4) Detection limits raised due to matrix interference.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

BV Labs Job #: C064167
Report Date: 2020/10/28

STANTEC CONSULTING LTD
Client Project #: 121414585
Site Location: Gordon Lake

RESULTS OF CHEMICAL ANALYSES OF GROUND WATER

BV Labs ID		YK0723		
Sampling Date		2020/09/03		
COC Number		28002		
	UNITS	DUP1_GW_2020_02	RDL	QC Batch
Calculated Parameters				
Total Hardness (CaCO3)	mg/L	745	0.50	9990633
Dissolved Nitrate (NO3)	mg/L	<0.044	0.044	9990444
Nitrate plus Nitrite (N)	mg/L	<0.014	0.014	9990575
Dissolved Nitrite (NO2)	mg/L	<0.033	0.033	9990444
Misc. Inorganics				
Total Organic Carbon (C)	mg/L	21	0.50	9995223
Total Dissolved Solids	mg/L	1100	10	9992976
Total Suspended Solids	mg/L	60	1.0	9992981
Nutrients				
Total Ammonia (N)	mg/L	1.4	0.015	9994144
Orthophosphate (P)	mg/L	0.0031	0.0030	9992045
Total Phosphorus (P)	mg/L	0.073	0.0030	9995558
Dissolved Nitrite (N)	mg/L	<0.010	0.010	9992784
Dissolved Nitrate (N)	mg/L	<0.010	0.010	9992784
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YK0718	YK0718	YK0719		
Sampling Date		2020/09/03	2020/09/03	2020/09/03		
COC Number		28002	28002	28002		
	UNITS	CAM_GW_SNP_7A_2020_02	CAM_GW_SNP_7A_2020_02 Lab-Dup	CAM_GW_SNP_7B_2020_02	RDL	QC Batch
Total Metals by ICPMS						
Total Aluminum (Al)	ug/L	48.3	46.0	130	3.0	9994755
Total Antimony (Sb)	ug/L	<0.50	<0.50	<0.50	0.50	9994755
Total Arsenic (As)	ug/L	15.0	15.2	40.2	0.10	9994755
Total Barium (Ba)	ug/L	329	330	57.9	1.0	9994755
Total Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	0.10	9994755
Total Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	1.0	9994755
Total Boron (B)	ug/L	80	80	<50	50	9994755
Total Cadmium (Cd)	ug/L	0.019	0.020	0.016	0.010	9994755
Total Cesium (Cs)	ug/L	<0.20	<0.20	<0.20	0.20	9994755
Total Chromium (Cr)	ug/L	1.6	1.5	1.9	1.0	9994755
Total Cobalt (Co)	ug/L	12.6	12.9	8.89	0.20	9994755
Total Copper (Cu)	ug/L	0.94	0.84	1.75	0.50	9994755
Total Iron (Fe)	ug/L	20100	20500	11000	10	9994755
Total Lead (Pb)	ug/L	0.20	<0.20	0.39	0.20	9994755
Total Lithium (Li)	ug/L	16.9	17.1	3.2	2.0	9994755
Total Manganese (Mn)	ug/L	4170	4210	7290	1.0	9994755
Total Mercury (Hg)	ug/L	<0.050	<0.050	<0.050	0.050	9994755
Total Molybdenum (Mo)	ug/L	2.2 (1)	2.2	2.1	1.0	9994755
Total Nickel (Ni)	ug/L	3.1	3.1	22.9	1.0	9994755
Total Selenium (Se)	ug/L	0.17	0.15	0.14	0.10	9994755
Total Silicon (Si)	ug/L	8920	9010	8510	100	9994755
Total Silver (Ag)	ug/L	<0.020	0.025	<0.020	0.020	9994755
Total Strontium (Sr)	ug/L	1420	1430	449	1.0	9994755
Total Thallium (Tl)	ug/L	<0.010	<0.010	<0.010	0.010	9994755
Total Tin (Sn)	ug/L	<5.0	<5.0	<5.0	5.0	9994755
Total Titanium (Ti)	ug/L	<5.0	<5.0	<5.0	5.0	9994755
Total Uranium (U)	ug/L	7.05	7.10	1.08	0.10	9994755
Total Vanadium (V)	ug/L	<5.0	<5.0	<5.0	5.0	9994755
Total Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	5.0	9994755
Total Zirconium (Zr)	ug/L	3.28 (1)	3.26	0.59	0.10	9994755

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
(1) Matrix Spike outside acceptance criteria due to sample matrix interference.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YK0718	YK0718	YK0719		
Sampling Date		2020/09/03	2020/09/03	2020/09/03		
COC Number		28002	28002	28002		
	UNITS	CAM_GW_SNP_7A_2020_02	CAM_GW_SNP_7A_2020_02 Lab-Dup	CAM_GW_SNP_7B_2020_02	RDL	QC Batch
Total Calcium (Ca)	mg/L	212	N/A	126	0.050	9990637
Total Magnesium (Mg)	mg/L	50.5	N/A	17.3	0.050	9990637
Total Potassium (K)	mg/L	17.3	N/A	4.57	0.050	9990637
Total Sodium (Na)	mg/L	70.6	N/A	6.16	0.050	9990637
Total Sulphur (S)	mg/L	104	N/A	69.0	3.0	9990637

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YK0720		YK0721		YK0722		
Sampling Date		2020/09/03		2020/09/03		2020/09/03		
COC Number		28002		28002		28002		
	UNITS	CAM_GW_SNP_7C_2020_02	RDL	CAM_GW_SNP_7D_2020_02	RDL	CAM_GW_MW2_2020_02	RDL	QC Batch
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	20.3	6.0	16.9	3.0	52	15	9994755
Total Antimony (Sb)	ug/L	<1.0	1.0	3.36	0.50	<2.5	2.5	9994755
Total Arsenic (As)	ug/L	21.0	0.20	2.90	0.10	49.2	0.50	9994755
Total Barium (Ba)	ug/L	117	2.0	39.5	1.0	34.9	5.0	9994755
Total Beryllium (Be)	ug/L	<0.20	0.20	<0.10	0.10	<0.50	0.50	9994755
Total Bismuth (Bi)	ug/L	<2.0	2.0	<1.0	1.0	<5.0	5.0	9994755
Total Boron (B)	ug/L	<100	100	<50	50	<250	250	9994755
Total Cadmium (Cd)	ug/L	0.110	0.020	0.053	0.010	0.135	0.050	9994755
Total Cesium (Cs)	ug/L	<0.40	0.40	<0.20	0.20	<1.0	1.0	9994755
Total Chromium (Cr)	ug/L	<2.0	2.0	<1.0	1.0	<5.0	5.0	9994755
Total Cobalt (Co)	ug/L	11.6	0.40	0.82	0.20	156	1.0	9994755
Total Copper (Cu)	ug/L	<1.0	1.0	2.03	0.50	<2.5	2.5	9994755
Total Iron (Fe)	ug/L	13500	20	56	10	21700	50	9994755
Total Lead (Pb)	ug/L	<0.40	0.40	<0.20	0.20	1.2	1.0	9994755
Total Lithium (Li)	ug/L	5.2	4.0	<2.0	2.0	44	10	9994755
Total Manganese (Mn)	ug/L	4440	2.0	543	1.0	4150	5.0	9994755
Total Mercury (Hg)	ug/L	<0.10	0.10	<0.050	0.050	<0.25	0.25	9994755
Total Molybdenum (Mo)	ug/L	<2.0	2.0	3.9	1.0	22.0	5.0	9994755
Total Nickel (Ni)	ug/L	10.3	2.0	3.8	1.0	455	5.0	9994755
Total Selenium (Se)	ug/L	0.29	0.20	0.88	0.10	1.36	0.50	9994755
Total Silicon (Si)	ug/L	8870	200	4880	100	10800	500	9994755
Total Silver (Ag)	ug/L	<0.040	0.040	<0.020	0.020	<0.10	0.10	9994755
Total Strontium (Sr)	ug/L	1430	2.0	373	1.0	4050	5.0	9994755
Total Thallium (Tl)	ug/L	<0.020	0.020	0.022	0.010	0.052	0.050	9994755
Total Tin (Sn)	ug/L	<10	10	<5.0	5.0	<25	25	9994755
Total Titanium (Ti)	ug/L	<10	10	<5.0	5.0	<25	25	9994755
Total Uranium (U)	ug/L	7.48	0.20	3.86	0.10	33.6	0.50	9994755
Total Vanadium (V)	ug/L	<10	10	<5.0	5.0	<25	25	9994755
Total Zinc (Zn)	ug/L	<10	10	<5.0	5.0	390	25	9994755
Total Zirconium (Zr)	ug/L	0.55	0.20	<0.10	0.10	3.83	0.50	9994755
Total Calcium (Ca)	mg/L	253	0.10	95.1	0.050	355	0.25	9990637
Total Magnesium (Mg)	mg/L	34.3	0.10	9.98	0.050	169	0.25	9990637
Total Potassium (K)	mg/L	14.5	0.10	2.12	0.050	94.1	0.25	9990637
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YK0720		YK0721		YK0722		
Sampling Date		2020/09/03		2020/09/03		2020/09/03		
COC Number		28002		28002		28002		
	UNITS	CAM_GW_SNP_7C_2020_02	RDL	CAM_GW_SNP_7D_2020_02	RDL	CAM_GW_MW2_2020_02	RDL	QC Batch
Total Sodium (Na)	mg/L	35.3	0.10	3.23	0.050	1870	0.25	9990637
Total Sulphur (S)	mg/L	162	6.0	35.5	3.0	1620	15	9990637
RDL = Reportable Detection Limit								

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YK0723		
Sampling Date		2020/09/03		
COC Number		28002		
	UNITS	DUP1_GW_2020_02	RDL	QC Batch
Total Metals by ICPMS				
Total Aluminum (Al)	ug/L	37.8	3.0	9994755
Total Antimony (Sb)	ug/L	<0.50	0.50	9994755
Total Arsenic (As)	ug/L	15.4	0.10	9994755
Total Barium (Ba)	ug/L	335	1.0	9994755
Total Beryllium (Be)	ug/L	<0.10	0.10	9994755
Total Bismuth (Bi)	ug/L	<1.0	1.0	9994755
Total Boron (B)	ug/L	82	50	9994755
Total Cadmium (Cd)	ug/L	0.016	0.010	9994755
Total Cesium (Cs)	ug/L	<0.20	0.20	9994755
Total Chromium (Cr)	ug/L	1.7	1.0	9994755
Total Cobalt (Co)	ug/L	12.9	0.20	9994755
Total Copper (Cu)	ug/L	0.77	0.50	9994755
Total Iron (Fe)	ug/L	21400	10	9994755
Total Lead (Pb)	ug/L	<0.20	0.20	9994755
Total Lithium (Li)	ug/L	17.0	2.0	9994755
Total Manganese (Mn)	ug/L	4420	1.0	9994755
Total Mercury (Hg)	ug/L	<0.050	0.050	9994755
Total Molybdenum (Mo)	ug/L	2.0	1.0	9994755
Total Nickel (Ni)	ug/L	2.6	1.0	9994755
Total Selenium (Se)	ug/L	0.18	0.10	9994755
Total Silicon (Si)	ug/L	9320	100	9994755
Total Silver (Ag)	ug/L	<0.020	0.020	9994755
Total Strontium (Sr)	ug/L	1440	1.0	9994755
Total Thallium (Tl)	ug/L	<0.010	0.010	9994755
Total Tin (Sn)	ug/L	<5.0	5.0	9994755
Total Titanium (Ti)	ug/L	<5.0	5.0	9994755
Total Uranium (U)	ug/L	7.20	0.10	9994755
Total Vanadium (V)	ug/L	<5.0	5.0	9994755
Total Zinc (Zn)	ug/L	<5.0	5.0	9994755
Total Zirconium (Zr)	ug/L	3.18	0.10	9994755
Total Calcium (Ca)	mg/L	214	0.050	9990637
Total Magnesium (Mg)	mg/L	50.8	0.050	9990637
Total Potassium (K)	mg/L	17.8	0.050	9990637
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

BV Labs ID		YK0723		
Sampling Date		2020/09/03		
COC Number		28002		
	UNITS	**DUP1_GW_2020_02**	**RDL**	**QC Batch**
Total Sodium (Na)	mg/L	70.5	0.050	9990637
Total Sulphur (S)	mg/L	114	3.0	9990637
RDL = Reportable Detection Limit				

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.5°C
Package 2	8.8°C
Package 3	6.3°C
Package 4	8.2°C

Version 2: Select samples included in report as per client request received 2020/10/27.

Sample YK0718 [CAM_GW_SNP_7A_2020_02] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YK0719 [CAM_GW_SNP_7B_2020_02] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YK0720 [CAM_GW_SNP_7C_2020_02] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YK0721 [CAM_GW_SNP_7D_2020_02] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YK0722 [CAM_GW_MW2_2020_02] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

Sample YK0723 [DUP1_GW_2020_02] : Sample was analyzed past method specified hold time for Orthophosphate by Konelab. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample was analyzed past method specified hold time for Nitrogen (Nitrite - Nitrate) by IC.

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER) Comments

Sample YK0720 [CAM_GW_SNP_7C_2020_02] Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required.
Sample YK0722 [CAM_GW_MW2_2020_02] Elements by CRC ICPMS (total): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9991092	RSU	Matrix Spike [YK0719-01]	1,4-Difluorobenzene (sur.)	2020/09/09		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2020/09/09		98	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2020/09/09		100	%	50 - 140
			Benzene	2020/09/09		103	%	50 - 140
			Toluene	2020/09/09		98	%	50 - 140
			Ethylbenzene	2020/09/09		100	%	50 - 140
			m & p-Xylene	2020/09/09		99	%	50 - 140
			o-Xylene	2020/09/09		101	%	50 - 140
			F1 (C6-C10)	2020/09/09		82	%	60 - 140
9991092	RSU	Spiked Blank	1,4-Difluorobenzene (sur.)	2020/09/09		107	%	50 - 140
			4-Bromofluorobenzene (sur.)	2020/09/09		105	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2020/09/09		99	%	50 - 140
			Benzene	2020/09/09		106	%	60 - 130
			Toluene	2020/09/09		101	%	60 - 130
			Ethylbenzene	2020/09/09		102	%	60 - 130
			m & p-Xylene	2020/09/09		102	%	60 - 130
			o-Xylene	2020/09/09		104	%	60 - 130
			F1 (C6-C10)	2020/09/09		93	%	60 - 140
9991092	RSU	Method Blank	1,4-Difluorobenzene (sur.)	2020/09/09		106	%	50 - 140
			4-Bromofluorobenzene (sur.)	2020/09/09		96	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2020/09/09		95	%	50 - 140
			Benzene	2020/09/09	<0.40		ug/L	
			Toluene	2020/09/09	<0.40		ug/L	
			Ethylbenzene	2020/09/09	<0.40		ug/L	
			m & p-Xylene	2020/09/09	<0.80		ug/L	
			o-Xylene	2020/09/09	<0.40		ug/L	
			F1 (C6-C10)	2020/09/09	<100		ug/L	
9991092	RSU	RPD [YK0718-01]	Benzene	2020/09/09	NC		%	30
			Toluene	2020/09/09	NC		%	30
			Ethylbenzene	2020/09/09	NC		%	30
			m & p-Xylene	2020/09/09	NC		%	30
			o-Xylene	2020/09/09	NC		%	30
			F1 (C6-C10)	2020/09/09	NC		%	30
9991147	EC0	Matrix Spike	O-TERPHENYL (sur.)	2020/09/10		93	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2020/09/10		98	%	60 - 140
9991147	EC0	Spiked Blank	O-TERPHENYL (sur.)	2020/09/10		91	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2020/09/10		88	%	60 - 140
9991147	EC0	Method Blank	O-TERPHENYL (sur.)	2020/09/10		93	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2020/09/10	<0.10		mg/L	
9991147	EC0	RPD [YK0735-02]	F2 (C10-C16 Hydrocarbons)	2020/09/10	NC		%	30
9992045	STI	Matrix Spike [YK0721-05]	Orthophosphate (P)	2020/09/09		101	%	80 - 120
9992045	STI	Spiked Blank	Orthophosphate (P)	2020/09/09		98	%	80 - 120
9992045	STI	Method Blank	Orthophosphate (P)	2020/09/09	<0.0030		mg/L	
9992045	STI	RPD [YK0721-05]	Orthophosphate (P)	2020/09/09	9.1		%	20
9992378	IK0	Spiked Blank	Alkalinity (Total as CaCO3)	2020/09/10		92	%	80 - 120
9992378	IK0	Method Blank	Alkalinity (PP as CaCO3)	2020/09/10	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2020/09/10	<1.0		mg/L	
			Bicarbonate (HCO3)	2020/09/10	<1.0		mg/L	
			Carbonate (CO3)	2020/09/10	<1.0		mg/L	
			Hydroxide (OH)	2020/09/10	<1.0		mg/L	
9992378	IK0	RPD	Alkalinity (PP as CaCO3)	2020/09/10	NC		%	20
			Alkalinity (Total as CaCO3)	2020/09/10	1.5		%	20
			Bicarbonate (HCO3)	2020/09/10	1.0		%	20
			Carbonate (CO3)	2020/09/10	NC		%	20

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hydroxide (OH)	2020/09/10	NC		%	20
9992381	IK0	Spiked Blank	pH	2020/09/10		99	%	97 - 103
9992381	IK0	RPD	pH	2020/09/10	1.6		%	N/A
9992382	IK0	Spiked Blank	Conductivity	2020/09/10		100	%	90 - 110
9992382	IK0	Method Blank	Conductivity	2020/09/10	<2.0		uS/cm	
9992382	IK0	RPD	Conductivity	2020/09/10	0.55		%	10
9992616	BFE	Matrix Spike [YK0720-04]	Total Ammonia (N)	2020/09/10		93	%	80 - 120
9992616	BFE	Spiked Blank	Total Ammonia (N)	2020/09/09		97	%	80 - 120
9992616	BFE	Method Blank	Total Ammonia (N)	2020/09/09	<0.015		mg/L	
9992616	BFE	RPD [YK0720-04]	Total Ammonia (N)	2020/09/09	5.4		%	20
9992784	KD9	Matrix Spike [YK0731-07]	Dissolved Nitrite (N)	2020/09/09		107	%	80 - 120
			Dissolved Nitrate (N)	2020/09/09		106	%	80 - 120
9992784	KD9	Spiked Blank	Dissolved Nitrite (N)	2020/09/09		103	%	80 - 120
			Dissolved Nitrate (N)	2020/09/09		102	%	80 - 120
9992784	KD9	Method Blank	Dissolved Nitrite (N)	2020/09/09	<0.010		mg/L	
			Dissolved Nitrate (N)	2020/09/09	<0.010		mg/L	
9992784	KD9	RPD [YK0731-07]	Dissolved Nitrite (N)	2020/09/09	NC		%	20
			Dissolved Nitrate (N)	2020/09/09	NC		%	20
9992976	HE1	Matrix Spike	Total Dissolved Solids	2020/09/10		101	%	80 - 120
9992976	HE1	Spiked Blank	Total Dissolved Solids	2020/09/10		98	%	80 - 120
9992976	HE1	Method Blank	Total Dissolved Solids	2020/09/10	<10		mg/L	
9992976	HE1	RPD	Total Dissolved Solids	2020/09/10	2.8		%	20
9992979	AP1	Matrix Spike	Total Suspended Solids	2020/09/10		101	%	80 - 120
9992979	AP1	Spiked Blank	Total Suspended Solids	2020/09/10		99	%	80 - 120
9992979	AP1	Method Blank	Total Suspended Solids	2020/09/10	<1.0		mg/L	
9992979	AP1	RPD	Total Suspended Solids	2020/09/10	NC		%	20
9992981	HE1	Matrix Spike	Total Suspended Solids	2020/09/10		116	%	80 - 120
9992981	HE1	Spiked Blank	Total Suspended Solids	2020/09/10		89	%	80 - 120
9992981	HE1	Method Blank	Total Suspended Solids	2020/09/10	<1.0		mg/L	
9992981	HE1	RPD	Total Suspended Solids	2020/09/10	8.6		%	20
9993619	IK0	Spiked Blank	Alkalinity (Total as CaCO3)	2020/09/10		91	%	80 - 120
9993619	IK0	Method Blank	Alkalinity (PP as CaCO3)	2020/09/10	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2020/09/10	<1.0		mg/L	
			Bicarbonate (HCO3)	2020/09/10	<1.0		mg/L	
			Carbonate (CO3)	2020/09/10	<1.0		mg/L	
			Hydroxide (OH)	2020/09/10	<1.0		mg/L	
9993619	IK0	RPD	Alkalinity (PP as CaCO3)	2020/09/10	NC		%	20
			Alkalinity (Total as CaCO3)	2020/09/10	0.56		%	20
			Bicarbonate (HCO3)	2020/09/10	0.56		%	20
			Carbonate (CO3)	2020/09/10	NC		%	20
			Hydroxide (OH)	2020/09/10	NC		%	20
9993626	IK0	Spiked Blank	pH	2020/09/10		99	%	97 - 103
9993626	IK0	RPD	pH	2020/09/10	0.57		%	N/A
9993627	IK0	Spiked Blank	Conductivity	2020/09/10		100	%	90 - 110
9993627	IK0	Method Blank	Conductivity	2020/09/10	<2.0		uS/cm	
9993627	IK0	RPD	Conductivity	2020/09/10	0.79		%	10
9993753	FM0	Matrix Spike	Total Phosphorus (P)	2020/09/11		99	%	80 - 120
9993753	FM0	QC Standard	Total Phosphorus (P)	2020/09/11		90	%	80 - 120
9993753	FM0	Spiked Blank	Total Phosphorus (P)	2020/09/11		91	%	80 - 120
9993753	FM0	Method Blank	Total Phosphorus (P)	2020/09/11	<0.0030		mg/L	
9993753	FM0	RPD	Total Phosphorus (P)	2020/09/11	9.9		%	20
9994139	HG	Matrix Spike [YK0725-04]	Total Ammonia (N)	2020/09/10		91	%	80 - 120
9994139	HG	Spiked Blank	Total Ammonia (N)	2020/09/10		97	%	80 - 120
9994139	HG	Method Blank	Total Ammonia (N)	2020/09/10	<0.015		mg/L	

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9994139	HG	RPD [YK0725-04]	Total Ammonia (N)	2020/09/10	NC		%	20
9994144	HG	Matrix Spike [YK0731-04]	Total Ammonia (N)	2020/09/10		93	%	80 - 120
9994144	HG	Spiked Blank	Total Ammonia (N)	2020/09/10		98	%	80 - 120
9994144	HG	Method Blank	Total Ammonia (N)	2020/09/10	<0.015		mg/L	
9994144	HG	RPD [YK0731-04]	Total Ammonia (N)	2020/09/10	NC		%	20
9994168	HG	Matrix Spike [YK0732-04]	Total Ammonia (N)	2020/09/11		98	%	80 - 120
9994168	HG	Spiked Blank	Total Ammonia (N)	2020/09/11		103	%	80 - 120
9994168	HG	Method Blank	Total Ammonia (N)	2020/09/11	<0.015		mg/L	
9994168	HG	RPD [YK0732-04]	Total Ammonia (N)	2020/09/11	NC		%	20
9994755	AD5	Matrix Spike [YK0718-03]	Total Aluminum (Al)	2020/09/11		105	%	80 - 120
			Total Antimony (Sb)	2020/09/11		112	%	80 - 120
			Total Arsenic (As)	2020/09/11		111	%	80 - 120
			Total Barium (Ba)	2020/09/11		NC	%	80 - 120
			Total Beryllium (Be)	2020/09/11		100	%	80 - 120
			Total Bismuth (Bi)	2020/09/11		96	%	80 - 120
			Total Boron (B)	2020/09/11		103	%	80 - 120
			Total Cadmium (Cd)	2020/09/11		103	%	80 - 120
			Total Cesium (Cs)	2020/09/11		107	%	80 - 120
			Total Chromium (Cr)	2020/09/11		97	%	80 - 120
			Total Cobalt (Co)	2020/09/11		90	%	80 - 120
			Total Copper (Cu)	2020/09/11		85	%	80 - 120
			Total Iron (Fe)	2020/09/11		NC	%	80 - 120
			Total Lead (Pb)	2020/09/11		99	%	80 - 120
			Total Lithium (Li)	2020/09/11		98	%	80 - 120
			Total Manganese (Mn)	2020/09/11		NC	%	80 - 120
			Total Mercury (Hg)	2020/09/11		108	%	80 - 120
			Total Molybdenum (Mo)	2020/09/11		123 (1)	%	80 - 120
			Total Nickel (Ni)	2020/09/11		90	%	80 - 120
			Total Selenium (Se)	2020/09/11		94	%	80 - 120
			Total Silicon (Si)	2020/09/11		NC	%	80 - 120
			Total Silver (Ag)	2020/09/11		101	%	80 - 120
			Total Strontium (Sr)	2020/09/11		NC	%	80 - 120
			Total Thallium (Tl)	2020/09/11		103	%	80 - 120
			Total Tin (Sn)	2020/09/11		108	%	80 - 120
			Total Titanium (Ti)	2020/09/11		103	%	80 - 120
			Total Uranium (U)	2020/09/11		112	%	80 - 120
			Total Vanadium (V)	2020/09/11		102	%	80 - 120
			Total Zinc (Zn)	2020/09/11		87	%	80 - 120
			Total Zirconium (Zr)	2020/09/11		125 (1)	%	80 - 120
9994755	AD5	Spiked Blank	Total Aluminum (Al)	2020/09/11		104	%	80 - 120
			Total Antimony (Sb)	2020/09/11		108	%	80 - 120
			Total Arsenic (As)	2020/09/11		102	%	80 - 120
			Total Barium (Ba)	2020/09/11		107	%	80 - 120
			Total Beryllium (Be)	2020/09/11		104	%	80 - 120
			Total Bismuth (Bi)	2020/09/11		102	%	80 - 120
			Total Boron (B)	2020/09/11		106	%	80 - 120
			Total Cadmium (Cd)	2020/09/11		105	%	80 - 120
			Total Cesium (Cs)	2020/09/11		102	%	80 - 120
			Total Chromium (Cr)	2020/09/11		102	%	80 - 120
			Total Cobalt (Co)	2020/09/11		97	%	80 - 120
			Total Copper (Cu)	2020/09/11		101	%	80 - 120
			Total Iron (Fe)	2020/09/11		101	%	80 - 120
			Total Lead (Pb)	2020/09/11		102	%	80 - 120
			Total Lithium (Li)	2020/09/11		99	%	80 - 120

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Manganese (Mn)	2020/09/11		101	%	80 - 120
			Total Mercury (Hg)	2020/09/11		103	%	80 - 120
			Total Molybdenum (Mo)	2020/09/11		109	%	80 - 120
			Total Nickel (Ni)	2020/09/11		102	%	80 - 120
			Total Selenium (Se)	2020/09/11		104	%	80 - 120
			Total Silicon (Si)	2020/09/11		106	%	80 - 120
			Total Silver (Ag)	2020/09/11		102	%	80 - 120
			Total Strontium (Sr)	2020/09/11		104	%	80 - 120
			Total Thallium (Tl)	2020/09/11		102	%	80 - 120
			Total Tin (Sn)	2020/09/11		105	%	80 - 120
			Total Titanium (Ti)	2020/09/11		105	%	80 - 120
			Total Uranium (U)	2020/09/11		108	%	80 - 120
			Total Vanadium (V)	2020/09/11		101	%	80 - 120
			Total Zinc (Zn)	2020/09/11		104	%	80 - 120
			Total Zirconium (Zr)	2020/09/11		106	%	80 - 120
9994755	AD5	Method Blank	Total Aluminum (Al)	2020/09/11	<3.0		ug/L	
			Total Antimony (Sb)	2020/09/11	<0.50		ug/L	
			Total Arsenic (As)	2020/09/11	<0.10		ug/L	
			Total Barium (Ba)	2020/09/11	<1.0		ug/L	
			Total Beryllium (Be)	2020/09/11	<0.10		ug/L	
			Total Bismuth (Bi)	2020/09/11	<1.0		ug/L	
			Total Boron (B)	2020/09/11	<50		ug/L	
			Total Cadmium (Cd)	2020/09/11	<0.010		ug/L	
			Total Cesium (Cs)	2020/09/11	<0.20		ug/L	
			Total Chromium (Cr)	2020/09/11	<1.0		ug/L	
			Total Cobalt (Co)	2020/09/11	<0.20		ug/L	
			Total Copper (Cu)	2020/09/11	<0.50		ug/L	
			Total Iron (Fe)	2020/09/11	<10		ug/L	
			Total Lead (Pb)	2020/09/11	<0.20		ug/L	
			Total Lithium (Li)	2020/09/11	<2.0		ug/L	
			Total Manganese (Mn)	2020/09/11	<1.0		ug/L	
			Total Mercury (Hg)	2020/09/11	<0.050		ug/L	
			Total Molybdenum (Mo)	2020/09/11	<1.0		ug/L	
			Total Nickel (Ni)	2020/09/11	<1.0		ug/L	
			Total Selenium (Se)	2020/09/11	<0.10		ug/L	
			Total Silicon (Si)	2020/09/11	<100		ug/L	
			Total Silver (Ag)	2020/09/11	<0.020		ug/L	
			Total Strontium (Sr)	2020/09/11	<1.0		ug/L	
			Total Thallium (Tl)	2020/09/11	<0.010		ug/L	
			Total Tin (Sn)	2020/09/11	<5.0		ug/L	
			Total Titanium (Ti)	2020/09/11	<5.0		ug/L	
			Total Uranium (U)	2020/09/11	<0.10		ug/L	
			Total Vanadium (V)	2020/09/11	<5.0		ug/L	
			Total Zinc (Zn)	2020/09/11	<5.0		ug/L	
			Total Zirconium (Zr)	2020/09/11	<0.10		ug/L	
9994755	AD5	RPD [YK0718-03]	Total Aluminum (Al)	2020/09/11	4.9		%	20
			Total Antimony (Sb)	2020/09/11	NC		%	20
			Total Arsenic (As)	2020/09/11	1.4		%	20
			Total Barium (Ba)	2020/09/11	0.10		%	20
			Total Beryllium (Be)	2020/09/11	NC		%	20
			Total Bismuth (Bi)	2020/09/11	NC		%	20
			Total Boron (B)	2020/09/11	0.88		%	20
			Total Cadmium (Cd)	2020/09/11	9.2		%	20
			Total Cesium (Cs)	2020/09/11	NC		%	20

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Chromium (Cr)	2020/09/11	2.0		%	20
			Total Cobalt (Co)	2020/09/11	2.3		%	20
			Total Copper (Cu)	2020/09/11	11		%	20
			Total Iron (Fe)	2020/09/11	2.2		%	20
			Total Lead (Pb)	2020/09/11	0.25		%	20
			Total Lithium (Li)	2020/09/11	0.86		%	20
			Total Manganese (Mn)	2020/09/11	1.0		%	20
			Total Mercury (Hg)	2020/09/11	NC		%	20
			Total Molybdenum (Mo)	2020/09/11	2.9		%	20
			Total Nickel (Ni)	2020/09/11	0.020		%	20
			Total Selenium (Se)	2020/09/11	11		%	20
			Total Silicon (Si)	2020/09/11	0.92		%	20
			Total Silver (Ag)	2020/09/11	NC		%	20
			Total Strontium (Sr)	2020/09/11	0.71		%	20
			Total Thallium (Tl)	2020/09/11	NC		%	20
			Total Tin (Sn)	2020/09/11	NC		%	20
			Total Titanium (Ti)	2020/09/11	NC		%	20
			Total Uranium (U)	2020/09/11	0.75		%	20
			Total Vanadium (V)	2020/09/11	NC		%	20
			Total Zinc (Zn)	2020/09/11	NC		%	20
			Total Zirconium (Zr)	2020/09/11	0.63		%	20
9995223	NMA	Matrix Spike	Total Organic Carbon (C)	2020/09/11		107	%	80 - 120
9995223	NMA	Spiked Blank	Total Organic Carbon (C)	2020/09/11		111	%	80 - 120
9995223	NMA	Method Blank	Total Organic Carbon (C)	2020/09/11	<0.50		mg/L	
9995223	NMA	RPD	Total Organic Carbon (C)	2020/09/11	3.1		%	20
9995504	MB5	Matrix Spike	Dissolved Chloride (Cl)	2020/09/14		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2020/09/14		NC	%	80 - 120
9995504	MB5	Spiked Blank	Dissolved Chloride (Cl)	2020/09/14		113	%	80 - 120
			Dissolved Sulphate (SO4)	2020/09/14		102	%	80 - 120
9995504	MB5	Method Blank	Dissolved Chloride (Cl)	2020/09/14	<1.0		mg/L	
			Dissolved Sulphate (SO4)	2020/09/14	<1.0		mg/L	
9995504	MB5	RPD	Dissolved Chloride (Cl)	2020/09/14	0.48		%	20
			Dissolved Sulphate (SO4)	2020/09/14	1.5		%	20
9995558	FM0	Matrix Spike	Total Phosphorus (P)	2020/09/12		95	%	80 - 120
9995558	FM0	QC Standard	Total Phosphorus (P)	2020/09/12		81	%	80 - 120
9995558	FM0	Spiked Blank	Total Phosphorus (P)	2020/09/12		86	%	80 - 120
9995558	FM0	Method Blank	Total Phosphorus (P)	2020/09/12	<0.0030		mg/L	
9995558	FM0	RPD	Total Phosphorus (P)	2020/09/12	2.7		%	20
9995816	MB5	Matrix Spike	Dissolved Chloride (Cl)	2020/09/14		NC	%	80 - 120
			Dissolved Sulphate (SO4)	2020/09/14		NC	%	80 - 120
9995816	MB5	Spiked Blank	Dissolved Chloride (Cl)	2020/09/14		115	%	80 - 120
			Dissolved Sulphate (SO4)	2020/09/14		103	%	80 - 120
9995816	MB5	Method Blank	Dissolved Chloride (Cl)	2020/09/14	<1.0		mg/L	
			Dissolved Sulphate (SO4)	2020/09/14	<1.0		mg/L	
9995816	MB5	RPD	Dissolved Chloride (Cl)	2020/09/14	0.54		%	20
			Dissolved Sulphate (SO4)	2020/09/14	1.7		%	20
9998299	MAP	Matrix Spike	Dissolved Calcium (Ca)	2020/09/15		NC	%	80 - 120
			Dissolved Iron (Fe)	2020/09/15		102	%	80 - 120
			Dissolved Magnesium (Mg)	2020/09/15		102	%	80 - 120
			Dissolved Manganese (Mn)	2020/09/15		NC	%	80 - 120
			Dissolved Potassium (K)	2020/09/15		109	%	80 - 120
			Dissolved Sodium (Na)	2020/09/15		NC	%	80 - 120
9998299	MAP	Spiked Blank	Dissolved Calcium (Ca)	2020/09/15		104	%	80 - 120
			Dissolved Iron (Fe)	2020/09/15		108	%	80 - 120

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Magnesium (Mg)	2020/09/15		102	%	80 - 120
			Dissolved Manganese (Mn)	2020/09/15		107	%	80 - 120
			Dissolved Potassium (K)	2020/09/15		100	%	80 - 120
			Dissolved Sodium (Na)	2020/09/15		100	%	80 - 120
9998299	MAP	Method Blank	Dissolved Calcium (Ca)	2020/09/15	<0.30		mg/L	
			Dissolved Iron (Fe)	2020/09/15	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2020/09/15	<0.20		mg/L	
			Dissolved Manganese (Mn)	2020/09/15	<0.0040		mg/L	
			Dissolved Potassium (K)	2020/09/15	<0.30		mg/L	
			Dissolved Sodium (Na)	2020/09/15	<0.50		mg/L	
9998299	MAP	RPD	Dissolved Calcium (Ca)	2020/09/15	0.44		%	20
			Dissolved Magnesium (Mg)	2020/09/15	0.55		%	20

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.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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)

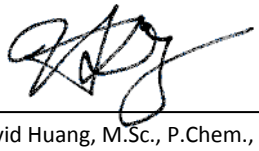
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

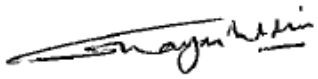
Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

VALIDATION SIGNATURE PAGE

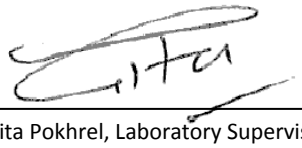
The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



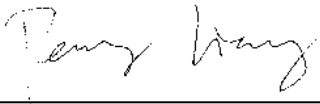
David Huang, M.Sc., P.Chem., QP, Scientific Services Manager



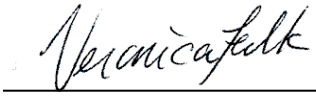
Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Gita Pokhrel, Laboratory Supervisor



Harry (Peng) Liang, Senior Analyst



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.

Bureau Veritas Laboratories Calgary: 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY # W 28002-H	
Page ___ of ___	1
Page ___ of ___	
Page ___ of ___	2
Page ___ of ___	
Page ___ of ___	3
Page ___ of ___	
Page ___ of ___	4
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	

COOLER OBSERVATIONS:

MAXXAM JOB#: C064167

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓		TEMP	9.3	4.4	5.8
INTACT	✓					
ICE PRESENT	✓			1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓		TEMP	8.3	9.7	8.4
INTACT	✓					
ICE PRESENT	✓			1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓		TEMP	9.1	6.5	3.3
INTACT	✓					
ICE PRESENT	✓			1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓		TEMP	9.2	7.4	8.1
INTACT	✓					
ICE PRESENT	✓			1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3

CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT			TEMP			
INTACT						
ICE PRESENT				1	2	3

RECEIVED BY (SIGN & PRINT)		DATE (YYYY/MM/DD)	TIME (HH:MM)
Jose Mercado	[signature]	2020/09/04	16:20

Maxxam
A Bureau Veritas Group Company

ADDITIONAL COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

Page	CHAIN OF CUSTODY #
Page 1 of 1	W28002
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	
Page ___ of ___	

COOLER OBSERVATIONS:

	YES	NO	COOLER ID	1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	2	0	1
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	0	0	1
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	0	1	-1
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT	✓					
INTACT	✓		TEMP	2	1	2
ICE PRESENT	✓					
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						

MAXXAM JOB#: C064167

	YES	NO	COOLER ID	1	2	3
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						
CUSTODY SEAL	YES	NO	COOLER ID			
PRESENT						
INTACT			TEMP			
ICE PRESENT						

RECEIVED BY (SIGN & PRINT)	DATE (YYYY/MM/DD)	TIME (HH:MM)
Jasmine Maymne / Jasmine M	2020/09/08	06:20

323

Custody Tracking Form

W28002-H

Please use this form for custody tracking when submitting the work instructions via eCOC (electronic Chain Of Custody). Please ensure your form has a barcode or a BV Labs eCOC confirmation number in the top right hand side. This number links your electronic submission to your samples.

First Sample: CAM_GW_SNP_7A_2020_02
Last Sample: DUP1_SW_SNP_2020_02
Sample Count: 18

Relinquished By				Received By			
Roxanne Pyke	R Pyke	Date	2020/09/04	Jasmine Maumre	Jasmine M	Date	2020/09/08
		Time (24 HR)	16:00			Time (24 HR)	00:20
		Date				Date	
		Time (24 HR)				Time (24 HR)	
		Date				Date	
		Time (24 HR)				Time (24 HR)	

Unless otherwise agreed to, submissions and use of services are governed by Bureau Veritas' standard terms and conditions which can be found at www.bvlabs.com

Submission Triage Information

Sampled By: Stantec

# of Coolers/Pkgs: 4

Rush ☐ Immediate Test ☐ Food Residue ☐

Micro ☐ Food Chemistry ☐

*** LAB USE ONLY ***

Received At

Labeled By

Verified By

Comments:

C064167

Received in Yellowknife
By: V.Mercanov
16:20
SEP 04 2020

Temp: / /

Ice - yes
CS - yes
} pls. see ACTR

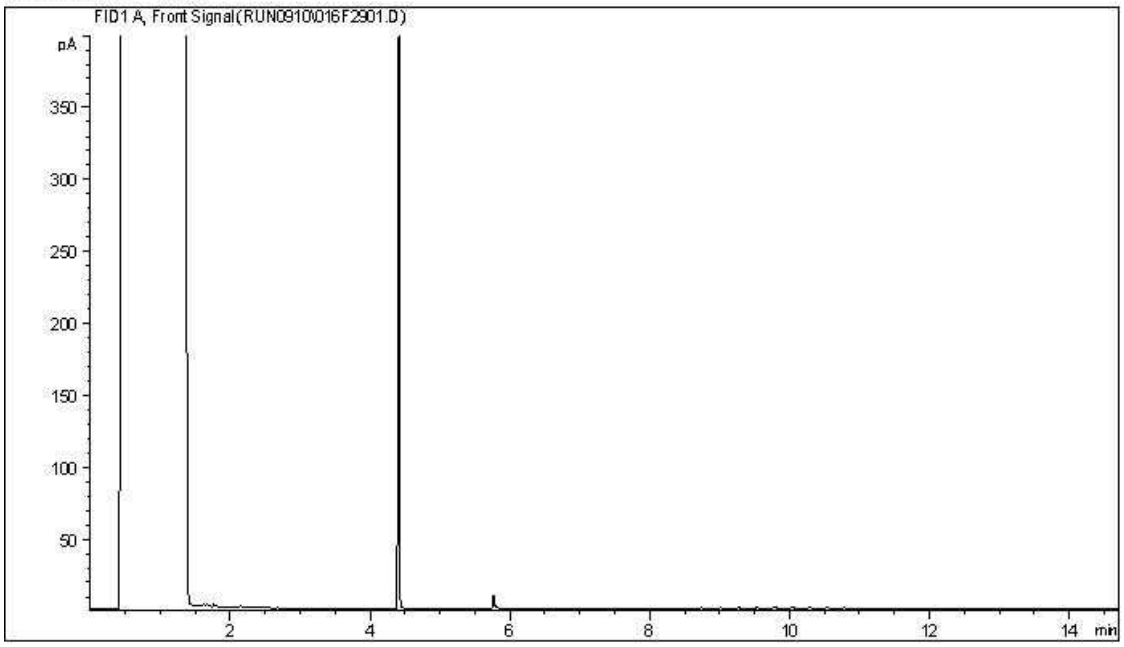
Custody Seal		Cooling	Temperature °C		
Present (Y/N)	Intact (Y/N)	Cooling Media (Y/N)	1	2	3
	MCAL	Refer to ACTR			

Page 1 of 1

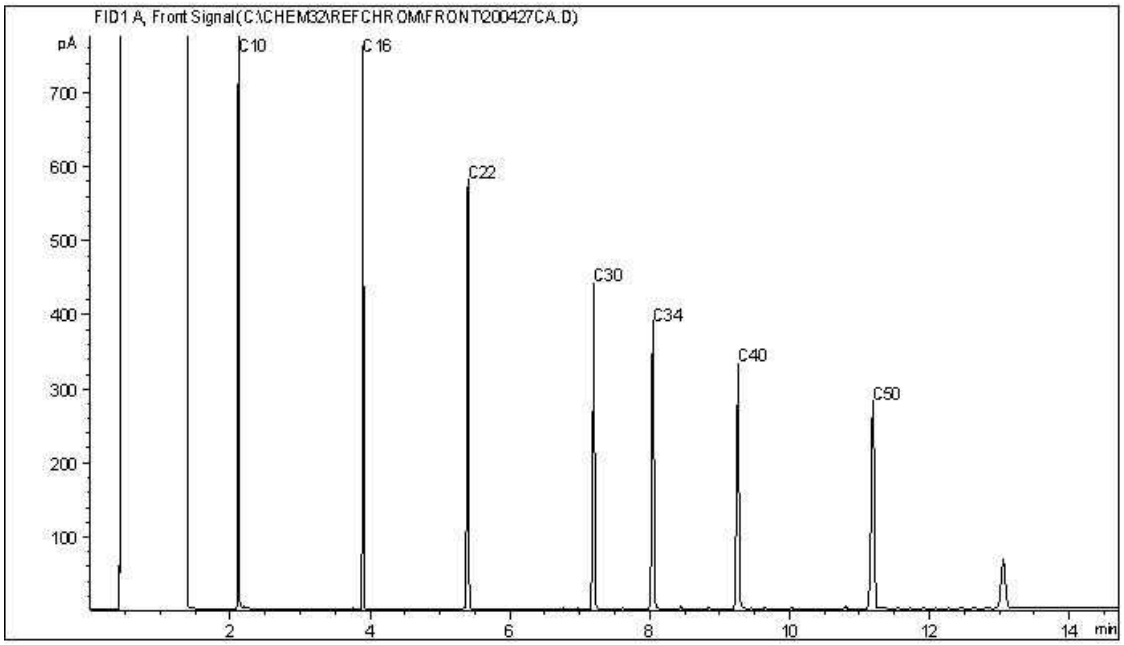
COR FCD-00383 / 1

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



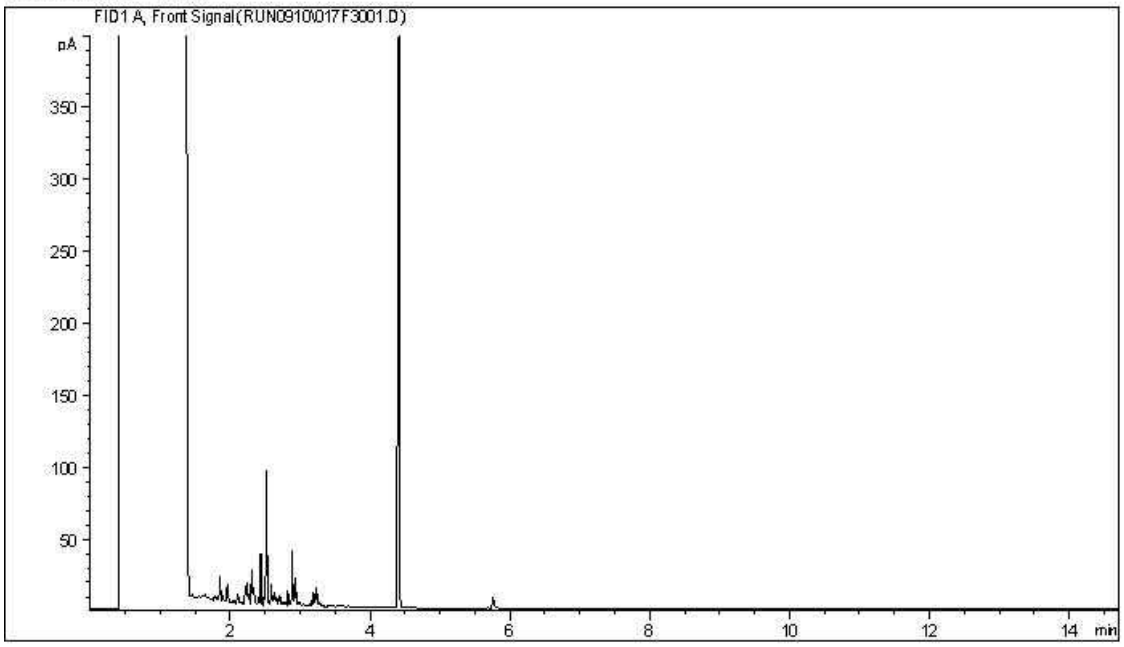
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

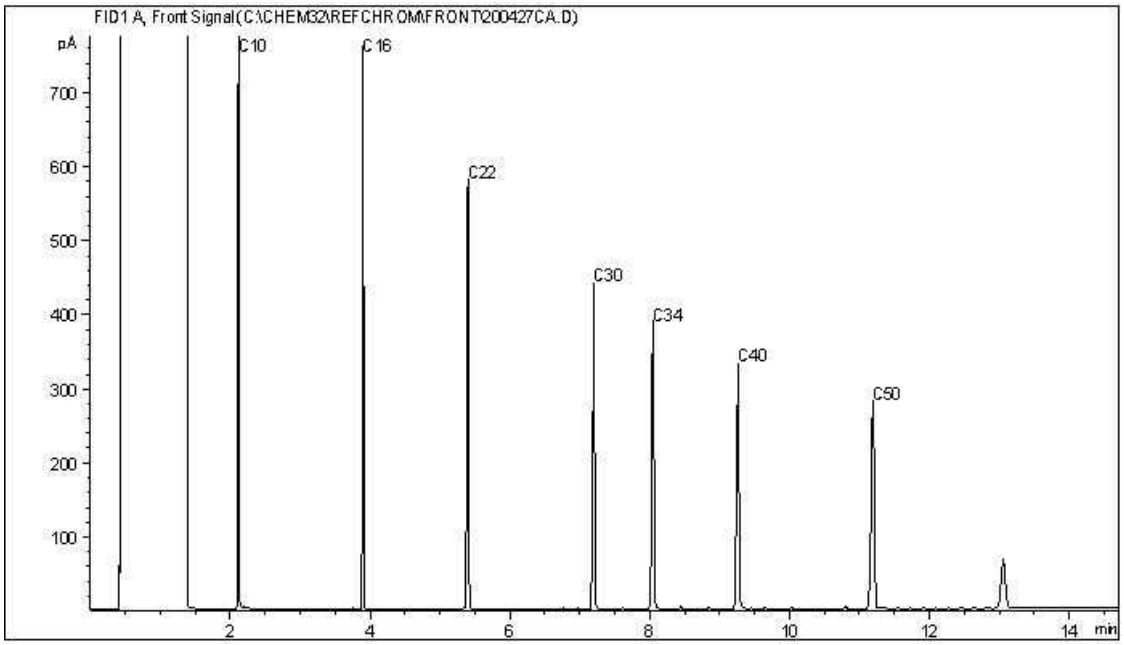
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



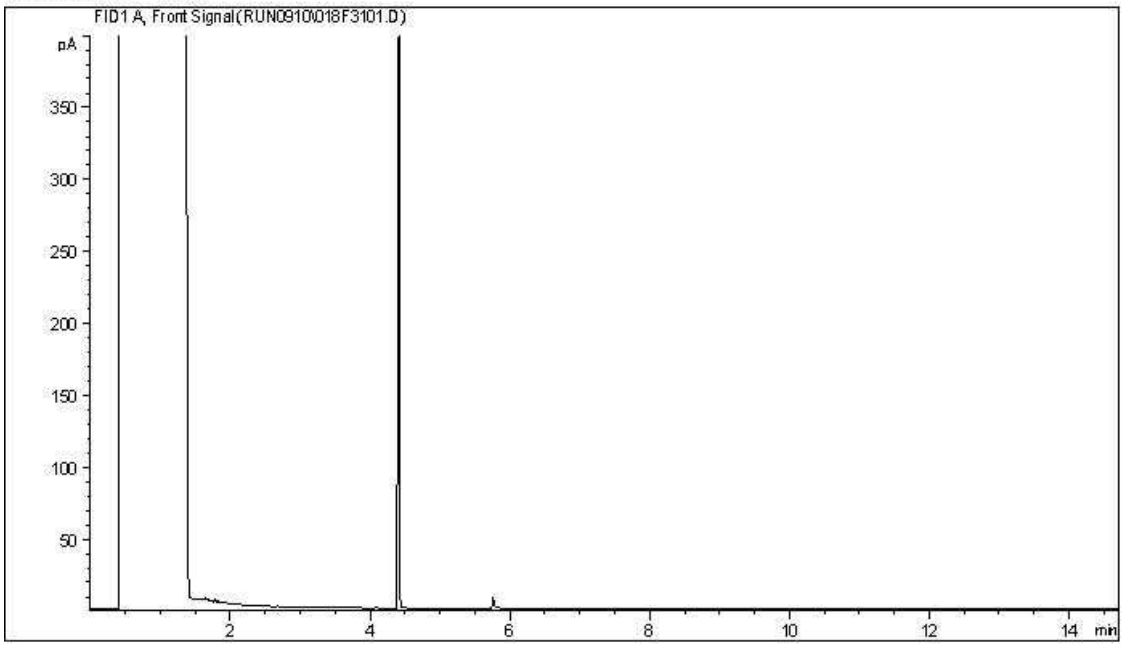
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

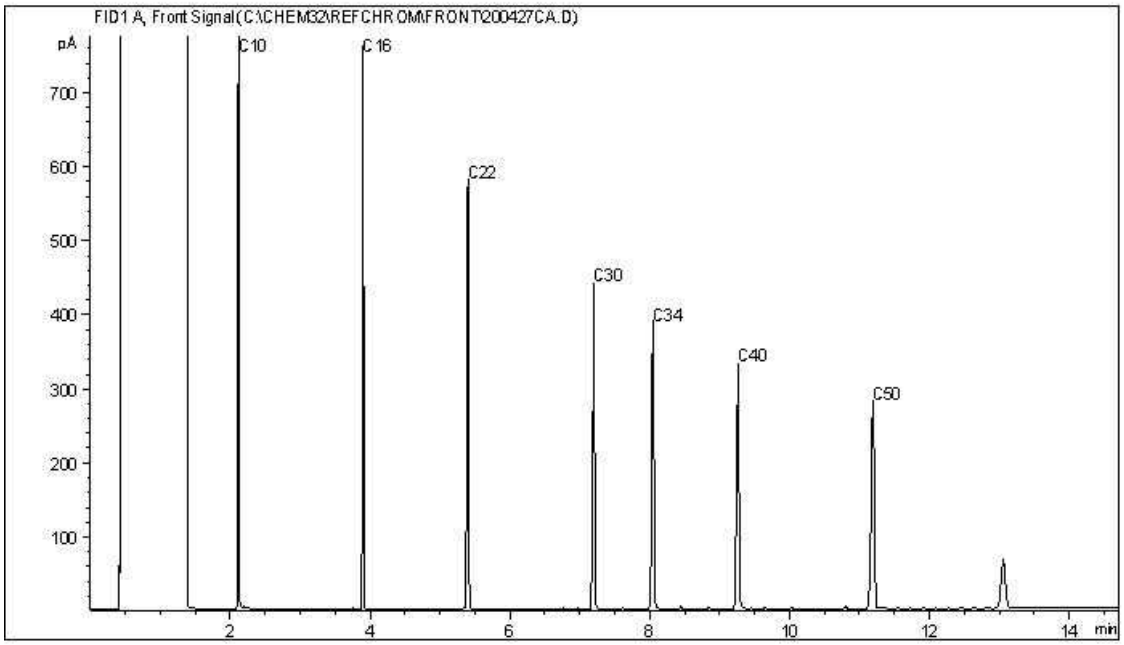
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



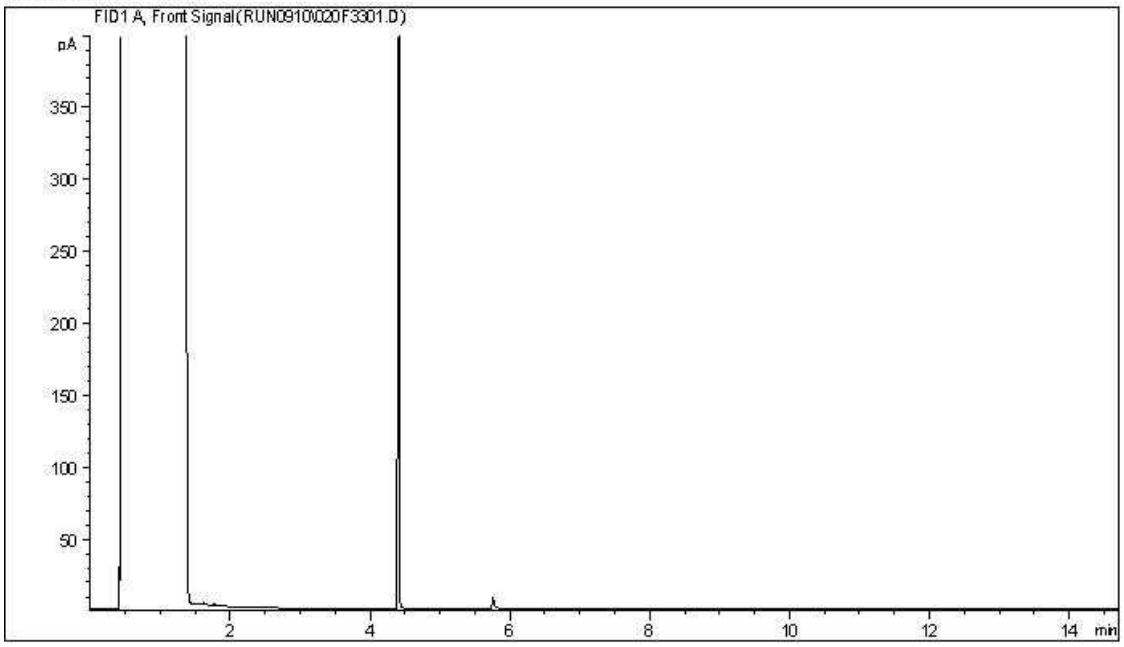
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

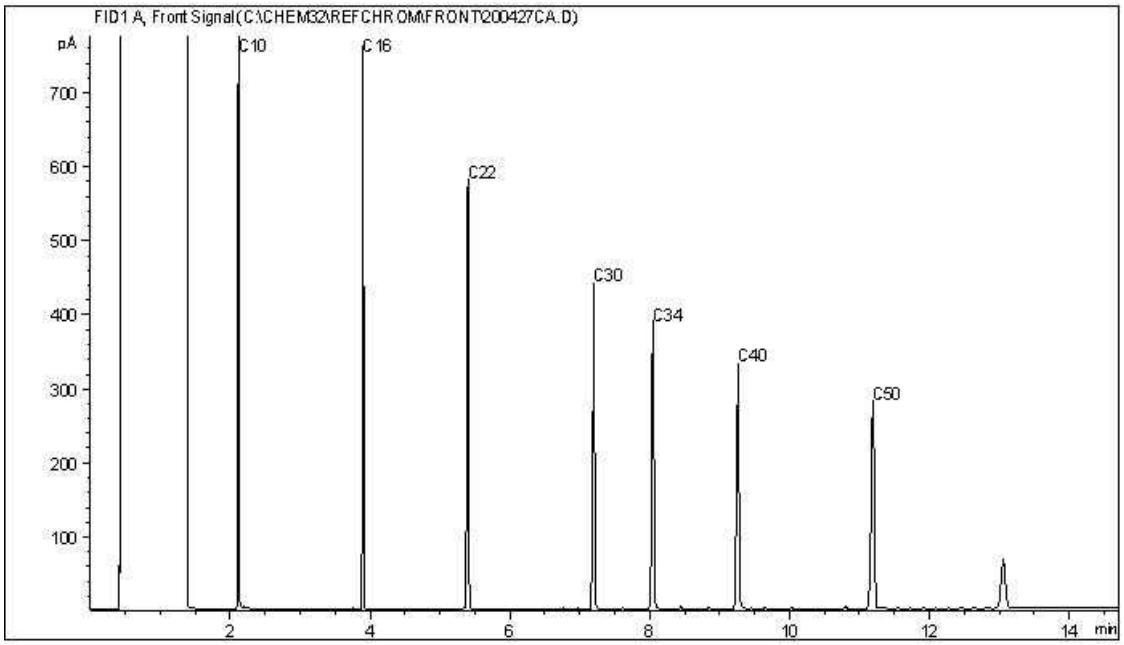
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



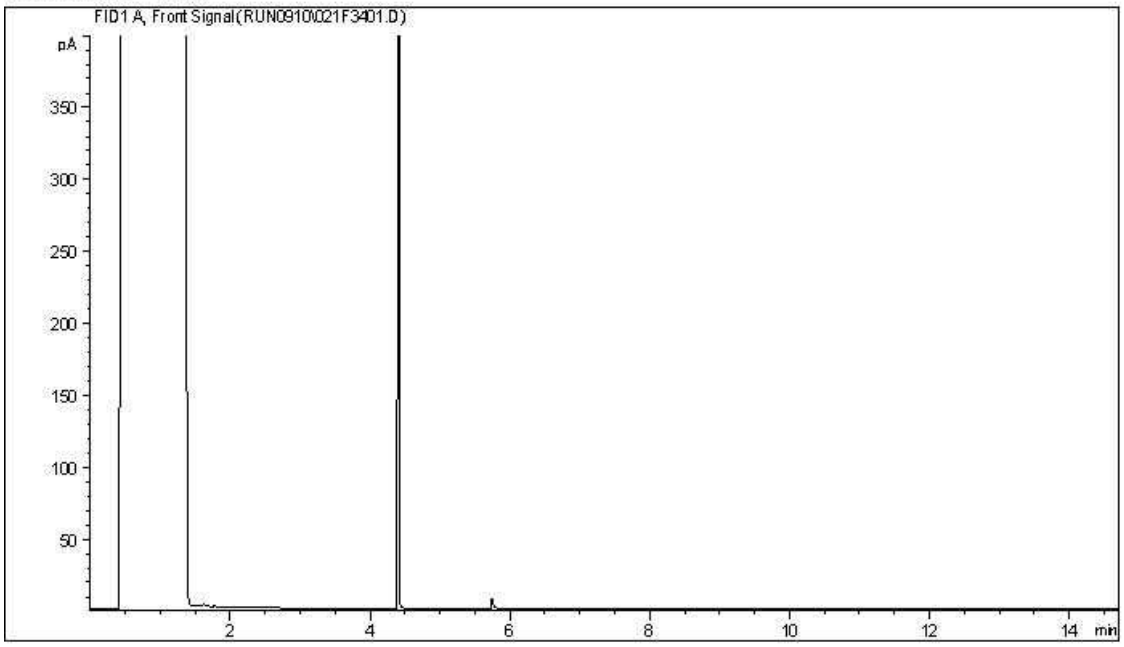
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

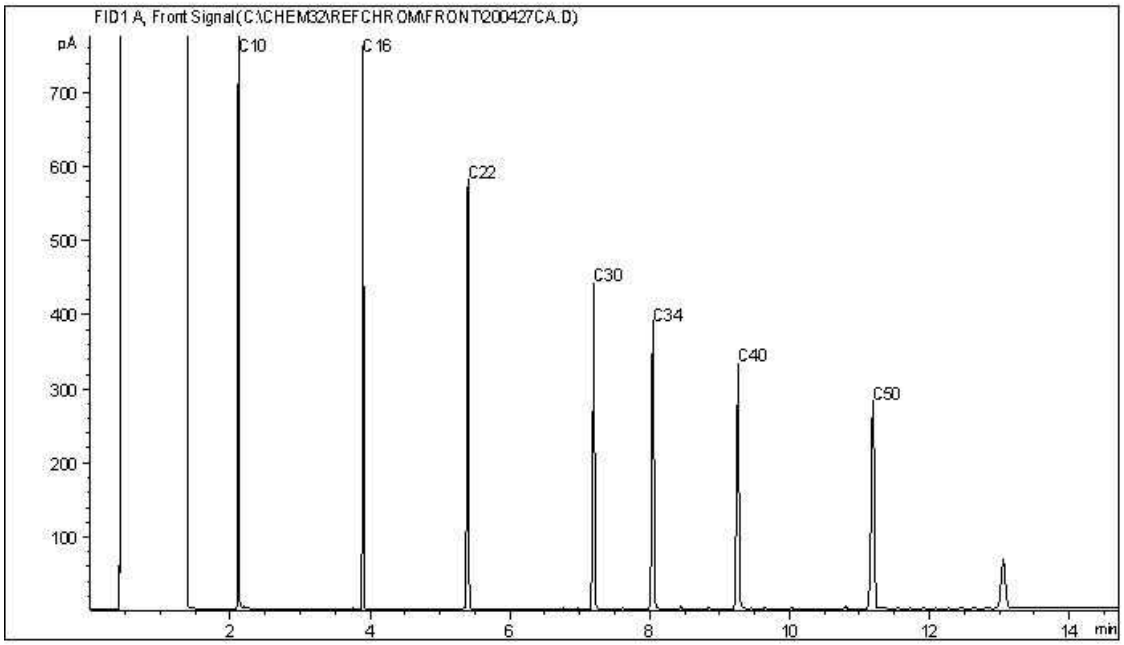
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



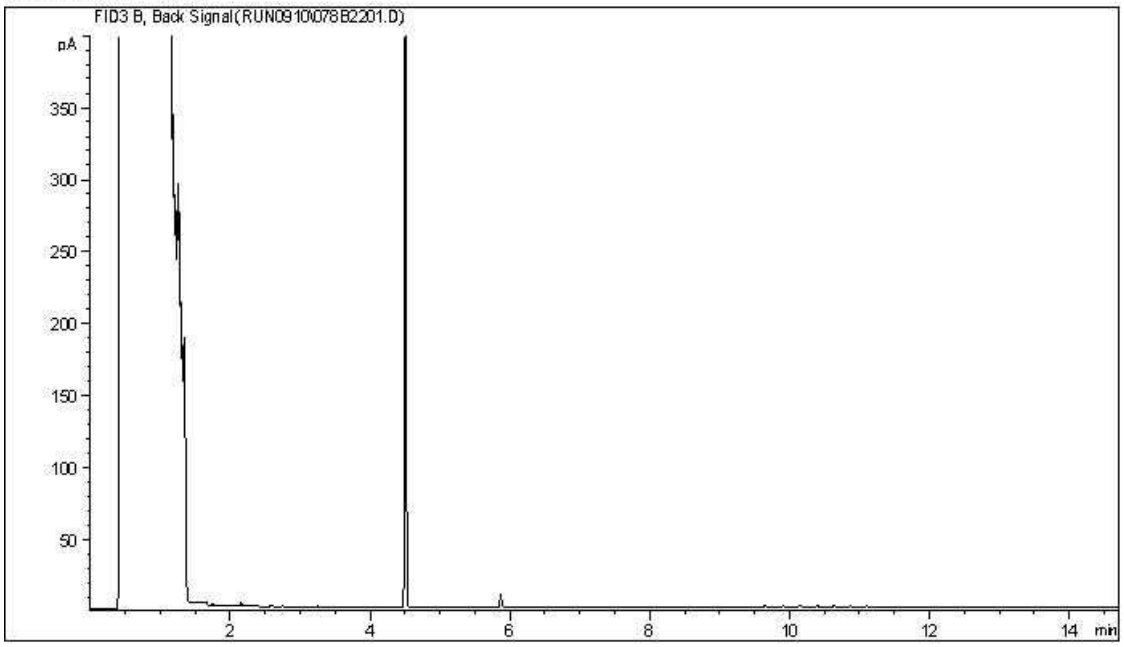
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

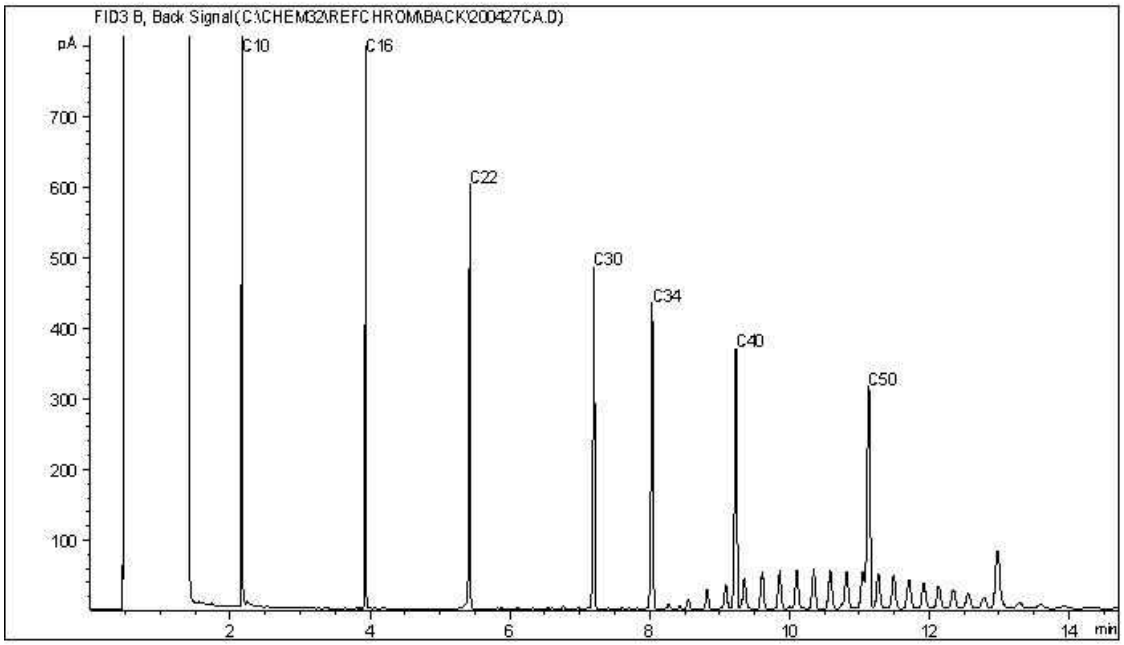
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons in Water (F2; C10-C16) Chromatogram

Instrument: GC13



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.