



**FINAL REPORT**

**Additional Assessment - Steps 5 to 7  
of the Federal Approach to Contaminated Sites**  
*Former Burgeo Rifle Range, Burgeo, NL*

Submitted to:

**Defence Construction Canada (DCC)**

Annette Murphy  
Defence Construction Canada  
175 Western Parkway, Suite 100  
Bedford, NS  
B4B 0V1

DCC Project #GR082101  
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Submitted by:

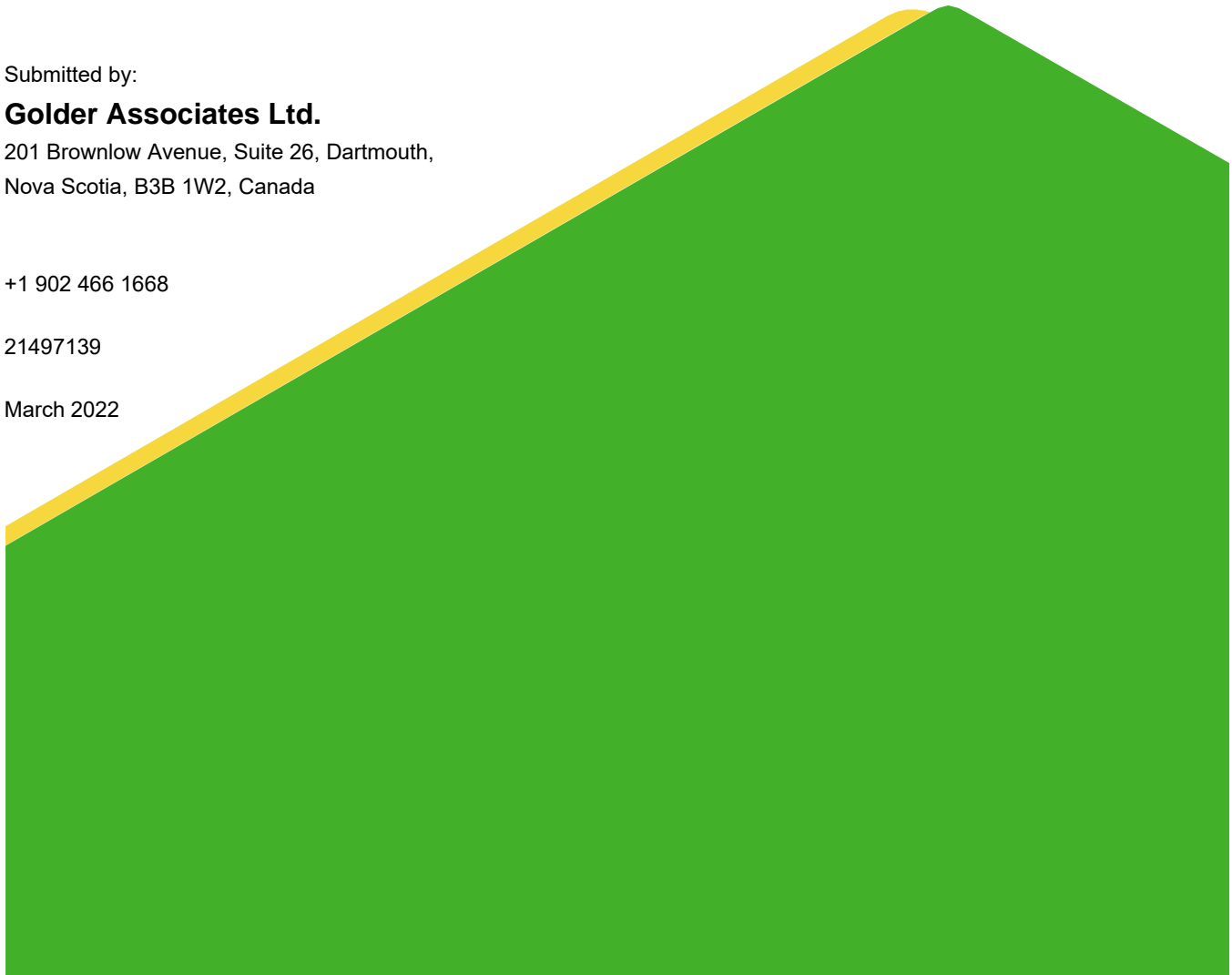
**Golder Associates Ltd.**

201 Brownlow Avenue, Suite 26, Dartmouth,  
Nova Scotia, B3B 1W2, Canada

+1 902 466 1668

21497139

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## Distribution List

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## Executive Summary

Golder Associates Ltd. (Golder) was retained by Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), to provide consulting services for completing Environmental Site Assessment (ESA) Steps 5 to 7 of the Federal Approach to Contaminated Sites (FACS) at the Burgeo Range, Burgeo, Newfoundland and Labrador (NL), in accordance with the Contaminated Site Management Working Group's FACS, including ESAs and the National Classification System (NCS) for Contaminated Sites (CS). This report is based on the Statement of Work (SOW) provided by DCC, dated September 2021 (file number GR082101), and Golder's proposal dated October 5, 2021.

The Department of National Defence is responsible for a former small arms rifle range set up near the Town of Burgeo (the Burgeo range). The property was leased from the Government of Newfoundland and Labrador (Crown lands) for use by the 5th Canadian Ranger Patrol Group (5CRPG) in 2008 (Location 1). Use of the Burgeo range was discontinued by 5CRPG in approximately 2010. DND was contacted by the Province of NL (Water Resources Division) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the Range and obtain closure from the Province, if required.

A second location (Location 2), near Location 1 but across the road, was also used as a firing range by 5CRPG. A DND Environmental Assessment Form from 2003 was recently discovered that indicates this second location was planned to be used as a rifle range. Information on this form specifies that this range was originally put in place by the Local Wildlife Office and 5 CRPG planned to use a portion of this range. Photos from Location 2, taken in 2021, show evidence of range use. There is a small stream flowing through the area and a few small ponds and marshes on the Site. Figure 1 shows the Site plan, including Locations 1 and 2.

In 2019, historical information was limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicated that the range (Location 1) was still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs have been installed at the Range. Assessment work was completed at Location 1 in 2020 (Golder, 2021) and generally findings indicated soil, groundwater, sediment and/or surface water impacts for various inorganic metals in comparison against representative background conditions and/or applicable guidelines for that time. Data gaps remain with regards to site-specific background concentrations, potential leachate from soil to groundwater (which can accumulate at Long Pond) and delineation of localized metals contamination in soil, sediment, and surface water.

This report details the field investigation, methodologies, analytical results of samples in comparison to applicable criteria, and makes conclusions and recommendations. A preliminary remediation & risk management strategy was completed for the Site. The preliminary remediation & risk management strategy identifies data gaps currently present that will be required to be filled to support the strategy (e.g. delineation of contaminants in soil and sediment, further site characterization, habitat assessment, toxicity testing).

Potential Contaminants of Concern (COCs) related to the historic activities (rifle range) at the Site include metals, PAHs, PHCs and BTEX, in surface soil, sediment, surface water, and/or groundwater were considered.

Based on the findings of the analytical program, metals concentrations in soil (Location 1), sediment (Location 1 and 2), surface water (Location 1 and 2), and groundwater (Location 1), as well as PAH concentrations in sediment (Location 1 and 2), have been found to exceed the applicable guidelines, and are attributed or likely attributed to bullets and casings from firing activities which includes the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Based on the findings of the assessment, a NCSCS score of 62.0 was calculated for the former Burgeo Range. As such, the former Burgeo Range is identified as Site Letter Grade C Class 2 site with a medium priority for action.

A preliminary blended remedial/risk management strategy was created for the Site. Elevated impacts in soil, sediment, and surface water in the high-activity firing area in Location 1 (in the area of the former DND firing range) are recommended to be addressed through remedial measures, while scattered impacts in soil, sediment, and surface water in areas of the Site not in close proximity to the former DND firing range are recommended to be addressed through a risk management approach. Additional assessment is recommended to assess data gaps to support both the remediation strategy in the high-activity firing area (e.g. delineation) as well as future risk management work for the farther out areas.

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## 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), to provide consulting services for completing Environmental Site Assessment (ESA) Steps 5 to 7 of the Federal Approach to Contaminated Sites (FACS) at the Burgeo Range, Burgeo, Newfoundland and Labrador (NL), in accordance with the Contaminated Site Management Working Group's FACS, including ESAs and the National Classification System (NCS) for Contaminated Sites (CS). This report is based on the Statement of Work (SOW) provided by DCC, dated September 2021 (file number GR082101), and Golder's proposal dated October 5, 2021.

## 2.0 BACKGROUND

### 2.1 Site Description

The Department of National Defence is responsible for a former small arms rifle range set up near the Town of Burgeo (the Burgeo range). The property was leased from the Government of Newfoundland and Labrador (Crown lands) for use by the 5th Canadian Ranger Patrol Group (5CRPG) in 2008 (Location 1). Use of the Burgeo range was discontinued by 5CRPG in approximately 2010. DND was contacted by the Province of NL (Water Resources Division) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the Range and obtain closure from the Province, if required.

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In 2019, historical information was limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicated that the range (Location 1) was still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs have been installed at the Range. Assessment work was completed at Location 1 in 2020 (Golder, 2021) and generally findings indicated soil, groundwater, sediment and/or surface water impacts for various inorganic metals in comparison against representative background conditions and/or applicable guidelines for that time. Data gaps remain with regards to site-specific background concentrations, potential leachate from soil to groundwater (which can accumulate at Long Pond) and delineation of localized metals contamination in soil, sediment, and surface water.

There is limited infrastructure on Site and no engineered controls.

## 2.2 2021 Golder Report on Steps 1 to 4 of the FACS

The Golder 2021 report entitled “Steps 1 to 4 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL” provided an initial testing program for the Site. The Site was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Zone 3 is located approximately 1150 m away from the zone 1 high-risk area and is considered to be representative of background conditions. Based on the findings of the analytical program, petroleum hydrocarbon (PHC) exceedances were identified in soil and sediment at the Site. However, additional analyses conducted by the lab indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Several metal exceedances in soil, sediment, and surface water were identified and considered to have resulted due to elevated background concentrations common to the Site and surrounding area. The concentrations of selenium and cadmium in the soil samples were fairly consistent across the Site, with some of the higher concentrations located in zone 3. The concentrations of aluminum and iron in surface water were also fairly consistent across the Site. Analytical data suggested the elevated concentrations of these metals are common to the Site and suggested that zone 3 can be considered representative of background conditions. However, presence of lead, tin and zinc in soil, lead in sediment, and lead and copper in surface water at the Site, all in Zone 1, were attributed to bullets and casings from firing activities which included the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Soil, surface water and sediment data exceedances on the Site are located in the area of the former firing range. Lead and iron concentrations in surface water are present in the pond adjacent to the former firing range, which discharges to the south toward Long Pond (a drinking water source for the Town of Burgeo), located approximately 1.2 km hydraulically down-gradient of the Site. Elevated iron concentrations are noted in the source water database for Long Pond from the Government of Newfoundland and Labrador Department of Environment and Conservation Water Resources Management Division’s (WRMD) Newfoundland and Labrador Water Resources Portal (collected from 1998 to 2018) suggesting iron is associated with background concentrations in the region. Lead concentrations in Long Pond source water data have been below the Guidelines for Canadian Drinking Water Quality. Although there are lead concentrations in the pond located on the south portion of the Site and there is a potential for migration to the south, it was inferred to be localized and not migrating to Long Pond.

Data gaps were identified with regards to site-specific background concentrations, potential leachate from soil to groundwater and delineation of localized metals contamination in soil, sediment, and surface water. As such, additional assessment was recommended to mitigate the identified impacts at the Site including collection of soil samples to laterally delineate the identified impacts and evaluate potential leaching into groundwater. In order to evaluate groundwater quality at the Site, installation of monitoring wells was recommended. Additional soil, sediment and surface water samples to establish Site-specific background concentrations were also recommended. Species at risk public registry search was recommended to be completed to confirm if species at risk are documented on or near the Site and to identify if the Site is considered critical habitat. It was noted that mitigation measures may involve risk assessment followed by remedial option evaluation.

## 2.3 Site Visit

Golder completed a Site visit at Burgeo on November 17 and 18, 2021. The field team consisted of Golder's Site Supervisor and two field technologists with Golder's subcontractor, Sikumiut Environmental Management (SEM). During the Site visit, the existing Site conditions were observed and documented. An initial reconnaissance of Location 2 was conducted, as well as an update reconnaissance at Location 1. A debris survey was conducted at both locations, to identify the type and quantity of debris found at each location. Sample locations at Location 2 were determined during the Site visit, based on features observed at the Site (e.g. firing point, targets, backstop, debris locations, etc.). A 5 CRPG representative did not accompany Golder for the Site visit.

During the initial Site visit conducted on November 30, 2020, as part of the previous field program, Golder met on-Site with local 5 CRPG representative, Cpl. Cyril Warren. Cpl. Warren identified areas of interest at Location 1, including the backstop, the 5CRPG firing spot, the former location of targets used by Burgeo residents prior to DND's lease period, the location where Burgeo residents have been known to fire across a waterbody onsite for target practice, and the location where Burgeo residents have been known to fire at clay targets and setup a clay target launcher. Cpl. Warren indicated that Burgeo residents also access the Site for activities such as berry picking.

Photos from the Site visits can be found in Appendix A.

## 2.4 Sampling Plan

A sampling and analytical plan (SAP) was developed in support of the follow-up work required to conduct additional assessment (at Location 1) and initial assessment (at Location 2), re-classify the Site, and develop and implement a remediation strategy consistent with Steps 5 to 7 of the FACS to aid in site closure. An initial SAP was developed prior to the Site visit and, upon completion of the Site visit, the SAP was confirmed and finalized based on information gathered during the Site visit. The SAP included details of the proposed media to be sampled and proposed sample locations including sample IDs and associated figures. The SAP also outlined the technical procedures associated with the proposed sample collection methods (and backup collection methods should the first method not be used due to unforeseen circumstances), the analytical methods and laboratory detection limits, and the number and type of quality control (QC) samples (i.e., blind duplicates). The SAP identified a total of 17 shallow soil samples at 17 locations in Location 1 and a total of 32 shallow soil samples at 16 locations in Locations 2, surface water samples at 25 locations in Location 1 and 10 locations in Location 2, sediment samples at 24 locations in Location 1 and 9 locations in Location 2, and groundwater samples at 5 locations in Location 1 and 3 locations in Location 2 to be collected and analyzed for PHCs, PAHs, and metals. Five (5) of the surface water and groundwater samples were also identified to be analyzed for general chemistry.

Given that guidance from the Government of Newfoundland and Labrador had changed from the time of the previous investigation with regards to applicable guidelines to compare analytical data to, a comparison of last year's data to the now-applicable guidelines was conducted. Based on this review, an additional 30 delineation samples were added to the sampling program, to delineate metals at 6 previous sampling locations that had exceedances identified when compared to the now-applicable guidelines. At each sample location, a delineation sample to the east, west, north, south, and beneath (vertically) were collected.

Based on the results of the Site reconnaissance, the drilling/monitoring well installation (and therefore groundwater sampling) scope of work was reduced to the collection of 3 groundwater samples in Location 1. Drill rig access to Location 2, and beyond the gravel access roadway area in Location 1 was impeded by boggy conditions and rough terrain.

### 3.0 REGULATORY FRAMEWORK

The Site land use classification is based on current land use as a protected water conservation area and future use as Crown Land. Federal guidance (CCME A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines, 2006), considers agricultural land use classification appropriate for sensitive land use scenarios for natural areas. Non-potable groundwater conditions are considered to be applicable to the Site as no potable wells are located in the vicinity of the Site; however, surface water from the Site likely discharges to the protected water conservation area (provides a water supply to the Town of Burgeo) located on the south portion of the Site and south of the Site.

Guidelines associated with agricultural land use, non-potable groundwater and coarse-grained soil (as a conservative approach) will be used for screening purposes. Given the Site will be divested to the Province of NL, provincial regulatory guidance was followed. The applicable guidelines are detailed in the following sections.

#### 3.1 Soil

For PHCs and benzene, toluene, ethylbenzene and xylene (BTEX), Atlantic Risk-Based Corrective Action (RBCA) Tier I Risk-Based Screening Levels (RBSLs) are protective of human health pathways, while the Atlantic RBCA Ecological Screening Levels (ESLs) are protective of ecological health. These are applicable for screening PHCs and BTEX.

For parameters other than PHCs and BTEX, the Atlantic RBCA Human Health Based Tier 1 Environmental Quality Standards (EQS<sub>HH</sub>) are protective of human health, while the Atlantic RBCA Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>ECO</sub>) are protective of ecological health. These are the primary applicable screening criteria for metals and PAHs in soil. In the absence of criteria from the Atlantic RBCA EQS, the Canadian Council of Ministers of the Environment (CCME) guidelines were considered as applicable screening criteria. The CCME defines generic guidelines to assess contaminant impacts in soil. The *CCME Soil Quality Guidelines (SQGs) for the Protection of Environmental and Human Health* are risk-based numerical guidelines that are divided into categories based on land use. These CCME SQGs will be used to screen soil quality for human and ecological health effects for non-hydrocarbon parameters such as metals (CCME, 2021). For PAHs, CCME (2010), presents a single human health soil quality guideline (SQG<sub>HH</sub>) for carcinogenic PAHs via direct contact pathways that is expressed as the benzo[a]pyrene total potency equivalent (B[a]P TPE). The B[a]P TPE is the sum of the estimated cancer potency relative to B[a]P for carcinogenic PAHs. The B[a]P TPE for a soil sample is calculated by multiplying the concentration of each of these PAHs in the sample by its B[a]P potency equivalence factor (PEF) and summing these products on the basis that the PAHs have similar modes of toxic action but different potencies. The PEFs are order of magnitude estimates of carcinogenic potency relative to benzo(a)pyrene outlined in the CCME (2010) factsheet on PAH guidelines. For the purposes of this assessment, guidelines will be based on an incremental lifetime cancer risk (ILCR) of  $10^{-5}$  for human receptors as this risk level is considered to be acceptable for receptors on federal properties (Health Canada, 2021). CCME only provides PEFs for benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene. Therefore, these parameters were assessed for only carcinogenic effects for human health through the B[a]P TPE.

In the absence of RBCA EQS or CCME SQGs, the Nova Scotia Environment (NSE) Environmental Quality Standards (EQS) were used as the applicable screening criteria.

## 3.2 Sediment

The Atlantic RBCA Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life was used for screening PHCs and BTEX in sediment.

For parameters other than PHCs and BTEX, the Atlantic RBCA Sediment Ecological Tier 1 Environmental Quality Standards (EQS) were used as the primary applicable screening criteria for metals and PAHs. In the absence of Atlantic RBCA EQS, the CCME Sediment Quality Guidelines for the Protection of Aquatic Life (CCME SEQG) were considered as applicable screening criteria. These are numerical guidelines derived for the protection of aquatic ecological receptors (CCME, 2021). The guidelines are divided into freshwater and marine water categories within which interim sediment quality guidelines (ISQGs) and probable effect levels (PELs) are provided. The ISQG and PEL represent the lower and upper range of concentrations respectively for sediment concentrations associated with adverse biological effects. As a conservative approach, and given that the Site will be remediated to agricultural land use, the ISQGs were used, however the PELs will be presented for information purposes only.

Note that since the above sediment screening criteria are only protective of ecological health, potential exposure to human receptors should be mitigated through risk management measures.

In the absence of Atlantic RBCA EQS or CCME SEQG, applicable screening criteria from NSE EQS for freshwater sediment from the Notification of Contamination Protocol PRO-100 (NSE, 2021) were considered.

## 3.3 Surface Water

For PHCs and BTEX, the Atlantic RBCA surface water ESLs for the protection of freshwater and marine aquatic life were considered the applicable screening criteria.

For parameters other than PHCs and BTEX, the Atlantic RBCA Sediment Ecological Tier 1 Environmental Quality Standards (EQS) were used as the primary applicable screening criteria for metals and PAHs. In the absence of Atlantic RBCA EQS, the CCME Water Quality Guidelines for the Protection of Aquatic Life (CCME WQG-PAL) were considered as applicable screening criteria. These WQGs are numerical guidelines derived for the protection of aquatic ecological receptors (CCME, 2021). The guidelines are divided into freshwater and marine water categories within which values for short- and long-term exposure are provided. With respect to the Site, CCME WQG for the Protection of Fresh Aquatic Life (CCME WQG PAL) for long term exposure in freshwater were considered to be most applicable.

Note that since the above sediment screening criteria are only protective of ecological health, potential exposure to human receptors should be mitigated through risk management measures.

In the absence of Atlantic RBCA EQS or CCME WQG-PAL, applicable screening criteria from NSE EQS for surface water for freshwater environments from the Notification of Contamination Protocol PRO-100 (NSE, 2021) were considered.

## 3.4 Groundwater

For PHCs and BTEX, Atlantic Risk-Based Corrective Action (RBCA) Tier I Risk-Based Screening Levels (RBSLs) are protective of human health pathways, while the Atlantic RBCA Ecological Screening Levels (ESLs) are protective of ecological health. These are applicable for screening PHCs and BTEX.



For parameters other than PHCs and BTEX, the Atlantic RBCA Human Health Based Tier 1 Environmental Quality Standards (EQSHH) are protective of human health, while the Atlantic RBCA Soil Ecological Tier 1 Environmental Quality Standards (EQSECO) are protective of ecological health. These are the primary applicable screening criteria for metals and PAHs in groundwater. In the absence of Atlantic RBCA EQS, the Federal Contaminated Sites Action Plan (FCSAP) Federal Interim Groundwater Quality Guidelines (FIGQGs) were considered as applicable screening criteria. The FIGQGs are presented in the document entitled Guidance Document on Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites (FCSAP, 2016). These are risk-based guidelines developed to protect against the potential adverse effects to human health and the environment, and are developed into categories based on land use and the grain size of soil. The FIGQGs for agricultural land use and coarse-grained soils were considered for screening purposes.

## 4.0 METHODOLOGY

The field sampling program was completed from November 17, 2021 to November 27, 2021, and December 17 to 19, 2021. The objective of the field program was to determine the presence or absence of suspected contaminants based on the historical and current activities at the Site – primarily used as a shooting range. All sampling locations and sample IDs of the sampled media were in accordance with industry accepted field methods and sampling protocols. Location 1 was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Location 1 sample locations are found on Figures 2 through 7. Location 2 sample locations are found on Figures 8 and 9.

The sampling program was completed in compliance with guidelines provided in Golder's Standard Operating Procedures (SOP), which maintain the industry standards and provincial/federal requirements. Throughout the program, the Site characteristics, weather conditions, and field observations were recorded. Spatial coordinates of all sampling locations were taken with a Geneq SXBlue II handheld global positioning system (GPS), which has an accuracy of 0.6 m. A photo log is included in Appendix A.

### 4.1 Soil Sampling

A total of 48 soil samples were collected from 48 sample locations in Location 1 (Figures 2-4); at depths of either 0 to 0.15 metres below ground surface (mbgs) and 0.15 to 0.30 mbgs, hereafter referred to as "shallow" and "deep" samples, respectively. Six field duplicates were also collected in Location 1. A total of 71 soil samples were collected at 55 locations in Location 2 (Figure 8). Two blind field duplicates were also collected in Location 2.

Soil samples were obtained using a stainless-steel trowel and shovel. The trowel and shovel were decontaminated prior to sampling activities and before each subsequent sample location, in accordance with Golder's SOPs, using Simple Green biodegradable all-purpose cleaner. Care was taken to exclude any deleterious materials (i.e., grass, roots, and foreign materials) from the sample. When handling the soil samples a pair of clean, disposable nitrile gloves were worn to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. Using the shovel, a hole was dug at each sample location to a depth of approximately 0.3 mbgs. Using the trowel, the samples were collected from the sidewall of each hole, over the depth intervals mentioned above of 0 to 0.15 mbgs and 0.15 to 0.3 mbgs.

Each of the samples was split into two components upon collection. One component of each sample was placed into labelled, pre-cleaned, laboratory-supplied sample containers and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. The second component of the sample was placed in a labelled plastic bag for subsequent field

headspace measurement for organic combustible vapours. Soil descriptions, including visual and olfactory observations, and results of the soil headspace measurements were recorded in the field.

Table 1, appended to this report, details the soil samples that were collected, including their spatial coordinates, depth, headspace reading, description, and location information.

Samples were not able to be collected from the following sample locations due to no soil being present at each location (e.g. bedrock outcrop or refusal on bedrock):

- BFR\_L1\_SS1\_D
- BFR\_L1\_SS2\_SA2
- BFR\_L1\_SS2\_A
- BFR\_L2\_SS4\_C

Samples were not collected from the following locations due to overlap with nearby locations:

- BFR\_L2\_SS7\_C
- BFR\_L2\_SS8\_A
- BFR\_L2\_SS8\_C
- BFR\_L2\_SS9\_A

## 4.2 Sediment Sampling

Sediment samples were collected at 22 locations in Location 1 (Figure 5-8) and 8 locations in Location 2 (Figure 9). At each location, a sample was collected from the top 0.15 m of sediment, from the middle of the stream channel or selected sampling stations within larger waterbodies. Three field duplicates (two at Location 1 and one at Location 2) were also collected at the Site.

Sediment samples were collected using a stainless-steel shovel, trowel or Ekman sampler depending on the size, depth, and substrate of the targeted sampling location. The Ekman sampler, trowel, and shovel were decontaminated prior to sampling activities and before each subsequent sample location, in accordance with Golder's SOPs, using Simple Green biodegradable all-purpose cleaner. Care was taken to exclude any deleterious materials (i.e., leaves, roots, organics, and foreign materials) from the sample and free water was allowed to flow out of the sampler or trowel once retrieved. When handling the sediment samples a pair of clean, disposable nitrile gloves were worn to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location.

Each of the samples was placed directly into labelled, pre-cleaned, laboratory-supplied sample containers upon collection and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Sediment descriptions, including visual (i.e., sediment material, texture, and colour) and olfactory observations were recorded in the field.

Table 2, appended to this report, details the sediment samples that were collected, including their spatial coordinates and description.

Samples were not able to be collected from the following sample locations due to no sediment present:

- BFR\_L1\_SED37
- BFR\_L1\_SED38
- BFR\_L1\_SED43
- BFR\_L2\_SED3
- BFR\_L2\_SED10

### 4.3 Surface Water Sampling

Surface water samples were collected at 25 locations in Location 1 (Figure 5-8) and 10 locations in Location 2 (Figure 9). Three field duplicates were also collected (two at Location 1 and one at Location 2) at the Site. At each location, the surface water sample was collected, followed directly by the measurement of field parameters consisting of temperature, pH, and electrical conductivity in water. These parameters were measured using a Hanna Instruments HI98130 Combo pH and electrical conductivity tester. In general, the sediment samples were collected from the same locations and were collected after the measurement of field parameters.

Surface water grab samples were either collected from shore, or by boat. The grab surface water samples were collected by submerging pre-cleaned, laboratory-supplied sample bottles in the water while wearing a pair of clean, disposable nitrile gloves to minimize the potential for cross-contamination, with a new pair of gloves worn for each sample location. In cases where a sample bottle contained a preservative, a similar, clean, laboratory-supplied bottle with no preservative was used to collect the sample and it was then immediately transferred to the bottle with the preservative. The samples were collected just below the water surface to avoid excessive introduction of re-suspended solids from the sediment bed. Once the sample bottle was resealed and labelled, it was placed in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Field observations, including color, odor, turbidity, and sheen were recorded in the field along with the measured field parameters.

Table 3, appended to this report, details the surface water samples that were collected, including their spatial coordinates, measured field parameters, and description.

### 4.4 Groundwater Sampling

Groundwater samples were collected at three newly installed monitoring wells in Location 1 (Figure 5).

Groundwater samples were collected following the development of newly drilled monitoring wells on Site. All monitoring wells were developed before sampling by purging at least three times the well volume. Groundwater sampling was done using low-flow equipment (peristaltic pump). Groundwater levels were measured and recorded prior to sampling using a water-level tape. Low-flow sampling were completed by submerging LDPE tubing into the well to the depth of mid-screen, and purging the water using a peristaltic pump. Field parameters were collected using a YSI flow-through multimeter, and samples were collected once field parameters stabilize. Each of the samples was placed directly into labelled, pre-cleaned, laboratory-supplied sample containers upon collection and stored in a cooler with ice along with a completed chain of custody form and maintained under chain of custody until released to the analytical laboratory for analysis. Field observations, including color, odor, turbidity, and sheen were recorded in the field along with the measured field parameters.

Table 4, appended to this report, details the groundwater samples that were collected, including their spatial coordinates and measured field parameters.

## 4.5 Analytical Program

The laboratory analyses of the soil, groundwater, sediment, and surface water samples collected during the field program were originally sent to Bureau Veritas Laboratories (BV Labs) in Bedford, NS. BV Labs is ISO 9001 registered and accredited by the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA). Just prior to receipt of samples at BV Labs, BV Labs suffered a cyber attack. Given the need to have samples analyzed in a timely manner, samples were sent from BV Labs to AGAT Laboratories (AGAT) in Dartmouth, NS. AGAT is also accredited by the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA).

### 4.5.1 Soil

Of the 48 soil samples collected in Location 1, all 48 were submitted to the laboratory and analyzed for metals, while 21 of the samples were additionally analyzed for PHCs and PAHs.

Of the 71 soil samples collected in Location 2, 16 samples were analyzed for metals, PHCs, and PAHs, while one additional sample was analyzed for metals only. The remaining samples (collected for delineation purposes) were sent to the laboratory but were not analyzed.

Table 5, appended to this report, summarizes the analyses completed on each soil sample.

### 4.5.2 Sediment

All 22 sediment samples in Location 1, all eight samples in Location 2, and three field duplicates (two at Location 1 and one at Location 2) were analyzed for PHCs, PAHs, and metals.

Table 6, appended to this report, summarizes the analyses completed on each sediment sample.

### 4.5.3 Surface Water

All 25 surface water samples in Location 1 and all 10 samples in Location 2 and three field duplicates (two at Location 1 and one at Location 2) were analyzed for PHCs, PAHs, and metals. Three samples from Location 1 and two samples from Location 2 were also analyzed for general chemistry.

Table 7, appended to this report, summarizes the analyses completed on each surface water sample.

### 4.5.4 Groundwater

All three groundwater samples and one field duplicate were analyzed for PHCs, PAHs, and metals.

Table 8, appended to this report, summarizes the analyses completed on each groundwater sample.

## 4.6 Survey

A drone survey of Location 1 was completed using a Sensefly eBee+ survey grade, autonomous fixed wing unmanned aerial vehicle (UAV), operated by SEM, on November 30, 2020, as part of the previous field investigation. During this field investigation, a similar drone survey of Location 2 was conducted on November 18, 2021. The survey area was input into the drone flight software and a flight plan was created automatically. After take-off, the UAV flew in a gridded pattern taking still images at a pre-defined interval, ensuring coverage for the entire Site. The images captured during the flight as well as the flight data from the GPS and inertial measurement

unit (IMU) of the UAV were used as inputs in eMotion and Pix4D software packages to produce georeferenced, orthomosaic imagery with a resolution of 5cm/pixel (drone survey plan). The drone survey plan is included in Appendix B.

A legal survey and description of the current License to Occupy (LTO) (at Location 1) was completed by the land surveyor, Yates & Woods Ltd in 2020. The survey identified the current lease boundary of the Site to encompass an area of 318.569 Ha. Upon completion of the survey, it became apparent that the portion of the Site to the southwest containing the access road, Rangers firing location, and backstop were not actually a part of the lease area. The survey highlights this portion as proposed additional land to be included in the lease area. As part of the 2021 field program, Yates & Woods conducted a survey of Location 2. The legal survey plans are included in Appendix B. As of the writing of this report, Golder has not yet received the survey plan for Location 2 from Yates & Woods. This will be added to the final report. The additional land proposed to be included in the lease is highlighted in pink on the survey plan. It is understood that DND is in communication with Crown Lands to have this additional land included in the lease boundary.

## 4.7 Quality Assurance / Quality Control (QA / QC)

Golder uses an internal quality management program (GAIMS) which controls the quality of each step of the project. Specific quality control measures applied include:

- Sampling was performed according to Golder's written SOPs. The purpose of these procedures is to minimize uncertainties and biases by obtaining representative samples.
- Field notes were recorded throughout the field program.

As well, to ensure that the samples and analytical results can be considered valid, representative, and reproducible, the field QA/QC program includes the collection of field duplicate samples for soil and groundwater. In addition, the analytical laboratory (AGAT) has its own quality assurance program, including laboratory replicate samples and control standards. The laboratory QA/QC results are included in the laboratory analytical reports provided in Appendix C.

## 5.0 GEOLOGY

Details of the subsurface conditions encountered during the field program are provided in Table 1 appended to this report. It should be noted that the subsurface conditions encountered may vary between and beyond soil sampling locations.

Based on area mapping, the surficial geology in the vicinity of the Site is expected to consist predominantly of exposed bedrock with little or no sediment or vegetation cover and with rare patches of till and other surficial sediment (Liverman and Taylor, 1994). The bedrock geology in the vicinity of the Site consists of weakly foliated to massive, coarse grained, variably K-feldspar porphyritic, biotite granite and adamellite (Gander Zone, Burgeo Granite) (O'Brien and Dickson, 1986).

Based on observations made during the field program, the surficial geology at Location 1 and Location 2 consisted of dark brown silt to silty sand.

## 6.0 RESULTS

Results of the analyses for soil, groundwater, sediment, and sediment at the Site along with the applicable guidelines, are provided in Tables 9-22 following the report. Results provided in Tables 9-22, as well as the below discussion, include samples collected as part of both the 2020 and 2021 field investigations. Laboratory certificates of analysis are provided in Appendix C.

The analytical results for are discussed in the following sections.

### 6.1 Soil Results

The laboratory results for the soil samples collected are compiled in Tables 9 to 11, appended to this report. The laboratory analytical results reports are provided in Appendix C. As mentioned in Sections 2.4 and 4.5.1, the soil samples were analyzed for PHCs, PAHs, and/or metals.

The PHC and PAH concentrations in all soil samples analyzed are below the applicable guidelines.

Various metals exceeded the applicable guidelines.

Boron was found to exceed the CCME SQG at the following locations (in either the original sample or associated step-out sample(s):

- BFR\_SS6, BFR\_SS7, BFR\_SS8, BFR\_SS12, BFR\_SS13, BFR\_SS16, BFR\_SS28

Cadmium was found to exceed the Atlantic RBCA EQS<sub>HH</sub> and CCME SQG at the following locations (in either the original sample or associated step-out sample(s):

- BFR\_SS8, BFR\_SS12, BFR\_SS16, BFR\_SS16, BFR\_SS23, BFR\_SS24, BFR\_L2\_SS15

Iron was found to exceed the Atlantic RBCA EQS<sub>HH</sub> at the following locations (in either the original sample or associated step-out sample(s):

- BFR\_SS1, BFR\_SS12, BFR\_SS12, BFR\_SS13, BFR\_SS25

Selenium was found to exceed the Atlantic RBCA EQS<sub>ECO</sub> and CCME SQG at the following locations (in either the original sample or associated step-out sample(s):

- BFR\_SS1, BFR\_SS4, BFR\_SS5, BFR\_SS6, BFR\_SS7, BFR\_SS8, BFR\_SS9, BFR\_SS10, BFR\_SS11, BFR\_SS12, BFR\_SS13, BFR\_SS14, BFR\_SS15, BFR\_SS16, BFR\_SS18, BFR\_SS19, BFR\_SS20, BFR\_SS21, BFR\_SS22, BFR\_SS23, BFR\_SS24, BFR\_SS25, BFR\_L1\_SS26, BFR\_L1\_SS27, BFR\_L1\_SS28, BFR\_L1\_SS29, BFR\_L1\_SS30, and in all locations in Location 2 (BFR\_L2\_SS1 to BFR\_L2\_SS16)

Exceedances of boron, cadmium, iron and selenium were found across the Site, including in site-specific background sample locations (ie. Samples collected in Location 1 – Zone 1, Location 1 – Zone 2, and in Location 2 – Site-specific background as noted in Table 5, appended to the text). Concentrations of the aforementioned metals found in non-site-specific background areas of the Site were generally within the background range, or on the same order of magnitude. It did not appear that any of the aforementioned metals showed a correlation with other elevated COCs (e.g. lead) in the high-activity firing area. As such, exceedances of boron, cadmium, iron, and selenium were inferred to be due to naturally elevated background concentrations.

Other select metals exceeded the applicable guidelines, primarily in the high-activity firing area, as follows:

- Antimony was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS3 and BFR\_SS7
- Copper was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS7
- Lead was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS2, BFR\_SS3, BFR\_SS7, BFR\_SS12, and BFR\_SS13
- Manganese was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS2
- Tin was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS6
- Vanadium was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS1, BFR\_SS2, BFR\_SS3, BFR\_SS4, BFR\_SS13, BFR\_SS16
- Zinc was found to exceed the applicable guidelines (Atlantic RBCA EQS<sub>ECO</sub>, Atlantic RBCS EQS<sub>HH</sub>, or CCME SQG) at the following locations (in either the original sample or associated step-out sample(s):
  - BFR\_SS7

The soil concentrations exceeding applicable guidelines are presented on Figures 10 to 12 (Location 1) and Figure 20 (Location 2).

All above metals exceedances of the applicable guidelines are found in Location 1 – Zone 1, with the majority found in the area between the firing spot and bullet catch. These exceedances (at locations BFR\_SS1, BFR\_SS2, BFR\_SS3, BFR\_SS4, BFR\_SS6, BFR\_SS7, and BFR\_SS8) are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice (or possibly hunting). Lateral (approximately 5 m step-outs) and vertical delineation (deeper) samples were collected at each 2020 sampling location where metals exceedances of applicable guidelines were found. As can be seen in Table 11 and Figure 10, some of the delineation samples resulted in similar exceedances to what were found in the original samples, and full delineation was not achieved. Metals exceedances found in samples collected outside of the immediate vicinity of the firing area (BFR\_SS12, BFR\_SS13, BFR\_SS16) may be due to firing activities at the Site (e.g. due to wind deposition of particulate/contaminants downwind), however, this is not confirmed. Given the distance from the firing area, it is

possible that firing activity not related to the DND firing range, or other sources (including naturally occurring metals, hunting, etc.) may be the source of this exceedance. Exceedances of vanadium in the vicinity of the access road may possibly due to elevated vanadium found in the fill to construct the access roadway.

## 6.2 Sediment Results

The laboratory results for the sediment samples collected are compiled in Tables 12 to 14, appended to this report. The laboratory analytical results reports are provided in Appendix C. As mentioned in Sections 2.4 and 4.5.2, the sediment samples were analyzed for PHCs, PAHs, and metals.

Exceedances of mTPH of the applicable Atlantic RBCA ESLs were reported in 22 of the 27 samples analyzed in 2020 (including two field duplicates). Upon recommendation from BV Labs, a silica gel cleanup was performed on these samples, and they were then re-analyzed. The silica gel cleanup serves to remove biogenic organics from the sample, in turn providing more accurate results. The mTPH concentrations in 16 of the re-analyzed samples were still above the Atlantic RBCA ESL for the diesel/no. 2 fuel oil or lube oil/no. 6 oil range. The other four re-analyzed samples also still had mTPH concentrations, but they were below the Atlantic RBCA ESL. BV Labs indicated that the concentrations remaining in the samples did not appear to resemble any petroleum products, but rather appear to be of natural and organic origin and not petrogenic in nature; they appeared to mainly be a mixture of peaks around the C32 marker that is normally attributed to highly organic detections. BV Labs also indicated that there were still a few detections for higher molecular weight alkanes, but these levels could not be attributed to any petroleum product as there was no pattern resemblance and there is a lack of secondary indicators (biomarkers). The mTPH concentrations in the sediment samples from the areas of the Site considered to be background (i.e., Location 1 - Zones 2 and 3) ranged from <15 to 690 mg/kg. The mTPH concentrations in the sediment samples from Location 1 - Zone 1 ranged from <15 to 540 mg/kg, except for BFR\_SED13 which had a concentration of 790 mg/kg. The BTEX concentrations in all 27 samples were below the RDL. Based on the results of the 2020 sampling program, 2021 samples were also run with silica gel clean-up. Similarly, 20 of the 33 samples analyzed (including field duplicates) had mTPH exceedances of the applicable Atlantic RBCA ESLs. AGAT similarly commented that the majority (and all those exceeding the applicable guideline) 2021 sediment samples had peaks eluting around the C32 marker, with random peaks throughout the fuel and lube range. No biomarkers were present. As such, all mTPH exceedances were considered to be due to naturally occurring mTPH.

The PAH concentrations in all samples analyzed were below the applicable guidelines, with the following exceptions:

- BFR\_SED6: Chrysene, Fluoranthene, and Pyrene exceeded the CCME ISQGs
- BFR\_SED13: Chrysene and Pyrene exceeded the CCME ISQGs
- BFR\_L1\_SED29: Pyrene exceeded the CCME ISQGs
- BFR\_L2\_SED6: Acenaphthene exceeded the CCME ISQGs.

BFR\_SED6 and BFR\_L1\_SED29 are located within approximately 150 m of the firing range, however are also in close proximity to the highway. BFR\_SED13 is located approximately 850 m from the firing range. BFR\_L2\_SED6 is located in the area of a natural backstop to the west of the firing location in Location 2. In all locations, it is possible that the source of PAHs is historical activities that occurred at the DND firing range.



Select metals also exceed the applicable guidelines (Atlantic RBCA EQS, CCME PELs, and CCME ISQGs) at the Site, including:

- Exceedances of the applicable guidelines for chromium were found in the following samples:
  - BFR\_SED8, BFR\_SED18, BFR\_SED50, and BFR\_L2\_SED2

Three of four (BFR\_SED18, BFR\_SED50, and BFR\_L2\_SED2) are found in locations representative of site-specific background conditions. BFR\_SED8 is located approximately 550 m east of the firing area in Location 1. There are no exceedances of chromium in sediment nearer the firing area in either Location 1 or Location 2. Therefore, exceedances of chromium are also considered elevated background concentrations that are not associated with historical activities at the Site
- Exceedances of the applicable guidelines for selenium (79 of 105 samples collected in 2020 and 2021) were found across the Site, including in sampling locations selected for the purposes of assessing site-specific background conditions. Therefore, exceedances of selenium are also considered elevated background concentrations that are not associated with historical activities at the Site.
- Exceedances of the applicable guidelines for arsenic were found in the following samples:
  - BFR\_L1\_SED29, BFR\_L1\_SED30, BFR\_L1\_SED33, BFR\_L1\_SED42, and BFR\_L2\_SED8
- Exceedances of the applicable guidelines for cadmium were found in the following samples:
  - BFR\_SED6
- Exceedances of the applicable guidelines for iron were found in the following samples:
  - BFR\_L1\_SED30

Given that this is the lone exceedance of iron in sediment at the Site, and iron is found to be naturally elevated in soil on the Site, it is likely that exceedances of iron in sediment are also considered elevated background concentrations that are not associated with historical activities at the Site.
- Exceedances of the applicable guidelines for lead were found in the following samples:
  - BFR\_SED6, BFR\_SED12, BFR\_SED13, BFR\_SED16, BFR\_L1\_SED28, BFR\_L1\_SED29, BFR\_L1\_SED30, BFR\_L1\_SED33, BFR\_L1\_SED42, and BFR\_L2\_SED4
- Exceedances of the applicable guidelines for mercury were found in the following samples:
  - BFR\_SED2, BFR\_SED3, BFR\_SED4, BFR\_SED6, BFR\_SED12, BFR\_SED13, BFR\_L1\_SED30, BFR\_L1\_SED42

Sediment exceedances of arsenic, cadmium, lead, and mercury in samples collected from waterbodies in the vicinity of the firing area in Location 1 – Zone 1 and Location 2 are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice (or possible hunting). The source of the metals exceedances in areas outside the immediate vicinity of the firing area may be related to firing area activity (e.g. due to wind deposition of

particulate/contaminants downwind), however this cannot be confirmed. Given the distance from the firing area, it is possible that firing activity not related to the DND firing range, or other sources (including naturally occurring metals, hunting, etc.).

The sediment concentrations exceeding applicable guidelines are presented on Figures 13 to 16 (Location 1) and Figure 21 (Location 2).

### 6.3 Surface Water

The laboratory results for the surface water samples collected are compiled in Tables 15 to 18 appended to this report. The laboratory analytical results reports are provided in Appendix C. As mentioned in Sections 2.4 and 4.5.3, the surface water samples were analyzed for PHCs, PAHs, and metals. Five of the surface water samples were also analyzed for general chemistry (including one blind field duplicate).

The PHCs and PAHs concentrations in all surface water samples analyzed were below the applicable Atlantic RBCA ESL (PHCs) and Atlantic RBCA EQS and CCME WQGs (PAHs), with all below the RDL.

All 27 samples analyzed in 2020 (including two blind field duplicates) and all 38 samples analyzed in 2021 (including three blind field duplicates) have total aluminum concentrations which exceed the and Atlantic RBCA EQS and CCME WQGs; this is attributed to background concentration levels at the Site.

The following samples also exceeded the applicable Atlantic RBCA EQS and/or CCME WQG at specified locations:

- Iron in BFR\_SW1, BFR\_SW2, BFR\_SW5, BFR\_SW18, BFR\_L1\_SW26, BFR\_L1\_SW27, BFR\_L1\_SW28, BFR\_L1\_SW36, BFR\_L1\_SW37, BFR\_L1\_SW42, BFR\_L1\_SW43, BFR\_L1\_SW44, BFR\_L1\_SW47, BFR\_L1\_SW48, BFR\_L1\_SW49, BFR\_L2\_SW1, BFR\_L2\_SW2, BFR\_L2\_SW4, BFR\_L2\_SW8, BFR\_L2\_SW10
- Copper in BFR\_SW4
- Lead in BFR\_SW4, BFR\_SW5, BFR\_SW16, BFR\_L1\_SW28, BFR\_L1\_SW29, BFR\_L1\_SW45, BFR\_L2\_SW6
- Zinc in BFR\_L2\_SW1, BFR\_L2\_SW3, BFR\_L2\_SW4, BFR\_L2\_SW6, BFR\_L2\_SW7, BFR\_L2\_SW9

All nineteen samples analyzed for general chemistry (including three blind field duplicates) have a pH lower than the acceptable range in the CCME WQGs and Atlantic RBCA Ecological Tier I (EQS) (6.5 to 9); however, this is understood to be consistent with surface water data from the region based on the review of source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal. All 27 samples collected between 1988 and 2018 from Long Pond (water supply source for the Town of Burgeo), located approximately 1 km south of the Site (hydraulically downgradient), had pH values below 6.5.

The iron exceedances identified are considered background concentrations for the region based on the source water data for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal, where 14 out of 28 samples between 1988 and 2018 exceeded the CCME WQG for iron.

The zinc exceedances identified in Location 2 (in seven of 11 surface water samples collected, including one blind field duplicate) are also considered background concentrations, as they were found across Location 2 (including in surface water bodies upgradient of Location 2), and not found to be elevated in surface soil.

The exceedances of lead and copper at Location 1, collected from waterbodies between the firing spot and bullet catch, are considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice. The source of the exceedance of lead at BFR\_L1\_SW45 (approximately 800 m from the firing area) may be related to firing area activity (e.g. due to wind deposition of particulate/contaminants downwind), however this cannot be confirmed. Given the distance from the firing area, it is possible that firing activity not related to the DND firing range, or other sources (including naturally occurring metals, hunting, etc.) may be the source of this exceedance. The exceedance of lead at Location 2, collected from a waterbody between the firing spot and bullet catch, is considered to have resulted from firing activities associated with the former DND firing range.

The surface water concentrations exceeding applicable guidelines are presented on Figures 16 to 18 (Location 1) and 22 (Location 2).

## 6.4 Groundwater

The laboratory results for the groundwater samples collected are compiled in Tables 19 to 22, appended to this report. The laboratory analytical results reports are provided in Appendix C. As mentioned in Sections 2.3 and 4.5.4, the groundwater samples were analyzed for PHCs, PAHs, metals, and general chemistry.

The PHCs and PAHs concentrations in all soil samples analyzed are low and below the applicable guidelines, with most below the RDL.

Several of the groundwater samples have total metals concentrations which exceed the Atlantic RBCA EQS. These include:

- Aluminum in BFR\_L1\_GW1, BFR\_L1\_GW\_DUP1 (field duplicate of BFR\_L1\_GW1), BFR\_L1\_GW2, and BFR\_L1\_GW3
- Cobalt, copper, iron and zinc in BFR\_L1\_GW2
- Cadmium in BFR\_L1\_GW2, and BFR\_L1\_GW3

Several of the samples also have total metals concentrations which exceed the FIGQGs in addition to the Atlantic RBCA EQS. These includes:

- Aluminum and cadmium in BFR\_L1\_GW2, and BFR\_L1\_GW3
- Copper, iron and zinc in BFR\_L1\_GW2

The groundwater concentrations exceeding applicable guidelines are presented on Figure 19.

It is not known whether firing activity has impacted the groundwater. An investigation of groundwater concentrations in comparison to regional background data should be conducted as part of future data gap investigation (see Appendix F).

Monitoring wells were not installed in Location 2, and therefore, groundwater quality was not assessed in Location 2.

## 6.5 Debris Survey

During the Site visit on November 17, 2021, a survey of debris present on Site was conducted. The results of the debris survey are presented on Figures 23 (Location 1) and 24 (Location 2). Figures 23 and 24 include the location of each debris feature and a corresponding photograph.

Table 1 is a log of debris that was found on Site. Debris feature IDs correspond with those found on Figures 23 and 24.

**Table 1: Debris Log**

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m <sup>3</sup>
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m <sup>3</sup>
L1_DEB_3	Wooden stakes and cardboard target	~1m <sup>3</sup>
L1_DEB_4	Rusted drum used as target. Includes spent ammunition, spent rifle cartridges, and spent ammunition.	~1m <sup>3</sup>
L1_DEB_5	Rusted sink used as target. Includes spent ammunition.	<1m <sup>3</sup>
L2_DEB_1	Wooden stake target and spent ammunition.	<1m <sup>3</sup>
L2_DEB_2	Wooden stakes and spent shotgun shells	<1m <sup>3</sup>
L2_DEB_3	Wooden stakes and cardboard target.	<1m <sup>3</sup>
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m <sup>3</sup>
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_6	Wooden plank target	<1m <sup>3</sup>
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m <sup>3</sup>
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m <sup>3</sup>
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m <sup>3</sup>
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_13	Wooden stake and spent shot gun shells	~1m <sup>3</sup>

Created by: AB

Checked by: JTD

## 6.6 Quality Assurance/Quality Control Results

### 6.6.1 Blind Field Duplicates

Field duplicate samples were collected as part of the sampling program (soil, groundwater, sediment, and surface water). Analytical results for the field duplicate samples are provided in the analytical tables following this report, where the duplicate information is presented along with the primary sample data for comparison. The purpose was to assess the integrity of the samples. The relative percent difference (RPD) between the sample and its duplicate is expressed as an absolute value and is calculated using the following formula:

$$RPD (\%) = \frac{|C_o - C_{dup}|}{\frac{(C_o + C_{dup})}{2}} \times 100$$

Where:

C<sub>o</sub> = Detected concentration in the original sample

C<sub>dup</sub> = Detected concentration in the field duplicate sample

Acceptable limits for RPD (i.e., high vs. low degree of correlation) are based on BV Labs National QA/QC Interpretation Guide. The acceptable RPD between sample and duplicate for this field program is 25%. It is important to note that RPD calculations are only applicable when both the concentrations are greater than five times the laboratory RDL. When one, or both, values are less than the RDL, the RPD is not calculated.

The following RPD limits were considered reasonable and are based on Analytical Protocol: RPDs in soil, 50% for metals, 30% for PHCs and PAHs, and in groundwater, 30% for metals, and 30% for PHCs and PAHs.

Calculated RPDs are provided in Table 23, appended to this report. A summary of RPDs for samples and their corresponding duplicate samples are provided in Table 2, below.

**Table 2 – Relative Percent Differences between the Original and Duplicate Samples**

Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)		
		PHC	PAH	Metals
<b>Soil</b>				
DUP6	BFR_L1_SS2_D_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	9.8 - 106.5 %
DUP5	BFR_L1_SS3_C_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	3.6 - 21.7%
DUP4	BFR_L1_SS4_SA2	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	0.7 - 47.2%

Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)		
		PHC	PAH	Metals
DUP1	BFR_L1_SS6_A_SA1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	24.3 - 56.1%
DUP2	BFR_L1_SS13_A_SA1	4%	Not calculated due to parameters being equal or less than 5 times RDL	15.5 – 32.7 %
DUP3	BFR_L1_SS28_SA1	79.6 - 83.3%	Not calculated due to parameters being equal or less than 5 times RDL	13.6 – 91.5%
DUP2	BFR_L2_SS10_SA1	61.1 - 65.2%	Not calculated due to parameters being equal or less than 5 times RDL	6.2 – 114.1%
<b>Sediment</b>				
BFR_L1_SED_DUP1	BFR_L1_SED28	45.4 %	Not calculated due to parameters being equal or less than 5 times RDL	7.12 – 54.5%
BFR_L1_SED_DUP2	BFR_L1_SED29	27.0 – 27.0%	48%	9.30 – 55.9%
BFR_L2_SED_DUP1	BFR_L2_SED9	18.7%	72.8%	23.2 – 166.9%
<b>Surface water</b>				
BFR_L1_SW_DUP1	BFR_L1_SW28	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	2.3 – 7.4%
BFR_L1_SW_DUP2	BFR_L1_SW29	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	1.7- 2.3%
BFR_L2_SW_DUP1	BFR_L2_SW9	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	0.8 – 8.7%

Field Duplicate Sample ID	Original Sample ID	Relative percent difference (RPD)		
		PHC	PAH	Metals
<b>Groundwater</b>				
BFR_L1_DUP2	BFR_L1_GW1	Not calculated due to parameters being equal or less than 5 times RDL	Not calculated due to parameters being equal or less than 5 times RDL	1.5 – 13.3%

RPDs for several metals in soil were above the 50% including aluminium, iron, lead. However, only the lead concentration in the original sample exceeded the applicable guidelines whereas the duplicate’s concentration was below. All other metals with a RPD greater than 50%, had both samples lower than applicable guidelines.

As such, the results obtained from the Golder and the laboratory QA/QC programs are acceptable and the data collected during this investigation are considered acceptable for the purposes of this project.

### 6.6.2 Laboratory QA/QC

The laboratory QA/QC includes internal checks such as analytical duplicates, reference materials, analytical blanks, spiked standards, surrogate recoveries, etc. The results are provided in the Laboratory Certificates of Analysis provided in Appendix C. The calculated RPDs and recoveries for the internal laboratory QA/QC sample results are within the laboratory defined QC limits.

Based on the above, the laboratory analytical results are considered to be valid and reliable.

## 7.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) for potential sources of contamination to the surface soil, groundwater, sediment, and surface water at the Site is summarized and discussed below.

### 7.1 Contaminants of Concern

Potential Contaminants of Concern (COCs) related to the historic activities (rifle range) at the Site include metals, PAHs, PHCs and BTEX, in surface soil, sediment, surface water, and/or groundwater are considered.

### 7.2 Identification of Potential Receptors

Potential human and ecological receptors that may spend time on the Site and exposed to potential contamination of metals, PAHs, PHCs and benzene, toluene, ethylbenzene, xylenes (BTEX) in surface soil, sediment, groundwater and/or surface water are considered.

Access to the Site was never restricted, but the intention was for this land to solely be used by DND personnel and contractors. However, it is understood that since the Site is not fenced, locals make unauthorized use of the Site as a firing range or for recreational use such as hunting (“trespassers”). Given the Site will be returned to the Province of NL, remediation is anticipated in the future. Hence, human receptors considered for the Site include a DND Worker, Construction Worker and Trespasser.

Terrestrial ecological receptors can occur at the Site. The Site is predominantly grass covered sub-tundra terrain with varying elevation changes. Terrestrial receptors such as plants, soil invertebrates, mammals and birds .

Given there are surface water bodies on the Site, aquatic receptors that may occur on the Site include aquatic plants, invertebrates, mammals, birds and fish.

Amphibians and reptiles can exist at the Site, although there is generally a lack of data regarding exposure and effects of contaminants.

## 7.3 Identification of Potential Exposure Pathways

Exposure pathways are used to describe how a COC in the impacted media (i.e., surface soil, sediment, surface water, and groundwater) may come in contact with a receptor. In order for an exposure pathway to exist, a contaminant source, a release mechanism, transport media, and a receptor must be present. Inoperable and/or negligible pathways were not evaluated. Only those pathways that are complete and significant were considered.

### 7.3.1 Human Health

While DND intends to remediate the Site, the current site conditions are not expected to change in the foreseeable future and as such, the Site will remain as undeveloped parkland land. Based on the results of the current field investigation, groundwater at the Site is greater than 1.5 mbgs.

Complete exposure pathways considered in this assessment include:

- Direct contact with soil (i.e., incidental ingestion of and dermal contact) by the DND Worker, Construction Worker and Trespasser;
- Inhalation of soil particulates by a Construction Worker;
- Direct contact with surface water and sediment (i.e., incidental ingestion and dermal contact) by a Construction Worker; and
- Direct contact with groundwater (i.e., incidental ingestion and dermal contact) by a Construction Worker; and
- Inhalation of trench air sourced from soil and groundwater by a Construction Worker.

Several exposure pathways were not considered in this assessment. The pathways and rationale for their exclusion are provided below:

- Inhalation of soil particulates was considered to be negligible for the DND Worker and Trespassers as these receptors would not be expected to conduct soil-moving activities while on-site; therefore, generation of soil dusts during their work is expected to be negligible and as a result, this pathway was considered to be insignificant.
- Direct contact by incidental ingestion and dermal contact with surface and sediment water by the DND Worker and Trespassers is expected to be negligible given that these receptors would not be expected to engage in activities that would result in exposure to surface water or sediment.
- Inhalation of volatiles in indoor air was not evaluated given there are no buildings or structure at the Site, and future development is not anticipated.



- Human receptors may be exposed to COCs in outdoor air. However, it is assumed that vapours in outdoor air would rapidly mix with ambient air and be diluted such that exposure associated with this pathway would be negligible. Furthermore, exposure information associated with this pathway is subject to a high degree of uncertainty. As such, this pathway is considered to be complete but insignificant.

### 7.3.2 Ecological Health

Complete exposure pathways to contaminated media considered in this assessment include:

- Terrestrial plants:
  - Direct contact with soil;
- Terrestrial soil invertebrates:
  - Direct contact with soil;
- Terrestrial Mammals and birds:
  - Incidental ingestion of soil and ingestion of prey;
  - Ingestion of surface water;
- Aquatic plants:
  - Direct contact and root uptake of surface water;
  - Direct contact with sediment;
- Aquatic invertebrates:
  - Direct contact with surface water and sediment;
- Fish:
  - Direct contact with surface water and sediment.
- Aquatic mammals and birds:
  - Ingestion of surface water, sediment and prey.

Several exposure pathways were not considered for soil, groundwater, surface water, sediment. The pathways and rationale for their exclusion from the assessment are provided below:

- Groundwater at the Site is greater than 1.5 mbgs and as such, exposure by shallow-rooting terrestrial plants is not complete. Plant roots are not likely to extend to this depth.
- Soil invertebrates may be exposed to COCs in surface water, however soil invertebrates tend to avoid the saturated zone. As such, exposure to surface water for soil invertebrates was not considered complete.
- Terrestrial plants may be exposed to COCs via stem and foliar uptake of ambient air. However, it is assumed that vapours in outdoor air would rapidly mix with ambient air and be diluted such that exposure associated with this pathway would be negligible. Furthermore, exposure information associated with this pathway is subject to a high degree of uncertainty. As such, this pathway was considered to be complete but insignificant; and,

- Dermal contact with soil for terrestrial mammals and birds and sediment for aquatic mammals and birds is not considered a significant pathway as the presence of fur on mammals and feathers on birds' limits dermal contact with contaminated soil and sediment (US EPA, 2005; Sample and Suter, 1994). Furthermore, the data necessary to evaluate dermal contact exposure is often lacking (US EPA, 1993; Sample and Suter, 1994), or if available, based on studies in which the chemical is applied directly to the skin by shaving the fur from laboratory rodents (US EPA, 2005), a type of exposure that would not occur in the natural environment.

## 7.4 Conceptual Site Model Summary

A CSM identifies contaminant sources, release mechanisms, transport/residency media, exposure pathways and receptors (on-Site). Based on the information provided above, complete human health pathways associated with soil and surface water, and ecological health pathways associated with soil and surface water are considered to exist for the Site.

## 7.5 Species at Risk

### 7.5.1 Approach

A desktop screening was conducted for species listed in the Species at Risk Act (SARA) that may occur within the Project and 100 m Study Area. The results of this assessment are based on available desktop information, as well as review of aerial imagery and historic reports. The full SAR Assessment can be found in Appendix E.

Sources reviewed include:

- Results of a Data Request from the Atlantic Canada Conservation Center Data Centre (ACDC)
- The Canada Species at Risk Public Registry
- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), including status reports and the online SAR public registry
- DFO Aquatic Species at Risk Maps
- eBird
- Bat Conservation International
- Newfoundland Department of Environment and Conservation web tools, including management plans
- Site photos and available aerial imagery for the Site and surrounding area

Information from the above sources was used to identify SAR that have been observed and documented in the area, as well as species with the potential to occur. Habitat information, including a review of site photographs and available aerial imagery, was used to assess the suitability for SAR based on their known habitat requirements. Professional opinion was used where necessary, based on an understanding of and experience with SAR, plants, plant communities, and their ecology.

The potential for the species to occur was determined through a probability of occurrence methodology. A ranking of Low indicates no suitable habitat availability for that species in the Study Area and no specimens identified. Moderate probability indicates greater potential for the species to occur, as suitable habitat appeared to be present in the Study Area, but no occurrence of the species recorded. High potential indicates a known species record in the Study Area (including identifications made during field surveys or during background data

review) and good quality habitat is present. If a category could not be clearly determined based on the definitions above, professional opinion was used to make an assessment. Species screened as having a moderate to high potential to occur are considered to have suitable habitat conditions present and may require further confirmation to determine their status on the Site.

## 7.5.2 Results

### 7.5.2.1 Habitat Description

The Site is a mosaic of open barrens, meadows, open wetlands, small disturbed areas, and scattered scrubby trees and shrubs. The Site also includes several ponds, a small watercourse, and a portion of Grandy Brook. Adjacent lands are made up of similar habitats than that of the Site.

### 7.5.2.2 Species at Risk

Based on the habitat assessment and records review of the Site and vicinity, four SAR have a moderate likelihood of occurring. This includes boreal felt lichen (*Erioderma pedicellatum*), short-eared owl (*Asio flammeus*), banded killifish (*Fundulus diaphanus*), and American eel (*Anguilla rostrata*). Stunted scattered trees on the Site, may be suitable habitat for boreal felt lichen. The open habitats that dominate the Site may be suitable nesting and foraging habitat for short-eared owl. All of the water bodies on the Site may be suitable habitat for banded killifish, and Grandy Brook may be habitat for American eel. Several other species have ranges that overlap the Site, but suitable habitat was not identified through this desktop assessment. Table 1 of Appendix E provides a summary of these species, their SARA and ESA status, and their likelihood of occurrence on the Site.

## 8.0 CCME NATIONAL CLASSIFICATION SYSTEM FOR CONTAMINATED SITES

The CCME National Classification System for Contaminated Sites (NCSCS) ranks sites based on their individual characteristics. The descriptions of each class as described in the NCSCS Guideline Document (CCME NCSCS Guidance Document, 2008) are as follows:

**Class 1 – High Priority for Action:** Available information indicates that action (e.g., further site characterisation, risk management remediation, etc.) is required to address existing concerns. Typically, Class 1 sites show a propensity to high concern for several factors, and measured or observed impacts have been documented.

**Class 2 – Medium Priority for Action:** The available information indicates that there is a high potential for adverse offsite impacts, although the threat to human health and the environment is generally not imminent. There is probably no indication of offsite contamination; however, the potential for this was rated high and therefore some action is likely required.

**Class 3 – Low Priority for Action:** The available information indicates that this site is currently not a high concern. However additional investigation may be carried out to confirm the site classification, and some degree of action may be required.

**Class N – Not a Priority for Action:** The available information indicates there is probably no significant environmental impact of human health threats. There is likely no need for action unless new information becomes available indicating greater concerns, in which case the site should be re-examined.

**Class INS – Insufficient Information:** There is insufficient information to classify the site. In this event, additional information is required to address data gaps.

Based on the findings of the assessment, a NCSCS score of 62.0 was calculated for the former Burgeo Range. As such, the former Burgeo Range is identified as Site Letter Grade C Class 2 site with a medium priority for action. The NCSCS calculation sheet is provided in Appendix D.

## 9.0 ADDITIONAL ASSESSMENT AND PRELIMINARY REMEDIAL & RISK MANAGEMENT STRATEGY

A preliminary remedial & risk management strategy can be found in Appendix F. The preliminary remedial & risk management strategy identifies data gaps currently present that will be required to be filled to support the remedial & risk management strategy (e.g. delineation of contaminants in soil and sediment in the high-activity firing area) as well as future risk assessment and risk management (e.g. further site characterization, habitat survey, etc.).

## 10.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the analytical program, metals concentrations in soil (Location 1), sediment (Location 1 and 2), surface water (Location 1 and 2), and groundwater (Location 1), as well as PAH concentrations in sediment (Location 1 and 2), have been found to exceed the applicable guidelines, and are attributed or likely attributed to bullets and casings from firing activities which includes the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

A preliminary blended remedial/risk management strategy was created for the Site. Elevated impacts in soil, sediment, and surface water in the high-activity firing area in Location 1 (in the area of the former DND firing range) are recommended to be addressed through remedial measures, while scattered impacts in soil, sediment, and surface water in areas of the Site not in close proximity to the former DND firing range are recommended to be addressed through a risk management approach. Additional assessment is recommended to assess data gaps to support both the remediation strategy in the high-activity firing area (e.g. delineation) as well as future risk management work for the farther out areas.

## 11.0 LIMITATIONS

This letter report (the "Report") was prepared for the exclusive use of DCC and DND for the express purpose of providing advice with respect to the environmental condition of the Site. In evaluating the Site, Golder Associates Ltd. has relied in good faith on information provided by others as noted in the Report. We have assumed that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties. If a third party require reliance on this Report, written authorization from Golder is required. Failing such authorization, Golder disclaims responsibility to third parties of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The scope and the period of Golder's assessment are described in this Report, and are subject to the restrictions, assumptions and limitations described herein. Except as noted herein, the work was conducted in accordance with the scope of work and terms and conditions within Golder's proposal. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site referenced in the Report.

Conditions may therefore exist which were not detected given the limited nature of the assessment Golder was retained to undertake with respect to the Site and additional environmental studies and actions may be required. In addition, it is recognized that the passage of time affects the information provided in the Report. Golder's opinions are based upon information that existed at the time of the writing of the Report. It is understood that the services provided for in the scope of work allowed Golder to form no more than an opinion of the actual conditions at the Site at the time the Site was visited, and cannot be used to assess the effect of any subsequent changes in any laws, regulations, the environmental quality of the Site or its surroundings. If a service is not expressly indicated, do not assume it has been provided.

The results of an assessment of this nature should in no way be construed as a warranty that the Site is free from any and all contamination from past or current practices.

## 12.0 REFERENCES

Golder, 2021. Steps 1 to 4 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL. Golder Project Number 20439355. March 5, 2021.

Government of Newfoundland and Labrador, Department of Environment, Climate Change and Municipalities, Water Resources Management Division. Newfoundland and Labrador Water Resources Portal. Retrieved February 1, 2021, from <https://maps.gov.nl.ca/water/>

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## Signature Page

### Golder Associates Ltd.



James Doyle, B.Eng., M.A.Sc.  
Environmental Consultant



Belinda Culgin, P.Geo. FGC.  
Team Lead - Atlantic Environmental Management

JTD/MA/BC/ha

[https://golderassociates.sharepoint.com/sites/153673/project files/6 deliverables/3. report/21497139-r-rev0-burgeo report final\\_mar 2022\\_jd.docx](https://golderassociates.sharepoint.com/sites/153673/project%20files/6%20deliverables/3.%20report/21497139-r-rev0-burgeo%20report%20final_mar%202022_jd.docx)

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# TABLES

**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(6)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_SS1	Dec 1/20	451668.18 E, 5277431.50 N	BFR_SS1_SA1	0 - 0.15	19.75	(SW) SAND, some silt, trace gravel and organics; light brown to grey, odorless; moist.	Surrounded by bedrock. Possible to step out to the north, east, or south.
			BFR_SS_DUP1		8.83		
			BFR_SS1_SA2	0.15 - 0.30	8.93		
BFR_SS2	Dec 1/20	451678.51 E, 5277402.03 N	BFR_SS2_SA1	0 - 0.15	10.68	(SW) gravelly SAND, some silt and organics; dark brown, odorless, contains cobbles; moist.	At the top of a hill. Possible to step out in any direction.
			BFR_SS2_SA2	0.15 - 0.30	19.91	(SW) gravelly SAND, some silt, trace organics; dark brown, odorless, contains cobbles and boulders; moist.	
BFR_SS3	Dec 1/20	451767.10 E, 5277399.78 N	BFR_SS3_SA1	0 - 0.15	7.79	(SM) SILTY SAND, trace gravel and organics; light brown to light grey, odorless, contains cobbles; moist.	In front of backstop. Possible to step out in any direction, easiest to the south.
			BFR_SS3_SA2	0.15 - 0.30	9.58	(SM) gravelly SILTY SAND; brown, odorless, contains cobbles; moist.	
BFR_SS4	Dec 1/20	451713.46 E, 5277423.55 N	BFR_SS4_SA1	0 - 0.15	9.18	(PT) PEAT; black to brown, odorless; wet.	Open area with bedrock outcrop to south. Possible to step out in any direction.
			BFR_SS4_SA2	0.15 - 0.30	8.36		
BFR_SS5	Dec 1/20	451771.09 E, 5277489.13 N	BFR_SS5_SA1	0 - 0.15	9.34	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless, boulder at bottom of hole; moist.	Boggy area with bedrock outcrops. Possible to step out.
			BFR_SS5_SA2	0.15 - 0.30	7.95		
BFR_SS6	Dec 1/20	451770.37 E, 5277369.42 N	BFR_SS6_SA1	0 - 0.15	11.61	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Boggy area with bedrock outcrop to east.
			BFR_SS6_SA2	0.15 - 0.30	9.37		
BFR_SS7	Dec 1/20	451851.07 E, 5277395.04 N	BFR_SS7_SA1	0 - 0.15	8.43	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless, contains broken dinner plate fragments; wet.	In front of rock wall where former wooden targets were located. Possible to step out to south, east, or west.
			BFR_SS_DUP2		10.63		
			BFR_SS7_SA2	0.15 - 0.30	8.17	(PT) PEAT; black, odorless; wet.	
BFR_SS8	Dec 1/20	452003.45 E, 5277375.31 N	BFR_SS8_SA1	0 - 0.15	16.27	(PT) PEAT; orange to dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Open boggy area with some small bedrock outcrops in the vicinity.
			BFR_SS8_SA2	0.15 - 0.30	11.44		
BFR_SS9	Dec 1/20	451935.37 E, 5277533.75 N	BFR_SS9_SA1	0 - 0.15	28.17	(PT) PEAT; reddish brown to dark brown, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area.
			BFR_SS9_SA2	0.15 - 0.30	14.51		
BFR_SS10	Dec 1/20	452007.60 E, 5277686.97 N	BFR_SS10_SA1	0 - 0.15	11.94	(PT) PEAT; dark brown to black, 0.1 m of moss/rootlets at surface, odorless, boulder at bottom of hole; wet.	Open boggy area with some small bedrock outcrops in the vicinity.
			BFR_SS10_SA2	0.15 - 0.30	16.73		
BFR_SS11	Dec 1/20	451932.91 E, 5277824.57 N	BFR_SS11_SA1	0 - 0.15	8.7	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; moist to wet.	Open boggy area.
			BFR_SS11_SA2	0.15 - 0.30	13.41		
BFR_SS12	Dec 2/20	452229.33 E, 5277818.33 N	BFR_SS12_SA1	0 - 0.15	226	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet. Water seeping into and filling hole.	Low lying boggy area near waterbody.
			BFR_SS12_SA2	0.15 - 0.30	344.3		
BFR_SS13	Dec 2/20	452507.40 E, 5277898.05 N	BFR_SS13_SA1	0 - 0.15	226	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area, small bedrock outcrop adjacent to hole.
			BFR_SS13_SA2	0.15 - 0.30	252.2		
BFR_SS14	Dec 2/20	452654.37 E, 5277558.82 N	BFR_SS14_SA1	0 - 0.15	391.5	(PT) PEAT; orange brown to dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Boggy area near bottom of hill.
			BFR_SS14_SA2	0.15 - 0.30	5.24		
BFR_SS15	Dec 2/20	452313.20 E, 5277348.96 N	BFR_SS15_SA1	0 - 0.15	241.3	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, earthy odor; wet.	Open boggy area.
			BFR_SS15_SA2	0.15 - 0.30	335.5		
BFR_SS16	Dec 2/20	452190.51 E, 5277571.06 N	BFR_SS16_SA1	0 - 0.15	196.2	(PT) PEAT; black, 0.1 m of moss/rootlets at surface, earthy odor, boulder at bottom of hole; wet.	Open boggy area.
			BFR_SS16_SA2	0.15 - 0.30	5.13		
BFR_SS17	Dec 4/20	453069.75 E, 5277435.93 N	BFR_SS17_SA1	0 - 0.15	20.6	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	On top of and amongst area of bedrock outcrops.
			BFR_SS17_SA2	0.15 - 0.30	40.84	(PT) PEAT; some sand; dark brown to gray, 0.1 m of moss/rootlets at surface, odorless; moist. Bedrock encountered at 0.25 m.	



**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(6)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_SS18	Dec 4/20	452926.99 E, 5277450.02 N	BFR_SS18_SA1	0 - 0.15	42.78	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Boggy area with some bedrock outcrops in vicinity.
			BFR_SS_DUP3		44.75		
			BFR_SS18_SA2	0.15 - 0.30	42.53	(SM) gravelly SILTY SAND, some organics; brown to dark brown, odorless contains cobbles and boulders; moist.	
BFR_SS19	Dec 4/20	453751.56 E, 5277540.57 N	BFR_SS19_SA1	0 - 0.15	34.84	(PT) PEAT; dark brown, 0.1 m of red/orange moss/rootlets at surface, odorless; wet. Water seeping into hole at bottom.	Open boggy area near waterbody. Difficult to access – surrounded by dense tree cover.
			BFR_SS19_SA2	0.15 - 0.30	27.67		
BFR_SS20	Dec 3/20	454105.10 E, 5277584.29 N	BFR_SS20_SA1	0 - 0.15	9.62	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist to wet. Water seeping into and filling hole.	Open boggy area on hill, small bedrock outcrops nearby.
			BFR_SS20_SA2	0.15 - 0.30	16.96		
BFR_SS21	Dec 3/20	455114.92 E, 5277739.31 N	BFR_SS21_SA1	0 - 0.15	15.9	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; moist.	Open boggy area on hill, small bedrock outcrops nearby.
			BFR_SS21_SA2	0.15 - 0.30	15.75	(OL) ORGANIC SILT; black, layer of gravelly silty sand at bottom of hole, odorless; moist.	
BFR_SS22	Dec 3/20	454989.61 E, 5278636.23 N	BFR_SS22_SA1	0 - 0.15	15.18	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet.	Boggy area between two large bedrock outcrops.
			BFR_SS22_SA2	0.15 - 0.30	12.43	(OL) ORGANIC SILT; black, odorless; wet. Water seeping into and filling hole.	
BFR_SS23	Dec 3/20	454157.57 E, 5278495.27 N	BFR_SS23_SA1	0 - 0.15	16.75	(PT) PEAT; dark brown to black, 0.1 m of moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS23_SA2	0.15 - 0.30	7.98		
BFR_SS24	Dec 4/20	453860.43 E, 5278426.56 N	BFR_SS24_SA1	0 - 0.15	25.15	(PT) PEAT; dark brown to black, 0.1 m of orange moss/rootlets at surface, odorless; wet.	Open boggy area.
			BFR_SS24_SA2	0.15 - 0.30	27.93		
BFR_SS25	Dec 4/20	453002.91 E, 5278242.03 N	BFR_SS25_SA1	0 - 0.15	38.1	(PT) PEAT; dark brown, 0.1 m of moss/rootlets at surface, odorless; wet. Water seeping into and filling hole.	Open boggy area.
			BFR_SS25_SA2	0.15 - 0.30	46.57		
BFR_L1_SS1	Nov 27/21	451668.534765 E, 5277429.10591 N	BFR_L1_SS1_SA2	0.15 - 0.30	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		451668.326453 E, 5277434.00235 N	BFR_L1_SS1_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451673.743462 E, 5277428.99931 N	BFR_L1_SS1_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451664.486186 E, 5277422.58872 N	BFR_L1_SS1_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS2	Nov 27/21	5277400.37958 N	BFR_L1_SS2_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451678.363289 E, 5277395.08235 N	BFR_L1_SS2_C_SA1	0 - 0.15	ND		ND
		451673.490929 E, 5277400.28981 N	BFR_L1_SS2_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS3	Nov 27/21	451770.221824 E, 5277397.17084 N	BFR_L1_SS3_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451770.639991 E, 5277401.59289 N	BFR_L1_SS3_A_SA1	0 - 0.15	ND		ND
		451773.252521 E, 5277396.81198 N	BFR_L1_SS3_B_SA1	0 - 0.15	ND		ND
		451769.624654 E, 5277391.99047 N	BFR_L1_SS3_C_SA1	0 - 0.15	ND		ND
		451764.912663 E, 5277397.57367 N	BFR_L1_SS3_D_SA1	0 - 0.15	ND		ND

**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(6)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS4	Nov 27/21	451715.615615 E, 5277422.90289 N	BFR_L1_SS4_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451714.130007 E, 5277430.75139 N	BFR_L1_SS4_A_SA1	0 - 0.15	ND		ND
		451721.13933 E, 5277422.64998 N	BFR_L1_SS4_B_SA1	0 - 0.15	ND		ND
		451715.182435 E, 5277418.48973 N	BFR_L1_SS4_C_SA1	0 - 0.15	ND		ND
		451710.265125 E, 5277422.96448 N	BFR_L1_SS4_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS6	Nov 18/21	451770.365007 E, 5277374.42403 N	BFR_L1_SS6_A_SA1	0 - 0.15	ND	DUP1 taken here. Moist, dark brown silt with lots of organics mixed in bands of light brown, medium grained sand, odorless, no stain.	ND
		451775.365007 E, 5277369.42403 N	BFR_L1_SS6_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451770.365007 E, 5277364.42403 N	BFR_L1_SS6_C_SA1	0 - 0.15	ND		ND
		451765.365007 E, 5277369.42403 N	BFR_L1_SS6_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS7	Nov 18/21	451854.465736 E, 5277404.72678 N	BFR_L1_SS7_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451862.432806 E, 5277398.63367 N	BFR_L1_SS7_B_SA1	0 - 0.15	ND		ND
		451851.068759 E, 5277390.04455 N	BFR_L1_SS7_C_SA1	0 - 0.15	ND		ND
		451862.417 E, 5277396.72188 N	BFR_L1_SS7_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS8	Nov 18/21	452003.450935 E, 5277380.3082 N	BFR_L1_SS8_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452008.450935 E, 5277375.3082 N	BFR_L1_SS8_B_SA1	0 - 0.15	ND		ND
		452003.450935 E, 5277370.3082 N	BFR_L1_SS8_C_SA1	0 - 0.15	ND		ND
		451998.450935 E, 5277375.3082 N	BFR_L1_SS8_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS12	Nov 27/21	452229.58457 E, 5277819.11891 N	BFR_L1_SS12_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452229.752674 E, 5277823.89367 N	BFR_L1_SS12_A_SA1	0 - 0.15	ND		ND
		452233.091666 E, 5277819.00229 N	BFR_L1_SS12_B_SA1	0 - 0.15	ND		ND
		452229.511244 E, 5277814.1952 N	BFR_L1_SS12_C_SA1	0 - 0.15	ND		ND
		452224.414538 E, 5277818.90441 N	BFR_L1_SS12_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS13	Nov 17/21	452507.403266 E, 5277903.047 N	BFR_L1_SS13_A_SA1	0 - 0.15	ND	DUP2 Taken here. Moist, dark brown silt, high organics, odorless, no stain.	ND
		452512.403266 E, 5277898.04657 N	BFR_L1_SS13_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452507.403266 E, 5277893.04657 N	BFR_L1_SS13_C_SA1	0 - 0.15	ND		ND
		452502.403266 E, 5277898.04657 N	BFR_L1_SS13_D_SA1	0 - 0.15	ND		ND

**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(6)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L1_SS16	Nov 27/21	452190.478471 E, 5277571.32374 N	BFR_L1_SS16_SA2	0.15 - 0.30	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452190.356238 E, 5277576.27159 N	BFR_L1_SS16_A_SA1	0 - 0.15	ND		ND
		452196.625849 E, 5277571.58811 N	BFR_L1_SS16_B_SA1	0 - 0.15	ND		ND
		452190.355709 E, 5277566.28273 N	BFR_L1_SS16_C_SA1	0 - 0.15	ND		ND
		452185.436738 E, 5277571.35526 N	BFR_L1_SS16_D_SA1	0 - 0.15	ND		ND
BFR_L1_SS26	Nov 17/21	451658.115956 E, 5277535.125916 Y	BFR_L1_SS26_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS27	Nov 17/21	451786.968414 E, 5277672.180389 Y	BFR_L1_SS27_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS28	Nov 17/21	452029.631752 E, 5277311.026059 Y	BFR_L1_SS28_SA1	0 - 0.15	ND	DUP3 taken here.Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L1_SS29	Nov 17/21	451962.969935 E, 5277484.278632 Y	BFR_L1_SS29_SA1	0 - 0.15	ND	Moist, dark brown silt with lots of organics mixed in, odorless, no stain.	ND
BFR_L1_SS30	Nov 17/21	452083.732212 E, 5277655.568423 Y	BFR_L1_SS30_SA1	0 - 0.15	ND	Moist, dark brown silt with lots of organics mixed in, odorless, no stain.	ND
BFR_L2_SS1	Nov 25/21	451895.208043 E, 5279387.06957 N	BFR_L2_SS1_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451895.208043 E, 5279387.06957 N	BFR_L2_SS1_SA2	0.15 - 0.3	ND		ND
		451895.346312 E, 5279392.29951 N	BFR_L2_SS1_A_SA1	0 - 0.15	ND		ND
		451899.692412 E, 5279388.76252 N	BFR_L2_SS1_B_SA1	0 - 0.15	ND		ND
		451895.225511 E, 5279381.76666 N	BFR_L2_SS1_C_SA1	0 - 0.15	ND		ND
		451889.974505 E, 5279387.32055 N	BFR_L2_SS1_D_SA1	0 - 0.15	ND		ND
BFR_L2_SS2	Nov 25/21	451997.257495 E, 5279436.32189 N	BFR_L2_SS2_SA1	0 - 0.15	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		451997.257495 E, 5279436.32189 N	BFR_L2_SS2_SA2	0.15 - 0.3	ND		ND
		451997.790614 E, 5279441.01028 N	BFR_L2_SS2_A_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
		452002.584956 E, 5279436.29334 N	BFR_L2_SS2_B_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
		451997.102387 E, 5279431.01816 N	BFR_L2_SS2_C_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
		451992.151699 E, 5279436.21642 N	BFR_L2_SS2_D_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
BFR_L2_SS3	Nov 25/21	451981.219415 E, 5279427.69733 N	BFR_L2_SS3_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451981.219415 E, 5279427.69733 N	BFR_L2_SS3_SA2	0.15 - 0.3	ND		Dark brown sandy silt, high organics, odorless, no stain.
		451981.698696 E, 5279433.20743 N	BFR_L2_SS3_A_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
		451986.688831 E, 5279429.10423 N	BFR_L2_SS3_B_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
		451981.378458 E, 5279422.20622 N	BFR_L2_SS3_C_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.
		451975.909735 E, 5279426.20405 N	BFR_L2_SS3_D_SA1	0 - 0.15	ND		Moist, dark brown silt, high organics, odorless, no stain.

**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(6)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L2_SS4	Nov 26/21	452144.775851 E, 5279458.4812 N	BFR_L2_SS4_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452144.775851 E, 5279458.4812 N	BFR_L2_SS4_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452144.581161 E, 5279463.37951 N	BFR_L2_SS4_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452150.328364 E, 5279458.40474 N	BFR_L2_SS4_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452139.395352 E, 5279458.59398 N	BFR_L2_SS4_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS5	Nov 26/21	452111.260091 E, 5279392.48472 N	BFR_L2_SS5_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452111.260091 E, 5279392.48472 N	BFR_L2_SS5_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452100.533691 E, 5279388.36627 N	BFR_L2_SS5_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452105.475902 E, 5279383.09672 N	BFR_L2_SS5_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452100.25663 E, 5279378.21588 N	BFR_L2_SS5_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452095.315251 E, 5279383.34079 N	BFR_L2_SS5_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS6	Nov 26/21	452112.904811 E, 5279451.74992 N	BFR_L2_SS6_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452112.904811 E, 5279451.74992 N	BFR_L2_SS6_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452114.328174 E, 5279456.11845 N	BFR_L2_SS6_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452117.753025 E, 5279451.66793 N	BFR_L2_SS6_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452113.056199 E, 5279446.70685 N	BFR_L2_SS6_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452107.731579 E, 5279451.52851 N	BFR_L2_SS6_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS7	Nov 26/21	452064.787611 E, 5279434.99991 N	BFR_L2_SS7_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452064.787611 E, 5279434.99991 N	BFR_L2_SS7_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452064.901925 E, 5279440.14044 N	BFR_L2_SS7_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452069.647406 E, 5279434.79096 N	BFR_L2_SS7_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
	Nov 26/21	452060.152794 E, 5279435.36192 N	BFR_L2_SS7_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS8	Nov 26/21	452064.61305 E, 5279430.995 N	BFR_L2_SS8_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452064.61305 E, 5279430.995 N	BFR_L2_SS8_SA2	0.15 - 0.3	ND		ND
	Nov 26/21	452069.501011 E, 5279431.02002 N	BFR_L2_SS8_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
	Nov 26/21	452059.794661 E, 5279431.30178 N	BFR_L2_SS8_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND

**TABLE 1**  
**Soil Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(a)</sup>	Sample ID	Depth (mbgs)	Headspace (IBL ppm)	Description	Location Notes
BFR_L2_SS9	Nov 26/21	452063.696034 E, 5279425.46536 N	BFR_L2_SS9_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452063.696034 E, 5279425.46536 N	BFR_L2_SS9_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
	Nov 26/21	452069.251679 E, 5279425.1347 N	BFR_L2_SS9_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452063.311944 E, 5279419.9162 N	BFR_L2_SS9_C_SA1	0 - 0.15	ND		ND
		452058.839051 E, 5279425.47613 N	BFR_L2_SS9_D_SA1	0 - 0.15	ND		ND
BFR_L2_SS10	Nov 25/21	452027.481345 E, 5279430.54125 N	BFR_L2_SS10_SA1	0 - 0.15	ND	Dup 2 taken here. Moist, dark brown silt, high organics, odorless, no stain.	ND
		452027.481345 E, 5279430.54125 N	BFR_L2_SS10_SA2	0.15 - 0.3	ND	Dark brown sandy silt, high organics, odorless, no stain.	ND
		452027.68439 E, 5279435.12139 N	BFR_L2_SS10_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452032.558664 E, 5279430.54125 N	BFR_L2_SS10_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452027.481345 E, 5279424.89987 N	BFR_L2_SS10_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		452022.93515 E, 5279429.43415 N	BFR_L2_SS10_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS11	Nov 23/21	451985.035589 E, 5279231.73444 N	BFR_L2_SS11_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
			BFR_L2_SS11_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	ND
		451984.979483 E, 5279236.23951 N	BFR_L2_SS11_A_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451991.471058 E, 5279231.59077 N	BFR_L2_SS11_B_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451985.46951 E, 5279226.98902 N	BFR_L2_SS11_C_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
		451979.990826 E, 5279231.5927 N	BFR_L2_SS11_D_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	ND
BFR_L2_SS12	Nov 23/21	451751.453601 E, 5279370.2404 N	BFR_L2_SS12_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451751.453601 E, 5279370.2404 N	BFR_L2_SS12_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS13	Nov 23/21	451693.821155 E, 5279237.71195 N	BFR_L2_SS13_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451693.821155 E, 5279237.71195 N	BFR_L2_SS13_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS14	Nov 23/21	451526.753627 E, 5279327.38094 N	BFR_L2_SS14_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451526.753627 E, 5279327.38094 N	BFR_L2_SS14_SA2	0.15 - 0.3	ND	Dup 1 taken here. Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS15	Nov 23/21	451502.370642 E, 5279177.26787 N	BFR_L2_SS15_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451502.370642 E, 5279177.26787 N	BFR_L2_SS15_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
BFR_L2_SS16	Nov 23/21	451722.508108 E, 5279608.71118 N	BFR_L2_SS16_SA1	0 - 0.15	ND	Moist, dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2
		451722.508108 E, 5279608.71118 N	BFR_L2_SS16_SA2	0.15 - 0.3	ND	Dark brown silt, high organics, odorless, no stain.	Site-Specific Background for Location 2

**Notes:**  
<sup>(a)</sup> All coordinates are in UTM NAD83 Zone 21  
 ND = No Data

**TABLE 2**  
**Sediment Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Description
BFR_SED1	Dec 1/20	451696.77 E, 5277481.98 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED2	Dec 1/20	451756.45 E, 5277569.38 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED3	Dec 1/20	451870.22 E, 5277557.07 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED4	Dec 1/20	451758.98 E, 5277420.43 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED_DUP1				
BFR_SED5	Dec 2/20	451860.87 E, 5277343.06 N	Shore	Light brown fine and coarse grain sand with fine and coarse grain quartz and some black organics, odorless, no sheen. Moved sample location near river outlet because there were too many rocks near the shore to get a sample.
BFR_SED_DUP2				
BFR_SED6	Dec 1/20	451970.76 E, 5277648.35 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED7	Dec 2/20	452765.48 E, 5277405.30 N	Shore	Dark brown, muddy/silty with coarse and fine grain white sand and quartz, odorless, no sheen.
BFR_SED8	Dec 2/20	452360.81 E, 5277462.07 N	Shore	Brown and white fine grain sand mixed with light brown silty sand, dark brown mud/silt, and some organics/roots, odorless, no sheen.
BFR_SED9	Dec 2/20	452362.85 E, 5277345.31 N	Shore	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED10	Dec 1/20	452101.09 E, 5278004.86 N	Shore	Coarse and fine grain orange sand with brown silty sand, some quartz and larger (~1") black and orange and white and black rocks, odorless, no sheen.
BFR_SED11	Dec 1/20	452406.29 E, 5277825.93 N	Shore	Coarse and fine grain white and black sand mixed with dark brown muddy/silty sand, trace organic roots and one large rock with black and white grains, odorless, no sheen. Moved sample location away from surface water sample location because there were too many boulders to get a sample.
BFR_SED12	Dec 1/20	452610.74 E, 5277853.83 N	Shore	Dark brown, muddy/silty, odorless, no sheen.
BFR_SED13	Dec 2/20	452654.52 E, 5277447.53 N	Shore	Dark brown, muddy/silty, some organics/roots, odorless, no sheen.
BFR_SED14	Dec 2/20	452679.50 E, 5278117.72 N	Shore	Dark brown, muddy/silty with fine and trace coarse grain sand (mostly white, but some rare orange fine grain bits), trace quartz (very fine grain), some organics/roots, odorless, no sheen.

**TABLE 2**  
**Sediment Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Description
BFR_SED15	Dec 2/20	452798.11 E, 5277878.77 N	Shore	Dark brown, muddy/silty with organics and fine grain white sandy bits, odorless, no sheen.
BFR_SED16	Dec 1/20	451743.18 E, 5277431.34 N <sup>(b)</sup>	Boat	Dark brown, muddy/silty, earthy odor, no sheen.
BFR_SED17	Dec 4/20	453159.43 E, 5277434.22 N	Shore	Fine and coarse grain sand, mostly white with some pale orange, dark brown mud/silt, some organics/roots and quartz, odorless, no sheen.
BFR_SED_DUP3				
BFR_SED18	Dec 4/20	453741.99 E, 5277532.60 N	Shore	Fine grain with very little coarse grain sand, mostly white with some pale orange, dark brown muddy with some organics, odorless, no sheen. Moved sample location down shoreline because a tree grove prevented access to get a sample.
BFR_SED19	Dec 4/20	454016.48 E, 5277538.41 N	Shore	Dark brown muddy/silty with white coarse and fine grain sand, some quartz and organics/roots, odorless, no sheen.
BFR_SED20	Dec 3/20	454559.72 E, 5277750.44 N	Shore	Light brown fine and coarse grain sand with orange and black fine grain sand mixed in, some fine grain quartz, trace organics, odorless, no sheen.
BFR_SED21	Dec 3/20	455044.99 E, 5277705.31 N	Shore	Fine grain sand with coarse grain mixed in (light brown and white), dark brown silty/muddy with some organics/roots, odorless, no sheen. Moved sample location because cliff along waterline prevented access to get a sample. Stayed within site boundary.
BFR_SED22	Dec 3/20	454983.11 E, 5278619.48 N	Shore	Dark brown muddy/silty with minimal fine grain white sand, earthy odor, no sheen. Coordinates provided on map were not in a waterbody in the field – took sample from a small waterbody nearby.
BFR_SED23	Dec 3/20	454115.62 E, 5278512.37 N	Shore	Dark brown muddy/silty with organics/roots, fine grain white sand mixed in throughout, odorless, no sheen.
BFR_SED24	Dec 4/20	453881.19 E, 5278415.01 N	Shore	White, grey, yellow, orange fine and coarse grain sand, larger (~1/2" – 1") rocks with white and black spots and some minor orange staining on them, small amount of dark brown mud and organic roots, odorless, no sheen.
BFR_SED25	Dec 4/20	452959.88 E, 5278219.03 N	Shore	Dark brown muddy/silty with organics/roots, odorless, no sheen.
BFR_L1_SED26	Nov 21/21	451657.8227 E, 5277534.0281 N	Boat	Medium brown silty sand, fine to medium grained, no staining, odorless.
BFR_L1_SED27	Nov 21/21	451786.6751 E, 5277671.0826 N	Boat	Medium brown silty sand, fine grained, no staining, odorless.

**TABLE 2**  
**Sediment Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Description
BFR_L1_SED28 (BFR_L1_SED_DUP1)	Nov 21/21	452029.631752 E, 5277311.02606 N	Shore	Dark brown silt with lots of organics.
BFR_L1_SED29 (BFR_L1_SED_DUP2)	Nov 21/21	451962.969935 E, 5277484.27863 N	Shore	Dark brown silt with lots of organics.
BFR_L1_SED30	Nov 21/21	452083.4389 E, 5277654.4706 N	Boat	Medium brown silty sand, fine grained, no staining, odorless.
BFR_L1_SED31	Nov 21/21	452142.5646 E, 5277603.1325 N	Boat	Medium brown silty sand, fine grained, no staining, odorless.
BFR_L1_SED32	Nov 21/21	452200.381224 E, 5277660.77477 N	Shore	Dark brown silt with light brown sand mixed in.
BFR_L1_SED33	Nov 21/21	452128.9738 E, 5277467.8199 N	Boat	Medium brown sandy silt, fine grained, no staining, odorless, lots of organics.
BFR_L1_SED34	Nov 21/21	452208.64 E, 5277359.7771 N	Boat	Dark brown sandy silt, fine grained, no staining, odorless, lots of organics.
BFR_L1_SED35	Nov 20/21	452471.592022 E, 5277316.99079 N	Shore	Light brown, medium grained sand mixed with dark brown silt and organics
BFR_L1_SED36	Nov 20/21	452317.60382 E, 5277666.28121 N	Shore	Medium brown, medium grained sand with trace gravel and drak brown silt. Some organics.
BFR_L1_SED39	Nov 20/21	452317.60382 E, 5277666.28121 N	Shore	Dark brown, sandy silt, organic odour, no staining, lots of organics.
BFR_L1_SED40	Nov 20/21	452545.004454 E, 5277559.8861 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED41	Nov 21/21	452133.00932 E, 5277760.96413 N	Shore	Medium to coarse grained sand, light brown, trace of dark silt, trace organics.
BFR_L1_SED42	Nov 20/21	452364.550325 E, 5277703.67725 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED44	Nov 20/21	452303.576928 E, 5277831.67246 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED45	Nov 20/21	452370.132325 E, 5277903.45553 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.



**TABLE 2**  
**Sediment Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Description
BFR_L1_SED46	Nov 20/21	453134.250549 E, 5277754.64921 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED47	Nov 20/21	453134.250549 E, 5277754.64921 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED48	Nov 20/21	453551.259787 E, 5277596.96692 N	Shore	Grey, medium grained silty sand.
BFR_L1_SED49	Nov 20/21	453907.259859 E, 5277590.40298 N	Shore	Dark brown, silty sediment, organic odour, no staining, lots of organics.
BFR_L1_SED50	Nov 20/21	453964.339248 E, 5277966.8263 N	Shore	Medium brown sandy silt, fine grained, no staining, odorless.
BFR_L2_SED1	Nov 22/21	452161.44796 E, 5279514.48413 N	Shore	Medium brown coarse grained sand, no odour, no staining.
BFR_L2_SED2	Nov 21/21	452042.251743 E, 5279605.43347 N	Shore	Medium brown silty sand, medium grained.
BFR_L2_SED4	Nov 21/21	452207.880343 E, 5279209.67254 N	Boat	Dark brown silt with light brown sand mixed in, and lots of organics.
BFR_L2_SED5	Nov 21/21	452169.357543 E, 5279372.05157 N	Shore	Dark brown sandy silt, bands of light brown fine grained sand.
BFR_L2_SED6	Nov 22/21	451909.506722 E, 5279413.44075 N	Shore	Dark brown sandy silt, with lots of organics, no staining, odorless.
BFR_L2_SED7	Nov 22/21	451940.619434 E, 5279169.19728 N	Shore	Dark brown silt, with lots of organics, no staining, odorless.
BFR_L2_SED8	Nov 21/21	452138.233183 E, 5279019.85376 N	Shore	Medium brown sand, with gravel sized pieces mixed in, no staining, odorless.
BFR_L2_SED9 (BFR_L2_SED_DUP1)	Nov 22/21	451999.242067 E, 5279271.05433 N	Shore	Dark brown sandy silt, high organics, no staining, odorless.

**Notes:**

<sup>(a)</sup> All coordinates are in UTM NAD83 Zone 21

<sup>(b)</sup> Point taken at shoreline from closest point to sample location.

**TABLE 3**  
**Surface Water Sample Details and Field Observations**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	Description
BFR_SW1	Dec 1/20	451696.77 E, 5277481.98 N <sup>(b)</sup>	Boat	3.1	6.64	0.08	Slight yellow hue, odorless, clear, no sheen.
BFR_SW2	Dec 1/20	451756.45 E, 5277569.38 N <sup>(b)</sup>	Boat	3.4	6.54	0.08	Slight yellow hue, odorless, clear, no sheen.
BFR_SW3	Dec 1/20	451870.22 E, 5277557.07 N <sup>(b)</sup>	Boat	3.2	6.35	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW4 BFR_SW_DUP1	Dec 1/20	451758.98 E, 5277420.43 N <sup>(b)</sup>	Boat	2.7	8.65	0.07	Slight yellow hue, odorless, clear, no sheen.
BFR_SW5 BFR_SW_DUP2	Dec 2/20	451861.75 E, 5277340.03 N	Shore	5.4	5.27	0.05	Yellow hue, odorless, clear, no sheen. Moved sample location near river outlet to coincide with sediment sample location.
BFR_SW6	Dec 1/20	451970.76 E, 5277648.35 N <sup>(b)</sup>	Boat	3.4	6.70	0.04	Yellow hue, odorless, clear, no sheen.
BFR_SW7	Dec 2/20	452762.45 E, 5277406.64 N	Shore	7.3	4.94	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW8	Dec 2/20	452361.10 E, 5277463.78 N	Shore	6.4	5.49	0.04	Yellow hue, odorless, clear, no sheen.
BFR_SW9	Dec 2/20	452359.92 E, 5277344.95 N	Shore	6.1	6.15	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW10	Dec 1/20	452102.05 E, 5278001.93 N	Shore	3.4	5.84	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW11	Dec 1/20	452406.56 E, 5277818.31 N	Shore	3.6	5.44	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW12	Dec 1/20	452614.55 E, 5277852.42 N	Shore	4.1	4.80	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW13	Dec 2/20	452656.03 E, 5277445.33 N	Shore	6.1	5.20	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW14	Dec 2/20	452678.93 E, 5278119.35 N	Shore	5.3	5.20	0.05	Yellow hue, odorless, clear, no sheen.
BFR_SW15	Dec 2/20	452796.83 E, 5277878.59 N	Shore	5.5	5.40	0.05	Dull yellow hue, odorless, clear, no sheen.
BFR_SW16	Dec 1/20	451743.18 E, 5277431.34 N <sup>(b)</sup>	Boat	2.9	6.82	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW17 BFR_SW_DUP3	Dec 4/20	453154.94 E, 5277432.32 N	Shore	5.9	5.00	0.07	Slight yellow hue, odorless, clear, no sheen.
BFR_SW18	Dec 4/20	453737.62 E, 5277536.07 N	Shore	5.2	5.29	0.06	Yellow hue, odorless, clear, no sheen. Moved sample location down shoreline because a tree grove prevented access to get a sample.

**TABLE 3**  
**Surface Water Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	Description
BFR_SW19	Dec 4/20	454011.41 E, 5277541.00 N	Shore	4.7	5.06	0.08	Slight yellow hue, odorless, clear, no sheen.
BFR_SW20	Dec 3/20	454557.35 E, 5277753.10 N	Shore	7.4	5.79	0.07	Yellow hue, odorless, clear, no sheen.
BFR_SW21	Dec 3/20	455046.66 E, 5277701.19 N	Shore	7.3	5.65	0.07	Yellow hue, odorless, clear, no sheen. Moved sample location because cliff along waterline prevented access to get a sample. Stayed within site boundary.
BFR_SW22	Dec 3/20	454980.19 E, 5278620.97 N	Shore	7.7	5.04	0.07	Slight yellow hue, odorless, clear, no sheen. Coordinates provided on map were not in a waterbody in the field – took sample from a small waterbody nearby.
BFR_SW23	Dec 3/20	454111.56 E, 5278513.50 N	Shore	7.2	4.89	0.06	Yellow hue, odorless, clear, no sheen.
BFR_SW24	Dec 4/20	453883.12 E, 5278416.35 N	Shore	5.6	5.54	0.06	Slight yellow hue, odorless, clear, no sheen.
BFR_SW25	Dec 4/20	452963.04 E, 5278221.17 N	Shore	6.2	5.75	0.07	Yellow hue, odorless, clear, no sheen.
BFR_L1_SW26	Nov 21/21	451657.8227 E, 5277534.0281 N	Boat	4.5	5.34	30	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW27	Nov 21/21	451786.6751 E, 5277671.0826 N	Boat	4.4	5.08	30.8	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW28 (BFR_L1_DUP1)	Nov 21/21	452029.631752 E, 5277311.02606 N	Shore	5.2	6.61	66	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW29 (BFR_L1_DUP2)	Nov 21/21	451962.969935 E, 5277484.27863 N	Shore	4.3	6.43	65	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW30	Nov 21/21	452083.4389 E, 5277654.4706 N	Boat	4.8	5.07	19.1	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW31	Nov 21/21	452142.5646 E, 5277603.1325 N	Boat	4.6	5.09	18.3	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW32	Nov 21/21	452200.381224 E, 5277660.77477 N	Shore	7.1	5.56	42	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L1_SW33	Nov 21/21	452128.9738 E, 5277467.8199 N	Boat	4.6	4.87	20.2	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW34	Nov 21/21	452208.64 E, 5277359.7771 N	Boat	3.5	4.49	23.3	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L1_SW35	Nov 20/21	452484.8497 E, 5277322.3755 N	Shore	7.1	5.56	42	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW36	Nov 20/21	452317.60382 E, 5277666.28121 N	Shore	6.6	4.65	35	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.

**TABLE 3**  
**Surface Water Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	Description
BFR_L1_SW37	Nov 20/21	452368.666848 E, 5277576.68676 N	Shore	6.7	5.37	44	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity. NO SEDIMENT COLLECTED.
BFR_L1_SW38	Nov 20/21	452415.100836 E, 5277549.6969 N	Shore	6.7	5.57	38	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity. NO SEDIMENT COLLECTED.
BFR_L1_SW39	Nov 20/21	452464.396959 E, 5277543.74777 N	Shore	6.5	6.55	45	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW40	Nov 20/21	452545.004454 E, 5277559.8861 N	Shore	6.8	7.3	47	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW41	Nov 21/21	452129.494302 E, 5277760.55654 N	Shore	3.6	5.73	41	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW42	Nov 20/21	452364.550325 E, 5277703.67725 N	Shore	6.4	4.99	42	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW43	Nov 20/21	452578.444569 E, 5277650.07002 N	Shore	6.8	8.7	87	Clear with orange tinge, odorless, no sheen, pond stagnant, low turbidity bouldber base. NO SEDIMENT COLLECTED.
BFR_L1_SW44	Nov 21/21	452303.576928 E, 5277831.67246 N	Shore	5.9	5.23	28.5	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW45	Nov18/21	452370.132325 E, 5277903.45553 N	Shore	6.1	4.52	24.7	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW46	Nov 20/21	453134.250549 E, 5277754.64921 N	Shore	6.3	4.26	29.2	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW47	Nov 20/21	453296.644209 E, 5277905.73497 N	Shore	6.1	4.83	22.9	Clear with brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L1_SW48	Nov 20/21	453551.259787 E, 5277596.96692 N	Shore	5.5	4.71	27.2	Clear water with brown tinge, low turbidity, stagnant.
BFR_L1_SW49	Nov 20/21	453907.259859 E, 5277590.40298 N	Shore	5.7	4.52	28	Clear water with brown tinge, low turbidity, stagnant.
BFR_L1_SW50	Nov 20/21	453964.339248 E, 5277966.8263 N	Shore	6.3	4.3	33.6	Clear with brown tinge, low turbidity, no sheen, odorless.
BFR_L2_SW1	Nov 22/21	452161.44796 E, 5279514.48413 N	Shore	4.8	6.62	29	Clear rushing water, odorless, no sheen, pond stagnant, low turbidity NO SEDIMENT SAMPLE.
BFR_L2_SW2	Nov 21/21	452042.251743 E, 5279605.43347 N	Shore	5.4	6.58	37	Clear with orange/brown tinge, odorless, no sheen, pond stagnant, low turbidity.
BFR_L2_SW3	Nov 22/21	451879.374502 E, 5279479.87942 N	Shore	4.5	6	32	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW4	Nov 21/21	452207.880343 E, 5279209.67254 N	Boat	4.1	5.61	28.4	Clear with orange/brown tinge, odorless, no sheen, low turbidity.

**TABLE 3**  
**Surface Water Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Date	Coordinates <sup>(a)</sup>	Collected from Boat or Shore	Temperature (°C)	pH	Electrical Conductivity (mS/cm)	Description
BFR_L2_SW5	Nov 21/21	452169.357543 E, 5279372.05157 N	Shore	4.8	6.57	37	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW6	Nov 22/21	451909.506722 E, 5279413.44075 N	Shore	4.4	4.8	55	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW7	Nov 22/21	451940.619434 E, 5279169.19728 N	Shore	5.3	4.8	53	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW8	Nov 21/21	452138.233183 E, 5279019.85376 N	Shore	4	5.41	20.4	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW9 (BFR_L2_SW_DUP1)	Nov 22/21	451999.242067 E, 5279271.05433 N	Shore	4.4	3.96	45	Clear with orange/brown tinge, odorless, no sheen, low turbidity.
BFR_L2_SW10	Nov 27/21	452187.194812 E, 5279558.75658 N	Shore	12.5	6.14	29.1	Clear rushing water, odorless, no sheen, pond stagnant, low turbidity NO SEDIMENT SAMPLE.

**Notes:**

<sup>(a)</sup> All coordinates are in UTM NAD83 Zone 21.

<sup>(b)</sup> Point taken at shoreline from closest point to sample location.

**TABLE 4**  
**Groundwater Sample Details and Field Observations**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Date	Coordinates <sup>(a)</sup>	Sample ID	Water Level (mbTOP)	Time	pH	Conductivity (mS/cm)	DO (mg/L)	Temperature (°C)
BFR_L1_GW1	Dec 19/21	451668.18 E, 5277431.50 N	BFR_L1_GW1	7.75	13:18	5.9	0.094	8.61	8.05
			BFR_L1_GW_DUP1						
BFR_L1_GW2	Dec 19/21	451770.37 E, 5277369.42 N	BFR_L1_GW2	3.76	15:37	5.27	0.066	1.63	7.20
BFR_L1_GW3	Dec 19/21	451851.06 E, 5277390.04 N	BFR_L1_GW3	3.75	17:13	4.69	0.083	2.26	3.65

(a) All coordinates are in UTM NAD83 Zone 21.  
 DO= Dissolved Oxygen

**TABLE 5**  
**Soil Sample Analyses Completed**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX <sup>(a)</sup>	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SS1	BFR_L1_SS1_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS1_A	BFR_L1_SS1_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS1_B	BFR_L1_SS1_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS1_C	BFR_L1_SS1_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS2_B	BFR_L1_SS2_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS2_C	BFR_L1_SS2_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS2_D	BFR_L1_SS2_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3	BFR_L1_SS3_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS3_A	BFR_L1_SS3_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3_B	BFR_L1_SS3_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3_C	BFR_L1_SS3_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS3_D	BFR_L1_SS3_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4	BFR_L1_SS4_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS4_A	BFR_L1_SS4_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4_B	BFR_L1_SS4_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4_C	BFR_L1_SS4_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS4_D	BFR_L1_SS4_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS6_A	BFR_L1_SS6_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS6_B	BFR_L1_SS6_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS6_C	BFR_L1_SS6_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS6_D	BFR_L1_SS6_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_A	BFR_L1_SS7_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_B	BFR_L1_SS7_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_C	BFR_L1_SS7_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS7_D	BFR_L1_SS7_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_A	BFR_L1_SS8_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_B	BFR_L1_SS8_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_C	BFR_L1_SS8_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS8_D	BFR_L1_SS8_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS12	BFR_L1_SS12_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS12_A	BFR_L1_SS12_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS12_B	BFR_L1_SS12_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS12_C	BFR_L1_SS12_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS12_D	BFR_L1_SS12_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS13_A	BFR_L1_SS13_A_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS13_B	BFR_L1_SS13_B_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS13_C	BFR_L1_SS13_C_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS13_D	BFR_L1_SS13_D_SA1	0-0.15	High (zone 1)	X	X	X	X
BFR_L1_SS16	BFR_L1_SS16_SA2	0.15 - 0.30	High (zone 1)	X		X	
BFR_L1_SS16_A	BFR_L1_SS16_A_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS16_B	BFR_L1_SS16_B_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS16_C	BFR_L1_SS16_C_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS16_D	BFR_L1_SS16_D_SA1	0-0.15	High (zone 1)	X		X	
BFR_L1_SS26	BFR_L1_SS26_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS27	BFR_L1_SS27_SA1	0-0.15	Medium (zone 2)	X	X	X	X

**TABLE 5**  
**Soil Sample Analyses Completed**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX <sup>(a)</sup>	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SS28_	BFR_L1_SS28_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS29	BFR_L1_SS29_SA1	0-0.15	Medium (zone 2)	X	X	X	X
BFR_L1_SS30	BFR_L1_SS30_SA1	0-0.15	Medium (zone 2)	X	X	X	X
n/a	BFR_L1_SS_DUP1	0-0.15	n/a	X	X	X	X
n/a	BFR_L1_SS_DUP2	0-0.15	n/a	X	X	X	X
n/a	BFR_L1_SS_DUP3	0-0.15	n/a	X	X	X	X
n/a	BFR_L1_SS_DUP4	0-0.15	n/a	X		X	
n/a	BFR_L1_SS_DUP5	0-0.15	n/a	X		X	
n/a	BFR_L1_SS_DUP6	0-0.15	n/a	X		X	
BFR_L2_SS1	BFR_L2_SS1_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS1_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS1_A_SA1	BFR_L2_SS1_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS1_B_SA1	BFR_L2_SS1_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS1_C_SA1	BFR_L2_SS1_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS1_D_SA1	BFR_L2_SS1_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2	BFR_L2_SS2_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS2_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS2_A_SA1	BFR_L2_SS2_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2_B_SA1	BFR_L2_SS2_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2_C_SA1	BFR_L2_SS2_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS2_D_SA1	BFR_L2_SS2_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3	BFR_L2_SS3_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS3_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS3_A_SA1	BFR_L2_SS3_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3_B_SA1	BFR_L2_SS3_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3_C_SA1	BFR_L2_SS3_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS3_D_SA1	BFR_L2_SS3_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS4	BFR_L2_SS4_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS4_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS4_A_SA1	BFR_L2_SS4_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS4_B_SA1	BFR_L2_SS4_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS4_D_SA1	BFR_L2_SS4_D_SA1	0-0.15	High (near area of firing activity)	X			



**TABLE 5**  
**Soil Sample Analyses Completed**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX <sup>(a)</sup>	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L2_SS5	BFR_L2_SS5_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS5_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS5_A_SA1	BFR_L2_SS5_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5_B_SA1	BFR_L2_SS5_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5_C	BFR_L2_SS5_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS5_D	BFR_L2_SS5_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6	BFR_L2_SS6_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS6_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS6_A	BFR_L2_SS6_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6_B	BFR_L2_SS6_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6_C	BFR_L2_SS6_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS6_D	BFR_L2_SS6_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS7	BFR_L2_SS7_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS7_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS7_A_SA1	BFR_L2_SS7_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS7_B_SA1	BFR_L2_SS7_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS7_D_SA1	BFR_L2_SS7_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS8	BFR_L2_SS8_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS8_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS8_B_SA1	BFR_L2_SS8_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS8_D_SA1	BFR_L2_SS8_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS9	BFR_L2_SS9_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS9_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS9_B	BFR_L2_SS9_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS9_C	BFR_L2_SS9_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS9_D	BFR_L2_SS9_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10	BFR_L2_SS10_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS10_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS10_A	BFR_L2_SS10_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10_B	BFR_L2_SS10_B_SA1	0-0.15	High (near area of firing activity)	X			

**TABLE 5**  
**Soil Sample Analyses Completed**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Sample ID	Depth (mbgs)	Risk Ranking	Field Parameters	Required Analysis		
				Organic/ Combustible Vapors	Petroleum Hydrocarbons + BTEX <sup>(a)</sup>	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L2_SS10_C	BFR_L2_SS10_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS10_D	BFR_L2_SS10_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11	BFR_L2_SS11_SA1	0-0.15	High (near area of firing activity)	X	X	X	X
	BFR_L2_SS11_SA2	0.15 - 0.3	High (near area of firing activity)	X			
BFR_L2_SS11_A	BFR_L2_SS11_A_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11_B	BFR_L2_SS11_B_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11_C	BFR_L2_SS11_C_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS11_D	BFR_L2_SS11_D_SA1	0-0.15	High (near area of firing activity)	X			
BFR_L2_SS12	BFR_L2_SS12_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS12_SA2	0.15 - 0.3	Low (site-specific background)	X			
BFR_L2_SS13	BFR_L2_SS13_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS13_SA2	0.15 - 0.3	Low (site-specific background)	X			
BFR_L2_SS14	BFR_L2_SS14_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS14_SA2	0.15 - 0.3	Low (site-specific background)	X			
BFR_L2_SS15	BFR_L2_SS15_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS15_SA2	0.15 - 0.3	Low (site-specific background)	X		X	
BFR_L2_SS16	BFR_L2_SS16_SA1	0-0.15	Low (site-specific background)	X	X	X	X
	BFR_L2_SS16_SA2	0.15 - 0.3	Low (site-specific background)	X			
n/a	BFR_L2_SS_DUP1	0.15 - 0.3	n/a	X			
n/a	BFR_L2_SS_DUP2	0-0.15	n/a	X	X	X	X

**TABLE 6**  
**Sediment Sample Analyses Completed**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Risk Ranking	Field Parameters	Required Analysis		
		Moisture	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)
BFR_L1_SED26	High (zone 1)	X	X	X	X
BFR_L1_SED27	High (zone 1)	X	X	X	X
BFR_L1_SED28	High (zone 1)	X	X	X	X
BFR_L1_SED29	High (zone 1)	X	X	X	X
BFR_L1_SED30	High (zone 1)	X	X	X	X
BFR_L1_SED31	High (zone 1)	X	X	X	X
BFR_L1_SED32	High (zone 1)	X	X	X	X
BFR_L1_SED33	High (zone 1)	X	X	X	X
BFR_L1_SED34	High (zone 1)	X	X	X	X
BFR_L1_SED35	High (zone 1)	X	X	X	X
BFR_L1_SED36	High (zone 1)	X	X	X	X
BFR_L1_SED39	High (zone 1)	X	X	X	X
BFR_L1_SED40	High (zone 1)	X	X	X	X
BFR_L1_SED41	High (zone 1)	X	X	X	X
BFR_L1_SED42	High (zone 1)	X	X	X	X
BFR_L1_SED44	High (zone 1)	X	X	X	X
BFR_L1_SED45	High (zone 1)	X	X	X	X
BFR_L1_SED46	Medium (zone 2)	X	X	X	X
BFR_L1_SED47	Medium (zone 2)	X	X	X	X
BFR_L1_SED48	Medium (zone 2)	X	X	X	X
BFR_L1_SED49	Medium (zone 2)	X	X	X	X
BFR_L1_SED50	Medium (zone 2)	X	X	X	X
BFR_L1_SED_DUP1	n/a	X	X	X	X
BFR_L1_SED_DUP2	n/a	X	X	X	X
BFR_L2_SED1	n/a	X	X	X	X
BFR_L2_SED2	n/a	X	X	X	X
BFR_L2_SED4	n/a	X	X	X	X
BFR_L2_SED5	n/a	X	X	X	X
BFR_L2_SED6	n/a	X	X	X	X
BFR_L2_SED7	n/a	X	X	X	X
BFR_L2_SED8	n/a	X	X	X	X
BFR_L2_SED9	n/a	X	X	X	X
BFR_L2_SED_DUP1	n/a	X	X	X	X

**TABLE 7**  
**Surface Water Sample Analyses**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Risk Ranking	Field Parameters	Required Analysis			
		pH, Temperature, Electrical Conductivity	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	General Chemistry
BFR_L1_SW26	High (zone 1)	X	X	X	X	
BFR_L1_SW27	High (zone 1)	X	X	X	X	
BFR_L1_SW28	High (zone 1)	X	X	X	X	
BFR_L1_SW29	High (zone 1)	X	X	X	X	X
BFR_L1_SW30	High (zone 1)	X	X	X	X	
BFR_L1_SW31	High (zone 1)	X	X	X	X	
BFR_L1_SW32	High (zone 1)	X	X	X	X	
BFR_L1_SW33	High (zone 1)	X	X	X	X	
BFR_L1_SW34	High (zone 1)	X	X	X	X	
BFR_L1_SW35	High (zone 1)	X	X	X	X	
BFR_L1_SW36	High (zone 1)	X	X	X	X	
BFR_L1_SW37	High (zone 1)	X	X	X	X	
BFR_L1_SW38	High (zone 1)	X	X	X	X	X
BFR_L1_SW39	High (zone 1)	X	X	X	X	
BFR_L1_SW40	High (zone 1)	X	X	X	X	
BFR_L1_SW41	High (zone 1)	X	X	X	X	
BFR_L1_SW42	High (zone 1)	X	X	X	X	
BFR_L1_SW43	High (zone 1)	X	X	X	X	
BFR_L1_SW44	High (zone 1)	X	X	X	X	
BFR_L1_SW45	High (zone 1)	X	X	X	X	
BFR_L1_SW46	Medium (zone 2)	X	X	X	X	
BFR_L1_SW47	Medium (zone 2)	X	X	X	X	
BFR_L1_SW48	Medium (zone 2)	X	X	X	X	
BFR_L1_SW49	Medium (zone 2)	X	X	X	X	
BFR_L1_SW50	Medium (zone 2)	X	X	X	X	
BFR_L1_SW_DUP1	n/a	X	X	X	X	
BFR_L1_SW_DUP2	n/a	X	X	X	X	X
BFR_L2_SW1	n/a	X	X	X	X	
BFR_L2_SW2	n/a	X	X	X	X	
BFR_L2_SW3	n/a	X	X	X	X	
BFR_L2_SW4	n/a	X	X	X	X	X
BFR_L2_SW5	n/a	X	X	X	X	
BFR_L2_SW6	n/a	X	X	X	X	
BFR_L2_SW7	n/a	X	X	X	X	
BFR_L2_SW8	n/a	X	X	X	X	
BFR_L2_SW9	n/a	X	X	X	X	
BFR_L2_SW10	n/a	X	X	X	X	X
BFR_L2_SW_DUP1	n/a	X	X	X	X	

**TABLE 8**  
**Groundwater Sample Analyses**  
**Burgo Firing Range, 9 Wing Gander, NL**

Sample ID	Risk Ranking	Field Parameters	Required Analysis			
		pH, Temperature, Electrical Conductivity	Petroleum Hydrocarbons +BTEX	Metals + Mercury	Polycyclic Aromatic Hydrocarbons (PAHs)	General Chemistry
BFR_L1_GW1	High (zone 1)	X	X	X	X	X
BFR_L1_GW2	High (zone 1)	X	X	X	X	
BFR_L1_GW3	High (zone 1)	X	X	X	X	
BFR_L1_GW4	High (zone 1)	X	X	X	X	X
BFR_L1_GW5	High (zone 1)	X	X	X	X	
BFR_L1_GW_DUP1	n/a	X	X	X	X	X
BFR_L2_GW1	TBD	X	X	X	X	X
BFR_L2_GW2	TBD	X	X	X	X	
BFR_L2_GW3	TBD	X	X	X	X	X
BFR_L2_GW_DUP1	n/a	X	X	X	X	

**Exceedance Identification:**

**Bold and shaded = Exceedance of applicable guidelines**

**TABLE 9**  
**petroleum Hydrocarbons (PHCs) in Soil**  
**Site Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 1									
				BFR_SS1		BFR_SS2	BFR_SS3	BFR_SS4		BFR_SS5		BFR_SS6	
				BFR_SS1_SA1	BFR_SS_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1 (original)	BFR_SS4_SA1 (revised)	BFR_SS5_SA1 (original)	BFR_SS5_SA1 (revised)	BFR_SS6_SA1 (original)	BFR_SS6_SA1 (revised)
Sample ID				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Sample Depth (mbgs)				2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01
Date Collected													
Benzene	31	0.021	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	47	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	55	60	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	4.9	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<10	<10	<10	<10	94	<10	85	<10	120	<10
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<10	<10	<10	<10	190	<10	190	<10	200	<10
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	<15	<15	56	<15	1900	<15	240	1000	43	1200
Modified TPH	Gasoline	NGA	75*	mg/kg									
	Diesel/No. 2 Fuel Oil	NGA	3200**	mg/kg	<15	<15	56***	<15	2200**	240***	1300**	43***	1500**
	Lube oil/No. 6 Oil	NGA	1800***	mg/kg									
Reached Baseline at C32				NA	NA	Yes	NA	No	No	No	Yes	No	Yes
Hydrocarbon Resemblance				NA	NA	Possible lube oil fraction.	NA	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range. Lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.

**Notes:**

NA = Not Applicable

No Guideline Available

Disturbances below ground surface

Below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup

**TABLE 9**  
**petroleum Hydrocarbons (PHCs) in Soil**  
**Site Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 1									
				BFR_SS6					BFR_SS7				
				BFR_L1_SS6A	BFR_L1_SS-DUP1 (Duplicate of BFR_L1_SS6_A_SA1)	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_SS7_SA1 (original)	BFR_SS7_SA1 (revised)	BFR_SS_DUP2 (original)	BFR_SS_DUP2 (revised)	
Sample ID													
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01	2020-12-01	2020-12-01	2020-12-01	
Benzene	31	0.021	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.025	<0.025	<0.025	<0.025	
Toluene	75	47	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.10	<0.10	<0.10	<0.10	
Ethylbenzene	55	60	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.025	<0.025	<0.025	<0.025	
Total Xylenes	95	4.9	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<0.10	
C6 - C10 (less BTEX)	210	NGA	mg/kg	<3	<3	<3	<3	<3	<5.0	<5.0	<5.0	<5.0	
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<15	<15	16	47	<15	76	<10	61	<1	
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<15	<15	16	<15	<15	190	<10	200	<10	
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	312	192	532	191	845	850	37	1300	270	
Modified TPH	Gasoline	NGA	75*										
	Diesel/No. 2 Fuel Oil	NGA	3200**	312	192	564	238	845	1100**	37***	1500**	270***	
	Lube oil/No. 6 Oil	NGA	1800***										
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	
Hydrocarbon Resemblance				Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	

**Notes:**

NA = Not Applicable

No Guideline Available

0.05 mg/kg below ground surface

0.05 mg/kg Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup

**TABLE 9**  
**roleum Hydrocarbons (PHCs) in Soil**  
**Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier I RBSL <sup>b</sup>	Units	Location 1										
				BFR_SS7				BFR_SS8						
				BFR_L1_SS7A	BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_SS8_SA1 (original)	BFR_SS8_SA1 (revised)	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	
Sample ID														
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18
Benzene	31	0.021	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	75	47	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.10	<0.10	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	55	60	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.025	<0.025	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes	95	4.9	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)	210	NGA	mg/kg	<3	<3	<3	<3	<5.0	<5.0	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<15	<15	<15	53	<10	<10	<15	25	102	<15	<15
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<15	<15	<15	21	230	<10	16	15	21	21	21
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	554	466	250	290	1300	34	504	283	268	502	502
Modified TPH	Gasoline	NGA	75*	mg/kg										
	Diesel/No. 2 Fuel Oil	NGA	3200**	mg/kg	554	466	250	364	1500**	34***	520	323	391	523
	Lube oil/No. 6 Oil	NGA	1800***	mg/kg										
Reached Baseline at C32				Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

**Notes:**

NA = Not Applicable

No Guideline Available

res below ground surface

low Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occuring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I RBSL, prior to Silica Gel Cleanup**



**TABLE 9**  
 **Petroleum Hydrocarbons (PHCs) in Soil**  
 **j Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier I RBSL <sup>b</sup>	Units	Location 1									
				BFR_SS9		BFR_SS10		BFR_SS11		BFR_SS12	BFR_SS13		
				BFR_SS9_SA1 (original)	BFR_SS9_SA1 (revised)	BFR_SS10_SA1 (original)	BFR_SS10_SA1 (revised)	BFR_SS11_SA1 (original)	BFR_SS11_SA1 (revised)	BFR_SS12_SA1	BFR_SS13_SA1 (original)	BFR_SS13_SA1 (revised)	
Sample ID													
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02
Benzene	31	0.021	mg/kg	<0.02	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	47	mg/kg	<0.04	<0.10	<0.050	<0.050	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10
Ethylbenzene	55	60	mg/kg	<0.03	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	4.9	mg/kg	<0.05	<0.10	<0.050	<0.050	<0.10	<0.10	<0.050	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<3	<5.0	<2.5	<2.5	<5.0	<5.0	<2.5	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<15	<10	65	<10	130	<10	<10	<b>160</b>	<10	<10
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<15	<10	120	<10	290	<10	<10	240	<10	<10
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	192	17	810	51	1600	38	590	1300	33	33
Modified TPH													
Gasoline	NGA	75*	mg/kg										
Diesel/No. 2 Fuel Oil	NGA	3200**	mg/kg	860**	17***	990**	51***	2000**	38***	590***	1700**	33***	33***
Lube oil/No. 6 Oil	NGA	1800***	mg/kg										
Reached Baseline at C32				Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes
Hydrocarbon Resemblance				Fuel/lube oil range. Possible lube oil fraction.	Possible lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction <sup>(c)</sup> .	Lube oil range <sup>(c)</sup> .	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Possible lube oil fraction.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range.

**Notes:**

NA = Not Applicable

No Guideline Available

Residues below ground surface

Below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I RBSL, prior to Silica Gel Cleanup**

**TABLE 9**  
**roleum Hydrocarbons (PHCs) in Soil**  
**Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 1									
				BFR_SS13					BFR_SS14		BFR_SS15		
				BFR_L1_SS13A_S A1	BFR_L1_SS_DUP2 (Duplicate of BFR_L1_SS13_A_S A1)	BFR_L1_SS13B_S A1	BFR_L1_SS13C_S A1	BFR_L1_SS13D_S A1	BFR_SS14_SA1 (original)	BFR_SS14_SA1 (revised)	BFR_SS15_SA1 (original)	BFR_SS15_SA1 (revised)	
Sample ID				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	
Sample Depth (mbgs)				2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2020-12-02	2020-12-02	2020-12-02	
Date Collected													
Benzene	31	0.021	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.025	<0.025	<0.025	
Toluene	75	47	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.10	<0.10	<0.10	
Ethylbenzene	55	60	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.025	<0.025	<0.025	
Total Xylenes	95	4.9	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	
C6 - C10 (less BTEX)	210	NGA	mg/kg	<3	<3	<3	<3	<3	<3	<5.0	<5.0	<5.0	
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<15	<15	<15	22	<15	<15	<10	<10	<10	
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<15	<15	<15	<15	<15	<15	190	<10	230	
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	586	610	240	117	151	1300	250	2200	550	
Modified TPH	Gasoline	NGA	75*										
	Diesel/No. 2 Fuel Oil	NGA	3200**	586	610	240	139	151***	1500***	250***	2400***	550***	
	Lube oil/No. 6 Oil	NGA	1800***										
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	
Hydrocarbon Resemblance				Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube range, Unidentified Compounds	Lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range. Possible lube oil fraction.	Lube oil range.

**Notes:**

NA = Not Applicable

No Guideline Available

tres below ground surface

low Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**ance Identification:**

**Bold and shaded = Naturally Occuring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup**

**TABLE 9**  
**petroleum Hydrocarbons (PHCs) in Soil**  
**Site Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 1									
				BFR_SS16		BFR_SS17		BFR_SS18		BFR_SS19		BFR_SS20	
				BFR_SS16_SA1 (original)	BFR_SS16_SA1 (revised)	BFR_SS17_SA1 (original)	BFR_SS17_SA1 (revised)	BFR_SS18_SA1 (original)	BFR_SS18_SA1 (revised)	BFR_SS19_SA1 (original)	BFR_SS19_SA1 (revised)	BFR_SS20_SA1 (original)	
Sample ID													
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2020-12-02	2020-12-02	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-03
Benzene	31	0.021	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	75	47	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	55	60	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	95	4.9	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)	210	NGA	mg/kg	<5.0	<5.0	<5.0	<5.0	<2.5	<2.5	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons	150	NGA	mg/kg	120	<10	110	61	57	<10	91	<10	98	98
>C16-C21 Hydrocarbons	300	NGA	mg/kg	290	<10	140	<10	150	<10	270	<10	290	290
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	<b>3400</b>	850	1200	160	1100	120	2500	450	2200	2200
Modified TPH	Gasoline	NGA	75*										
	Diesel/No. 2 Fuel Oil	NGA	3200**	<u>3900**</u>	850***	1500**	220**	1300**	120***	2900**	450***	2600**	2600**
	Lube oil/No. 6 Oil	NGA	1800***										
Reached Baseline at C32				No	No	No	Yes	No	Yes	No	Yes	No	
Hydrocarbon Resemblance				Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Fuel/lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	

**Notes:**

NA = Not Applicable

No Guideline Available

Residues below ground surface

Below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup

**TABLE 9**  
**petroleum Hydrocarbons (PHCs) in Soil**  
**Site Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 1									
				BFR_SS20	BFR_SS21		BFR_SS22		BFR_SS23		BFR_SS24		
				BFR_SS20_SA1 (revised)	BFR_SS21_SA1 (original)	BFR_SS21_SA1 (revised)	BFR_SS22_SA1 (original)	BFR_SS22_SA1 (revised)	BFR_SS23_SA1 (original)	BFR_SS23_SA1 (revised)	BFR_SS24_SA1 (original)	BFR_SS24_SA1 (revised)	
Sample ID				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	
Sample Depth (mbgs)				2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	
Date Collected													
Benzene	31	0.021	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Toluene	75	47	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Ethylbenzene	55	60	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Total Xylenes	95	4.9	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
C6 - C10 (less BTEX)	210	NGA	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<10	100	56	66	<10	<10	<10	<10	<10	
>C16-C21 Hydrocarbons	300	NGA	mg/kg	<10	190	<10	120	<10	250	<10	<10	<10	
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	480	1200	240	980	140	2100	410	500	<15	
Modified TPH	Gasoline	NGA	75*										
	Diesel/No. 2 Fuel Oil	NGA	3200**	480***	1500**	300**	1200**	140***	2300**	410***	500***	<15	
	Lube oil/No. 6 Oil	NGA	1800***										
Reached Baseline at C32				Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	NA	
Hydrocarbon Resemblance				Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Fuel/lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	NA	

**Notes:**

NA = Not Applicable

No Guideline Available

Disturbances below ground surface

Below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup**

**TABLE 9**  
 **petroleum Hydrocarbons (PHCs) in Soil**  
 **j Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier I RBSL <sup>b</sup>	Units	Location 1							
				BFR_SS25		BFR_L1_SS26	BFR_L1_SS27	BFR_L1_SS28		BFR_L1_SS29	BFR_L1_SS30
				BFR_SS25_SA1 (original)	BFR_SS25_SA1 (revised)	BFR_L1_SS26_SA1	BFR_L1_SS27_SA1	BFR_L1_SS28_SA1	BFR_L1_SS_DUP3 (Duplicate of BFR_L1_SS28_SA1)	BFR_L1_SS29_SA1	BFR_L1_SS30_SA1
Sample ID											
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2020-12-04	2020-12-04	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17
Benzene	31	0.021	mg/kg	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	75	47	mg/kg	<0.10	<0.10	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	55	60	mg/kg	<0.025	<0.025	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes	95	4.9	mg/kg	<0.10	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)	210	NGA	mg/kg	<5.0	<5.0	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<10	<10	<15	<15	<15	<15	22	<15
>C16-C21 Hydrocarbons	300	NGA	mg/kg	230	<10	17	21	19	<15	29	15
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	1900	470	480	322	418	180	1050	339
Modified TPH	Gasoline	NGA	75*								
	Diesel/No. 2 Fuel Oil	NGA	3200**	2100**	470***	497***	343***	437***	180***	1100***	354***
	Lube oil/No. 6 Oil	NGA	1800***								
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Hydrocarbon Resemblance				Fuel/lube oil range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

**Notes:**

NA = Not Applicable

No Guideline Available

mbgs = metres below ground surface

NDL = Below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier I RBSL, prior to Silica Gel Cleanup**

**TABLE 9**  
 **Petroleum Hydrocarbons (PHCs) in Soil**  
 **j Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 2									
				BRF_L2_SS1	BRF_L2_SS2	BRF_L2_SS3	BRF_L2_SS4	BRF_L2_SS5	BRF_L2_SS6	BRF_L2_SS7	BRF_L2_SS8	BRF_L2_SS9	
Sample ID				BRF_L2_SS1_SA1	BRF_L2_SS2_SA1	BRF_L2_SS3_SA1	BRF_L2_SS4_SA1	BRF_L2_SS5_SA1	BRF_L2_SS6_SA1	BRF_L2_SS7_SA1	BRF_L2_SS8_SA1	BRF_L2_SS9_SA1	
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	
Date Collected				2021-11-25	2021-11-25	2021-11-25	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26	
Benzene	31	0.021	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Toluene	75	47	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Ethylbenzene	55	60	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Total Xylenes	95	4.9	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
C6 - C10 (less BTEX)	210	NGA	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3	<3	
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<15	27	<15	<15	<15	40	<15	<15	<15	
>C16-C21 Hydrocarbons	300	NGA	mg/kg	24	24	16	18	18	31	24	32	<15	
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	492	572	361	512	639	420	824	786	448	
Modified TPH	Gasoline	NGA	75*	mg/kg									
	Diesel/No. 2 Fuel Oil	NGA	3200**	mg/kg	516***	623***	377***	530***	657***	491***	848***	818***	448***
	Lube oil/No. 6 Oil	NGA	1800***	mg/kg									
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Hydrocarbon Resemblance				Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds, Product in Fuel Oil Range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	

**Notes:**

NA = Not Applicable

No Guideline Available

tres below ground surface

low Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occuring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup**

**TABLE 9**  
**petroleum Hydrocarbons (PHCs) in Soil**  
**Sample Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Atlantic RBCA Tier 1 RBSL <sup>b</sup>	Units	Location 2							
				BRF_L2_SS10		BRF_L2_SS11	BRF_L2_SS12	BRF_L2_SS13	BRF_L2_SS14	BRF_L2_SS15	BRF_L2_SS16
				BRF_L2_SS10_SA1	BRF_L2_SS10_DUP2	BRF_L2_SS11_SA1	BRF_L2_SS12_SA1	BRF_L2_SS13_SA1	BRF_L2_SS14_SA1	BRF_L2_SS15_SA1	BRF_L2_SS16_SA1
Sample Depth (mbgs)				0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected				2021-11-25	2021-11-25	2021-11-23	2021-11-23	2021-11-23	2021-11-23	2021-11-23	2021-11-23
Benzene	31	0.021	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	75	47	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	55	60	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes	95	4.9	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)	210	NGA	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	150	NGA	mg/kg	<15	19	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons	300	NGA	mg/kg	15	42	15	<15	<15	<15	<15	<15
>C21-<C32 Hydrocarbons	2800	NGA	mg/kg	359	675	332	245	252	400	230	250
Modified TPH	Gasoline	NGA	75*								
	Diesel/No. 2 Fuel Oil	NGA	3200**	374***	736***	347***	245***	252***	400***	230***	250***
	Lube oil/No. 6 Oil	NGA	1800***								
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

**Notes:**

NA = Not Applicable

No Guideline Available

mbgs = meters below ground surface

NDL = Below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Guidance Identification:**

**Bold and shaded = Naturally Occurring Exceedance of Atlantic RBCA RBSL ESL, prior to Silica Gel Cleanup**

**Underline and shaded = Naturally occurring Exceedance of Atlantic RBCA Tier 1 RBSL, prior to Silica Gel Cleanup**

**TABLE 10**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	Units	Location 1											
					BFR_SS1		BFR_SS2	BFR_SS3	BFR_SS4	BFR_SS5	BFR_SS6	BFR_SS6				
					BFR_SS1_SA1	BFR_SS1_DUP1	BFR_SS2_SA1	BFR_SS3_SA1	BFR_SS4_SA1	BFR_SS5_SA1	BFR_SS6_SA1	BFR_L1_SS-DUP1 (Duplicate of BFR_L1_SS6_SA1)	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D
Sample Depth (mbgs)	0 - 0.15		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15		
Date Collected	2020-12-01		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	
1-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	2.5	24000	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.6	NGA	20	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b,j)fluoranthene	6.2	NGA	0.1	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-
Chrysene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	0.036	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	15.4	3500	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	0.047	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	15.4	2700	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.02	0.03	<0.01	<0.01	0.02
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.6	2.2	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	0.078	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	7.7	2100	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.060	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05
Index of Additive Cancer Risk (IACR) <sup>d</sup>	NGA	5.3	1.0	-	0.15	0.15	0.15	0.15	0.16	0.15	0.15	-	-	-	-	-

**Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
 (b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil  
 (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use  
 (d) The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Crysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**  
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)  
*Italised and shaded = Exceedance of CCME SQG (None reported)*



**TABLE 10**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>Eco</sup> <sup>a</sup>	Atlantic RBCA EQS <sup>HH</sup> <sup>b</sup>	CCME SQG <sup>c</sup>	Units	Location 1										
					BFR_SS7				BFR_SS8				BFR_SS9		
					BFR_SS7_SA1	BFR_SS_DUP2	BFR_L1_SS7A	BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_SS8_SA1	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D
Sample Depth (mbgs)					0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected					2020-12-01	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2020-12-01	2021-11-18	2021-11-18	2021-11-18	2020-12-01
1-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	mg/kg	<0.010	<0.010	<0.00671	<0.00671	<0.00671	<0.00671	<0.010	<0.00671	<0.00671	<0.00671	<0.010
Acenaphthylene	NGA	4.5	NGA	mg/kg	<0.010	<0.010	<0.004	<0.004	<0.004	<0.004	<0.010	<0.004	<0.004	<0.004	<0.010
Anthracene	2.5	24000	NR	mg/kg	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.010	<0.03	<0.03	<0.03	<0.010
Benzo(a)anthracene	0.5	NGA	0.1	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010
Benzo(a)pyrene	0.6	NGA	20	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	<0.010
Benzo(b,j)fluoranthene	6.2	NGA	0.1	mg/kg	<0.020	<0.020	-	-	-	-	<0.020	-	-	-	<0.020
Benzo(g,h,i)perylene	6.6	NGA	NGA	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010
Benzo(j)fluoranthene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	-	-	-	-	<0.010	-	-	-	<0.010
Benzo(k)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	-	-	-	-	<0.010	-	-	-	<0.010
Chrysene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	0.1	mg/kg	<0.010	<0.010	<0.006	<0.006	<0.006	<0.006	<0.010	<0.006	<0.006	<0.006	<0.010
Fluoranthene	15.4	3500	NR	mg/kg	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	<0.010
Fluorene	15.4	2700	NGA	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	0.02	<0.01	<0.01	0.01
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010
Naphthalene	0.6	2.2	NR	mg/kg	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010
Perylene	NGA	NGA	NGA	mg/kg	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	<0.010
Phenanthrene	6.2	NGA	0.046	mg/kg	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.010	<0.03	<0.03	<0.03	<0.010
Pyrene	7.7	2100	NR	mg/kg	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.010	<0.05	<0.05	<0.05	<0.010
Index of Additive Cancer Risk (IACR) <sup>d</sup>	NGA	5.3	1.0	-	0.15	0.15	-	-	-	-	0.15	-	-	-	0.15

**Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
 (b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil  
 (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use  
 (d) The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Chrysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**  
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)  
*Italicised and shaded = Exceedance of CCME SQG (None reported)*

**TABLE 10**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	Units	Location 1											
					BFR_SS10	BFR_SS11	BFR_SS12	BFR_SS13					BFR_SS14	BFR_SS15	BFR_SS16	
					BFR_SS10_SA1	BFR_SS11_SA1	BFR_SS12_SA1	BFR_SS13_SA1	BFR_L1_SS13A_SA1	BFR_L1_SS_DU P2 (Duplicate of BFR_L1_SS13_A_SA1)	BFR_L1_SS13B_SA1	BFR_L1_SS13C_SA1	BFR_L1_SS13D_SA1	BFR_SS14_SA1	BFR_SS15_SA1	BFR_SS16_SA1
Sample Depth (mbgs)					0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected					2020-12-01	2020-12-01	2020-12-02	2020-12-02	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2020-12-02	2020-12-02	2020-12-02
1-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010
2-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Acenaphthene	21.5	3900	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.010	<0.010	<0.010
Acenaphthylene	NGA	4.5	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.004	<0.004	<0.004	<0.004	<0.004	<0.010	<0.010	<0.010
Anthracene	2.5	24000	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.5	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.070
Benzo(a)pyrene	0.6	NGA	20	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010
Benzo(b,j)fluoranthene	6.2	NGA	0.1	mg/kg	<0.020	<0.020	<0.020	<0.020	-	-	-	-	-	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	6.6	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.32
Benzo(j)fluoranthene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-	<0.010	<0.010	<0.010
Chrysene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.006	<0.006	<0.006	<0.006	<0.006	<0.010	<0.010	<0.010
Fluoranthene	15.4	3500	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010
Fluorene	15.4	2700	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	0.03	0.03	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	mg/kg	0.041	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Naphthalene	0.6	2.2	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
Perylene	NGA	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	1.1
Phenanthrene	6.2	NGA	0.046	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03	<0.03	<0.03	<0.010	<0.010	<0.010
Pyrene	7.7	2100	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010
Index of Additive Cancer Risk (IACR) <sup>d</sup>	NGA	5.3	1.0	-	0.15	0.15	0.15	0.15	-	-	-	-	-	0.15	0.15	0.15

**Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
 (b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil  
 (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use  
 (d) The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Chrysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**  
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)  
*Italised and shaded = Exceedance of CCME SQG (None reported)*

**TABLE 10**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	Units	Location 1											
					BFR_SS17	BFR_SS18	BFR_SS19	BFR_SS20	BFR_SS21	BFR_SS22	BFR_SS23	BFR_SS24	BFR_SS25	BFR_L1_SS26	BFR_L1_SS27	BFR_L1_SS28
					BFR_SS17_SA1	BFR_SS18_SA1	BFR_SS19_SA1	BFR_SS20_SA1	BFR_SS21_SA1	BFR_SS22_SA1	BFR_SS23_SA1	BFR_SS24_SA1	BFR_SS25_SA1	BFR_L1_SS26_SA1	BFR_L1_SS27_SA1	BFR_L1_SS28_SA1
Sample Depth (mbgs)					0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15
Date Collected					2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2021-11-17	2021-11-17	2021-11-17
1-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
2-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.060	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Acenaphthene	21.5	3900	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.00671	<0.00671	<0.00671
Acenaphthylene	NGA	4.5	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.004	<0.004	<0.004
Anthracene	2.5	24000	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.5	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.6	NGA	20	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Benzo(b,j)fluoranthene	6.2	NGA	0.1	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-
Benzo(g,h,i)perylene	6.6	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-
Benzo(k)fluoranthene	6.2	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-
Chrysene	6.2	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.006	<0.006	<0.006
Fluoranthene	15.4	3500	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Fluorene	15.4	2700	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.054	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Naphthalene	0.6	2.2	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Phenanthrene	6.2	NGA	0.046	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.03	<0.03	<0.03
Pyrene	7.7	2100	NR	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.05	<0.05	<0.05
Index of Additive Cancer Risk (IACR) <sup>d</sup>	NGA	5.3	1.0	-	0.15	0.15	0.15	0.15	0.15	0.17	0.15	0.15	0.15	-	-	-

**Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
 (b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil  
 (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use  
 (d) The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Crysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**  
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)  
*Italised and shaded = Exceedance of CCME SQG (None reported)*

**TABLE 10**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	Units	Location 1								Location 2							
					BFR L1_SS28	BFR L1_SS29	BFR L1_SS30	BRF L2_SS1	BRF L2_SS2	BRF L2_SS3	BRF L2_SS4	BRF L2_SS5	BRF L2_SS6	BRF L2_SS7	BRF L2_SS8	BRF L2_SS9				
					BFR L1_SS_DUP3 (Duplicate of BFR L1_SS28_S A1)	BFR L1_SS29_S A1	BFR L1_SS30_S A1	BRF L2_SS1_S A1	BRF L2_SS2_S A1	BRF L2_SS3_S A1	BRF L2_SS4_S A1	BRF L2_SS5_S A1	BRF L2_SS6_S A1	BRF L2_SS7_S A1	BRF L2_SS8_S A1	BRF L2_SS9_S A1				
Sample ID					0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15				
Sample Depth (mbgs)					2021-11-17	2021-11-17	2021-11-17	2021-11-25	2021-11-25	2021-11-25	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26	2021-11-26				
Date Collected																				
1-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
2-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Acenaphthene	21.5	3900	NGA	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671				
Acenaphthylene	NGA	4.5	NGA	mg/kg	<0.004	<0.004	<0.004	0.006	<0.004	<0.004	0.023	0.010	0.008	0.005	0.004	<0.004				
Anthracene	2.5	24000	NR	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05	0.18				
Benzo(a)anthracene	0.5	NGA	0.1	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.03	<0.03	<0.03				
Benzo(a)pyrene	0.6	NGA	20	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.01	<0.01				
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-				
Benzo(g,h,i)perylene	6.6	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Benzo(j)fluoranthene	6.2	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-				
Benzo(k)fluoranthene	6.2	NGA	0.1	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-				
Chrysene	6.2	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Dibenzo(a,h)anthracene	NGA	NGA	0.1	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006				
Fluoranthene	15.4	3500	NR	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Fluorene	15.4	2700	NGA	mg/kg	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01				
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Naphthalene	0.6	2.2	NR	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01				
Perylene	NGA	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Phenanthrene	6.2	NGA	0.046	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03				
Pyrene	7.7	2100	NR	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05				
Index of Additive Cancer Risk (IACR) <sup>d</sup>	NGA	5.3	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-				

**Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
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 (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)  
 (b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil  
 (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use  
 (d) The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Chrysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**  
Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)  
*Italised and shaded = Exceedance of CCME SQG (None reported)*

**TABLE 10**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	Units	Location 2								
					BRF_L2_SS10		BRF_L2_SS11	BRF_L2_SS12		BRF_L2_SS13	BRF_L2_SS14	BRF_L2_SS15	BRF_L2_SS16
					BRF_L2_SS10_S A1	BRF_L2_SS10_DU P2	BRF_L2_SS11_S A1	BRF_L2_SS12_S A1	BRF_L2_SS13_S A1	BRF_L2_SS14_S A1	BRF_L2_SS15_S A1	BRF_L2_SS16_S A1	
Sample Depth (mbgs)					0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	
Date Collected					2021-11-25	2021-11-25	2021-11-23	2021-11-23	2021-11-23	2021-11-23	2021-11-23	2021-11-23	
1-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
2-Methylnaphthalene	NGA	72	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthene	21.5	3900	NGA	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	
Acenaphthylene	NGA	4.5	NGA	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Anthracene	2.5	24000	NR	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Benzo(a)anthracene	0.5	NGA	0.1	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(a)pyrene	0.6	NGA	20	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(b)fluoranthene	6.2	NGA	0.1	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(b,j)fluoranthene	6.2	NGA	0.1	mg/kg	-	-	-	-	-	-	-	-	
Benzo(g,h,i)perylene	6.6	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(j)fluoranthene	6.2	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-	
Benzo(k)fluoranthene	6.2	NGA	0.1	mg/kg	-	-	-	-	-	-	-	-	
Chrysene	6.2	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dibenzo(a,h)anthracene	NGA	NGA	0.1	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
Fluoranthene	15.4	3500	NR	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Fluorene	15.4	2700	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3-cd)pyrene	0.38	NGA	0.1	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Naphthalene	0.6	2.2	NR	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Perylene	NGA	NGA	NGA	mg/kg	0.11	0.18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Phenanthrene	6.2	NGA	0.046	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Pyrene	7.7	2100	NR	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Index of Additive Cancer Risk (IACR) <sup>d</sup>	NGA	5.3	1.0	-	-	-	-	-	-	-	-	-	

**Notes:**

NGA = No Guideline Available

NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Screening Levels (ESL) for the protection of plants and soil invertebrates; direct soil contact, coarse agricultural soils (2015)

(b) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for soil, agricultural land use, non-potable groundwater, coarse-grained soil

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) The Index of Additive Cancer Risk (IACR) assesses potential threats to potable groundwater water quality from leaching of carcinogenic PAH mixtures from soil. It is used for the protection of potable water. IACR = [Benzo(a)anthracene / 0.33 mg/kg] + [Benzo(b,j,k)fluoranthene / 0.16 mg/kg] + [Benzo(g,h,i)perylene / 6.8 mg/kg] + [Benzo(a)pyrene / 0.37 mg/kg] + [Chrysene / 2.1 mg/kg] + [Dibenzo(a,h)anthracene / 0.23 mg/kg] + [Indeno(1,2,3-c,d)pyrene / 2.7 mg/kg]. Where values are below the detection limit, half the detection limit is used.

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**

**Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)**

**Italicised and shaded = Exceedance of CCME SQG (None reported)**

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1												
								Location 1												
								BFR_SS1						BFR_SS2						BFR_SS3
								BFR_SS1_SA1	BFR_SS_DUP 1	BFR_L1_SS1_ SA2	BFR_L1_SS1_ A_SA1	BFR_L1_SS1_ B_SA1	BFR_L1_SS1_ C_SA1	BFR_SS2_SA1	BFR_L1_SS2_ B_SA1	BFR_L1_SS2_ C_SA1	BFR_L1_SS2_ D_SA1	BFR_L1_SS DU P6 (Duplicate of BFR_L1_SS2_D_ SA1)	BFR_SS3_SA1	
Sample ID					Min	Max		0 - 0.15 2020-12-01	0 - 0.15 2020-12-01	0.15 - 0.30 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2020-12-01	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2020-12-01	
Sample Depth (mbgs)																				
Date Collected																				
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	5500	5700	5210	4520	12100	2640	7800	7800	7310	10900	9880	6000	
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<2.0	<2.0	<0.8	<0.8	<0.8	<0.8	<2.0	<0.8	<0.8	<0.8	0.9	<0.8	2.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.5	3.2	3.0	4.0	3.0	2.0	5.7	7.0	5.0	6.0	7.0	3.5	
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	21	21	19	19	10	38	34	38	28	84	58	24	
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<2.0	<2.0	<0.4	<0.4	<0.4	<0.4	<2.0	0.5	0.4	0.5	0.6	<2.0	
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	-	-	-	-	<2.0	-	-	-	-	<2.0	
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<50	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<50	
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	<0.50	<0.50	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50	<0.50	<0.30	
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	10	10	11	10	11	10	20	24	28	28	25	10	
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	2.8	3.1	2.9	2.8	2.5	2.9	5.6	6.6	7.2	9.4	7.9	2.9	
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	4.5	4.9	5.6	5.3	2.9	8.4	12	14.4	12.5	16.7	14.4	8.7	
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	8700	9500	8540	8180	<b>13500</b>	9550	<b>16000</b>	<b>15000</b>	<b>14100</b>	<b>20800</b>	<b>18000</b>	8700	
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	3.8	4.1	27	6.0	29	30	17	20	18	<b>82</b>	25	13	
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	8.6	9.3	8.2	7.9	8.1	4.5	12.0	12.2	13.6	<b>22.8</b>	19.0	8.3	
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	130	130	143	125	116	88	330	<b>449</b>	<b>387</b>	<b>560</b>	<b>435</b>	140	
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.10	<0.10	0.06	0.07	0.14	0.19	<0.10	0.09	0.06	0.05	<0.03	<0.10	
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	<2.0	0.6	0.6	<0.5	<0.5	<2.0	
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	6.6	7.3	6.0	6.0	4.0	6.0	11	11	13	14	14	5.6	
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	8.0	8.9	-	-	-	-	17	-	-	-	-	9.7	
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<0.50	<0.50	<0.8	<0.8	<b>4.2</b>	<b>1.9</b>	<0.50	<0.8	<0.8	<0.8	<0.8	<0.50	
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5	<0.50	
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	11	9.3	15	14	10	8.0	<5.0	
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.10	<0.10	<0.50	<0.50	<0.50	<0.50	0.12	<0.50	<0.50	<0.50	<0.50	<0.10	
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	<1.0	<1.0	<1.0	2.0	1.0	<1.0	<1.0	<1.0	1.0	1.0	<1.0	
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.68	0.52	0.92	0.74	1.87	1.07	0.95	1.38	1.17	1.32	1.14	1.20	
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	18.0	<b>20.0</b>	<b>18.9</b>	17.8	<b>36.5</b>	<b>26.5</b>	<b>34.0</b>	<b>35.6</b>	<b>42.0</b>	<b>62.0</b>	<b>48.1</b>	17	
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	14	14	14	14	21	23	38	59	40	62	53	15	

**Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**  
*Italicised and shaded = Exceedance of CCME SQG*  
**Double underline and shaded = Exceedance of NSE Tier 1**  
 Yellow Shaded = exceedance is within or below background range

**TABLE 11**  
Analytical Results - Metals in Soil  
Burgeo Firing Range, 9 Wing Gander, NL

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1											
								Location 1											
								BFR_SS3						BFR_SS4					
								BFR_L1_SS3 SA2	BFR_L1_SS3 A_SA1	BFR_L1_SS3 B_SA1	BFR_L1_SS3 C_SA1	BFR_L1_SS3 DUP5 (Duplicate of BFR_L1_SS3 C_SA1)	BFR_L1_SS3 D_SA1	BFR_SS4_SA1	BFR_L1_SS4 SA2	BFR_L1_SS4 DUP4 (Duplicate of BFR_L1_SS4 SA2)	BFR_L1_SS4 A_SA1	BFR_L1_SS4 B_SA1	BFR_L1_SS4 C_SA1
Sample ID					Min	Max		0.15 - 0.30 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2020-12-01	0.15 - 0.30 2021-11-27	0.15 - 0.30 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27
Sample Depth (mbgs)																			
Date Collected																			
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	5880	7160	5490	4670	4840	5610	13000	4890	7910	5850	2280	12000
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<b>21.8</b>	<b>33.1</b>	<b>10</b>	2.0	2.3	<0.8	<2.0	<0.8	<0.8	<0.8	<0.8	<0.8
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	4.0	5.0	3.0	3.0	3.0	4.0	<2.0	2.0	2.0	2.0	3.0	2.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	20	23	15	18	16	21	15	13	14	15	23	23
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<2.0	<0.4	<0.4	<0.4	<0.4	0.5
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-	<2.0	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.50	<0.50	<0.50	NR	<0.50	<0.50	<0.30	<0.50	<0.50	<0.50	0.60	<0.50
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	12	12	10	8.0	7.0	10	13	9.0	8.0	9.0	<5.0	17
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	3.2	3.3	2.4	2.3	2.0	3.8	1.0	0.9	1.0	1.2	<0.5	2.0
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	37.9	57.5	18	8.6	9.2	8.2	4.2	5.0	4.3	4.8	4.7	38.2
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	9320	10500	8400	6870	6010	8980	5000	3450	3620	7170	1140	6800
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	<b>1820</b>	<b>2130</b>	<b>384</b>	41	51	15	52	32	33	36	30	61
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	10.2	10.5	6.9	6.4	6.0	11.5	3.8	2.3	2.2	2.3	<0.5	7.4
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	157	168	138	127	104	384	47	46	49	82	38	104
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.04	0.03	<0.03	<0.03	<0.03	<0.03	0.17	0.20	0.17	0.15	0.22	0.14
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.0	<0.5	<0.5	<0.5	<0.5	0.5
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	7.0	7.0	4.0	4.0	4.0	6.0	4.5	3.0	3.0	3.0	2.0	5.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	5.3	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<b>2.2</b>	<b>4.7</b>	<b>3.8</b>	<b>2.9</b>	<b>3.0</b>	<b>4.1</b>
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	<5.0	5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	35	7.0
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	2.0	2.0	1.0	<1.0	<1.0	<1.0	1.4	3.0	1.0	1.0	<1.0	2.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	2.93	0.83	1.13	1.36	1.12	0.98	2.50	1.29	1.15	0.99	<0.50	2.59
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	<b>20.9</b>	<b>22.4</b>	<b>19.0</b>	15.5	13.8	16.8	<b>25.0</b>	14.1	14.2	18.9	4.0	<b>32.2</b>
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	22	29	15	12	11	26	25	9.0	9.0	12	32	59

- Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)
- (b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
- (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
- (d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**  
*Italicised and shaded = Exceedance of CCME SQG*  
 Double underline and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1													
								Location 1													
								BFR_SS4		BFR_SS5		BFR_SS6						BFR_SS7			
								BFR_L1_SS4_D_SA1	BFR_SS5_SA1	BFR_SS6_SA1	BFR_SS6_SA2	BFR_L1_SS6A	BFR_L1_SS-DUP1 (Duplicate of BFR_L1_SS6A_SA1)	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_SS7_SA1	BFR_SS_DUP2	BFR_SS7_SA2		
0 - 0.15		0 - 0.15		0 - 0.15		0.15 - 0.3		0 - 0.15		0 - 0.15		0 - 0.15		0 - 0.15		0.15 - 0.3					
2021-11-27		2020-12-01		2020-12-01		2020-12-01		2021-11-18		2021-11-18		2021-11-18		2021-11-18		2020-12-01					
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	7990	840	5800	9700	888	1580	519	937	6340	1600	1200	2500		
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<0.8	<2.0	<2.0	<2.0	<1.0	<1.0	2.0	1.0	<1.0	9.3	5.9	20		
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.0	<2.0	<2.0	<2.0	2.0	3.0	2.0	3.0	2.0	2.8	2.1	<2.0		
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	14	33	19	6.3	6.0	11	15	20	5.0	220	63	44		
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<0.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	<2.0	<2.0	<2.0	-	-	-	-	-	<2.0	<2.0	<2.0		
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	10	7.0	3.0	<5.0	<5.0	<5.0		
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.50	<0.30	0.42	NR	<0.30	<0.30	0.30	0.60	<0.30	0.85	0.64	0.42		
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	9.0	<2.0	3.8	5.7	<2.0	3.0	<2.0	<2.0	3.0	<2.0	<2.0	<2.0		
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	2.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6	1.3	1.2		
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	3.6	2.4	6.2	2.3	<2.0	<2.0	7.0	3.0	3.0	42	31	46		
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	7110	690	4600	1500	399	721	507	435	286	2000	1200	1800		
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	19	17	16	8.9	4.7	6.0	60.4	11.6	3.6	640	420	780		
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	8.1	<2.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<2.0		
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	119	13	26	18	11	15	19	9.0	<2.0	22	14	24		
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.08	0.25	0.31	0.15	0.04	0.07	0.12	0.16	0.08	0.49	0.32	0.29		
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<0.5	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	3.0	<2.0	2.7	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.5	3.8	4.4		
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	<2.0	2.8	3.2	-	-	-	-	-	<2.0	<2.0	<2.0		
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	1.8	1.8	2.3	1.9	<1.0	<1.0	<1.0	2.0	5.0	1.7	1.4	1.7		
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.5	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.50		
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	36	12	<5.0	<5.0	8.0	14	57	<5.0	76	110	57		
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.50	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	0.11	0.10		
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	1.0	<1.0	16	<1.0	3.0	3.0	<2.0	4.0	3.0	2.2	<1.0	<1.0		
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	1.41	0.11	0.70	1.30	0.20	0.20	<0.10	<0.10	1.00	0.17	0.10	0.18		
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	22.7	2.5	7.5	8.8	6.0	9.0	4.0	5.0	4.0	8.1	3.9	4.9		
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	31	27	18	<5.0	<5.0	5.0	27	28	7.0	270	90	110		

**Notes:**  
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 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**

*Italicised and shaded = Exceedance of CCME SQG*

Double underline and shaded = Exceedance of NSE Tier 1

**Yellow Shaded = exceedance is within or below background range**



**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1													
								Location 1													
								BFR_SS7				BFR_SS8					BFR_SS9	BFR_SS10			
								BFR_L1_SS7A	BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_SS8_SA1	BFR_SS8_SA2	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_SS9_SA1	BFR_SS10_SA1		
0 - 0.15		0 - 0.15		0 - 0.15		0 - 0.15		0 - 0.15		0.15 - 0.3		0 - 0.15		0 - 0.15		0 - 0.15		0 - 0.15			
2021-11-18		2021-11-18		2021-11-18		2021-11-18		2020-12-01		2020-12-01		2021-11-18		2021-11-18		2021-11-18		2020-12-01		2020-12-01	
Sample ID					Min	Max															
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	1950	2010	1320	650	700	2600	3550	724	2710	2530	5800	3700		
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1.0	4.0	3.0	<1.0	<2.0	<2.0	<1.0	1.0	<1.0	<1.0	<2.0	<2.0		
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.0	3.0	2.0	3.0	2.7	<2.0	2.0	4.0	3.0	3.0	2.3	<2.0		
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	<5.0	7.0	32	6.0	17	7.9	9.0	13.0	6.0	6.0	23	7.9		
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	<2.0	<2.0	-	-	-	-	<2.0	<2.0		
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	4.0	4.0	3.0	3.0	<50	<50	<2.0	3.0	<2.0	<2.0	<50	<50		
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	0.40	0.80	1.5	<0.30	0.40	1.1	<0.30	<0.30	0.42	<0.30		
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<2.0	3.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.8		
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	<2.0	7.1	11	5.0	2.5	2.5	<2.0	<2.0	<2.0	3.0	3.1	<2.0		
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	566	874	479	306	1600	130	401	1390	2040	471	2800	1100		
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	8.1	148	56	22	28	1.4	6.9	28.6	5.6	15.6	58	7.3		
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0		
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	21	7.0	8.0	3.0	7.9	<2.0	3.0	10	13	3.0	8.2	4.4		
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.03	0.09	<0.03	0.03	0.23	0.12	<0.03	0.10	0.09	0.09	0.16	0.12		
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0		
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	<2.0	<2.0	-	-	-	-	<2.0	<2.0		
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	1.0	2.0	2.0	2.0	1.8	2.6	3.0	2.0	<1.0	2.0	1.5	1.1		
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50		
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	<5.0	<5.0	41	27	46	7.0	11.0	30.0	14.0	12.0	23	<5.0		
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.10	<0.10	0.11	<0.10		
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	3.0	3.0	<2.0	<2.0	1.9	<1.0	<2.0	4.0	4.0	4.0	1.2	1.5		
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.40	0.80	0.10	<0.10	<0.10	0.88	0.40	<0.10	0.20	0.30	0.22	0.97		
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	5.0	8.0	4.0	4.0	2.8	<2.0	5.0	5.0	11.0	4.0	<2.0	6.4		
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	6.0	7.0	41	55	33	<5.0	8.0	23	9.0	7.0	16	<5.0		

**Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**

*Italicised and shaded = Exceedance of CCME SQG*

Double underline and shaded = Exceedance of NSE Tier 1

**Yellow Shaded = exceedance is within or below background range**

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1												
								Location 1												
								BFR_SS11			BFR_SS12				BFR_SS13					
								BFR_SS11_SA 1	BFR_SS12_SA 1	BFR_L1_SS12 SA2	BFR_L1_SS12 A_SA1	BFR_L1_SS12 B_SA1	BFR_L1_SS12 C_SA1	BFR_L1_SS12 D_SA1	BFR_SS13_SA 1	BFR_SS13_SA 2	BFR_L1_SS13 A_SA1	BFR_L1_SS DUP2 (Duplicate of BFR_L1_SS1 3 A_SA1)	BFR_L1_SS13 B_SA1	
0 - 0.15 2020-12-01	0 - 0.15 2020-12-02	0.15 - 0.30 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2020-12-02	0.15 - 0.3 2020-12-02	0 - 0.15 2021-11-17	0 - 0.15 2021-11-17	0 - 0.15 2021-11-17									
Sample Depth (mbgs)	Date Collected		Min	Max																
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	1000	6700	7510	4370	6820	4560	7710	9800	13000	1190	1390	7470	
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<2.0	<2.0	1.0	1.0	1.0	1.0	1.0	<2.0	<2.0	<1.0	<1.0	<1.0	
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	<2.0	2.7	5.0	3.0	6.0	5.0	5.0	2.9	<2.0	2.0	2.0	3.0	
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	16	27	15	22	18	22	15	34	17	<5.0	6.0	61	
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	-	-	-	-	-	<2.0	<2.0	-	-	-	
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<50	4.0	3.0	3.0	6.0	3.0	<50	<50	12	<2.0	6.0	
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	0.48	0.36	0.50	1.6	0.80	0.80	0.80	0.54	<0.30	<0.30	<0.30	<0.30	
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<2.0	3.7	4.0	<2.0	4.0	3.0	4.0	3.0	11	<2.0	<2.0	7.0	
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	5.0	
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	2.1	7.4	7.0	5.0	5.0	8.0	7.1	2.7	<2.0	<2.0	<2.0	6.0	
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	930	12000	4180	2400	2520	7150	2820	4900	3400	450	573	11500	
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	5.9	45	45	36	76	74	120	9.6	4.6	6.4	5.2	5.2	
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	<5.0	<5.0	5.0	
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	5.0	32	26	19	23	29	24	27	6.0	12	9.0	111	
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.15	0.26	0.18	0.14	0.17	0.18	0.17	0.31	0.21	0.07	0.08	0.09	
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	3.3	2.0	<2.0	2.0	<2.0	2.0	3.8	2.8	<2.0	<2.0	6.0	
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	<2.0	<2.0	-	-	-	-	-	<2.0	<2.0	-	-	-	
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	2.3	3.3	4.0	2.0	5.0	3.0	5.0	3.4	3.7	1.0	2.0	1.0	
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.50	<0.50	<0.5	<0.5	<0.5	
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	27	22	21	25	22	26	18	17	6.1	<5.0	<5.0	8.0	
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	4.1	1.3	4.0	3.0	5.0	4.0	4.0	1.5	<1.0	3.0	3.0	4.0	
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.19	1.40	1.20	0.60	1.20	0.60	1.50	1.10	2.30	0.40	0.40	0.20	
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	<2.0	11	10.0	6.0	10.0	10.0	13.0	5.0	8.6	4.0	4.0	49.0	
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	15	19	12	14	14	16	13	15	<5.0	16	<5.0	27	

- Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)
- (b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
- (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
- (d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**  
 Italicised and shaded = Exceedance of CCME SQG  
 Double underline and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1									
								Location 1									
								BFR_SS13		BFR_SS14	BFR_SS15	BFR_SS16					
								BFR_L1_SS13 C_SA1	BFR_L1_SS13 D_SA1	BFR_SS14_SA 1	BFR_SS15_SA 1	BFR_SS16_SA 1	BFR_L1_SS16 _SA2	BFR_L1_SS16 _A_SA1	BFR_L1_SS16 _B_SA1	BFR_L1_SS16 _C_SA1	BFR_L1_SS16 _D_SA1
Sample ID					Min	Max		0 - 0.15 2021-11-17	0 - 0.15 2021-11-17	0 - 0.15 2020-12-02	0 - 0.15 2020-12-02	0 - 0.15 2020-12-02	0.15 - 0.30 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27	0 - 0.15 2021-11-27
Sample Depth (mbgs)																	
Date Collected																	
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	3340	639	860	2900	8400	7850	1080	3000	12100	4720
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1.0	<1.0	<2.0	<2.0	<2.0	<1.0	2.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3.0	3.0	<2.0	<2.0	<2.0	2.0	5.0	2.0	3.0	2.0
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	7.0	22	16	33	9.0	<5.0	14	<5.0	6.0	<5.0
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	<2.0	<2.0	<2.0	-	-	-	-	-
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	4.0	3.0	<5.0	<5.0	<2.0	6.0	<2.0	<2.0	3.0	3.0
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	0.78	0.54	0.46	0.40	0.80	<0.30	1.7	<0.30
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	3.0	<2.0	<2.0	<2.0	9.2	9.0	<2.0	3.0	4.0	2.0
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	<2.0	3.0	<2.0	3.7	3.4	4.0	5.0	<2.0	14	<2.0
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	4790	369	880	770	350	3570	581	492	2390	406
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	15	4.7	17	8.0	37	19	13	12	59	4.1
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	<5.0	<5.0	<2.0	<2.0	<2.0	6.0	<5.0	<5.0	<2.0	<5.0
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	23	5.0	4.2	2.6	5.8	81	5.0	29	41	3.0
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.11	0.09	0.15	0.20	0.16	0.04	0.12	0.03	0.09	0.06
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	<2.0	<2.0	2.6	<2.0	2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	<2.0	<2.0	<2.0	-	-	-	-	-
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	2.0	2.0	1.8	1.9	3.7	2.0	3.0	1.0	8.0	3.0
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.5	<0.5	<0.50	<0.50	<0.50	<0.5	<0.5	<0.5	<0.5	<0.5
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	5.0	54	36	26	<5.0	<5.0	37	<5.0	14	11
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	3.0	4.0	1.2	<1.0	<1.0	4.0	4.0	5.0	3.0	4.0
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.40	<0.10	0.11	0.20	10.0	1.90	0.10	0.50	9.80	0.50
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	10.0	4.0	2.1	<2.0	15	21.0	6.0	12.0	8.0	4.0
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	9.0	19	31	11	<5.0	12	39	<5.0	7.0	<5.0

- Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
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- (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)
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- (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
- (d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**  
 Italicised and shaded = Exceedance of CCME SQG  
 Double underline and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Location 1													
								Zone 2		Zone 3						Zone 2					
								BFR_SS17	BFR_SS18	BFR_SS19	BFR_SS20	BFR_SS21	BFR_SS22	BFR_SS23		BFR_SS24		BFR_SS25	BFR_L1_SS26		
								BFR_SS17_SA 1	BFR_SS18_SA 1	BFR_SS19_SA 1	BFR_SS20_SA 1	BFR_SS21_SA 1	BFR_SS22_SA 1	BFR_SS23_SA 1	BFR_SS23_SA 2	BFR_SS24_SA 1	BFR_SS24_SA 2	BFR_SS25_SA 1	BFR_L1_SS26 _SA1		
Sample ID					Min	Max		0 - 0.15 2020-12-04	0 - 0.15 2020-12-04	0 - 0.15 2020-12-04	0 - 0.15 2020-12-03	0 - 0.15 2020-12-03	0 - 0.15 2020-12-03	0 - 0.15 2020-12-03	0.15 - 0.3 2020-12-03	0 - 0.15 2020-12-04	0 - 0.15 2020-12-04	0 - 0.15 2020-12-04	0 - 0.15 2021-11-17		
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	640	5700	1800	3000	720	6600	1100	8200	1100	12000	8100	2290		
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	<2.0	2.0	<2.0	4.3	2.0		
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	8.1	15	31	27	20	10	24	13	37	15	17	18		
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	2.0		
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	0.70	0.45	0.38	<0.30	<b>3.1</b>	<0.30	<b>1.8</b>	<0.30	0.33	<0.30		
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<2.0	5.6	<2.0	<2.0	<2.0	4.1	<2.0	4.4	<2.0	3.2	2.6	3.0		
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	2.4	<1.0	<1.0	<1.0			
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	2.8	<2.0	3.2	4.4	2.7	<2.0	4.6	2.3	4.3	7.1	4.6	3.0		
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	1100	1900	960	1300	820	3700	2400	550	3500	210	<b>29000</b>	487		
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	19	13	34	18	5.3	7.7	57	4.2	29	3.9	41	7.9		
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0		
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	15	22	6.0	6.0	5.8	19	25	5.3	13	<2.0	11	8.0		
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.16	0.18	0.22	0.38	0.18	0.13	0.25	0.17	0.15	0.17	0.24	<0.23		
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	<2.0	2.3	2.0	<2.0	<2.0	2.3	<2.0	2.1	2.9	2.1	<2.0		
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	<2.0	3.5	<2.0	<2.0	<2.0	2.3	2.7	<2.0	2.6	<2.0	<2.0			
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	0.80	<b>1.4</b>	<b>2.0</b>	<b>2.0</b>	<b>2.2</b>	<b>1.5</b>	<b>2.0</b>	<b>1.8</b>	<b>1.5</b>	<b>3.4</b>	<b>2.8</b>	<b>2.0</b>		
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50		
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	13	6.6	24	13	63	<5.0	32	5.4	33	<5.0	12	8.0		
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.23	<0.10	0.46	<0.10	<0.10			
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	1.7	<1.0	1.4	<2.0		
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.28	0.94	0.39	0.79	0.12	0.60	0.20	0.82	<0.10	5.60	0.81	0.40		
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	4.7	12.0	2.6	NR	5.0	2.7	10.0	3.5	11.0	<2.0	6.4	11.0		
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	12	6.2	16	11	27	<5.0	28	6.0	31	<5.0	13	6.0		

**Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**  
 Italicised and shaded = Exceedance of CCME SQG  
 Double underline and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 2													
								Location 1							Location 2						
								BFR_L1_SS27	BFR_L1_SS28	BFR_L1_SS29	BFR_L1_SS30	BRF_L2_SS1	BRF_L2_SS2	BRF_L2_SS3	BRF_L2_SS4	BRF_L2_SS5	BRF_L2_SS6	BRF_L2_SS7			
								BFR_L1_SS27_SA1	BFR_L1_SS28_SA1	DUP3 (Duplicate of BFR_L1_SS28_SA1)	BFR_L1_SS29_SA1	BFR_L1_SS30_SA1	BRF_L2_SS1_SA1	BRF_L2_SS2_SA1	BRF_L2_SS3_SA1	BRF_L2_SS4_SA1	BRF_L2_SS5_SA1	BRF_L2_SS6_SA1	BRF_L2_SS7_SA1		
Sample Depth (mbgs)		Date Collected		0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15	0 - 0.15						
				2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-17	2021-11-25	2021-11-25	2021-11-25	2021-11-25	2021-11-26	2021-11-26	2021-11-26						
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	2160	3210	1200	3410	2910	1980	2610	2190	4330	3000	5620	2550		
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8		
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	3.0	3.0	2.0	2.0	2.0	1.0	2.0	1.0	1.0	2.0	1.0	<1.0		
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	13	13	5.0	8.0	13	17	25	18	47	21	38	21		
Acid Extractable Beryllium (Be)	5	75	4	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<0.4	<0.4	<0.4	<0.4	<0.4	0.6	<0.4		
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-	-	-	-	-	-	-		
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<2.0	5.0	<2.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0		
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.50	<0.50	<0.50	0.60	<0.50	<0.50	<0.50		
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	2.0	10	<2.0	6.0	2.0	<5.0	5.0	5.0	<5.0	5.0	<5.0	<5.0		
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<0.5	<0.5	<0.5	0.6	0.6	<0.5	0.6		
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	<2.0	10	2.0	<2.0	3.0	2.5	43.6	4.5	8.2	15	27.8	29.8		
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	374	634	274	952	226	462	1460	352	848	1190	767	871		
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	16	8.2	9.4	7.9	6.8	7.0	64	10	11	19	14	8.0		
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA		mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	4.0	3.0	5.0	5.0	3.0	5.6	8.5	6.1	5.6	7.8	10	<5.0		
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	<0.03	0.06	<0.03	0.06	<0.03	0.12	0.36	0.18	0.20	0.17	0.17	0.13		
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	<2.0	4.0	<2.0	<2.0	<2.0	2.0	2.0	1.0	1.0	2.0	1.0	2.0		
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-		
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	2.0	3.0	<1.0	2.0	3.0	2.8	4.2	4.4	2.1	3.3	2.2	1.7		
Acid Extractable Silver (Ag)	20	77	20	NR	NA		mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	7.0	9.0	<5.0	<5.0	7.0	16	12	10	14	11	10	11		
Acid Extractable Thallium (Tl)	1	1	1	NR	NA		mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.5	<0.5	<0.50	<0.50	<0.50	<0.50	<0.50		
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<2.0	3.0	3.0	4.0	<2.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0		
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	0.20	0.70	0.10	0.70	0.50	<0.50	0.70	1.17	1.11	<0.50	1.37	<0.50		
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	6.0	7.0	3.0	13.0	4.0	1.5	3.2	3.3	4.4	4.2	6.0	4.1		
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	<5.0	10	7.0	<5.0	5.0	10	23	16	7.0	15	7.0	28		

- Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)
- (b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)
- (c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use
- (d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**  
 Italicised and shaded = Exceedance of CCME SQG  
 Double underline and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range

**TABLE 11**  
**Analytical Results - Metals in Soil**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	CCME SQG <sup>c</sup>	NSE EQS Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Location 2											
								BRF_L2_SS8	BRF_L2_SS9	BRF_L2_SS10		BRF_L2_SS11	BRF_L2_SS12	BRF_L2_SS13	BRF_L2_SS14	BRF_L2_SS15		BRF_L2_SS16	
								BRF_L2_SS8_SA1	BRF_L2_SS9_SA1	BRF_L2_SS10_SA1	BRF_L2_SS10_DUP2 (Duplicate of BRF_L2_SS10_SA1)	BRF_L2_SS11_SA1	BRF_L2_SS12_SA1	BRF_L2_SS13_SA1	BRF_L2_SS14_SA1	BRF_L2_SS15_SA1	BRF_L2_SS15_SA2	BRF_L2_SS16_SA1	
Sample ID					Min	Max		0 - 0.15 2021-11-26	0 - 0.15 2021-11-26	0 - 0.15 2021-11-25	0 - 0.15 2021-11-25	0 - 0.15 2021-11-23	0 - 0.15 2021-11-23	0 - 0.15 2021-11-23	0 - 0.15 2021-11-23	0 - 0.15 2021-11-23	0.15- 0.3 2021-11-23	0 - 0.15 2021-11-23	
Sample Depth (mbgs)																			
Date Collected																			
Acid Extractable Aluminum (Al)	NGA	15400	NGA	15400	640	12000	mg/kg	3290	3670	6570	6990	2910	3830	3570	3190	3540	2920	2760	
Acid Extractable Antimony (Sb)	20	7.5	20	NR	<0.8	2.0	mg/kg	<0.8	<0.8	2.0	<1.0	<0.8	<0.8	<0.8	<0.8	<0.8	2.0	<0.8	
Acid Extractable Arsenic (As)	17.1	31	12	NR	<1.0	4.3	mg/kg	2.0	3.0	2.0	3.0	2.0	<1.0	1.0	<1.0	1.0	4.0	1.0	
Acid Extractable Barium (Ba)	400	6800	750	NR	5.0	37	mg/kg	35	21	11	13	16	9.1	31	22	24	21	26	
Acid Extractable Beryllium (Be)	5	75	4	NR	NA	NA	mg/kg	<0.4	<0.4	<2.0	<2.0	<0.4	<0.4	<0.4	<0.4	<0.4	<2.0	<0.4	
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA	NA	mg/kg	-	-	-	-	-	-	-	-	-	-	-	
Acid Extractable Boron (B)	120	4300	2	NR	<2.0	5.0	mg/kg	<5.0	<5.0	<2.0	<2.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<5.0	
Acid Extractable Cadmium (Cd)	3.8	1.4	1.4	NR	<0.30	3.1	mg/kg	<0.50	<0.50	<0.30	<0.30	<0.50	<0.50	<0.50	<0.50	<b>1.5</b>	<b>1.7</b>	0.50	
Acid Extractable Chromium (Cr)	64	220	64	NR	<2.0	10	mg/kg	<5.0	<5.0	4.0	3.0	5.0	<5.0	<5.0	<5.0	<5.0	3.0	<5.0	
Acid Extractable Cobalt (Co)	20	22	40	NR	<0.5	2.4	mg/kg	1.0	<0.5	<1.0	<1.0	<0.5	<0.5	0.5	0.6	0.5	<1.0	0.5	
Acid Extractable Copper (Cu)	63	1100	63	NR	<2.0	10	mg/kg	36.5	55.2	14.0	NR	6.0	4.9	2.5	4.3	3.3	4.2	5.0	4.3
Acid Extractable Iron (Fe)	NGA	11000	NGA	11000	210	29000	mg/kg	837	682	594	489	1050	397	688	713	1180	1760	696	
Acid Extractable Lead (Pb)	70	140	70	NR	3.9	57	mg/kg	7.0	14	29	7.9	33	4.0	7.0	7.0	12	24	16	
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	NA	NA	mg/kg	<0.5	<0.5	<5.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0	<0.5	
Acid Extractable Manganese (Mn)	NGA	360	NGA	360	<2.0	25	mg/kg	5.3	7.3	5.0	4.0	11	6.2	5.4	<5.0	6.9	23	7.5	
Acid Extractable Mercury (Hg)	12	6.6	6.6	NR	0.13	0.38	mg/kg	0.13	0.15	0.04	<0.03	0.22	0.11	0.19	0.13	0.15	-	0.17	
Acid Extractable Molybdenum (Mo)	4	110	5	NR	NA	NA	mg/kg	<0.5	<0.5	<2.0	<2.0	0.7	<0.5	0.5	<0.5	<0.5	<2.0	<0.5	
Acid Extractable Nickel (Ni)	45	200	45	NR	1.0	4.0	mg/kg	3.0	2.0	<2.0	<2.0	2.0	2.0	1.0	1.0	1.0	3.0	1.0	
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	3.5	mg/kg	-	-	-	-	-	-	-	-	-	-	-	
Acid Extractable Selenium (Se)	1	80	1	NR	0.80	3.4	mg/kg	<b>2.5</b>	<b>3.4</b>	<b>2.0</b>	<b>2.0</b>	<b>2.7</b>	<b>2.1</b>	<b>2.7</b>	<b>1.7</b>	<b>1.6</b>	<b>2.0</b>	<b>2.9</b>	
Acid Extractable Silver (Ag)	20	77	20	NR	NA	NA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Acid Extractable Strontium (Sr)	NGA	9400	NGA	9400	<5.0	63	mg/kg	12	18	9.0	9.0	10	<5.0	11	10	11	12	15	
Acid Extractable Thallium (Tl)	1	1	1	NR	NA	NA	mg/kg	<0.50	<0.50	<0.10	<0.10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.10	<0.50	
Acid Extractable Tin (Sn)	5	9400	5	NR	<1.0	4.0	mg/kg	<1.0	<1.0	3.0	3.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.0	<1.0	
Acid Extractable Uranium (U)	33	23	23	NR	<0.10	5.60	mg/kg	<0.50	<0.50	0.70	0.80	0.53	0.79	0.87	<0.50	<0.50	0.40	<0.50	
Acid Extractable Vanadium (V)	18	39	130	NR	<2.0	13.0	mg/kg	3.2	5.2	9.0	9.0	5.3	3.1	3.2	3.1	2.9	7.0	3.3	
Acid Extractable Zinc (Zn)	200	10000	250	NR	<5.0	31	mg/kg	37	32	6.0	7.0	10	6.0	9.0	7.0	8.0	11	12	

**Notes:**  
 NA = Not Applicable  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Soil Ecological Tier 1 Environmental Quality Standards (EQS<sub>Eco</sub>) for soil - coarse agricultural soils (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Based Tier 1 Environmental Quality standards (EQS<sub>HH</sub>) for soil, agricultural land use, non-potable groundwater, coarse-grained soil (2021)

(c) Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the protection of environmental and human health, 2010, for potable and coarse grained soil with agricultural land use

(d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Soil - All Land Uses; Non-Potable Groundwater Condition. Only used where guidelines for Atlantic RBCA and CCME do not exist.

(e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded = Exceedance of RBCA Human Health-Based Tier 1**

*Italicised and shaded = Exceedance of CCME SQG*

Double underline and shaded = Exceedance of NSE Tier 1

**Yellow Shaded = exceedance is within or below background range**

Created by: MA  
 Checked by: SZ

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL <sup>a</sup>	Units	Zone 1									
				Location 1									
				BFR_SED1		BFR_SED2		BFR_SED3		BFR_SED4			
Sample ID			BFR_SED1 (original)	BFR_SED1 (revised)	BFR_SED2 (original)	BFR_SED2 (revised)	BFR_SED3 (original)	BFR_SED3 (revised)	BFR_SED4 (original)	BFR_SED4 (revised)	BFR_SED_DUP1 (original)	BFR_SED_DUP1 (revised)	
Date Collected			2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	
Benzene		1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.050	<0.050
Toluene		1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
Ethylbenzene		1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.10	<0.10
C6 - C10 (less BTEX)		NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<5.0	<5.0	<5.0	<5.0
>C10-C16 Hydrocarbons		NGA	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	mg/kg	<10	<10	110	<10	170	<10	170	<10	<10	<10
>C21-<C32 Hydrocarbons		NGA	mg/kg	510	160	880	300	2300	640	950	390	880	290
Modified TPH	Gasoline*	15	mg/kg										
	Diesel/No. 2 Fuel Oil**	25	mg/kg	<u>510**</u>	<u>160***</u>	<u>990**</u>	<u>300***</u>	<u>2500**</u>	<u>640***</u>	<u>1100**</u>	<u>390***</u>	<u>880***</u>	<u>290***</u>
	Lube oil/No. 6 Oil***	43	mg/kg										
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
Hydrocarbon Resemblance				Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range <sup>(b)</sup> .	Lube oil range.	Lube oil range.	Lube oil range.

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments <sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL <sup>a</sup>	Units	Zone 1								
				Location 1								
				BFR_SED5				BFR_SED6		BFR_SED7		BFR_SED8
Sample ID			BFR_SED5 (original)	BFR_SED5 (revised)	BFR_SED_DUP2 (original)	BFR_SED_DUP2 (revised)	BFR_SED6 (original)	BFR_SED6 (revised)	BFR_SED7 (original)	BFR_SED7 (revised)	BFR_SED8	
Date Collected			2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	
Benzene		1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.050	<0.050	<0.025	<0.025	<0.025
Toluene		1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.050	<0.050	<0.050
Ethylbenzene		1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.10	<0.10	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	mg/kg	7.9	7.9	<2.5	<2.5	<5.0	<5.0	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	mg/kg	18	<10	23	<10	<10	<10	190	<10	<10
>C21-<C32 Hydrocarbons		NGA	mg/kg	120	26	120	23	1000	290	1300	370	36
Modified TPH	Gasoline*	15	mg/kg	<u>150**</u>	34***	<u>140**</u>	23***	<u>1000***</u>	<u>290***</u>	<u>1400**</u>	<u>370***</u>	36***
	Diesel/No. 2 Fuel Oil**	25	mg/kg									
	Lube oil/No. 6 Oil***	43	mg/kg									
Reached Baseline at C32				Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube oil range.

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)



**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL <sup>a</sup>	Units	Zone 1							
				Location 1							
				BFR_SED9		BFR_SED10	BFR_SED11		BFR_SED12		BFR_SED13
Sample ID			BFR_SED9 (original)	BFR_SED9 (revised)	BFR_SED10	BFR_SED11 (original)	BFR_SED11 (revised)	BFR_SED12 (original)	BFR_SED12 (revised)	BFR_SED13 (original)	BFR_SED13 (revised)
Date Collected			2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02
Benzene		1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene		1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene		1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes		1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)		NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons		NGA	mg/kg	55	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons		NGA	mg/kg	170	<10	<10	17	<10	160	<10	210
>C21-<C32 Hydrocarbons		NGA	mg/kg	2300	550	<15	160	42	1700	540	2800
Modified TPH	Gasoline*	15	mg/kg								
	Diesel/No. 2 Fuel Oil**	25	mg/kg	<u>2500**</u>	<u>550***</u>	<15	<u>180**</u>	42***	<u>1800**</u>	<u>540***</u>	<u>3000**</u>
	Lube oil/No. 6 Oil***	43	mg/kg								<u>790***</u>
Reached Baseline at C32				No	No	NA	Yes	Yes	Yes	Yes	No
Hydrocarbon Resemblance				Fuel/lube range. Possible lube oil fraction.	Lube oil range.	NA	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Units	Zone 1						Zone 2				
			Location 1										
			BFR_SED14		BFR_SED15		BFR_SED16		BFR_SED17	BFR_SED18	BFR_SED19		
Sample ID			BFR_SED14 (original)	BFR_SED14 (revised)	BFR_SED15 (original)	BFR_SED15 (revised)	BFR_SED16 (original)	BFR_SED16 (revised)	BFR_SED17	BFR_SED18	BFR_SED19 (original)	BFR_SED19 (revised)	
Date Collected			2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-04	
Benzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Toluene	1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Total Xylenes	1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
C6 - C10 (less BTEX)	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
>C10-C16 Hydrocarbons	NGA	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C16-C21 Hydrocarbons	NGA	mg/kg	25	<10	110	<10	230	<10	<10	<10	<10	44	<10
>C21-<C32 Hydrocarbons	NGA	mg/kg	210	54	1100	310	900	370	34	<15	270	85	
Modified TPH	Gasoline*	15	mg/kg										
	Diesel/No. 2 Fuel Oil**	25	mg/kg	<u>240**</u>	<u>54***</u>	<u>1200**</u>	<u>310***</u>	<u>1100**</u>	<u>370***</u>	34***	<15	<u>320**</u>	<u>85***</u>
	Lube oil/No. 6 Oil***	43	mg/kg										
Reached Baseline at C32			No	Yes	No	Yes	No	Yes	Yes	NA	No	Yes	
Hydrocarbon Resemblance			Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range.	Lube oil range.	Lube oil range.	NA	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Units	Zone 3						Zone 2			
			Location 1									
			BFR_SED20	BFR_SED21		BFR_SED22		BFR_SED23		BFR_SED24		
Sample ID			BFR_SED21 (original)	BFR_SED21 (revised)	BFR_SED22 (original)	BFR_SED22 (revised)	BFR_SED23 (original)	BFR_SED23 (revised)	BFR_SED24 (original)	BFR_SED24 (revised)		
Date Collected			2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	
Benzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Toluene	1.4	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	
Total Xylenes	1.3	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
C6 - C10 (less BTEX)	NGA	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	
>C10-C16 Hydrocarbons	NGA	mg/kg	<10	<10	<10	76	<10	62	<10	<10	<10	
>C16-C21 Hydrocarbons	NGA	mg/kg	<10	<10	<10	150	52	110	<10	<10	<10	
>C21-<C32 Hydrocarbons	NGA	mg/kg	<15	120	32	2000	630	1000	280	69	27	
Modified TPH	Gasoline*	15	<15	<u>120***</u>	32***	<u>2200**</u>	<u>690**</u>	<u>1200**</u>	<u>280***</u>	<u>69***</u>	27***	
	Diesel/No. 2 Fuel Oil**	25										
	Lube oil/No. 6 Oil***	43										
Reached Baseline at C32			NA	No	Yes	No	Yes	No	Yes	Yes	Yes	
Hydrocarbon Resemblance			NA	Lube oil range. Possible lube oil fraction.	Lube oil range.	Fuel/lube range. Lube oil fraction.	Fuel/lube range.	Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube oil range.	Lube oil range.	

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

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**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Units	Zone 2		Zone 1							
			BFR_SED25		BFR_L1_SED2 6	BFR_L1_SED2 7	BFR_L1_SED28		BFR_L1_SED29		BFR_L1_SED3 0	BFR_L1_SED3 1
			BFR_SED25 (original)	BFR_SED25 (revised)	BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28	BFR_L1_SED_D UP1	BFR_L1_SED29	BFR_L1_SED_D UP2	BFR_L1_SED30	BFR_L1_SED31
<b>Date Collected</b>			2020-12-04	2020-12-04	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Benzene	1.2	mg/kg	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	1.4	mg/kg	<0.050	<0.050	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	1.2	mg/kg	<0.025	<0.025	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes	1.3	mg/kg	<0.050	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)	NGA	mg/kg	<2.5	<2.5	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	NGA	mg/kg	<10	<10	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons	NGA	mg/kg	220	<10	<15	<15	<15	<15	41	54	<15	<15
>C21-<C32 Hydrocarbons	NGA	mg/kg	2700	690	55	59	160	254	468	614	29	<15
Modified TPH	Gasoline*	15	mg/kg									
	Diesel/No. 2 Fuel Oil**	25	mg/kg	<u>2900**</u>	<u>690***</u>	<u>55***</u>	<u>59***</u>	<u>160***</u>	<u>254***</u>	<u>509***</u>	<u>668***</u>	<u>29***</u>
	Lube oil/No. 6 Oil***	43	mg/kg									<15
Reached Baseline at C32			No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance			Fuel/lube range. Possible lube oil fraction.	Lube oil range.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube oil range.	No Resemblance.

**Notes:**

NA = Not Applicable

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< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

		Zone 1											
		Location 1											
Location	Atlantic RBCA ESL <sup>a</sup>	Units	BFR_L1_SED3 2	BFR_L1_SED3 3	BFR_L1_SED3 4	BFR_L1_SED3 5	BFR_L1_SED3 6	BFR_L1_SED3 9	BFR_L1_SED4 0	BFR_L1_SED4 1	BFR_L1_SED42	BFR_L1_SED44	
Sample ID			BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36	BFR_L1_SED39	BFR_L1_SED40	BFR_L1_SED41	BFR_L1_SED42	BFR_L1_SED44	
Date Collected			2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-20	
Benzene	1.2	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Toluene	1.4	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Ethylbenzene	1.2	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Total Xylenes	1.3	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
C6 - C10 (less BTEX)	NGA	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	
>C10-C16 Hydrocarbons	NGA	mg/kg	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	
>C16-C21 Hydrocarbons	NGA	mg/kg	<15	<15	<15	<15	<15	<15	27	<15	<15	<15	
>C21-<C32 Hydrocarbons	NGA	mg/kg	122	24	606	<15	62	343	428	<15	82	121	
Modified TPH	Gasoline*	15	mg/kg				<15	62***	343***	455***	<15	82***	121***
	Diesel/No. 2 Fuel Oil**	25	mg/kg	<u>122***</u>	<u>24***</u>	<u>606***</u>	<15	<u>62***</u>	<u>343***</u>	<u>455***</u>	<15	<u>82***</u>	<u>121***</u>
	Lube oil/No. 6 Oil***	43	mg/kg										
Reached Baseline at C32			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Hydrocarbon Resemblance			Lube range, Unidentified Compounds.	Lube oil range.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Units	Zone 1		Zone 2				Location 2				
			BFR_L1_SED4 5	BFR_L1_SED4 6	BFR_L1_SED4 7	BFR_L1_SED4 8	BFR_L1_SED4 9	BFR_L1_SED5 0	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4	BFR_L2_SED5	
			BFR_L1_SED45	BFR_L1_SED46	BFR_L1_SED47	BFR_L1_SED48	BFR_L1_SED49	BFR_L1_SED50	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4	BFR_L2_SED5	
Date Collected			2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-21	2021-11-21	
Benzene	1.2	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	1.4	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	1.2	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes	1.3	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)	NGA	mg/kg	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	NGA	mg/kg	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons	NGA	mg/kg	<15	<15	<15	<15	<15	<15	<15	<15	<15	<15	19
>C21-<C32 Hydrocarbons	NGA	mg/kg	<15	54	<15	<15	<15	76	<15	<15	39	333	
Modified TPH	Gasoline*	15	mg/kg										
	Diesel/No. 2 Fuel Oil**	25	mg/kg	<15	<u>54***</u>	<15	<15	<15	<u>76***</u>	<15	<15	<u>39***</u>	<u>352***</u>
	Lube oil/No. 6 Oil***	43	mg/kg										
Reached Baseline at C32			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance			No Resemblance.	Lube range, Unidentified Compounds.	No Resemblance.	No Resemblance.	No Resemblance.	No Resemblance.	Lube range, Unidentified Compounds.	No Resemblance.	No Resemblance.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 12**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a</sup>	Units	Location 2				
			BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	
Sample ID			BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	BFR_L2_SED_D UP1
Date Collected			2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22
Benzene	1.2	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	1.4	mg/kg	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	1.2	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03
Total Xylenes	1.3	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (less BTEX)	NGA	mg/kg	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons	NGA	mg/kg	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons	NGA	mg/kg	37	20	<15	<15	<15
>C21-<C32 Hydrocarbons	NGA	mg/kg	620	320	<15	266	321
Modified TPH	Gasoline*	15	657***	340***	<15	266***	321***
	Diesel/No. 2 Fuel Oil**	25					
	Lube oil/No. 6 Oil***	43					
Reached Baseline at C32			Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance			Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.	No Resemblance.	Lube range, Unidentified Compounds.	Lube range, Unidentified Compounds.

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Sediment Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for typical sediments<sup>(2015)</sup>

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underlined and shaded = Naturally occurring exceedance of Atlantic RBCA ESL (background concentration)

**Bold and shaded** = Exceedance of Atlantic RBCA RBSL ESL (None reported)

**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID Date Collected	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1								
					BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4		BFR_SED5		BFR_SED6	
					BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED_DUP1	BFR_SED5	BFR_SED_DUP2	BFR_SED6	
					2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	0.038	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.18
Benzo(b,j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.010	<0.010	0.038	<0.010	<0.010	<0.010	<0.010	<0.010	0.18
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.0050	<0.080	<0.19	<0.0050	<0.0050	<0.0080	<0.0050	<0.0050	<0.15
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	mg/kg	<0.0050	<0.0050	0.042	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<b>0.12</b>
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.0050	<0.0050	0.077	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<b>0.15</b>
Fluorene	0.144	0.0212	0.144	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.13
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	mg/kg	1.0	1.2	0.7	<0.0050	0.081	0.028	0.028	0.028	1.8
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	mg/kg	<0.0050	<0.0050	0.05	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<b>0.11</b>

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded** = Exceedance of CCME ISQGs

*Italicised and shaded* = Exceedance of CCME PELs



**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1								
					BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12	BFR_SED13	BFR_SED14	
					BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12	BFR_SED13	BFR_SED14	
Date Collected													
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.082	0.053	<0.0050	<0.0050
Benzo(b,j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	0.082	0.053	<0.010	<0.010
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.80	<0.0050	<0.030	<0.0050	<0.040	<0.0050	<0.19	<0.050	<0.050
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<b>0.059</b>	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.063	0.094	<0.0050	<0.0050
Fluorene	0.144	0.0212	0.144	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	mg/kg	2.0	<0.0050	0.58	<0.0050	0.041	<0.0050	<0.16	0.35	<0.0050
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<b>0.061</b>	<0.0050	<0.0050

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

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(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded = Exceedance of CCME ISQGs**

*Italicised and shaded = Exceedance of CCME PELs*

**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1							
					BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22
					BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19	BFR_SED20	BFR_SED21	BFR_SED22
Date Collected												
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Anthracene	0.245	0.0469	0.245	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b/j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<1.2	<0.0050	<0.0050	<0.0050	<0.040	<0.0050	<0.0050	<0.050
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	0.846	0.0571	0.862	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	0.144	0.0212	0.144	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NGA	NGA	NGA	mg/kg	1.3	0.17	<0.0050	0.022	0.084	<0.0050	<0.0050	0.17
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	1.298	0.053	0.875	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

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**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded** = Exceedance of CCME ISQGs

*Italicised and shaded* = Exceedance of CCME PELs

**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1							
					BFR_SED23	BFR_SED24	BFR_SED25	BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28		BFR_L1_SED29
					BFR_SED23	BFR_SED24	BFR_SED25	BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28	BFR_L1_SED_DUP 1	BFR_L1_SED29
Date Collected												
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.0050	<0.0050	<0.0050	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.0050	<0.0050	<0.0050	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.0050	<0.0050	<0.0050	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	mg/kg	<0.0050	<0.0050	<0.0050	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.0050	<0.0050	<0.0050	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.0050	<0.0050	<0.0050	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b,j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.010	<0.010	<0.010	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.0050	<0.020	<0.88	0.01	<0.01	<0.01	<0.01	0.08
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	mg/kg	<0.0050	<0.0050	<0.0050	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.0050	<0.0050	<0.0050	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.0050	<0.0050	<0.0050	<0.05	<0.05	<0.05	<0.05	0.1
Fluorene	0.144	0.0212	0.144	mg/kg	<0.0050	<0.0050	<0.0050	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.0050	<0.0050	<0.0050	0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.0050	<0.0050	<0.0050	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	0.11	<0.0050	1.4	<0.05	<0.05	<0.05	0.09	<0.05
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.0050	<0.0050	<0.0050	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	mg/kg	<0.0050	<0.0050	<0.0050	<0.05	<0.05	<0.05	<0.05	<b>0.08</b>

**Notes:**

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**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1							
					BFR_L1_SED29	BFR_L1_SED30	BFR_L1_SED31	BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36
					BFR_L1_SED_DUP 2	BFR_L1_SED30	BFR_L1_SED31	BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36
Date Collected					2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.01	0.07	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	mg/kg	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.01	0.1	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	0.83	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

**Notes:**

NGA = No Guideline Available

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**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

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**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1							
					BFR_L1_SED39	BFR_L1_SED40	BFR_L1_SED41	BFR_L1_SED42	BFR_L1_SED44	BFR_L1_SED45	BFR_L1_SED46	BFR_L1_SED47
					2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

**Notes:**

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**Exceedance Identification:**

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**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 1			Location 2					
					BFR_L1_SED48	BFR_L1_SED49	BFR_L1_SED50	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4	BFR_L2_SED5	BFR_L2_SED6	
					2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-21	2021-11-21	2021-11-22	
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<b>0.016</b>
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b,j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-	-	-	-	-	-
Chrysene	0.846	0.0571	0.862	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	0.2	<0.05	0.16	<0.05	<0.05	<0.05	0.6	8.35	
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

**Notes:**

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**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

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*Italicised and shaded* = Exceedance of CCME PELs

**TABLE 13**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location Sample ID	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	Units	Location 2			
					BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	
					BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	BFR_L2_SED_DUP 1
Date Collected					2021-11-22	2021-11-21	2021-11-22	2021-11-22
1-Methylnaphthalene	0.201	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	0.201	0.0202	0.201	mg/kg	<0.01	<0.01	<0.01	<0.01
Acenaphthene	0.0889	0.00671	0.0889	mg/kg	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	0.128	0.00587	0.128	mg/kg	<0.004	<0.004	<0.004	<0.004
Anthracene	0.245	0.0469	0.245	mg/kg	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.693	0.0317	0.385	mg/kg	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.763	0.0319	0.782	mg/kg	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	4.5	NGA	NGA	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(b/j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-
Benzo(g,h,i)perylene	0.78	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-
Benzo(k)fluoranthene	4.5	NGA	NGA	mg/kg	-	-	-	-
Chrysene	0.846	0.0571	0.862	mg/kg	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	0.135	0.00622	0.135	mg/kg	<0.006	<0.006	<0.006	<0.006
Fluoranthene	1.494	0.111	2.355	mg/kg	<0.05	<0.05	<0.05	<0.05
Fluorene	0.144	0.0212	0.144	mg/kg	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	0.88	NGA	NGA	mg/kg	<0.01	<0.01	<0.01	<0.01
Naphthalene	0.391	0.0346	0.391	mg/kg	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	NGA	mg/kg	6.44	<0.05	0.11	0.09
Phenanthrene	0.544	0.0419	0.515	mg/kg	<0.03	<0.03	<0.03	<0.03
Pyrene	1.298	0.053	0.875	mg/kg	<0.05	<0.05	<0.05	<0.05

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment

(b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only.

(c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded** = Exceedance of CCME ISQGs

*Italicised and shaded* = Exceedance of CCME PELs

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1						
								Location 1						
								BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4		BFR_SED5	
								BFR_SED1	BFR_SED2	BFR_SED3	BFR_SED4	BFR_SED_DUP1	BFR_SED5	BFR_SED_DUP2
Date Collected	Minimum		Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02			
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	7300	8000	11000	5800	6000	2100	2400
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	<2.0	2.2	<2.0	2.5	2.2	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	34	33	29	23	24	9.7	11
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.42	0.52	0.60	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	10	9.3	5.4	4.8	4.4	3.1	2.9
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	1.5	1.7	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	8.4	9.6	9.1	19	16	<2.0	2.2
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	7500	8800	1900	2100	1800	6000	6400
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	35	35	34	<u>770</u>	<u>250</u>	17	21
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	5.0	4.1	<2.0	<2.0	<2.0	3.0	2.9
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	74	130	15	11	9.1	71	76
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.15	<u>0.18</u>	<u>0.26</u>	<u>0.25</u>	<u>0.23</u>	<0.10	<0.10
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	7.0	6.5	4.5	7.0	6.7	<2.0	2.1
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	9.3	7.9	2.0	2.6	2.0	4.9	6.3
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	1.9	<u>2.7</u>	<u>5.6</u>	<u>4.5</u>	<u>4.4</u>	<0.50	<0.50
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	9.5	11	22	12	12	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	1.3	1.2	1.0	3.2	3.1	<1.0	1.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	1.9	2.4	1.3	0.74	0.76	0.36	0.65
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	28	32	8.4	17	16	13	15
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	45	37	13	19	18	8.4	10

**Notes:**

- NGA = No Guideline Available
- NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Sediment
- (b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only
- (c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.
- (d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**



**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1						
								Location 1						
								BFR_SED6	BFR_SED7	BFR_SED8	BFR_SED9	BFR_SED10	BFR_SED11	BFR_SED12
								2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01	2020-12-01
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	14000	7700	17000	7800	2500	9400	7400
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	5.3	<2.0	<2.0	<2.0	<2.0	<2.0	3.1
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	50	15	170	5.4	8.3	61	19
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<b>0.80</b>	<0.30	<0.30	<0.30	<0.30	<0.30	0.47
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	12	3.9	<b>45</b>	6.0	3.3	13	5.5
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	1.1	<1.0	9.9	<1.0	2.5	5.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	15	7.5	12	2.5	<2.0	<2.0	10
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	3800	1400	25000	320	8600	12000	3800
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	<b>140</b>	18	17	5.3	5.6	8.9	<b>100</b>
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	4.2	<2.0	20	<2.0	4.7	16	<2.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	52	22	290	2.0	160	260	7.8
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<b>0.32</b>	0.13	<0.10	<0.10	<0.10	<0.10	<b>0.24</b>
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	9.9	3.3	19	<2.0	2.4	8.7	5.2
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	8.2	2.7	60	<2.0	7.4	40	<2.0
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<b>4.9</b>	<b>2.1</b>	<0.50	1.9	<0.50	<0.50	<b>5.3</b>
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	17	9.7	<5.0	<5.0	<5.0	<5.0	8.4
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	0.11	<0.10	0.37	<0.10	<0.10	0.24	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	5.9	1.5	1.2	1.3	<1.0	1.8	3.4
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	1.8	3.4	1.6	1.2	0.66	1.2	1.4
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	36	12	95	18	22	44	22
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	42	8.1	45	<5.0	10	34	13

**Notes:**

- NGA = No Guideline Available
- NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment
- (b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only
- (c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.
- (d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1				Zone 2		
								Location 1						
								BFR_SED13	BFR_SED14	BFR_SED15	BFR_SED16	BFR_SED17	BFR_SED18	BFR_SED19
								2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	4900	7500	6700	4900	4600	14000	11000
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	2.1	<2.0	2.2	<2.0	<2.0	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	24	33	22	27	16	210	58
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<50	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.44	<0.30	0.37	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	4.5	8.4	6.2	4.3	4.7	<b>88</b>	13
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	<1.0	2.5	1.2	<1.0	2.6	6.8	3.2
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	8.7	2.3	5.4	10	<2.0	2.6	3.3
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	2400	7800	8400	2000	9900	13000	16000
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	<b>63</b>	6.5	4.8	<b>79</b>	7.2	8.6	15
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	<2.0	8.2	<2.0	<2.0	8.5	7.8	7.7
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	10	170	100	18	120	180	170
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<b>0.23</b>	<0.10	<0.10	0.16	<0.10	<0.10	<0.10
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	4.6	4.4	2.6	7.8	4.8	36	6.9
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	<2.0	19	2.8	2.9	17	25	14
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<b>5.1</b>	0.52	1.6	<b>3.0</b>	<0.50	<0.50	0.99
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	27	<5.0	14	11	<5.0	8.9	6.4
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	0.13	<0.10	<0.10	0.11	0.17	0.11
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	1.7	1.1	<1.0	1.9	<1.0	1.3	1.1
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	0.78	0.55	1.3	0.69	0.23	0.25	1.4
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	10	28	24	16	19	50	48
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	19	20	11	13	15	21	26

**Notes:**

- NGA = No Guideline Available
- NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment
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- (c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.
- (d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQSa	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 3				Zone 2	
								Location 1					
								BFR_SED20	BFR_SED21	BFR_SED22	BFR_SED23	BFR_SED24	BFR_SED25
								2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	1100	8100	11000	6200	7000	7800
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	6.6	38	32	40	74	15
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<50	<50	<50	<50	<50	<50
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	<0.30	0.45	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	<2.0	12	10	6.2	9.9	<2.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	<1.0	3.9	1.2	1.8	4.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	<2.0	<2.0	4.7	3.6	<2.0	4.8
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	1200	15000	3400	6800	12000	460
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	2.6	12	9.6	25	15	2.8
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	<2.0	7.5	3.7	3.6	8.5	<2.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	42	240	57	95	200	3.0
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.10	<0.10	0.13	0.12	<0.10	0.12
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	<2.0	5.5	3.5	4.7	7.3	2.6
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	2.1	20	6.7	7.9	22	<2.0
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<0.50	<0.50	2.9	1.2	<0.50	2.1
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	<5.0	12	14	<5.0	10
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	0.16	<0.10	<0.10	0.16	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	<1.0	2.1	<1.0	1.4	2.1	<1.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	0.25	1.7	1.4	0.84	0.86	1.4
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	4.3	54	16	23	42	5.0
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	<5.0	25	9.1	18	24	5.3

**Notes:**

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- (a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment
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- (d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1						
								Location 1						
								BFR_SED26	BFR_SED27	BFR_SED28		BFR_SED29		BFR_SED30
								BFR_L1_SED26	BFR_L1_SED27	BFR_L1_SED28	BFR_L1_SED_D UP1	BFR_L1_SED_D UP2	BFR_L1_SED30	
Date Collected	Minimum		Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21			
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	5990	7310	2760	2570	7260	4090	16800
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<1.0	<1.0	3.0	2.0	2.0	1.0	1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	5.0	4.0	3.0	3.0	6.0	5.0	18
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	15	19	25	22	17	13	7.0
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	5.0	3.0	2.0	<2.0	3.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	0.40	0.60	<0.30	0.60	0.50	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	8.0	12	<2.0	3.0	7.0	5.0	15
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	2.0	2.0	<1.0	<1.0	<1.0	<1.0	2.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	9.0	14	21	12	10	7.0	13
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	29100	8420	5950	5630	7180	4690	73600
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	23.9	27.2	126	114	62.5	68.6	64.3
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	<5.0	7.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	62	154	60	51	28	21	56
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.11	0.11	0.17	0.11	0.17	0.12	0.21
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	4.0	6.0	<2.0	<2.0	4.0	3.0	8.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	3.0	3.0	2.0	<1.0	6.0	3.0	7.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	8.0	11	28	21	17	12	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	3.0	3.0	4.0	4.0	6.0	5.0	6.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	1.1	1.5	0.60	0.50	1.2	0.90	1.0
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	33	39	7.0	6.0	32	23	57
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	32	38	28	23	34	24	29

**Notes:**

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- (c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.
- (d) Nova Scotia Tier 1 Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1						
								Location 1						
								BFR_SED31	BFR_SED32	BFR_SED33	BFR_SED34	BFR_SED35	BFR_SED36	BFR_SED39
								BFR_L1_SED31	BFR_L1_SED32	BFR_L1_SED33	BFR_L1_SED34	BFR_L1_SED35	BFR_L1_SED36	BFR_L1_SED39
Date Collected	Minimum		Maximum		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20			
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	20100	6250	10300	6390	1760	7910	5910
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	5.0	2.0	6.0	3.0	2.0	2.0	3.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	19	5.0	11	11	<5.0	17	25
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.60	<0.30	<0.30	0.40	<0.30	<0.30	0.50
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	18	5.0	9.0	5.0	8.0	12	3.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	3.0	<1.0	1.0	<1.0	<1.0	3.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	11	<2.0	7.0	5.0	<2.0	2.0	4.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	17200	2410	23400	1750	2120	5550	4540
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	26.6	5.6	63.2	4.7	34.0	15.3	18.7
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	6.0	<5.0	<5.0	<5.0	<5.0	5.0	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	129	46	46	6.0	50	117	12
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.08	<0.03	0.15	0.11	<0.03	<0.03	0.06
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	4.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	11	<2.0	5.0	3.0	<2.0	4.0	2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	6.0	1.0	5.0	7.0	<1.0	<1.0	2.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	8.0	<5.0	<5.0	11	<5.0	<5.0	19
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	4.0	4.0	5.0	5.0	4.0	5.0	4.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	1.7	0.40	1.5	0.70	0.70	0.60	0.60
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	60	21	41	13	10	30	8.0
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	48	8.0	24	10	7.0	22	15

**Notes:**

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- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 1					
								Location 1					
								BFR_SED40	BFR_SED41	BFR_SED42	BFR_SED44	BFR_SED45	BFR_SED46
								BFR_L1_SED40	BFR_L1_SED41	BFR_L1_SED42	BFR_L1_SED44	BFR_L1_SED45	BFR_L1_SED46
Date Collected	Minimum		Maximum		2021-11-20	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20			
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	9150	4770	4610	2840	11100	4050
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<1.0	<1.0	1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	4.0	2.0	6.0	4.0	3.0	2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	25	9.0	20	14	29	8.0
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	0.50	<0.30	0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	11	6.0	4.0	3.0	19	7.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	2.0	2.0	<1.0	<1.0	9.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	6.0	<2.0	5.0	3.0	7.0	<2.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	11100	5810	20100	9950	33900	3190
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	28.9	7.8	38.7	31.5	6.5	19.9
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	6.0	6.0	<5.0	<5.0	18	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	88	84	46	30	402	50
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.16	<0.03	0.20	0.12	<0.03	0.04
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	5.0	3.0	<2.0	<2.0	11	<2.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	3.0	<1.0	1.0	2.0	<1.0	<1.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	8.0	<5.0	20	17	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	5.0	3.0	5.0	5.0	5.0	4.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	1.1	0.60	0.70	0.40	0.50	0.40
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	36	19	16	9.0	82	16
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	45	14	23	16.0	50	7.0

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**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQSa	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Zone 2						
								Location 1				Location 2		
								BFR_SED47	BFR_SED48	BFR_SED49	BFR_SED50	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4
								BFR_L1_SED47	BFR_L1_SED48	BFR_L1_SED49	BFR_L1_SED50	BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4
Date Collected	Minimum		Maximum		2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-21			
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	2300	6530	2920	9100	4330	7400	10300
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	2.0	2.0	2.0	2.0	3.0	2.0	5.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	<5.0	31	11	75	13	43	24
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	4.0	10	3.0	54	11	60	28
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	<1.0	4.0	1.0	6.0	2.0	4.0	6.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	<2.0	<2.0	<2.0	6.0	<2.0	3.0	11
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	2200	10200	3720	11600	8570	9190	19500
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	9.0	4.3	4.0	8.5	9.9	12.4	45.4
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	<5.0	11	<5.0	12	6.0	<5.0	10
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	55	199	96	166	112	86	350
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	<0.03	<0.03	<0.03	0.03	<0.03	0.14	0.04
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	2.0	5.0	<2.0	18	4.0	11	11
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	<5.0	<5.0	<5.0	7.0	<5.0	<5.0	9.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	3.0	4.0	5.0	4.0	4.0	5.0	5.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	0.50	0.70	0.50	1.6	0.50	0.10	2.4
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	9.0	30	13	44	24	45	56
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	7.0	25	15	29	15	14	45

**Notes:**

- NGA = No Guideline Available
- NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment
- (b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only
- (c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.
- (d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**

**TABLE 14**  
**Analytical Results - Metals in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQSa	CCME ISQGs <sup>b</sup>	CCME PELs <sup>c</sup>	NSE Tier 1 <sup>d</sup>	Background Range <sup>e</sup>		Units	Location 2					
								BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	
								BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9	BFR_L2_SED UP1
Sample ID	Date Collected		Minimum	Maximum	2021-11-21	2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22			
Acid Extractable Aluminum (Al)	NGA	NGA	NGA	NGA	1100	14000	mg/kg	6760	6970	3460	6020	8280	4770
Acid Extractable Antimony (Sb)	25	NGA	NGA	NR	NA		mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acid Extractable Arsenic (As)	17	5.9	17	NR	<2.0	3.0	mg/kg	4.0	3.0	2.0	7.0	2.0	2.0
Acid Extractable Barium (Ba)	NGA	NGA	NGA	NGA	<5.0	210	mg/kg	15	38	20	14	22	8.0
Acid Extractable Beryllium (Be)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Bismuth (Bi)	NGA	NGA	NGA	NGA	NA		mg/kg	-	-	-	-	-	-
Acid Extractable Boron (B)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	2.0	<2.0	<2.0	<2.0
Acid Extractable Cadmium (Cd)	3.5	0.60	3.5	NR	<0.30	0.45	mg/kg	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acid Extractable Chromium (Cr)	90	37.3	90	NR	<2.0	88	mg/kg	13	5.0	3.0	7.0	12	7.0
Acid Extractable Cobalt (Co)	NGA	NGA	NGA	NGA	<1.0	6.8	mg/kg	2.0	<1.0	<1.0	4.0	2.0	<1.0
Acid Extractable Copper (Cu)	197	35.7	197	NR	<2.0	6.0	mg/kg	4.0	6.0	4.0	8.0	3.0	3.0
Acid Extractable Iron (Fe)	43766	NGA	NGA	NR	460	16000	mg/kg	8020	2410	4720	14400	5380	1300
Acid Extractable Lead (Pb)	91.3	35	91.3	NR	2.6	25	mg/kg	8.1	8.7	2.1	5.1	4.4	3.7
Acid Extractable Lithium (Li)	NGA	NGA	NGA	NGA	<2.0	12	mg/kg	7.0	<5.0	<5.0	13	6.0	<5.0
Acid Extractable Manganese (Mn)	1100	NGA	NGA	NR	3.0	240	mg/kg	127	22	102	282	112	31
Acid Extractable Mercury (Hg)	0.486	0.17	0.486	NR	<0.03	0.13	mg/kg	0.07	0.05	<0.03	<0.03	0.08	<0.03
Acid Extractable Molybdenum (Mo)	NGA	NGA	NGA	NGA	NA		mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Acid Extractable Nickel (Ni)	75	NGA	NGA	NR	<2.0	36	mg/kg	6.0	2.0	2.0	7.0	4.0	3.0
Acid Extractable Rubidium (Rb)	NGA	NGA	NGA	NGA	<2.0	25	mg/kg	-	-	-	-	-	-
Acid Extractable Selenium (Se)	2	NGA	NGA	NR	<0.50	2.9	mg/kg	2.0	2.0	3.0	<1.0	1.0	2.0
Acid Extractable Silver (Ag)	0.5	NGA	NGA	NR	NA		mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acid Extractable Strontium (Sr)	NGA	NGA	NGA	NGA	<5.0	14	mg/kg	10	29	16	<5.0	<5.0	<5.0
Acid Extractable Thallium (Tl)	NGA	NGA	NGA	NGA	<0.10	0.17	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acid Extractable Tin (Sn)	NGA	NGA	NGA	NGA	<1.0	5.0	mg/kg	4.0	5.0	4.0	4.0	4.0	3.0
Acid Extractable Uranium (U)	NGA	NGA	NGA	NGA	0.23	1.7	mg/kg	1.5	1.0	0.50	0.50	0.40	0.40
Acid Extractable Vanadium (V)	NGA	NGA	NGA	NGA	4.3	54	mg/kg	31	10	6.0	21	34	17
Acid Extractable Zinc (Zn)	315	123	315	NR	<5.0	29	mg/kg	26	9.0	<5.0	39	15	6.0

**Notes:**

- NGA = No Guideline Available
- NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier I Environmental Quality Standards (EQS) for Sediment
- (b) Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQGs) for the protection of aquatic life, 2010, for freshwater. Presented for informational purposes only
- (c) Canadian Council of Ministers of the Environment (CCME) Probable Effect Levels (PELs) for the protection of aquatic life, 2010, for freshwater.
- (d) Nova Scotia Tier I Environmental Quality Standards (EQS) for Sediment. Only used where guidelines for Atlantic RBCA and CCME do not exist.
- (e) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.

**Exceedance Identification:**



**TABLE 15**  
**Analytical Results - Inorganics in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Zone 1						
				Location 1						
				BFR_SW4		BFR_SW5		BFR_SW7	BFR_SW8	BFR_SW10
				BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW7	BFR_SW8	BFR_SW10
Sample ID				2020-12-04	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-02	2020-12-04
Date Collected										
Total Alkalinity (Total as CaCO <sub>3</sub> )	NGA	NGA	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl <sup>-</sup> )	120	120	mg/L	12	11	10	10	13	9.3	12
Colour	NGA	NGA	TCU	79.0	91.0	110	110	79.0	85.0	91.0
Nitrate + Nitrite (N)	NGA	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.054	0.052
Nitrite (N)	60	0.197	mg/L	0.011	0.012	0.011	0.012	0.013	0.011	0.012
Nitrogen (Ammonia Nitrogen)	153 <sup>c</sup>	153 <sup>c</sup>	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Total Organic Carbon (C)	NGA	NGA	mg/L	-	-	-	-	-	8.5	-
Orthophosphate (P)	NGA	NGA	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	pH	5.30	5.46	6.20	5.94	5.84	6.11	6.05
Reactive Silica (SiO <sub>2</sub> )	NGA	NGA	mg/L	1.0	1.1	1.7	1.7	2.6	1.1	1.9
Dissolved Sulphate (SO <sub>4</sub> )	128	NGA	mg/L	2.0	2.6	2.8	2.2	<2.0	2.1	<2.0
Turbidity	NGA	<2 NTU above background levels	NTU	0.57	0.61	4.3	3.7	0.26	0.57	1.3
Conductivity	NGA	NGA	uS/cm	47	45	40	39	50	37	45

**Notes:**

- NGA = No Guideline Available
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
- (b) Canadian Council of Ministers of the Environment (CCME) water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
- (c) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table

**Exceedance Identification:**

Underlined and shaded = Naturally occurring low levels of pH

**TABLE 15**  
**Analytical Results - Inorganics in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Zone 1	Zone 2	Zone 3	Zone 2			
				Location 1						
				BFR_SW13	BFR_SW16	BFR_SW17	BFR_SW19	BFR_SW21	BFR_SW23	BFR_SW24
Sample ID				BFR_SW13	BFR_SW16	BFR_SW17	BFR_SW19	BFR_SW21	BFR_SW23	BFR_SW24
Date Collected				2020-12-04	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-04
Total Alkalinity (Total as CaCO <sub>3</sub> )	NGA	NGA	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl <sup>-</sup> )	120	120	mg/L	12	11	14	14	14	12	12
Colour	NGA	NGA	TCU	100	75.0	87.0	85.0	92.0	110	80.0
Nitrate + Nitrite (N)	NGA	NGA	mg/L	0.14	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	mg/L	0.013	0.011	0.012	0.011	0.012	0.013	0.011
Nitrogen (Ammonia Nitrogen)	153 <sup>c</sup>	153 <sup>c</sup>	mg/L	<0.050	<0.050	0.070	<0.050	<0.050	<0.050	<0.050
Total Organic Carbon (C)	NGA	NGA	mg/L	-	9.0	-	-	-	-	-
Orthophosphate (P)	NGA	NGA	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	pH	5.30	5.19	5.23	5.08	5.34	5.27	5.48
Reactive Silica (SiO <sub>2</sub> )	NGA	NGA	mg/L	0.70	1.1	2.9	2.1	2.1	1.8	1.5
Dissolved Sulphate (SO <sub>4</sub> )	128	NGA	mg/L	<2.0	<2.0	4.6	3.1	3.1	3.4	3.4
Turbidity	NGA	<2 NTU above background levels	NTU	2.7	1.1	0.55	0.64	0.44	1.0	0.68
Conductivity	NGA	NGA	uS/cm	49	48	63	61	53	50	45

**Notes:**

- NGA = No Guideline Available
- < = concentration is below Reportable Detection Limit (RDL)
- "-" = no data available
- (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
- (b) Canadian Council of Ministers of the Environment (CCME) water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
- (c) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table

**Exceedance Identification:**

Underlined and shaded = Naturally occurring low levels of pH

**TABLE 15**  
**Analytical Results - Inorganics in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Zone 1				
				Location 1			Location 2	
				BFR_L1_SW29		BFR_L1_SW38	BFR_L2_SW4	BFR_L2_SW10
				BFR_L1_SW29	BFR_L1_DUP2	BFR_L1_SW38	BFR_L2_SW4	BFR_L2_SW10
Sample ID								
Date Collected				2021-11-21	2021-11-21	2021-11-20	2021-11-21	2021-11-27
Total Alkalinity (Total as CaCO <sub>3</sub> )	NGA	NGA	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Chloride (Cl <sup>-</sup> )	120	120	mg/L	7.0	7.0	6.0	5.0	8.0
Colour	NGA	NGA	TCU	78.8	136	89.3	21.8	46.8
Nitrate + Nitrite (N)	NGA	NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrite (N)	60	0.197	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Nitrogen (Ammonia Nitrogen)	153 <sup>c</sup>	153 <sup>c</sup>	mg/L	0.040	0.090	<0.030	<0.030	<0.050
Total Organic Carbon (C)	NGA	NGA	mg/L	10	10	11	12	7
Orthophosphate (P)	NGA	NGA	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
pH	6.5 - 9.0	6.5 - 9.0	pH	6.46	5.40	5.39	5.36	4.85
Reactive Silica (SiO <sub>2</sub> )	NGA	NGA	mg/L	10.6	1.5	1.1	16.1	1.4
Dissolved Sulphate (SO <sub>4</sub> )	128	NGA	mg/L	<2.0	<2.0	<2.0	<2.0	6.0
Turbidity	NGA	<2 NTU above background levels	NTU	1.0	0.90	1.8	1.40	1.4
Conductivity	NGA	NGA	uS/cm	41	44	42	32	80

**Notes:**

- NGA = No Guideline Available
- < = concentration is below Reportable Detection Limit (RDL)
- "." = no data available
- (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water
- (b) Canadian Council of Ministers of the Environment (CCME) water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term
- (c) Average temperature (5.6 °C) and pH (5.54 units) used for lookup table

**Exceedance Identification:**

Underlined and shaded = Naturally occurring low levels of pH

**TABLE 16**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL*	Units	Location 1												
				BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11
Sample ID				BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9	BFR_SW10	BFR_SW11
Date Collected				2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-01
Benzene		2.1	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene		0.77	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene		0.32	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes		0.33	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)		NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons		NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons		NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons		NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Diesel/No. 2 Fuel Oil	0.10**	mg/L													
	Lube oil/No. 6 Oil	0.10***	mg/L													
Reached Baseline at C32				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**  
 NA = not applicable  
 NGA = No Guideline Available  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.  
 \*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**  
**Bold and shaded = Exceedance of Atlantic RBCA ESL (None reported)**

**TABLE 16**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL*	Units	Location 1												
				BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24
Sample ID				BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24
Date Collected				2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04
Benzene		2.1	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Toluene		0.77	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene		0.32	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes		0.33	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)		NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons		NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons		NGA	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons		NGA	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*	mg/L	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090	<0.090
	Diesel/No. 2 Fuel Oil	0.10**	mg/L													
	Lube oil/No. 6 Oil	0.10***	mg/L													
Reached Baseline at C32				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbon Resemblance				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes:**

NA = not applicable

NGA = No Guideline Available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL (None reported)**

**TABLE 16**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL*	Units	Location 1										
				BFR_SW25	BFR_SW26	BFR_SW27	BFR_SW28		BFR_SW29		BFR_SW30	BFR_SW31	BFR_SW32	BFR_SW33
Sample ID				BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	BFR_L1_DUP1	BFR_L1_SW29	BFR_L1_DUP2	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33
Date Collected				2020-12-04	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Benzene		2.1	mg/L	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	mg/L	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	mg/L	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	mg/L	<0.0020	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	mg/L	<0.090	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	mg/L	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	mg/L	<0.050	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	mg/L	<0.090	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	mg/L	<0.090	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	mg/L											
	Lube oil/No. 6 Oil	0.10***	mg/L											
Reached Baseline at C32				NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				NA	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

**Notes:**

NA = not applicable

NGA = No Guideline Available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL (None reported)**

**TABLE 16**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL*	Units	Location 1										
				BFR_SW34	BFR_SW35	BFR_SW36	BFR_SW37	BFR_SW38	BFR_SW39	BFR_SW40	BFR_SW41	BFR_SW42	BFR_SW43	BFR_SW44
Sample ID				BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36	BFR_L1_SW37	BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42	BFR_L1_SW43	BFR_L1_SW44
Date Collected				2021-11-21	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Benzene		2.1	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	mg/L											
	Lube oil/No. 6 Oil	0.10***	mg/L											
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

**Notes:**

NA = not applicable

NGA = No Guideline Available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL (None reported)**

**TABLE 16**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL*	Units	Location 1						Location 2				
Sample ID	Date Collected			BFR_SW45	BFR_SW46	BFR_SW47	BFR_SW48	BFR_SW49	BFR_SW50	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4	BFR_L2_SW5
				BFR_L1_SW45	BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49	BFR_L1_SW50	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4	BFR_L2_SW5
			2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-22	2021-11-21	2021-11-21	
Benzene		2.1	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	mg/L											
	Lube oil/No. 6 Oil	0.10***	mg/L											
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

**Notes:**

NA = not applicable

NGA = No Guideline Available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL (None reported)**



**TABLE 16**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location		Atlantic RBCA ESL*	Units	Location 2					
				BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9		BFR_L2_SW10
Sample ID				BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9	BFR_L2_SW_D UP1	BFR_L2_SW10
Date Collected				2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22	2021-11-27
Benzene		2.1	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene		0.77	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene		0.32	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Xylenes		0.33	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6 - C10 (less BTEX)		NGA	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons		NGA	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons		NGA	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-<C32 Hydrocarbons		NGA	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH	Gasoline	1.5*	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Diesel/No. 2 Fuel Oil	0.10**	mg/L						
	Lube oil/No. 6 Oil	0.10***	mg/L						
Reached Baseline at C32				Yes	Yes	Yes	Yes	Yes	Yes
Hydrocarbon Resemblance				No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance	No Resemblance

**Notes:**

NA = not applicable

NGA = No Guideline Available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Surface Water and Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water (2015)

(b) Volatile Isobutylbenzene surrogate recovery not within acceptance limits due to matrix interference.

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA ESL (None reported)**

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 1										
				BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9
				BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DU P1	BFR_SW5	BFR_SW_DU P2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9
Date Collected														
1-Methylnaphthalene	2	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
2-Methylnaphthalene	2	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Acenaphthene	5.8	5.8	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Acenaphthylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Acridine	NGA	4.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Anthracene	0.012	0.012	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(a)anthracene	0.018	0.018	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b/j)fluoranthene	NGA	NGA	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(j)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(k)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Chrysene	0.1	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Fluoranthene	0.04	0.04	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Fluorene	3	3	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Naphthalene	1.1	1.1	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Perylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Phenanthrene	0.4	0.4	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Pyrene	0.025	0.025	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Quinoline	NGA	3.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Flags				c	c	c	c			d	c			

- Notes:**  
 NGA = No Guideline Available  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)  
 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time  
 (d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**  
Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)  
**Bold and shaded = Exceedance of CCME WQGs (None reported)**

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 1											
				BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19	BFR_SW20	
				2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04	2020-12-03	
1-Methylnaphthalene	2	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
2-Methylnaphthalene	2	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Acenaphthene	5.8	5.8	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Acenaphthylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Acridine	NGA	4.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Anthracene	0.012	0.012	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(a)anthracene	0.018	0.018	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(j)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(k)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Chrysene	0.1	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Fluoranthene	0.04	0.04	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Fluorene	3	3	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Naphthalene	1.1	1.1	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Perylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Phenanthrene	0.4	0.4	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Pyrene	0.025	0.025	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Quinoline	NGA	3.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Flags				c	c	c				c					

- Notes:**  
 NGA = No Guideline Available  
 < = concentration is below Reportable Detection Limit (RDL)  
 "-" = no data available  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)  
 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time  
 (d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)  
 Bold and shaded = Exceedance of CCME WQGs (None reported)

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 1									
				BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28		BFR_L1_SW29
				BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	BFR_L1_DUP1	BFR_L1_SW29
Date Collected													
1-Methylnaphthalene	2	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.01	0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b/j)fluoranthene	NGA	NGA	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	-	-	-	-	-
Chrysene	0.1	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	<0.01
Flags													

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)

(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time

(d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)

**Bold and shaded** = Exceedance of CCME WQGs (None reported)

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 1								
				BFR_L1_SW29	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36	BFR_L1_SW37
				BFR_L1_DUP2	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36	BFR_L1_SW37
Date Collected				2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20	2021-11-20
1-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b,j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-
Chrysene	0.1	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flags												

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

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(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)

(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time

(d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)

**Bold and shaded** = Exceedance of CCME WQGs (None reported)

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 1									
				BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42	BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45	BFR_L1_SW46	
				BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42	BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45	BFR_L1_SW46	
Date Collected				2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20	
1-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
2-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthene	5.8	5.8	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acridine	NGA	4.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Anthracene	0.012	0.012	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	
Benzo(a)anthracene	0.018	0.018	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(b/j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-	
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-	
Benzo(k)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-	
Chrysene	0.1	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Fluoranthene	0.04	0.04	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Fluorene	3	3	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Naphthalene	1.1	1.1	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Phenanthrene	0.4	0.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Pyrene	0.025	0.025	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Quinoline	NGA	3.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Flags													

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)

(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time

(d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)

**Bold and shaded = Exceedance of CCME WQGs (None reported)**

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 1				Location 2					
				BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49	BFR_L1_SW50	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4	BFR_L2_SW5	
				2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-22	2021-11-21	2021-11-21	
1-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b,j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-	-	-	-	-
Chrysene	0.1	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Fluorene	3	3	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flags													

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)

(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time

(d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)

**Bold and shaded = Exceedance of CCME WQGs (None reported)**

**TABLE 17**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA Ecological Tier I (EQS) <sup>a</sup>	CCME WQGs <sup>b</sup>	Units	Location 2					
				BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9		BFR_L2_SW10
				BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9	BFR_L2_SW_D UP1	BFR_L2_SW10
Date Collected				2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22	2021-11-27
1-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	2	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	5.8	5.8	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	NGA	4.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	0.012	0.012	ug/L	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	0.018	0.018	ug/L	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	0.015	0.015	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)jfluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-
Benzo(g,h,i)perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-
Benzo(k)fluoranthene	NGA	NGA	ug/L	-	-	-	-	-	-
Chrysene	0.1	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	0.04	0.04	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	3	3	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	1.1	1.1	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	NGA	NGA	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	0.4	0.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	0.025	0.025	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	NGA	3.4	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flags									

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

"-" = no data available

(a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water (Fresh Water)

(b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term

(c) D14-Terphenyl surrogate recovery sample analysed past recommended hold time

(d) D10-Anthracene, D14-Terphenyl, and D8-Acenaphthylene PAH surrogates not within acceptance limits

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier I EQS (None reported)

**Bold and shaded = Exceedance of CCME WQGs (None reported)**



**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME WQGs <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Zone 1										
							Location 1										
							BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4		BFR_SW5		BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9
							BFR_SW1	BFR_SW2	BFR_SW3	BFR_SW4	BFR_SW_DUP1	BFR_SW5	BFR_SW_DUP2	BFR_SW6	BFR_SW7	BFR_SW8	BFR_SW9
Sample ID				Minimum	Maximum		2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-01	2020-12-02	2020-12-02	2020-12-02
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>270</b>	<b>250</b>	<b>300</b>	<b>160</b>	<b>170</b>	<b>270</b>	<b>250</b>	<b>260</b>	<b>180</b>	<b>200</b>	<b>100</b>
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	3.7	4.0	3.0	2.4	2.2	2.3	2.3	1.9	2.7	2.2	1.4
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	NR	<5.0	<50	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	0.020	0.017	0.017	0.014	0.015	0.013	0.020	0.016	0.018	0.018	0.015
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	1400	1700	550	510	430	800	820	310	1100	740	400
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Total Copper (Cu)	2	2 <sup>f</sup>	NR	<0.50	2.0	ug/L	0.57	0.56	<0.50	<b>2.2</b>	1.9	1.5	1.3	<0.50	<0.50	<0.50	<0.50
Total Iron (Fe)	300	300	NR	73	562	ug/L	<b>310</b>	<b>370</b>	270	140	140	<b>330</b>	300	110	200	160	83
Total Lead (Pb)	1	1 <sup>f</sup>	NR	<0.50	0.90	ug/L	0.61	0.52	0.80	<b>8.6</b>	<b>8.3</b>	<b>2.7</b>	<b>2.6</b>	0.60	<0.50	0.61	0.61
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	850	820	780	720	690	640	610	520	800	570	760
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	14	14	5.9	2.9	3.0	18	18	4.4	11	8.4	<2.0
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25 <sup>f</sup>	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20 <sup>g</sup>	NGA	<20	<100	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	400	420	180	120	110	220	230	150	190	240	150
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	7900	8500	5500	5200	4700	4900	4900	4000	5600	4700	5700
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	7.9	7.6	6.4	5.7	4.9	4.9	5.5	4.4	6.8	4.7	5.5
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	4.4	5.5	4.0	2.6	<2.0	5.0	5.2	2.6	2.4	3.5	<2.0
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	6.4	5.9	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

- Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water  
 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.  
 (d) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.  
 (e) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table  
 (f) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
 (g) Value for mesotrophic freshwater used  
 (h) Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
 Bold and shaded = Exceedance CCME WQS  
 Italicised and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range  
 Orange shaded = exceedance above maximum background range but naturally occurring

**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME WQGs <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Zone 1										Zone 2		
							Location 1										BFR_SW17	BFR_SW18	BFR_SW19
							BFR_SW10	BFR_SW11	BFR_SW12	BFR_SW13	BFR_SW14	BFR_SW15	BFR_SW16	BFR_SW17	BFR_SW18	BFR_SW19			
							2020-12-01	2020-12-01	2020-12-01	2020-12-02	2020-12-02	2020-12-02	2020-12-01	2020-12-04	2020-12-04	2020-12-04			
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>210</b>	<b>230</b>	<b>170</b>	<b>120</b>	<b>200</b>	<b>130</b>	<b>170</b>	<b>210</b>	<b>390</b>	<b>180</b>			
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	2.3	2.4	1.9	1.9	1.6	2.8	2.1	3.6	5.4	4.2			
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
Total Boron (B)	1500	1500	NR	<5.0	<50	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	0.017	0.017	0.020	0.017	0.014	0.018	0.013	0.015	0.020	0.017			
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	780	710	480	450	600	650	470	1000	950	680			
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0			
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40			
Total Copper (Cu)	2	2 <sup>f</sup>	NR	<0.50	2.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	0.99	1.6	<0.50	0.54	<0.50			
Total Iron (Fe)	300	300	NR	73	562	ug/L	260	260	150	140	110	210	140	230	<b>370</b>	200			
Total Lead (Pb)	1	1 <sup>f</sup>	NR	<0.50	0.90	ug/L	0.69	0.64	0.61	0.77	<0.50	<0.50	<b>3.4</b>	<0.50	0.70	0.57			
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	720	710	760	760	570	630	770	880	870	910			
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	430	9.2	3.6	2.3	5.0	7.3	2.8	18	11	5.1			
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013			
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
Total Nickel (Ni)	25	25 <sup>f</sup>	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
Total Phosphorus (P)	NGA	10 - 20 <sup>g</sup>	NGA	<20	<100	ug/L	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	180	230	170	150	190	210	110	190	320	150			
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50			
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	5100	5400	5500	5500	4900	4800	5400	6200	6100	6000			
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	6.1	6.0	5.6	5.9	4.8	5.3	5.7	7.8	7.3	6.9			
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	2.5	3.7	2.1	3.1	2.5	<2.0	2.6	3.1	9.0	3.1			
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0			
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<5.0	5.2	<5.0	<5.0	<5.0	6.9	<5.0	<5.0	6.1			

- Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water  
 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.  
 (d) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.  
 (e) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table  
 (f) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
 (g) Value for mesotrophic freshwater used  
 (h) Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
 Bold and shaded = Exceedance CCME WQS  
 Italicised and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range  
 Orange shaded = exceedance above maximum background range but naturally occurring

**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME WQGs <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Zone 3			Zone 2			Zone 1			
							Location 1									
							BFR_SW20	BFR_SW21	BFR_SW22	BFR_SW23	BFR_SW24	BFR_SW25	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	
Date Collected																
Sample ID				Minimum	Maximum		2020-12-03	2020-12-03	2020-12-03	2020-12-03	2020-12-04	2020-12-04	2021-11-21	2021-11-21	2021-11-21	2021-11-21
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>210</b>	<b>230</b>	<b>110</b>	<b>240</b>	<b>190</b>	<b>190</b>	<b>335</b>	<b>377</b>	<b>262</b>	<b>268</b>
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	4.4	4.2	2.4	4.5	3.1	2.6	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	NR	<5.0	<50	ug/L	<50	<50	<50	<50	<50	<50	<5.0	<5.0	<5.0	<5.0
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	0.021	0.020	0.019	0.025	0.018	0.018	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	890	940	370	810	780	480	-	-	-	-
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2 <sup>f</sup>	NR	<0.50	2.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<1.0	1.0	1.0
Total Iron (Fe)	300	300	NR	73	562	ug/L	200	220	73	240	170	140	<b>348</b>	<b>437</b>	<b>303</b>	294
Total Lead (Pb)	1	1 <sup>f</sup>	NR	<0.50	0.90	ug/L	0.59	<0.50	<0.50	0.65	<0.50	0.57	0.80	0.70	<b>2.8</b>	<b>3.0</b>
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	860	940	750	830	760	700	-	-	-	-
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	10	11	<2.0	11	7.2	2.7	10	17	13	14
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25 <sup>f</sup>	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	12	<2.0
Total Phosphorus (P)	NGA	10 - 20 <sup>g</sup>	NGA	<20	<100	ug/L	<100	<100	<100	<100	<100	<100	-	-	-	-
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	230	230	<100	290	220	160	-	-	-	-
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	5700	6200	5300	5300	5300	5300	-	-	-	-
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	7.1	7.5	5.4	6.7	6.2	5.8	5.0	6.0	<5.0	<5.0
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	4.2	4.0	<2.0	4.9	3.0	2.6	6.0	8.0	3.0	4.0
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0

- Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water  
 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.  
 (d) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.  
 (e) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table  
 (f) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
 (g) Value for mesotrophic freshwater used  
 (h) Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
 Bold and shaded = Exceedance CCME WQS  
 Italicised and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range  
 Orange shaded = exceedance above maximum background range but naturally occurring

**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME WQGS <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Zone 1									
							Location 1									
							BFR_L1_SW29		BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36	
							BFR_L1_SW29	BFR_L1_DUP2	BFR_L1_SW30	BFR_L1_SW31	BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L1_SW35	BFR_L1_SW36	
Date Collected				Minimum	Maximum	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	2021-11-20			
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>174</b>	<b>177</b>	<b>253</b>	<b>245</b>	<b>214</b>	<b>232</b>	<b>169</b>	<b>231</b>	<b>310</b>	
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Boron (B)	1500	1500	NR	<5.0	<5.0	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	500	500	-	-	-	-	-	-	-	
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Copper (Cu)	2	2 <sup>f</sup>	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Iron (Fe)	300	300	NR	73	562	ug/L	249	247	151	201	181	225	206	172	<b>348</b>	
Total Lead (Pb)	1	1 <sup>f</sup>	NR	<0.50	0.90	ug/L	<b>1.4</b>	<b>1.4</b>	0.60	0.60	0.70	0.60	0.60	0.70	0.70	
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	600	600	-	-	-	-	-	-	-	
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	4.0	4.0	6.0	6.0	4.0	7.0	<2.0	2.0	11	
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Nickel (Ni)	25	25 <sup>f</sup>	NR	<2.0	<2.0	ug/L	<2.0	8.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	
Total Phosphorus (P)	NGA	10 - 20 <sup>g</sup>	NGA	<20	<100	ug/L	20	<20	-	-	-	-	-	-	-	
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	200	200	-	-	-	-	-	-	-	
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	4400	4500	-	-	-	-	-	-	-	
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.0	
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	2.0	2.0	2.0	2.0	3.0	3.0	3.0	2.0	12	
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	

- Notes:**  
 NGA = No Guideline Available  
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 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water  
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 (c) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.  
 (d) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.  
 (e) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table  
 (f) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
 (g) Value for mesotrophic freshwater used  
 (h) Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
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**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME WQGS <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Zone 1									
							Location 1									
							BFR_L1_SW37	BFR_L1_SW38	BFR_L1_SW39	BFR_L1_SW40	BFR_L1_SW41	BFR_L1_SW42	BFR_L1_SW43	BFR_L1_SW44	BFR_L1_SW45	
Sample ID				Minimum	Maximum											
Date Collected							2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-20	
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>235</b>	<b>269</b>	<b>280</b>	<b>189</b>	<b>337</b>	<b>249</b>	<b>188</b>	<b>234</b>	<b>268</b>	
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Boron (B)	1500	1500	NR	<5.0	<50	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	-	300	-	-	-	-	-	-	-	
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Copper (Cu)	2	2 <sup>g</sup>	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	
Total Iron (Fe)	300	300	NR	73	562	ug/L	<b>325</b>	194	190	235	290	<b>316</b>	<b>325</b>	<b>342</b>	294	
Total Lead (Pb)	1	1 <sup>h</sup>	NR	<0.50	0.90	ug/L	0.60	0.70	0.70	<0.50	0.70	0.60	0.50	<0.50	<b>3.0</b>	
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	-	400	-	-	-	-	-	-	-	
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	12	3.0	3.0	3.0	8.0	7.0	7.0	6.0	14	
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Nickel (Ni)	25	25 <sup>g</sup>	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Phosphorus (P)	NGA	10 - 20 <sup>h</sup>	NGA	<20	<100	ug/L	-	20	-	-	-	-	-	-	-	
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	-	200	-	-	-	-	-	-	-	
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	-	4100	-	-	-	-	-	-	-	
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	3.0	3.0	3.0	<2.0	5.0	4.0	3.0	3.0	4.0	
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	

- Notes:**  
 NGA = No Guideline Available  
 NR = Guideline is Not Required, as an applicable guideline is available from another more appropriate jurisdiction  
 < = concentration is below Reportable Detection Limit (RDL)  
 (a) Atlantic RBCA - Ecological Tier I Environmental Quality Standards (EQS) for Surface Water  
 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGS) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.  
 (d) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.  
 (e) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table  
 (f) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
 (g) Value for mesotrophic freshwater used  
 (h) Water chemistry parameters outside of valid range for CCME equation

**Exceedance Identification:**  
 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
 Bold and shaded = Exceedance CCME WQS  
 Italicised and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range  
 Orange shaded = exceedance above maximum background range but naturally occurring

**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Zone 1						Zone 2					Location 2			
	Atlantic RBCA EQS <sup>a</sup>	CCME WQGs <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Location 1					Location 2			
				Minimum	Maximum		BFR_L1_SW46	BFR_L1_SW47	BFR_L1_SW48	BFR_L1_SW49	BFR_L1_SW50	BFR_L2_SW1	BFR_L2_SW2	BFR_L2_SW3	BFR_L2_SW4
							2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-22	2021-11-21	2021-11-22	2021-11-21
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>162</b>	<b>366</b>	<b>378</b>	<b>436</b>	<b>183</b>	<b>435</b>	<b>295</b>	<b>401</b>	<b>355</b>
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	NR	<5.0	<50	ug/L	<5.0	<5.0	<5.0	<5.0	44	<5.0	46	25	
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	-	-	-	-	-	-	-	-	2200
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2 <sup>f</sup>	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Iron (Fe)	300	300	NR	73	562	ug/L	177	<b>342</b>	<b>369</b>	<b>361</b>	156	<b>560</b>	<b>562</b>	227	<b>315</b>
Total Lead (Pb)	1	1 <sup>f</sup>	NR	<0.50	0.90	ug/L	0.70	0.90	0.90	0.80	0.60	0.80	0.60	0.70	0.80
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	-	-	-	-	-	-	-	-	500
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	2.0	6.0	7.0	8.0	4.0	11	3.0	7.0	
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25 <sup>f</sup>	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20 <sup>g</sup>	NGA	<20	<100	ug/L	-	-	-	-	-	-	-	-	30
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	-	-	-	-	-	-	-	-	300
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	-	-	-	-	-	-	-	-	3900
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	<5.0	<5.0	5.0	5.0	<5.0	8.0	<5.0	8.0	7.0
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	2.0	7.0	7.0	8.0	3.0	8.0	6.0	6.0	6.0
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<b>32</b>	<5.0	<b>39</b>	<b>16</b>

- Notes:**  
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 < = concentration is below Reportable Detection Limit (RDL)  
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 (b) Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines (WQGs) for the Protection of Aquatic Life (2010) - Freshwater, Long Term  
 (c) Nova Scotia Tier I Environmental Quality Standards (EQS) for Surface Water and Groundwater Discharging to Surface Water. Only used where guidelines for Atlantic RBCA and CCME do not exist.  
 (d) Background range minimum and maximum calculated based on Location 1 and Location 2 selected background locations.  
 (e) Average temperature (5.4 °C) and pH (5.6 units) used for lookup table  
 (f) Average water hardness (2.5 mg/L) used for calculation, where half of detection limit was used for values below RDL  
 (g) Value for mesotrophic freshwater used  
 (h) Water chemistry parameters outside of valid range for CCME equation

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 Underline and shaded = Exceedance of RBCA Ecological Tier 1  
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 Italicised and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range  
 Orange shaded = exceedance above maximum background range but naturally occurring

**TABLE 18**  
**Analytical Results - Metals in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sup>a</sup>	CCME WQGS <sup>b</sup>	NSE Tier 1 <sup>c</sup>	Background Range <sup>d</sup>		Units	Location 2						
							BFR_L2_SW5	BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9		BFR_L2_SW10
							BFR_L2_SW5	BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW8	BFR_L2_SW9	BFR_L2_SW_DUP1	BFR_L2_SW10
Date Collected				Minimum	Maximum	2021-11-21	2021-11-22	2021-11-22	2021-11-21	2021-11-22	2021-11-22	2021-11-27	
Total Aluminum (Al)	5	5 <sup>e</sup>	NR	110	436	ug/L	<b>284</b>	<b>631</b>	<b>264</b>	<b>286</b>	<b>631</b>	<b>636</b>	<b>210</b>
Total Antimony (Sb)	9	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Arsenic (As)	5	5	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Barium (Ba)	1000	NGA	NR	2.4	5.4	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Beryllium (Be)	0.15	NGA	NR	<1.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Bismuth (Bi)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	NR	<5.0	<50	ug/L	6.0	80	37	<5.0	140	147	7.0
Total Cadmium (Cd)	0.09	0.04 <sup>f</sup>	NR	0.015	<0.09	ug/L	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Calcium (Ca)	NGA	NGA	NGA	370	1200	ug/L	-	-	-	-	-	-	1200
Total Chromium (Cr)	8.9	NGA	NR	<1.0	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	NR	<0.40	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Copper (Cu)	2	2 <sup>f</sup>	NR	<0.50	2.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.0
Total Iron (Fe)	300	300	NR	73	562	ug/L	296	226	192	<b>302</b>	128	139	<b>353</b>
Total Lead (Pb)	1	1 <sup>f</sup>	NR	<0.50	0.90	ug/L	0.60	<b>1.5</b>	0.60	0.60	0.80	0.80	<0.50
Total Magnesium (Mg)	NGA	NGA	NGA	600	940	ug/L	-	-	-	-	-	-	600
Total Manganese (Mn)	430	190 <sup>e,f</sup>	NR	<2.0	18	ug/L	6.0	4.0	4.0	7.0	3.0	3.0	8.0
Total Mercury (Hg)	0.026	0.026	NR	<0.013	<0.026	ug/L	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026
Total Molybdenum (Mo)	73	73	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	25 <sup>f</sup>	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Phosphorus (P)	NGA	10 - 20 <sup>g</sup>	NGA	<20	<100	ug/L	-	-	-	-	-	-	<20
Total Potassium (K)	NGA	NGA	NGA	<100	400	ug/L	-	-	-	-	-	-	400
Total Selenium (Se)	1	1	NR	<0.50	<1.0	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Silver (Ag)	0.25	0.25	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	NGA	5000	6200	ug/L	-	-	-	-	-	-	5000
Total Strontium (Sr)	21000	NGA	NR	<5.0	8.0	ug/L	5.0	11	7.0	<5.0	16	16	<5.0
Total Thallium (Tl)	0.8	0.8	NR	<0.10	<0.10	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	NGA	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	NGA	NGA	<2.0	9.0	ug/L	5.0	11	5.0	4.0	11	12	3.0
Total Uranium (U)	15	15	NR	<0.10	<0.20	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Total Vanadium (V)	120	NGA	NR	<2.0	<2.0	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	NGA <sup>h</sup>	NR	<5.0	32	ug/L	<5.0	<b>64</b>	<b>28</b>	<5.0	<b>119</b>	<b>115</b>	<5.0

- Notes:**  
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 Bold and shaded = Exceedance CCME WQS  
 Italicised and shaded = Exceedance of NSE Tier 1  
 Yellow Shaded = exceedance is within or below background range  
 Orange shaded = exceedance above maximum background range but naturally occurring

**TABLE 19**  
**Analytical Results - Inorganics in Groundwater**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	FIGQGs <sup>a</sup>	Units	Location 1			
			BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3
			BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3
Sample ID			2021-12-19	2021-12-19	2021-12-19	2021-12-19
Date Collected						
Total Alkalinity (Total as CaCO <sub>3</sub> )	NGA	mg/L	<1.0	<1.0	<1.0	<1.0
Dissolved Chloride (Cl <sup>-</sup> )	120	mg/L	8.2	8.9	9.5	6.8
Colour	NGA	TCU	<5.0	<5.0	23	<5.0
Nitrate + Nitrite (N)	NGA	mg/L	0.42	0.47	<0.050	0.33
Nitrite (N)	0.06	mg/L	0.012	<0.010	<0.010	<0.010
Nitrogen (Ammonia Nitrogen)	Table <sup>b</sup>	mg/L	<0.050	0.081	0.064	0.072
Total Organic Carbon (C)	NGA	mg/L	5.8	5.2	5.1	1.4
Orthophosphate (P)	NGA	mg/L	<0.010	<0.010	<0.010	<0.010
pH	6.5-9	pH	6.94	7.09	<u>6.31</u>	6.50
Reactive Silica (SiO <sub>2</sub> )	NGA	mg/L	7.2	7.7	6.5	7.0
Dissolved Sulphate (SO <sub>4</sub> )	100	mg/L	2.7	2.6	<2.0	2.6
Turbidity	NGA	NTU	3.0	5.1	4.10	6.3
Conductivity	NGA	uS/cm	83.0	84.0	58.0	65.0

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, June 2016 v4 – Table 3: residential/parkland land, Coarse grained soil

(b) Ammonia guideline is pH and temperature dependant: See Lookup Table

		pH								
		6	6.5	7	7.5	8	8.5	9	10	
Temp (°C)	0	231	73	23.1	7.52	2.33	0.749	0.26	0.042	
	5	153	46.3	15.3	4.84	1.54	0.502	0.172	0.034	
	10	102	32.4	10.3	3.26	1.04	0.343	0.121	0.023	
	15	69.7	22	6.99	2.22	0.716	0.239	0.089	0.026	
	20	48	15.2	4.82	1.54	0.489	0.171	0.067	0.024	
	25	33.5	10.8	3.37	1.08	0.364	0.125	0.053	0.022	
30	23.7	7.5	2.39	0.757	0.256	0.094	0.043	0.021		

**Exceedance Identification:**

Underlined and shaded = Exceedance of FIGQGs (Naturally occurring)



**TABLE 20**  
**Analytical Results - Petroleum Hydrocarbons (PHCs) in Groundwater**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA ESL <sup>a,b</sup>		Atlantic RBCA Tier I RBSL <sup>c</sup>	Units	Location 1			
					BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3
Sample ID					BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3
Date Collected	Aquatic life	Plant and Invertebrate			2021-12-19	2021-12-19	2021-12-19	2021-12-19
Benzene	2.1	61	0.53	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Toluene	0.77	59	20	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Ethylbenzene	0.32	20	20	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Total Xylenes	0.33	31	20	mg/L	<0.0020	<0.0020	<0.0020	<0.0020
C6 - C10 (less BTEX)	NGA	7.1	NGA	mg/L	<0.090	<0.090	<0.090	<0.090
>C10-C16 Hydrocarbons	NGA	1.8	NGA	mg/L	<0.050	<0.050	<0.050	<0.050
>C16-C21 Hydrocarbons	NGA	NGA	NGA	mg/L	0.067	<0.050	<0.050	<0.050
>C21-<C32 Hydrocarbons	NGA	NGA	NGA	mg/L	<0.090	<0.090	<0.090	<0.090
Modified TPH	Gasoline	1.5*	NGA	20	<0.090	<0.090	<0.090	<0.090
	Diesel/No. 2 Fuel Oil	0.10**	NGA	20				
	Lube oil/No. 6 Oil	0.10***	NGA	20				
Reached Baseline at C32					NA	NA	NA	NA
Hydrocarbon Resemblance					NA	NA	NA	NA

**Notes:**

NA = Not Applicable

NGA = No Guideline Available

mbgs = metres below ground surface

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Groundwater Ecological Screening Levels (ESL) for the protection of freshwater and marine aquatic life for surface water(2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Groundwater Ecological Screening Levels (ESL) for Plant and Invertebrate Direct Contact with Shallow Groundwater, Agricultural Land-Use, Coarse Grained Soil (2021)

(c) Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Risk-Based Screening Levels (RBSL) for groundwater, agricultural land use, non-potable groundwater, coarse-grained soil

\*Guideline for gas range \*\*Guideline for fuel range \*\*\*Guideline for lube range

**Exceedance Identification:**

Underline and shaded = Exceedance of Atlantic RBCA ESL (None reported)

**Bold and shaded = Exceedance of Atlantic RBCA Tier I RDSL (None reported)**

**TABLE 21**  
**Analytical Results - Polycyclic Aromatic Hydrocarbons (PAHs) in Groundwater**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Location	Atlantic RBCA EQS <sub>Eco</sub> <sup>a</sup>	Atlantic RBCA EQS <sub>HH</sub> <sup>b</sup>	FIGQGs <sup>c</sup>	Units	Location 1			
					BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3
					BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3
Sample ID								
Date Collected					2021-12-19	2021-12-19	2021-12-19	2021-12-19
1-Methylnaphthalene	2	NGA	180	ug/L	<0.050	<0.050	<0.050	<0.050
2-Methylnaphthalene	2	NGA	180	ug/L	<0.050	<0.050	<0.050	<0.050
Acenaphthene	5.8	NGA	5.8	ug/L	<0.010	<0.010	<0.010	<0.010
Acenaphthylene	NGA	360	46	ug/L	<0.010	<0.010	<0.010	<0.010
Acridine	NGA	NGA	0.05	ug/L	-	-	-	-
Anthracene	0.012	NGA	0.012	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	0.018	NGA	0.018	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(a)pyrene	0.015	NGA	0.01	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	NGA	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(b/j)fluoranthene	NGA	NGA	0.48	ug/L	<0.020	<0.020	<0.020	<0.020
Benzo(g,h,i)perylene	NGA	NGA	0.17	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(j)fluoranthene	NGA	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010
Benzo(k)fluoranthene	NGA	NGA	0.48	ug/L	<0.010	<0.010	<0.010	<0.010
Chrysene	0.1	NGA	0.1	ug/L	<0.010	<0.010	<0.010	<0.010
Dibenzo(a,h)anthracene	NGA	NGA	0.26	ug/L	<0.010	<0.010	<0.010	<0.010
Fluoranthene	0.04	NGA	0.04	ug/L	<0.010	<0.010	<0.010	<0.010
Fluorene	3	NGA	3	ug/L	<0.010	<0.010	<0.010	<0.010
Indeno(1,2,3-cd)pyrene	NGA	NGA	0.21	ug/L	<0.010	<0.010	<0.010	<0.010
Naphthalene	1.1	7000	1.1	ug/L	<0.20	<0.20	<0.20	<0.20
Perylene	NGA	NGA	NGA	ug/L	<0.010	<0.010	<0.010	<0.010
Phenanthrene	0.4	NGA	0.4	ug/L	0.01	<0.010	<0.010	<0.010
Pyrene	0.025	NGA	0.025	ug/L	<0.010	<0.010	<0.010	<0.010
Quinoline	NGA	NGA	3.4	ug/L	-	-	-	-

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater, Discharge to Fresh Water, <10m from Surface Water Body (2021)

(b) Atlantic Risk-Based Corrective Action (RBCA) Human Health Tier 1 Environmental Quality Standards (EQS) for Groundwater, Agricultural Land-Use, Non-Potable Groundwater Condition

(c) Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, June 2016 v4 – Table 1: agricultural land-use, Coarse grained soil

**Exceedance Identification:**

**Bold and shaded = Exceedance of Atlantic RBCA EQS Eco (None reported)**

**Underline and shaded = Exceedance of Atlantic RBCA EQS HH (None reported)**

**Italicised and shaded = Exceedance of FIGQGs (None reported)**

**TABLE 22**  
**Analytical Results - Metals in Groundwater**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Atlantic RBCA EQS <sup>a</sup>	FIGQGs <sup>b</sup>	Units	BFR_L1_GW1		BFR_L1_GW2	BFR_L1_GW3
				BFR_L1_GW1	BFR_L1_GW_DUP1	BFR_L1_GW2	BFR_L1_GW3
Date Collected				2021-12-19	2021-12-19	2021-12-19	2021-12-19
pH	6.5-9	6.5-9	pH	6.94	7.09	<u>6.31</u>	6.50
Total Aluminum (Al)	5	100 <sup>1</sup>	ug/L	<u>23</u>	<u>17</u>	<b><u>200</u></b>	<b><u>140</u></b>
Total Antimony (Sb)	9	2000	ug/L	<1.0	<1.0	<1.0	<1.0
Total Arsenic (As)	5	5	ug/L	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	1000	500	ug/L	5.3	4.4	8.7	13.0
Total Beryllium (Be)	0.15	5.3	ug/L	<0.10	<0.10	<0.10	<0.10
Total Bismuth (Bi)	NGA	NGA	ug/L	<2.0	<2.0	<2.0	<2.0
Total Boron (B)	1500	1500	ug/L	<50	<50	<50	<50
Total Cadmium (Cd)	0.09	0.09	ug/L	0.030	0.031	<b><u>0.790</u></b>	<b><u>0.100</u></b>
Total Calcium (Ca)	NGA	NGA	ug/L	6300	6400	3000	3500
Total Chromium (Cr)	8.9	8.9	ug/L	<1.0	<1.0	<1.0	<1.0
Total Cobalt (Co)	1	NGA	ug/L	<0.40	<0.40	<u>9.9</u>	0.55
Total Copper (Cu)	2	2	ug/L	2.0	1.0	<b><u>2.9</u></b>	1.3
Total Iron (Fe)	300	300	ug/L	73	<50	<b><u>650</u></b>	79
Total Lead (Pb)	1	1	ug/L	<0.50	<0.50	<0.50	<0.50
Total Magnesium (Mg)	NGA	NGA	ug/L	1200	1200	910	1500
Total Manganese (Mn)	430	NGA	ug/L	24	21	420	120
Total Mercury (Hg)	0.026	0.026	ug/L	<0.013 <sup>2</sup>	<0.013 <sup>2</sup>	<0.013 <sup>2</sup>	<0.013 <sup>2</sup>
Total Molybdenum (Mo)	73	73	ug/L	5.2	<2.0	<2.0	<2.0
Total Nickel (Ni)	25	NGA	ug/L	4.0	4.0	9.5	<2.0
Total Phosphorus (P)	NGA	NGA	ug/L	<100	<100	<100	<100
Total Potassium (K)	NGA	NGA	ug/L	1500	1500	1200	3400
Total Selenium (Se)	1	1	ug/L	<0.50	<0.50	<0.50	<0.50
Total Silver (Ag)	0.25	0.25	ug/L	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NGA	NGA	ug/L	7800	7200	5600	5600
Total Strontium (Sr)	21000	NGA	ug/L	22	22	16	18
Total Thallium (Tl)	0.8	0.8	ug/L	<0.10	<0.10	<0.10	<0.10
Total Tin (Sn)	NGA	NGA	ug/L	<2.0	<2.0	<2.0	<2.0
Total Titanium (Ti)	NGA	100	ug/L	<2.0	<2.0	<2.0	4.8
Total Uranium (U)	15	15	ug/L	0.96	0.98	1.7	<0.10
Total Vanadium (V)	120	NGA	ug/L	<2.0	<2.0	<2.0	<2.0
Total Zinc (Zn)	7	10	ug/L	6.8	<5.0	<b><u>11</u></b>	5.1

**Notes:**

NGA = No Guideline Available

< = concentration is below Reportable Detection Limit (RDL)

(a) Atlantic Risk-Based Corrective Action (RBCA) Ecological Tier 1 Environmental Quality Standards (EQS) for Groundwater, Discharge to Fresh Water, <10m from Surface Water Body (2021).

(b) Federal Interim Groundwater Quality Guidelines for Federal Contaminated Sites, June 2016 v4 – Table 1: agricultural land, Coarse grained soil.

(1) Aluminum Guideline = 5 µg/L if pH < 6.5; = 100 µg/L if pH ≥ 6.5

(2) Mercury analyzed past recommended hold time.

**Exceedance Identification:**

Underline and shaded = Exceedance of RBCA Ecological Tier 1

**Bold and shaded** = Exceedance of FIGQGs

**TABLE 23a**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SS1			BFR_SS7			BFR_L1_SS6			BFR_L1_SS13			BFR_L1_SS28			BFR_L2_SS10		
		BFR_SS1_SA1	BFR_SS1_D_UP1	RPD (%)	BFR_SS7_SA1 (revised)	BFR_SS7_D_UP2 (revised)	RPD (%)	BFR_L1_S_S6A	BFR_L1_S_S-DUP1	RPD (%)	BFR_L1_SS_13A_SA1	BFR_L1_SS_DUP2	RPD (%)	BFR_L1_SS_28_SA1	BFR_L1_SS_DUP3	RPD (%)	BRF_L2_SS_10_SA1	BRF_L2_SS_DUP2	RPD (%)
		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2020-12-01	2020-12-01	2020-12-01	2020-12-01		2021-11-18	2021-11-18		2021-11-17	2021-11-17		2021-11-17	2021-11-17		2021-11-25	2021-11-25		
Benzene	mg/kg	<0.025	<0.025	-	<0.025	<0.025	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Toluene	mg/kg	<0.050	<0.050	-	<0.10	<0.10	-	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	-
Ethylbenzene	mg/kg	<0.025	<0.025	-	<0.025	<0.025	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Total Xylenes	mg/kg	<0.050	<0.050	-	<0.10	<0.10	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
C6 - C10 (less BTEX)	mg/kg	<2.5	<2.5	-	<5.0	<5.0	-	<3	<3	-	<3	<3	-	<3	<3	-	<3	<3	-
>C10-C16 Hydrocarbons	mg/kg	<10	<10	-	<10	<1	-	<15	<15	-	<15	<15	-	<15	<15	-	<15	19	NA
>C16-C21 Hydrocarbons	mg/kg	<10	<10	-	<10	<10	-	<15	<15	-	<15	<15	-	19	<15	NA	15	42	NA
>C21-<C32 Hydrocarbons	mg/kg	<15	<15	-	37	270	-	312	192	47.62	586	610	4.01	418	180	79.60	359	675	61.12
Modified TPH	mg/kg	<15	<15	-	37	270	-	312	192	47.62	586	610	4.01	437	180	83.31	374	736	65.23

**Notes:**  
 NA = not applicable  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 mbgs = metres below ground surface  
 < = concentration is below  
 Reportable Detection Limit (RDL)

**RPD over 50% limit**

Created by: MA  
 Checked by: SZ

**TABLE 23b**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SS1		RPD (%)	BFR_SS7		RPD (%)	BFR_L1_SS6			RPD (%)	BFR_L1_SS13			RPD (%)	BFR_L1_SS28		RPD (%)	BFR_L2_SS10		RPD (%)
		BFR_SS1_SA1	BFR_SS1_UP1		BFR_SS7_SA1	BFR_SS7_UP2		BFR_L1_S_S6A	BFR_L1_SS-DUP1	BFR_L1_SS13_3A_SA1		BFR_L1_SS13_DUP2	BFR_L1_SS28_28_SA1	DUP3		BFR_L2_SS10_SA1	BFR_L2_SS10_UP2				
		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15				
Date Collected		2020-12-01	2020-12-01		2020-12-01	2020-12-01		2021-11-18	2021-11-18		2021-11-17	2021-11-17		2021-11-17	2021-11-17		2021-11-25	2021-11-25			
1-Methylnaphthalene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05
2-Methylnaphthalene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Acenaphthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671
Acenaphthylene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004
Anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03
Benzo(a)anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Benzo(a)pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05
Benzo(b)fluoranthene	mg/kg	<0.020	<0.020	-	<0.020	<0.020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Benzo(j)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006
Fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05
Fluorene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	0.02	0.02	NA	0.03	0.03	NA	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Naphthalene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01
Perylene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	0.11	0.18
Phenanthrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03
Pyrene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05
Index of Additive Cancer Risk (IACR)		0.15	0.15	-	0.15	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)

Created by: MA  
 Checked by: SZ

**TABLE 23c**  
**RPDs - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SS1			BFR_SS7			BFR_L1_SS2			BFR_L1_SS3			BFR_L1_SS4		
		BFR_SS1_S	BFR_SS1_DU	RPD (%)	BFR_SS7_S	BFR_SS7_DU	RPD (%)	BFR_L1_SS2_D_SA1	BFR_L1_SS2_DUP6	RPD (%)	BFR_L1_SS3_C_SA1	BFR_L1_SS3_DUP5	RPD (%)	BFR_L1_SS4_SA2	BFR_L1_SS4_DUP4	RPD (%)
		A1	P1		A1	P2		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Sample Depth (mbgs)	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	
Date Collected	2020-12-01		2020-12-01	2020-12-01		2020-12-01	2021-11-27		2021-11-27	2021-11-27		2021-11-27	2021-11-27		2021-11-27	
Acid Extractable Aluminum (Al)	mg/kg	5500	5700	3.57	1600	1200	28.57	10900	9880	9.82	4670	4840	3.58	4890	7910	47.19
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	-	9.3	5.9	-	0.9	<0.8	NA	2	2.3	NA	<0.8	<0.8	-
Acid Extractable Arsenic (As)	mg/kg	2.5	3.2	24.56	2.8	2.1	-	6	7	15.38	3	3	NA	2	2	NA
Acid Extractable Barium (Ba)	mg/kg	21	21	0	220	63	110.95	84.1	58	36.73	18	16.3	9.91	13.1	13.5	3.01
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	0.5	0.6	NA	<0.4	<0.4	-	<0.4	<0.4	-
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	<50	<50	-	<50	<50	-	<5	<5	-	<5	<5	-	<5	<5	-
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	-	0.85	0.64	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Chromium (Cr)	mg/kg	10	10	0	<2.0	<2.0	-	28	25	11.32	8	7	NA	9	8	NA
Acid Extractable Cobalt (Co)	mg/kg	2.8	3.1	10.17	2.6	1.3	-	9.4	7.9	17.34	2.3	2	NA	0.9	1	NA
Acid Extractable Copper (Cu)	mg/kg	4.5	4.9	8.51	42	31	30.14	16.7	14.4	14.79	8.6	9.2	6.74	5	4.3	NA
Acid Extractable Iron (Fe)	mg/kg	8700	9500	8.79	2000	1200	50.00	20800	18000	14.43	6870	6010	13.35	3450	3620	4.81
Acid Extractable Lead (Pb)	mg/kg	3.8	4.1	7.59	640	420	41.51	82	25	106.54	41	51	21.74	32	33	3.08
Acid Extractable Lithium (Li)	mg/kg	8.6	9.3	7.82	<2.0	<2.0	-	22.8	19	18.18	6.4	6	6.45	2.3	2.2	NA
Acid Extractable Manganese (Mn)	mg/kg	130	130	0	22	14	44.44	560	435	25.13	127	104	19.91	46.3	49.3	6.28
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	-	0.49	0.32	-	0.05	<0.03	NA	<0.03	<0.03	-	0.2	0.17	16.22
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Nickel (Ni)	mg/kg	6.6	7.3	-	5.5	3.8	-	14	14	0	4	4	NA	3	3	NA
Acid Extractable Rubidium (Rb)	mg/kg	8.0	8.9	10.65	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	-	1.7	1.4	-	<0.8	<0.8	-	<0.8	<0.8	-	4.7	3.8	21.18
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	-	<0.50	<0.50	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	<5.0	<5.0	-	76	110	36.56	10	8	NA	<5	<5	-	<5	<5	-
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	-	0.15	0.11	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	-	2.2	<1.0	-	1	1	NA	<1	<1	-	3	1	NA
Acid Extractable Uranium (U)	mg/kg	0.68	0.52	-	0.17	0.10	-	1.32	1.14	NA	1.36	1.12	NA	1.29	1.15	NA
Acid Extractable Vanadium (V)	mg/kg	18	20	10.53	8.1	3.9	-	62	48.1	25.25	15.5	13.8	11.60	14.1	14.2	0.71
Acid Extractable Zinc (Zn)	mg/kg	14	14	0	270	90	100.00	62	53	15.65	12	11	NA	9	9	NA

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
**RPD over 50% limit**

**TABLE 23c**  
**RPDs - Metals in Soil**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SS1			BFR_L1_SS6			BFR_L1_SS13			BFR_L1_SS28			BFR_L2_SS10		
		BFR_SS1_S	BFR_SS_DU	RPD (%)	BFR_L1_SS6	BFR_L1_SS-	RPD (%)	BFR_L1_SS1	BFR_L1_SS-	RPD (%)	BFR_L1_SS2	BFR_L1_SS-	RPD (%)	BFR_L2_SS1	BFR_L2_SS-	RPD (%)
		A1	P1		A_SA	DUP1		3_A_SA1	DUP2		8_SA1	DUP3		0_SA1	DUP2	
Sample Depth (mbgs)		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15		0 - 0.15	0 - 0.15	
Date Collected		2020-12-01	2020-12-01		2021-11-18	2021-11-18		2021-11-17	2021-11-17		2021-11-17	2021-11-17		2021-11-25	2021-11-25	
Acid Extractable Aluminum (Al)	mg/kg	5500	5700	3.57	888	1580	56.08	1190	1390	15.50	3210	1200	91.16	6570	6990	6.19
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	-	<1	<1	-	<1	<1	-	<1	<1	-	2	<1	NA
Acid Extractable Arsenic (As)	mg/kg	2.5	3.2	24.56	2	3	NA	2	2	NA	3	2	NA	2	3	NA
Acid Extractable Barium (Ba)	mg/kg	21	21	0	6	11	NA	<5	6	NA	13	5	NA	11	13	NA
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	-	<2	<2	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	<50	<50	-	<2	<2	-	12	<2	NA	5	<2	NA	<2	<2	-
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	-	<0.3	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	-
Acid Extractable Chromium (Cr)	mg/kg	10	10	0	<2	3	NA	<2	<2	-	10	<2	NA	4	3	NA
Acid Extractable Cobalt (Co)	mg/kg	2.8	3.1	10.17	<1	<1	-	<1	<1	-	<1	<1	-	<1	<1	-
Acid Extractable Copper (Cu)	mg/kg	4.5	4.9	8.51	<2	<2	-	<2	<2	-	10	2	NA	14	6	NA
Acid Extractable Iron (Fe)	mg/kg	8700	9500	8.79	399	721	57.50	450	573	24.05	634	274	79.30	594	489	19.39
Acid Extractable Lead (Pb)	mg/kg	3.8	4.1	7.59	4.7	6	24.30	4.6	6.4	32.73	8.2	9.4	13.64	28.9	7.9	114.13
Acid Extractable Lithium (Li)	mg/kg	8.6	9.3	7.82	<5	<5	-	<5	<5	-	<5	<5	-	<5	<5	-
Acid Extractable Manganese (Mn)	mg/kg	130	130	0	11	15	30.77	12	9	28.57	3	5	NA	5	4	NA
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	-	0.04	0.07	NA	0.07	0.08	NA	0.06	<0.03	NA	0.04	<0.03	NA
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	-	<2	<2	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Nickel (Ni)	mg/kg	6.6	7.3	-	<2	<2	-	<2	<2	-	4	<2	NA	<2	<2	-
Acid Extractable Rubidium (Rb)	mg/kg	8.0	8.9	10.65	-	-	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	<0.50	<0.50	-	<1	<1	-	1	2	NA	3	<1	NA	2	2	NA
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	<5.0	<5.0	-	<5	8	NA	<5	<5	-	9	<5	NA	9	9	NA
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	-	3	3	NA	3	3	NA	3	3	NA	3	3	NA
Acid Extractable Uranium (U)	mg/kg	0.68	0.52	-	0.2	0.2	NA	0.4	0.4	NA	0.7	0.1	NA	0.7	0.8	13.33
Acid Extractable Vanadium (V)	mg/kg	18	20	10.53	6	9	NA	4	4	NA	7	3	NA	9	9	NA
Acid Extractable Zinc (Zn)	mg/kg	14	14	0	<5	5	NA	16	<5	NA	10	7	NA	6	7	NA

Created by: MA  
 Checked by: SZ

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 mbgs = metres below ground surface  
 < = concentration is below Reportable Detection Limit (RDL)  
**RPD over 50% limit**

**TABLE 23d**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SED4			BFR_SED5			BFR_L1_SED28			BFR_L1_SED29			BFR_L2_SED9		
		BFR_SED4 (revised)	BFR_SED_DUP1 (revised)	RPD (%)	BFR_SED5 (revised)	BFR_SED_DUP2 (revised)	RPD (%)	BFR_L1_SED 28	BFR_L1_SED _DUP1	RPD (%)	BFR_L1_SED 29	BFR_L1_SED _DUP2	RPD (%)	BFR_L2_SED9	BFR_L2_SED_ DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21				
Benzene	mg/kg	<0.050	<0.050	-	<0.025	<0.025	-	<0.02	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	-
Toluene	mg/kg	<0.10	<0.10	-	<0.050	<0.050	-	<0.04	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	-
Ethylbenzene	mg/kg	<0.025	<0.025	-	<0.025	<0.025	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Total Xylenes	mg/kg	<0.10	<0.10	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
C6 - C10 (less BTEX)	mg/kg	<5.0	<5.0	-	7.9	<2.5	-	<3	<3	-	<3	<3	-	<3	<3	-
>C10-C16 Hydrocarbons	mg/kg	<10	<10	-	<10	<10	-	<15	<15	-	<15	<15	-	<15	<15	-
>C16-C21 Hydrocarbons	mg/kg	<10	<10	-	<10	<10	-	<15	<15	-	41	54	NA	<15	<15	-
>C21-<C32 Hydrocarbons	mg/kg	390	290	29.41	26	23	12.24	160	254	45.41	468	614	26.99	266	321	18.74
Modified TPH	mg/kg	390	290	29.41	34	23	38.60	160	254	45.41	509	668	27.02	266	321	18.74

Created by: MA  
 Checked by: SZ

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 < = concentration is below Reportable Detection Limit (RDL)



**TABLE 23e**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Sediment**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SED4			BFR_SED5			BFR_L1_SED28			BFR_L1_SED29			BFR_L2_SED9		
		BFR_SED4	BFR_SED_D UP1	RPD (%)	BFR_SED5	BFR_SED_D UP2	RPD (%)	BFR_L1_SED2 8	BFR_L1_SED DUP1	RPD (%)	BFR_L1_SED29	BFR_L1_SED_D UP2	RPD (%)	BFR_L2_SED9	BFR_L2_SED_D UP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-22	2021-11-22	
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-	<0.00671	<0.00671	-
Acenaphthylene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.004	<0.004	-	<0.004	<0.004	-	<0.004	<0.004	-
Anthracene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b)fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
Benzo(b/f)fluoranthene	mg/kg	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	-	<0.0080	<0.0050	-	<0.01	<0.01	-	0.08	<0.01	NA	<0.01	<0.01	-
Benzo(j)fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.006	<0.006	-	<0.006	<0.006	-	<0.006	<0.006	-
Fluoranthene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	0.1	0.1	NA	<0.05	<0.05	-
Fluorene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	mg/kg	<0.0050	0.081	176.74	0.028	0.028	0	<0.05	0.09	NA	<0.05	0.83	177.27	0.11	0.09	20.00
Phenanthrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.03	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	-
Pyrene	mg/kg	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.05	<0.05	-	0.08	<0.05	NA	<0.05	<0.05	-

Created by: MA  
 Checked by: SZ

**Notes:**  
 "- " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 "< = concentration is below Reportable Detection Limit (RDL)

**RPD over 50% limit**

**TABLE 23f**  
**RPDs - Metals in Sediment**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SED4			BFR_SED5			BFR_L1_SED28			BFR_L1_SED29			BFR_L2_SED9		
		BFR_SED4	BFR_SED_DUP1	RPD (%)	BFR_SED5	BFR_SED_DUP2	RPD (%)	BFR_L1_SED28	BFR_L1_SED_DUP1	RPD (%)	BFR_L1_SED29	BFR_L1_SED_DUP2	RPD (%)	BFR_L2_SED9	BFR_L2_SED_DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-22	2021-11-22	
Acid Extractable Aluminum (Al)	mg/kg	5800	6000	3.39	2100	2400	13.33	2760	2570	7.13	7260	4090	55.86	6020	4770	23.17
Acid Extractable Antimony (Sb)	mg/kg	2.7	<2.0	-	<2.0	<2.0	-	3	2	NA	2	1	NA	<1	<1	-
Acid Extractable Arsenic (As)	mg/kg	2.5	2.2	-	<2.0	<2.0	-	3	3	NA	6	5	18.18	7	2	NA
Acid Extractable Barium (Ba)	mg/kg	23	24	-	9.7	11	-	25	22	NA	17	13	NA	14	8	NA
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	-	-	-	-	-	-	-	-	-
Acid Extractable Boron (B)	mg/kg	<50	<50	-	<50	<50	-	5	3	NA	2	<2	NA	<2	<2	-
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	-	<0.30	<0.30	-	0.6	<0.3	NA	0.6	0.5	NA	<0.3	<0.3	-
Acid Extractable Chromium (Cr)	mg/kg	4.8	4.4	-	3.1	2.9	-	<2	3	NA	7	5	NA	7	7	NA
Acid Extractable Cobalt (Co)	mg/kg	<1.0	<1.0	-	<1.0	<1.0	-	<1	<1	-	<1	<1	-	4	<1	NA
Acid Extractable Copper (Cu)	mg/kg	19	16	17.14	<2.0	2.2	-	21	12	54.55	10	7	NA	8	3	NA
Acid Extractable Iron (Fe)	mg/kg	2100	1800	15.38	6000	6400	6.45	5950	5630	5.53	7180	4690	41.95	14400	1300	166.88
Acid Extractable Lead (Pb)	mg/kg	770	250	101.96	17	21	21.05	126	114	10.00	62.5	68.6	9.31	5.1	3.7	31.82
Acid Extractable Lithium (Li)	mg/kg	<2.0	<2.0	-	3.0	2.9	-	<5	<5	-	<5	<5	-	13	<5	NA
Acid Extractable Manganese (Mn)	mg/kg	11	9.1	-	71	76	6.80	60	51	16.22	28	21	28.57	282	31	160.38
Acid Extractable Mercury (Hg)	mg/kg	0.25	0.23	-	<0.10	<0.10	-	0.17	0.11	NA	0.17	0.12	NA	<0.03	<0.03	-
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-	<2	<2	-
Acid Extractable Nickel (Ni)	mg/kg	7.0	6.7	-	<2.0	2.1	-	<2	<2	-	4	3	NA	7	3	NA
Acid Extractable Rubidium (Rb)	mg/kg	2.6	2.0	-	4.9	6.3	-	-	-	-	-	-	-	-	-	-
Acid Extractable Selenium (Se)	mg/kg	4.5	4.4	2.25	<0.50	<0.50	-	2	<1	NA	6	3	NA	<1	2	NA
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	-	<0.50	<0.50	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-
Acid Extractable Strontium (Sr)	mg/kg	12	12	0	<5.0	<5.0	-	28	21	NA	17	12	NA	<5	<5	-
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	-	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Acid Extractable Tin (Sn)	mg/kg	3.2	3.1	3.17	<1.0	1.0	-	4	4	NA	6	5	NA	4	3	NA
Acid Extractable Uranium (U)	mg/kg	0.74	0.76	2.67	0.36	0.65	-	0.6	0.5	18.18	1.2	0.9	28.57	0.5	0.4	NA
Acid Extractable Vanadium (V)	mg/kg	17	16	6.06	13	15	14.29	7	6	NA	32	23	32.73	21	17	21.05
Acid Extractable Zinc (Zn)	mg/kg	19	18	-	8.4	10	-	28	23	19.61	34	24	34.48	39	6	NA

Created by: MA  
 Checked by: SZ

**Notes:**  
 \* - = RPD not calculated due to parameters being equal or less than 5 times RDL  
 < = concentration is below Reportable Detection Limit (RDL)  
**RPD over 50% limit**

**TABLE 23g**  
**RPDs - Inorganics in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW29		
		BFR_SW4	BFR_SW_DU P1	RPD (%)	BFR_SW5	BFR_SW_DUP 2	RPD (%)	BFR_L1_SW29	BFR_L1_DUP2	RPD (%)
Date Collected		2020-12-04	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21	
Total Alkalinity (Total as CaCO3)	mg/L	<5.0	<5.0	-	<5.0	<5.0	-	<5	<5	-
Dissolved Chloride (Cl-)	mg/L	12	11	8.70	10	10	0	7	7	0
Colour	TCU	79	91	-	110	110	0	78.8	136	<b>53.26</b>
Nitrate + Nitrite (N)	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.05	<0.05	-
Nitrite (N)	mg/L	0.011	0.012	8.70	0.011	0.012	8.70	<0.05	<0.05	-
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	0.04	0.09	NA
Total Organic Carbon (C)	mg/L	-	-	-	-	-	-	10	10	0
Orthophosphate (P)	mg/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-
pH	pH	5.3	5.46	2.97	6.2	5.94	4.28	6.46	5.4	-
Reactive Silica (SiO2)	mg/L	1	1.1	9.52	1.7	1.7	0	10.6	1.5	<b>150.41</b>
Dissolved Sulphate (SO4)	mg/L	2	2.6	NA	2.8	2.2	-	<2	<2	-
Turbidity	NTU	0.57	0.61	6.78	4.3	3.7	15.00	1	0.9	NA
Conductivity	uS/cm	47	45	4.35	40	39	2.53	41	44	7.06

Created by: MA  
 Checked by: SZ

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

**RPD over 50% limit**

**TABLE 23h**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Surface Water**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW28			BFR_L1_SW29			BFR_L2_SW9		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW28	BFR_L1_DUP1	RPD (%)	BFR_L1_SW29	BFR_L1_DUP2	RPD (%)	BFR_L2_SW9	BFR_L2_SW_DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-22	2021-11-22	
Benzene	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Toluene	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Ethylbenzene	mg/L	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.001	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	-
Total Xylenes	mg/L	<0.0020	<0.0020	-	<0.0020	<0.0020	-	<0.002	<0.002	-	<0.002	<0.002	-	<0.002	<0.002	-
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	-	<0.090	<0.090	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
>C16-C21 Hydrocarbons	mg/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.05	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	-
>C21-C32 Hydrocarbons	mg/L	<0.090	<0.090	-	<0.090	<0.090	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-
Modified TPH	mg/L	<0.090	<0.090	-	<0.090	<0.090	-	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	-

Created by: MA  
 Checked by: SZ

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 < = concentration is below Reportable Detection Limit (RDL)

**TABLE 23i**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW28			BFR_L1_SW29			BFR_L2_SW9		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW28	BFR_L1_DUP1	RPD (%)	BFR_L1_SW29	BFR_L1_DUP1	RPD (%)	BFR_L2_SW9	BFR_L2_SW_DUP1	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21		2021-11-22	2021-11-22	
1-Methylnaphthalene	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
2-Methylnaphthalene	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acenaphthylene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Acridine	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Anthracene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.012	<0.012	-	<0.012	<0.012	-	<0.012	<0.012	-
Benzo(a)anthracene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.018	<0.018	-	<0.018	<0.018	-	<0.018	<0.018	-
Benzo(a)pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(b)jfluoranthene	ug/L	<0.020	<0.020	-	<0.020	<0.020	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	-	-	-	-	-	-	-	-	-
Chrysene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Fluoranthene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Fluorene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Naphthalene	ug/L	<0.20	<0.20	-	<0.20	<0.20	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Perylene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Phenanthrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Pyrene	ug/L	<0.010	<0.010	-	<0.010	<0.010	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-
Quinoline	ug/L	<0.050	<0.050	-	<0.050	<0.050	-	<0.01	<0.01	-	<0.01	<0.01	-	<0.01	<0.01	-

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL  
 < = concentration is below Reportable Detection Limit (RDL)

Created by: MA  
 Checked by: SZ

**TABLE 23j**  
**RPDs - Metals in Surface Water**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_SW4			BFR_SW5			BFR_L1_SW28			BFR_L1_SW29		
		BFR_SW4	BFR_SW_DUP1	RPD (%)	BFR_SW5	BFR_SW_DUP2	RPD (%)	BFR_L1_SW28	BFR_L1_DUP1	RPD (%)	BFR_L1_SW29	BFR_L1_DUP2	RPD (%)
Date Collected		2020-12-01	2020-12-01		2020-12-02	2020-12-02		2021-11-21	2021-11-21		2021-11-21	2021-11-21	
Total Aluminum (Al)	ug/L	160	170	6.06	270	250	7.69	262	268	2.26	174	177	1.71
Total Antimony (Sb)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<2	<2	-	<2	<2	-
Total Arsenic (As)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<2	<2	-	<2	<2	-
Total Barium (Ba)	ug/L	2.4	2.2	-	2.3	2.3	-	<5	<5	-	<5	<5	-
Total Beryllium (Be)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<2	<2	-	<2	<2	-
Total Bismuth (Bi)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Boron (B)	ug/L	<50	<50	-	<50	<50	-	<5	<5	-	<5	<5	-
Total Cadmium (Cd)	ug/L	0.014	0.015	-	0.013	0.020	-	<0.09	<0.09	-	<0.09	<0.09	-
Total Calcium (Ca)	ug/L	510	430	-	800	820	2.47	-	-	-	500	500	NA
Total Chromium (Cr)	ug/L	<1.0	<1.0	-	<1.0	<1.0	-	<1	<1	-	<1	<1	-
Total Cobalt (Co)	ug/L	<0.40	<0.40	-	<0.40	<0.40	-	<1	<1	-	<1	<1	-
Total Copper (Cu)	ug/L	2.2	1.9	-	1.5	1.3	-	1	1	NA	<1	<1	-
Total Iron (Fe)	ug/L	140	140	-	330	300	9.52	303	294	3.02	249	247	NA
Total Lead (Pb)	ug/L	8.6	8.3	3.55	2.7	2.6	3.77	2.8	3	6.90	1.4	1.4	NA
Total Magnesium (Mg)	ug/L	720	690	4.26	640	610	4.80	-	-	-	600	600	0
Total Manganese (Mn)	ug/L	2.9	3.0	-	18	18	0	13	14	7.41	4	4	NA
Total Mercury (Hg)	ug/L	<0.013	<0.013	-	<0.013	<0.013	-	<0.026	<0.026	-	<0.026	<0.026	-
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Nickel (Ni)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	12	<2	NA	<2	8	NA
Total Phosphorus (P)	ug/L	<100	<100	-	<100	<100	-	-	-	-	20	<20	NA
Total Potassium (K)	ug/L	120	110	-	220	230	-	-	-	-	200	200	NA
Total Selenium (Se)	ug/L	<0.50	<0.50	-	<0.50	<0.50	-	<1	<1	-	<1	<1	-
Total Silver (Ag)	ug/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-
Total Sodium (Na)	ug/L	5200	4700	10.10	4900	4900	0	-	-	-	4400	4500	2.25
Total Strontium (Sr)	ug/L	5.7	4.9	-	4.9	5.5	-	<5	<5	-	<5	<5	-
Total Thallium (Tl)	ug/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.1	<0.1	-	<0.1	<0.1	-
Total Tin (Sn)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Titanium (Ti)	ug/L	2.6	<2.0	-	5.0	5.2	-	3	4	NA	2	2	NA
Total Uranium (U)	ug/L	<0.10	<0.10	-	<0.10	<0.10	-	<0.2	<0.2	-	<0.2	<0.2	-
Total Vanadium (V)	ug/L	<2.0	<2.0	-	<2.0	<2.0	-	<2	<2	-	<2	<2	-
Total Zinc (Zn)	ug/L	6.4	5.9	-	<5.0	<5.0	-	<5	<5	-	<5	<5	-

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

**TABLE 23j**  
**RPDs - Metals in Surface Water**  
**Burgeo Firing Range, 9 Wing Gand**

Sample ID	Units	BFR_L2_SW9		RPD (%)
		BFR_L2_SW9	BFR_L2_SW_DUP 1	
Date Collected		2021-11-22	2021-11-22	
Total Aluminum (Al)	ug/L	631	636	0.79
Total Antimony (Sb)	ug/L	<2	<2	-
Total Arsenic (As)	ug/L	<2	<2	-
Total Barium (Ba)	ug/L	<5	<5	-
Total Beryllium (Be)	ug/L	<2	<2	-
Total Bismuth (Bi)	ug/L	<2	<2	-
Total Boron (B)	ug/L	140	147	4.88
Total Cadmium (Cd)	ug/L	<0.09	<0.09	-
Total Calcium (Ca)	ug/L	-	-	-
Total Chromium (Cr)	ug/L	<1	<1	-
Total Cobalt (Co)	ug/L	<1	<1	-
Total Copper (Cu)	ug/L	<1	<1	-
Total Iron (Fe)	ug/L	128	139	NA
Total Lead (Pb)	ug/L	0.8	0.8	NA
Total Magnesium (Mg)	ug/L	-	-	-
Total Manganese (Mn)	ug/L	3	3	NA
Total Mercury (Hg)	ug/L	<0.026	<0.026	-
Total Molybdenum (Mo)	ug/L	<2	<2	-
Total Nickel (Ni)	ug/L	<2	<2	-
Total Phosphorus (P)	ug/L	-	-	-
Total Potassium (K)	ug/L	-	-	-
Total Selenium (Se)	ug/L	<1	<1	-
Total Silver (Ag)	ug/L	<0.1	<0.1	-
Total Sodium (Na)	ug/L	-	-	-
Total Strontium (Sr)	ug/L	16	16	NA
Total Thallium (Tl)	ug/L	<0.1	<0.1	-
Total Tin (Sn)	ug/L	<2	<2	-
Total Titanium (Ti)	ug/L	11	12	8.70
Total Uranium (U)	ug/L	<0.2	<0.2	-
Total Vanadium (V)	ug/L	<2	<2	-
Total Zinc (Zn)	ug/L	119	115	3.42

**Notes:**  
 " - " = RPD not calculated due to parameters being equal or less than 5 times RDL

Created by: MA  
 Checked by: SZ

< = concentration is below Reportable Detection Limit (RDL)

**TABLE 23k**  
**RPDs - Inorganics in Groundwater**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_L1_GW1		RPD (%)
		BFR_L1_GW1	BFR_L1_DUP2	
Date Collected		2021-12-19	2021-12-19	
Total Alkalinity (Total as CaCO <sub>3</sub> )	mg/L	<1.0	<1.0	-
Dissolved Chloride (Cl <sup>-</sup> )	mg/L	8.2	8.9	8.19
Colour	TCU	<5.0	<5.0	-
Nitrate + Nitrite (N)	mg/L	0.42	0.47	11.24
Nitrite (N)	mg/L	0.012	<0.010	NA
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	0.081	NA
Total Organic Carbon (C)	mg/L	5.8	5.2	10.91
Orthophosphate (P)	mg/L	<0.010	<0.010	-
pH	pH	6.94	7.09	-
Reactive Silica (SiO <sub>2</sub> )	mg/L	7.2	7.7	6.71
Dissolved Sulphate (SO <sub>4</sub> )	mg/L	2.7	2.6	NA
Turbidity	NTU	3.0	5.1	51.85
Conductivity	uS/cm	83.0	84.0	1.20

Created by: MA

Checked by: SZ

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit

**RPD over 50% limit**



**TABLE 23I**  
**RPDs - Petroleum Hydrocarbons (PHCs) in Groundwater**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_L1_GW1		
		BFR_L1_GW1	BFR_L1_DUP2	RPD (%)
Date Collected		2021-12-19	2021-12-19	
Benzene	mg/L	<0.0010	<0.0010	-
Toluene	mg/L	<0.0010	<0.0010	-
Ethylbenzene	mg/L	<0.0010	<0.0010	-
Total Xylenes	mg/L	<0.0020	<0.0020	-
C6 - C10 (less BTEX)	mg/L	<0.090	<0.090	-
>C10-C16 Hydrocarbons	mg/L	<0.050	<0.050	-
>C16-C21 Hydrocarbons	mg/L	0.067	<0.050	-
>C21-<C32 Hydrocarbons	mg/L	<0.090	<0.090	-

Created by: MA

Checked by: SZ

**Notes:**

" - " = RPD not calculated due to parameters being equal or  
 < = concentration is below Reportable Detection Limit (RDL)

**TABLE 23m**  
**RPDs - Polycyclic Aromatic Hydrocarbons (PAHs) in Groundwater**  
**Burgeo Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_L1_GW1		RPD (%)
		BFR_L1_GW1	BFR_L1_DUP2	
Date Collected		2021-12-19	2021-12-19	
1-Methylnaphthalene	ug/L	<0.050	<0.050	-
2-Methylnaphthalene	ug/L	<0.050	<0.050	-
Acenaphthene	ug/L	<0.010	<0.010	-
Acenaphthylene	ug/L	<0.010	<0.010	-
Anthracene	ug/L	<0.010	<0.010	-
Benzo(a)anthracene	ug/L	<0.010	<0.010	-
Benzo(a)pyrene	ug/L	<0.010	<0.010	-
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	-
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	-
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	-
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	-
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	-
Chrysene	ug/L	<0.010	<0.010	-
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	-
Fluoranthene	ug/L	<0.010	<0.010	-
Fluorene	ug/L	<0.010	<0.010	-
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	-
Naphthalene	ug/L	<0.20	<0.20	-
Perylene	ug/L	<0.010	<0.010	-
Phenanthrene	ug/L	0.01	<0.010	-
Pyrene	ug/L	<0.010	<0.010	-

Created by: MA

Checked by: SZ

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

< = concentration is below Reportable Detection Limit (RDL)

**TABLE 23n**  
**RPDs - Metals in Groundwater**  
**Burgoe Firing Range, 9 Wing Gander, NL**

Sample ID	Units	BFR_L1_GW1		RPD (%)
		BFR_L1_GW1	BFR_L1_DUP2	
Date Collected		2021-12-19	2021-12-19	
Total Aluminum (Al)	ug/L	23	17	NA
Total Antimony (Sb)	ug/L	<1.0	<1.0	-
Total Arsenic (As)	ug/L	<1.0	<1.0	-
Total Barium (Ba)	ug/L	5.3	4.4	NA
Total Beryllium (Be)	ug/L	<0.10	<0.10	-
Total Bismuth (Bi)	ug/L	<2.0	<2.0	-
Total Boron (B)	ug/L	<50	<50	-
Total Cadmium (Cd)	ug/L	0.030	0.031	NA
Total Calcium (Ca)	ug/L	6300	6400	1.57
Total Chromium (Cr)	ug/L	<1.0	<1.0	-
Total Cobalt (Co)	ug/L	<0.40	<0.40	-
Total Copper (Cu)	ug/L	2.00	1.0	NA
Total Iron (Fe)	ug/L	73	<50	NA
Total Lead (Pb)	ug/L	<0.50	<0.50	-
Total Magnesium (Mg)	ug/L	1200	1200	0
Total Manganese (Mn)	ug/L	24	21.0	13.33
Total Mercury (Hg)	ug/L	<0.013	<0.013	-
Total Molybdenum (Mo)	ug/L	5.2	<2.0	NA
Total Nickel (Ni)	ug/L	4	4	NA
Total Phosphorus (P)	ug/L	<100	<100	-
Total Potassium (K)	ug/L	1500	1500	0
Total Selenium (Se)	ug/L	<0.50	<0.50	-
Total Silver (Ag)	ug/L	<0.10	<0.10	-
Total Sodium (Na)	ug/L	7800	7200	8.00
Total Strontium (Sr)	ug/L	22.0	22.0	0
Total Thallium (Tl)	ug/L	<0.10	<0.10	-
Total Tin (Sn)	ug/L	<2.0	<2.0	-
Total Titanium (Ti)	ug/L	<2.0	<2.0	-
Total Uranium (U)	ug/L	0.96	0.98	2.06
Total Vanadium (V)	ug/L	<2.0	<2.0	-
Total Zinc (Zn)	ug/L	6.8	<5.0	NA

Created by: MA

Checked by: SZ

**Notes:**

" - " = RPD not calculated due to parameters being equal or less than 5 times RDL

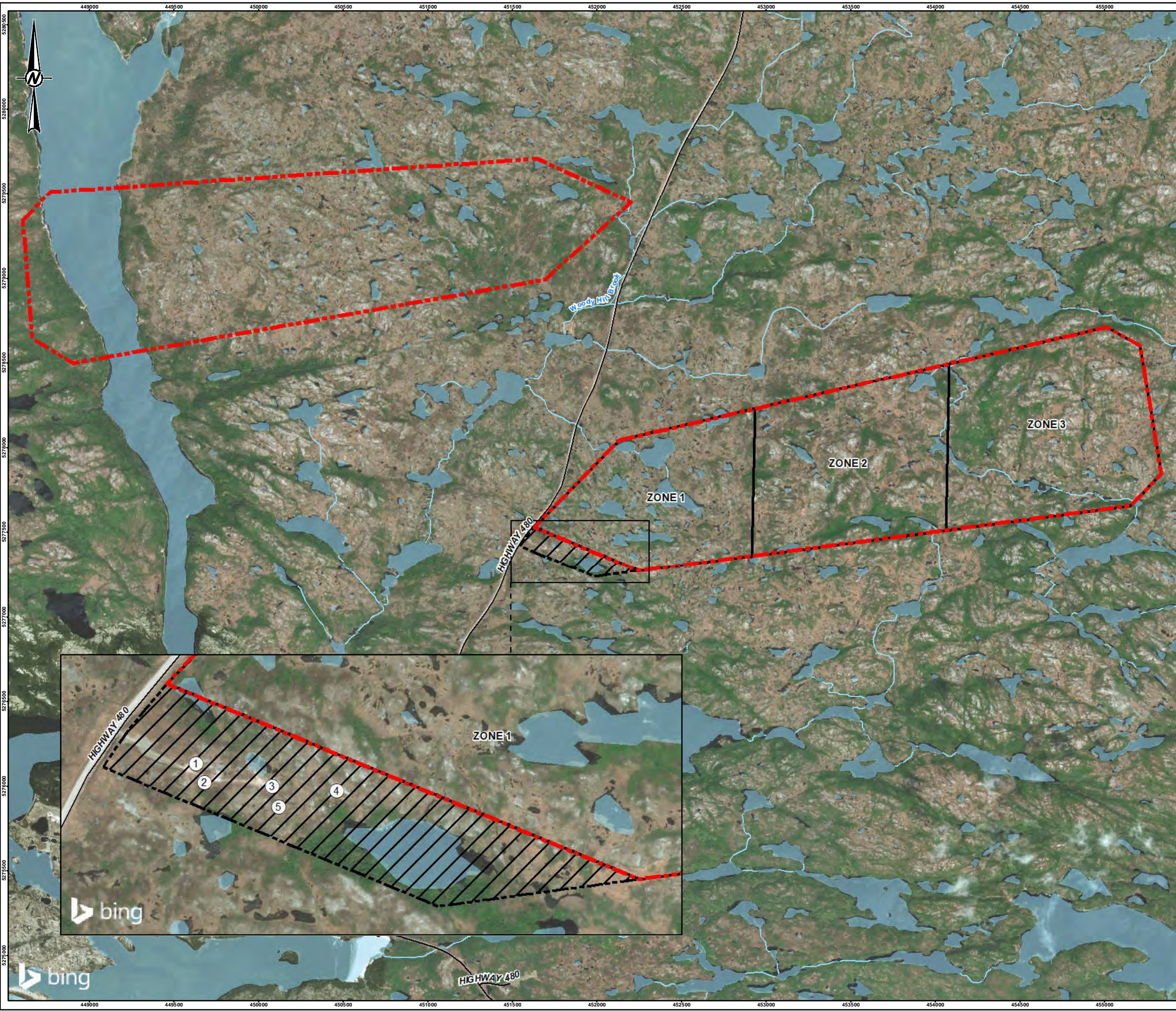
< = concentration is below Reportable Detection Limit (RDL)

**Table 24: Monitoring Well Construction Details and Groundwater Levels**

Monitoring Well ID	Ground Surface Elevation (masl)	Top of Pipe Elevation (masl)	Depth to Bedrock (mbgs)	Bedrock Elevation	Monitoring Well Depth (mbTOP)	Monitoring Well Depth Elevation (masl)	Screen Interval (mbgs)	Screen Interval Elevation (masl)	Depth to Groundwater (mbTOP) (Dec. 19, 2021)	Groundwater Elevation (masl) (Dec. 20, 2021)	Date of well Completion
GW1	84.81	85.72	1.68	83.13	8.45	77.270	4.58 - 8.45	77.27 - 78.79	6.73	78.99	16-Dec-21
GW2	82.00	82.79	1.75	80.25	5.18	77.610	0.99 - 5.18	77.61 - 79.13	2.30	80.49	17-Dec-21
GW3	80.10	80.93	1.00	79.10	5.34	75.590	2.11 - 5.34	75.59 - 77.11	3.23	77.70	17-Dec-21

**Notes:**  
 mbgs-metres below ground surface  
 masl: metres above sea level  
 mbTOP: metres below top of (well) pipe

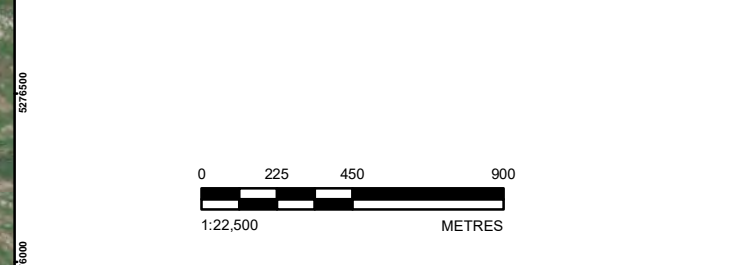
# FIGURES



- LEGEND**
- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
  - ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
  - ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
  - ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
  - ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
  - ROADWAY
  - WATERCOURSE
  - WATERBODY
  - ▨ PROPOSED ADDITIONAL LEASE AREA
  - ▭ ZONE BOUNDARY
  - ▭ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. KEY MAP: 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  
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 4. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)


---

PROJECT  
 BURGIO FIRING RANGE  
 9 WING GANDER, NL

---

TITLE  
**SITE PLAN**

---

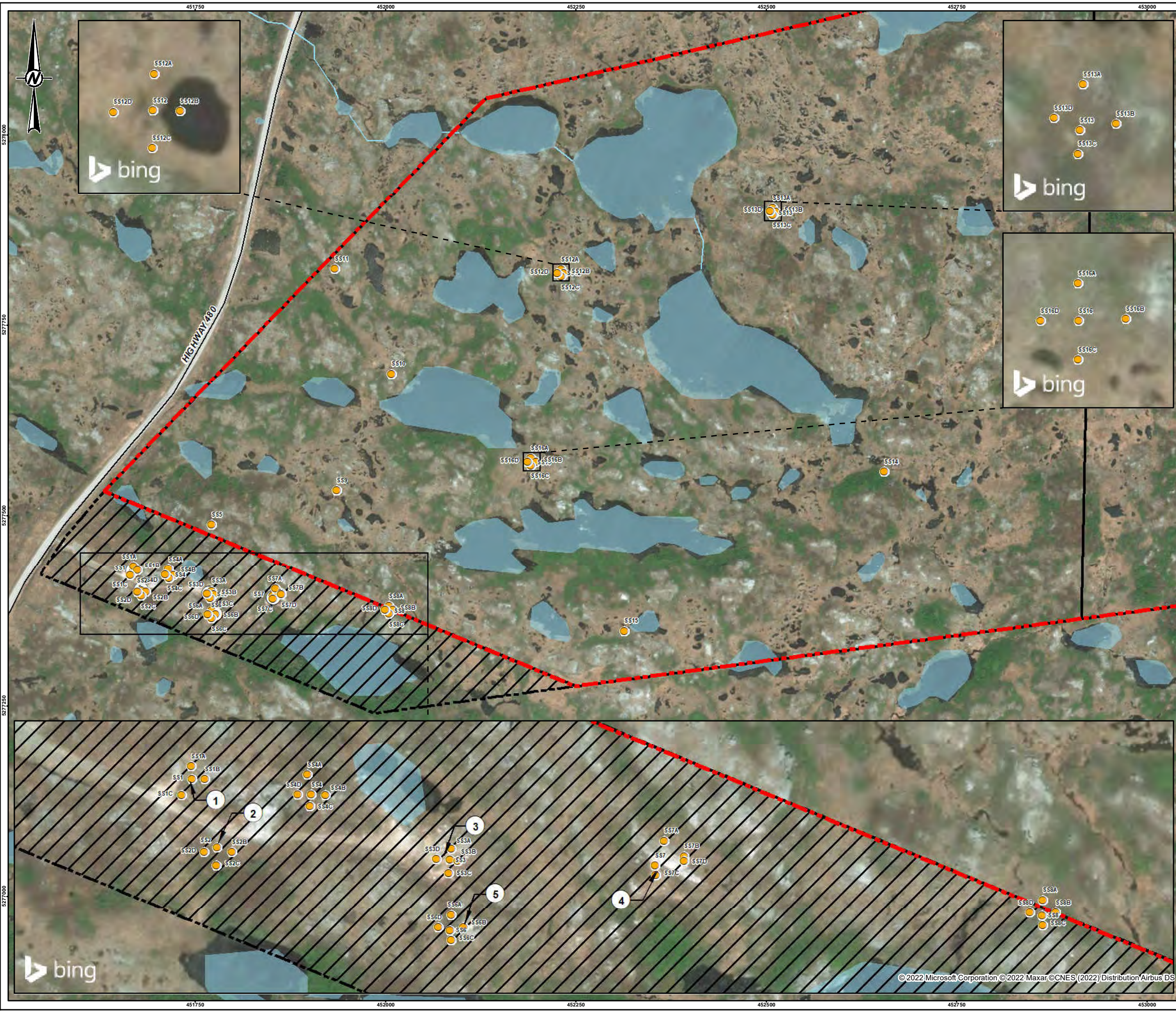
CONSULTANT	YYYY-MM-DD	2022-02-11
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

---

PROJECT NO. 21497139	CONTROL 0001	REV. 0	FIGURE <b>1</b>
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm

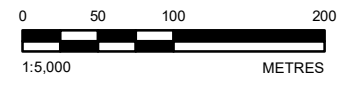



**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION (SAMPLE ID PREFIX "BFR\_" OR "BFR\_L1\_" TRUNCATED ON FIGURE FOR READABILITY)
- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

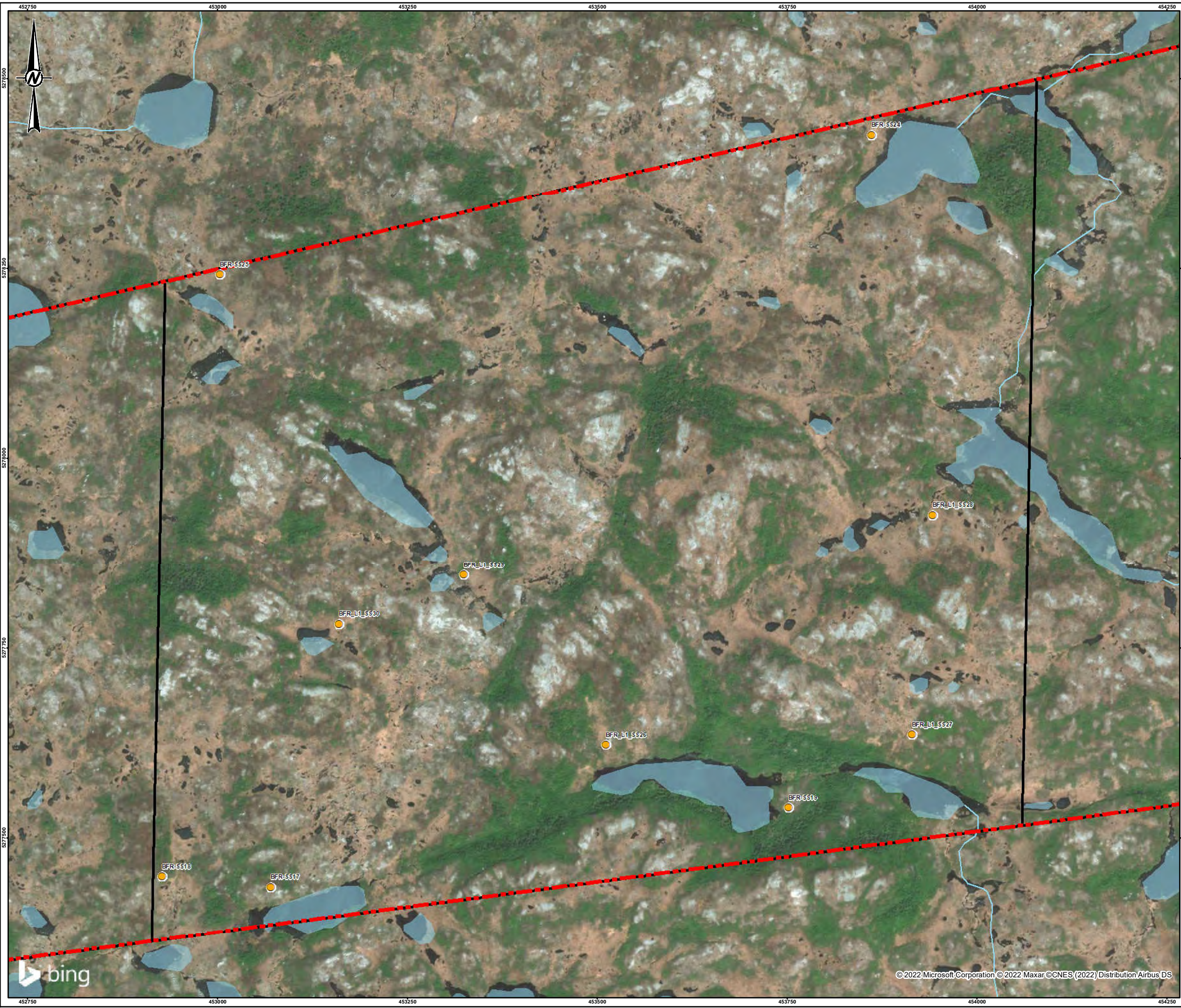
**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
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 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT DEFENCE CONSTRUCTION CANADA (DCC)		
PROJECT BURGEO FIRING RANGE 9 WING GANDER, NL		
TITLE <b>LOCATION 1 - ZONE 1 - SOIL SAMPLE LOCATIONS</b>		
CONSULTANT	YYYY-MM-DD	2022-02-25
 <b>GOLDER</b> MEMBER OF WSP	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC
PROJECT NO. 21497139	CONTROL 0001	REV. 0
		FIGURE <b>2</b>

Path: N:\Active\Spatial\IMDC\Burgeo\_Range\_Site\_NL\08\_PROJ\21497139\_DOC\_Enviro\001\_Sampling\_Path\21497139\_0001-HB-0002.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm

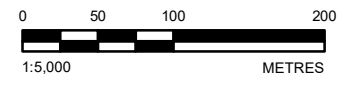


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
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 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
**LOCATION 1 - ZONE 2 - SOIL SAMPLE LOCATIONS**

CONSULTANT	YYYY-MM-DD	2022-02-25
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0001 REV. 0

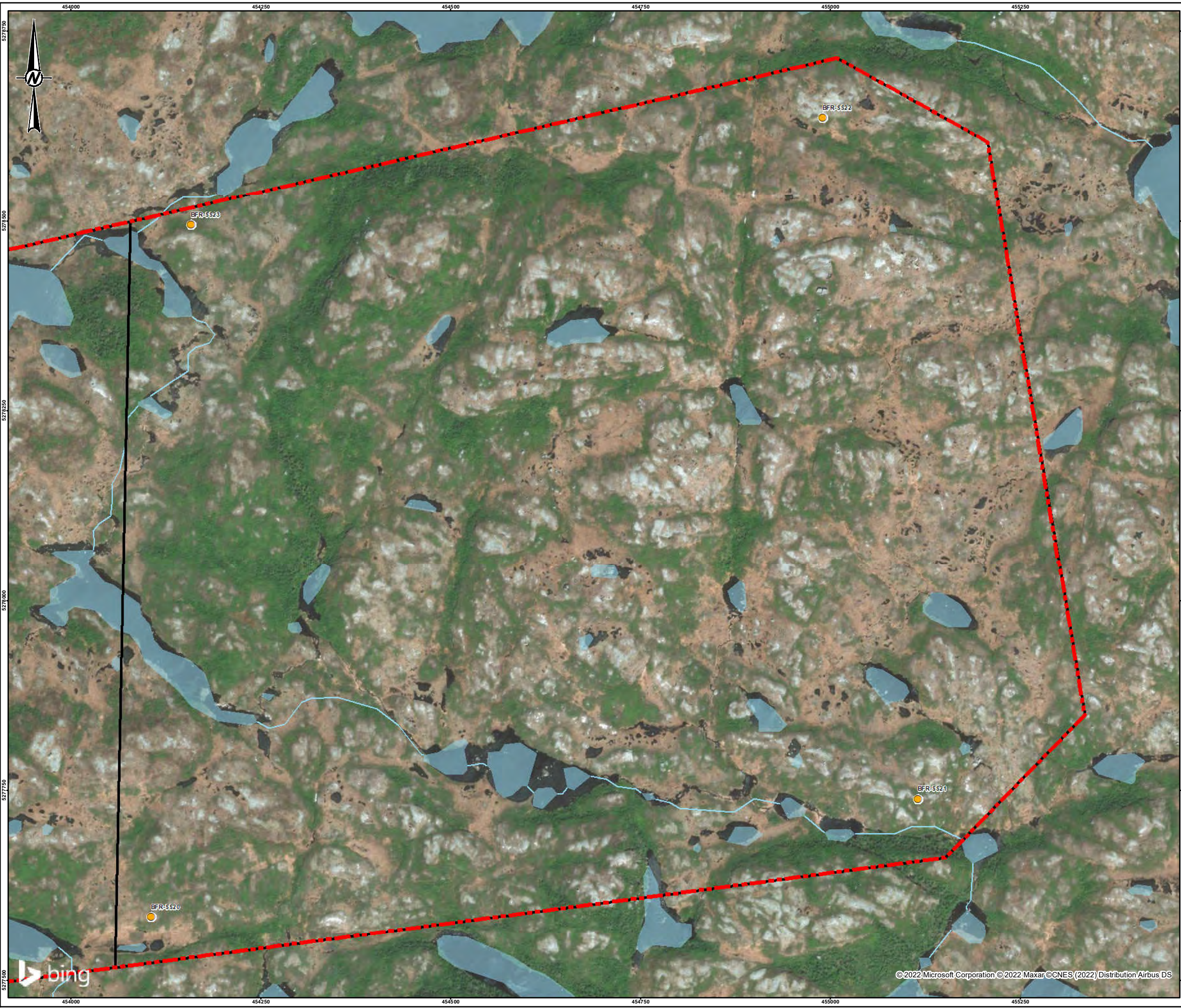
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



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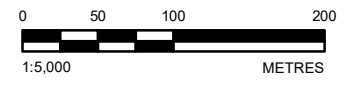


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
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 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

---

PROJECT  
 BURGIO FIRING RANGE  
 9 WING GANDER, NL

---

TITLE  
**LOCATION 1 - ZONE 3 - SOIL SAMPLE LOCATIONS**

---

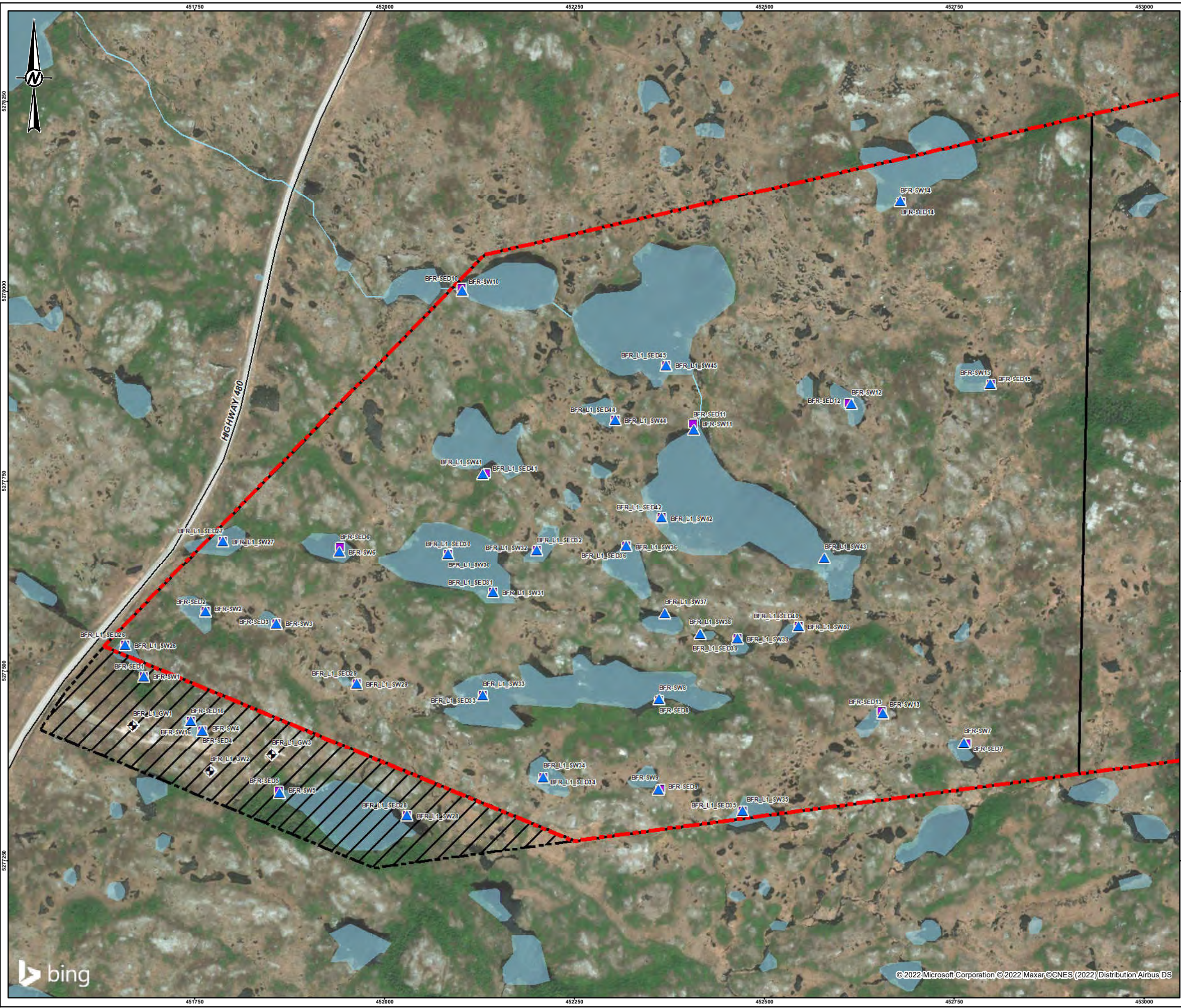
CONSULTANT	YYYY-MM-DD	2022-02-25
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

---

PROJECT NO. 21497139	CONTROL 0001	REV. 0	FIGURE <b>4</b>
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm

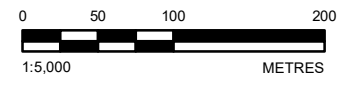


**LEGEND**

- APPROXIMATE GROUNDWATER SAMPLE LOCATION
- APPROXIMATE SEDIMENT SAMPLE LOCATION
- APPROXIMATE SURFACE WATER SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
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CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
 LOCATION 1 - ZONE 1 - SURFACE WATER, SEDIMENT, AND GROUNDWATER SAMPLE LOCATIONS

CONSULTANT	YYYY-MM-DD	2022-02-25
DESIGNED	---	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

PROJECT NO. 21497139 CONTROL 0001 REV. 0

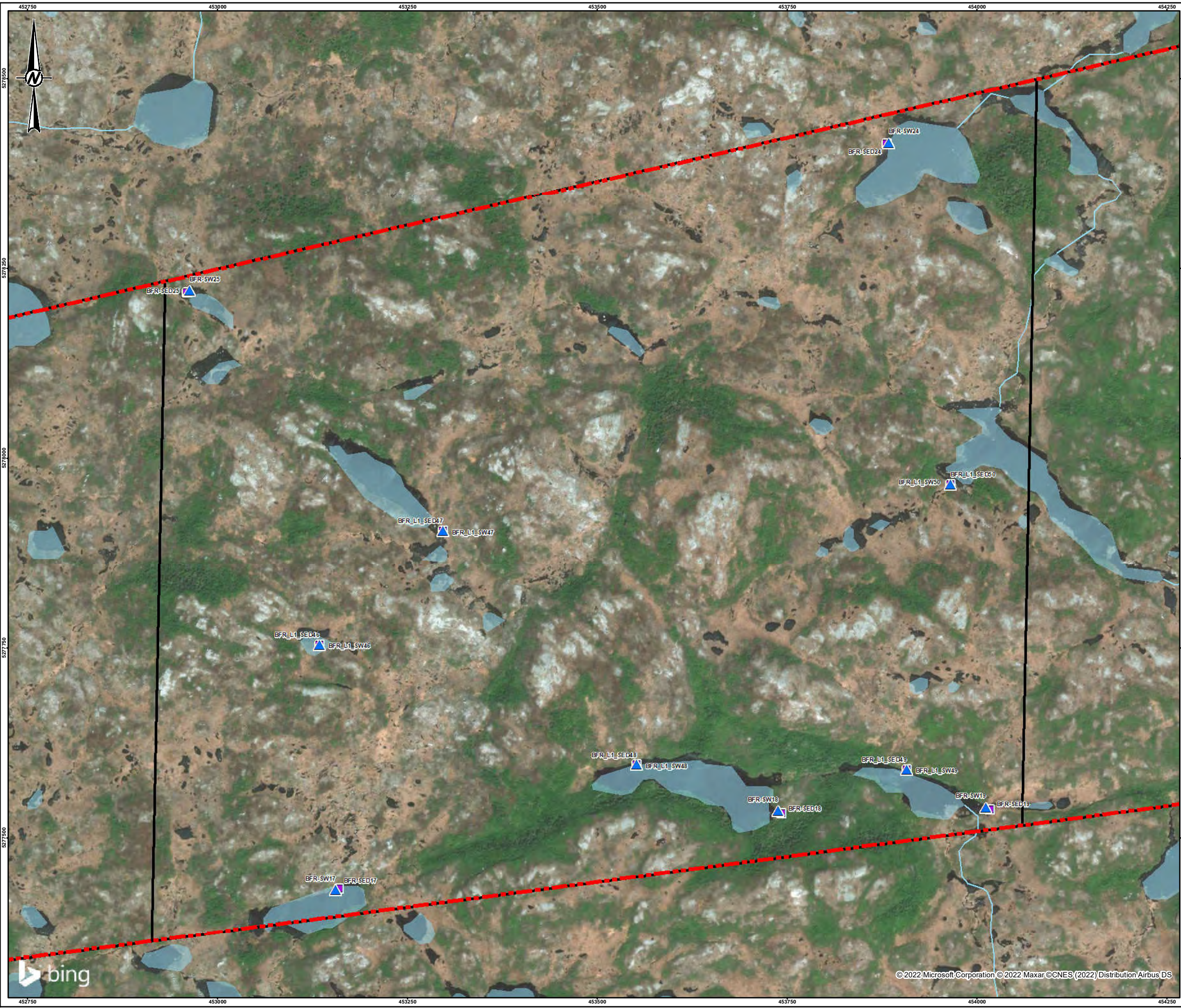
FIGURE 5

Path: N:\Active\Spatial\IMDC\Burgao\_Range\_Site\_NL\09\_PROC\21497139\_DCC\_Emerald\001\_Sampling\_Path\21497139\_0001-HS-0005.mxd

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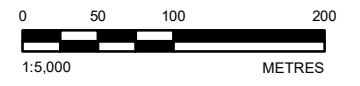


**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
**LOCATION 1 - ZONE 2 - SURFACE WATER AND SEDIMENT  
 SAMPLE LOCATIONS**

CONSULTANT	YYYY-MM-DD	2022-03-01
DESIGNED	---	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

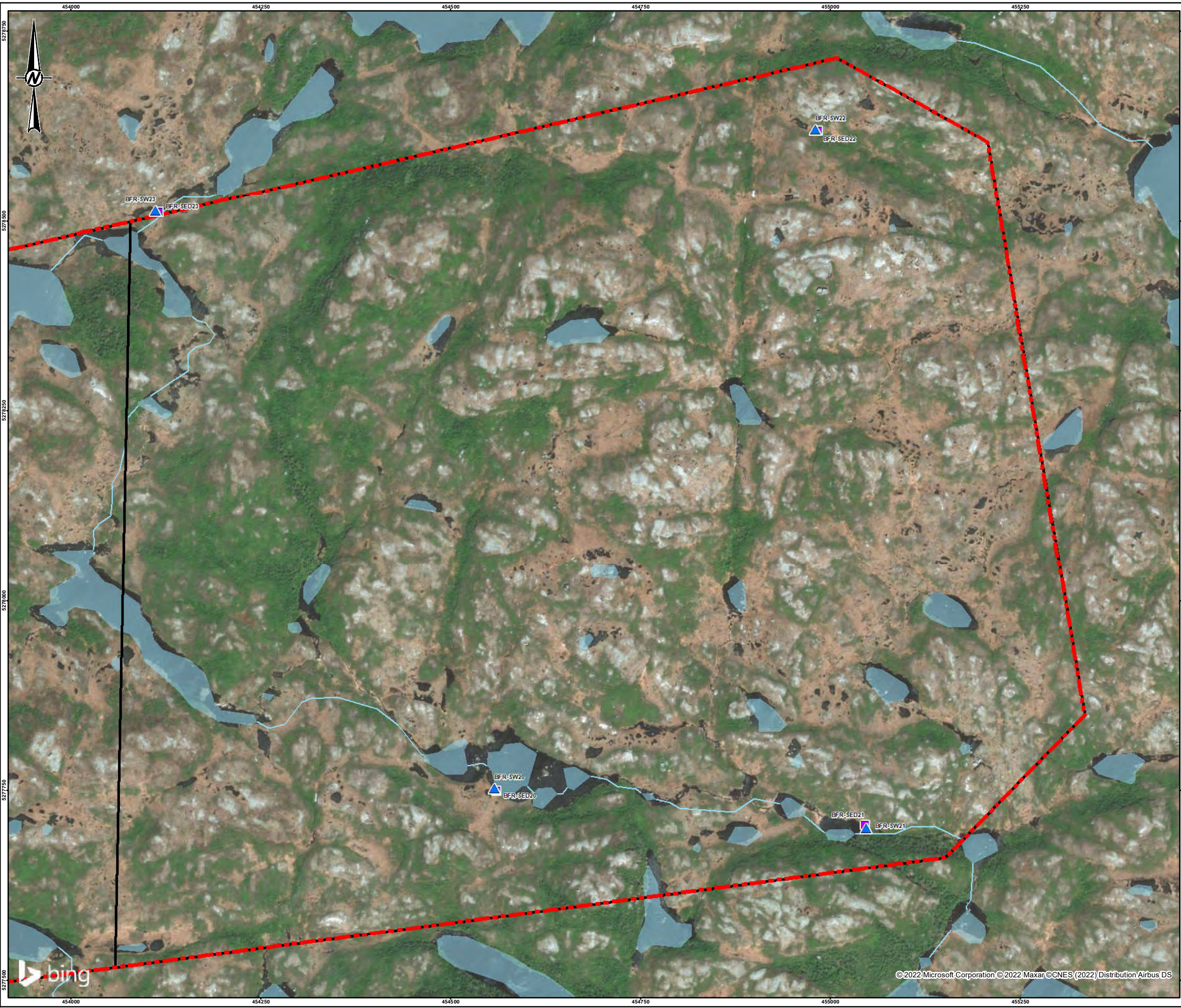
PROJECT NO. 21497139 CONTROL 0001 REV. 0 FIGURE 6

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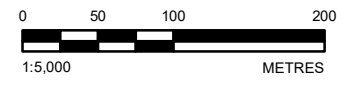


**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
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CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 1 - ZONE 3 - SURFACE WATER AND SEDIMENT  
SAMPLE LOCATIONS**

CONSULTANT	YYYY-MM-DD	2022-02-25
DESIGNED	---	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	



PROJECT NO. 21497139	CONTROL 0001	REV. 0	FIGURE <b>7</b>
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Path: N:\Projects\Spatial\_Images\Burgao\_Range\_Site\_NL\08\_PROJ\21497139\_DCC\_Enviro\0001\_Sampling\_Phase\21497139\_0001-HS-0007.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm

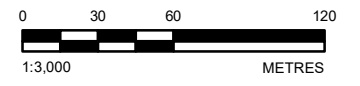


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION (SAMPLE ID PREFIX "BFR\_L2\_" TRUNCATED ON FIGURE FOR READABILITY)
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▭ SITE

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
**DEFENCE CONSTRUCTION CANADA (DCC)**

---

PROJECT  
**BURGENO FIRING RANGE  
9 WING GANDER, NL**

---

TITLE  
**LOCATION 2 - SOIL SAMPLE LOCATIONS**

---

CONSULTANT	YYYY-MM-DD	2022-02-25
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

---

PROJECT NO. 21497139	CONTROL 0001	REV. 0	FIGURE <b>8</b>
-------------------------	-----------------	-----------	--------------------

Path: N:\Active\Spatial\IMDC\Burgeno\_Range\_Site\_NL\08\_PROJ\21497139\_DCC\_Emerald001\_Sampling\_Phase2\1497139\_0001-HB-0008.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm

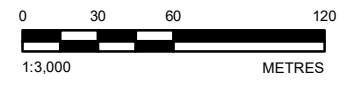


**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

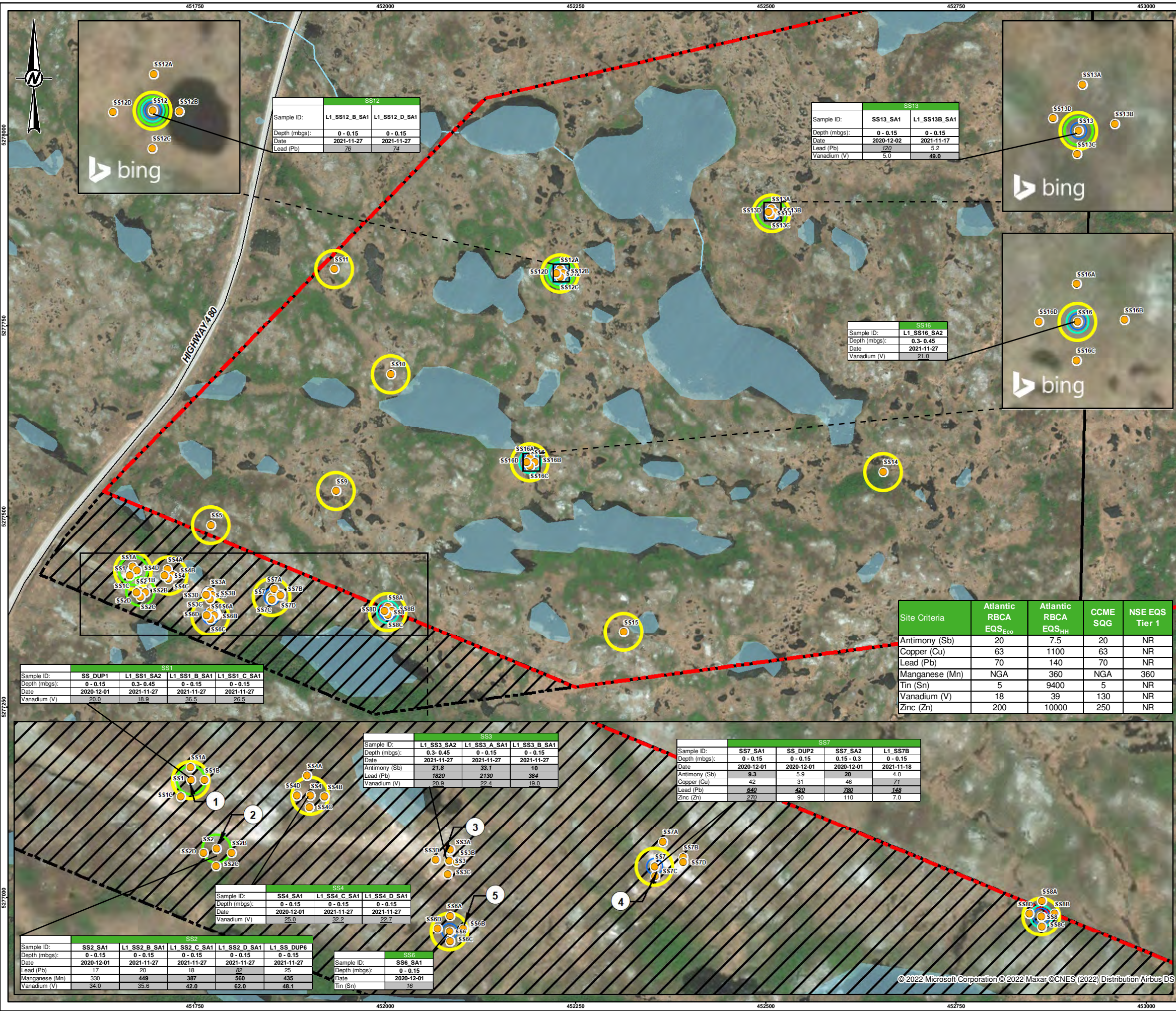
TITLE  
**LOCATION 2 - SURFACE WATER, SEDIMENT, AND GROUNDWATER SAMPLE LOCATIONS**

CONSULTANT	YYYY-MM-DD	2022-02-25
DESIGNED	---	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

PROJECT NO. 21497139 CONTROL 0001 REV. 0

Path: N:\Active\Spatial\IMDC\Burgas Range\_Site\_NL\09\_PROC\21497139\_DCC\_Emerald\001\_Sampling\_Path\21497139\_0001-HS-0000.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm



**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION (SAMPLE ID PREFIX "BFR\_" OR "BFR\_L1\_" TRUNCATED ON FIGURE FOR READABILITY)
- NATURALLY OCCURRING EXCEEDANCE OF BORON
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM

- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY

- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

**EXCEEDANCE IDENTIFICATION**

1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

**NOTE(S)**

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
4. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE

**REFERENCE(S)**

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

Site Criteria	Atlantic RBCA EQS <sub>Eco</sub>	Atlantic RBCA EQS <sub>HH</sub>	CCME SQG	NSE EQS Tier 1
Antimony (Sb)	20	7.5	20	NR
Copper (Cu)	63	1100	63	NR
Lead (Pb)	70	140	70	NR
Manganese (Mn)	NGA	360	NGA	360
Tin (Sn)	5	9400	5	NR
Vanadium (V)	18	39	130	NR
Zinc (Zn)	200	10000	250	NR

CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
LOCATION 1 - ZONE 1 - METALS EXCEEDANCES IN SOIL

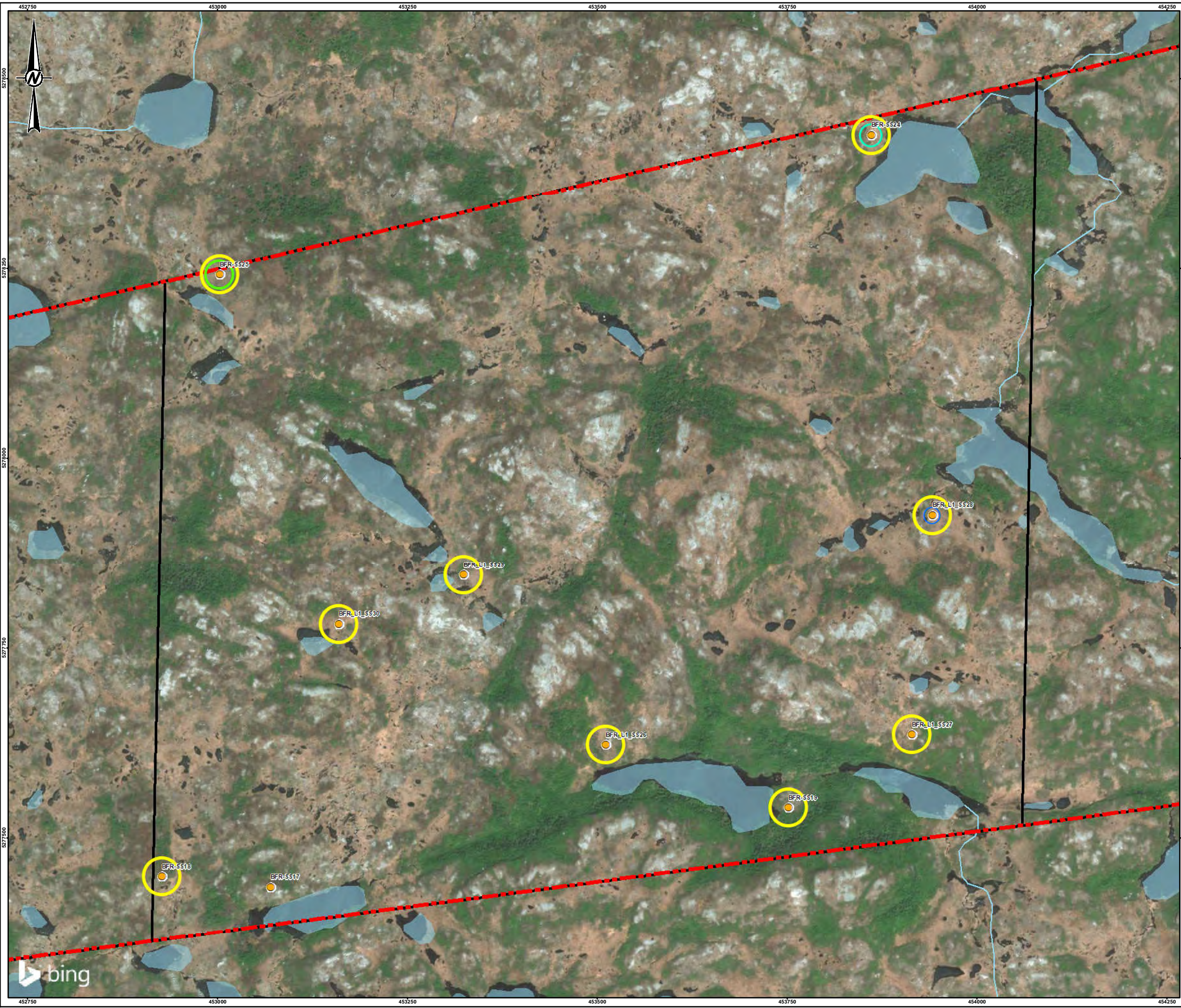
CONSULTANT	YYYY-MM-DD	2022-03-02
DESIGNED	----	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

PROJECT NO. 21497139 CONTROL 0001 REV. 0 FIGURE 10

Path: \\nucleus\spatial\IMDCC\Burgoe\_Firing\_Range\_Site\N198\_PRC021497139\_DCC\_Enviro0201\_Sampling\_Plan\21497139\_0001\_H5-00.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

© 2022 Microsoft Corporation © 2022 Maxar © CNES (2022) Distribution Airbus DS



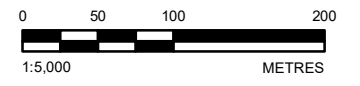
**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- NATURALLY OCCURRING EXCEEDANCE OF BORON
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM

- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
**DEFENCE CONSTRUCTION CANADA (DCC)**

---

PROJECT  
**BURGEO FIRING RANGE  
9 WING GANDER, NL**

---

TITLE  
**LOCATION 1 - ZONE 2 - METALS EXCEEDANCES IN SOIL**

---

CONSULTANT	YYYY-MM-DD	2022-03-01
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

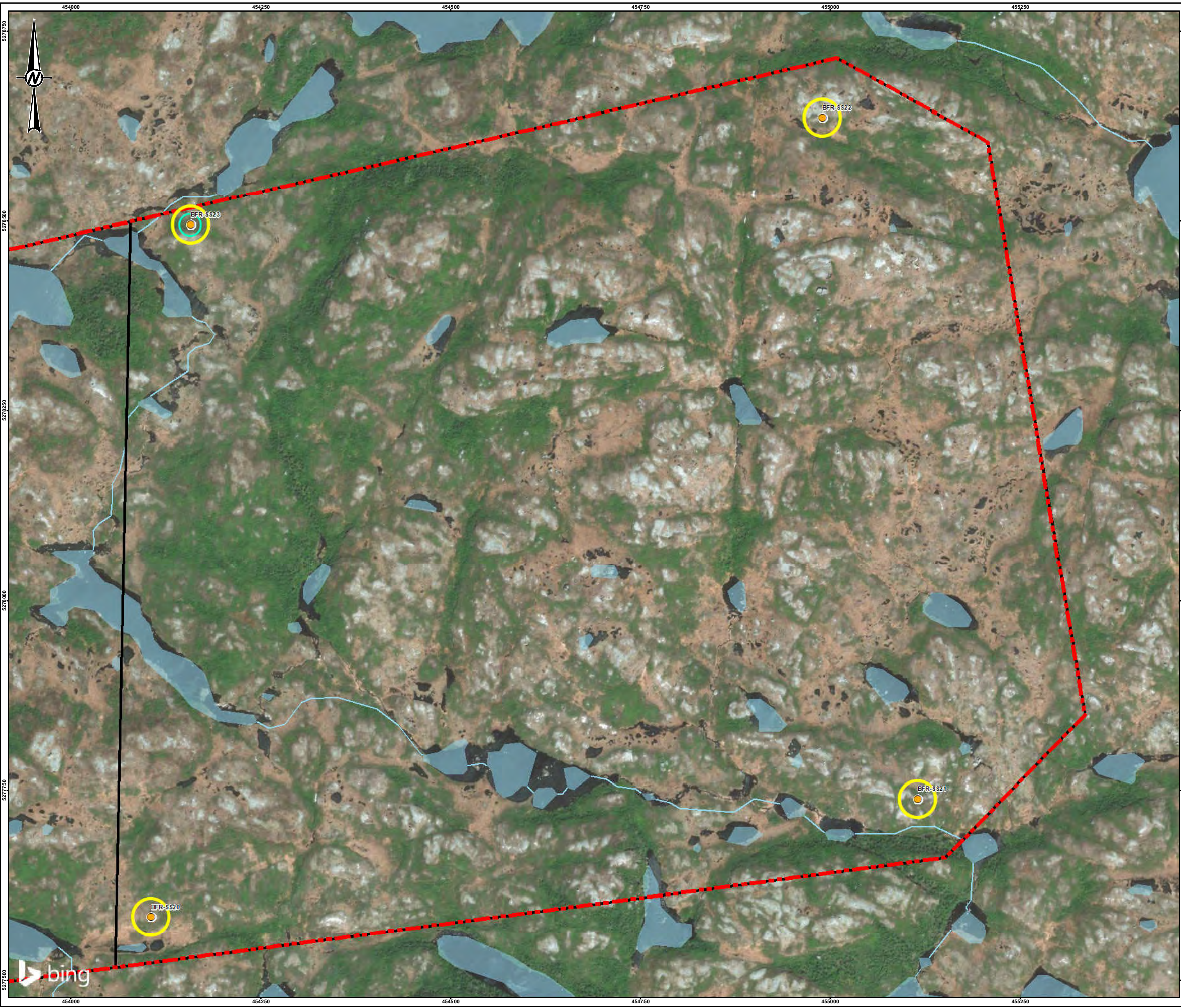
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PROJECT NO. 21497139	CONTROL 0001	REV. 0	FIGURE <b>11</b>
-------------------------	-----------------	-----------	---------------------

Path: N:\Active\Spatial\IMDCC\Burgao\_Range\_Site\_NL\08\_PROJ\21497139\_DCC\_Enviro\001\_Sampling\_Path\21497139\_0001-HS-0011.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



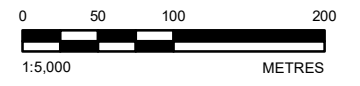


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- - - SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
 LOCATION 1 - ZONE 3 - METALS EXCEEDANCES IN SOIL

CONSULTANT	YYYY-MM-DD	2022-03-02
DESIGNED	---	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

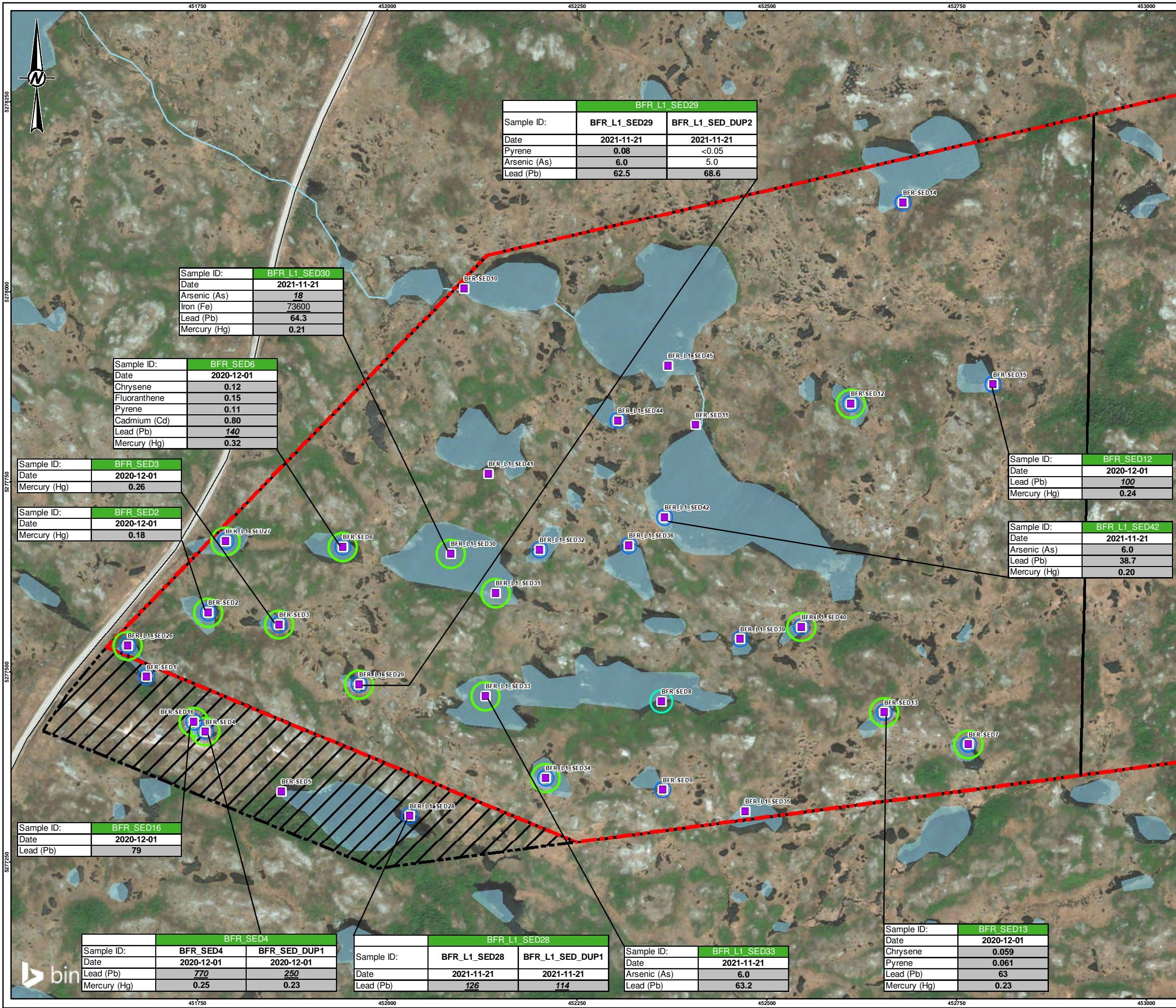
PROJECT NO. 21497139 CONTROL 0001 REV. 0

**GOLDER**  
 MEMBER OF WSP

FIGURE 12

Path: N:\Projects\Spatial\_Images\Burgao\_Site\_NL\08\_PROJ\_21497139\_DCC\_Enviro\0001\_Sampling\_Phase\21497139\_0001-HS-012.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



	BFR_L1_SED29	BFR_L1_SED_DUP2
Sample ID:	BFR_L1_SED29	BFR_L1_SED_DUP2
Date	2021-11-21	2021-11-21
Pyrene	0.08	<0.05
Arsenic (As)	6.0	5.0
Lead (Pb)	62.5	68.6

	BFR_L1_SED30
Sample ID:	BFR_L1_SED30
Date	2021-11-21
Arsenic (As)	18
Iron (Fe)	73600
Lead (Pb)	64.3
Mercury (Hg)	0.21

	BFR_SED6
Sample ID:	BFR_SED6
Date	2020-12-01
Chrysene	0.12
Fluoranthene	0.15
Pyrene	0.11
Cadmium (Cd)	0.80
Lead (Pb)	140
Mercury (Hg)	0.32

	BFR_SED3
Sample ID:	BFR_SED3
Date	2020-12-01
Mercury (Hg)	0.26

	BFR_SED2
Sample ID:	BFR_SED2
Date	2020-12-01
Mercury (Hg)	0.18

	BFR_SED12
Sample ID:	BFR_SED12
Date	2020-12-01
Lead (Pb)	100
Mercury (Hg)	0.24

	BFR_L1_SED42
Sample ID:	BFR_L1_SED42
Date	2021-11-21
Arsenic (As)	6.0
Lead (Pb)	38.7
Mercury (Hg)	0.20

	BFR_SED16
Sample ID:	BFR_SED16
Date	2020-12-01
Lead (Pb)	79

	BFR_SED4	BFR_SED_DUP1
Sample ID:	BFR_SED4	BFR_SED_DUP1
Date	2020-12-01	2020-12-01
Lead (Pb)	770	250
Mercury (Hg)	0.25	0.23

	BFR_L1_SED28	BFR_L1_SED_DUP1
Sample ID:	BFR_L1_SED28	BFR_L1_SED_DUP1
Date	2021-11-21	2021-11-21
Lead (Pb)	126	114

	BFR_L1_SED33
Sample ID:	BFR_L1_SED33
Date	2021-11-21
Arsenic (As)	6.0
Lead (Pb)	63.2

	BFR_SED13
Sample ID:	BFR_SED13
Date	2020-12-01
Chrysene	0.059
Pyrene	0.061
Lead (Pb)	63
Mercury (Hg)	0.23

**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF CHROMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

Site Criteria	Atlantic RBCA EQS	CCME ISQGs	CCME PELs
Acenaphthene	0.0889	0.00671	0.0889
Chrysene	0.846	0.0571	0.862
Fluoranthene	1.494	0.111	2.355
Pyrene	1.298	0.053	0.875
Arsenic (As)	17	5.9	17
Cadmium (Cd)	3.5	0.60	3.5
Iron (Fe)	43766	NGA	NGA
Lead (Pb)	91.3	35	91.3
Mercury (Hg)	0.486	0.17	0.486

**EXCEEDANCE IDENTIFICATION**

- UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
- BOLD AND SHADED = EXCEEDANCE OF CCME ISQGs
- ITALICISED AND SHADED = EXCEEDANCE OF CCME PELs

**NOTE(S)**

- ALL LOCATIONS ARE APPROXIMATE
- ALL CONCENTRATIONS IN mg/kg
- ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SEDIMENT
- CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) INTERIM SEDIMENT QUALITY GUIDELINES (ISQGs) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER. PRESENTED FOR INFORMATIONAL PURPOSES ONLY.
- CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) PROBABLE EFFECT LEVELS (PELS) FOR THE PROTECTION OF AQUATIC LIFE, 2010, FOR FRESHWATER
- ASSUMED TEMPERATURE AND AVERAGE pH USED FOR GUIDELINES WITH LOOKUP TABLE

**REFERENCE(S)**

- BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
- BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
- PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

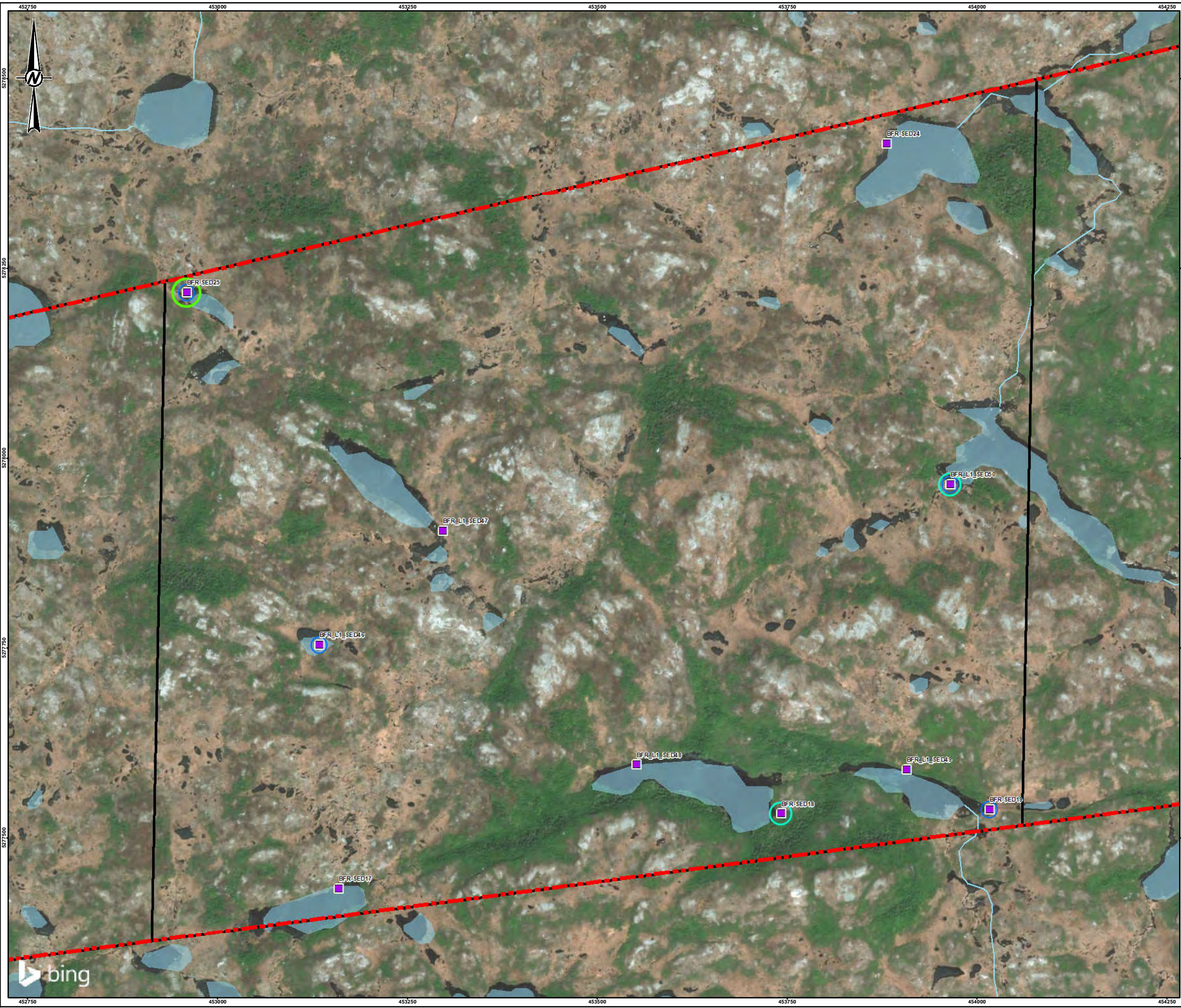
TITLE  
**LOCATION 1 - ZONE 1 - EXCEEDANCES IN SEDIMENT**

CONSULTANT	DATE
YYYY-MM-DD	2022-03-07
DESIGNED	----
PREPARED	JEM
REVIEWED	JTD
APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0001 REV. 0 FIGURE 13

Path: \\buckler\spatial\DMCC\Burgoe\_Firing\_Range\_Site\_NL\98\_PRCO\21497139\_DCC\_Enviro\0001\_Sampling\_Plan\21497139\_0001-HS-013.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF CHROMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**

1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28

CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 1 - ZONE 2 - EXCEEDANCES IN SEDIMENT**

CONSULTANT

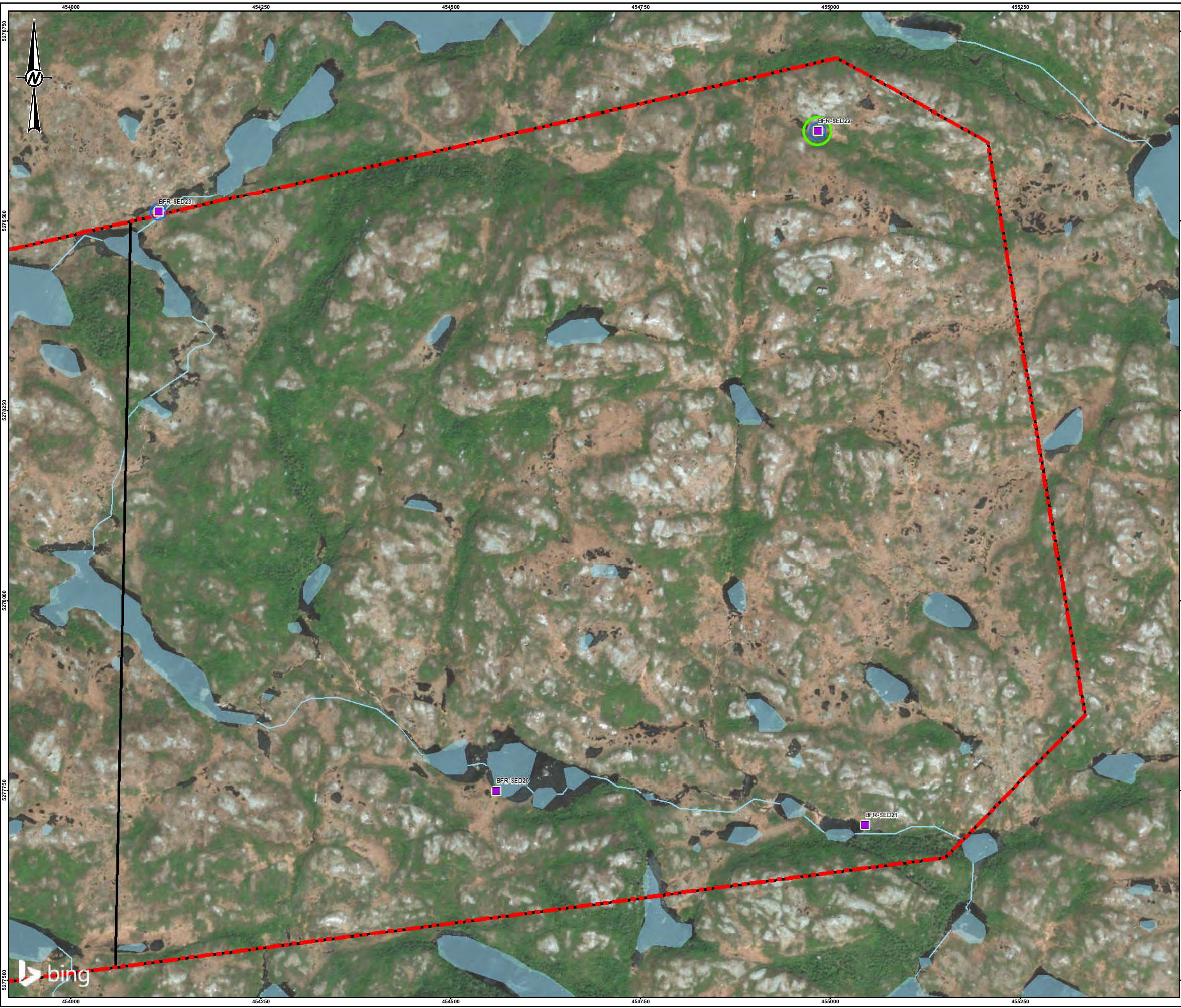
YYYY-MM-DD	2022-03-02
DESIGNED	---
PREPARED	JEM
REVIEWED	JTD
APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0001 REV. 0

FIGURE 14

Path: N:\Active\Spatial\IMDCC\Burgao\_Range\_Site\_NL\08\_PROJ\21497139\_DCC\_Enviro\001\_Sampling\_Path\21497139\_0001-HS-0014.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm

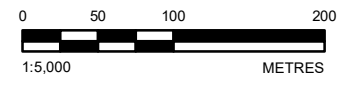


**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▨ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
**LOCATION 1 - ZONE 3 - EXCEEDANCES IN SEDIMENT**

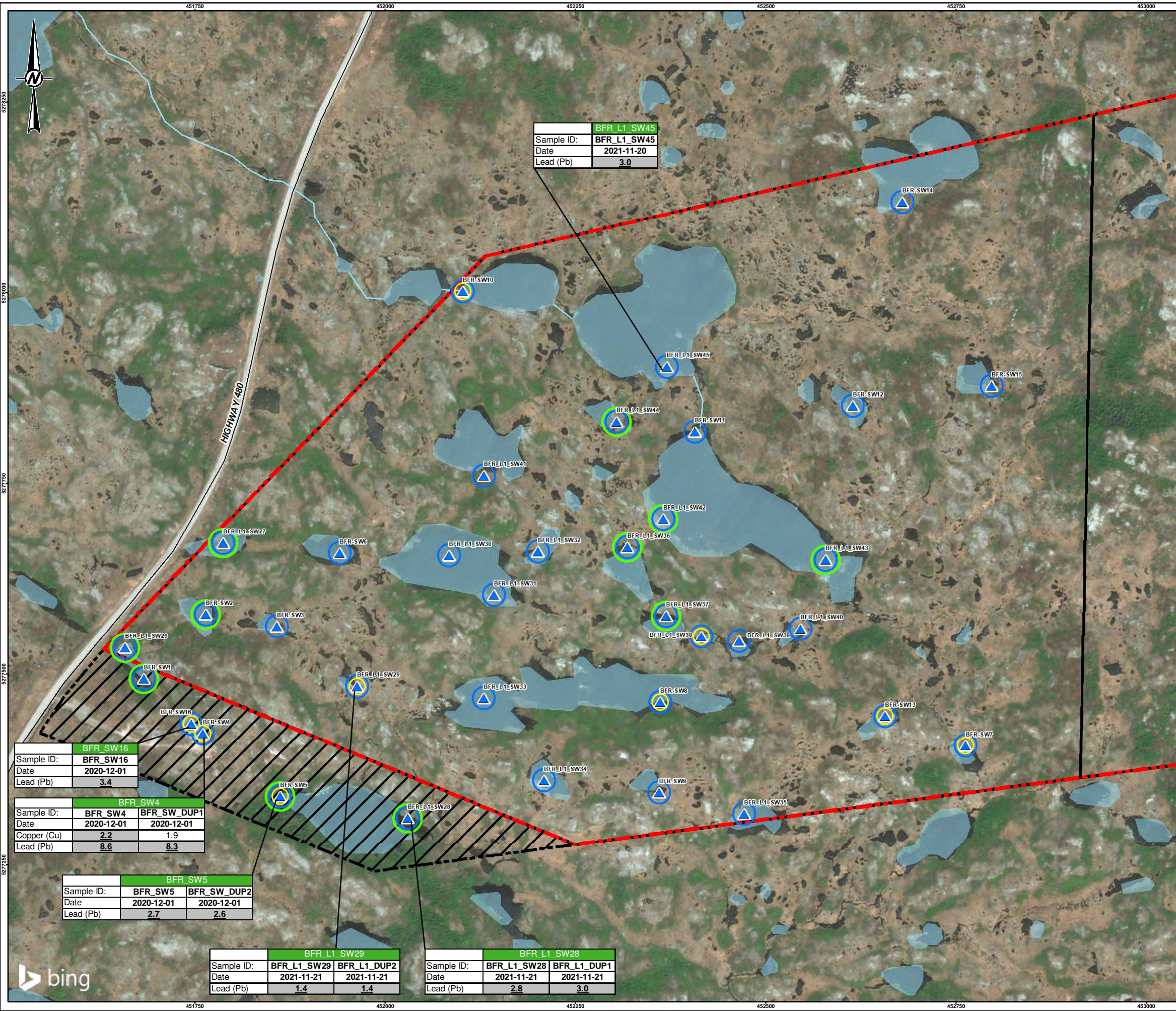
CONSULTANT	YYYY-MM-DD	2022-03-04
DESIGNED	---	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

PROJECT NO. 21497139 CONTROL 0001 REV. 0

FIGURE 15

Path: N:\Projects\Spatial\_Images\Burgeo\_Range\_Site\_NL\08\_PROJ\_21497139\_DCC\_Enviro\0001\_Sampling\_Phase\21497139\_0001-HS-0015.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



BFR L1_SW45	
Sample ID:	BFR L1_SW45
Date:	2021-11-20
Lead (Pb)	3.0

BFR_SW16	
Sample ID:	BFR_SW16
Date:	2020-12-01
Lead (Pb)	3.4

BFR_SW4		
Sample ID:	BFR_SW4	BFR_SW_DUP1
Date:	2020-12-01	2020-12-01
Copper (Cu)	2.2	1.9
Lead (Pb)	8.6	8.3

BFR_SW5		
Sample ID:	BFR_SW5	BFR_SW_DUP2
Date:	2020-12-01	2020-12-01
Lead (Pb)	2.7	2.6

BFR L1_SW29		
Sample ID:	BFR L1_SW29	BFR L1_DUP1
Date:	2021-11-21	2021-11-21
Lead (Pb)	1.4	1.4

BFR L1_SW28		
Sample ID:	BFR L1_SW28	BFR L1_DUP1
Date:	2021-11-21	2021-11-21
Lead (Pb)	2.8	3.0

**LEGEND**

- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

Site Criteria	Atlantic RBCA EQS	CCME WQGs
Copper (Cu)	2	2
Lead (Pb)	1	1

**EXCEEDANCE IDENTIFICATION**

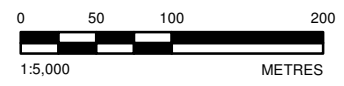
1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE CCME WQS

**NOTE(S)**

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN µg/L
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SURFACE WATER (FRESH WATER)
4. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) WATER QUALITY GUIDELINES (WQGS) FOR THE PROTECTION OF AQUATIC LIFE (2010) - FRESHWATER, LONG TERM
5. AVERAGE pH AND WATER HARDNESS VALUES USED FOR CALCULATING VARIABLE GUIDELINES
6. NGA = NO GUIDELINE AVAILABLE

**REFERENCE(S)**

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

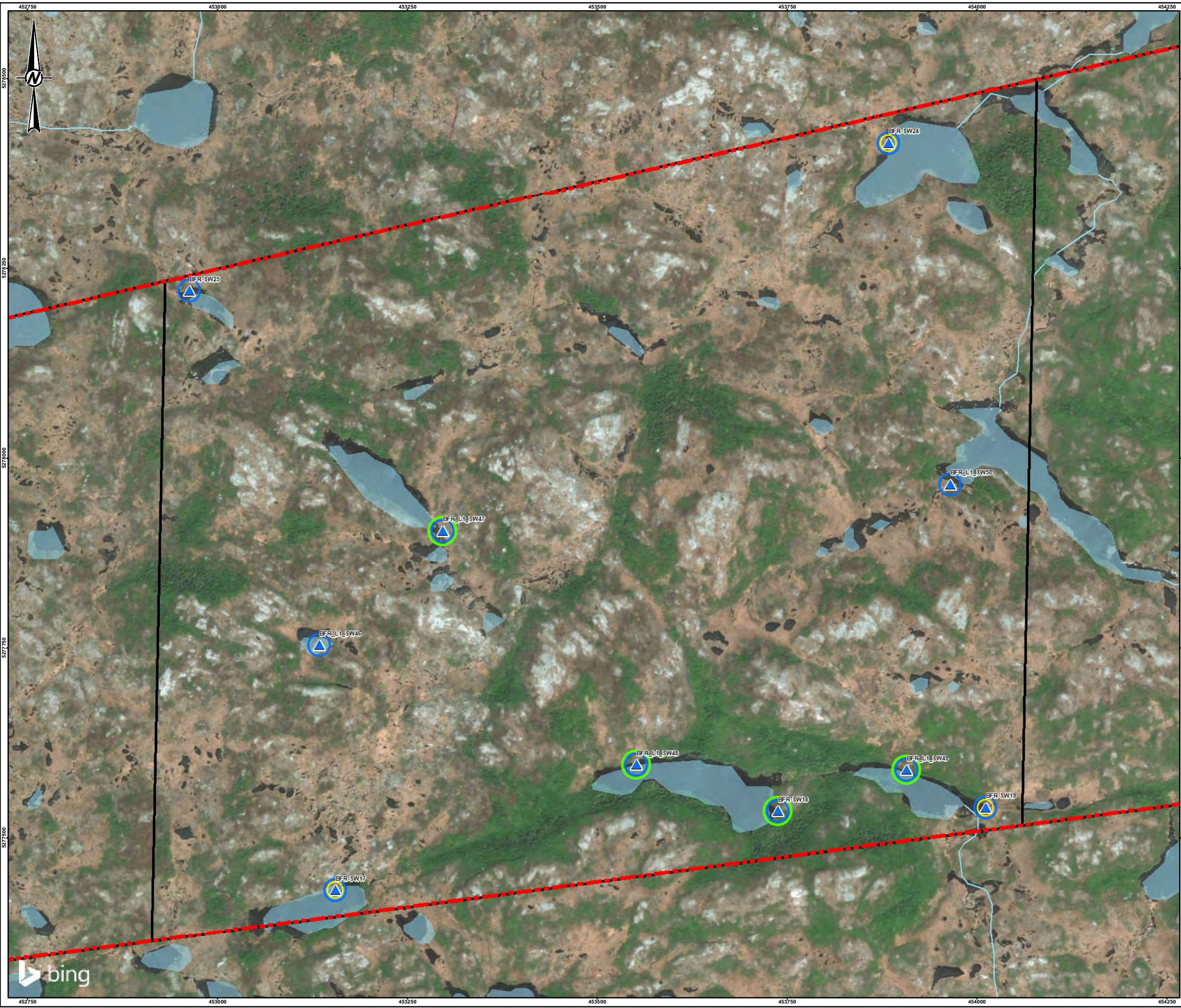
TITLE  
**LOCATION 1 - ZONE 1 - EXCEEDANCES IN SURFACE WATER**

CONSULTANT	YYYY-MM-DD	2022-03-01
DESIGNED	----	
PREPARED	JEM	
REVIEWED	JTD	
APPROVED	BMC	

PROJECT NO. 21497139 CONTROL 0001 REV. 0 FIGURE 16

Path: \\ukelco\spatial\IMDCC\Burgoe\_Range\_Site\_NL\99\_PRCO\21497139\_DCC\_Enviro\0001\_Sampling\_Plan\21497139\_0001-HS-016.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

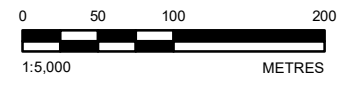


**LEGEND**

- ▲ APPROXIMATE SURFACE WATER SAMPLE LOCATION
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

TITLE  
 LOCATION 1 - ZONE 2 - EXCEEDANCES IN SURFACE WATER

CONSULTANT	YYYY-MM-DD	2022-03-01
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

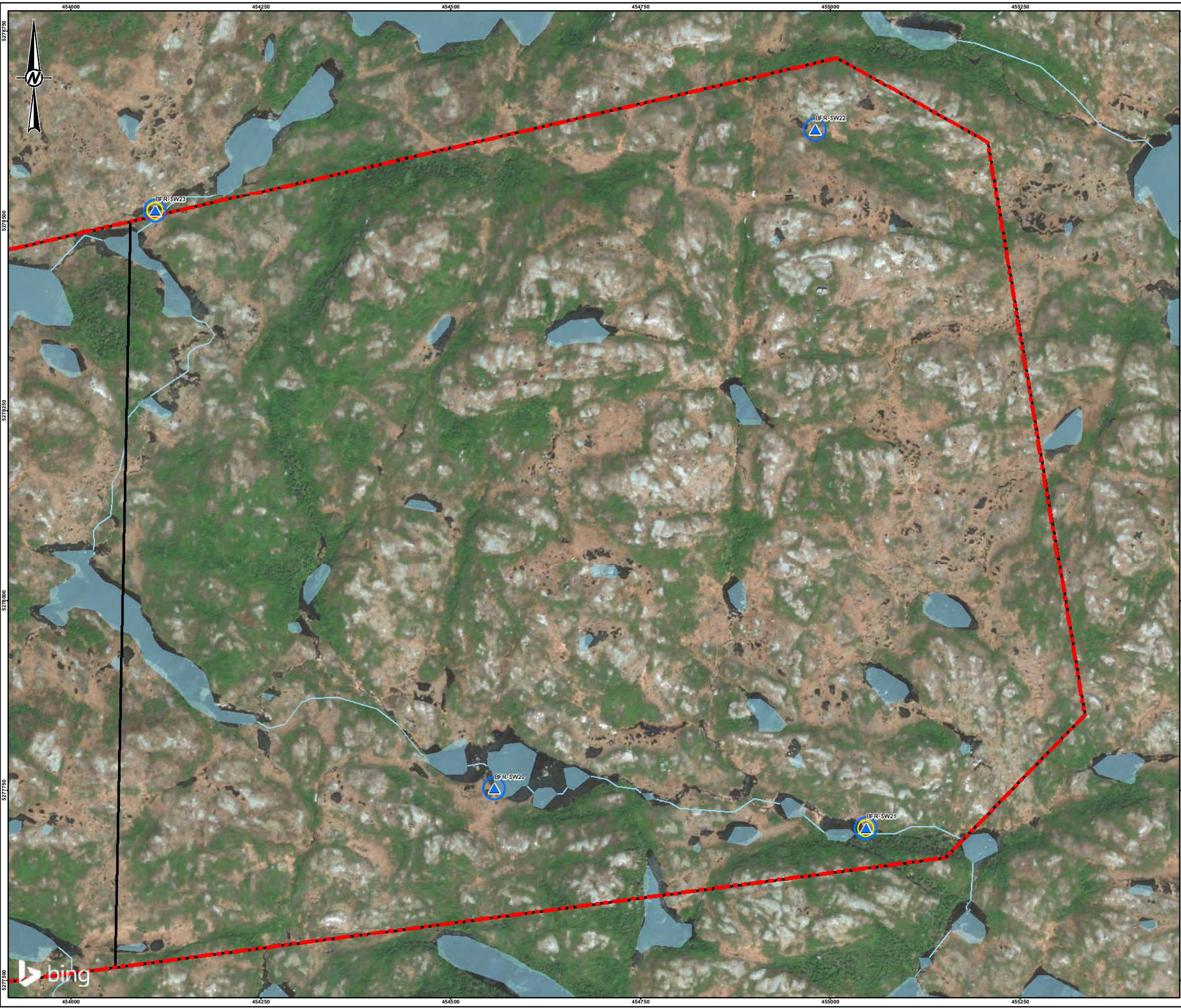
PROJECT NO. 21497139 CONTROL 0001 REV. 0

**GOLDER**  
 MEMBER OF WSP

FIGURE 17

Path: N:\Active\Spatial\IMDCC\Burgao\_Range\_Site\_NL\09\_PROJ\21497139\_DCC\_Enviro\0001\_Sampling\_Phase\21497139\_0001-HS-0017.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm

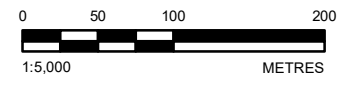


**LEGEND**

- APPROXIMATE SURFACE WATER SAMPLE LOCATION
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ZONE BOUNDARY
- SITE

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
**DEFENCE CONSTRUCTION CANADA (DCC)**

---

PROJECT  
**BURGIO FIRING RANGE  
9 WING GANDER, NL**

---

TITLE  
**LOCATION 1 - ZONE 3 - EXCEEDANCES IN SURFACE WATER**

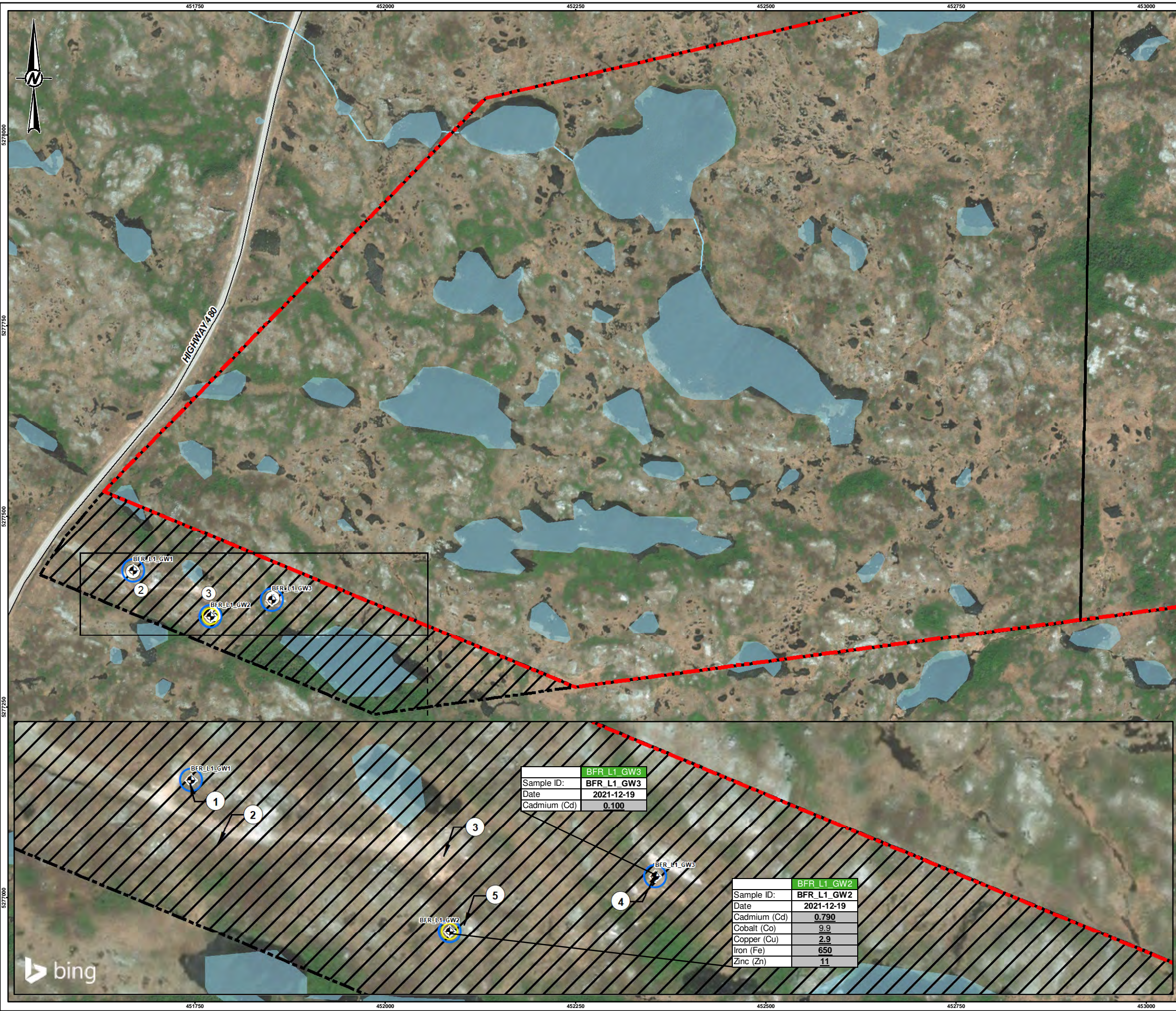
CONSULTANT	YYYY-MM-DD	2022-03-01
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0001 REV. 0

FIGURE **18**

Path: N:\Projects\Spatial\_Images\Burgio\_Range\_Site\_NL\08\_PROJ\_21497139\_DCC\_Enviro\0001\_Sampling\_Path\21497139\_0001-HS-0018.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 28mm



**LEGEND**

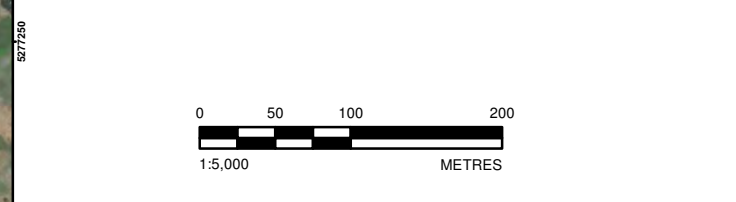
- APPROXIMATE GROUNDWATER SAMPLE LOCATION
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- EXCEEDANCE OF ALUMINIUM SITE CRITERIA
- APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- ROADWAY
- WATERCOURSE
- WATERBODY
- PROPOSED ADDITIONAL LEASE AREA
- ZONE BOUNDARY
- SITE

Site Criteria	Atlantic RBCA EQS	FIGQGs
Total Cadmium (Cd)	0.09	0.09
Total Cobalt (Co)	1	NGA
Total Copper (Cu)	2	2
Total Iron (Fe)	300	300
Total Zinc (Zn)	7	10

**EXCEEDANCE IDENTIFICATION**  
 1. UNDERLINE AND SHADED – EXCEEDANCE OF RBCA ECOLOGICAL TIER 1  
 2. UNDERLINED AND SHADED – EXCEEDANCE OF FIGQGs

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE  
 2. ALL CONCENTRATIONS IN µg/L  
 3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR GROUNDWATER, DISCHARGE TO FRESH WATER, <10 m FROM SURFACE WATER BODY (2021).  
 4. FEDERAL INTERIM GROUNDWATER QUALITY GUIDELINES FOR FEDERAL CONTAMINATED SITES, JUNE 2016 V4 – TABLE 3: RESIDENTIAL/PARKLAND LAND, COARSE GRAINED SOIL.  
 5. NGA – NO GUIDELINE AVAILABLE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
 DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
 BURGEO FIRING RANGE  
 9 WING GANDER, NL

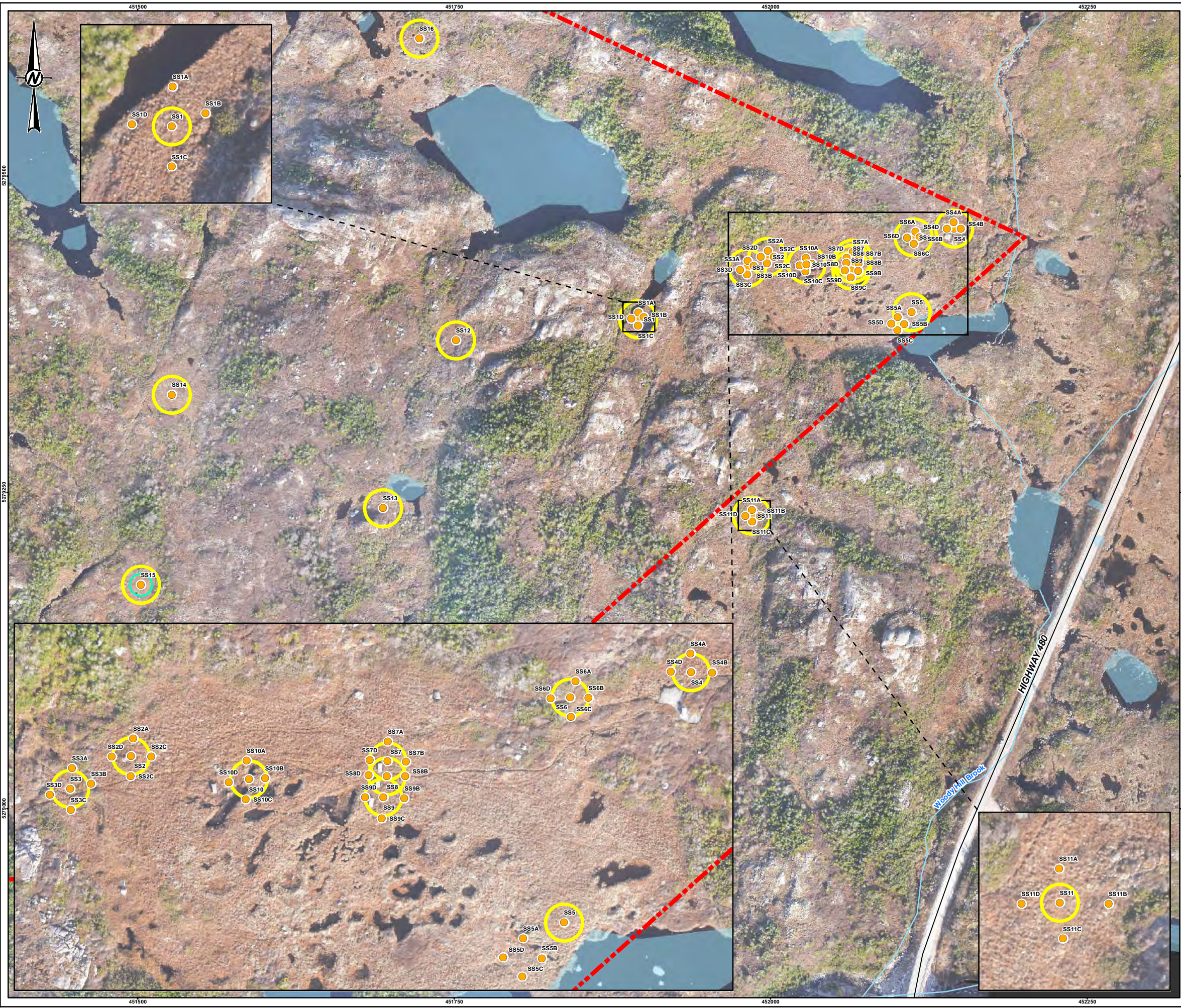
**TITLE**  
 LOCATION 1 - ZONE 1 - EXCEEDANCES IN GROUNDWATER

CONSULTANT	DATE	REVISION
	YYYY-MM-DD	2022-03-01
	DESIGNED	----
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

Path: \\ukelke\spatial\IMDCC\Burgoe\_Range\_Site\_NL\98\_PROJ\21497139\_DCC\_Enviro\0001\_Sampling\_Plan\21497139\_0001\_H5-09.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



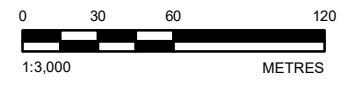


**LEGEND**

- APPROXIMATE SOIL SAMPLE LOCATION (SAMPLE ID PREFIX "BFR\_L2\_" TRUNCATED ON FIGURE FOR READABILITY)
- NATURALLY OCCURRING EXCEEDANCE OF CADMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▭ SITE

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT		DEFENCE CONSTRUCTION CANADA (DCC)
PROJECT		BURGEO FIRING RANGE 9 WING GANDER, NL
TITLE		LOCATION 2 - METALS EXCEEDANCES IN SOIL
CONSULTANT	YYYY-MM-DD	2022-03-02
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC
PROJECT NO.	CONTROL	REV.
21497139	0001	0
		FIGURE
		<b>20</b>

Path: N:\Active\Spatial\IMDC\Burgueso\_Range\_Site\_NL\08\_PROJ\21497139\_DCC\_Emerald001\_Sampling\_Path\21497139\_0001-HB-0020.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 26mm



Sample ID:	<b>BFR L2 SED6</b>
Date	<b>2021-11-21</b>
Acenaphthene	<b>0.016</b>

Sample ID:	<b>BFR L2 SED4</b>
Date	<b>2021-11-21</b>
Lead (Pb)	<b>45.4</b>

Sample ID:	<b>BFR L2 SED8</b>
Date	<b>2021-11-21</b>
Arsenic (As)	<b>7.0</b>

**LEGEND**

- APPROXIMATE SEDIMENT SAMPLE LOCATION
- NATURALLY OCCURRING SEDIMENT EXCEEDANCE OF MODIFIED TPH
- NATURALLY OCCURRING EXCEEDANCE OF CHROMIUM
- NATURALLY OCCURRING EXCEEDANCE OF SELENIUM
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

Site Criteria	Atlantic RBCA EQS <sub>Eco</sub>	Atlantic RBCA EQS <sub>HH</sub>	CCME SQG	NSE EQS Tier 1
Antimony (Sb)	20	7.5	20	NR
Copper (Cu)	63	1100	63	NR
Lead (Pb)	70	140	70	NR
Manganese (Mn)	NGA	360	NGA	360
Tin (Sn)	5	9400	5	NR
Vanadium (V)	18	39	130	NR
Zinc (Zn)	200	10000	250	NR

**EXCEEDANCE IDENTIFICATION**

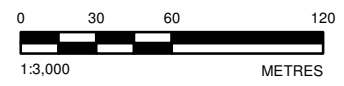
1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1
2. BOLD AND SHADED = EXCEEDANCE OF RBCA HUMAN HEALTH-BASED TIER 1
3. ITALICISED AND SHADED = EXCEEDANCE OF CCME SQG
4. DOUBLE UNDERLINE AND SHADED = EXCEEDANCE OF NSE TIER 1

**NOTE(S)**

1. ALL LOCATIONS ARE APPROXIMATE
2. ALL CONCENTRATIONS IN mg/kg
3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) SOIL ECOLOGICAL TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSECO) FOR SOIL - COARSE AGRICULTURAL SOILS (2021)
4. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) HUMAN HEALTH BASED TIER 1 ENVIRONMENTAL QUALITY STANDARDS (EQSHH) FOR SOIL, AGRICULTURAL LAND USE, NON-POTABLE GROUNDWATER, COARSE-GRAINED SOIL (2021)
5. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) SOIL QUALITY GUIDELINES (SQGS) FOR THE PROTECTION OF ENVIRONMENTAL AND HUMAN HEALTH, 2010, FOR POTABLE AND COARSE GRAINED SOIL WITH AGRICULTURAL LAND USE

**REFERENCE(S)**

1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 2 - EXCEEDANCES IN SEDIMENT**

CONSULTANT  
**GOLDER**  
MEMBER OF WSP

YYYY-MM-DD	2022-03-08
DESIGNED	----
PREPARED	JEM
REVIEWED	JTD
APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0001 REV. 0

FIGURE **21**

Path: N:\Projects\Spatial\IMDCC\Burgoe\_Firing\_Range\_Site\_NL\08\_PRCO\21497139\_DCC\_Enviro\0001\_Sampling\_Plan\21497139\_0001-HS-0021.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 25mm



	<b>BFR L2 SW6</b>
Sample ID:	<b>BFR L2 SW6</b>
Date:	<b>2021-11-22</b>
Lead (Pb):	<b>1.5</b>

**LEGEND**

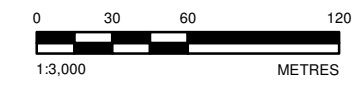
- APPROXIMATE SURFACE WATER SAMPLE LOCATION
- pH BELOW ACCEPTABLE SITE CRITERIA RANGE
- NATURALLY OCCURRING EXCEEDANCE OF ALUMINUM
- NATURALLY OCCURRING EXCEEDANCE OF IRON
- NATURALLY OCCURRING EXCEEDANCE OF ZINC
- ROADWAY
- WATERCOURSE
- WATERBODY
- SITE

Site Criteria	Atlantic RBCA EQS	CCME WQGs
Copper (Cu)	2	2
Lead (Pb)	1	1

**EXCEEDANCE IDENTIFICATION**  
 1. UNDERLINE AND SHADED = EXCEEDANCE OF RBCA ECOLOGICAL TIER 1  
 2. BOLD AND SHADED = EXCEEDANCE CCME WQS

**NOTE(S)**  
 1. ALL LOCATIONS ARE APPROXIMATE  
 2. ALL CONCENTRATIONS IN µg/L  
 3. ATLANTIC RISK-BASED CORRECTIVE ACTION (RBCA) ECOLOGICAL TIER I ENVIRONMENTAL QUALITY STANDARDS (EQS) FOR SURFACE WATER (FRESH WATER)  
 4. CANADIAN COUNCIL OF MINISTERS OF THE ENVIRONMENT (CCME) WATER QUALITY GUIDELINES (WQGs) FOR THE PROTECTION OF AQUATIC LIFE (2010) - FRESHWATER, LONG TERM  
 5. AVERAGE pH AND WATER HARDNESS VALUES USED FOR CALCULATING VARIABLE GUIDELINES  
 6. NGA = NO GUIDELINE AVAILABLE

**REFERENCE(S)**  
 1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
 2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
 3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 2 - EXCEEDANCES IN SURFACE WATER**

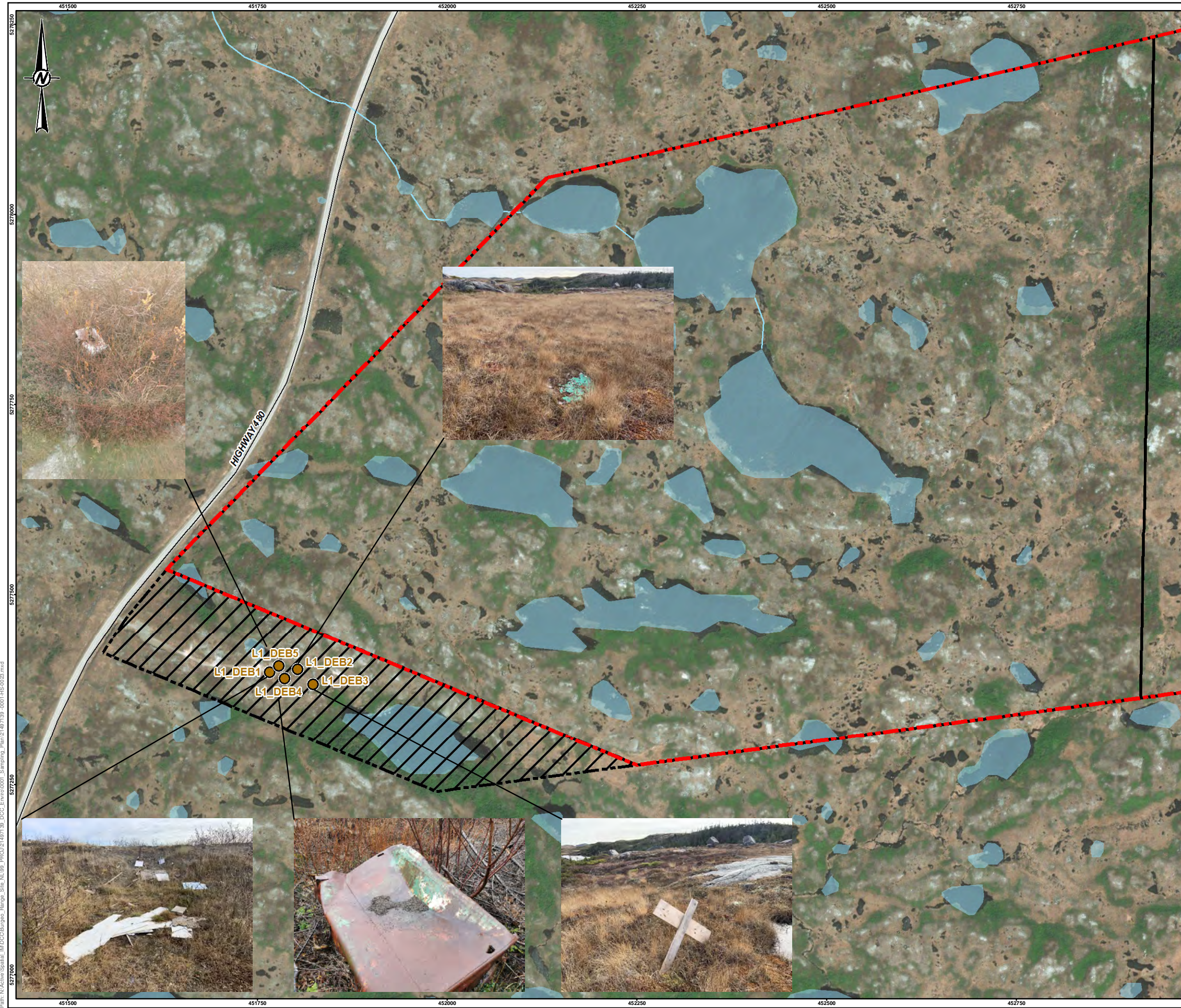
CONSULTANT	YYYY-MM-DD	2022-03-08
	DESIGNED	----
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0001 REV. 0

FIGURE 22

Path: N:\Active Spatial\IMDCC\Burgoe Range\_Site\_NL\09\_PROJ\21497139\_DCC\_Enviro\0001\_Sampling\_Path\21497139\_0001-HS-0022.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



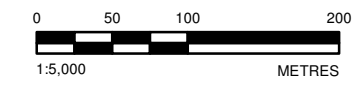
**LEGEND**

- APPROXIMATE DEBRIS LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m <sup>3</sup>
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m <sup>3</sup>
L1_DEB_3	Wooden stakes and cardboard target.	~1m <sup>3</sup>
L1_DEB_4	Rusted tank used as target. Includes spent ammunition, spent rifle cartridges and spent ammunition.	~1m <sup>3</sup>
L1_DEB_5	Rusted Kitchen sink used as target. Includes spent ammunition.	<1m <sup>3</sup>

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. BING IMAGERY SUPPLIED BY ESRI AND MICROSOFT © 2020 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS.  
3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

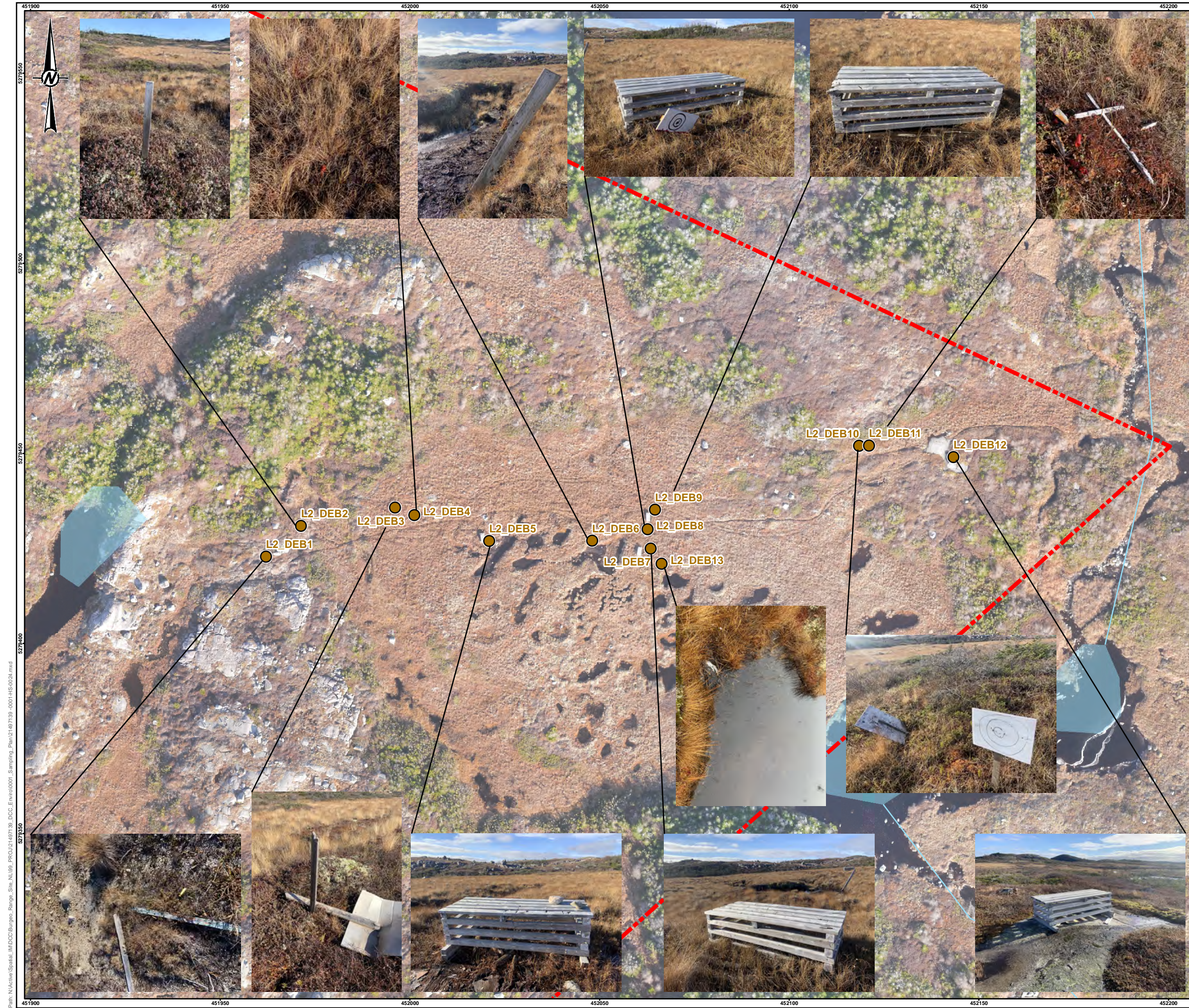
PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 1 - DEBRIS LOCATIONS**

CONSULTANT	YYYY-MM-DD	2022-03-08
	DESIGNED	----
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

Path: N:\Projects\Spatial\DMCC\Burgoe\_Range\_Site\_NL\98\_PROJ\21497139\_0001-HS-0023.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:



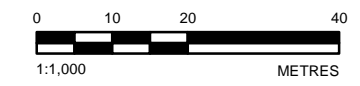
**LEGEND**

- APPROXIMATE DEBRIS LOCATION
- WATERCOURSE
- WATERBODY
- SITE

Debris ID	Description	Approximate Quantity
L2_DEB_1	Wooden stake target and spent ammunition.	<1m <sup>3</sup>
L2_DEB_2	Wooden stakes and spent shotgun shells.	<1m <sup>3</sup>
L2_DEB_3	Wooden stakes and cardboard target.	<1m <sup>3</sup>
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m <sup>3</sup>
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_6	Wooden plank target	<1m <sup>3</sup>
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m <sup>3</sup>
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m <sup>3</sup>
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m <sup>3</sup>
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_13	Wooden stake and spent shot gun shells	~1m <sup>3</sup>

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

---

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 2 - DEBRIS LOCATIONS**

---

CONSULTANT	YYYY-MM-DD	2022-03-08
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	----
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

---

PROJECT NO. 21497139	CONTROL 0001	REV. 0	FIGURE <b>24</b>
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Path: N:\Projects\Spatial\DMDC\Burgoe\_Range\_Site\_NL\99\_PROJ\01\071\_30\_DCC\_Evidence\001\_Sampling\_Photos\1497139\_0001\_H5-0024.mxd

25mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

**APPENDIX A**

**Photographs**



Photo 1: View within Zone 1 looking toward the Burgeo Highway, facing west from BFR\_L1\_SS3 location.



Photo 2: View of front side of backstop, facing south.



Photo 3: View of area where locals would set up to shoot across the water, facing southeast.



Photo 4: View of surface water where the locals would shoot, facing southwest from BFR\_L1\_SS8D.





Photo 5: Test pit at BFR\_L1\_SS8D.



Photo 6: Close up view of the body of in zone 2, from BFR\_L1\_SW49, facing southwest.



Photo 7: Close up view of sediment collected in zone 2, from BFR\_L1\_SED49.



Photo 8: View of L1 access road from BFR\_L1\_SS4C, facing south.



Photo 9: View of shell casings and debris on site between entrance and backstop, facing north.



Photo 10: View of BFR\_L1\_SS1 location in area of Rangers target practice shooting location, facing southeast. Backstop visible in middle of photo.



Photo 11: View of most eastern firing stand in Location 2, facing east. The Burgeo Highway can be seen in the background.



Photo 12: View of most western firing stand in Location 2, facing west. Natural backstop can be seen in the background.



Photo 13: View from base of natural backstop, facing east. Taken from BFR\_L2\_SS3.



Photo 14: Close-up view of BFR\_L2\_SW1, facing north.



Photo 15: Close-up view of BFR\_L2\_SW10, facing north.



Photo 16: View from top of natural backstop, facing north, toward BFR\_L2\_SW2.



Photo 17: View from top of natural backstop, facing northwest, toward BFR\_L2\_SW3.



Photo 18: Close-up view of BFR\_SED16.



Photo 19: View from BFR\_L2\_SS12 from behind the natural backstop, facing west.



Photo 20: Close-up view of BFR\_L2\_SW5. Facing east.





Photo 21: MW21-01 bedrock cores – 1.68 mbgs – 8.45 mbgs



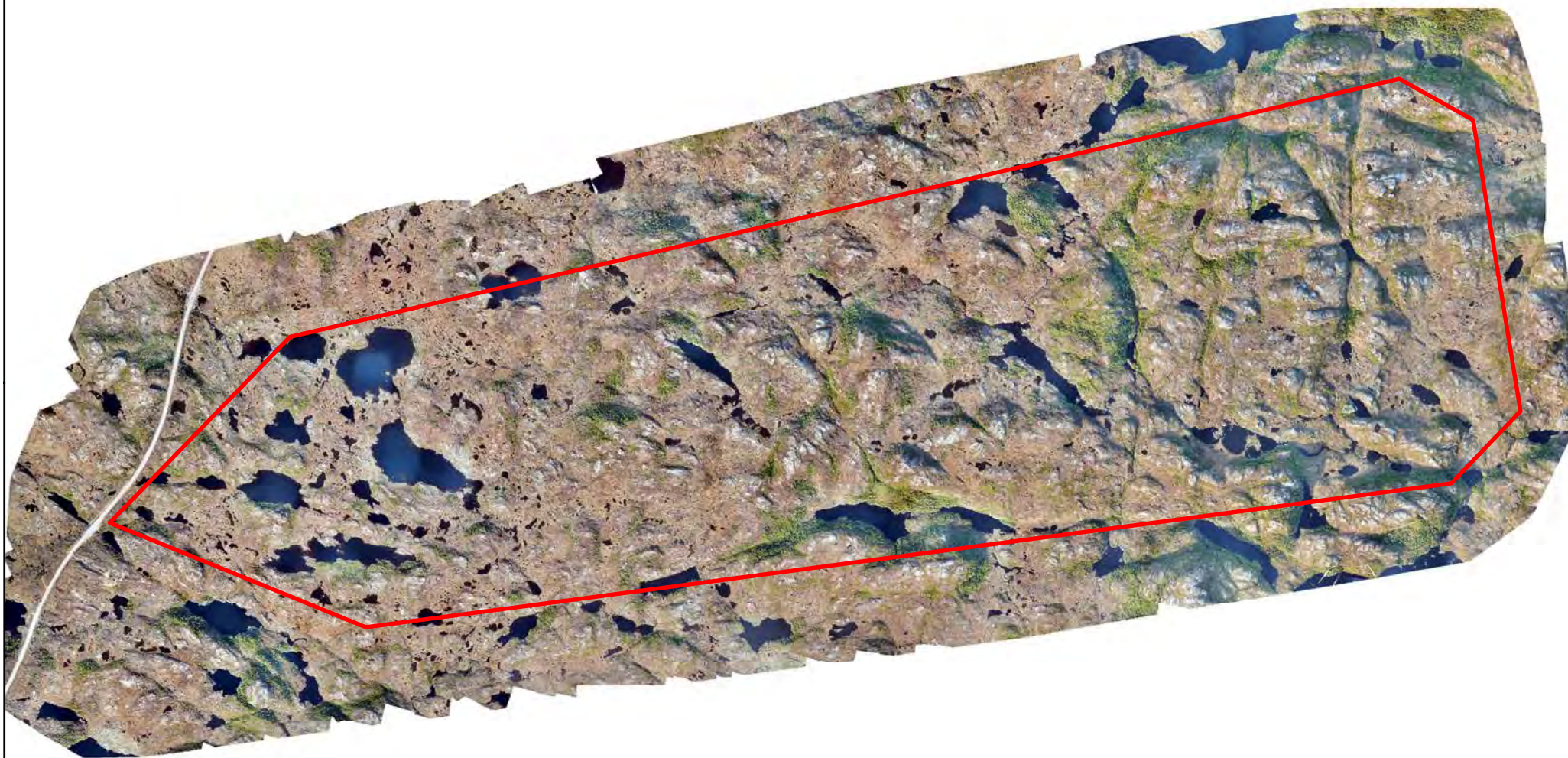
Photo 22: MW21-02 bedrock cores – 1.75 mbgs – 5.18 mbgs



Photo 23: MW21-03 bedrock cores – 1.00 mbgs – 5.24 mbgs

**APPENDIX B**

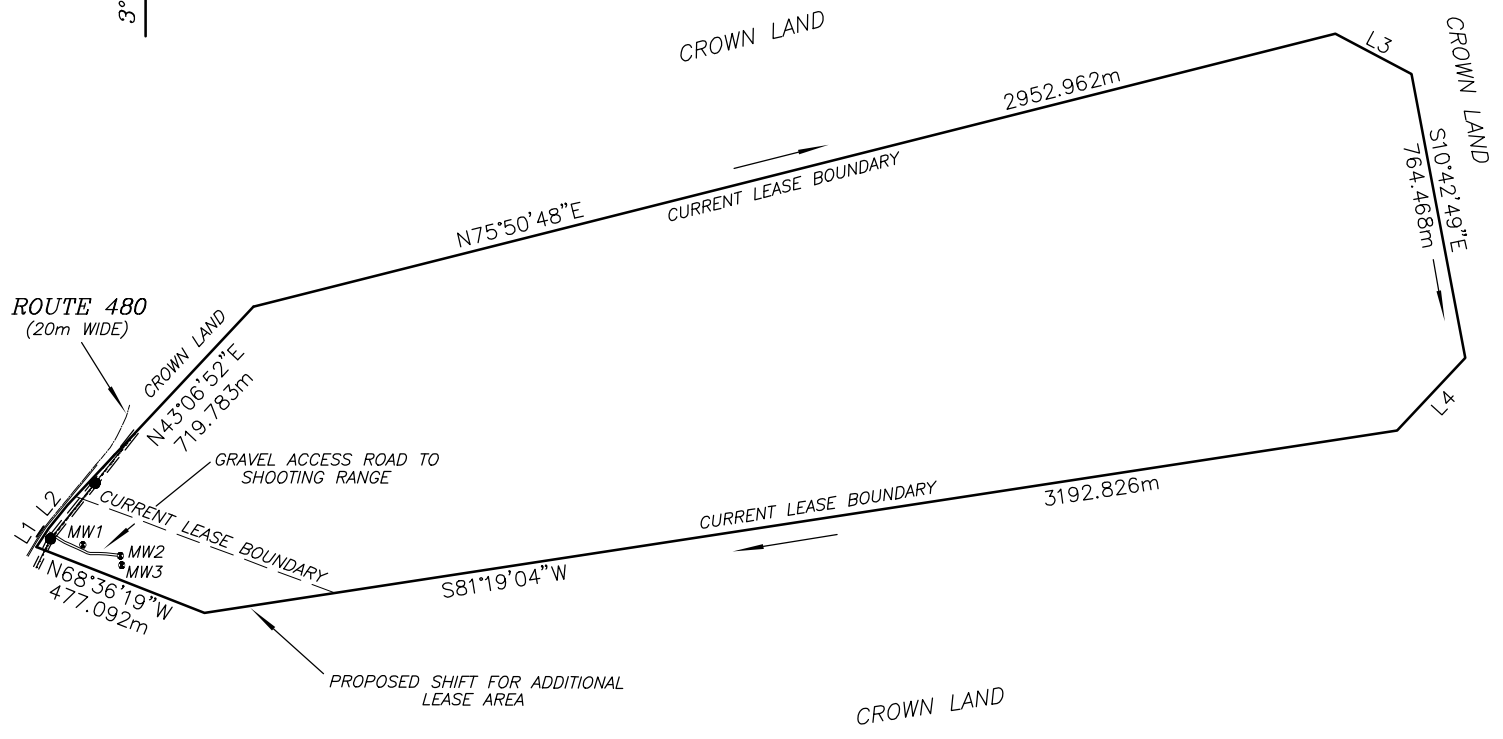
**Survey Plans**



0 0.25 0.5 1 Kilometers

 Approximate Project Area Boundary

3° GRID NORTH ( NAD, 83 )  
 C . M . 58° 30' W . L .



MW1	TOP=85.72	GROUND=84.81
MW2	TOP=82.79	GROUND=82.00
MW3	TOP=80.93	GROUND=80.10

**LEGEND**

- CONTROL MONUMENT .....
- CAPPED IRON PIN .....
- FOUND IRON PIN .....
- PK NAIL ..... PK
- MONITORING WELL..... MW
- BOUNDARY LINE .....
- POLE OR LIGHT STANDARD .....
- HYDRANT.....
- FENCE POST ..... FP
- FENCE LINES .....
- GUY WIRE .....
- POWER-TELEPHONE LINES .....
- EASEMENTS .....
- CENTERLINE .....

NUM	BEARING	DISTANCE
L1	N32°56'11"E	58.806m
L2	N39°01'19"E	79.097m
L3	S62°03'15"E	227.749m
L4	S43°03'53"W	263.456m

REFERENCE MONUMENTS : 89G6154 N 5,276,532.059 E 368,548.649  
 ( COMBINED SCALE FACTOR : 0.999942 )  
 89G6155 N 5,275,849.512 E 369,991.205

ALL DISTANCES SHOWN ARE HORIZONTAL  
 DISTANCES MEASURED IN METERS .

**YATES AND WOODS LTD.**  
 NEWFOUNDLAND LAND SURVEYORS  
 53 CARIBOU ROAD CORNER BROOK, NL.  
 A2H 4W8 TEL. 639-9177 E-mail: yatesandwoods@bellaliant.com



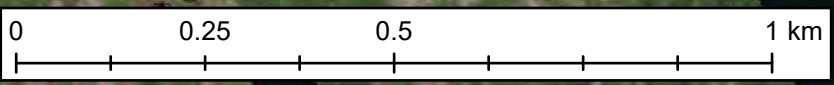
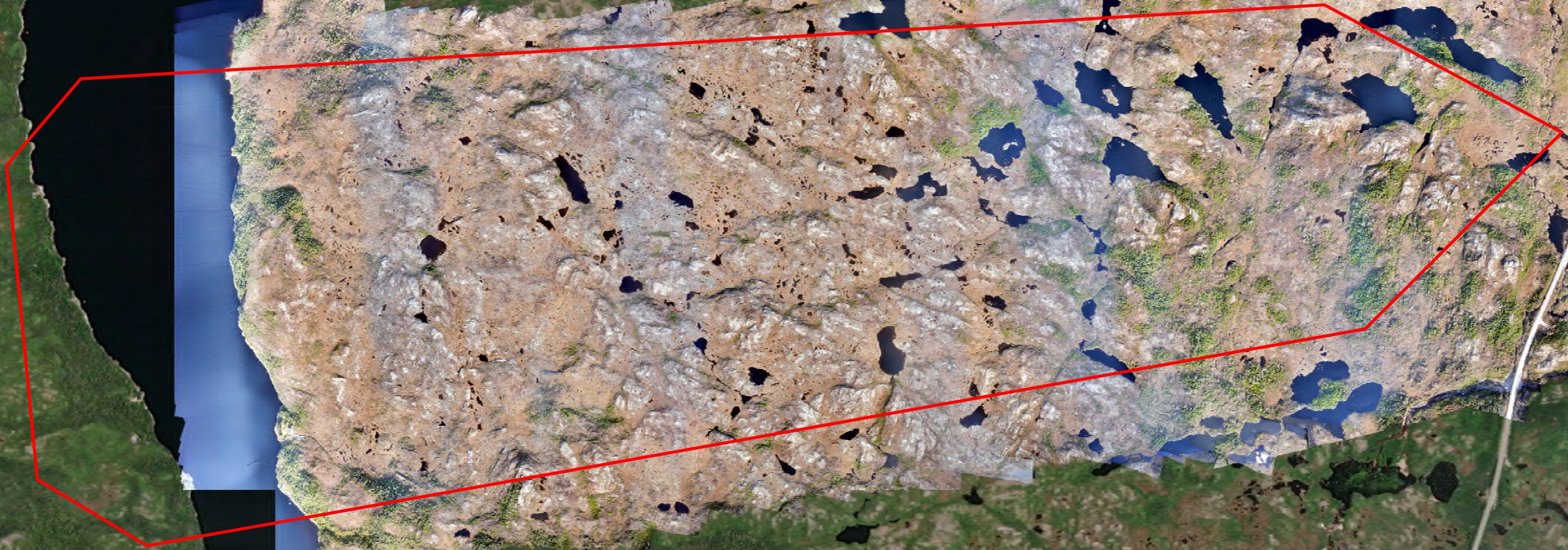
**SURVEY PLAN SHOWING MONITOR WELLS FOR  
 DEPARTMENT OF NATIONAL DEFENCE SHOOTING RANGE  
 ROUTE 480, BURGEO, NL.**

SCALE: 1 : 20000

DWG. NO. 20456-1

DRAWN BY M.D.L

DATE: MARCH 29, 2022



BURGEO FIRING RANGE  
LOCATION 2

UAV IMAGERY ACQUIRED 18/11/2021

3° GRID NORTH ( NAD, 83 )  
C . M . 58° 30' W . L .



APPROXIMATE CABIN LOCATIONS

CABIN NO. 1	MORGAN STRICKLAND	TITLE NO. 75661
CABIN NO. 2	CALVIN INGRAM	TITLE NO. 77947
CABIN NO. 3	WARD STRICKLAND	TITLE NO. 88621
CABIN NO. 4	ALLISTER BARTER	TITLE NO. 74906

LEGEND

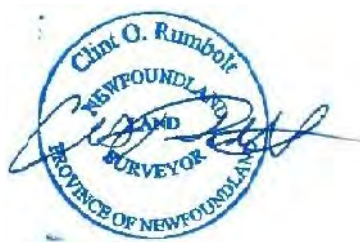
- CONTROL MONUMENT .....
- CAPPED IRON PIN .....
- FOUND IRON PIN .....
- PK NAIL ..... PK
- BOUNDARY LINE .....
- POLE OR LIGHT STANDARD .....
- HYDRANT.....
- FENCE POST ..... FP
- FENCE LINES .....
- GUY WIRE .....
- POWER-TELEPHONE LINES .....
- EASEMENTS .....
- CENTERLINE .....

NUM	BEARING	DISTANCE
L1	N59°08'13"W	228.058m
L2	N46°19'52"E	261.976m

REFERENCE MONUMENTS : 89G6154 N 5,276,532.059 E 368,548.649  
( COMBINED SCALE FACTOR : 0.999942 )  
89G6155 N 5,275,849.512 E 369,991.205

ALL DISTANCES SHOWN ARE HORIZONTAL  
DISTANCES MEASURED IN METERS .

**YATES AND WOODS LTD.**  
NEWFOUNDLAND LAND SURVEYORS  
53 CARIBOU ROAD CORNER BROOK, NL.  
A2H 4W8 TEL. 639-9177 E-mail: yatewood@nf.aibn.com



**SURVEY PLAN OF LAND FOR  
DEPARTMENT OF NATIONAL DEFENCE SHOOTING RANGE  
ROUTE 480, BURGEO, NL.**

SCALE: 1 : 20000	DWG. NO. 21474	DRAWN BY M.D.L	DATE: MARCH 29, 2022
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**APPENDIX C**

**Laboratory Certificates of Analysis**



**CLIENT NAME: GOLDER ASSOCIATES**  
**201 Brownlow Avenue, Suite 26**  
**DARTMOUTH, NS B3B 1W2**  
**(902) 466-1668**

**ATTENTION TO: BELINDA CULGIN**

**PROJECT: 21497139**

**AGAT WORK ORDER: 21X835413**

**TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.**

**WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer**

**DATE REPORTED: Dec 06, 2021**

**PAGES (INCLUDING COVER): 23**

**VERSION\*: 1**

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

**Disclaimer:**

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

# Certificate of Analysis

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	BFR_L2_SW_D							
				SAMPLE DESCRIPTION:	BFR_L2_SW1	BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW3	BFR_L2_SW9	BFR_L2_SW10	UP1
				SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water
				DATE SAMPLED:	2021-11-22 08:57	2021-11-22 09:57	2021-11-22 10:49	2021-11-22 09:30	2021-11-22 11:12	2021-11-22 10:25	2021-11-22 11:12
		3253905	3253925	3253926	3253927	3253928	3253931	3253932			
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Modified TPH (Tier 1)	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Sediment			TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	
Resemblance Comment			NR	NR	NR	NR	NR	NR	NR	NR	
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y	Y	
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	70-130	107	104	107	106	106	105	105	106	
Isobutylbenzene - VPH	%	70-130	84	86	86	86	83	86	86	82	
n-Dotriacontane - EPH	%	70-130	109	103	105	108	106	105	105	105	

Certified By:





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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

**Comments:** RDL - Reported Detection Limit; G / S - Guideline / Standard

**3253905-3253932** Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:

GF - Gasoline Fraction

WGF - Weathered Gasoline Fraction

GR - Product in Gasoline Range

FOF - Fuel Oil Fraction

WFOF - Weathered Fuel Oil Fraction

FR - Product in Fuel Oil Range

LOF - Lube Oil Fraction

LR - Lube Range

UC - Unidentified Compounds

NR - No Resemblance

NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

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 http://www.agatlabs.com

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L2_SW1 BFR_L2_SW6 BFR_L2_SW7 BFR_L2_SW3 BFR_L2_SW9 BFR_L2_SW10							BFR_L2_SW_D
				SAMPLE TYPE: Water Water Water Water Water Water Water							UP1
				DATE SAMPLED: 2021-11-22 2021-11-22 2021-11-22 2021-11-22 2021-11-22 2021-11-22 2021-11-22							2021-11-22
				08:57 09:57 10:49 09:30 11:12 10:25 11:12							11:12
				3253905	3253925	3253926	3253927	3253928	3253931	3253932	
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Sediment				NO	NO	NO	NO	NO	NO	NO	
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	80	96	92	84	87	91	93		
Terphenyl-d14	%	50-140	76	81	86	78	80	79	84		
Pyrene-d10	%	50-140	71	81	83	76	77	77	81		

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
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FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3253905-3253932 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	BFR_L2_SW_D								
				SAMPLE DESCRIPTION:	BFR_L2_SW1	BFR_L2_SW6	BFR_L2_SW7	BFR_L2_SW3	BFR_L2_SW9	BFR_L2_SW10	UP1	
				SAMPLE TYPE:	Water	Water	Water	Water	Water	Water	Water	Water
				DATE SAMPLED:	2021-11-22 08:57	2021-11-22 09:57	2021-11-22 10:49	2021-11-22 09:30	2021-11-22 11:12	2021-11-22 10:25	2021-11-22 11:12	3253932
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

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# Certificate of Analysis

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PROJECT: 21497139

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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-22  
10:25

3253931

Parameter	Unit	G / S	RDL	3253931
pH				5.14
Reactive Silica as SiO2	mg/L		0.5	2.2
Chloride	mg/L		1	6
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	<2
Alkalinity	mg/L		5	<5
True Color	TCU		5.00	102
Turbidity	NTU		0.5	1.5
Electrical Conductivity	umho/cm		1	32
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	0.07
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	4.2
Total Potassium	mg/L		0.1	0.2
Total Calcium	mg/L		0.1	3.9
Total Magnesium	mg/L		0.1	0.5
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	16
Hardness	mg/L			11.8
Langelier Index (@20C)	NA			-5.09
Langelier Index (@ 4C)	NA			-5.41
Saturation pH (@ 20C)	NA			10.2
Saturation pH (@ 4C)	NA			10.5
Anion Sum	me/L			0.17
Cation sum	me/L			0.51

Certified By:



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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-22  
10:25

3253931

Parameter	Unit	G / S	RDL	3253931
% Difference/ Ion Balance	%			49.9
Total Aluminum	ug/L		5	536
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	<5
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	78
Total Cadmium	ug/L	0.09		<0.09
Total Chromium	ug/L	1		<1
Total Cobalt	ug/L	1		<1
Total Copper	ug/L	1		<1
Total Iron	ug/L		50	253
Total Lead	ug/L		0.5	0.7
Total Manganese	ug/L		2	6
Total Molybdenum	ug/L		2	<2
Total Nickel	ug/L		2	<2
Total Phosphorous	mg/L	0.02		<0.02
Total Selenium	ug/L	1		<1
Total Silver	ug/L	0.1		<0.1
Total Strontium	ug/L		5	11
Total Thallium	ug/L		0.1	<0.1
Total Tin	ug/L		2	<2
Total Titanium	ug/L		2	8
Total Uranium	ug/L		0.2	<0.2
Total Vanadium	ug/L		2	<2
Total Zinc	ug/L		5	63

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3253931 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835413

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L2_SW1 BFR_L2_SW6 BFR_L2_SW7 BFR_L2_SW3 BFR_L2_SW9						BFR_L2_SW_D		
				SAMPLE TYPE: Water		Water		Water		Water		UP1
				DATE SAMPLED: 2021-11-22 08:57		2021-11-22 09:57		2021-11-22 10:49		2021-11-22 09:30		2021-11-22 11:12
				3253905		3253925		3253926		3253927		3253928
Total Aluminum	ug/L		5	435	631	264	401	631	636			
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Barium	ug/L		5	<5	<5	<5	<5	<5	<5			
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Boron	ug/L		5	44	80	37	46	140	147			
Total Cadmium	ug/L	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09			
Total Chromium	ug/L		1	<1	<1	<1	<1	<1	<1			
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1			
Total Copper	ug/L		1	<1	<1	<1	<1	<1	<1			
Total Iron	ug/L		50	560	226	192	227	128	139			
Total Lead	ug/L		0.5	0.8	1.5	0.6	0.7	0.8	0.8			
Total Manganese	ug/L		2	12	4	4	3	3	3			
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Nickel	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1			
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Total Strontium	ug/L		5	8	11	7	8	16	16			
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Titanium	ug/L		2	8	11	5	6	11	12			
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2			
Total Zinc	ug/L		5	32	64	28	39	119	115			

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Water Analysis - TOC

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-22  
10:25

Parameter	Unit	G / S	RDL	3253931
Total Organic Carbon	mg/L		1	10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3250850	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	138%	50%	140%	133%	50%	140%
2-Methylnaphthalene	1	3250850	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	128%	50%	140%	120%	50%	140%
Acenaphthene	1	3250850	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	135%	50%	140%	105%	50%	140%
Acenaphthylene	1	3250850	< 0.01	< 0.01	NA	< 0.01	94%	50%	140%	121%	50%	140%	23%	50%	140%
Acridine	1	3250850	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	133%	50%	140%	122%	50%	140%
Anthracene	1	3250850	< 0.012	< 0.012	NA	< 0.012	89%	50%	140%	113%	50%	140%	71%	50%	140%
Benzo(a)anthracene	1	3250850	< 0.018	< 0.018	NA	< 0.018	94%	50%	140%	118%	50%	140%	103%	50%	140%
Benzo(a)pyrene	1	3250850	< 0.010	< 0.010	NA	< 0.010	80%	50%	140%	103%	50%	140%	62%	50%	140%
Benzo(b)fluoranthene	1	3250850	< 0.01	< 0.01	NA	< 0.01	128%	50%	140%	133%	50%	140%	98%	50%	140%
Benzo(j+k)fluoranthene	1	3250850	< 0.01	< 0.01	NA	< 0.01	135%	50%	140%	127%	50%	140%	97%	50%	140%
Benzo(e)pyrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	130%	50%	140%	96%	50%	140%
Benzo(ghi)perylene	1	3250850	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	122%	50%	140%	35%	50%	140%
Chrysene	1	3250850	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	121%	50%	140%	136%	50%	140%
Dibenzo(a,h)anthracene	1	3250850	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	112%	50%	140%	31%	50%	140%
Fluoranthene	1	3250850	0.01	0.01	NA	< 0.01	107%	50%	140%	133%	50%	140%	123%	50%	140%
Fluorene	1	3250850	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	136%	50%	140%	125%	50%	140%
Indeno(1,2,3-cd)pyrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	119%	50%	140%	121%	50%	140%	56%	50%	140%
Naphthalene	1	3250850	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	136%	50%	140%	133%	50%	140%
Perylene	1	3250850	< 0.01	< 0.01	NA	< 0.01	98%	50%	140%	122%	50%	140%	81%	50%	140%
Phenanthrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	118%	50%	140%	136%	50%	140%	131%	50%	140%
Pyrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	137%	50%	140%	123%	50%	140%
Quinoline	1	3250850	< 0.01	< 0.01	NA	< 0.01	123%	50%	140%	162%	50%	140%	122%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike and Blank Spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3259657	< 0.001	< 0.001	NA	< 0.001	86%	70%	130%	93%	70%	130%			
Toluene	1	3259657	< 0.001	< 0.001	NA	< 0.001	89%	70%	130%	95%	70%	130%			
Ethylbenzene	1	3259657	< 0.001	< 0.001	NA	< 0.001	91%	70%	130%	93%	70%	130%			
Xylene (Total)	1	3259657	< 0.002	< 0.002	NA	< 0.002	91%	70%	130%	94%	70%	130%			
C6-C10 (less BTEX)	1	3259657	< 0.01	< 0.01	NA	< 0.01	94%	70%	130%	88%	70%	130%	100%	70%	130%
>C10-C16 Hydrocarbons	1	3253905	< 0.05	< 0.05	NA	< 0.05	101%	70%	130%	101%	70%	130%	105%	70%	130%
>C16-C21 Hydrocarbons	1	3253905	< 0.05	< 0.05	NA	< 0.05	102%	70%	130%	101%	70%	130%	105%	70%	130%
>C21-C32 Hydrocarbons	1	3253905	< 0.1	< 0.1	NA	< 0.1	75%	70%	130%	101%	70%	130%	105%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

## Quality Assurance

 CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X835413  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## Quality Assurance

**CLIENT NAME: GOLDER ASSOCIATES**
**AGAT WORK ORDER: 21X835413**
**PROJECT: 21497139**
**ATTENTION TO: BELINDA CULGIN**
**SAMPLING SITE:**
**SAMPLED BY:**

Water Analysis															
RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Total Metals**

Total Aluminum	3254143		313	335	6.6%	< 5	101%	80%	120%	103%	80%	120%	104%	70%	130%
Total Antimony	3254143		<2	<2	NA	< 2	87%	80%	120%	120%	80%	120%	95%	70%	130%
Total Arsenic	3254143		<2	<2	NA	< 2	101%	80%	120%	100%	80%	120%	101%	70%	130%
Total Barium	3254143		<5	5	NA	< 5	89%	80%	120%	90%	80%	120%	90%	70%	130%
Total Beryllium	3254143		<2	<2	NA	< 2	98%	80%	120%	96%	80%	120%	96%	70%	130%
Total Bismuth	3254143		<2	<2	NA	< 2	87%	80%	120%	105%	80%	120%	105%	70%	130%
Total Boron	3254143		53	65	20.5%	< 5	98%	80%	120%	100%	80%	120%	101%	70%	130%
Total Cadmium	3254143		<0.09	<0.09	NA	< 0.09	94%	80%	120%	102%	80%	120%	101%	70%	130%
Total Chromium	3254143		<1	1	NA	< 1	90%	80%	120%	98%	80%	120%	94%	70%	130%
Total Cobalt	3254143		<1	<1	NA	< 1	91%	80%	120%	102%	80%	120%	98%	70%	130%
Total Copper	3254143		273	267	2.2%	< 1	94%	80%	120%	101%	80%	120%	104%	70%	130%
Total Iron	3254143		134	168	NA	< 50	92%	80%	120%	98%	80%	120%	93%	70%	130%
Total Lead	3254143		0.9	1.0	NA	< 0.5	105%	80%	120%	108%	80%	120%	111%	70%	130%
Total Manganese	3254143		12	12	1.8%	< 2	91%	80%	120%	99%	80%	120%	96%	70%	130%
Total Molybdenum	3254143		<2	<2	NA	< 2	82%	80%	120%	95%	80%	120%	100%	70%	130%
Total Nickel	3254143		<2	<2	NA	< 2	90%	80%	120%	98%	80%	120%	101%	70%	130%
Total Selenium	3254143		<1	<1	NA	< 1	97%	80%	120%	110%	80%	120%	100%	70%	130%
Total Silver	3254143		<0.1	<0.1	NA	< 0.1	89%	80%	120%	99%	80%	120%	97%	70%	130%
Total Strontium	3254143		14	14	NA	< 5	93%	80%	120%	101%	80%	120%	103%	70%	130%
Total Thallium	3254143		<0.1	<0.1	NA	< 0.1	105%	80%	120%	108%	80%	120%	109%	70%	130%
Total Tin	3254143		<2	<2	NA	< 2	90%	80%	120%	99%	80%	120%	100%	70%	130%
Total Titanium	3254143		4	5	NA	< 2	99%	80%	120%	99%	80%	120%	104%	70%	130%
Total Uranium	3254143		<0.2	<0.2	NA	< 0.2	104%	80%	120%	103%	80%	120%	107%	70%	130%
Total Vanadium	3254143		<2	<2	NA	< 2	91%	80%	120%	98%	80%	120%	98%	70%	130%
Total Zinc	3254143		315	330	4.8%	< 5	94%	80%	120%	102%	80%	120%	109%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Mercury Analysis in Water (Total)**

Total Mercury	3253925	3253925	<0.026	<0.026	NA	< 0.026	95%	80%	120%	97%	80%	120%	94%	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Standard Water Analysis + Total Metals**

pH	3271396		7.79	7.78	0.1%	<	102%	80%	120%	NA			NA		
Reactive Silica as SiO2	3251143		5.0	5.1	2.4%	<0.5	95%	80%	120%	92%	80%	120%	92%	80%	120%
Chloride	3254801		53	54	1.4%	< 1	89%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3254801		<0.12	<0.12	NA	< 0.12	101%	80%	120%	NA	80%	120%	95%	70%	130%
Sulphate	3254801		105	106	0.9%	< 2	106%	80%	120%	NA	80%	120%	NA	70%	130%
Alkalinity	3271396		77	77	0.4%	< 5	89%	80%	120%	NA			NA		
True Color	3251143		<5.00	<5.00	NA	< 5	81%	80%	120%	95%	80%	120%	NA		
Turbidity	3278296		2.2	2.2	NA	< 0.5	96%	80%	120%	NA			NA		

**AGAT QUALITY ASSURANCE REPORT (V1)**

Page 14 of 23

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

## Quality Assurance

**CLIENT NAME: GOLDER ASSOCIATES**
**AGAT WORK ORDER: 21X835413**
**PROJECT: 21497139**
**ATTENTION TO: BELINDA CULGIN**
**SAMPLING SITE:**
**SAMPLED BY:**

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Electrical Conductivity	3271396		312	318	1.6%	< 1	103%	90%	110%	NA			NA		
Nitrate as N	3254801		<0.05	<0.05	NA	< 0.05	90%	80%	120%	NA	80%	120%	82%	70%	130%
Nitrite as N	3254801		<0.05	<0.05	NA	< 0.05	92%	80%	120%	NA	80%	120%	109%	70%	130%
Ammonia as N	3244531		0.25	0.27	7.9%	< 0.03	115%	80%	120%	87%	80%	120%	104%	70%	130%
Ortho-Phosphate as P	3251143		<0.01	<0.01	NA	< 0.01	89%	80%	120%	109%	80%	120%	105%	80%	120%
Total Sodium	3254143		10.9	11.0	0.9%	< 0.1	102%	80%	120%	104%	80%	120%	NA	70%	130%
Total Potassium	3254143		0.4	0.3	NA	< 0.1	100%	80%	120%	103%	80%	120%	0%	70%	130%
Total Calcium	3254143		8.4	8.2	1.6%	< 0.1	101%	80%	120%	99%	80%	120%	NA	70%	130%
Total Magnesium	3254143		0.5	0.5	NA	< 0.1	99%	80%	120%	98%	80%	120%	4%	70%	130%
Bicarb. Alkalinity (as CaCO3)	3271396		77	77	0.4%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3271396		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3271396		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3254143		313	335	6.6%	< 5	101%	80%	120%	103%	80%	120%	NA	70%	130%
Total Antimony	3254143		<2	<2	NA	< 2	87%	80%	120%	127%	80%	120%	-3%	70%	130%
Total Arsenic	3254143		<2	<2	NA	< 2	101%	80%	120%	100%	80%	120%	0%	70%	130%
Total Barium	3254143		<5	5	NA	< 5	89%	80%	120%	90%	80%	120%	4%	70%	130%
Total Beryllium	3254143		<2	<2	NA	< 2	98%	80%	120%	96%	80%	120%	0%	70%	130%
Total Bismuth	3254143		<2	<2	NA	< 2	87%	80%	120%	105%	80%	120%	0%	70%	130%
Total Boron	3254143		53	65	20.5%	< 5	98%	80%	120%	100%	80%	120%	NA	70%	130%
Total Cadmium	3254143		<0.09	<0.09	NA	< 0.09	94%	80%	120%	102%	80%	120%	0%	70%	130%
Total Chromium	3254143		<1	1	NA	< 1	90%	80%	120%	98%	80%	120%	2%	70%	130%
Total Cobalt	3254143		<1	<1	NA	< 1	91%	80%	120%	102%	80%	120%	0%	70%	130%
Total Copper	3254143		273	267	2.2%	< 1	94%	80%	120%	101%	80%	120%	NA	70%	130%
Total Iron	3254143		134	168	NA	< 50	92%	80%	120%	98%	80%	120%	129%	70%	130%
Total Lead	3254143		0.9	1.0	NA	< 0.5	105%	80%	120%	108%	80%	120%	2%	70%	130%
Total Manganese	3254143		12	12	1.8%	< 2	91%	80%	120%	99%	80%	120%	NA	70%	130%
Total Molybdenum	3254143		<2	<2	NA	< 2	82%	80%	120%	95%	80%	120%	0%	70%	130%
Total Nickel	3254143		<2	<2	NA	< 2	90%	80%	120%	98%	80%	120%	14%	70%	130%
Total Phosphorous	3254143		0.48	0.50	2.8%	< 0.02	83%	80%	120%	91%	80%	120%	NA	70%	130%
Total Selenium	3254143		<1	<1	NA	< 1	97%	80%	120%	110%	80%	120%	5%	70%	130%
Total Silver	3254143		<0.1	<0.1	NA	< 0.1	89%	80%	120%	99%	80%	120%	0%	70%	130%
Total Strontium	3254143		14	14	NA	< 5	93%	80%	120%	101%	80%	120%	17%	70%	130%
Total Thallium	3254143		<0.1	<0.1	NA	< 0.1	105%	80%	120%	108%	80%	120%	0%	70%	130%
Total Tin	3254143		<2	<2	NA	< 2	90%	80%	120%	99%	80%	120%	1%	70%	130%
Total Titanium	3254143		4	5	NA	< 2	99%	80%	120%	99%	80%	120%	43%	70%	130%
Total Uranium	3254143		<0.2	<0.2	NA	< 0.2	104%	80%	120%	103%	80%	120%	0%	70%	130%
Total Vanadium	3254143		<2	<2	NA	< 2	91%	80%	120%	98%	80%	120%	2%	70%	130%
Total Zinc	3254143		315	330	4.8%	< 5	94%	80%	120%	102%	80%	120%	NA	70%	130%

## Quality Assurance

**CLIENT NAME:** GOLDER ASSOCIATES  
**PROJECT:** 21497139  
**SAMPLING SITE:**

**AGAT WORK ORDER:** 21X835413  
**ATTENTION TO:** BELINDA CULGIN  
**SAMPLED BY:**

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Water Analysis - TOC**

Total Organic Carbon	3247455	2	2	NA	< 1	116%	80%	120%	112%	80%	120%	112%	80%	120%
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Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.  
 Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 



## QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

RPT Date: Dec 06, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

Acenaphthylene	3250850	94%	50% 140%	121%	50% 140%	23%	50% 140%
Benzo(ghi)perylene	3250850	99%	50% 140%	122%	50% 140%	35%	50% 140%
Dibenzo(a,h)anthracene	3250850	93%	50% 140%	112%	50% 140%	31%	50% 140%
Quinoline	3250850	123%	50% 140%	162%	50% 140%	122%	50% 140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike and Blank Spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## QC Exceedance

**CLIENT NAME: GOLDER ASSOCIATES**
**AGAT WORK ORDER: 21X835413**
**PROJECT: 21497139**
**ATTENTION TO: BELINDA CULGIN**

RPT Date: Dec 06, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
<b>Standard Water Analysis + Total Metals</b>										
Total Potassium		100%	80%	120%	103%	80%	120%	0%	70%	130%
Total Magnesium		99%	80%	120%	98%	80%	120%	4%	70%	130%
Total Antimony		87%	80%	120%	127%	80%	120%	-3%	70%	130%
Total Arsenic		101%	80%	120%	100%	80%	120%	0%	70%	130%
Total Barium		89%	80%	120%	90%	80%	120%	4%	70%	130%
Total Beryllium		98%	80%	120%	96%	80%	120%	0%	70%	130%
Total Bismuth		87%	80%	120%	105%	80%	120%	0%	70%	130%
Total Cadmium		94%	80%	120%	102%	80%	120%	0%	70%	130%
Total Chromium		90%	80%	120%	98%	80%	120%	2%	70%	130%
Total Cobalt		91%	80%	120%	102%	80%	120%	0%	70%	130%
Total Lead		105%	80%	120%	108%	80%	120%	2%	70%	130%
Total Molybdenum		82%	80%	120%	95%	80%	120%	0%	70%	130%
Total Nickel		90%	80%	120%	98%	80%	120%	14%	70%	130%
Total Selenium		97%	80%	120%	110%	80%	120%	5%	70%	130%
Total Silver		89%	80%	120%	99%	80%	120%	0%	70%	130%
Total Strontium		93%	80%	120%	101%	80%	120%	17%	70%	130%
Total Thallium		105%	80%	120%	108%	80%	120%	0%	70%	130%
Total Tin		90%	80%	120%	99%	80%	120%	1%	70%	130%
Total Titanium		99%	80%	120%	99%	80%	120%	43%	70%	130%
Total Uranium		104%	80%	120%	103%	80%	120%	0%	70%	130%
Total Vanadium		91%	80%	120%	98%	80%	120%	2%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

## Method Summary

**CLIENT NAME: GOLDER ASSOCIATES**
**AGAT WORK ORDER: 21X835413**
**PROJECT: 21497139**
**ATTENTION TO: BELINDA CULGIN**
**SAMPLING SITE:**
**SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Trace Organics Analysis</b>			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835413

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

**CLIENT NAME: GOLDER ASSOCIATES**
**AGAT WORK ORDER: 21X835413**
**PROJECT: 21497139**
**ATTENTION TO: BELINDA CULGIN**
**SAMPLING SITE:**
**SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
<b>Water Analysis</b>			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO <sub>2</sub>	INOR-121-6027	SM 4500-SiO <sub>2</sub> F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH <sub>3</sub> H	COLORIMETER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

## Method Summary

**CLIENT NAME: GOLDER ASSOCIATES**
**AGAT WORK ORDER: 21X835413**
**PROJECT: 21497139**
**ATTENTION TO: BELINDA CULGIN**
**SAMPLING SITE:**
**SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Organic Carbon	INST 0170	SM 5310 B	COMBUSTION

Temp: 5.8, 7.8, 6.4

21x835413 ATL FCD 00149 / 26



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770  
 www.bvna.com E-mail: customerservicebedford@bureauveritas.com

**CHAIN OF CUSTODY RECORD**

COC #: **D 57741** Page \_\_\_\_ of \_\_\_\_

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: <u>GOLDER ASSOCIATES LTD</u>		Company Name: _____		Quotation #: <u>C04828</u>		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: <u>Belinda Culgin</u>		Contact Name: _____		Purchase Order#: _____		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>201 Brownlow Ave Suite 26</u> <u>DARTMOUTH NS</u> PC: _____		Address: _____ PC: _____		Project #: <u>21497139</u>		IF RUSH please specify date (Surcharges will be applied)	
Phone: <u>(902) 466 1668</u>		Phone: _____		Site Location: _____		<b>DATE REQUIRED:</b>	
Email: <u>Belinda-Culgin@golder.com</u>		Email: _____		Site Province: _____			
Report Copies: <u>jdoyle@golder.com</u>		Report Copies: _____		Site #: _____			
Report Copies: _____		Report Copies: _____		Sampled By: <u>A. Brunsell</u>			

Laboratory Use Only				Analysis Requested																					
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL, CCME Sediment)	PCBs - Select One: Default or CCME sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	Regulatory Parameters (Specified)	COMMENTS
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water						Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)												
COOLING MEDIA PRESENT Y / N																									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																					
1	BFD-L2-SW1	2021/11/22	8:57	SW	8					X	X			X	X										
2	<del>BFR-L2-SW6</del> BFR-L2-SW6	2021/11/22	9:57	SW	8					X	X			X	X										
3	BFR-L2-SW7	2021/11/22	10:49	SW	8					X	X			X	X										
4	BFR-L2-SW3	2021/11/22	9:30	SW	8					X	X			X	X										
5	BFR-L2-SW9	2021/11/22	11:12	SW	8					X	X			X	X										
6	BFR-L2-SW10	2021/11/22	10:25	SW	12					X	X			X	X							X			
7	BFR-L2-SW-DUP1	2021/11/22	11:12	SW	8					X	X			X	X										
8																									
9																									
10																									
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																	
<i>[Signature]</i>		2021/11/22		<i>[Signature]</i>																					

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvna.com

White: Bureau Veritas

Pink: Client

CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835441

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Dec 07, 2021

PAGES (INCLUDING COVER): 22

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.





## Certificate of Analysis

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SW26 BFR_L1_SW27 BFR_L1_SW28 BFR_L1_SW29 BFR_L1_SW30 BFR_L1_SW31					
				SAMPLE TYPE: Water	Water	Water	Water	Water	Water
				DATE SAMPLED: 2021-11-21 14:30	2021-11-21 11:08	2021-11-21 11:30	2021-11-21 12:10	2021-11-21 11:47	2021-11-21 12:15
				3254153	3254171	3254172	3254176	3254301	3254302
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH (Tier 1)	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sediment				TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Resemblance Comment				NR	NR	NR	NR	NR	NR
Return to Baseline at C32				Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits							
Isobutylbenzene - EPH	%	70-130	106	107	104	105	107	107	107
Isobutylbenzene - VPH	%	70-130	84	84	80	83	78	84	84
n-Dotriacontane - EPH	%	70-130	104	110	103	108	109	104	104

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254153-3254302 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:

GF - Gasoline Fraction

WGF - Weathered Gasoline Fraction

GR - Product in Gasoline Range

FOF - Fuel Oil Fraction

WFOF - Weathered Fuel Oil Fraction

FR - Product in Fuel Oil Range

LOF - Lube Oil Fraction

LR - Lube Range

UC - Unidentified Compounds

NR - No Resemblance

NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW26 BFR_L1_SW27 BFR_L1_SW28 BFR_L1_SW29 BFR_L1_SW30 BFR_L1_SW31							
		G / S	RDL	3254153	3254171	3254172	3254176	3254301	3254302
1-Methylnaphthalene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L	0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L	0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment			NO	NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140	94	72	81	76	80	76	
Terphenyl-d14	%	50-140	87	83	85	84	83	84	
Pyrene-d10	%	50-140	84	79	87	82	84	84	

Certified By:





**AGAT** Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254153-3254302 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

		SAMPLE DESCRIPTION: BFR_L1_SW26 BFR_L1_SW27 BFR_L1_SW28 BFR_L1_SW29 BFR_L1_SW30 BFR_L1_SW31							
		SAMPLE TYPE: Water		Water		Water		Water	
		DATE SAMPLED: 2021-11-21 14:30		2021-11-21 11:08		2021-11-21 11:30		2021-11-21 12:10	
Parameter	Unit	G / S	RDL	3254153	3254171	3254172	3254176	3254301	3254302
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





# Certificate of Analysis

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11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

SAMPLE DESCRIPTION: BFR\_L1\_SW29

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
12:10

Parameter	Unit	G / S	RDL	3254176
pH				6.46
Reactive Silica as SiO2	mg/L		0.5	10.6
Chloride	mg/L		1	7
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	<2
Alkalinity	mg/L		5	<5
True Color	TCU		5.00	78.8
Turbidity	NTU		0.5	1.0
Electrical Conductivity	umho/cm		1	41
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	0.04
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	4.4
Total Potassium	mg/L		0.1	0.2
Total Calcium	mg/L		0.1	0.5
Total Magnesium	mg/L		0.1	0.6
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	13
Hardness	mg/L			3.7
Langelier Index (@20C)	NA			-4.66
Langelier Index (@ 4C)	NA			-4.98
Saturation pH (@ 20C)	NA			11.1
Saturation pH (@ 4C)	NA			11.4
Anion Sum	me/L			0.20
Cation sum	me/L			0.30

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 FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

SAMPLE DESCRIPTION: BFR\_L1\_SW29

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
12:10

3254176

Parameter	Unit	G / S	RDL	3254176
% Difference/ Ion Balance	%			21.0
Total Aluminum	ug/L		5	174
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	<5
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	<5
Total Cadmium	ug/L	0.09		<0.09
Total Chromium	ug/L	1		<1
Total Cobalt	ug/L	1		<1
Total Copper	ug/L	1		<1
Total Iron	ug/L		50	249
Total Lead	ug/L		0.5	1.4
Total Manganese	ug/L		2	4
Total Molybdenum	ug/L		2	<2
Total Nickel	ug/L		2	<2
Total Phosphorous	mg/L	0.02		0.02
Total Selenium	ug/L	1		<1
Total Silver	ug/L	0.1		<0.1
Total Strontium	ug/L	5		<5
Total Thallium	ug/L	0.1		<0.1
Total Tin	ug/L	2		<2
Total Titanium	ug/L	2		2
Total Uranium	ug/L		0.2	<0.2
Total Vanadium	ug/L		2	<2
Total Zinc	ug/L		5	<5

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

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SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254176 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





## Certificate of Analysis

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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 FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

Parameter	Unit	SAMPLE DESCRIPTION:						
		G / S	RDL	BFR_L1_SW26	BFR_L1_SW27	BFR_L1_SW28	BFR_L1_SW30	BFR_L1_SW31
				Water	Water	Water	Water	Water
				DATE SAMPLED:	DATE SAMPLED:	DATE SAMPLED:	DATE SAMPLED:	DATE SAMPLED:
				2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
				14:30	11:08	11:30	11:47	12:15
				3254153	3254171	3254172	3254301	3254302
Total Aluminum	ug/L		5	335	377	262	253	245
Total Antimony	ug/L		2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	<5	<5	<5	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	<5	<5	<5	<5	<5
Total Cadmium	ug/L	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	<1	<1	1	<1	<1
Total Iron	ug/L		50	348	437	303	151	201
Total Lead	ug/L		0.5	0.8	0.7	2.8	0.6	0.6
Total Manganese	ug/L		2	10	17	13	6	6
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	12	<2	<2
Total Selenium	ug/L		1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	5	6	<5	<5	<5
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	6	8	3	2	2
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Water Analysis - TOC

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-07

SAMPLE DESCRIPTION: BFR\_L1\_SW29

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
12:10

Parameter	Unit	G / S	RDL	3254176
Total Organic Carbon	mg/L		1	10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 07, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3259657	< 0.001	< 0.001	NA	< 0.001	86%	70%	130%	93%	70%	130%		
Toluene	1	3259657	< 0.001	< 0.001	NA	< 0.001	89%	70%	130%	95%	70%	130%		
Ethylbenzene	1	3259657	< 0.001	< 0.001	NA	< 0.001	91%	70%	130%	93%	70%	130%		
Xylene (Total)	1	3259657	< 0.002	< 0.002	NA	< 0.002	91%	70%	130%	94%	70%	130%		
C6-C10 (less BTEX)	1	3259657	< 0.01	< 0.01	NA	< 0.01	94%	70%	130%	88%	70%	130%	100%	70%
>C10-C16 Hydrocarbons	1	3253905	< 0.05	< 0.05	NA	< 0.05	101%	70%	130%	101%	70%	130%	105%	70%
>C16-C21 Hydrocarbons	1	3253905	< 0.05	< 0.05	NA	< 0.05	102%	70%	130%	101%	70%	130%	105%	70%
>C21-C32 Hydrocarbons	1	3253905	< 0.1	< 0.1	NA	< 0.1	75%	70%	130%	101%	70%	130%	105%	70%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3250850	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	138%	50%	140%	133%	50%
2-Methylnaphthalene	1	3250850	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	128%	50%	140%	120%	50%
Acenaphthene	1	3250850	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	135%	50%	140%	105%	50%
Acenaphthylene	1	3250850	< 0.01	< 0.01	NA	< 0.01	94%	50%	140%	121%	50%	140%	23%	50%
Acridine	1	3250850	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	133%	50%	140%	122%	50%
Anthracene	1	3250850	< 0.012	< 0.012	NA	< 0.012	89%	50%	140%	113%	50%	140%	71%	50%
Benzo(a)anthracene	1	3250850	< 0.018	< 0.018	NA	< 0.018	94%	50%	140%	118%	50%	140%	103%	50%
Benzo(a)pyrene	1	3250850	< 0.010	< 0.010	NA	< 0.010	80%	50%	140%	103%	50%	140%	62%	50%
Benzo(b)fluoranthene	1	3250850	< 0.01	< 0.01	NA	< 0.01	128%	50%	140%	133%	50%	140%	98%	50%
Benzo(j+k)fluoranthene	1	3250850	< 0.01	< 0.01	NA	< 0.01	135%	50%	140%	127%	50%	140%	97%	50%
Benzo(e)pyrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	130%	50%	140%	96%	50%
Benzo(ghi)perylene	1	3250850	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	122%	50%	140%	35%	50%
Chrysene	1	3250850	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	121%	50%	140%	136%	50%
Dibenzo(a,h)anthracene	1	3250850	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	112%	50%	140%	31%	50%
Fluoranthene	1	3250850	0.01	0.01	NA	< 0.01	107%	50%	140%	133%	50%	140%	123%	50%
Fluorene	1	3250850	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	136%	50%	140%	125%	50%
Indeno(1,2,3-cd)pyrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	119%	50%	140%	121%	50%	140%	56%	50%
Naphthalene	1	3250850	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	136%	50%	140%	133%	50%
Perylene	1	3250850	< 0.01	< 0.01	NA	< 0.01	98%	50%	140%	122%	50%	140%	81%	50%
Phenanthrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	118%	50%	140%	136%	50%	140%	131%	50%
Pyrene	1	3250850	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	137%	50%	140%	123%	50%
Quinoline	1	3250850	< 0.01	< 0.01	NA	< 0.01	123%	50%	140%	162%	50%	140%	122%	50%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike and Blank Spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835441  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 07, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Water - (PAH)															
1-Methylnaphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	132%	50%	140%	114%	50%	140%
2-Methylnaphthalene	1	3254171	0.01	< 0.01	NA	< 0.01	105%	50%	140%	115%	50%	140%	100%	50%	140%
Acenaphthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	117%	50%	140%	108%	50%	140%
Acenaphthylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	89%	50%	140%	103%	50%	140%	92%	50%	140%
Acridine	1	3254171	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	127%	50%	140%	129%	50%	140%
Anthracene	1	3254171	< 0.012	< 0.012	NA	< 0.012	89%	50%	140%	101%	50%	140%	101%	50%	140%
Benzo(a)anthracene	1	3254171	< 0.018	< 0.018	NA	< 0.018	88%	50%	140%	108%	50%	140%	105%	50%	140%
Benzo(a)pyrene	1	3254171	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	94%	50%	140%	96%	50%	140%
Benzo(b)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	117%	50%	140%	107%	50%	140%
Benzo(j+k)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	111%	50%	140%	103%	50%	140%
Benzo(e)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	114%	50%	140%	113%	50%	140%
Benzo(ghi)perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	107%	50%	140%	111%	50%	140%
Chrysene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	126%	50%	140%	119%	50%	140%
Dibenzo(a,h)anthracene	1	3254171	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	95%	50%	140%	102%	50%	140%
Fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	121%	50%	140%	120%	50%	140%
Fluorene	1	3254171	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	113%	50%	140%	105%	50%	140%
Indeno(1,2,3-cd)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	95%	50%	140%	102%	50%	140%
Naphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	115%	50%	140%	101%	50%	140%
Perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	101%	50%	140%	122%	50%	140%	119%	50%	140%
Phenanthrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	127%	50%	140%	123%	50%	140%
Pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	129%	50%	140%	125%	50%	140%
Quinoline	1	3254171	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	138%	50%	140%	118%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: \_\_\_\_\_



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: Dec 07, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Metals															
Total Aluminum	3254607		46	49	6.4%	< 5	98%	80%	120%	105%	80%	120%	102%	70%	130%
Total Antimony	3254607		<2	<2	NA	< 2	80%	80%	120%	113%	80%	120%	NA	70%	130%
Total Arsenic	3254607		<2	<2	NA	< 2	94%	80%	120%	105%	80%	120%	95%	70%	130%
Total Barium	3254607		62	61	2.1%	< 5	80%	80%	120%	84%	80%	120%	NA	70%	130%
Total Beryllium	3254607		<2	<2	NA	< 2	97%	80%	120%	101%	80%	120%	91%	70%	130%
Total Bismuth	3254607		<2	<2	NA	< 2	80%	80%	120%	100%	80%	120%	80%	70%	130%
Total Boron	3254607		6	6	NA	< 5	95%	80%	120%	100%	80%	120%	95%	70%	130%
Total Cadmium	3254607		<0.09	<0.09	NA	< 0.09	100%	80%	120%	107%	80%	120%	95%	70%	130%
Total Chromium	3254607		<1	<1	NA	< 1	87%	80%	120%	98%	80%	120%	96%	70%	130%
Total Cobalt	3254607		<1	<1	NA	< 1	91%	80%	120%	101%	80%	120%	94%	70%	130%
Total Copper	3254607		32	30	6.5%	< 1	99%	80%	120%	104%	80%	120%	NA	70%	130%
Total Iron	3254607		67	57	NA	< 50	94%	80%	120%	101%	80%	120%	99%	70%	130%
Total Lead	3254607		1.4	1.3	NA	< 0.5	91%	80%	120%	105%	80%	120%	80%	70%	130%
Total Manganese	3254607		7	7	NA	< 2	95%	80%	120%	103%	80%	120%	100%	70%	130%
Total Molybdenum	3254607		<2	<2	NA	< 2	86%	80%	120%	99%	80%	120%	104%	70%	130%
Total Nickel	3254607		<2	<2	NA	< 2	93%	80%	120%	101%	80%	120%	91%	70%	130%
Total Selenium	3254607		<1	<1	NA	< 1	94%	80%	120%	115%	80%	120%	92%	70%	130%
Total Silver	3254607		<0.1	<0.1	NA	< 0.1	93%	80%	120%	101%	80%	120%	89%	70%	130%
Total Strontium	3254607		152	138	9.7%	< 5	95%	80%	120%	103%	80%	120%	NA	70%	130%
Total Thallium	3254607		<0.1	<0.1	NA	< 0.1	87%	80%	120%	101%	80%	120%	80%	70%	130%
Total Tin	3254607		<2	<2	NA	< 2	91%	80%	120%	101%	80%	120%	96%	70%	130%
Total Titanium	3254607		<2	<2	NA	< 2	97%	80%	120%	100%	80%	120%	104%	70%	130%
Total Uranium	3254607		2.9	2.8	4.0%	< 0.2	85%	80%	120%	101%	80%	120%	NA	70%	130%
Total Vanadium	3254607		<2	<2	NA	< 2	88%	80%	120%	100%	80%	120%	99%	70%	130%
Total Zinc	3254607		16	14	NA	< 5	96%	80%	120%	108%	80%	120%	84%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Mercury Analysis in Water (Total)**

Total Mercury	3254301	3254301	<0.026	<0.026	NA	< 0.026	96%	80%	120%	96%	80%	120%	95%	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Standard Water Analysis + Total Metals**

pH	3279214		7.88	7.86	0.3%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	3269515		<0.5	<0.5	NA	< 0.5	84%	80%	120%	93%	80%	120%	97%	80%	120%
Chloride	3253355		12	12	1.1%	< 1	88%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3253355		<0.12	<0.12	NA	< 0.12	101%	80%	120%	NA	80%	120%	100%	70%	130%
Sulphate	3253355		7	7	NA	< 2	105%	80%	120%	NA	80%	120%	96%	70%	130%
Alkalinity	3279214		77	77	0.1%	< 5	88%	80%	120%	NA			NA		
True Color	3269515		<5.00	<5.00	NA	< 5	86%	80%	120%	93%	80%	120%	NA		
Turbidity	3283908		4.2	4.4	4.5%	< 0.5	95%	80%	120%	NA			NA		

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835441  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

Water Analysis (Continued)															
RPT Date: Dec 07, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Electrical Conductivity	3279214		1900	1910	0.8%	< 1	105%	90%	110%	NA			NA		
Nitrate as N	3253355		3.50	3.53	0.9%	< 0.05	94%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3253355		<0.05	<0.05	NA	< 0.05	89%	80%	120%	NA	80%	120%	98%	70%	130%
Ammonia as N	3244531		0.25	0.27	7.9%	< 0.03	115%	80%	120%	87%	80%	120%	104%	70%	130%
Ortho-Phosphate as P	3269515		0.03	<0.01	NA	< 0.01	89%	80%	120%	108%	80%	120%	97%	80%	120%
Total Sodium	3254760		4.3	4.4	2.7%	< 0.1	114%	80%	120%	119%	80%	120%	102%	70%	130%
Total Potassium	3254760		0.2	0.2	NA	< 0.1	102%	80%	120%	108%	80%	120%	105%	70%	130%
Total Calcium	3254760		0.6	0.6	3.0%	< 0.1	101%	80%	120%	109%	80%	120%	107%	70%	130%
Total Magnesium	3254760		0.5	0.5	4.8%	< 0.1	100%	80%	120%	106%	80%	120%	103%	70%	130%
Bicarb. Alkalinity (as CaCO3)	3279214		77	77	0.1%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3279214		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3279214		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3254760		249	245	1.9%	< 5	103%	80%	120%	117%	80%	120%	106%	70%	130%
Total Antimony	3254760		<2	<2	NA	< 2	80%	80%	120%	109%	80%	120%	NA	70%	130%
Total Arsenic	3254760		<2	<2	NA	< 2	104%	80%	120%	99%	80%	120%	99%	70%	130%
Total Barium	3254760		<5	<5	NA	< 5	80%	80%	120%	89%	80%	120%	80%	70%	130%
Total Beryllium	3254760		<2	<2	NA	< 2	106%	80%	120%	112%	80%	120%	103%	70%	130%
Total Bismuth	3254760		<2	<2	NA	< 2	80%	80%	120%	104%	80%	120%	100%	70%	130%
Total Boron	3254760		<5	<5	NA	< 5	107%	80%	120%	114%	80%	120%	107%	70%	130%
Total Cadmium	3254760		<0.09	<0.09	NA	< 0.09	100%	80%	120%	99%	80%	120%	100%	70%	130%
Total Chromium	3254760		<1	<1	NA	< 1	92%	80%	120%	94%	80%	120%	100%	70%	130%
Total Cobalt	3254760		<1	<1	NA	< 1	95%	80%	120%	97%	80%	120%	101%	70%	130%
Total Copper	3254760		<1	<1	NA	< 1	98%	80%	120%	100%	80%	120%	104%	70%	130%
Total Iron	3254760		316	325	2.9%	< 50	97%	80%	120%	101%	80%	120%	104%	70%	130%
Total Lead	3254760		0.6	0.6	NA	< 0.5	98%	80%	120%	109%	80%	120%	93%	70%	130%
Total Manganese	3254760		7	6	NA	< 2	97%	80%	120%	98%	80%	120%	105%	70%	130%
Total Molybdenum	3254760		<2	<2	NA	< 2	84%	80%	120%	90%	80%	120%	99%	70%	130%
Total Nickel	3254760		<2	<2	NA	< 2	96%	80%	120%	100%	80%	120%	108%	70%	130%
Total Phosphorous	3254760		0.02	<0.02	NA	< 0.02	103%	80%	120%	118%	80%	120%	104%	70%	130%
Total Selenium	3254760		<1	<1	NA	< 1	97%	80%	120%	95%	80%	120%	94%	70%	130%
Total Silver	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	91%	80%	120%	97%	70%	130%
Total Strontium	3254760		<5	<5	NA	< 5	98%	80%	120%	96%	80%	120%	101%	70%	130%
Total Thallium	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	104%	80%	120%	88%	70%	130%
Total Tin	3254760		<2	<2	NA	< 2	94%	80%	120%	93%	80%	120%	99%	70%	130%
Total Titanium	3254760		4	4	NA	< 2	97%	80%	120%	108%	80%	120%	105%	70%	130%
Total Uranium	3254760		<0.2	<0.2	NA	< 0.2	94%	80%	120%	105%	80%	120%	89%	70%	130%
Total Vanadium	3254760		<2	<2	NA	< 2	90%	80%	120%	93%	80%	120%	100%	70%	130%
Total Zinc	3254760		<5	<5	NA	< 5	98%	80%	120%	102%	80%	120%	95%	70%	130%

## Quality Assurance

 CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X835441  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 07, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

#### Water Analysis - TOC

Total Organic Carbon	3247455	2	2	NA	< 1	116%	80%	120%	112%	80%	120%	112%	80%	120%
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Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.  
 Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from [www.cala.ca](http://www.cala.ca) and/or [www.scc.ca](http://www.scc.ca). The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

## QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

RPT Date: Dec 07, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

Acenaphthylene	3250850	94%	50%	140%	121%	50%	140%	23%	50%	140%
Benzo(ghi)perylene	3250850	99%	50%	140%	122%	50%	140%	35%	50%	140%
Dibenzo(a,h)anthracene	3250850	93%	50%	140%	112%	50%	140%	31%	50%	140%
Quinoline	3250850	123%	50%	140%	162%	50%	140%	122%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike and Blank Spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.



## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835441

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO <sub>2</sub>	INOR-121-6027	SM 4500-SiO <sub>2</sub> F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH <sub>3</sub> H	COLORIMETER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835441  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Organic Carbon	INST 0170	SM 5310 B	COMBUSTION



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

www.bvna.com E-mail: customerservicebedford@bureauveritas.com

Temp: 6.2, 5.0, 3.9  
 21x835441  
 ATL FCD 00149 / 26

**CHAIN OF CUSTODY RECORD**

COC #: **D 57733** Page      of     

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information (where applicable)</b>		<b>Turnaround Time (TAT) Required</b>	
Company Name: <u>Golder Associates Ltd</u>		Company Name: <u>    </u>		Quotation #: <u>C04028</u>		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: <u>Belinda Culgin</u>		Contact Name: <u>Belinda Culgin</u>		Purchase Order#: <u>    </u>		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>201 Brownlow Ave, Suite 26</u> <u>Dartmouth NS</u> PC: <u>    </u>		Address: <u>    </u> PC: <u>    </u>		Project #: <u>2149739</u>		IF RUSH please specify date surcharges will be applied	
Phone: <u>(902) 466 1668</u>		Phone: <u>    </u>		Site Location: <u>    </u>		<b>DATE REQUIRED:</b> <u>21NOV25 3:10PM</u>	
Email: <u>belinda_culgin@golder.com</u>		Email: <u>belinda_culgin@golder.com</u>		Site Province: <u>    </u>			
Report Copies: <u>jdaye@golder.com</u>		Report Copies: <u>jdaye@golder.com</u>		Site #: <u>    </u>			
				Sampled By: <u>A. Brunskill</u>			

Laboratory Use Only					Analysis Requested												Regulatory Requirements (Specify)														
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		Mercury (CIRCLE) TOTAL / DISSOLVED	Mercury & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.Coli (Count)	General Chemistry	HOLD- DO NOT ANALYZE	COMMENTS			
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water																										
COOLING MEDIA PRESENT Y / N					SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																										
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																											
1	BFR-L1-SW26	2021/11/21	14:30	SW	8					X	X						X	X													
2	BFR-L1-SW27	2021/11/21	11:08	SW	8					X	X						X	X													
3	BFR-L1-SW28	2021/11/21	11:30	SW	8					X	X						X	X													
4	BFR-L1-SW29	2021/11/21	12:10	SW	17					X	X						X	X					X								
5	BFR-L1-SW30	2021/11/21	11:47	SW	8					X	X						X	X													
6	BFR-L1-SW31	2021/11/21	12:15	SW	8					X	X						X	X													
7																															
8																															
9																															
10																															
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																							
		2021/11/22																													

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvna.com

White: Bureau Veritas Pink: Client

CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835495

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Dec 06, 2021

PAGES (INCLUDING COVER): 21

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



## Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION:							
				BFR_L1_SW32	BFR_L1_SW33	BFR_L1_SW34	BFR_L2_SW5	BFR_L2_SW2	BFR_L2_SW8	BFR_L2_SW4	
SAMPLE TYPE:				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:				2021-11-21 13:00	2021-11-21 12:54	2021-11-21 13:16	2021-11-21 16:30	2021-11-21 15:00	2021-11-21 16:45	2021-11-21 16:10	
				3254497	3254612	3254613	3254614	3254615	3254616	3254690	
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Modified TPH (Tier 1)	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Sediment			TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	
Resemblance Comment			NR	NR	NR	NR	NR	NR	NR	NR	
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y	Y	
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	70-130	106	106	105	106	106	105	106	106	
Isobutylbenzene - VPH	%	70-130	81	80	80	81	82	78	78	78	
n-Dotriacontane - EPH	%	70-130	105	111	107	109	107	107	107	105	

Certified By:



# Certificate of Analysis

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PROJECT: 21497139

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FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254497-3254690 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

- Resemblance Comment Key:
- GF - Gasoline Fraction
  - WGF - Weathered Gasoline Fraction
  - GR - Product in Gasoline Range
  - FOF - Fuel Oil Fraction
  - WFOF - Weathered Fuel Oil Fraction
  - FR - Product in Fuel Oil Range
  - LOF - Lube Oil Fraction
  - LR - Lube Range
  - UC - Unidentified Compounds
  - NR - No Resemblance
  - NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SW32 BFR_L1_SW33 BFR_L1_SW34 BFR_L2_SW5 BFR_L2_SW2 BFR_L2_SW8 BFR_L2_SW4							
				Water	Water	Water	Water	Water	Water	Water	Water
DATE SAMPLED:		2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21		
		13:00	12:54	13:16	16:30	15:00	16:45	16:10			
		3254497	3254612	3254613	3254614	3254615	3254616	3254690			
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Sediment			NO	NO	NO	NO	NO	NO	NO	NO	
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	80	79	83	77	75	84	80		
Terphenyl-d14	%	50-140	85	82	92	86	78	96	88		
Pyrene-d10	%	50-140	85	84	92	85	80	93	87		

Certified By:





**AGAT** Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254497-3254690 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

		SAMPLE DESCRIPTION: BFR_L1_SW32 BFR_L1_SW33 BFR_L1_SW34 BFR_L2_SW5 BFR_L2_SW2 BFR_L2_SW8 BFR_L2_SW4								
		SAMPLE TYPE: Water			Water			Water		
		DATE SAMPLED: 2021-11-21 13:00			2021-11-21 12:54			2021-11-21 13:16		
Parameter	Unit	G / S	RDL	3254497	3254612	3254613	3254614	3254615	3254616	3254690
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L2\_SW4

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
16:10

3254690

Parameter	Unit	G / S	RDL	3254690
pH				5.36
Reactive Silica as SiO2	mg/L		0.5	16.1
Chloride	mg/L		1	5
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	<2
Alkalinity	mg/L		5	<5
True Color	TCU		5.00	21.8
Turbidity	NTU		0.5	1.4
Electrical Conductivity	umho/cm		1	32
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	3.9
Total Potassium	mg/L		0.1	0.3
Total Calcium	mg/L		0.1	2.2
Total Magnesium	mg/L		0.1	0.5
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	13
Hardness	mg/L			7.6
Langelier Index (@20C)	NA			-5.11
Langelier Index (@ 4C)	NA			-5.43
Saturation pH (@ 20C)	NA			10.5
Saturation pH (@ 4C)	NA			10.8
Anion Sum	me/L			0.14
Cation sum	me/L			0.38

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L2\_SW4

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
16:10

3254690

Parameter	Unit	G / S	RDL	3254690
% Difference/ Ion Balance	%			46.3
Total Aluminum	ug/L		5	355
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	<5
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	25
Total Cadmium	ug/L	0.09		<0.09
Total Chromium	ug/L	1		<1
Total Cobalt	ug/L	1		<1
Total Copper	ug/L	1		<1
Total Iron	ug/L	50		315
Total Lead	ug/L	0.5		0.8
Total Manganese	ug/L	2		7
Total Molybdenum	ug/L	2		<2
Total Nickel	ug/L	2		<2
Total Phosphorous	mg/L	0.02		0.03
Total Selenium	ug/L	1		<1
Total Silver	ug/L	0.1		<0.1
Total Strontium	ug/L	5		7
Total Thallium	ug/L	0.1		<0.1
Total Tin	ug/L	2		<2
Total Titanium	ug/L	2		6
Total Uranium	ug/L	0.2		<0.2
Total Vanadium	ug/L	2		<2
Total Zinc	ug/L	5		16

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

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CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254690 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW32 BFR_L1_SW33 BFR_L1_SW34 BFR_L2_SW5 BFR_L2_SW2 BFR_L2_SW8							
		G / S	RDL	Water		Water		Water	
				DATE SAMPLED:	3254497	3254612	3254613	3254614	3254615
Total Aluminum	ug/L		5	214	232	169	284	295	286
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	<5	<5	<5	<5	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	<5	<5	<5	6	<5	<5
Total Cadmium	ug/L	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	<1	<1	<1	<1	<1	<1
Total Iron	ug/L		50	181	225	206	296	562	302
Total Lead	ug/L		0.5	0.7	0.6	0.6	0.6	0.6	0.6
Total Manganese	ug/L		2	4	7	<2	6	11	7
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	2	<2	<2	<2	<2
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	<5	<5	<5	5	<5	<5
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	3	3	3	5	6	4
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

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Dartmouth, Nova Scotia  
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FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Water Analysis - TOC

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L2\_SW4

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
16:10

Parameter	Unit	G / S	RDL	3254690
Total Organic Carbon	mg/L		1	12

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3254497	< 0.001	< 0.001	NA	< 0.001	78%	70%	130%	73%	70%	130%			
Toluene	1	3254497	< 0.001	< 0.001	NA	< 0.001	77%	70%	130%	73%	70%	130%			
Ethylbenzene	1	3254497	< 0.001	< 0.001	NA	< 0.001	76%	70%	130%	72%	70%	130%			
Xylene (Total)	1	3254497	< 0.002	< 0.002	NA	< 0.002	78%	70%	130%	75%	70%	130%			
C6-C10 (less BTEX)	1	3254497	< 0.01	< 0.01	NA	< 0.01	88%	70%	130%	106%	70%	130%	102%	70%	130%
>C10-C16 Hydrocarbons	1	3253905	< 0.05	< 0.05	NA	< 0.05	101%	70%	130%	101%	70%	130%	105%	70%	130%
>C16-C21 Hydrocarbons	1	3253905	< 0.05	< 0.05	NA	< 0.05	102%	70%	130%	101%	70%	130%	105%	70%	130%
>C21-C32 Hydrocarbons	1	3253905	< 0.1	< 0.1	NA	< 0.1	75%	70%	130%	101%	70%	130%	105%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	132%	50%	140%	114%	50%	140%
2-Methylnaphthalene	1	3254171	0.01	< 0.01	NA	< 0.01	105%	50%	140%	115%	50%	140%	100%	50%	140%
Acenaphthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	117%	50%	140%	108%	50%	140%
Acenaphthylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	89%	50%	140%	103%	50%	140%	92%	50%	140%
Acridine	1	3254171	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	127%	50%	140%	129%	50%	140%
Anthracene	1	3254171	< 0.012	< 0.012	NA	< 0.012	89%	50%	140%	101%	50%	140%	101%	50%	140%
Benzo(a)anthracene	1	3254171	< 0.018	< 0.018	NA	< 0.018	88%	50%	140%	108%	50%	140%	105%	50%	140%
Benzo(a)pyrene	1	3254171	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	94%	50%	140%	96%	50%	140%
Benzo(b)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	117%	50%	140%	107%	50%	140%
Benzo(j+k)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	111%	50%	140%	103%	50%	140%
Benzo(e)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	114%	50%	140%	113%	50%	140%
Benzo(ghi)perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	107%	50%	140%	111%	50%	140%
Chrysene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	126%	50%	140%	119%	50%	140%
Dibenzo(a,h)anthracene	1	3254171	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	95%	50%	140%	102%	50%	140%
Fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	121%	50%	140%	120%	50%	140%
Fluorene	1	3254171	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	113%	50%	140%	105%	50%	140%
Indeno(1,2,3-cd)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	95%	50%	140%	102%	50%	140%
Naphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	115%	50%	140%	101%	50%	140%
Perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	101%	50%	140%	122%	50%	140%	119%	50%	140%
Phenanthrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	127%	50%	140%	123%	50%	140%
Pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	129%	50%	140%	125%	50%	140%
Quinoline	1	3254171	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	138%	50%	140%	118%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

## Quality Assurance

 CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X835495  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835495  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

Water Analysis															
RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Metals															
Total Aluminum	3254607		46	49	6.4%	< 5	98%	80%	120%	105%	80%	120%	102%	70%	130%
Total Antimony	3254607		<2	<2	NA	< 2	80%	80%	120%	113%	80%	120%	NA	70%	130%
Total Arsenic	3254607		<2	<2	NA	< 2	94%	80%	120%	105%	80%	120%	95%	70%	130%
Total Barium	3254607		62	61	2.1%	< 5	80%	80%	120%	84%	80%	120%	NA	70%	130%
Total Beryllium	3254607		<2	<2	NA	< 2	97%	80%	120%	101%	80%	120%	91%	70%	130%
Total Bismuth	3254607		<2	<2	NA	< 2	80%	80%	120%	100%	80%	120%	80%	70%	130%
Total Boron	3254607		6	6	NA	< 5	95%	80%	120%	100%	80%	120%	95%	70%	130%
Total Cadmium	3254607		<0.09	<0.09	NA	< 0.09	100%	80%	120%	107%	80%	120%	95%	70%	130%
Total Chromium	3254607		<1	<1	NA	< 1	87%	80%	120%	98%	80%	120%	96%	70%	130%
Total Cobalt	3254607		<1	<1	NA	< 1	91%	80%	120%	101%	80%	120%	94%	70%	130%
Total Copper	3254607		32	30	6.5%	< 1	99%	80%	120%	104%	80%	120%	NA	70%	130%
Total Iron	3254607		67	57	NA	< 50	94%	80%	120%	101%	80%	120%	99%	70%	130%
Total Lead	3254607		1.4	1.3	NA	< 0.5	91%	80%	120%	105%	80%	120%	80%	70%	130%
Total Manganese	3254607		7	7	NA	< 2	95%	80%	120%	103%	80%	120%	100%	70%	130%
Total Molybdenum	3254607		<2	<2	NA	< 2	86%	80%	120%	99%	80%	120%	104%	70%	130%
Total Nickel	3254607		<2	<2	NA	< 2	93%	80%	120%	101%	80%	120%	91%	70%	130%
Total Selenium	3254607		<1	<1	NA	< 1	94%	80%	120%	115%	80%	120%	92%	70%	130%
Total Silver	3254607		<0.1	<0.1	NA	< 0.1	93%	80%	120%	101%	80%	120%	89%	70%	130%
Total Strontium	3254607		152	138	9.7%	< 5	95%	80%	120%	103%	80%	120%	NA	70%	130%
Total Thallium	3254607		<0.1	<0.1	NA	< 0.1	87%	80%	120%	101%	80%	120%	80%	70%	130%
Total Tin	3254607		<2	<2	NA	< 2	91%	80%	120%	101%	80%	120%	96%	70%	130%
Total Titanium	3254607		<2	<2	NA	< 2	97%	80%	120%	100%	80%	120%	104%	70%	130%
Total Uranium	3254607		2.9	2.8	4.0%	< 0.2	85%	80%	120%	101%	80%	120%	NA	70%	130%
Total Vanadium	3254607		<2	<2	NA	< 2	88%	80%	120%	100%	80%	120%	99%	70%	130%
Total Zinc	3254607		16	14	NA	< 5	96%	80%	120%	108%	80%	120%	84%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Mercury Analysis in Water (Total)

Total Mercury	3254764	3254764	<0.026	<0.026	NA	< 0.026	95%	80%	120%	91%	80%	120%	92%	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Standard Water Analysis + Total Metals

pH	3266887		8.19	8.17	0.2%	<	102%	80%	120%	NA			NA		
Reactive Silica as SiO2	3269515		<0.5	<0.5	NA	< 0.5	84%	80%	120%	93%	80%	120%	97%	80%	120%
Chloride	3253355		12	12	1.1%	< 1	88%	80%	120%	NA	80%	120%	91%	70%	130%
Fluoride	3253355		<0.12	<0.12	NA	< 0.12	101%	80%	120%	NA	80%	120%	100%	70%	130%
Sulphate	3253355		7	7	NA	< 2	105%	80%	120%	NA	80%	120%	96%	70%	130%
Alkalinity	3266887		200	199	0.4%	< 5	90%	80%	120%	NA			NA		
True Color	3269515		<5.00	<5.00	NA	< 5	86%	80%	120%	93%	80%	120%	NA		
Turbidity	3283908		4.2	4.4	4.5%	< 0.5	95%	80%	120%	NA			NA		

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Electrical Conductivity	3266887		560	558	0.4%	< 1	104%	90%	110%	NA			NA		
Nitrate as N	3253355		3.50	3.53	0.9%	< 0.05	94%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3253355		<0.05	<0.05	NA	< 0.05	89%	80%	120%	NA	80%	120%	98%	70%	130%
Ammonia as N	3244531		0.25	0.27	7.9%	< 0.03	115%	80%	120%	87%	80%	120%	104%	70%	130%
Ortho-Phosphate as P	3269515		0.03	<0.01	NA	< 0.01	89%	80%	120%	108%	80%	120%	97%	80%	120%
Total Sodium	3254760		4.3	4.4	2.7%	< 0.1	114%	80%	120%	119%	80%	120%	102%	70%	130%
Total Potassium	3254760		0.2	0.2	NA	< 0.1	102%	80%	120%	108%	80%	120%	105%	70%	130%
Total Calcium	3254760		0.6	0.6	3.0%	< 0.1	101%	80%	120%	109%	80%	120%	107%	70%	130%
Total Magnesium	3254760		0.5	0.5	4.8%	< 0.1	100%	80%	120%	106%	80%	120%	103%	70%	130%
Bicarb. Alkalinity (as CaCO3)	3266887		200	199	0.4%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3266887		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3266887		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3254760		249	245	1.9%	< 5	103%	80%	120%	117%	80%	120%	106%	70%	130%
Total Antimony	3254760		<2	<2	NA	< 2	80%	80%	120%	109%	80%	120%	NA	70%	130%
Total Arsenic	3254760		<2	<2	NA	< 2	104%	80%	120%	99%	80%	120%	99%	70%	130%
Total Barium	3254760		<5	<5	NA	< 5	80%	80%	120%	89%	80%	120%	80%	70%	130%
Total Beryllium	3254760		<2	<2	NA	< 2	106%	80%	120%	112%	80%	120%	103%	70%	130%
Total Bismuth	3254760		<2	<2	NA	< 2	80%	80%	120%	104%	80%	120%	100%	70%	130%
Total Boron	3254760		<5	<5	NA	< 5	107%	80%	120%	114%	80%	120%	107%	70%	130%
Total Cadmium	3254760		<0.09	<0.09	NA	< 0.09	100%	80%	120%	99%	80%	120%	100%	70%	130%
Total Chromium	3254760		<1	<1	NA	< 1	92%	80%	120%	94%	80%	120%	100%	70%	130%
Total Cobalt	3254760		<1	<1	NA	< 1	95%	80%	120%	97%	80%	120%	101%	70%	130%
Total Copper	3254760		<1	<1	NA	< 1	98%	80%	120%	100%	80%	120%	104%	70%	130%
Total Iron	3254760		316	325	2.9%	< 50	97%	80%	120%	101%	80%	120%	104%	70%	130%
Total Lead	3254760		0.6	0.6	NA	< 0.5	98%	80%	120%	109%	80%	120%	93%	70%	130%
Total Manganese	3254760		7	6	NA	< 2	97%	80%	120%	98%	80%	120%	105%	70%	130%
Total Molybdenum	3254760		<2	<2	NA	< 2	84%	80%	120%	90%	80%	120%	99%	70%	130%
Total Nickel	3254760		<2	<2	NA	< 2	96%	80%	120%	100%	80%	120%	108%	70%	130%
Total Phosphorous	3254760		0.02	<0.02	NA	< 0.02	103%	80%	120%	118%	80%	120%	104%	70%	130%
Total Selenium	3254760		<1	<1	NA	< 1	97%	80%	120%	95%	80%	120%	94%	70%	130%
Total Silver	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	91%	80%	120%	97%	70%	130%
Total Strontium	3254760		<5	<5	NA	< 5	98%	80%	120%	96%	80%	120%	101%	70%	130%
Total Thallium	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	104%	80%	120%	88%	70%	130%
Total Tin	3254760		<2	<2	NA	< 2	94%	80%	120%	93%	80%	120%	99%	70%	130%
Total Titanium	3254760		4	4	NA	< 2	97%	80%	120%	108%	80%	120%	105%	70%	130%
Total Uranium	3254760		<0.2	<0.2	NA	< 0.2	94%	80%	120%	105%	80%	120%	89%	70%	130%
Total Vanadium	3254760		<2	<2	NA	< 2	90%	80%	120%	93%	80%	120%	100%	70%	130%
Total Zinc	3254760		<5	<5	NA	< 5	98%	80%	120%	102%	80%	120%	95%	70%	130%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835495  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Water Analysis - TOC**

Total Organic Carbon	3247455	2	2	NA	< 1	116%	80%	120%	112%	80%	120%	112%	80%	120%
----------------------	---------	---	---	----	-----	------	-----	------	------	-----	------	------	-----	------

Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.  
 Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: \_\_\_\_\_



## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835495

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO <sub>2</sub>	INOR-121-6027	SM 4500-SiO <sub>2</sub> F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH <sub>3</sub> H	COLORIMETER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS



## Method Summary

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835495  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Organic Carbon	INST 0170	SM 5310 B	COMBUSTION



CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835518

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Dec 06, 2021

PAGES (INCLUDING COVER): 21

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



## Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SW35 BFR_L1_SW36 BFR_L1_SW37 BFR_L1_SW38 BFR_L1_SW39 BFR_L1_SW40					
				SAMPLE TYPE: Water	Water	Water	Water	Water	Water
				DATE SAMPLED: 2021-11-20 12:00	2021-11-20 14:45	2021-11-20 14:25	2021-11-20 14:00	2021-11-20 11:25	2021-11-20 11:10
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH (Tier 1)	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sediment				TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Resemblance Comment				NR	NR	NR	NR	NR	NR
Return to Baseline at C32				Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits							
Isobutylbenzene - EPH	%	70-130	108	109	106	106	109	106	
Isobutylbenzene - VPH	%	70-130	76	78	75	75	73	74	
n-Dotriacontane - EPH	%	70-130	110	108	109	107	106	101	

Certified By:

# Certificate of Analysis

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PROJECT: 21497139

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FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254703-3254710 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

## Resemblance Comment Key:

GF - Gasoline Fraction  
WGF - Weathered Gasoline Fraction  
GR - Product in Gasoline Range  
FOF - Fuel Oil Fraction  
WFOF - Weathered Fuel Oil Fraction  
FR - Product in Fuel Oil Range  
LOF - Lube Oil Fraction  
LR - Lube Range  
UC - Unidentified Compounds  
NR - No Resemblance  
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

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11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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 FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW35 BFR_L1_SW36 BFR_L1_SW37 BFR_L1_SW38 BFR_L1_SW39 BFR_L1_SW40							
		G / S	RDL	3254703	3254706	3254707	3254708	3254709	3254710
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment			NO	NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140	82	77	86	85	87	81	
Terphenyl-d14	%	50-140	91	82	91	92	92	87	
Pyrene-d10	%	50-140	89	83	92	93	93	86	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
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FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254703-3254710 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

		SAMPLE DESCRIPTION: BFR_L1_SW35 BFR_L1_SW36 BFR_L1_SW37 BFR_L1_SW38 BFR_L1_SW39 BFR_L1_SW40							
		SAMPLE TYPE: Water		Water		Water		Water	
		DATE SAMPLED: 2021-11-20 12:00		2021-11-20 14:45		2021-11-20 14:25		2021-11-20 14:00	
Parameter	Unit	G / S	RDL	3254703	3254706	3254707	3254708	3254709	3254710
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

11 Morris Drive, Unit 122  
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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L1\_SW38

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-20  
 14:00

Parameter	Unit	G / S	RDL	3254708
pH				5.39
Reactive Silica as SiO2	mg/L		0.5	1.1
Chloride	mg/L		1	6
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	<2
Alkalinity	mg/L		5	<5
True Color	TCU		5.00	89.3
Turbidity	NTU		0.5	1.8
Electrical Conductivity	umho/cm		1	42
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	4.1
Total Potassium	mg/L		0.1	0.2
Total Calcium	mg/L		0.1	0.3
Total Magnesium	mg/L		0.1	0.4
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	11
Hardness	mg/L			2.4
Langelier Index (@20C)	NA			-5.94
Langelier Index (@ 4C)	NA			-6.26
Saturation pH (@ 20C)	NA			11.3
Saturation pH (@ 4C)	NA			11.7
Anion Sum	me/L			0.17
Cation sum	me/L			0.27

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L1\_SW38

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-20  
 14:00

3254708

Parameter	Unit	G / S	RDL	3254708
% Difference/ Ion Balance	%			23.3
Total Aluminum	ug/L		5	269
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	<5
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	<5
Total Cadmium	ug/L	0.09		<0.09
Total Chromium	ug/L	1		<1
Total Cobalt	ug/L	1		<1
Total Copper	ug/L	1		<1
Total Iron	ug/L		50	194
Total Lead	ug/L		0.5	0.7
Total Manganese	ug/L		2	3
Total Molybdenum	ug/L		2	<2
Total Nickel	ug/L		2	<2
Total Phosphorous	mg/L	0.02		0.02
Total Selenium	ug/L	1		<1
Total Silver	ug/L	0.1		<0.1
Total Strontium	ug/L		5	<5
Total Thallium	ug/L		0.1	<0.1
Total Tin	ug/L		2	<2
Total Titanium	ug/L		2	3
Total Uranium	ug/L		0.2	<0.2
Total Vanadium	ug/L		2	<2
Total Zinc	ug/L		5	<5

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254708 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	SAMPLE DESCRIPTION:						
		G / S	RDL	BFR_L1_SW35	BFR_L1_SW36	BFR_L1_SW37	BFR_L1_SW39	BFR_L1_SW40
				Water	Water	Water	Water	Water
				2021-11-20 12:00 3254703	2021-11-20 14:45 3254706	2021-11-20 14:25 3254707	2021-11-20 11:25 3254709	2021-11-20 11:10 3254710
Total Aluminum	ug/L	5	231	310	235	280	189	
Total Antimony	ug/L	2	<2	<2	<2	<2	<2	
Total Arsenic	ug/L	2	<2	<2	<2	<2	<2	
Total Barium	ug/L	5	<5	<5	<5	<5	<5	
Total Beryllium	ug/L	2	<2	<2	<2	<2	<2	
Total Bismuth	ug/L	2	<2	<2	<2	<2	<2	
Total Boron	ug/L	5	<5	<5	<5	<5	<5	
Total Cadmium	ug/L	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	
Total Chromium	ug/L	1	<1	<1	<1	<1	<1	
Total Cobalt	ug/L	1	<1	<1	<1	<1	<1	
Total Copper	ug/L	1	<1	<1	<1	<1	<1	
Total Iron	ug/L	50	172	348	325	190	235	
Total Lead	ug/L	0.5	0.7	0.7	0.6	0.7	<0.5	
Total Manganese	ug/L	2	2	11	12	3	3	
Total Molybdenum	ug/L	2	<2	<2	<2	<2	<2	
Total Nickel	ug/L	2	<2	<2	<2	<2	<2	
Total Selenium	ug/L	1	<1	<1	<1	<1	<1	
Total Silver	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Total Strontium	ug/L	5	<5	<5	<5	<5	<5	
Total Thallium	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Total Tin	ug/L	2	<2	4	<2	<2	<2	
Total Titanium	ug/L	2	2	12	3	3	<2	
Total Uranium	ug/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	
Total Vanadium	ug/L	2	<2	<2	<2	<2	<2	
Total Zinc	ug/L	5	<5	<5	<5	<5	<5	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Water Analysis - TOC

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L1\_SW38

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-20

14:00

3254708

Parameter	Unit	G / S	RDL	3254708
Total Organic Carbon	mg/L		1	11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3254497	< 0.001	< 0.001	NA	< 0.001	78%	70%	130%	73%	70%	130%			
Toluene	1	3254497	< 0.001	< 0.001	NA	< 0.001	77%	70%	130%	73%	70%	130%			
Ethylbenzene	1	3254497	< 0.001	< 0.001	NA	< 0.001	76%	70%	130%	72%	70%	130%			
Xylene (Total)	1	3254497	< 0.002	< 0.002	NA	< 0.002	78%	70%	130%	75%	70%	130%			
C6-C10 (less BTEX)	1	3254497	< 0.01	< 0.01	NA	< 0.01	88%	70%	130%	106%	70%	130%	102%	70%	130%
>C10-C16 Hydrocarbons	1	3254918	< 0.05	< 0.05	NA	< 0.05	103%	70%	130%	102%	70%	130%	107%	70%	130%
>C16-C21 Hydrocarbons	1	3254918	0.30	0.36	18.2%	< 0.05	103%	70%	130%	102%	70%	130%	107%	70%	130%
>C21-C32 Hydrocarbons	1	3254918	0.7	0.5	33.3%	< 0.1	75%	70%	130%	102%	70%	130%	107%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	132%	50%	140%	114%	50%	140%
2-Methylnaphthalene	1	3254171	0.01	< 0.01	NA	< 0.01	105%	50%	140%	115%	50%	140%	100%	50%	140%
Acenaphthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	117%	50%	140%	108%	50%	140%
Acenaphthylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	89%	50%	140%	103%	50%	140%	92%	50%	140%
Acridine	1	3254171	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	127%	50%	140%	129%	50%	140%
Anthracene	1	3254171	< 0.012	< 0.012	NA	< 0.012	89%	50%	140%	101%	50%	140%	101%	50%	140%
Benzo(a)anthracene	1	3254171	< 0.018	< 0.018	NA	< 0.018	88%	50%	140%	108%	50%	140%	105%	50%	140%
Benzo(a)pyrene	1	3254171	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	94%	50%	140%	96%	50%	140%
Benzo(b)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	117%	50%	140%	107%	50%	140%
Benzo(j+k)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	111%	50%	140%	103%	50%	140%
Benzo(e)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	114%	50%	140%	113%	50%	140%
Benzo(ghi)perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	107%	50%	140%	111%	50%	140%
Chrysene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	126%	50%	140%	119%	50%	140%
Dibenzo(a,h)anthracene	1	3254171	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	95%	50%	140%	102%	50%	140%
Fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	121%	50%	140%	120%	50%	140%
Fluorene	1	3254171	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	113%	50%	140%	105%	50%	140%
Indeno(1,2,3-cd)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	95%	50%	140%	102%	50%	140%
Naphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	115%	50%	140%	101%	50%	140%
Perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	101%	50%	140%	122%	50%	140%	119%	50%	140%
Phenanthrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	127%	50%	140%	123%	50%	140%
Pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	129%	50%	140%	125%	50%	140%
Quinoline	1	3254171	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	138%	50%	140%	118%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

## Quality Assurance

 CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X835518  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835518  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

Water Analysis															
RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Metals															
Total Aluminum	3254760		249	245	1.9%	< 5	103%	80%	120%	117%	80%	120%	106%	70%	130%
Total Antimony	3254760		<2	<2	NA	< 2	80%	80%	120%	109%	80%	120%	NA	70%	130%
Total Arsenic	3254760		<2	<2	NA	< 2	104%	80%	120%	99%	80%	120%	99%	70%	130%
Total Barium	3254760		<5	<5	NA	< 5	80%	80%	120%	89%	80%	120%	80%	70%	130%
Total Beryllium	3254760		<2	<2	NA	< 2	106%	80%	120%	112%	80%	120%	103%	70%	130%
Total Bismuth	3254760		<2	<2	NA	< 2	80%	80%	120%	104%	80%	120%	100%	70%	130%
Total Boron	3254760		<5	<5	NA	< 5	107%	80%	120%	114%	80%	120%	107%	70%	130%
Total Cadmium	3254760		<0.09	<0.09	NA	< 0.09	100%	80%	120%	99%	80%	120%	100%	70%	130%
Total Chromium	3254760		<1	<1	NA	< 1	92%	80%	120%	94%	80%	120%	100%	70%	130%
Total Cobalt	3254760		<1	<1	NA	< 1	95%	80%	120%	97%	80%	120%	101%	70%	130%
Total Copper	3254760		<1	<1	NA	< 1	98%	80%	120%	100%	80%	120%	104%	70%	130%
Total Iron	3254760		316	325	2.9%	< 50	97%	80%	120%	101%	80%	120%	104%	70%	130%
Total Lead	3254760		0.6	0.6	NA	< 0.5	98%	80%	120%	109%	80%	120%	93%	70%	130%
Total Manganese	3254760		7	6	NA	< 2	97%	80%	120%	98%	80%	120%	105%	70%	130%
Total Molybdenum	3254760		<2	<2	NA	< 2	84%	80%	120%	90%	80%	120%	99%	70%	130%
Total Nickel	3254760		<2	<2	NA	< 2	96%	80%	120%	100%	80%	120%	108%	70%	130%
Total Selenium	3254760		<1	<1	NA	< 1	97%	80%	120%	95%	80%	120%	94%	70%	130%
Total Silver	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	91%	80%	120%	97%	70%	130%
Total Strontium	3254760		<5	<5	NA	< 5	98%	80%	120%	96%	80%	120%	101%	70%	130%
Total Thallium	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	104%	80%	120%	88%	70%	130%
Total Tin	3254760		<2	<2	NA	< 2	94%	80%	120%	93%	80%	120%	99%	70%	130%
Total Titanium	3254760		4	4	NA	< 2	97%	80%	120%	108%	80%	120%	105%	70%	130%
Total Uranium	3254760		<0.2	<0.2	NA	< 0.2	94%	80%	120%	105%	80%	120%	89%	70%	130%
Total Vanadium	3254760		<2	<2	NA	< 2	90%	80%	120%	93%	80%	120%	100%	70%	130%
Total Zinc	3254760		<5	<5	NA	< 5	98%	80%	120%	102%	80%	120%	95%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Mercury Analysis in Water (Total)

Total Mercury	3254764	3254764	<0.026	<0.026	NA	< 0.026	95%	80%	120%	91%	80%	120%	92%	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Standard Water Analysis + Total Metals

pH	3266887		8.19	8.17	0.2%	<	102%	80%	120%	NA			NA		
Reactive Silica as SiO2	3269515		<0.5	<0.5	NA	< 0.5	84%	80%	120%	93%	80%	120%	97%	80%	120%
Chloride	3253355		12	12	1.1%	< 1	88%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3253355		<0.12	<0.12	NA	< 0.12	101%	80%	120%	NA	80%	120%	100%	70%	130%
Sulphate	3253355		7	7	NA	< 2	105%	80%	120%	NA	80%	120%	96%	70%	130%
Alkalinity	3266887		200	199	0.4%	< 5	90%	80%	120%	NA			NA		
True Color	3269515		<5.00	<5.00	NA	< 5	86%	80%	120%	93%	80%	120%	NA		
Turbidity	3283908		4.2	4.4	4.5%	< 0.5	95%	80%	120%	NA			NA		



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835518  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Electrical Conductivity	3266887		560	558	0.4%	< 1	104%	90%	110%	NA			NA		
Nitrate as N	3253355		3.50	3.53	0.9%	< 0.05	94%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3253355		<0.05	<0.05	NA	< 0.05	89%	80%	120%	NA	80%	120%	98%	70%	130%
Ammonia as N	3244531		0.25	0.27	7.9%	< 0.03	115%	80%	120%	87%	80%	120%	104%	70%	130%
Ortho-Phosphate as P	3269515		0.03	<0.01	NA	< 0.01	89%	80%	120%	108%	80%	120%	97%	80%	120%
Total Sodium	3254760		4.3	4.4	2.7%	< 0.1	114%	80%	120%	119%	80%	120%	102%	70%	130%
Total Potassium	3254760		0.2	0.2	NA	< 0.1	102%	80%	120%	108%	80%	120%	105%	70%	130%
Total Calcium	3254760		0.6	0.6	3.0%	< 0.1	101%	80%	120%	109%	80%	120%	107%	70%	130%
Total Magnesium	3254760		0.5	0.5	4.8%	< 0.1	100%	80%	120%	106%	80%	120%	103%	70%	130%
Bicarb. Alkalinity (as CaCO3)	3266887		200	199	0.4%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3266887		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3266887		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3254760		249	245	1.9%	< 5	103%	80%	120%	117%	80%	120%	106%	70%	130%
Total Antimony	3254760		<2	<2	NA	< 2	80%	80%	120%	109%	80%	120%	NA	70%	130%
Total Arsenic	3254760		<2	<2	NA	< 2	104%	80%	120%	99%	80%	120%	99%	70%	130%
Total Barium	3254760		<5	<5	NA	< 5	80%	80%	120%	89%	80%	120%	80%	70%	130%
Total Beryllium	3254760		<2	<2	NA	< 2	106%	80%	120%	112%	80%	120%	103%	70%	130%
Total Bismuth	3254760		<2	<2	NA	< 2	80%	80%	120%	104%	80%	120%	100%	70%	130%
Total Boron	3254760		<5	<5	NA	< 5	107%	80%	120%	114%	80%	120%	107%	70%	130%
Total Cadmium	3254760		<0.09	<0.09	NA	< 0.09	100%	80%	120%	99%	80%	120%	100%	70%	130%
Total Chromium	3254760		<1	<1	NA	< 1	92%	80%	120%	94%	80%	120%	100%	70%	130%
Total Cobalt	3254760		<1	<1	NA	< 1	95%	80%	120%	97%	80%	120%	101%	70%	130%
Total Copper	3254760		<1	<1	NA	< 1	98%	80%	120%	100%	80%	120%	104%	70%	130%
Total Iron	3254760		316	325	2.9%	< 50	97%	80%	120%	101%	80%	120%	104%	70%	130%
Total Lead	3254760		0.6	0.6	NA	< 0.5	98%	80%	120%	109%	80%	120%	93%	70%	130%
Total Manganese	3254760		7	6	NA	< 2	97%	80%	120%	98%	80%	120%	105%	70%	130%
Total Molybdenum	3254760		<2	<2	NA	< 2	84%	80%	120%	90%	80%	120%	99%	70%	130%
Total Nickel	3254760		<2	<2	NA	< 2	96%	80%	120%	100%	80%	120%	108%	70%	130%
Total Phosphorous	3254760		0.02	<0.02	NA	< 0.02	103%	80%	120%	118%	80%	120%	104%	70%	130%
Total Selenium	3254760		<1	<1	NA	< 1	97%	80%	120%	95%	80%	120%	94%	70%	130%
Total Silver	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	91%	80%	120%	97%	70%	130%
Total Strontium	3254760		<5	<5	NA	< 5	98%	80%	120%	96%	80%	120%	101%	70%	130%
Total Thallium	3254760		<0.1	<0.1	NA	< 0.1	92%	80%	120%	104%	80%	120%	88%	70%	130%
Total Tin	3254760		<2	<2	NA	< 2	94%	80%	120%	93%	80%	120%	99%	70%	130%
Total Titanium	3254760		4	4	NA	< 2	97%	80%	120%	108%	80%	120%	105%	70%	130%
Total Uranium	3254760		<0.2	<0.2	NA	< 0.2	94%	80%	120%	105%	80%	120%	89%	70%	130%
Total Vanadium	3254760		<2	<2	NA	< 2	90%	80%	120%	93%	80%	120%	100%	70%	130%
Total Zinc	3254760		<5	<5	NA	< 5	98%	80%	120%	102%	80%	120%	95%	70%	130%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835518  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Water Analysis - TOC**

Total Organic Carbon	3247455	2	2	NA	< 1	116%	80%	120%	112%	80%	120%	112%	80%	120%
----------------------	---------	---	---	----	-----	------	-----	------	------	-----	------	------	-----	------

Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.  
 Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835518  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO2	INOR-121-6027	SM 4500-SiO2 F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH3 H	COLORIMETER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO3)	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835518

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Organic Carbon	INST 0170	SM 5310 B	COMBUSTION

Temp: 6.1, 4.2, 4.1

21x835518

ATL FCD 00149 / 26



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

www.bvna.com E-mail: customerservicebedford@bureauveritas.com

**CHAIN OF CUSTODY RECORD**

COC #: **D 57732**

Page \_\_\_ of \_\_\_

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information (where applicable)</b>		<b>Turnaround Time (TAT) Required</b>	
Company Name: <u>Golden Associates Ltd</u>		Company Name: _____		Quotation #: <u>C04828</u>		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: <u>Belinda Culgin</u>		Contact Name: <u>Belinda Culgin</u>		Purchase Order#: _____		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>201 Brownlow Ave, Suite 26</u> <u>Dartmouth NS</u> PC: _____		Address: _____ PC: _____		Project #: <u>21477137</u>		IF RUSH please specify date (Surcharges will be applied)	
Phone: <u>(902) 460 1608</u>		Phone: _____		Site Location: _____		<b>DATE REQUIRED:</b>	
Email: <u>belinda_culgin@golder.com</u>		Email: <u>belinda.culgin@golder.com</u>		Site Province: _____			
Report Copies: _____		Report Copies: <u>jdoyle@golder.com</u>		Site #: _____			
				Sampled By: <u>A Brunskill</u>			

Laboratory Use Only				Analysis Requested															Regulatory Requirements (Specify)						
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD- DO NOT ANALYZE	COMMENTS
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water					Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest														
COOLING MEDIA PRESENT Y / N																									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED																				
1	BFR-L1-SW35	2021/11/20	12:00	SW	8					X	X					X									
2	BFR-L1-SW36	2021/11/20	14:45	SW	8					X	X					X									
3	BFR-L1-SW37	2021/11/20	14:25	SW	8					X	X					X									
4	BFR-L1-SW38	2021/11/20	14:00	SW	12					X	X					X						X			
5	BFR-L1-SW39	2021/11/20	11:25	SW	8					X	X					X									
6	BFR-L1-SW40	2021/11/20	11:10	SW	8					X	X					X									
7																									
8																									
9																									
10																									
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																	
<u>A Brunskill</u>		2021/11/22		<u>Maria Agoo</u>																					

'21 NOV 25 3:12 PM

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvna.com

White: Bureau Veritas

Pink: Client

CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835536

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Dec 06, 2021

PAGES (INCLUDING COVER): 22

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.





## Certificate of Analysis

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SW41 BFR_L1_SW42 BFR_L1_SW43 BFR_L1_SW44 BFR_L1_DUP1 BFR_L1_DUP2					
				SAMPLE TYPE: Water	Water	Water	Water	Water	Water
				DATE SAMPLED: 2021-11-21 13:30	2021-11-21 15:15	2021-11-21 10:45	2021-11-21 15:45	2021-11-21 11:30	2021-11-21 12:10
				3254758	3254760	3254761	3254762	3254763	3254764
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH (Tier 1)	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sediment				TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Resemblance Comment				NR	NR	NR	NR	NR	NR
Return to Baseline at C32				Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits							
Isobutylbenzene - EPH	%	70-130	107	107	107	109	107	107	107
Isobutylbenzene - VPH	%	70-130	75	74	73	75	71	70	70
n-Dotriacontane - EPH	%	70-130	104	102	111	106	100	107	107

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254758-3254764 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

## Resemblance Comment Key:

GF - Gasoline Fraction  
WGF - Weathered Gasoline Fraction  
GR - Product in Gasoline Range  
FOF - Fuel Oil Fraction  
WFOF - Weathered Fuel Oil Fraction  
FR - Product in Fuel Oil Range  
LOF - Lube Oil Fraction  
LR - Lube Range  
UC - Unidentified Compounds  
NR - No Resemblance  
NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

 11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW41 BFR_L1_SW42 BFR_L1_SW43 BFR_L1_SW44 BFR_L1_DUP1 BFR_L1_DUP2							
		G / S	RDL	Water	Water	Water	Water	Water	Water
				DATE SAMPLED:	2021-11-21	2021-11-21	2021-11-21	2021-11-21	2021-11-21
				3254758	3254760	3254761	3254762	3254763	3254764
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment				NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140	82	78	81	105	90	103	
Terphenyl-d14	%	50-140	89	84	85	97	85	92	
Pyrene-d10	%	50-140	90	84	79	94	82	89	

Certified By:





**AGAT** Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254758-3254764 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

		SAMPLE DESCRIPTION: BFR_L1_SW41 BFR_L1_SW42 BFR_L1_SW43 BFR_L1_SW44 BFR_L1_DUP1 BFR_L1_DUP2							
		SAMPLE TYPE: Water		Water		Water		Water	
		DATE SAMPLED: 2021-11-21 13:30		2021-11-21 15:15		2021-11-21 10:45		2021-11-21 15:45	
Parameter	Unit	G / S	RDL	3254758	3254760	3254761	3254762	3254763	3254764
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L1\_DUP2

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
12:10

3254764

Parameter	Unit	G / S	RDL	3254764
pH				5.40
Reactive Silica as SiO2	mg/L		0.5	1.5
Chloride	mg/L		1	7
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	<2
Alkalinity	mg/L		5	<5
True Color	TCU		5.00	136
Turbidity	NTU		0.5	0.9
Electrical Conductivity	umho/cm		1	44
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	0.09
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	4.5
Total Potassium	mg/L		0.1	0.2
Total Calcium	mg/L		0.1	0.5
Total Magnesium	mg/L		0.1	0.6
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	13
Hardness	mg/L			3.7
Langelier Index (@20C)	NA			-5.72
Langelier Index (@ 4C)	NA			-6.04
Saturation pH (@ 20C)	NA			11.1
Saturation pH (@ 4C)	NA			11.4
Anion Sum	me/L			0.20
Cation sum	me/L			0.31

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## Certificate of Analysis

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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L1\_DUP2

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
 12:10

3254764

Parameter	Unit	G / S	RDL	3254764
% Difference/ Ion Balance	%			22.8
Total Aluminum	ug/L		5	177
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	<5
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	<5
Total Cadmium	ug/L	0.09		<0.09
Total Chromium	ug/L	1		<1
Total Cobalt	ug/L	1		<1
Total Copper	ug/L	1		<1
Total Iron	ug/L		50	247
Total Lead	ug/L		0.5	1.4
Total Manganese	ug/L		2	4
Total Molybdenum	ug/L		2	<2
Total Nickel	ug/L		2	8
Total Phosphorous	mg/L	0.02		<0.02
Total Selenium	ug/L	1		<1
Total Silver	ug/L	0.1		<0.1
Total Strontium	ug/L	5		<5
Total Thallium	ug/L	0.1		<0.1
Total Tin	ug/L	2		<2
Total Titanium	ug/L	2		2
Total Uranium	ug/L		0.2	<0.2
Total Vanadium	ug/L		2	<2
Total Zinc	ug/L		5	<5

Certified By:



# Certificate of Analysis

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PROJECT: 21497139

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
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FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254764 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW41 BFR_L1_SW42 BFR_L1_SW43 BFR_L1_SW44 BFR_L1_DUP1						
		G / S	RDL	3254758	3254760	3254761	3254762	3254763
Total Aluminum	ug/L		5	337	249	188	234	268
Total Antimony	ug/L		2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	<5	<5	<5	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	<5	<5	<5	<5	<5
Total Cadmium	ug/L	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	<1	<1	<1	<1	1
Total Iron	ug/L		50	290	316	325	342	294
Total Lead	ug/L		0.5	0.7	0.6	0.5	<0.5	3.0
Total Manganese	ug/L		2	8	7	7	6	14
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2
Total Selenium	ug/L		1	<1	<1	<1	<1	<1
Total Silver	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	<5	<5	<5	<5	<5
Total Thallium	ug/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	5	4	3	3	4
Total Uranium	ug/L		0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Water Analysis - TOC

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-06

SAMPLE DESCRIPTION: BFR\_L1\_DUP2

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-21  
12:10

Parameter	Unit	G / S	RDL	3254764
Total Organic Carbon	mg/L		1	10

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3254497	< 0.001	< 0.001	NA	< 0.001	78%	70%	130%	73%	70%	130%			
Toluene	1	3254497	< 0.001	< 0.001	NA	< 0.001	77%	70%	130%	73%	70%	130%			
Ethylbenzene	1	3254497	< 0.001	< 0.001	NA	< 0.001	76%	70%	130%	72%	70%	130%			
Xylene (Total)	1	3254497	< 0.002	< 0.002	NA	< 0.002	78%	70%	130%	75%	70%	130%			
C6-C10 (less BTEX)	1	3254497	< 0.01	< 0.01	NA	< 0.01	88%	70%	130%	106%	70%	130%	102%	70%	130%
>C10-C16 Hydrocarbons	1	3254918	< 0.05	< 0.05	NA	< 0.05	103%	70%	130%	102%	70%	130%	107%	70%	130%
>C16-C21 Hydrocarbons	1	3254918	0.30	0.36	18.2%	< 0.05	103%	70%	130%	102%	70%	130%	107%	70%	130%
>C21-C32 Hydrocarbons	1	3254918	0.7	0.5	33.3%	< 0.1	75%	70%	130%	102%	70%	130%	107%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	132%	50%	140%	114%	50%	140%
2-Methylnaphthalene	1	3254171	0.01	< 0.01	NA	< 0.01	105%	50%	140%	115%	50%	140%	100%	50%	140%
Acenaphthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	117%	50%	140%	108%	50%	140%
Acenaphthylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	89%	50%	140%	103%	50%	140%	92%	50%	140%
Acridine	1	3254171	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	127%	50%	140%	129%	50%	140%
Anthracene	1	3254171	< 0.012	< 0.012	NA	< 0.012	89%	50%	140%	101%	50%	140%	101%	50%	140%
Benzo(a)anthracene	1	3254171	< 0.018	< 0.018	NA	< 0.018	88%	50%	140%	108%	50%	140%	105%	50%	140%
Benzo(a)pyrene	1	3254171	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	94%	50%	140%	96%	50%	140%
Benzo(b)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	117%	50%	140%	107%	50%	140%
Benzo(j+k)fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	111%	50%	140%	103%	50%	140%
Benzo(e)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	114%	50%	140%	113%	50%	140%
Benzo(ghi)perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	107%	50%	140%	111%	50%	140%
Chrysene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	126%	50%	140%	119%	50%	140%
Dibenzo(a,h)anthracene	1	3254171	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	95%	50%	140%	102%	50%	140%
Fluoranthene	1	3254171	< 0.01	< 0.01	NA	< 0.01	102%	50%	140%	121%	50%	140%	120%	50%	140%
Fluorene	1	3254171	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	113%	50%	140%	105%	50%	140%
Indeno(1,2,3-cd)pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	81%	50%	140%	95%	50%	140%	102%	50%	140%
Naphthalene	1	3254171	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	115%	50%	140%	101%	50%	140%
Perylene	1	3254171	< 0.01	< 0.01	NA	< 0.01	101%	50%	140%	122%	50%	140%	119%	50%	140%
Phenanthrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	127%	50%	140%	123%	50%	140%
Pyrene	1	3254171	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	129%	50%	140%	125%	50%	140%
Quinoline	1	3254171	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	138%	50%	140%	118%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3254761	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	133%	50%	140%	125%	50%	140%
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## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
2-Methylnaphthalene	1	3254761	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	135%	50%	140%	114%	50%	140%	
Acenaphthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	133%	50%	140%	119%	50%	140%	
Acenaphthylene	1	3254761	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	117%	50%	140%	104%	50%	140%	
Acridine	1	3254761	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	120%	50%	140%	123%	50%	140%	
Anthracene	1	3254761	< 0.012	< 0.012	NA	< 0.012	108%	50%	140%	125%	50%	140%	107%	50%	140%	
Benzo(a)anthracene	1	3254761	< 0.018	< 0.018	NA	< 0.018	96%	50%	140%	125%	50%	140%	109%	50%	140%	
Benzo(a)pyrene	1	3254761	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	109%	50%	140%	96%	50%	140%	
Benzo(b)fluoranthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	82%	50%	140%	130%	50%	140%	91%	50%	140%	
Benzo(j+k)fluoranthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	124%	50%	140%	109%	50%	140%	
Benzo(e)pyrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	136%	50%	140%	124%	50%	140%	
Benzo(ghi)perylene	1	3254761	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	125%	50%	140%	111%	50%	140%	
Chrysene	1	3254761	< 0.01	< 0.01	NA	< 0.01	121%	50%	140%	128%	50%	140%	137%	50%	140%	
Dibenzo(a,h)anthracene	1	3254761	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	96%	50%	140%	103%	50%	140%	
Fluoranthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	129%	50%	140%	137%	50%	140%	130%	50%	140%	
Fluorene	1	3254761	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	132%	50%	140%	121%	50%	140%	
Indeno(1,2,3-cd)pyrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	105%	50%	140%	101%	50%	140%	97%	50%	140%	
Naphthalene	1	3254761	< 0.01	< 0.01	NA	< 0.01	121%	50%	140%	139%	50%	140%	123%	50%	140%	
Perylene	1	3254761	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	134%	50%	140%	117%	50%	140%	
Phenanthrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	135%	50%	140%	135%	50%	140%	136%	50%	140%	
Pyrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	134%	50%	140%	140%	50%	140%	134%	50%	140%	
Quinoline	1	3254761	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	162%	50%	140%	135%	50%	140%	

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: Dec 06, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Metals															
Total Aluminum	3254607		46	49	6.4%	< 5	98%	80%	120%	105%	80%	120%	102%	70%	130%
Total Antimony	3254607		<2	<2	NA	< 2	80%	80%	120%	113%	80%	120%	NA	70%	130%
Total Arsenic	3254607		<2	<2	NA	< 2	94%	80%	120%	105%	80%	120%	95%	70%	130%
Total Barium	3254607		62	61	2.1%	< 5	80%	80%	120%	84%	80%	120%	NA	70%	130%
Total Beryllium	3254607		<2	<2	NA	< 2	97%	80%	120%	101%	80%	120%	91%	70%	130%
Total Bismuth	3254607		<2	<2	NA	< 2	80%	80%	120%	100%	80%	120%	80%	70%	130%
Total Boron	3254607		6	6	NA	< 5	95%	80%	120%	100%	80%	120%	95%	70%	130%
Total Cadmium	3254607		<0.09	<0.09	NA	< 0.09	100%	80%	120%	107%	80%	120%	95%	70%	130%
Total Chromium	3254607		<1	<1	NA	< 1	87%	80%	120%	98%	80%	120%	96%	70%	130%
Total Cobalt	3254607		<1	<1	NA	< 1	91%	80%	120%	101%	80%	120%	94%	70%	130%
Total Copper	3254607		32	30	6.5%	< 1	99%	80%	120%	104%	80%	120%	NA	70%	130%
Total Iron	3254607		67	57	NA	< 50	94%	80%	120%	101%	80%	120%	99%	70%	130%
Total Lead	3254607		1.4	1.3	NA	< 0.5	91%	80%	120%	105%	80%	120%	80%	70%	130%
Total Manganese	3254607		7	7	NA	< 2	95%	80%	120%	103%	80%	120%	100%	70%	130%
Total Molybdenum	3254607		<2	<2	NA	< 2	86%	80%	120%	99%	80%	120%	104%	70%	130%
Total Nickel	3254607		<2	<2	NA	< 2	93%	80%	120%	101%	80%	120%	91%	70%	130%
Total Selenium	3254607		<1	<1	NA	< 1	94%	80%	120%	115%	80%	120%	92%	70%	130%
Total Silver	3254607		<0.1	<0.1	NA	< 0.1	93%	80%	120%	101%	80%	120%	89%	70%	130%
Total Strontium	3254607		152	138	9.7%	< 5	95%	80%	120%	103%	80%	120%	NA	70%	130%
Total Thallium	3254607		<0.1	<0.1	NA	< 0.1	87%	80%	120%	101%	80%	120%	80%	70%	130%
Total Tin	3254607		<2	<2	NA	< 2	91%	80%	120%	101%	80%	120%	96%	70%	130%
Total Titanium	3254607		<2	<2	NA	< 2	97%	80%	120%	100%	80%	120%	104%	70%	130%
Total Uranium	3254607		2.9	2.8	4.0%	< 0.2	85%	80%	120%	101%	80%	120%	NA	70%	130%
Total Vanadium	3254607		<2	<2	NA	< 2	88%	80%	120%	100%	80%	120%	99%	70%	130%
Total Zinc	3254607		16	14	NA	< 5	96%	80%	120%	108%	80%	120%	84%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Mercury Analysis in Water (Total)

Total Mercury	3254764	3254764	<0.026	<0.026	NA	< 0.026	95%	80%	120%	91%	80%	120%	92%	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Standard Water Analysis + Total Metals

pH	3266887		8.19	8.17	0.2%	<	102%	80%	120%	NA			NA		
Reactive Silica as SiO2	3269515		<0.5	<0.5	NA	< 0.5	84%	80%	120%	93%	80%	120%	97%	80%	120%
Chloride	3253355		12	12	1.1%	< 1	88%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3253355		<0.12	<0.12	NA	< 0.12	101%	80%	120%	NA	80%	120%	100%	70%	130%
Sulphate	3253355		7	7	NA	< 2	105%	80%	120%	NA	80%	120%	96%	70%	130%
Alkalinity	3266887		200	199	0.4%	< 5	90%	80%	120%	NA			NA		
True Color	3269515		<5.00	<5.00	NA	< 5	86%	80%	120%	93%	80%	120%	NA		
Turbidity	3283908		4.2	4.4	4.5%	< 0.5	95%	80%	120%	NA			NA		

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Electrical Conductivity	3266887		560	558	0.4%	< 1	104%	90%	110%	NA			NA		
Nitrate as N	3253355		3.50	3.53	0.9%	< 0.05	94%	80%	120%	NA	80%	120%	NA	70%	130%
Nitrite as N	3253355		<0.05	<0.05	NA	< 0.05	89%	80%	120%	NA	80%	120%	98%	70%	130%
Ammonia as N	3244531		0.25	0.27	7.9%	< 0.03	115%	80%	120%	87%	80%	120%	104%	70%	130%
Ortho-Phosphate as P	3269515		0.03	<0.01	NA	< 0.01	89%	80%	120%	108%	80%	120%	97%	80%	120%
Total Sodium	3254607		43.3	38.5	11.7%	< 0.1	107%	80%	120%	115%	80%	120%	NA	70%	130%
Total Potassium	3254607		1.7	1.6	4.8%	< 0.1	97%	80%	120%	105%	80%	120%	NA	70%	130%
Total Calcium	3254607		50.0	48.8	2.4%	< 0.1	98%	80%	120%	102%	80%	120%	NA	70%	130%
Total Magnesium	3254607		6.6	6.3	5.8%	< 0.1	98%	80%	120%	101%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	3266887		200	199	0.4%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3266887		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3266887		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3254607		46	49	6.4%	< 5	98%	80%	120%	105%	80%	120%	102%	70%	130%
Total Antimony	3254607		<2	<2	NA	< 2	80%	80%	120%	113%	80%	120%	NA	70%	130%
Total Arsenic	3254607		<2	<2	NA	< 2	94%	80%	120%	105%	80%	120%	95%	70%	130%
Total Barium	3254607		62	61	2.1%	< 5	80%	80%	120%	84%	80%	120%	NA	70%	130%
Total Beryllium	3254607		<2	<2	NA	< 2	97%	80%	120%	101%	80%	120%	91%	70%	130%
Total Bismuth	3254607		<2	<2	NA	< 2	80%	80%	120%	100%	80%	120%	80%	70%	130%
Total Boron	3254607		6	6	NA	< 5	95%	80%	120%	100%	80%	120%	95%	70%	130%
Total Cadmium	3254607		<0.09	<0.09	NA	< 0.09	100%	80%	120%	107%	80%	120%	95%	70%	130%
Total Chromium	3254607		<1	<1	NA	< 1	87%	80%	120%	98%	80%	120%	96%	70%	130%
Total Cobalt	3254607		<1	<1	NA	< 1	91%	80%	120%	101%	80%	120%	94%	70%	130%
Total Copper	3254607		32	30	6.5%	< 1	99%	80%	120%	104%	80%	120%	NA	70%	130%
Total Iron	3254607		67	57	NA	< 50	94%	80%	120%	101%	80%	120%	99%	70%	130%
Total Lead	3254607		1.4	1.3	NA	< 0.5	91%	80%	120%	105%	80%	120%	80%	70%	130%
Total Manganese	3254607		7	7	NA	< 2	95%	80%	120%	103%	80%	120%	100%	70%	130%
Total Molybdenum	3254607		<2	<2	NA	< 2	86%	80%	120%	99%	80%	120%	104%	70%	130%
Total Nickel	3254607		<2	<2	NA	< 2	93%	80%	120%	101%	80%	120%	91%	70%	130%
Total Phosphorous	3254607		<0.02	<0.02	NA	< 0.02	92%	80%	120%	100%	80%	120%	94%	70%	130%
Total Selenium	3254607		<1	<1	NA	< 1	94%	80%	120%	115%	80%	120%	92%	70%	130%
Total Silver	3254607		<0.1	<0.1	NA	< 0.1	93%	80%	120%	101%	80%	120%	89%	70%	130%
Total Strontium	3254607		152	138	9.7%	< 5	95%	80%	120%	103%	80%	120%	NA	70%	130%
Total Thallium	3254607		<0.1	<0.1	NA	< 0.1	87%	80%	120%	101%	80%	120%	80%	70%	130%
Total Tin	3254607		<2	<2	NA	< 2	91%	80%	120%	101%	80%	120%	96%	70%	130%
Total Titanium	3254607		<2	<2	NA	< 2	97%	80%	120%	100%	80%	120%	104%	70%	130%
Total Uranium	3254607		2.9	2.8	4.0%	< 0.2	85%	80%	120%	101%	80%	120%	NA	70%	130%
Total Vanadium	3254607		<2	<2	NA	< 2	88%	80%	120%	100%	80%	120%	99%	70%	130%
Total Zinc	3254607		16	14	NA	< 5	96%	80%	120%	108%	80%	120%	84%	70%	130%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835536  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 06, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Water Analysis - TOC**

Total Organic Carbon	3247455	2	2	NA	< 1	116%	80%	120%	112%	80%	120%	112%	80%	120%
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Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.  
 Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: 

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

## QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

RPT Date: Dec 06, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Water - (PAH)										
Quinoline	3254761	120%	50%	140%	162%	50%	140%	135%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.  
 Blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.



## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835536

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO <sub>2</sub>	INOR-121-6027	SM 4500-SiO <sub>2</sub> F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH <sub>3</sub> H	COLORIMETER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835536  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Organic Carbon	INST 0170	SM 5310 B	COMBUSTION



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

www.bvna.com E-mail: customerservicebedford@bureauveritas.com

CHAIN OF CUSTODY RECORD

COC #: **D 57734** Page \_\_\_\_ of \_\_\_\_

Temp: 9.1, 7.2, 7.8  
 21x835536 ATL FCD 00149 / 26

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information (where applicable)</b>		<b>Turnaround Time (TAT) Required</b>	
Company Name: <u>Golder Associates Ltd</u>		Company Name: _____		Quotation #: <u>C04828</u>		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: <u>Belinda Culgin</u>		Contact Name: <u>Belinda Culgin</u>		Purchase Order#: _____		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>201 Brownlow Ave, Suite 26</u>		Address: _____		Project #: <u>21497139</u>		IF RUSH please specify date (Surcharges will be applied)	
<u>DARTMOUTH NS</u> PC: _____		PC: _____		Site Location: _____		DATE REQUIRED:	
Phone: <u>(902) 466 1668</u>		Phone: _____		Site Province: _____		<b>'21 NOV 25 3:19 PM</b>	
Email: <u>belinda_culgin@golder.com</u>		Email: <u>belinda_culgin@golder.com</u>		Site #: _____			
Report Copies: <u>j.doyle@golder.com</u>		Report Copies: <u>james.doyle@golder.com</u>		Sampled By: <u>A. Brunskill</u>			

<b>Laboratory Use Only</b>				<b>Analysis Requested</b>														<b>Regulatory Requirements (Specify)</b>							
<b>CUSTODY SEAL</b>		<b>COOLER TEMPERATURES</b>		<b>COOLER TEMPERATURES</b>		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL, CCME Sediment)	PCBS - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD-DO NOT ANALYZE	COMMENTS
Present	Intact																								
COOLING MEDIA PRESENT Y / N																									
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL, CCME Sediment)	PCBS - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	General Chemistry	HOLD-DO NOT ANALYZE	COMMENTS	
										Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest												Hot Water Soluble Boron (required for CCME Agricultural / Landfill)
1	BFR-LI-SW41	2021/11/21	13:30	SW	8					X	X			X		X									
2	BFR-LI-SW42	2021/11/20	15:45	SW	8					X	X			X		X									
3	BFR-LI-SW43	2021/11/20	10:45	SW	8					X	X			X		X									
4	BFR-LI-SW44	2021/11/20	15:45	SW	8					X	X			X		X									
5	BFR-LI-DUP1	2021/11/21	11:30	SW	8					X	X			X		X									
6	BFR-LI-DUP2	2021/11/21	12:10	SW	12					X	X			X		X					X				
7																									
8																									
9																									
10																									

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #
	2021/11/22					

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvna.com

CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835545

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Dec 08, 2021

PAGES (INCLUDING COVER): 15

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



## Certificate of Analysis

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SW45 BFR_L1_SW46 BFR_L1_SW47 BFR_L1_SW48 BFR_L1_SW49 BFR_L1_SW50					
				SAMPLE TYPE: Water	Water	Water	Water	Water	Water
				DATE SAMPLED: 2021-11-20 15:51	2021-11-20 14:43	2021-11-20 14:14	2021-11-20 11:18	2021-11-20 12:10	2021-11-20 13:21
				3254778	3254787	3254788	3254789	3254790	3254791
Benzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Modified TPH (Tier 1)	mg/L		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Sediment			TRACE	TRACE	TRACE	TRACE	TRACE	TRACE	TRACE
Resemblance Comment			NR	NR	NR	NR	NR	NR	NR
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits							
Isobutylbenzene - EPH	%	70-130	109	109	107	106	106	106	106
Isobutylbenzene - VPH	%	70-130	75	70	77	84	96	95	95
n-Dotriacontane - EPH	%	70-130	107	108	107	104	103	104	104

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

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FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254778-3254791 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

- Resemblance Comment Key:
- GF - Gasoline Fraction
  - WGF - Weathered Gasoline Fraction
  - GR - Product in Gasoline Range
  - FOF - Fuel Oil Fraction
  - WFOF - Weathered Fuel Oil Fraction
  - FR - Product in Fuel Oil Range
  - LOF - Lube Oil Fraction
  - LR - Lube Range
  - UC - Unidentified Compounds
  - NR - No Resemblance
  - NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

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PROJECT: 21497139

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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW45 BFR_L1_SW46 BFR_L1_SW47 BFR_L1_SW48 BFR_L1_SW49 BFR_L1_SW50							
		G / S	RDL	Water		Water		Water	
				DATE SAMPLED:	2021-11-20 15:51	2021-11-20 14:43	2021-11-20 14:14	2021-11-20 11:18	2021-11-20 12:10
				3254778	3254787	3254788	3254789	3254790	3254791
1-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acridine	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	ug/L		0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Quinoline	ug/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sediment				NO	NO	NO	NO	NO	NO
Surrogate	Unit	Acceptable Limits							
Naphthalene-d8	%	50-140	97	92	103	138	114	97	
Terphenyl-d14	%	50-140	91	88	94	137	106	88	
Pyrene-d10	%	50-140	91	85	91	123	101	84	

Certified By:





**AGAT** Laboratories

# Certificate of Analysis

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3254778-3254791 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
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FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

		SAMPLE DESCRIPTION: BFR_L1_SW45 BFR_L1_SW46 BFR_L1_SW47 BFR_L1_SW48 BFR_L1_SW49 BFR_L1_SW50							
		SAMPLE TYPE: Water		Water		Water		Water	
		DATE SAMPLED: 2021-11-20 15:51		2021-11-20 14:43		2021-11-20 14:14		2021-11-20 11:18	
Parameter	Unit	G / S	RDL	3254778	3254787	3254788	3254789	3254790	3254791
Total Mercury	ug/L		0.026	<0.026	<0.026	<0.026	<0.026	<0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Total Metals

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SW45 BFR_L1_SW46 BFR_L1_SW47 BFR_L1_SW48 BFR_L1_SW49 BFR_L1_SW50							
		G / S	RDL	3254778	3254787	3254788	3254789	3254790	3254791
Total Aluminum	ug/L		5	264	162	366	378	436	183
Total Antimony	ug/L		2	<2	<2	<2	<2	<2	<2
Total Arsenic	ug/L		2	<2	<2	<2	<2	<2	<2
Total Barium	ug/L		5	<5	<5	<5	<5	<5	<5
Total Beryllium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Bismuth	ug/L		2	<2	<2	<2	<2	<2	<2
Total Boron	ug/L		5	<5	<5	<5	<5	<5	<5
Total Cadmium	ug/L	0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09	<0.09
Total Chromium	ug/L		1	<1	<1	<1	<1	<1	<1
Total Cobalt	ug/L		1	<1	<1	<1	<1	<1	<1
Total Copper	ug/L		1	<1	<1	<1	<1	<1	<1
Total Iron	ug/L		50	333	177	342	369	361	156
Total Lead	ug/L	0.5	0.7	0.7	0.9	0.9	0.9	0.8	0.6
Total Manganese	ug/L		2	7	2	6	7	8	4
Total Molybdenum	ug/L		2	<2	<2	<2	<2	<2	<2
Total Nickel	ug/L		2	<2	<2	<2	<2	<2	<2
Total Selenium	ug/L		1	<1	<1	<1	<1	<1	<1
Total Silver	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Strontium	ug/L		5	<5	<5	<5	5	5	<5
Total Thallium	ug/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Tin	ug/L		2	<2	<2	<2	<2	<2	<2
Total Titanium	ug/L		2	4	2	7	7	8	3
Total Uranium	ug/L	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Vanadium	ug/L		2	<2	<2	<2	<2	<2	<2
Total Zinc	ug/L		5	<5	<5	<5	<5	<5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3267181	< 0.001	< 0.001	NA	< 0.001	79%	70%	130%	112%	70%	130%			
Toluene	1	3267181	0.002	0.002	NA	< 0.001	80%	70%	130%	110%	70%	130%			
Ethylbenzene	1	3267181	< 0.001	< 0.001	NA	< 0.001	80%	70%	130%	109%	70%	130%			
Xylene (Total)	1	3267181	0.003	0.003	NA	< 0.002	82%	70%	130%	109%	70%	130%			
C6-C10 (less BTEX)	1	3267181	0.02	0.01	NA	< 0.01	82%	70%	130%	102%	70%	130%	100%	70%	130%
>C10-C16 Hydrocarbons	1	3254918	< 0.05	< 0.05	NA	< 0.05	103%	70%	130%	102%	70%	130%	107%	70%	130%
>C16-C21 Hydrocarbons	1	3254918	0.30	0.36	18.2%	< 0.05	103%	70%	130%	102%	70%	130%	107%	70%	130%
>C21-C32 Hydrocarbons	1	3254918	0.7	0.5	33.3%	< 0.1	75%	70%	130%	102%	70%	130%	107%	70%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3254761	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	133%	50%	140%	125%	50%	140%
2-Methylnaphthalene	1	3254761	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	135%	50%	140%	114%	50%	140%
Acenaphthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	133%	50%	140%	119%	50%	140%
Acenaphthylene	1	3254761	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	117%	50%	140%	104%	50%	140%
Acridine	1	3254761	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	120%	50%	140%	123%	50%	140%
Anthracene	1	3254761	< 0.012	< 0.012	NA	< 0.012	108%	50%	140%	125%	50%	140%	107%	50%	140%
Benzo(a)anthracene	1	3254761	< 0.018	< 0.018	NA	< 0.018	96%	50%	140%	125%	50%	140%	109%	50%	140%
Benzo(a)pyrene	1	3254761	< 0.010	< 0.010	NA	< 0.010	84%	50%	140%	109%	50%	140%	96%	50%	140%
Benzo(b)fluoranthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	82%	50%	140%	130%	50%	140%	91%	50%	140%
Benzo(j+k)fluoranthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	124%	50%	140%	109%	50%	140%
Benzo(e)pyrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	136%	50%	140%	124%	50%	140%
Benzo(ghi)perylene	1	3254761	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	125%	50%	140%	111%	50%	140%
Chrysene	1	3254761	< 0.01	< 0.01	NA	< 0.01	121%	50%	140%	128%	50%	140%	137%	50%	140%
Dibenzo(a,h)anthracene	1	3254761	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	96%	50%	140%	103%	50%	140%
Fluoranthene	1	3254761	< 0.01	< 0.01	NA	< 0.01	129%	50%	140%	138%	50%	140%	130%	50%	140%
Fluorene	1	3254761	< 0.01	< 0.01	NA	< 0.01	113%	50%	140%	132%	50%	140%	121%	50%	140%
Indeno(1,2,3-cd)pyrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	105%	50%	140%	101%	50%	140%	97%	50%	140%
Naphthalene	1	3254761	< 0.01	< 0.01	NA	< 0.01	121%	50%	140%	139%	50%	140%	123%	50%	140%
Perylene	1	3254761	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	134%	50%	140%	117%	50%	140%
Phenanthrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	135%	50%	140%	151%	50%	140%	136%	50%	140%
Pyrene	1	3254761	< 0.01	< 0.01	NA	< 0.01	134%	50%	140%	142%	50%	140%	134%	50%	140%
Quinoline	1	3254761	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	160%	50%	140%	135%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

 CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X835545  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 08, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835545  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

Water Analysis															
RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Total Metals															
Total Aluminum	3283510		617	686	10.5%	< 5	100%	80%	120%	107%	80%	120%	NA	70%	130%
Total Antimony	3283510		<2	<2	NA	< 2	75%	80%	120%	105%	80%	120%	NA	70%	130%
Total Arsenic	3283510		<2	<2	NA	< 2	97%	80%	120%	95%	80%	120%	101%	70%	130%
Total Barium	3283510		<5	<5	NA	< 5	80%	80%	120%	83%	80%	120%	73%	70%	130%
Total Beryllium	3283510		<2	<2	NA	< 2	104%	80%	120%	110%	80%	120%	106%	70%	130%
Total Bismuth	3283510		<2	<2	NA	< 2	77%	80%	120%	96%	80%	120%	87%	70%	130%
Total Boron	3283510		22	23	NA	< 5	100%	80%	120%	109%	80%	120%	116%	70%	130%
Total Cadmium	3283510		<0.09	<0.09	NA	< 0.09	99%	80%	120%	101%	80%	120%	97%	70%	130%
Total Chromium	3283510		2	1	NA	< 1	93%	80%	120%	96%	80%	120%	104%	70%	130%
Total Cobalt	3283510		<1	<1	NA	< 1	95%	80%	120%	97%	80%	120%	103%	70%	130%
Total Copper	3283510		<1	<1	NA	< 1	93%	80%	120%	99%	80%	120%	103%	70%	130%
Total Iron	3283510		1280	1400	9.5%	< 50	100%	80%	120%	107%	80%	120%	NA	70%	130%
Total Lead	3283510		0.6	0.7	NA	< 0.5	91%	80%	120%	106%	80%	120%	90%	70%	130%
Total Manganese	3283510		26	26	1.3%	< 2	96%	80%	120%	100%	80%	120%	NA	70%	130%
Total Molybdenum	3283510		4	4	NA	< 2	84%	80%	120%	90%	80%	120%	113%	70%	130%
Total Nickel	3283510		<2	<2	NA	< 2	92%	80%	120%	97%	80%	120%	101%	70%	130%
Total Selenium	3283510		<1	<1	NA	< 1	91%	80%	120%	97%	80%	120%	100%	70%	130%
Total Silver	3283510		<0.1	<0.1	NA	< 0.1	94%	80%	120%	95%	80%	120%	92%	70%	130%
Total Strontium	3283510		66	66	0.6%	< 5	93%	80%	120%	92%	80%	120%	NA	70%	130%
Total Thallium	3283510		<0.1	<0.1	NA	< 0.1	88%	80%	120%	100%	80%	120%	84%	70%	130%
Total Tin	3283510		<2	<2	NA	< 2	94%	80%	120%	92%	80%	120%	87%	70%	130%
Total Titanium	3283510		3	3	NA	< 2	96%	80%	120%	103%	80%	120%	83%	70%	130%
Total Uranium	3283510		0.4	0.4	NA	< 0.2	86%	80%	120%	101%	80%	120%	87%	70%	130%
Total Vanadium	3283510		<2	<2	NA	< 2	90%	80%	120%	93%	80%	120%	101%	70%	130%
Total Zinc	3283510		<5	<5	NA	< 5	98%	80%	120%	100%	80%	120%	97%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Reference Material: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

### Mercury Analysis in Water (Total)

Total Mercury	3267243	3267243	0.044	0.045	NA	< 0.026	94%	80%	120%	93%	80%	120%	NA	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike not within acceptance limits. Sample visibly non-homogeneous.

Certified By:



## QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

RPT Date: Dec 08, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Water - (PAH)										
Phenanthrene	3254761	135%	50%	140%	151%	50%	140%	136%	50%	140%
Pyrene	3254761	134%	50%	140%	142%	50%	140%	134%	50%	140%
Quinoline	3254761	120%	50%	140%	160%	50%	140%	135%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Blank spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.



## QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139

AGAT WORK ORDER: 21X835545  
 ATTENTION TO: BELINDA CULGIN

RPT Date: Dec 08, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

Total Metals										
Total Antimony		75%	80%	120%	105%	80%	120%	NA	70%	130%
Total Bismuth		77%	80%	120%	96%	80%	120%	87%	70%	130%

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.  
 Reference Material: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits by up to 10% absolute.

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from [www.cala.ca](http://www.cala.ca) and/or [www.scc.ca](http://www.scc.ca). The tests in this report may not necessarily be included in the scope of accreditation.

Results relate only to the items tested. Results apply to samples as received.

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835545

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

Temp: 3.1, 3.6, 3.6

21x835545

ATL FCD 00149 / 26



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

www.bvna.com E-mail: customerservicebedford@bureauveritas.com

**CHAIN OF CUSTODY RECORD**

COC #: **D 57750**

Page \_\_\_ of \_\_\_

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information (where applicable)</b>		<b>Turnaround Time (TAT) Required</b>	
Company Name: <u>GOLDER ASSOCIATES LTD</u>		Company Name: _____		Quotation #: <u>C04828</u>		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: <u>Belinda Culgin</u>		Contact Name: <u>Belinda Culgin</u>		Purchase Order #: _____		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>201 Brownlow Ave Suite 26</u> <u>Dartmouth NS</u> PC: _____		Address: _____ PC: _____		Project #: <u>21497139</u>		IF RUSH please specify date (Surcharges will be applied)	
Phone: <u>(902) 466 1668</u>		Phone: _____		Site Location: _____		<b>DATE REQUIRED:</b>	
Email: <u>belinda_culgin@golder.com</u>		Email: <u>belinda_culgin@golder.com</u>		Site Province: _____			
Report Copies: <u>jdoyle@golder.com</u>		Report Copies: <u>jdoyle@golder.com</u>		Sampled By: <u>A. Brunskill</u>			

Laboratory Use Only				Analysis Requested																Regulatory Requirements (Specify)								
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS [Total Metals] Well / Surface	RCAP-MS [Dissolved Metals] Ground water	Metals (Water)		Metals (Soil)		Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD- DO NOT ANALYZE	COMMENTS	
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water																							
COOLING MEDIA PRESENT Y / N																												
SAMPLES MUST BE KEPT COOL (<10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																												
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																								
1	BFR-LI-SW45	2021/11/20	15:51	SW	8					α	α			α	α			α	α									
2	BFR-LI-SW46	2021/11/20	14:43	SW	8					α	α			α	α			α	α									
3	BFR-LI-SW47	2021/11/20	14:14	SW	8					α	α			α	α			α	α									
4	BFR-LI-SW48	2021/11/20	11:18	SW	8					α	α			α	α			α	α									
5	BFR-LI-SW49	2021/11/20	12:10	SW	8					α	α			α	α			α	α									
6	BFR-LI-SW50	2021/11/20	13:21	SW	8					α	α			α	α			α	α									
7																												
8																												
9																												
10																												
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																				
<u>[Signature]</u>		2021/11/22		<u>[Signature]</u>																								

21 NOV 25 3:13 PM

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvna.com

CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835677

SOIL ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

DATE REPORTED: Dec 08, 2021

PAGES (INCLUDING COVER): 33

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SED26 BFR_L1_SED27 BFR_L1_SED28 BFR_L1_SED29 BFR_L1_SED30 BFR_L1_SED31 BFR_L1_SED32 BFR_L1_SED33											
		G / S	RDL	Soil		Soil		Soil		Soil		Soil	
				DATE SAMPLED:	2021-11-21 14:30	2021-11-21 11:08	2021-11-21 11:30	2021-11-21 12:10	2021-11-21 11:47	2021-11-21 12:15	2021-11-21 13:00	2021-11-21 12:54	
Aluminum	mg/kg	10	5990	7310	2760	7260	16800	20100	6250	10300			
Antimony	mg/kg	1	<1	<1	3	2	1	<1	<1	<1			
Arsenic	mg/kg	1	5	4	3	6	18	5	2	6			
Barium	mg/kg	5	15	19	25	17	7	19	5	11			
Beryllium	mg/kg	2	<2	<2	<2	<2	<2	<2	<2	<2			
Boron	mg/kg	2	<2	<2	5	2	3	2	<2	2			
Cadmium	mg/kg	0.3	<0.3	0.4	0.6	0.6	<0.3	0.6	<0.3	<0.3			
Chromium	mg/kg	2	8	12	<2	7	15	18	5	9			
Cobalt	mg/kg	1	2	2	<1	<1	2	3	<1	1			
Copper	mg/kg	2	9	14	21	10	13	11	<2	7			
Iron	mg/kg	50	29100	8420	5950	7180	73600	17200	2410	23400			
Lead	mg/kg	0.5	23.9	27.2	126	62.5	64.3	26.6	5.6	63.2			
Lithium	mg/kg	5	<5	7	<5	<5	<5	6	<5	<5			
Manganese	mg/kg	2	62	154	60	28	56	129	46	46			
Molybdenum	mg/kg	2	<2	<2	<2	<2	5	4	<2	2			
Nickel	mg/kg	2	4	6	<2	4	8	11	<2	5			
Selenium	mg/kg	1	3	3	2	6	7	6	1	5			
Silver	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			
Strontium	mg/kg	5	8	11	28	17	<5	8	<5	<5			
Thallium	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Tin	mg/kg	2	3	3	4	6	6	4	4	5			
Uranium	mg/kg	0.1	1.1	1.5	0.6	1.2	1.0	1.7	0.4	1.5			
Vanadium	mg/kg	2	33	39	7	32	57	60	21	41			
Zinc	mg/kg	5	32	38	28	34	29	48	8	24			

Certified By:



# Certificate of Analysis

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SED34 BFR_L1_SED35 BFR_L1_SED36 BFR_L1_SED39 BFR_L1_SED40 BFR_L1_SED41 BFR_L1_SED42 BFR_L1_SED44									
		G / S	RDL	Soil		Soil		Soil		Soil	
				DATE SAMPLED:	2021-11-21 13:16	2021-11-20 12:00	2021-11-20 14:45	2021-11-20 11:25	2021-11-20 11:10	2021-11-21 13:30	2021-11-21 15:15
3256454	3256455	3256456	3256457	3256458	3256459	3256460	3256461				
Aluminum	mg/kg	10	6390	1760	7910	5910	9150	4770	4610	2840	
Antimony	mg/kg	1	<1	<1	<1	<1	<1	<1	1	<1	
Arsenic	mg/kg	1	3	2	2	3	4	2	6	4	
Barium	mg/kg	5	11	<5	17	25	25	9	20	14	
Beryllium	mg/kg	2	<2	<2	<2	<2	<2	<2	<2	<2	
Boron	mg/kg	2	<2	<2	<2	<2	<2	<2	<2	2	
Cadmium	mg/kg	0.3	0.4	<0.3	<0.3	0.5	0.5	<0.3	0.3	<0.3	
Chromium	mg/kg	2	5	8	12	3	11	6	4	3	
Cobalt	mg/kg	1	<1	<1	3	<1	2	2	<1	<1	
Copper	mg/kg	2	5	<2	2	4	6	<2	5	3	
Iron	mg/kg	50	1750	2120	5550	4540	11100	5810	20100	9950	
Lead	mg/kg	0.5	4.7	34.0	15.3	18.7	28.9	7.8	38.7	31.5	
Lithium	mg/kg	5	<5	<5	5	<5	6	6	<5	<5	
Manganese	mg/kg	2	6	50	117	12	88	84	46	30	
Molybdenum	mg/kg	2	<2	<2	<2	<2	<2	<2	<2	<2	
Nickel	mg/kg	2	3	<2	4	2	5	3	<2	<2	
Selenium	mg/kg	1	7	<1	<1	2	3	<1	1	2	
Silver	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Strontium	mg/kg	5	11	<5	<5	19	8	<5	20	17	
Thallium	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Tin	mg/kg	2	5	4	5	4	5	3	5	5	
Uranium	mg/kg	0.1	0.7	0.7	0.6	0.6	1.1	0.6	0.7	0.4	
Vanadium	mg/kg	2	13	10	30	8	36	19	16	9	
Zinc	mg/kg	5	10	7	22	15	45	14	23	16	

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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SED45 BFR_L1_SED46 BFR_L1_SED47 BFR_L1_SED48 BFR_L1_SED49 BFR_L1_SED50											
				Soil		Soil		Soil		Soil		Soil		BFR_L1_SED_D	BFR_L1_SED_D
				UP1		UP2		UP1		UP2		UP1		UP2	
				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-20	2021-11-21	2021-11-21			
				15:51	14:43	14:14	11:18	12:10	13:21	11:30	12:10				
				3256462	3256463	3256464	3256465	3256466	3256467	3256468	3256469				
Aluminum	mg/kg		10	11100	4050	2300	6530	2920	9100	2570	4090				
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	2	1				
Arsenic	mg/kg		1	3	2	2	2	2	2	3	5				
Barium	mg/kg		5	29	8	<5	31	11	75	22	13				
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2				
Boron	mg/kg		2	<2	<2	<2	<2	<2	<2	3	<2				
Cadmium	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.5				
Chromium	mg/kg		2	19	7	4	10	3	54	3	5				
Cobalt	mg/kg		1	9	<1	<1	4	1	6	<1	<1				
Copper	mg/kg		2	7	<2	<2	<2	<2	6	12	7				
Iron	mg/kg		50	33900	3190	2200	10200	3720	11600	5630	4690				
Lead	mg/kg		0.5	6.5	19.9	9.0	4.3	4.0	8.5	114	68.6				
Lithium	mg/kg		5	18	<5	<5	11	<5	12	<5	<5				
Manganese	mg/kg		2	402	50	55	199	96	166	51	21				
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2				
Nickel	mg/kg		2	11	<2	2	5	<2	18	<2	3				
Selenium	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	3				
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				
Strontium	mg/kg		5	<5	<5	<5	<5	<5	7	21	12				
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				
Tin	mg/kg		2	5	4	3	4	5	4	4	5				
Uranium	mg/kg		0.1	0.5	0.4	0.5	0.7	0.5	1.6	0.5	0.9				
Vanadium	mg/kg		2	82	16	9	30	13	44	6	23				
Zinc	mg/kg		5	50	7	7	25	15	29	23	24				

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# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L2_SED1 BFR_L2_SED2 BFR_L2_SED4 BFR_L2_SED5 BFR_L2_SED6 BFR_L2_SED7 BFR_L2_SED8 BFR_L2_SED9											
		G / S	RDL	Soil		Soil		Soil		Soil		Soil	
				DATE SAMPLED:	2021-11-22 08:57	2021-11-21 15:00	2021-11-21 16:10	2021-11-21 16:30	2021-11-22 09:57	2021-11-22 10:49	2021-11-21 16:45	2021-11-22 11:12	
Aluminum	mg/kg	10	4330	7400	10300	6760	6970	3460	6020	8280			
Antimony	mg/kg	1	<1	<1	<1	<1	<1	<1	<1	<1			
Arsenic	mg/kg	1	3	2	5	4	3	2	7	2			
Barium	mg/kg	5	13	43	24	15	38	20	14	22			
Beryllium	mg/kg	2	<2	<2	<2	<2	<2	<2	<2	<2			
Boron	mg/kg	2	<2	<2	<2	<2	<2	2	<2	<2			
Cadmium	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			
Chromium	mg/kg	2	11	60	28	13	5	3	7	12			
Cobalt	mg/kg	1	2	4	6	2	<1	<1	4	2			
Copper	mg/kg	2	<2	3	11	4	6	4	8	3			
Iron	mg/kg	50	8570	9190	19500	8020	2410	4720	14400	5380			
Lead	mg/kg	0.5	9.9	12.4	45.4	8.1	8.7	2.1	5.1	4.4			
Lithium	mg/kg	5	6	<5	10	7	<5	<5	13	6			
Manganese	mg/kg	2	112	86	350	127	22	102	282	112			
Molybdenum	mg/kg	2	<2	<2	<2	<2	<2	<2	<2	<2			
Nickel	mg/kg	2	4	11	11	6	2	2	7	4			
Selenium	mg/kg	1	<1	<1	<1	2	2	3	<1	1			
Silver	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			
Strontium	mg/kg	5	<5	<5	9	10	29	16	<5	<5			
Thallium	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Tin	mg/kg	2	4	5	5	4	5	4	4	4			
Uranium	mg/kg	0.1	0.5	0.1	2.4	1.5	1.0	0.5	0.5	0.4			
Vanadium	mg/kg	2	24	45	56	31	10	6	21	34			
Zinc	mg/kg	5	15	14	45	26	9	<5	39	15			

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# Certificate of Analysis

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	BFR_L2_SED_D			
		G / S	RDL	3256478	3256479
Aluminum	mg/kg		10	5920	4770
Antimony	mg/kg		1	<1	<1
Arsenic	mg/kg		1	3	2
Barium	mg/kg		5	13	8
Beryllium	mg/kg		2	<2	<2
Boron	mg/kg		2	2	<2
Cadmium	mg/kg	0.3	0.3	0.3	<0.3
Chromium	mg/kg		2	7	7
Cobalt	mg/kg		1	<1	<1
Copper	mg/kg		2	4	3
Iron	mg/kg		50	5940	1300
Lead	mg/kg		0.5	9.5	3.7
Lithium	mg/kg		5	<5	<5
Manganese	mg/kg		2	29	31
Molybdenum	mg/kg		2	3	<2
Nickel	mg/kg		2	<2	3
Selenium	mg/kg		1	2	2
Silver	mg/kg	0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	22	<5
Thallium	mg/kg		0.1	<0.1	<0.1
Tin	mg/kg		2	3	3
Uranium	mg/kg		0.1	7.0	0.4
Vanadium	mg/kg		2	18	17
Zinc	mg/kg		5	14	6

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3256438-3256479 Results are based on the dry weight of the sample.

Analysis performed at AGAT Halifax (unless marked by \*)

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# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Mercury in Soil											
DATE RECEIVED: 2021-11-25						DATE REPORTED: 2021-12-08					
SAMPLE DESCRIPTION: BFR_L1_SED26 BFR_L1_SED27 BFR_L1_SED28 BFR_L1_SED29 BFR_L1_SED30 BFR_L1_SED31 BFR_L1_SED32 BFR_L1_SED33											
SAMPLE TYPE: Soil Soil Soil Soil Soil Soil Soil Soil											
DATE SAMPLED: 2021-11-21 2021-11-21 2021-11-21 2021-11-21 2021-11-21 2021-11-21 2021-11-21 2021-11-21 2021-11-21 2021-11-21											
14:30 11:08 11:30 12:10 11:47 12:15 13:00 12:54											
Parameter	Unit	G / S	RDL	3256438	3256447	3256448	3256449	3256450	3256451	3256452	3256453
Mercury	mg/kg		0.03	0.11	0.11	0.17	0.17	0.21	0.08	<0.03	0.15
SAMPLE DESCRIPTION: BFR_L1_SED34 BFR_L1_SED35 BFR_L1_SED36 BFR_L1_SED39 BFR_L1_SED40 BFR_L1_SED41 BFR_L1_SED42 BFR_L1_SED44											
SAMPLE TYPE: Soil Soil Soil Soil Soil Soil Soil Soil											
DATE SAMPLED: 2021-11-21 2021-11-20 2021-11-20 2021-11-20 2021-11-20 2021-11-21 2021-11-21 2021-11-21 2021-11-20 2021-11-20											
13:16 12:00 14:45 11:25 11:10 13:30 15:15 15:45											
Parameter	Unit	G / S	RDL	3256454	3256455	3256456	3256457	3256458	3256459	3256460	3256461
Mercury	mg/kg		0.03	0.11	<0.03	<0.03	0.06	0.16	<0.03	0.20	0.12
SAMPLE DESCRIPTION: BFR_L1_SED45 BFR_L1_SED46 BFR_L1_SED47 BFR_L1_SED48 BFR_L1_SED49 BFR_L1_SED50 BFR_L1_SED_D BFR_L1_SED_D											
SAMPLE TYPE: Soil Soil Soil Soil Soil Soil Soil Soil											
DATE SAMPLED: 2021-11-20 2021-11-20 2021-11-20 2021-11-20 2021-11-20 2021-11-20 2021-11-21 2021-11-21 2021-11-21 2021-11-21											
15:51 14:43 14:14 11:18 12:10 13:21 11:30 12:10											
Parameter	Unit	G / S	RDL	3256462	3256463	3256464	3256465	3256466	3256467	3256468	3256469
Mercury	mg/kg		0.03	<0.03	0.04	<0.03	<0.03	<0.03	0.03	0.11	0.12
SAMPLE DESCRIPTION: BFR_L2_SED1 BFR_L2_SED2 BFR_L2_SED4 BFR_L2_SED5 BFR_L2_SED6 BFR_L2_SED7 BFR_L2_SED8 BFR_L2_SED9											
SAMPLE TYPE: Soil Soil Soil Soil Soil Soil Soil Soil											
DATE SAMPLED: 2021-11-22 2021-11-21 2021-11-21 2021-11-21 2021-11-22 2021-11-22 2021-11-21 2021-11-21 2021-11-22 2021-11-22											
08:57 15:00 16:10 16:30 09:57 10:49 16:45 11:12											
Parameter	Unit	G / S	RDL	3256470	3256471	3256472	3256473	3256474	3256475	3256476	3256477
Mercury	mg/kg		0.03	<0.03	<0.03	0.14	0.04	0.07	0.05	<0.03	<0.03

Certified By:



## Certificate of Analysis

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PROJECT: 21497139

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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Mercury in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

BFR\_L2\_SED\_D

SAMPLE DESCRIPTION: BFR\_L2\_SED10

UP1

SAMPLE TYPE: Soil

Soil

DATE SAMPLED: 2021-11-22  
10:25

2021-11-22  
11:12

Parameter	Unit	G / S	RDL	3256478	3256479
Mercury	mg/kg		0.03	0.08	<0.03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3256438-3256479 Results are based on the dry weight of the soil.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel											
DATE RECEIVED: 2021-11-25						DATE REPORTED: 2021-12-08					
SAMPLE DESCRIPTION: BFR_L1_SED26 BFR_L1_SED27 BFR_L1_SED28 BFR_L1_SED29 BFR_L1_SED30 BFR_L1_SED31 BFR_L1_SED32 BFR_L1_SED33											
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-11-21 14:30	2021-11-21 11:08	2021-11-21 11:30	2021-11-21 12:10	2021-11-21 11:47	2021-11-21 12:15	2021-11-21 13:00	2021-11-21 12:54		
Parameter	Unit	G / S	RDL	3256438	3256447	3256448	3256449	3256450	3256451	3256452	3256453
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	41	<15	<15	<15	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	55	59	160	468	29	<15	122	24
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	55	59	160	509	29	<15	122	24
Resemblance Comment			LR, UC	LR, UC	LR, UC	LR, UC	LR	NR	LR, UC	LR	
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup			Y	Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140	104	99	102	101	105	106	99	102	
Isobutylbenzene - VPH	%	60-140	99	105	98	77	103	102	98	100	
n-Dotriacontane - EPH	%	60-140	106	107	111	117	113	118	134	108	

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

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 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

SAMPLE DESCRIPTION: BFR_L1_SED34 BFR_L1_SED35 BFR_L1_SED36 BFR_L1_SED39 BFR_L1_SED40 BFR_L1_SED41 BFR_L1_SED42 BFR_L1_SED44											
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-11-21 13:16	2021-11-20 12:00	2021-11-20 14:45	2021-11-20 11:25	2021-11-20 11:10	2021-11-21 13:30	2021-11-21 15:15	2021-11-20 15:45		
Parameter	Unit	G / S	RDL	3256454	3256455	3256456	3256457	3256458	3256459	3256460	3256461
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	27	<15	<15	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	606	<15	62	343	428	<15	82	121
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	606	<15	62	343	455	<15	82	121
Resemblance Comment			LR, UC	NR	LR, UC	LR, UC	LR, UC	LR, UC	NR	LR, UC	LR, UC
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup			Y	Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140	104	105	101	103	106	106	106	100	100
Isobutylbenzene - VPH	%	60-140	96	100	99	98	95	96	96	96	94
n-Dotriacontane - EPH	%	60-140	118	115	112	107	118	118	108	109	109

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SED45 BFR_L1_SED46 BFR_L1_SED47 BFR_L1_SED48 BFR_L1_SED49 BFR_L1_SED50						BFR_L1_SED_D	BFR_L1_SED_D	
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	UP1	UP2
				DATE SAMPLED:	2021-11-20 15:51	2021-11-20 14:43	2021-11-20 14:14	2021-11-20 11:18	2021-11-20 12:10	2021-11-20 13:21	2021-11-21 11:30	2021-11-21 12:10
				3256462	3256463	3256464	3256465	3256466	3256467	3256468	3256469	
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3	
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15	
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	54	
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	<15	54	<15	<15	<15	76	254	614	
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	<15	54	<15	<15	<15	76	254	668	
Resemblance Comment			NR	LR, UC	NR	NR	NR	NR	LR, UC	LR, UC	LR, UC	
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Silica Gel Cleanup			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Surrogate	Unit	Acceptable Limits										
Isobutylbenzene - EPH	%	60-140	105	105	104	108	107	107	107	108	108	
Isobutylbenzene - VPH	%	60-140	98	84	89	88	86	89	85	82	82	
n-Dotriacontane - EPH	%	60-140	118	134	120	120	121	133	123	133	133	

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L2_SED1	BFR_L2_SED2	BFR_L2_SED4	BFR_L2_SED5	BFR_L2_SED6	BFR_L2_SED7	BFR_L2_SED8	BFR_L2_SED9
				SAMPLE TYPE: Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED: 2021-11-22 08:57	2021-11-21 15:00	2021-11-21 16:10	2021-11-21 16:30	2021-11-22 09:57	2021-11-22 10:49	2021-11-21 16:45	2021-11-22 11:12
				3256470	3256471	3256472	3256473	3256474	3256475	3256476	3256477
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	19	37	20	<15	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	39	333	620	320	<15	266
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	<15	<15	39	352	657	340	<15	266
Resemblance Comment				NR	NR	LR, UC	LR, UC	LR, UC	LR, UC	NR	LR, UC
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup				Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140	107	108	104	110	112	112	109	106	
Isobutylbenzene - VPH	%	60-140	88	84	88	62	86	81	83	78	
n-Dotriacontane - EPH	%	60-140	120	129	124	140	131	139	121	134	

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

 11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	BFR_L2_SED_D			
		G / S	RDL	3256478	3256479
SAMPLE DESCRIPTION: BFR_L2_SED10				UP1	
SAMPLE TYPE: Soil				Soil	
DATE SAMPLED: 2021-11-22 10:25				2021-11-22 11:12	
Benzene	mg/kg		0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	19	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	59	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	337	321
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	415	321
Resemblance Comment				FR, LR, UC	LR, UC
Return to Baseline at C32				Y	Y
Silica Gel Cleanup				Y	Y
Surrogate	Unit	Acceptable Limits			
Isobutylbenzene - EPH	%	60-140	103	110	
Isobutylbenzene - VPH	%	60-140	82	76	
n-Dotriacontane - EPH	%	60-140	140	126	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
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FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3256438-3256479 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

- Resemblance Comment Key:
- GF - Gasoline Fraction
  - WGF - Weathered Gasoline Fraction
  - GR - Product in Gasoline Range
  - FOF - Fuel Oil Fraction
  - WFOF - Weathered Fuel Oil Fraction
  - FR - Product in Fuel Oil Range
  - LOF - Lube Oil Fraction
  - LR - Lube Range
  - UC - Unidentified Compounds
  - NR - No Resemblance
  - NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

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 CANADA B3B 1M2  
 TEL (902)468-8718  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Moisture

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

SAMPLE DESCRIPTION: BFR_L1_SED26 BFR_L1_SED27 BFR_L1_SED28 BFR_L1_SED29 BFR_L1_SED30 BFR_L1_SED31 BFR_L1_SED32 BFR_L1_SED33												
Parameter		Unit	G / S	RDL	3256438	3256447	3256448	3256449	3256450	3256451	3256452	3256453
SAMPLE TYPE:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:					2021-11-21 14:30	2021-11-21 11:08	2021-11-21 11:30	2021-11-21 12:10	2021-11-21 11:47	2021-11-21 12:15	2021-11-21 13:00	2021-11-21 12:54
% Moisture		%	1		90	74	91	94	92	87	31	89
SAMPLE DESCRIPTION: BFR_L1_SED34 BFR_L1_SED35 BFR_L1_SED36 BFR_L1_SED39 BFR_L1_SED40 BFR_L1_SED41 BFR_L1_SED42 BFR_L1_SED44												
Parameter		Unit	G / S	RDL	3256454	3256455	3256456	3256457	3256458	3256459	3256460	3256461
SAMPLE TYPE:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:					2021-11-21 13:16	2021-11-20 12:00	2021-11-20 14:45	2021-11-20 11:25	2021-11-20 11:10	2021-11-21 13:30	2021-11-21 15:15	2021-11-20 15:45
% Moisture		%	1		88	35	55	94	86	23	94	97
SAMPLE DESCRIPTION: BFR_L1_SED45 BFR_L1_SED46 BFR_L1_SED47 BFR_L1_SED48 BFR_L1_SED49 BFR_L1_SED50										BFR_L1_SED_D BFR_L1_SED_D		
Parameter		Unit	G / S	RDL	3256462	3256463	3256464	3256465	3256466	3256467	3256468	3256469
SAMPLE TYPE:					Soil	Soil	Soil	Soil	Soil	Soil	UP1	UP2
DATE SAMPLED:					2021-11-20 15:51	2021-11-20 14:43	2021-11-20 14:14	2021-11-20 11:18	2021-11-20 12:10	2021-11-20 13:21	2021-11-21 11:30	2021-11-21 12:10
% Moisture		%	1		23	66	17	21	20	62	90	92
SAMPLE DESCRIPTION: BFR_L2_SED1 BFR_L2_SED2 BFR_L2_SED4 BFR_L2_SED5 BFR_L2_SED6 BFR_L2_SED7 BFR_L2_SED8 BFR_L2_SED9												
Parameter		Unit	G / S	RDL	3256470	3256471	3256472	3256473	3256474	3256475	3256476	3256477
SAMPLE TYPE:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:					2021-11-22 08:57	2021-11-21 15:00	2021-11-21 16:10	2021-11-21 16:30	2021-11-22 09:57	2021-11-22 10:49	2021-11-21 16:45	2021-11-22 11:12
% Moisture		%	1		22	32	92	73	85	86	8	69

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

BFR\_L2\_SED\_D

SAMPLE DESCRIPTION: BFR\_L2\_SED10

UP1

SAMPLE TYPE: Soil

Soil

DATE SAMPLED: 2021-11-22  
10:25

2021-11-22  
11:12

Parameter	Unit	G / S	RDL	3256478	3256479
% Moisture	%		1	87	69

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

SAMPLE DESCRIPTION: BFR_L1_SED26 BFR_L1_SED27 BFR_L1_SED28 BFR_L1_SED29 BFR_L1_SED30 BFR_L1_SED31 BFR_L1_SED32 BFR_L1_SED33											
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:		2021-11-21 14:30	2021-11-21 11:08	2021-11-21 11:30	2021-11-21 12:10	2021-11-21 11:47	2021-11-21 12:15	2021-11-21 13:00	2021-11-21 12:54		
Parameter	Unit	G / S	RDL	3256438	3256447	3256448	3256449	3256450	3256451	3256452	3256453
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	0.005	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	0.01	<0.01	<0.01	0.08	0.07	<0.01	<0.01	0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	0.10	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	0.01	<0.01	<0.01	<0.01	0.10	<0.01	<0.01	0.02
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	100	94	99	90	91	98	101	91	
Terphenyl-d14	%	50-140	102	101	104	99	98	102	98	96	
Pyrene-d10 (%)	%	50-140	98	96	97	92	95	98	99	97	

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L1_SED34 BFR_L1_SED35 BFR_L1_SED36 BFR_L1_SED39 BFR_L1_SED40 BFR_L1_SED41 BFR_L1_SED42 BFR_L1_SED44										
		G / S	RDL	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
				DATE SAMPLED:	2021-11-21 13:16	2021-11-20 12:00	2021-11-20 14:45	2021-11-20 11:25	2021-11-20 11:10	2021-11-21 13:30	2021-11-21 15:15	2021-11-20 15:45
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits										
Naphthalene-d8	%	50-140	92	89	95	96	84	92	107	88		
Terphenyl-d14	%	50-140	88	90	123	118	101	103	122	110		
Pyrene-d10 (%)	%	50-140	84	91	123	117	98	105	125	114		

Certified By:



# Certificate of Analysis

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PROJECT: 21497139

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 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SED45 BFR_L1_SED46 BFR_L1_SED47 BFR_L1_SED48 BFR_L1_SED49 BFR_L1_SED50									
				Soil		Soil		Soil		Soil		Soil	
				DATE SAMPLED:	2021-11-20 15:51	2021-11-20 14:43	2021-11-20 14:14	2021-11-20 11:18	2021-11-20 12:10	2021-11-20 13:21	2021-11-21 11:30	2021-11-21 12:10	
				3256462	3256463	3256464	3256465	3256466	3256467	3256468	3256469		
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671		
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006		
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10		
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	0.20	<0.05	0.16	0.09	0.83		
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03		
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Surrogate	Unit		Acceptable Limits										
Naphthalene-d8	%		50-140	105	86	89	114	93	100	89	109		
Terphenyl-d14	%		50-140	124	108	112	120	116	120	117	120		
Pyrene-d10 (%)	%		50-140	106	87	91	95	91	96	90	111		

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	SAMPLE DESCRIPTION: BFR_L2_SED1 BFR_L2_SED2 BFR_L2_SED4 BFR_L2_SED5 BFR_L2_SED6 BFR_L2_SED7 BFR_L2_SED8 BFR_L2_SED9										
		G / S	RDL	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
				DATE SAMPLED: 2021-11-22 08:57	2021-11-21 15:00	2021-11-21 16:10	2021-11-21 16:30	2021-11-22 09:57	2021-11-22 10:49	2021-11-21 16:45	2021-11-22 11:12	
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	0.016	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	0.60	8.35	6.44	<0.05	0.11	
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits										
Naphthalene-d8	%	50-140	85	101	89	84	89	104	87	99		
Terphenyl-d14	%	50-140	108	119	116	113	116	123	107	122		
Pyrene-d10 (%)	%	50-140	87	101	91	86	84	100	86	99		

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	BFR_L2_SED_D			
		G / S	RDL	3256478	3256479
		SAMPLE DESCRIPTION: BFR_L2_SED10		UP1	
		SAMPLE TYPE: Soil		Soil	
		DATE SAMPLED: 2021-11-22 10:25		2021-11-22 11:12	
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg	0.004	0.004	<0.004	<0.004
Acridine	mg/kg	0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg	0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg	0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg	0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg	0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg	0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg	0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg	0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg	0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg	0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	0.01	<0.01	<0.01	<0.01
Perylene	mg/kg	0.05	14.8	0.09	0.09
Phenanthrene	mg/kg	0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg	0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg	0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits			
Naphthalene-d8	%	50-140	85	90	
Terphenyl-d14	%	50-140	110	118	
Pyrene-d10 (%)	%	50-140	83	87	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

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CANADA B3B 1M2  
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FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3256438-3256479 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835677  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

Soil Analysis															
RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Available Metals in Soil**

Aluminum	3256454	3256454	6390	6110	4.4%	< 10	100%	80%	120%	104%	80%	120%	NA	70%	130%
Antimony	3256454	3256454	<1	<1	NA	< 1	80%	80%	120%	98%	80%	120%	NA	70%	130%
Arsenic	3256454	3256454	3	3	NA	< 1	99%	80%	120%	102%	80%	120%	NA	70%	130%
Barium	3256454	3256454	11	10	NA	< 5	80%	80%	120%	89%	80%	120%	96%	70%	130%
Beryllium	3256454	3256454	<2	<2	NA	< 2	98%	80%	120%	104%	80%	120%	130%	70%	130%
Boron	3256454	3256454	<2	<2	NA	< 2	99%	80%	120%	104%	80%	120%	127%	70%	130%
Cadmium	3256454	3256454	0.4	0.4	NA	< 0.3	100%	80%	120%	99%	80%	120%	129%	70%	130%
Chromium	3256454	3256454	5	5	NA	< 2	90%	80%	120%	96%	80%	120%	NA	70%	130%
Cobalt	3256454	3256454	<1	<1	NA	< 1	94%	80%	120%	98%	80%	120%	123%	70%	130%
Copper	3256454	3256454	5	5	NA	< 2	96%	80%	120%	100%	80%	120%	NA	70%	130%
Iron	3256454	3256454	1750	1760	0.9%	< 50	91%	80%	120%	97%	80%	120%	NA	70%	130%
Lead	3256454	3256454	4.7	4.5	3.6%	< 0.5	97%	80%	120%	108%	80%	120%	117%	70%	130%
Lithium	3256454	3256454	<5	<5	NA	< 5	94%	70%	130%	102%	70%	130%	NA	70%	130%
Manganese	3256454	3256454	6	6	NA	< 2	94%	80%	120%	98%	80%	120%	NA	70%	130%
Molybdenum	3256454	3256454	<2	<2	NA	< 2	80%	80%	120%	89%	80%	120%	NA	70%	130%
Nickel	3256454	3256454	3	3	NA	< 2	93%	80%	120%	98%	80%	120%	129%	70%	130%
Selenium	3256454	3256454	7	7	3.2%	< 1	113%	80%	120%	112%	80%	120%	NA	70%	130%
Silver	3256454	3256454	<0.5	<0.5	NA	< 0.5	96%	80%	120%	97%	80%	120%	130%	70%	130%
Strontium	3256454	3256454	11	11	NA	< 5	92%	80%	120%	97%	80%	120%	NA	70%	130%
Thallium	3256454	3256454	<0.1	<0.1	NA	< 0.1	95%	80%	120%	105%	80%	120%	NA	70%	130%
Tin	3256454	3256454	5	5	NA	< 2	92%	80%	120%	94%	80%	120%	119%	70%	130%
Uranium	3256454	3256454	0.7	0.7	2.2%	< 0.1	95%	80%	120%	104%	80%	120%	110%	70%	130%
Vanadium	3256454	3256454	13	14	4.9%	< 2	94%	80%	120%	99%	80%	120%	NA	70%	130%
Zinc	3256454	3256454	10	10	NA	< 5	98%	80%	120%	99%	80%	120%	126%	70%	130%

**Mercury in Soil**

Mercury	3256473	3256473	0.04	0.03	NA	< 0.03	88%	70%	130%	105%	70%	130%	110%	70%	130%
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Certified By:



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis															
RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3238810	< 0.05	< 0.05	NA	< 0.05	124%	50%	140%	105%	50%	140%	100%	50%	140%
2-Methylnaphthalene	1	3238810	< 0.01	< 0.01	NA	< 0.01	115%	50%	140%	96%	50%	140%	91%	50%	140%
Acenaphthene	1	3238810	< 0.00671	< 0.00671	NA	< 0.00671	114%	50%	140%	95%	50%	140%	93%	50%	140%
Acenaphthylene	1	3238810	< 0.004	< 0.004	NA	< 0.004	89%	50%	140%	78%	50%	140%	79%	50%	140%
Acridine	1	3238810	< 0.05	< 0.05	NA	< 0.05	93%	50%	140%	121%	50%	140%	110%	50%	140%
Anthracene	1	3238810	< 0.03	< 0.03	NA	< 0.03	82%	50%	140%	77%	50%	140%	88%	50%	140%
Benzo(a)anthracene	1	3238810	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	79%	50%	140%	90%	50%	140%
Benzo(a)pyrene	1	3238810	< 0.01	< 0.01	NA	< 0.01	79%	50%	140%	74%	50%	140%	78%	50%	140%
Benzo(b)fluoranthene	1	3238810	< 0.05	< 0.05	NA	< 0.05	78%	50%	140%	106%	50%	140%	102%	50%	140%
Benzo(j+k)fluoranthene	1	3238810	< 0.05	< 0.05	NA	< 0.05	106%	50%	140%	104%	50%	140%	99%	50%	140%
Benzo(e)pyrene	1	3238810	< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	94%	50%	140%	91%	50%	140%
Benzo(ghi)perylene	1	3238810	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	90%	50%	140%
Chrysene	1	3238810	< 0.01	< 0.01	NA	< 0.01	120%	50%	140%	107%	50%	140%	104%	50%	140%
Dibenzo(a,h)anthracene	1	3238810	< 0.006	< 0.006	NA	< 0.006	89%	50%	140%	82%	50%	140%	84%	50%	140%
Fluoranthene	1	3238810	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	92%	50%	140%	108%	50%	140%
Fluorene	1	3238810	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	94%	50%	140%	98%	50%	140%
Indeno(1,2,3)pyrene	1	3238810	< 0.01	< 0.01	NA	< 0.01	84%	50%	140%	79%	50%	140%	91%	50%	140%
Naphthalene	1	3238810	< 0.01	< 0.01	NA	< 0.01	126%	50%	140%	103%	50%	140%	98%	50%	140%
Perylene	1	3238810	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	91%	50%	140%	93%	50%	140%
Phenanthrene	1	3238810	< 0.03	< 0.03	NA	< 0.03	118%	50%	140%	99%	50%	140%	98%	50%	140%
Pyrene	1	3238810	< 0.05	< 0.05	NA	< 0.05	110%	50%	140%	96%	50%	140%	100%	50%	140%
Quinoline	1	3238810	< 0.05	< 0.05	NA	< 0.05	120%	50%	140%	122%	50%	140%	133%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3256462	< 0.05	< 0.05	NA	< 0.05	122%	50%	140%	95%	50%	140%	105%	50%	140%
2-Methylnaphthalene	1	3256462	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	90%	50%	140%	97%	50%	140%
Acenaphthene	1	3256462	< 0.00671	< 0.00671	NA	< 0.00671	110%	50%	140%	89%	50%	140%	98%	50%	140%
Acenaphthylene	1	3256462	< 0.004	< 0.004	NA	< 0.004	109%	50%	140%	88%	50%	140%	93%	50%	140%
Acridine	1	3256462	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	135%	50%	140%	103%	50%	140%
Anthracene	1	3256462	< 0.03	< 0.03	NA	< 0.03	103%	50%	140%	88%	50%	140%	96%	50%	140%
Benzo(a)anthracene	1	3256462	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	91%	50%	140%	102%	50%	140%
Benzo(a)pyrene	1	3256462	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	85%	50%	140%	92%	50%	140%
Benzo(b)fluoranthene	1	3256462	< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	108%	50%	140%	93%	50%	140%
Benzo(j+k)fluoranthene	1	3256462	< 0.05	< 0.05	NA	< 0.05	91%	50%	140%	108%	50%	140%	96%	50%	140%
Benzo(e)pyrene	1	3256462	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	95%	50%	140%	101%	50%	140%
Benzo(ghi)perylene	1	3256462	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	85%	50%	140%	90%	50%	140%
Chrysene	1	3256462	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	96%	50%	140%	103%	50%	140%
Dibenzo(a,h)anthracene	1	3256462	< 0.006	< 0.006	NA	< 0.006	96%	50%	140%	86%	50%	140%	94%	50%	140%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Fluoranthene	1	3256462	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	105%	50%	140%	111%	50%	140%	
Fluorene	1	3256462	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	71%	50%	140%	96%	50%	140%	
Indeno(1,2,3)pyrene	1	3256462	< 0.01	< 0.01	NA	< 0.01	98%	50%	140%	87%	50%	140%	94%	50%	140%	
Naphthalene	1	3256462	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	93%	50%	140%	95%	50%	140%	
Perylene	1	3256462	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	94%	50%	140%	101%	50%	140%	
Phenanthrene	1	3256462	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	96%	50%	140%	104%	50%	140%	
Pyrene	1	3256462	< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	105%	50%	140%	85%	50%	140%	
Quinoline	1	3256462	< 0.05	< 0.05	NA	< 0.05	121%	50%	140%	132%	50%	140%	108%	50%	140%	

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

#### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3245310	< 0.02	< 0.02	NA	< 0.02	73%	60%	140%	88%	60%	140%			
Toluene	1	3245310	< 0.04	< 0.04	NA	< 0.04	80%	60%	140%	89%	60%	140%			
Ethylbenzene	1	3245310	< 0.03	< 0.03	NA	< 0.03	82%	60%	140%	89%	60%	140%			
Xylene (Total)	1	3245310	< 0.05	< 0.05	NA	< 0.05	83%	60%	140%	90%	60%	140%			
C6-C10 (less BTEX)	1	3245310	< 3	< 3	NA	< 3	105%	60%	140%	96%	60%	140%	106%	30%	130%
>C10-C16 Hydrocarbons - 1X silica gel	1	3238810	< 15	< 15	NA	< 15	89%	60%	140%	107%	60%	140%	106%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3238810	< 15	< 15	NA	< 15	99%	60%	140%	107%	60%	140%	106%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3238810	< 15	< 15	NA	< 15	81%	60%	140%	107%	60%	140%	106%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

#### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

>C10-C16 Hydrocarbons - 1X silica gel	1	3256462	< 15	< 15	NA	< 15	83%	60%	140%	112%	60%	140%	114%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3256462	< 15	< 15	NA	< 15	96%	60%	140%	112%	60%	140%	114%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3256462	< 15	< 15	NA	< 15	82%	60%	140%	112%	60%	140%	114%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

#### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3256463	< 0.02	< 0.02	NA	< 0.02	71%	60%	140%	94%	60%	140%			
Toluene	1	3256463	< 0.04	< 0.04	NA	< 0.04	67%	60%	140%	83%	60%	140%			
Ethylbenzene	1	3256463	< 0.03	< 0.03	NA	< 0.03	67%	60%	140%	82%	60%	140%			
Xylene (Total)	1	3256463	< 0.05	< 0.05	NA	< 0.05	71%	60%	140%	92%	60%	140%			
C6-C10 (less BTEX)	1	3256463	< 3	< 3	NA	< 3	84%	60%	140%	96%	60%	140%	108%	30%	130%

## Quality Assurance

 CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X835677  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 08, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By:



## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS



## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835677

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS

Temp: 1.5, 1.3, 1.9

21x835677

ATL FCD 00149 / 26



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
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 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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CHAIN OF CUSTODY RECORD

COC #: **D 57736** Page **1** of **4**

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: <u>GOLDER ASSOCIATES LTD</u> Contact Name: <u>Belinda Culgin</u> Address: <u>201 Brownlow Ave Suite 26</u> <u>Dartmouth NS</u> PC: Phone: <u>902 466 1668</u> Email: <u>Belinda_culgin@golder.com</u> Report Copies: <u>jdoyle@golder.com</u>	Company Name: Contact Name: <u>Belinda culgin</u> Address: PC: Phone: Email: <u>belinda_culgin@golder.com</u> Report Copies: <u>jdoyle@golder.com</u>	Quotation #: <u>C04828</u> Purchase Order#: <u>21497139</u> Project #: <u>21497139</u> Site Location: Site Province: Site #: Sampled By: <u>A Brunskill</u>	<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS IF RUSH please specify date required <u>21 NOV 25 3:20 PM</u> <b>DATE REQUIRED:</b>

Laboratory Use Only				Analysis Requested															Regulatory Requirements (Specify)								
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME Sediment)	PCBS - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD- DO NOT ANALYZE	COMMENTS		
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water						Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest															
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																							
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																							
1	BFR-LI-SED26	2021/11/21	14:30	SED	3																					Silica Gel	
2	BFR-LI-SED27	2021/11/21	11:08	SED	3																					Silica Gel	
3	BFR-LI-SED28	2021/11/21	11:30	SED	3																					Silica Gel	
4	BFR-LI-SED29	2021/11/21	12:10	SED	3																					Silica Gel	
5	BFR-LI-SED30	2021/11/21	11:47	SED	3																					Silica Gel	
6	BFR-LI-SED31	2021/11/21	12:15	SED	3																					Silica Gel	
7	BFR-LI-SED32	2021/11/21	13:00	SED	3																					Silica Gel	
8	BFR-LI-SED33	2021/11/21	12:54	SED	3																					Silica Gel	
9	BFR-LI-SED34	2021/11/21	13:16	SED	3																					Silica Gel	
10	BFR-LI-SED35	2021/11/21	12:00	SED	3																					Silica Gel	
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)																BV LABS JOB #				
<i>A Brunskill</i>		2021/11/21		<i>M. Moore</i>																							

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 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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CHAIN OF CUSTODY RECORD

Temp: 1.5, 1.3, 1.9  
 21x 835677 ATL FCD 00149 / 26  
 COC #: **D 57737** Page **2** of **4**

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information (where applicable)</b>		<b>Turnaround Time (TAT) Required</b>	
Company Name: <u>GOLDER ASSOCIATES LTD</u>		Company Name: _____		Quotation #: <u>C04828</u>		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: <u>Belinda Culgin</u>		Contact Name: <u>Belinda Culgin</u>		Purchase Order#: _____		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: <u>201 Brownlow Ave Suite 26</u> <u>Dartmouth NS</u> PC: _____		Address: _____ PC: _____		Project #: <u>2149739</u>		IF RUSH please specify date (Surcharges will be applied)	
Phone: <u>(902) 466 1668</u>		Phone: _____		Site Location: _____		<b>DATE REQUIRED:</b>	
Email: <u>belinda_culgin@golder.com</u>		Email: <u>belinda-culgin@golder.com</u>		Site Province: _____		_____	
Report Copies: <u>jdoyle@golder.com</u>		Report Copies: <u>jdoyle@golder.com</u>		Site #: _____		_____	
Report Copies: _____		Report Copies: _____		Sampled By: <u>A. Bruns'ull</u>		_____	

'21 NOV 25 3:21 PM

Laboratory Use Only				Analysis Requested																Regulatory Requirements (Specify)				
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME Sediment)	PCBS - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD-DO NOT ANALYZE	COMMENTS
Present	Intact										Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest										
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																				
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																				
1	BFR-LI-SED36	2021/11/20	14:45	SED	3																			Silica Gel
2	BFR-LI-SED39	2021/11/20	11:25	SED	3																			Silica Gel
3	BFR-LI-SED40	2021/11/20	11:10	SED	3																			Silica Gel
4	BFR-LI-SED41	2021/11/21	13:30	SED	3																			Silica Gel
5	BFR-LI-SED42	2021/11/21	15:15	SED	3																			Silica Gel
6	BFR-LI-SED44	2021/11/20	15:45	SED	3																			Silica Gel
7	BFR-LI-SED45	2021/11/20	15:51	SED	3																			Silica Gel
8	BFR-LI-SED46	2021/11/20	14:43	SED	3																			Silica Gel
9	BFR-LI-SED47	2021/11/20	14:14	SED	3																			Silica Gel
10	BFR-LI-SED48	2021/11/20	11:18	SED	3																			Silica Gel
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																
				<i>W. Moore Agree</i>																				

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to BV Labs standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at www.bvna.com

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21 x 835677

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**CHAIN OF CUSTODY RECORD**

COC #: **D 57738** Page **3** of **4**

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: <u>Golder Associates Ltd</u> Contact Name: <u>Belinda Culin</u> Address: <u>201 Brownlow Ave Suite 26</u> <u>Dartmouth NS</u> PC: Phone: <u>(902) 466 1668</u> Email: <u>belinda_culin@golder.com</u> Report Copies: <u>jdoyle@golder.com</u>	Company Name: Contact Name: Address: Phone: Email: Report Copies:	Quotation #: <u>C04828</u> Purchase Order#: <u>2197139</u> Project #: <u>2197139</u> Site Location: Site Province: Site #: Sampled By: <u>A. Brunskill</u>	<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS IF RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b>

21 NOV 25 3:21 PM

Laboratory Use Only				Analysis Requested														Regulatory Requirements (Specify)						
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, P2-F4)	PAHs (Default for water/soil)		PAHs (FWAL /CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD- DO NOT ANALYZE
Present	Intact										Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default Acid Extractable (Available) Digest				Hot Water Soluble Boron (required for CCME Agricultural / Landfill)						
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																				
SAMPLE IDENTIFICATION				DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																		
1	BFR-L1-SED49	2021/11/20	12:10	SED	3																			Silica Gel
2	BFR-L1-SED50	2021/11/20	13:24	SED	3																			Silica Gel
3	BFR-L1-SED-DUP1	2021/11/24	11:30	SED	3																			Silica Gel
4	BFR-L1-SED-DUP2	2021/11/24	12:10	SED	3																			Silica Gel
5	BFR-L2-SED1	2021/11/22	8:57	SED	3																			Silica Gel
6	BFR-L2-SED2	2021/11/21	15:00	SED	3																			Silica Gel
7	BFR-L2-SED4	2021/11/21	16:10	SED	3																			Silica Gel
8	BFR-L2-SED5	2021/11/21	16:30	SED	3																			Silica Gel
9	BFR-L2-SED6	2021/11/22	9:57	SED	3																			Silica Gel
10	BFR-L2-SED7	2021/11/22	10:49	SED	3																			Silica Gel
RELINQUISHED BY: (Signature/Print)				DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)				DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #												
				2021/11/22																				

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Temp: 1.5, 1.3, 1.8

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465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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CHAIN OF CUSTODY RECORD

COC #: D 57740 Page 4 of 4

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: <u>GOLDER ASSOCIATES LTD</u> Contact Name: <u>Belinda Culgin</u> Address: <u>201 Brownlow Ave Suite 26</u> <u>Dartmouth NS</u> PC: Phone: <u>(902) 466 1668</u> Email: <u>Belinda_culgin@golder.com</u> Report Copies: <u>j.doyle@golder.com</u>	Company Name: Contact Name: Address: Phone: Email: Report Copies:	Quotation #: <u>COA-828</u> Purchase Order#: Project #: <u>21497139</u> Site Location: Site Province: Site #: Sampled By: <u>A. Brunskill</u>	<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS <input type="checkbox"/> RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b> <u>'21 NOV 25 3:21 PM</u>

Laboratory Use Only				Analysis Requested																Regulatory Requirements (Specify)									
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury (Default: Acid Extractable (Available) Digest)	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)		PAHs (Default for water/soil)	PAHs (FWAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.coli (Count)	HOLD - DO NOT ANALYZE	COMMENTS	
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water																								
COOLING MEDIA PRESENT Y / N				SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																									
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																									
1	BFR-L2-SED8	2021/11/21	16:45	SED	3																								
2	BFR-L2-SED9	2021/11/21	11:12	SED	3																								Silica Gel
3	BFR-L2-SED10	2021/11/21	10:25	SED	3																								Silica Gel
4	BFR-L2-SED DUPI	2021/11/21	11:12	SED	3																								Silica Gel
5																													
6																													
7																													
8																													
9																													
10																													
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																					
				<i>manu...</i>																									

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Pink: Client

CLIENT NAME: GOLDER ASSOCIATES  
201 Brownlow Avenue, Suite 26  
DARTMOUTH, NS B3B 1W2  
(902) 466-1668

ATTENTION TO: BELINDA CULGIN

PROJECT: 21497139

AGAT WORK ORDER: 21X835693

SOIL ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

DATE REPORTED: Dec 08, 2021

PAGES (INCLUDING COVER): 26

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

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- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	BFR_L1_SS13A	BFR_L1_SS13B	BFR_L1_SS13C	BFR_L1_SS13D	BFR_L1_SS_DU	BFR_L1_SS26_	BFR_L1_SS27_	BFR_L1_SS28_
				_SA1	_SA1	_SA1	_SA1	P2	SA1	SA1	SA1
				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2021-11-17 15:35	2021-11-17 15:50	2021-11-17 15:45	2021-11-17 15:40	2021-11-17 15:35	2021-11-17 11:45	2021-11-17 12:15
				3256759	3256760	3256761	3256762	3256763	3256764	3256765	3256766
Aluminum	mg/kg		10	1190	7470	3340	639	1390	2290	2160	3210
Antimony	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic	mg/kg		1	2	3	3	3	2	2	3	3
Barium	mg/kg		5	<5	61	7	22	6	18	13	13
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	12	6	4	3	<2	2	<2	5
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium	mg/kg		2	<2	7	3	<2	<2	3	2	10
Cobalt	mg/kg		1	<1	5	<1	<1	<1	<1	<1	<1
Copper	mg/kg		2	<2	6	<2	3	<2	3	<2	10
Iron	mg/kg		50	450	11500	4790	369	573	487	374	634
Lead	mg/kg		0.5	4.6	5.2	15.0	4.7	6.4	7.9	16.3	8.2
Lithium	mg/kg		5	<5	5	<5	<5	<5	<5	<5	<5
Manganese	mg/kg		2	12	111	23	5	9	8	4	3
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	<2	6	<2	<2	<2	<2	<2	4
Selenium	mg/kg		1	1	1	2	2	2	2	2	3
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	<5	8	5	54	<5	8	7	9
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg		2	3	4	3	4	3	<2	<2	3
Uranium	mg/kg		0.1	0.4	0.2	0.4	<0.1	0.4	0.4	0.2	0.7
Vanadium	mg/kg		2	4	49	10	4	4	5	6	7
Zinc	mg/kg		5	16	27	9	19	<5	6	<5	10

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	BFR_L1_SS29_ BFR_L1_SS30_ BFR_L1_SS_DU										
				SAMPLE DESCRIPTION:			SA1	SA1	P3	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A
				SAMPLE TYPE:			Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:			2021-11-17 14:00	2021-11-17 14:30	2021-11-17 12:15	2021-11-18 17:15	2021-11-18 17:20	2021-11-18 17:25	2021-11-18 17:30	2021-11-18 16:45
				3256767	3256768	3256769	3256770	3256771	3256772	3256773	3256774			
Aluminum	mg/kg		10	3410	2910	1200	888	519	937	6340	1950			
Antimony	mg/kg		1	<1	<1	<1	<1	2	1	<1	<1			
Arsenic	mg/kg		1	2	2	2	2	2	3	2	2			
Barium	mg/kg		5	8	13	5	6	15	20	5	<5			
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2			
Boron	mg/kg		2	<2	<2	<2	<2	10	7	3	4			
Cadmium	mg/kg		0.3	<0.3	<0.3	<0.3	<0.3	0.3	0.6	<0.3	<0.3			
Chromium	mg/kg		2	6	2	<2	<2	<2	<2	3	<2			
Cobalt	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1			
Copper	mg/kg		2	<2	3	2	<2	7	3	3	<2			
Iron	mg/kg		50	952	226	274	399	507	435	286	566			
Lead	mg/kg		0.5	7.9	6.8	9.4	4.7	60.4	11.6	3.6	8.1			
Lithium	mg/kg		5	<5	<5	<5	<5	<5	<5	<5	<5			
Manganese	mg/kg		2	5	3	5	11	19	9	<2	21			
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2			
Nickel	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2			
Selenium	mg/kg		1	2	3	<1	<1	<1	2	5	1			
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			
Strontium	mg/kg		5	<5	7	<5	<5	14	57	<5	<5			
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Tin	mg/kg		2	4	<2	3	3	<2	4	3	3			
Uranium	mg/kg		0.1	0.7	0.5	0.1	0.2	<0.1	<0.1	1.0	0.4			
Vanadium	mg/kg		2	13	4	3	6	4	5	4	5			
Zinc	mg/kg		5	<5	5	7	<5	27	28	7	6			

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SS7B BFR_L1_SS7C BFR_L1_SS7D BFR_L1_SS8A BFR_L1_SS8B BFR_L1_SS8C BFR_L1_SS8D BFR_L1_SS-							
				SAMPLE TYPE: Soil Soil Soil Soil Soil Soil Soil Soil							
				DATE SAMPLED: 2021-11-18 2021-11-18 2021-11-18 2021-11-18 2021-11-18 2021-11-18 2021-11-18 2021-11-18							
				16:50 16:55 17:00 16:25 16:15 16:10 16:00 17:15							
				3256775	3256776	3256777	3256778	3256779	3256780	3256781	3256782
Aluminum	mg/kg		10	2010	1320	650	3550	724	2710	2530	1580
Antimony	mg/kg		1	4	3	<1	<1	1	<1	<1	<1
Arsenic	mg/kg		1	3	2	3	2	4	3	3	3
Barium	mg/kg		5	7	32	6	9	13	6	6	11
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Boron	mg/kg		2	4	3	3	<2	3	<2	<2	<2
Cadmium	mg/kg		0.3	<0.3	0.4	0.8	0.4	1.1	<0.3	<0.3	<0.3
Chromium	mg/kg		2	3	<2	<2	<2	<2	<2	<2	3
Cobalt	mg/kg		1	<1	<1	<1	<1	<1	<1	<1	<1
Copper	mg/kg		2	71	11	5	<2	<2	<2	3	<2
Iron	mg/kg		50	874	479	306	401	1390	2040	471	721
Lead	mg/kg		0.5	148	55.5	21.5	6.9	28.6	5.6	15.6	6.0
Lithium	mg/kg		5	<5	<5	<5	<5	<5	<5	<5	<5
Manganese	mg/kg		2	7	8	3	3	10	13	3	15
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Nickel	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2
Selenium	mg/kg		1	2	2	2	3	2	<1	2	<1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Strontium	mg/kg		5	<5	41	27	11	30	14	12	8
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1
Tin	mg/kg		2	3	<2	<2	<2	4	4	4	3
Uranium	mg/kg		0.1	0.8	0.1	<0.1	0.4	<0.1	0.2	0.3	0.2
Vanadium	mg/kg		2	8	4	4	5	5	11	4	9
Zinc	mg/kg		5	7	41	55	8	23	9	7	5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 3256759-3256782 Results are based on the dry weight of the sample.  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Mercury in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

		BFR_L1_SS13A	BFR_L1_SS13B	BFR_L1_SS13C	BFR_L1_SS13D	BFR_L1_SS_DU	BFR_L1_SS26_	BFR_L1_SS27_	BFR_L1_SS28_		
SAMPLE DESCRIPTION:		_SA1	_SA1	_SA1	_SA1	P2	SA1	SA1	SA1		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-11-17 15:35	2021-11-17 15:50	2021-11-17 15:45	2021-11-17 15:40	2021-11-17 15:35	2021-11-17 11:45	2021-11-17 12:15	2021-11-17 13:15		
Parameter	Unit	G / S	RDL	3256759	3256760	3256761	3256762	3256763	3256764	3256765	3256766
Mercury	mg/kg		0.03	0.07	0.09	0.11	0.09	0.08	<0.03	<0.03	0.06
		BFR_L1_SS29_	BFR_L1_SS30_	BFR_L1_SS_DU	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A		
SAMPLE DESCRIPTION:		SA1	SA1	P3	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-11-17 14:00	2021-11-17 14:30	2021-11-17 12:15	2021-11-18 17:15	2021-11-18 17:20	2021-11-18 17:25	2021-11-18 17:30	2021-11-18 16:45		
Parameter	Unit	G / S	RDL	3256767	3256768	3256769	3256770	3256771	3256772	3256773	3256774
Mercury	mg/kg		0.03	0.06	<0.03	<0.03	0.04	0.12	0.16	0.08	<0.03
		BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_L1_SS-DUP1		
SAMPLE DESCRIPTION:		BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_L1_SS-DUP1		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-11-18 16:50	2021-11-18 16:55	2021-11-18 17:00	2021-11-18 16:25	2021-11-18 16:15	2021-11-18 16:10	2021-11-18 16:00	2021-11-18 17:15		
Parameter	Unit	G / S	RDL	3256775	3256776	3256777	3256778	3256779	3256780	3256781	3256782
Mercury	mg/kg		0.03	0.09	<0.03	0.03	<0.03	0.10	0.09	0.09	0.07

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3256759-3256782 Results are based on the dry weight of the soil.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:


## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	BFR_L1_SS13A	BFR_L1_SS13B	BFR_L1_SS13C	BFR_L1_SS13D	BFR_L1_SS_DU	BFR_L1_SS26_	BFR_L1_SS27_	BFR_L1_SS28_
				_SA1	_SA1	_SA1	_SA1	P2	SA1	SA1	SA1
SAMPLE DESCRIPTION:				_SA1	_SA1	_SA1	_SA1	P2	SA1	SA1	SA1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2021-11-17 15:35	2021-11-17 15:50	2021-11-17 15:45	2021-11-17 15:40	2021-11-17 15:35	2021-11-17 11:45	2021-11-17 12:15	2021-11-17 13:15
				3256759	3256760	3256761	3256762	3256763	3256764	3256765	3256766
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	22	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	17	21	19
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	586	240	117	151	610	480	322	418
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	586	240	139	151	610	497	343	437
Resemblance Comment				LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup				Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140	109	110	100	107	103	104	103	103	103
Isobutylbenzene - VPH	%	60-140	84	78	81	110	110	108	106	100	100
n-Dotriacontane - EPH	%	60-140	140	136	131	140	134	120	130	117	117

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	BFR_L1_SS29_	BFR_L1_SS30_	BFR_L1_SS_DU	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A
				SA1	SA1	P3	Soil	Soil	Soil	Soil	Soil
SAMPLE DESCRIPTION:				SA1	SA1	P3	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2021-11-17 14:00	2021-11-17 14:30	2021-11-17 12:15	2021-11-18 17:15	2021-11-18 17:20	2021-11-18 17:25	2021-11-18 17:30	2021-11-18 16:45
				3256767	3256768	3256769	3256770	3256771	3256772	3256773	3256774
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	22	<15	<15	<15	16	47	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	29	15	<15	<15	16	<15	<15	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	1050	339	180	312	532	191	845	554
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	1100	354	180	312	564	238	845	554
Resemblance Comment				LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup				Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140	101	104	107	107	105	104	105	105	105
Isobutylbenzene - VPH	%	60-140	97	95	91	91	96	98	93	92	92
n-Dotriacontane - EPH	%	60-140	127	125	130	127	136	139	138	129	129

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SS7B BFR_L1_SS7C BFR_L1_SS7D BFR_L1_SS8A BFR_L1_SS8B BFR_L1_SS8C BFR_L1_SS8D BFR_L1_SS-							
				DUP1							
				Soil							
SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil	
DATE SAMPLED:		2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18	2021-11-18
		16:50	16:55	17:00	16:25	16:15	16:10	16:00	17:15		
		3256775	3256776	3256777	3256778	3256779	3256780	3256781	3256782		
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	53	<15	25	102	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	21	16	15	21	21	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	466	250	290	504	283	268	502	192
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	466	250	364	520	323	391	523	192
Resemblance Comment			LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC
Return to Baseline at C32			Y	Y	Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup			Y	Y	Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits									
Isobutylbenzene - EPH	%	60-140	110	103	110	108	106	109	102	107	107
Isobutylbenzene - VPH	%	60-140	87	88	89	89	83	92	95	98	98
n-Dotriacontane - EPH	%	60-140	126	136	132	136	130	139	139	137	137

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3256759-3256782 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

Resemblance Comment Key:

- GF - Gasoline Fraction
- WGF - Weathered Gasoline Fraction
- GR - Product in Gasoline Range
- FOF - Fuel Oil Fraction
- WFOF - Weathered Fuel Oil Fraction
- FR - Product in Fuel Oil Range
- LOF - Lube Oil Fraction
- LR - Lube Range
- UC - Unidentified Compounds
- NR - No Resemblance
- NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X835693

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11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
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CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

		BFR_L1_SS13A	BFR_L1_SS13B	BFR_L1_SS13C	BFR_L1_SS13D	BFR_L1_SS_DU	BFR_L1_SS26_	BFR_L1_SS27_	BFR_L1_SS28_		
SAMPLE DESCRIPTION:		_SA1	_SA1	_SA1	_SA1	P2	SA1	SA1	SA1		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-11-17 15:35	2021-11-17 15:50	2021-11-17 15:45	2021-11-17 15:40	2021-11-17 15:35	2021-11-17 11:45	2021-11-17 12:15	2021-11-17 13:15		
Parameter	Unit	G / S	RDL	3256759	3256760	3256761	3256762	3256763	3256764	3256765	3256766
% Moisture	%	1	73	68	85	82	71	87	86	87	
		BFR_L1_SS29_	BFR_L1_SS30_	BFR_L1_SS_DU	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A		
SAMPLE DESCRIPTION:		SA1	SA1	P3	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-11-17 14:00	2021-11-17 14:30	2021-11-17 12:15	2021-11-18 17:15	2021-11-18 17:20	2021-11-18 17:25	2021-11-18 17:30	2021-11-18 16:45		
Parameter	Unit	G / S	RDL	3256767	3256768	3256769	3256770	3256771	3256772	3256773	3256774
% Moisture	%	1	73	86	87	70	80	81	73	74	
		BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_L1_SS-DUP1		
SAMPLE DESCRIPTION:		BFR_L1_SS7B	BFR_L1_SS7C	BFR_L1_SS7D	BFR_L1_SS8A	BFR_L1_SS8B	BFR_L1_SS8C	BFR_L1_SS8D	BFR_L1_SS-DUP1		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
DATE SAMPLED:		2021-11-18 16:50	2021-11-18 16:55	2021-11-18 17:00	2021-11-18 16:25	2021-11-18 16:15	2021-11-18 16:10	2021-11-18 16:00	2021-11-18 17:15		
Parameter	Unit	G / S	RDL	3256775	3256776	3256777	3256778	3256779	3256780	3256781	3256782
% Moisture	%	1	73	76	77	84	88	62	85	54	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	BFR_L1_SS13A	BFR_L1_SS13B	BFR_L1_SS13C	BFR_L1_SS13D	BFR_L1_SS_DU	BFR_L1_SS26_	BFR_L1_SS27_	BFR_L1_SS28_
				_SA1	_SA1	_SA1	_SA1	P2	SA1	SA1	SA1
				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2021-11-17 15:35	2021-11-17 15:50	2021-11-17 15:45	2021-11-17 15:40	2021-11-17 15:35	2021-11-17 11:45	2021-11-17 12:15
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	0.03	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	98	96	104	84	99	88	94	92	
Terphenyl-d14	%	50-140	123	124	122	103	124	117	125	122	
Pyrene-d10 (%)	%	50-140	95	85	99	67	99	94	100	96	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:


## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	BFR_L1_SS29_ BFR_L1_SS30_ BFR_L1_SS_DU										
				SAMPLE DESCRIPTION:		SA1	SA1	P3	BFR_L1_SS6A	BFR_L1_SS6B	BFR_L1_SS6C	BFR_L1_SS6D	BFR_L1_SS7A	
				SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:		2021-11-17 14:00	2021-11-17 14:30	2021-11-17 12:15	2021-11-18 17:15	2021-11-18 17:20	2021-11-18 17:25	2021-11-18 17:30	2021-11-18 16:45	
				3256767	3256768	3256769	3256770	3256771	3256772	3256773	3256774			
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671			
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004			
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006			
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Fluorene	mg/kg		0.01	0.04	<0.01	<0.01	0.03	<0.01	<0.01	0.02	<0.01			
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03			
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05			
Surrogate	Unit	Acceptable Limits												
Naphthalene-d8	%	50-140	84	77	91	90	94	97	79	94				
Terphenyl-d14	%	50-140	108	108	125	117	125	124	106	128				
Pyrene-d10 (%)	%	50-140	78	84	100	80	91	86	77	107				

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Parameter	Unit	G / S	RDL	SAMPLE DESCRIPTION: BFR_L1_SS7B BFR_L1_SS7C BFR_L1_SS7D BFR_L1_SS8A BFR_L1_SS8B BFR_L1_SS8C BFR_L1_SS8D BFR_L1_SS- DUP1									
				Soil		Soil		Soil		Soil		Soil	
				2021-11-18		2021-11-18		2021-11-18		2021-11-18		2021-11-18	
				16:50		16:55		17:00		16:25		16:10	
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.01	0.02		
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Surrogate	Unit	Acceptable Limits											
Naphthalene-d8	%	50-140	80	101	82	89	94	89	91	99			
Terphenyl-d14	%	50-140	113	134	111	119	127	118	117	131			
Pyrene-d10 (%)	%	50-140	86	78	70	89	97	77	89	84			

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: GOLDER ASSOCIATES

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-11-25

DATE REPORTED: 2021-12-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3256759-3256782 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835693  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

Soil Analysis															
RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Available Metals in Soil**

Aluminum	3256775	3256775	2010	1530	27.4%	< 10	93%	80%	120%	107%	80%	120%	NA	70%	130%
Antimony	3256775	3256775	4	2	NA	< 1	80%	80%	120%	112%	80%	120%	NA	70%	130%
Arsenic	3256775	3256775	3	<1	NA	< 1	96%	80%	120%	104%	80%	120%	77%	70%	130%
Barium	3256775	3256775	7	5	NA	< 5	80%	80%	120%	86%	80%	120%	79%	70%	130%
Beryllium	3256775	3256775	<2	<2	NA	< 2	97%	80%	120%	104%	80%	120%	82%	70%	130%
Boron	3256775	3256775	4	2	NA	< 2	93%	80%	120%	104%	80%	120%	83%	70%	130%
Cadmium	3256775	3256775	<0.3	<0.3	NA	< 0.3	97%	80%	120%	106%	80%	120%	82%	70%	130%
Chromium	3256775	3256775	3	<2	NA	< 2	85%	80%	120%	95%	80%	120%	84%	70%	130%
Cobalt	3256775	3256775	<1	<1	NA	< 1	91%	80%	120%	98%	80%	120%	74%	70%	130%
Copper	3256775	3256775	71	56	24.2%	< 2	94%	80%	120%	103%	80%	120%	NA	70%	130%
Iron	3256775	3256775	874	672	26.1%	< 50	89%	80%	120%	98%	80%	120%	NA	70%	130%
Lead	3256775	3256775	148	126	16.6%	< 0.5	92%	80%	120%	108%	80%	120%	NA	70%	130%
Lithium	3256775	3256775	<5	<5	NA	< 5	95%	70%	130%	107%	70%	130%	86%	70%	130%
Manganese	3256775	3256775	7	4	NA	< 2	91%	80%	120%	103%	80%	120%	115%	70%	130%
Molybdenum	3256775	3256775	<2	<2	NA	< 2	82%	80%	120%	97%	80%	120%	77%	70%	130%
Nickel	3256775	3256775	<2	<2	NA	< 2	92%	80%	120%	100%	80%	120%	76%	70%	130%
Selenium	3256775	3256775	2	2	NA	< 1	99%	80%	120%	110%	80%	120%	79%	70%	130%
Silver	3256775	3256775	<0.5	<0.5	NA	< 0.5	90%	80%	120%	101%	80%	120%	79%	70%	130%
Strontium	3256775	3256775	<5	<5	NA	< 5	91%	80%	120%	104%	80%	120%	88%	70%	130%
Thallium	3256775	3256775	<0.1	<0.1	NA	< 0.1	89%	80%	120%	103%	80%	120%	NA	70%	130%
Tin	3256775	3256775	3	<2	NA	< 2	85%	80%	120%	97%	80%	120%	78%	70%	130%
Uranium	3256775	3256775	0.8	0.6	24.7%	< 0.1	87%	80%	120%	100%	80%	120%	80%	70%	130%
Vanadium	3256775	3256775	8	3	NA	< 2	88%	80%	120%	97%	80%	120%	NA	70%	130%
Zinc	3256775	3256775	7	5	NA	< 5	94%	80%	120%	105%	80%	120%	81%	70%	130%

**Mercury in Soil**

Mercury	3256775	3256775	0.07	0.09	NA	< 0.03	89%	70%	130%	106%	70%	130%	92%	70%	130%
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Certified By: \_\_\_\_\_



## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis														
RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits
							Lower	Upper	Lower		Upper	Lower		Upper

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3256462	< 0.05	< 0.05	NA	< 0.05	122%	50%	140%	95%	50%	140%	105%	50%	140%
2-Methylnaphthalene	1	3256462	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	90%	50%	140%	97%	50%	140%
Acenaphthene	1	3256462	< 0.00671	< 0.00671	NA	< 0.00671	110%	50%	140%	89%	50%	140%	98%	50%	140%
Acenaphthylene	1	3256462	< 0.004	< 0.004	NA	< 0.004	109%	50%	140%	88%	50%	140%	93%	50%	140%
Acridine	1	3256462	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	135%	50%	140%	103%	50%	140%
Anthracene	1	3256462	< 0.03	< 0.03	NA	< 0.03	103%	50%	140%	88%	50%	140%	96%	50%	140%
Benzo(a)anthracene	1	3256462	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	91%	50%	140%	102%	50%	140%
Benzo(a)pyrene	1	3256462	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	85%	50%	140%	92%	50%	140%
Benzo(b)fluoranthene	1	3256462	< 0.05	< 0.05	NA	< 0.05	80%	50%	140%	108%	50%	140%	93%	50%	140%
Benzo(j+k)fluoranthene	1	3256462	< 0.05	< 0.05	NA	< 0.05	91%	50%	140%	108%	50%	140%	96%	50%	140%
Benzo(e)pyrene	1	3256462	< 0.05	< 0.05	NA	< 0.05	104%	50%	140%	95%	50%	140%	101%	50%	140%
Benzo(ghi)perylene	1	3256462	< 0.01	< 0.01	NA	< 0.01	93%	50%	140%	85%	50%	140%	90%	50%	140%
Chrysene	1	3256462	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	96%	50%	140%	103%	50%	140%
Dibenzo(a,h)anthracene	1	3256462	< 0.006	< 0.006	NA	< 0.006	96%	50%	140%	86%	50%	140%	94%	50%	140%
Fluoranthene	1	3256462	< 0.05	< 0.05	NA	< 0.05	90%	50%	140%	105%	50%	140%	111%	50%	140%
Fluorene	1	3256462	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	71%	50%	140%	96%	50%	140%
Indeno(1,2,3)pyrene	1	3256462	< 0.01	< 0.01	NA	< 0.01	98%	50%	140%	87%	50%	140%	94%	50%	140%
Naphthalene	1	3256462	< 0.01	< 0.01	NA	< 0.01	109%	50%	140%	93%	50%	140%	95%	50%	140%
Perylene	1	3256462	< 0.05	< 0.05	NA	< 0.05	103%	50%	140%	94%	50%	140%	101%	50%	140%
Phenanthrene	1	3256462	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	96%	50%	140%	104%	50%	140%
Pyrene	1	3256462	< 0.05	< 0.05	NA	< 0.05	92%	50%	140%	105%	50%	140%	85%	50%	140%
Quinoline	1	3256462	< 0.05	< 0.05	NA	< 0.05	121%	50%	140%	132%	50%	140%	108%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3256761	< 0.05	< 0.05	NA	< 0.05	124%	50%	140%	101%	50%	140%	109%	50%	140%
2-Methylnaphthalene	1	3256761	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	93%	50%	140%	100%	50%	140%
Acenaphthene	1	3256761	< 0.00671	< 0.00671	NA	< 0.00671	110%	50%	140%	93%	50%	140%	98%	50%	140%
Acenaphthylene	1	3256761	< 0.004	< 0.004	NA	< 0.004	93%	50%	140%	82%	50%	140%	95%	50%	140%
Acridine	1	3256761	< 0.05	< 0.05	NA	< 0.05	102%	50%	140%	120%	50%	140%	81%	50%	140%
Anthracene	1	3256761	< 0.03	< 0.03	NA	< 0.03	95%	50%	140%	89%	50%	140%	103%	50%	140%
Benzo(a)anthracene	1	3256761	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	95%	50%	140%	112%	50%	140%
Benzo(a)pyrene	1	3256761	< 0.01	< 0.01	NA	< 0.01	91%	50%	140%	86%	50%	140%	87%	50%	140%
Benzo(b)fluoranthene	1	3256761	< 0.05	< 0.05	NA	< 0.05	109%	50%	140%	105%	50%	140%	85%	50%	140%
Benzo(j+k)fluoranthene	1	3256761	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	112%	50%	140%	80%	50%	140%
Benzo(e)pyrene	1	3256761	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	99%	50%	140%	95%	50%	140%
Benzo(ghi)perylene	1	3256761	< 0.01	< 0.01	NA	< 0.01	110%	50%	140%	102%	50%	140%	89%	50%	140%
Chrysene	1	3256761	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	106%	50%	140%	103%	50%	140%
Dibenzo(a,h)anthracene	1	3256761	< 0.006	< 0.006	NA	< 0.006	104%	50%	140%	97%	50%	140%	101%	50%	140%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Fluoranthene	1	3256761	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	102%	50%	140%	113%	50%	140%	
Fluorene	1	3256761	< 0.01	< 0.01	NA	< 0.01	104%	50%	140%	93%	50%	140%	102%	50%	140%	
Indeno(1,2,3)pyrene	1	3256761	< 0.01	< 0.01	NA	< 0.01	89%	50%	140%	101%	50%	140%	112%	50%	140%	
Naphthalene	1	3256761	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	92%	50%	140%	95%	50%	140%	
Perylene	1	3256761	< 0.05	< 0.05	NA	< 0.05	100%	50%	140%	92%	50%	140%	91%	50%	140%	
Phenanthrene	1	3256761	< 0.03	< 0.03	NA	< 0.03	114%	50%	140%	104%	50%	140%	107%	50%	140%	
Pyrene	1	3256761	< 0.05	< 0.05	NA	< 0.05	113%	50%	140%	105%	50%	140%	111%	50%	140%	
Quinoline	1	3256761	< 0.05	< 0.05	NA	< 0.05	122%	50%	140%	133%	50%	140%	11%	50%	140%	

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

#### Polycyclic Aromatic Hydrocarbons in Soil

1-Methylnaphthalene	1	3256781	<0.01	<0.01	0	< 0.05	121%	50%	140%	106%	50%	140%	109%	50%	140%
2-Methylnaphthalene	1	3256781	<0.01	<0.01	0	< 0.01	110%	50%	140%	97%	50%	140%	100%	50%	140%
Acenaphthene	1	3256781	<0.00671	<0.00671	0	< 0.00671	109%	50%	140%	96%	50%	140%	99%	50%	140%
Acenaphthylene	1	3256781	<0.004	<0.004	0	< 0.004	102%	50%	140%	89%	50%	140%	94%	50%	140%
Acridine	1	3256781	<0.01	<0.01	0	< 0.05	108%	50%	140%	103%	50%	140%	43%	50%	140%
Anthracene	1	3256781	<0.01	<0.01	0	< 0.03	101%	50%	140%	89%	50%	140%	91%	50%	140%
Benzo(a)anthracene	1	3256781	<0.01	<0.01	0	< 0.01	110%	50%	140%	96%	50%	140%	94%	50%	140%
Benzo(a)pyrene	1	3256781	<0.01	<0.01	0	< 0.01	93%	50%	140%	82%	50%	140%	66%	50%	140%
Benzo(b)fluoranthene	1	3256781	<0.01	<0.01	0	< 0.05	85%	50%	140%	97%	50%	140%	81%	50%	140%
Benzo(j+k)fluoranthene	1	3256781	<0.01	<0.01	0	< 0.05	100%	50%	140%	98%	50%	140%	87%	50%	140%
Benzo(e)pyrene	1	3256781	<0.01	<0.01	0	< 0.05	105%	50%	140%	92%	50%	140%	71%	50%	140%
Benzo(ghi)perylene	1	3256781	<0.01	<0.01	0	< 0.01	107%	50%	140%	95%	50%	140%	60%	50%	140%
Chrysene	1	3256781	<0.01	<0.01	0	< 0.01	106%	50%	140%	95%	50%	140%	83%	50%	140%
Dibenzo(a,h)anthracene	1	3256781	<0.006	<0.006	0	< 0.006	107%	50%	140%	96%	50%	140%	79%	50%	140%
Fluoranthene	1	3256781	<0.01	<0.01	0	< 0.05	109%	50%	140%	98%	50%	140%	97%	50%	140%
Fluorene	1	3256781	0.01	0.01	0	< 0.01	108%	50%	140%	95%	50%	140%	100%	50%	140%
Indeno(1,2,3)pyrene	1	3256781	<0.01	<0.01	0	< 0.01	115%	50%	140%	112%	50%	140%	107%	50%	140%
Naphthalene	1	3256781	<0.01	<0.01	0	< 0.01	107%	50%	140%	94%	50%	140%	93%	50%	140%
Perylene	1	3256781	<0.01	<0.01	0	< 0.05	105%	50%	140%	91%	50%	140%	68%	50%	140%
Phenanthrene	1	3256781	<0.01	<0.01	0	< 0.03	112%	50%	140%	99%	50%	140%	95%	50%	140%
Pyrene	1	3256781	<0.01	<0.01	0	< 0.05	112%	50%	140%	99%	50%	140%	94%	50%	140%
Quinoline	1	3256781	<0.01	<0.01	0	< 0.05	121%	50%	140%	126%	50%	140%	17%	50%	140%
Naphthalene-d8	1	3256781	91	<0	0	<		50%	140%		50%	140%		50%	140%
Terphenyl-d14	1	3256781	117	<0	0	<1									
Pyrene-d10 (%)	1	3256781	89	<0	0	<1		50%	140%		50%	140%		50%	140%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3256463	< 0.02	< 0.02	NA	< 0.02	71%	60%	140%	94%	60%	140%			
Toluene	1	3256463	< 0.04	< 0.04	NA	< 0.04	67%	60%	140%	83%	60%	140%			
Ethylbenzene	1	3256463	< 0.03	< 0.03	NA	< 0.03	67%	60%	140%	82%	60%	140%			
Xylene (Total)	1	3256463	< 0.05	< 0.05	NA	< 0.05	71%	60%	140%	92%	60%	140%			
C6-C10 (less BTEX)	1	3256463	< 3	< 3	NA	< 3	84%	60%	140%	96%	60%	140%	108%	30%	130%
>C10-C16 Hydrocarbons - 1X silica gel	1	3256462	< 15	< 15	NA	< 15	83%	60%	140%	112%	60%	140%	114%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3256462	< 15	< 15	NA	< 15	96%	60%	140%	112%	60%	140%	114%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3256462	< 15	< 15	NA	< 15	82%	60%	140%	112%	60%	140%	114%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

>C10-C16 Hydrocarbons - 1X silica gel	1	3256761	22	18	NA	< 15	101%	60%	140%	112%	60%	140%	121%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3256761	< 15	< 15	NA	< 15	100%	60%	140%	112%	60%	140%	121%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3256761	117	149	24.1%	< 15	75%	60%	140%	112%	60%	140%	121%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3224545	< 0.02	< 0.02	NA	< 0.02	119%	60%	140%	126%	60%	140%			
Toluene	1	3224545	< 0.04	< 0.04	NA	< 0.04	115%	60%	140%	115%	60%	140%			
Ethylbenzene	1	3224545	< 0.03	< 0.03	NA	< 0.03	111%	60%	140%	111%	60%	140%			
Xylene (Total)	1	3224545	< 0.05	< 0.05	NA	< 0.05	115%	60%	140%	119%	60%	140%			
C6-C10 (less BTEX)	1	3224545	< 3	< 3	NA	< 3	98%	60%	140%	86%	60%	140%	74%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3256771	< 0.02	< 0.02	NA	< 0.02	91%	60%	140%	90%	60%	140%			
Toluene	1	3256771	< 0.04	< 0.04	NA	< 0.04	86%	60%	140%	79%	60%	140%			
Ethylbenzene	1	3256771	< 0.03	< 0.03	NA	< 0.03	86%	60%	140%	78%	60%	140%			
Xylene (Total)	1	3256771	< 0.05	< 0.05	NA	< 0.05	90%	60%	140%	87%	60%	140%			
C6-C10 (less BTEX)	1	3256771	< 3	< 3	NA	< 3	96%	60%	140%	80%	60%	140%	99%	30%	130%

## Quality Assurance

CLIENT NAME: GOLDER ASSOCIATES  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X835693  
 ATTENTION TO: BELINDA CULGIN  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 08, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

>C10-C16 Hydrocarbons - 1X silica gel	1	3256781	< 15	< 15	NA	< 15	107%	60%	140%	107%	60%	140%	117%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3256781	21	19	NA	< 15	109%	60%	140%	107%	60%	140%	117%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3256781	502	411	19.9%	< 15	81%	60%	140%	107%	60%	140%	117%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: \_\_\_\_\_





## QC Exceedance

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

RPT Date: Dec 08, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

**Polycyclic Aromatic Hydrocarbons in Soil**

Quinoline	3256761	122%	50%	140%	133%	50%	140%	11%	50%	140%
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Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

**Polycyclic Aromatic Hydrocarbons in Soil**

Acridine	3256781	108%	50%	140%	103%	50%	140%	43%	50%	140%
Quinoline	3256781	121%	50%	140%	126%	50%	140%	17%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: GOLDER ASSOCIATES

AGAT WORK ORDER: 21X835693

PROJECT: 21497139

ATTENTION TO: BELINDA CULGIN

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS

Temp: 0.9, 0.6, 0.6



200 Bluewater Road, Suite 105, Bedford, Nova Scotia B4B 1G9 Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-8504 Toll Free: 1-888-535-7770

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21x835693

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www.bvna.com E-mail: customerservicebedford@bureauveritas.com

CHAIN OF CUSTODY RECORD

COC #: D 57731 Page 1 of 3

Invoice Information		Report Information (if differs from invoice)		Project Information (where applicable)		Turnaround Time (TAT) Required	
Company Name: #14090 GOLDER ASSOCIATES LTD	Company Name:	Contact Name: Belinda Culgin	Quotation #: C04828	Purchase Order#: 21497139		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS IF RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b> 21 NOV 25 3:00 PM	
Contact Name: ACCOUNTS PAYABLE	Contact Name:	Address:	Project #: 21497139	Site Location:			
Address: 1931 Robertson Rd Ottawa ON K2H 5P7 PC:	Address:	PC:	Site Location:	Site Province:			
Phone: (613) 592 9600	Phone:	Phone:	Site Province:	Site #:			
Email: Canada.AccountsPayable@invoicex.com	Email: bculgin@golder.com	Email:	Site #:	Sampled By: A. Brunskill			
Report Copies: jdayle@golder.com	Report Copies: jdayle@golder.com	Report Copies:					

Laboratory Use Only				Analysis Requested														Regulatory Requirements (Specify)						
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs (FWAL /CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E.coli (Presence/Absence)	Total Coliform/E.Coli (Count)	HOLD- DO NOT ANALYZE	COMMENTS
Present	Intact			Total Digest (Default Method) for well water & surface water	Dissolved for ground water						Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default: Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)											
COOLING MEDIA PRESENT Y / N																								
SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS																								
SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX																				
1	BFR_LI-SS13A-SAI	2021/11/17	15:35	Soil	3						X		X		X									Silica Gel
2	BFR_LI-SS13B-SAI	2021/11/17	15:50	Soil	3						X		X		X									Silica Gel
3	BFR_LI-SS13C-SAI	2021/11/17	15:45	Soil	3						X		X		X									Silica Gel
4	BFR_LI-SS13D-SAI	2021/11/17	15:40	Soil	3						X		X		X									Silica Gel
5	BFR_LI-SS-DUP2	2021/11/17	15:35	Soil	3						X		X		X									Silica Gel
6	BFR_LI-SS26-SAI	2021/11/17	11:45	Soil	3						X		X		X									Silica Gel
7	BFR_LI-SS27-SAI	2021/11/17	12:15	Soil	3						X		X		X									Silica Gel
8	BFR_LI-SS28-SAI	2021/11/17	13:15	Soil	3						X		X		X									Silica Gel
9	BFR_LI-SS29-SAI	2021/11/17	14:00	Soil	3						X		X		X									Silica Gel
10	BFR_LI-SS30-SAI	2021/11/17	14:30	Soil	3						X		X		X									Silica Gel
RELINQUISHED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)		DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #																
[Signature]		2021/11/21		[Signature]																				

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 465 George Street, Unit G, Sydney, NS B1P 1K5 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

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CHAIN OF CUSTODY RECORD

COC #: **D 57751** Page **2** of **3**

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information (where applicable)</b>		<b>Turnaround Time (TAT) Required</b>	
Company Name: #14090 GOLDER ASSOCIATES LTD		Company Name:		Quotation #: C04828		<input checked="" type="checkbox"/> Regular TAT (5 business days) Most analyses	
Contact Name: Accounts Payable		Contact Name: Belinda Culgin		Purchase Order#:		PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS	
Address: 1931 Robertson Rd OTTAWA ON K2H 5B7 PC:		Address:		Project #: 21497139		IF RUSH please specify date & charges will be applied	
Phone: (613) 592 9600		Phone:		Site Location:		DATE REQUIRED:	
Email: Canada Accounts Payable Invoices @golder.com		Email: bculgin@golder.com		Site Province:			
Report Copies: jdoyle@golder.com		Report Copies: jdoyle@golder.com		Site #:			
				Sampled By: A Brunel			

<b>Laboratory Use Only</b>				<b>Analysis Requested</b>																						
<b>CUSTODY SEAL</b>		<b>COOLER TEMPERATURES</b>		<b>COOLER TEMPERATURES</b>		<b># OF CONTAINERS SUBMITTED</b>	<b>FIELD FILTERED &amp; PRESERVED</b>	<b>LAB FILTRATION REQUIRED</b>	<b>RCAP-MS (Total Metals) Well / Surface</b>	<b>RCAP-MS (Dissolved Metals) Ground water</b>	<b>Metals (Water)</b>		<b>Metals (Soil)</b>		<b>Hot Water Soluble Boron</b> (required for CCME Agriculture / Landfill)	<b>RBCA Hydrocarbons</b> (BTEX, C6-C12)	<b>CCME Hydrocarbons</b> (CWS-PHC F1/BTEX, F2-F4)	<b>PAHs</b> (Default for: water/soil)	<b>PAHs</b> (FWAL / CCME Sediment)	<b>PCBs</b> - Select One: Default or CCME Sediment	<b>VOCs</b>	<b>Total Coliform/E. coli (Presence/Absence)</b>	<b>Total Coliform/E. Coli (Count)</b>	<b>HOLD- DO NOT ANALYZE</b>	<b>Regulatory Requirements (Specify)</b>	
Present	Intact																									
<b>COOLING MEDIA PRESENT Y / N</b>				<b>SAMPLES MUST BE KEPT COOL (&lt; 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS</b>																						

SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default: Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agriculture / Landfill)	RBCA Hydrocarbons (BTEX, C6-C12)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for: water/soil)	PAHs (FWAL / CCME Sediment)	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E. coli (Presence/Absence)	Total Coliform/E. Coli (Count)	HOLD- DO NOT ANALYZE	COMMENTS
1	BFR-LI-SS-DUP3	2021/11/17	12:15	Soil	3								X		X	X	X	X	X	X				Silica Gel
2	BFR-LI-SS6A	2021/11/18	17:15	Soil	3								X		X	X	X	X	X	X				Silica Gel
3	BFR-LI-SS6B	2021/11/18	17:20	Soil	3								X		X	X	X	X	X	X				Silica Gel
4	BFR-LI-SS6C	2021/11/18	17:25	Soil	3								X		X	X	X	X	X	X				Silica Gel
5	BFR-LI-SS6D	2021/11/18	17:30	Soil	3								X		X	X	X	X	X	X				Silica Gel
6	BFR-LI-SS7A	2021/11/18	16:45	Soil	3								X		X	X	X	X	X	X				Silica Gel
7	BFR-LI-SS7B	2021/11/18	16:50	Soil	3								X		X	X	X	X	X	X				Silica Gel
8	BFR-LI-SS7C	2021/11/18	16:55	Soil	3								X		X	X	X	X	X	X				Silica Gel
9	BFR-LI-SS7D	2021/11/18	17:00	Soil	3								X		X	X	X	X	X	X				Silica Gel
10	BFR-LI-SS8A	2021/11/18	16:25	Soil	3								X		X	X	X	X	X	X				Silica Gel

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #
<i>[Signature]</i>	2021/11/21		<i>Mamae Agoo</i>			

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**CHAIN OF CUSTODY RECORD**

COC #: **D 57739** Page **3** of **3**

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: # <u>HORO GOLDER ASSOCIATES</u> Contact Name: <u>ACCOUNTS PAYABLE</u> Address: <u>1931 Robertson Road</u> <u>OTTAWA ON K2H 5B7</u> PC: Phone: <u>(613) 592 9600</u> Email: <u>Canada Accounts Payable Invoices@golder.com</u> Report Copies: <u>j.doyle@golder.com</u>	Company Name: Contact Name: <u>Belinda Culgin</u> Address: Phone: Email: <u>bculgin@golder.com</u> Report Copies: <u>j.doyle@golder.com</u>	Quotation #: <u>04828</u> Purchase Order#: <u>21497139</u> Project #: Site Location: Site Province: Site #: Sampled By: <u>A. Brunskill</u>	<input checked="" type="checkbox"/> Regular TAT (5 business days) <u>Wed 3:16 PM</u> analyses <u>21 NOV 25</u> PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS IF RUSH please specify date (Surcharges will be applied) <b>DATE REQUIRED:</b>

Laboratory Use Only			Analysis Requested													Regulatory Requirements (Specify)								
CUSTODY SEAL		COOLER TEMPERATURES		COOLER TEMPERATURES		# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Metals (Water)		Metals (Soil)		Total Coliform/E. coli (Presence/Absence)		Total Coliform/E. Coli (Count)	HOLD - DO NOT ANALYZE						
Present	Intact										Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default: Acid Extractable (Available) Digest					Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBGA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs FWAL / CCME Sediment	PCBs - Select One: Default or CCME Sediment

COOLING MEDIA PRESENT Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

SAMPLE IDENTIFICATION		DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED & PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (Total Metals) Well / Surface	RCAP-MS (Dissolved Metals) Ground water	Total Digest (Default Method) for well water & surface water	Dissolved for ground water	Mercury (CIRCLE) TOTAL / DISSOLVED	Metals & Mercury Default: Acid Extractable (Available) Digest	Hot Water Soluble Boron (required for CCME Agricultural / Landfill)	RBGA Hydrocarbons (BTEX, C6-C32)	CCME Hydrocarbons (CWS-PHC F1/BTEX, F2-F4)	PAHs (Default for water/soil)	PAHs FWAL / CCME Sediment	PCBs - Select One: Default or CCME Sediment	VOCs	Total Coliform/E. coli (Presence/Absence)	Total Coliform/E. Coli (Count)	HOLD - DO NOT ANALYZE	COMMENTS
1	BFR-LI-SS8B	2021/11/18	16:15	Soil	3																			Silica Gel
2	BFR-LI-SS8C	2021/11/18	16:10	Soil	3																			Silica Gel
3	BFR-LI-SS8D	2021/11/18	16:00	Soil	3																			Silica Gel
4	BFR-LI-SS-DUP1	2021/11/18	17:15	Soil	3																			Silica Gel
5																								
6																								
7																								
8																								
9																								
10																								

RELINQUISHED BY: (Signature/Print) <i>[Signature]</i>	DATE: (YYYY/MM/DD) 2021/11/22	TIME: (HH:MM)	RECEIVED BY: (Signature/Print) <i>[Signature]</i>	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	BV LABS JOB #
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Pink: Client

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203  
ATTENTION TO: Belinda Culgin  
PROJECT: 21497139  
AGAT WORK ORDER: 21X838787  
SOIL ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer  
DATE REPORTED: Dec 21, 2021  
PAGES (INCLUDING COVER): 10  
VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.





## Certificate of Analysis

AGAT WORK ORDER: 21X838787

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-21

Parameter	Unit	G / S	RDL	BFR_L1_SS1_S		BFR_L1_SS1_A		BFR_L1_SS1_B		BFR_L1_SS1_C		BFR_L1_SS2_B					
				SAMPLE DESCRIPTION:		A2	_SA1	_SA1		_SA1		_SA1		_SA1			
				SAMPLE TYPE:		Soil	Soil	Soil		Soil		Soil		Soil		Soil	
				DATE SAMPLED:		2021-11-27 15:00	2021-11-27 00:04	2021-11-27 15:08		2021-11-27 15:11		2021-11-27 15:20		2021-11-27 15:20		2021-11-27 15:20	
				3284306	3284316	RDL	3284317	RDL	3284318	RDL	3284319						
Aluminum	mg/kg		100	5210	4520	100	12100	100	2640	100	7800						
Antimony	mg/kg		0.8	<0.8	<0.8	0.8	<0.8	0.8	<0.8	0.8	<0.8						
Arsenic	mg/kg		1	3	4	1	3	1	2	1	7						
Barium	mg/kg		2.0	19.2	19.1	2.0	10.1	2.0	37.6	2.0	38.2						
Beryllium	mg/kg		0.4	<0.4	<0.4	0.4	<0.4	0.4	<0.4	0.4	0.5						
Boron	mg/kg		5	<5	<5	5	<5	5	<5	5	<5						
Cadmium	mg/kg		0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5						
Chromium	mg/kg		5	11	10	5	11	5	10	5	24						
Cobalt	mg/kg		0.5	2.9	2.8	0.5	2.5	0.5	2.9	0.5	6.6						
Copper	mg/kg		1.0	5.6	5.3	1.0	2.9	1.0	8.4	1.0	14.4						
Iron	mg/kg		50	8540	8180	500	13500	50	9550	500	15000						
Lead	mg/kg		1	27	6	1	29	1	30	1	20						
Lithium	mg/kg		0.5	8.2	7.9	0.5	8.1	0.5	4.5	0.5	12.2						
Manganese	mg/kg		5.0	143	125	5.0	116	5.0	88.1	5.0	449						
Mercury	mg/kg		0.03	0.06	0.07	0.03	0.14	0.03	0.19	0.03	0.09						
Molybdenum	mg/kg		0.5	<0.5	<0.5	0.5	0.5	0.5	<0.5	0.5	0.6						
Nickel	mg/kg		1	6	6	1	4	1	6	1	11						
Selenium	mg/kg		0.8	<0.8	<0.8	0.8	4.2	0.8	1.9	0.8	<0.8						
Silver	mg/kg		0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5						
Strontium	mg/kg		5	<5	<5	5	<5	5	11	5	15						
Thallium	mg/kg		0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5						
Tin	mg/kg		1	<1	<1	1	2	1	1	1	<1						
Uranium	mg/kg		0.50	0.92	0.74	0.50	1.87	0.50	1.07	0.50	1.38						
Vanadium	mg/kg		0.4	18.9	17.8	0.4	36.5	0.4	26.5	0.4	35.6						
Zinc	mg/kg		5	14	14	5	21	5	23	5	59						

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838787

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-21

Parameter	Unit	G / S	RDL	BFR_L1_SS2_C		BFR_L1_SS2_D		BFR_L1_SS3_S		BFR_L1_SS3_A		BFR_L1_SS3_B			
				SAMPLE DESCRIPTION: _SA1		_SA1		A2		_SA1		_SA1			
				SAMPLE TYPE: Soil		Soil		Soil		Soil		Soil		Soil	
				DATE SAMPLED: 2021-11-27 15:23		2021-11-27 15:26		2021-11-27 14:20		2021-11-27 14:23		2021-11-27 14:26			
				3284320	3284321	RDL	3284322	RDL	3284323	RDL	3284324				
Aluminum	mg/kg		100	7310	10900	100	5880	100	7160	100	5490				
Antimony	mg/kg		0.8	<0.8	0.9	0.8	21.8	0.8	33.1	0.8	10.0				
Arsenic	mg/kg		1	5	6	1	4	1	5	1	3				
Barium	mg/kg		2.0	28.1	84.1	2.0	19.8	2.0	23.4	2.0	15.4				
Beryllium	mg/kg		0.4	0.4	0.5	0.4	<0.4	0.4	<0.4	0.4	<0.4				
Boron	mg/kg		5	<5	<5	5	<5	5	<5	5	<5				
Cadmium	mg/kg		0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5				
Chromium	mg/kg		5	28	28	5	12	5	12	5	10				
Cobalt	mg/kg		0.5	7.2	9.4	0.5	3.2	0.5	3.3	0.5	2.4				
Copper	mg/kg		1.0	12.5	16.7	1.0	37.9	1.0	57.5	1.0	18.0				
Iron	mg/kg		500	14100	20800	50	9320	500	10500	50	8400				
Lead	mg/kg		1	18	82	10	1820	10	2130	1	384				
Lithium	mg/kg		0.5	13.6	22.8	0.5	10.2	0.5	10.5	0.5	6.9				
Manganese	mg/kg		5.0	387	560	5.0	157	5.0	168	5.0	138				
Mercury	mg/kg		0.03	0.06	0.05	0.03	0.04	0.03	0.03	0.03	<0.03				
Molybdenum	mg/kg		0.5	0.6	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5				
Nickel	mg/kg		1	13	14	1	7	1	7	1	4				
Selenium	mg/kg		0.8	<0.8	<0.8	0.8	<0.8	0.8	<0.8	0.8	<0.8				
Silver	mg/kg		0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5				
Strontium	mg/kg		5	14	10	5	<5	5	<5	5	5				
Thallium	mg/kg		0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	<0.5				
Tin	mg/kg		1	<1	1	1	2	1	2	1	1				
Uranium	mg/kg		0.50	1.17	1.32	0.50	2.93	0.50	0.83	0.50	1.13				
Vanadium	mg/kg		0.4	42.0	62.0	0.4	20.9	0.4	22.4	0.4	19.0				
Zinc	mg/kg		5	40	62	5	22	5	29	5	15				

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838787

PROJECT: 21497139

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-21

Parameter	Unit	G / S	RDL	BFR_L1_SS3_C	BFR_L1_SS3_D	BFR_L1_SS4_S	BFR_L1_SS4_A	RDL	BFR_L1_SS4_B	BFR_L1_SS4_C	
				_SA1	_SA1	A2	_SA1		_SA1	_SA1	
				Soil	Soil	Soil	Soil		Soil	Soil	
				DATE SAMPLED:	2021-11-27 14:30	2021-11-27 14:33	2021-11-27 14:40		2021-11-27 14:40	2021-11-27 14:43	2021-11-27 14:46
				3284325	3284326	3284327	3284328		3284329		3284330
Aluminum	mg/kg		100	4670	5610	4890	5850	10.0	2280	100	12000
Antimony	mg/kg		0.8	2.0	<0.8	<0.8	<0.8	0.8	<0.8	0.8	<0.8
Arsenic	mg/kg		1	3	4	2	2	1	3	1	2
Barium	mg/kg		2.0	18.0	21.0	13.1	15.3	2.0	23.4	2.0	22.7
Beryllium	mg/kg		0.4	<0.4	<0.4	<0.4	<0.4	0.4	<0.4	0.4	0.5
Boron	mg/kg		5	<5	<5	<5	<5	5	<5	5	<5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.5	<0.5
Chromium	mg/kg		5	8	10	9	9	5	<5	5	17
Cobalt	mg/kg		0.5	2.3	3.8	0.9	1.2	0.5	<0.5	0.5	2.0
Copper	mg/kg		1.0	8.6	8.2	5.0	4.8	1.0	4.7	1.0	38.2
Iron	mg/kg		50	6870	8980	3450	7170	50	1140	50	6800
Lead	mg/kg		1	41	15	32	36	1	30	1	61
Lithium	mg/kg		0.5	6.4	11.5	2.3	2.3	0.5	<0.5	0.5	7.4
Manganese	mg/kg		5.0	127	384	46.3	81.9	5.0	38.1	5.0	104
Mercury	mg/kg		0.03	<0.03	<0.03	0.20	0.15	0.03	0.22	0.03	0.14
Molybdenum	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	0.5
Nickel	mg/kg		1	4	6	3	3	1	2	1	5
Selenium	mg/kg		0.8	<0.8	<0.8	4.7	2.9	0.8	3.0	0.8	4.1
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5
Strontium	mg/kg		5	<5	<5	<5	<5	5	35	5	7
Thallium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5
Tin	mg/kg		1	<1	<1	3	1	1	<1	1	2
Uranium	mg/kg		0.50	1.36	0.98	1.29	0.99	0.50	<0.50	0.50	2.59
Vanadium	mg/kg		0.4	15.5	16.8	14.1	18.9	0.4	4.0	0.4	32.2
Zinc	mg/kg		5	12	26	9	12	5	32	5	59

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838787

PROJECT: 21497139

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-21

Parameter	Unit	G / S	RDL	BFR_L1_SS4_D	BFR_L1_SS_DU	BFR_L1_SS_DU	RDL	BFR_L1_SS_DU	
				_SA1	P4	P5		P6	
SAMPLE DESCRIPTION:				Soil	Soil	Soil	Soil		
SAMPLE TYPE:				Soil	Soil	Soil	Soil		
DATE SAMPLED:				2021-11-27 14:55	2021-11-27 14:40	2021-11-27 14:30	2021-11-27 15:26		
				3284331	3284332	3284333	3284334		
Aluminum	mg/kg		100	7990	7910	4840	100	9880	
Antimony	mg/kg		0.8	<0.8	<0.8	2.3	0.8	<0.8	
Arsenic	mg/kg		1	2	2	3	1	7	
Barium	mg/kg		2.0	14.4	13.5	16.3	2.0	58.0	
Beryllium	mg/kg		0.4	<0.4	<0.4	<0.4	0.4	0.6	
Boron	mg/kg		5	<5	<5	<5	5	<5	
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	0.5	<0.5	
Chromium	mg/kg		5	9	8	7	5	25	
Cobalt	mg/kg		0.5	2.1	1.0	2.0	0.5	7.9	
Copper	mg/kg		1.0	3.6	4.3	9.2	1.0	14.4	
Iron	mg/kg		50	7110	3620	6010	500	18000	
Lead	mg/kg		1	19	33	51	1	25	
Lithium	mg/kg		0.5	8.1	2.2	6.0	0.5	19.0	
Manganese	mg/kg		5.0	119	49.3	104	5.0	435	
Mercury	mg/kg		0.03	0.08	0.17	<0.03	0.03	<0.03	
Molybdenum	mg/kg		0.5	<0.5	<0.5	<0.5	0.5	<0.5	
Nickel	mg/kg		1	3	3	4	1	14	
Selenium	mg/kg		0.8	1.8	3.8	<0.8	0.8	<0.8	
Silver	mg/kg		0.5	<0.5	<0.5	<0.5	0.5	<0.5	
Strontium	mg/kg		5	<5	<5	<5	5	8	
Thallium	mg/kg		0.5	<0.5	<0.5	<0.5	0.5	<0.5	
Tin	mg/kg		1	1	1	<1	1	1	
Uranium	mg/kg		0.50	1.41	1.15	1.12	0.50	1.14	
Vanadium	mg/kg		0.4	22.7	14.2	13.8	0.4	48.1	
Zinc	mg/kg		5	31	9	11	5	53	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284306-3284334

Analysis performed at AGAT Toronto (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838787  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

Soil Analysis															
RPT Date: Dec 21, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Metals - Available metals (Halifax)**

Aluminum	3284306	3284306	5210	5830	11.2%	< 10.0	97%	70%	130%	108%	80%	120%	109%	70%	130%
Antimony	3284306	3284306	<0.8	<0.8	NA	< 0.8	129%	70%	130%	98%	80%	120%	89%	70%	130%
Arsenic	3284306	3284306	3	3	NA	< 1	96%	70%	130%	104%	80%	120%	101%	70%	130%
Barium	3284306	3284306	19.2	18.2	5.3%	< 2.0	97%	70%	130%	100%	80%	120%	94%	70%	130%
Beryllium	3284306	3284306	<0.4	<0.4	NA	< 0.4	91%	70%	130%	100%	80%	120%	98%	70%	130%
Boron	3284306	3284306	<5	<5	NA	< 5	99%	70%	130%	103%	80%	120%	102%	70%	130%
Cadmium	3284306	3284306	<0.5	<0.5	NA	< 0.5	108%	70%	130%	102%	80%	120%	97%	70%	130%
Chromium	3284306	3284306	11	12	NA	< 5	104%	70%	130%	102%	80%	120%	87%	70%	130%
Cobalt	3284306	3284306	2.9	2.9	0.0%	< 0.5	100%	70%	130%	107%	80%	120%	98%	70%	130%
Copper	3284306	3284306	5.6	5.4	3.6%	< 1.0	100%	70%	130%	105%	80%	120%	95%	70%	130%
Iron	3284306	3284306	8540	8300	2.9%	< 50	90%	70%	130%	87%	80%	120%	108%	70%	130%
Lead	3284306	3284306	27	20	29.8%	< 1	100%	70%	130%	101%	80%	120%	75%	70%	130%
Lithium	3284306	3284306	8.2	8.4	2.4%	< 0.5	98%	70%	130%	106%	80%	120%	113%	70%	130%
Manganese	3284306	3284306	143	131	8.8%	< 5.0	99%	70%	130%	106%	80%	120%	114%	70%	130%
Mercury	3284306	3284306	0.06	0.05	NA	< 0.03	107%	70%	130%	103%	80%	120%	96%	70%	130%
Molybdenum	3284306	3284306	<0.5	<0.5	NA	< 0.5	100%	70%	130%	106%	80%	120%	101%	70%	130%
Nickel	3284306	3284306	6	6	0.0%	< 1	100%	70%	130%	107%	80%	120%	94%	70%	130%
Selenium	3284306	3284306	<0.8	<0.8	NA	< 0.8	99%	70%	130%	103%	80%	120%	102%	70%	130%
Silver	3284306	3284306	<0.5	<0.5	NA	< 0.5	97%	70%	130%	106%	80%	120%	93%	70%	130%
Strontium	3284306	3284306	<5	<5	NA	< 5	98%	70%	130%	101%	80%	120%	103%	70%	130%
Thallium	3284306	3284306	<0.5	<0.5	NA	< 0.5	108%	70%	130%	100%	80%	120%	95%	70%	130%
Tin	3284306	3284306	<1	<1	NA	< 1	96%	70%	130%	120%	80%	120%	104%	70%	130%
Uranium	3284306	3284306	0.92	0.76	NA	< 0.50	98%	70%	130%	106%	80%	120%	103%	70%	130%
Vanadium	3284306	3284306	18.9	18.6	1.6%	< 0.4	96%	70%	130%	98%	80%	120%	92%	70%	130%
Zinc	3284306	3284306	14	13	NA	< 5	100%	70%	130%	106%	80%	120%	108%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.

Certified By: 

Results relate only to the items tested. Results apply to samples as received.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838787

PROJECT: 21497139

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Iron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lithium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Manganese	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Strontium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Tin	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS



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105-200 Bluewater Road, Bedford, NS B4B 1G9  
49-55 Elizabeth Avenue, St John's, NL A1A 1W9  
465 George Street, Unit G, Sydney, NS B1P 1K5

Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

CHAIN OF CUSTODY RECORD  
ENV COC - 00016v2

0.5, 2.2, 6.1

21X838787

Page 1 of 2

<b>Invoice Information</b>		<b>Report Information (If differs from Invoice)</b>		<b>Project Information</b>		<b>'21 DEC 2 12:22PM</b> LAB USE ONLY - PLACE STICKER HERE  Rush Confirmation #:
Company:	Golder Associates Ltd	Company:		Quotation #:	C04828	
Contact Name:	Belinda Culgin	Contact Name:		P.O. #/ AFE#:		
Street Address:	201 Brownlow Ave. Suttle 26	Street Address:		Project #:	21497139	
City:	Dartmouth	City:		Site #:		
Prov:	NS	Prov:		Site Location:	Burgoe	
Postal Code:	B3B 1W2	Postal Code:		Site Location Province:		
Phone:	(902) 466 1668	Phone:		Sampled By:	A Brunskill	
Email:	belinda_culgin@golder.com	Email:				
Copies:	James_doyle@golder.com	Copies:				

Regulatory Criteria							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
<b>**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal</b>		Regulation		**Matrix		FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAp-M5 (total metals) well / surface water	RCAp-M5 (dissolved metals) - GW	Total metals (default)-well/SW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME agr/ landfill)	RBCA HC (BTEX, C6-C13)	CCME HC (F1/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (presence/absence)	Total coliform/E.coli (count)	# OF CONTAINERS SUBMITTED	Regular Turnaround Time (TAT)				
		<input checked="" type="checkbox"/> 5 to 7 Day <input type="checkbox"/> 10 Day																												
SAMPLES MUST BE KEPT COOL (<10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																														
Sample Identification		Date Sampled			Time (24hr)		Matrix																					Rush Turnaround Time (TAT) Surcharges apply		
		YY	MM	DD	HH	MM		<input type="checkbox"/> Same Day <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 4 Day																						
																											Date Required:    YY    MM    DD			
																											Comments			
1	BFR_L1_SS1_SA2	21	11	27	15	0	Soil																				1			
2	BFR_L1_SS1_A_SA1	21	11	27	0:00	4	Soil																				1			
3	BFR_L1_SS1_B_SA1	21	11	27	15	8	Soil																				1			
4	BFR_L1_SS1_C_SA1	21	11	27	15	11	Soil																				1			
5	BFR_L1_SS2_B_SA1	21	11	27	15	20	Soil																				1			
6	BFR_L1_SS2_C_SA1	21	11	27	15	23	Soil																				1			
7	BFR_L1_SS2_D_SA1	21	11	27	15	26	Soil																				1			
8	BFR_L1_SS3_SA2	21	11	27	14	20	Soil																				1			
9	BFR_L1_SS3_A_SA1	21	11	27	14	23	Soil																				1			
10	BFR_L1_SS3_B_SA1	21	11	27	14	26	Soil																				1			
11	BFR_L1_SS3_C_SA1	21	11	27	14	30	Soil																				1			
12	BFR_L1_SS3_D_SA1	21	11	27	14	33	Soil																				1			

UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY.

LAB USE ONLY		Yes	No	°C	LAB USE ONLY		Yes	No	°C	LAB USE ONLY		Yes	No	°C	Temperature reading by:
Seal present			Seal present			Seal present									
Seal intact			Seal intact			Seal intact									
Cooling media present			Cooling media present			Cooling media present									
Relinquished by: (Signature/ Print)		Date			Time		Received by: (Signature/ Print)		Date			Time		Special instructions	
A. Brunskill		21	11	29			K. Collier								



CONTINUED

[PAGE 1 REFERENCE]

Company:	Golder Associates Ltd
Contact Name:	Belinda Culgin
Project #:	21497139

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Sample Identification	Date Sampled			Time (24hr)		Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
	YY	MM	DD	HH	MM		FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (total metals) well /SW	RCAP-MS (dissolved metals) - GW	Total metals (default: well/SW)	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME agr/ landfill)	RBCA HC (BTEX, C6-C32)	CCME HC (F1/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (P/A)	Total coliform/E.coli (count)	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	Comments	
13	BFR_L1_SS4_SA2	21	11	27	14	40	Soil									x											1		Same as above
14	BFR_L1_SS4_A_SA1	21	11	27	14	43	Soil									x											1		
15	BFR_L1_SS4_B_SA1	21	11	27	14	46	Soil									x											1		
16	BFR_L1_SS4_C_SA1	21	11	27	14	50	Soil									x											1		
17	BFR_L1_SS4_D_SA1	21	11	27	14	55	Soil									x											1		
18	BFR_L1_SS_DUP4	21	11	27	14	40	Soil									x											1		
19	BFR_L1_SS_DUP5	21	11	27	14	30	Soil									x											1		
20	BFR_L1_SS_DUP6	21	11	27	15	26	Soil									x											1		
21																													
22																													
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40																													

*Rollen*







# Project Details for External Facility Redirection

Sent to:

AGAT - DARTMOUTH

Chain of Custodies received with this form are to be reported to the name name on the coc and the Bureau Veritas

ALL Invoices are to be directed to Bureau Veritas only

Bureau Veritas Contact Details	<b>BV Location:</b>	BEDFORD
	<b>BV Contact #:</b> (for questions related to submission)	Marie Muisse
	<b>BV Phone #:</b> (for questions related to submission)	902-420-0203 ext 253
Invoice to information	<b>BV Project Reference #:</b>	D1202-007 - D1202-013 (7 submissions)
	<b>BV invoice to Email</b>	bvsubcontract@bureauveritas.com
Report to information	<b>Client Report To Email:</b>	see attached chain of custoday form(s)
	<b>BV Report To Email:</b>	bvsubcontract@bureauveritas.com
Project details	<b>Analytical Tests</b>	See attached chain of custody form(s)
	<b>Comments/ Job details</b>	7 submissions - 104 samples total
	<b>Special Instructions</b>	<b>1</b> Email data directly to COC client and BV simultaneously
		<b>2</b> Bureau Veritas reference must be providing on the invoice with a copy fo the coc in order to ensure payment.
<b>3</b> Bureau Veritas must have received an email of the data to the listed email address in order to process invoices.		

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203  
ATTENTION TO: Belinda Culgin  
PROJECT: 21497139/D1202-007-D1202-013  
AGAT WORK ORDER: 21X838797  
SOIL ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician  
TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.  
DATE REPORTED: Dec 23, 2021  
PAGES (INCLUDING COVER): 17  
VERSION\*: 2

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

VERSION 2: This report supersedes all previous reports. It is the complete data set.

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

# Certificate of Analysis

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-23

Parameter	Unit	G / S	BRF_L2_SS4_S		BRF_L2_SS5_S		BRF_L2_SS6_S	
			RDL	3284623	RDL	3284652	RDL	3284658
Aluminum	mg/kg		100	4330	10.0	3000	100	5620
Antimony	mg/kg		0.8	<0.8	0.8	<0.8	0.8	<0.8
Arsenic	mg/kg		1	1	1	2	1	1
Barium	mg/kg		2.0	46.8	2.0	20.8	2.0	37.9
Beryllium	mg/kg		0.4	<0.4	0.4	<0.4	0.4	0.6
Boron	mg/kg		5	<5	5	<5	5	<5
Cadmium	mg/kg		0.5	0.6	0.5	<0.5	0.5	<0.5
Chromium	mg/kg		5	<5	5	5	5	<5
Cobalt	mg/kg		0.5	0.6	0.5	0.6	0.5	<0.5
Copper	mg/kg		1.0	8.2	1.0	15.0	1.0	27.8
Iron	mg/kg		50	848	50	1190	50	767
Lead	mg/kg		1	11	1	19	1	14
Lithium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Manganese	mg/kg		5.0	5.6	5.0	7.8	5.0	10.3
Mercury	mg/kg		0.03	0.20	0.03	0.17	0.03	0.17
Molybdenum	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Nickel	mg/kg		1	1	1	2	1	1
Selenium	mg/kg		0.8	2.1	0.8	3.3	0.8	2.2
Silver	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Strontium	mg/kg		5	14	5	11	5	10
Thallium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Tin	mg/kg		1	<1	1	<1	1	<1
Uranium	mg/kg		0.50	1.11	0.50	<0.50	0.50	1.37
Vanadium	mg/kg		0.4	4.4	0.4	4.2	0.4	6.0
Zinc	mg/kg		5	7	5	15	5	7

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284623-3284658

Analysis performed at AGAT Toronto (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:


Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-23

				BRF_L2_SS4_S	BRF_L2_SS5_S	BRF_L2_SS6_S
SAMPLE DESCRIPTION:				A1	A1	A1
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2021-11-26 16:00	2021-11-26 16:00	2021-11-26 16:00
Parameter	Unit	G / S	RDL	3284623	3284652	3284658
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	40
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	18	18	31
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	512	639	420
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	530	657	491
Resemblance Comment				LR, UC	LR, UC	FR, LR, UC
Return to Baseline at C32				Y	Y	Y
Silica Gel Cleanup				Y	Y	Y
Surrogate	Unit	Acceptable Limits				
Isobutylbenzene - EPH	%	60-140		102	101	101
Isobutylbenzene - VPH	%	60-140		93	93	81
n-Dotriacontane - EPH	%	60-140		131	132	135

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-23

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284623-3284658 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

Resemblance Comment Key:

GF - Gasoline Fraction

WGF - Weathered Gasoline Fraction

GR - Product in Gasoline Range

FOF - Fuel Oil Fraction

WFOF - Weathered Fuel Oil Fraction

FR - Product in Fuel Oil Range

LOF - Lube Oil Fraction

LR - Lube Range

UC - Unidentified Compounds

NR - No Resemblance

NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-23

		BRF_L2_SS4_S	BRF_L2_SS5_S	BRF_L2_SS6_S
SAMPLE DESCRIPTION:		A1	A1	A1
SAMPLE TYPE:		Soil	Soil	Soil
DATE SAMPLED:		2021-11-26	2021-11-26	2021-11-26
		16:00	16:00	16:00
Parameter	Unit	G / S	RDL	3284623
% Moisture	%	1	87	81
				84

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:


## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-23

Parameter	Unit	G / S	RDL	BRF_L2_SS4_S	BRF_L2_SS5_S	BRF_L2_SS6_S
				A1	A1	A1
SAMPLE DESCRIPTION:				A1	A1	A1
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2021-11-26	2021-11-26	2021-11-26
				16:00	16:00	16:00
				3284623	3284652	3284658
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	0.023	0.010	0.008
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140	97	110	91	
Terphenyl-d14	%	50-140	128	135	126	
Pyrene-d10 (%)	%	50-140	98	106	90	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-23

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3284623-3284658 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Soil Analysis

RPT Date: Dec 23, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals - Available metals (Halifax)															
Aluminum	3284891		2910	2980	2.4%	< 10.0	101%	70%	130%	111%	80%	120%	97%	70%	130%
Antimony	3284891		<0.8	<0.8	NA	< 0.8	102%	70%	130%	109%	80%	120%	98%	70%	130%
Arsenic	3284891		2	2	NA	< 1	98%	70%	130%	106%	80%	120%	105%	70%	130%
Barium	3284891		16.2	16.3	0.6%	< 2.0	96%	70%	130%	114%	80%	120%	114%	70%	130%
Beryllium	3284891		<0.4	<0.4	NA	< 0.4	103%	70%	130%	82%	80%	120%	85%	70%	130%
Boron	3284891		<5	<5	NA	< 5	100%	70%	130%	87%	80%	120%	79%	70%	130%
Cadmium	3284891		<0.5	<0.5	NA	< 0.5	114%	70%	130%	109%	80%	120%	98%	70%	130%
Chromium	3284891		5	5	NA	< 5	100%	70%	130%	114%	80%	120%	109%	70%	130%
Cobalt	3284891		<0.5	<0.5	NA	< 0.5	101%	70%	130%	108%	80%	120%	109%	70%	130%
Copper	3284891		4.9	5.1	NA	< 1.0	101%	70%	130%	111%	80%	120%	104%	70%	130%
Iron	3284891		1050	1060	0.9%	< 50	102%	70%	130%	113%	80%	120%	107%	70%	130%
Lead	3284891		33	33	0.0%	< 1	102%	70%	130%	109%	80%	120%	94%	70%	130%
Lithium	3284891		<0.5	<0.5	NA	< 0.5	100%	70%	130%	80%	80%	120%	78%	70%	130%
Manganese	3284891		11.0	11.4	NA	< 5.0	101%	70%	130%	109%	80%	120%	105%	70%	130%
Mercury	3284891		0.22	0.22	0.0%	< 0.03	122%	70%	130%	109%	80%	120%	107%	70%	130%
Molybdenum	3284891		0.7	0.8	NA	< 0.5	97%	70%	130%	117%	80%	120%	114%	70%	130%
Nickel	3284891		2	2	NA	< 1	98%	70%	130%	105%	80%	120%	103%	70%	130%
Selenium	3284891		2.7	2.8	NA	< 0.8	98%	70%	130%	97%	80%	120%	97%	70%	130%
Silver	3284891		<0.5	<0.5	NA	< 0.5	95%	70%	130%	120%	80%	120%	100%	70%	130%
Strontium	3284891		10	10	NA	< 5	99%	70%	130%	96%	80%	120%	89%	70%	130%
Thallium	3284891		<0.5	<0.5	NA	< 0.5	98%	70%	130%	108%	80%	120%	106%	70%	130%
Tin	3284891		<1	<1	NA	< 1	112%	70%	130%	116%	80%	120%	111%	70%	130%
Uranium	3284891		0.53	0.56	NA	< 0.50	126%	70%	130%	111%	80%	120%	112%	70%	130%
Vanadium	3284891		5.3	5.6	5.5%	< 0.4	100%	70%	130%	112%	80%	120%	110%	70%	130%
Zinc	3284891		10	11	NA	< 5	99%	70%	130%	107%	80%	120%	98%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.

Certified By:



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 23, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
<b>Polycyclic Aromatic Hydrocarbons in Soil</b>															
1-Methylnaphthalene	1	3284915	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	104%	50%	140%	102%	50%	140%
2-Methylnaphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	96%	50%	140%	95%	50%	140%
Acenaphthene	1	3284915	< 0.00671	< 0.00671	NA	< 0.00671	113%	50%	140%	99%	50%	140%	97%	50%	140%
Acenaphthylene	1	3284915	< 0.004	< 0.004	NA	< 0.004	98%	50%	140%	88%	50%	140%	89%	50%	140%
Acridine	1	3284915	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	113%	50%	140%	18%	50%	140%
Anthracene	1	3284915	< 0.03	< 0.03	NA	< 0.03	93%	50%	140%	84%	50%	140%	87%	50%	140%
Benzo(a)anthracene	1	3284915	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	86%	50%	140%
Benzo(a)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	79%	50%	140%	68%	50%	140%
Benzo(b)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	84%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	87%	50%	140%	89%	50%	140%
Benzo(e)pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	94%	50%	140%	73%	50%	140%
Benzo(ghi)perylene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	93%	50%	140%	66%	50%	140%
Chrysene	1	3284915	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	98%	50%	140%	83%	50%	140%
Dibenzo(a,h)anthracene	1	3284915	< 0.006	< 0.006	NA	< 0.006	100%	50%	140%	88%	50%	140%	77%	50%	140%
Fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	103%	50%	140%	99%	50%	140%
Fluorene	1	3284915	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	93%	50%	140%	94%	50%	140%
Indeno(1,2,3)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	97%	50%	140%	91%	50%	140%
Naphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	93%	50%	140%	93%	50%	140%
Perylene	1	3284915	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	89%	50%	140%	69%	50%	140%
Phenanthrene	1	3284915	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	98%	50%	140%	94%	50%	140%
Pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	105%	50%	140%	96%	50%	140%
Quinoline	1	3284915	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	133%	50%	140%	137%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

#### Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3290478	0.02	0.02	NA	< 0.02	107%	60%	140%	129%	60%	140%			
Toluene	1	3290478	0.07	0.07	NA	< 0.04	112%	60%	140%	124%	60%	140%			
Ethylbenzene	1	3290478	0.03	0.02	NA	< 0.03	126%	60%	140%	134%	60%	140%			
Xylene (Total)	1	3290478	0.12	0.12	NA	< 0.05	115%	60%	140%	128%	60%	140%			
C6-C10 (less BTEX)	1	3290478	< 3	< 3	NA	< 3	95%	60%	140%	110%	60%	140%	89%	30%	130%
>C10-C16 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	90%	60%	140%	108%	60%	140%	118%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	103%	60%	140%	108%	60%	140%	118%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3284915	123	107	13.9%	< 15	88%	60%	140%	108%	60%	140%	118%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

## Quality Assurance

 CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X838797  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 23, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## QC Exceedance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

RPT Date: Dec 23, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Soil										
Acridine	3284915	98%	50%	140%	113%	50%	140%	18%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838797  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Iron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lithium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Manganese	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Strontium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Tin	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838797

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS



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Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

5.8, 5.9, 7.6

CHAIN OF CUSTODY RECORD

ENV COC - 00016v2

21x838797

Page 1 of 2

Invoice Information				Report information (if differs from invoice)				Project Information				LAB USE ONLY - PLACE STICKER HERE
Company: Golder Associates				Company:				Quotation #: C04828				
Contact Name: Belinda Culgin				Contact Name:				P.O. #/ AFE#:				
Street Address: 201 Brownlow Ave, Suite 26				Street Address:				Project #: 21497139				
City: Dartmouth	Prov: NS	Postal Code: B3B 1W2	City:	Prov:	Postal Code:	Site #:						
Phone: (902) 466-1668				Phone:				Site Location:				
Email: Belinda_culgin@golder.com				Email:				Site Location Province:				
Copies: James_doyle@golder.com				Copies:				Sampled By: A Brunskill				

21 DEC 2012 2:22 PM

Regulatory Criteria							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22				
Regulation							FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-M5 (total metals) well / surface water	RCAP-M5 (dissolved metals) - GW	Total metals (default) well/SW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME agr/ landfill)	ARICA HC (RTEX, C6-C32)	CCME HC (F1/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (presence/absence)	Total coliform/E.coli (count)	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	Regular Turnaround Time (TAT)				
**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal																					<input checked="" type="checkbox"/> 5 to 7 Day <input type="checkbox"/> 10 Day <input type="checkbox"/> Same Day <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 4 Day											
Date Sampled							Time (24hr)		Matrix																					Rush Turnaround Time (TAT) Surcharges apply		
YY	MM	DD	HH	MM																							Date Required:	YY	MM	DD		
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																																
1	BRF_L2_SS4_SA1						21	11	26	16	0	Soil																	4			Silica Gel Clean Up
2	BRF_L2_SS4_SA2						21	11	26	16	5	Soil																	4	X		Silica Gel Clean Up
3	BRF_L2_SS4_A_SA1						21	11	26	16	9	Soil																	4	X		Silica Gel Clean Up
4	BRF_L2_SS4_B_SA1						21	11	26	16	14	Soil																	4	X		Silica Gel Clean Up
5	BRF_L2_SS4_D_SA1						21	11	26	16	20	Soil																	4	X		Silica Gel Clean Up
6	BRF_L2_SS5_SA1						21	11	26	11	40	Soil																	4			Silica Gel Clean Up
7	BRF_L2_SS5_SA2						21	11	26	11	42	Soil																	4	X		Silica Gel Clean Up
8	BRF_L2_SS5_A_SA1						21	11	26	11	45	Soil																	4	X		Silica Gel Clean Up
9	BRF_L2_SS5_B_SA1						21	11	26	11	50	Soil																	4	X		Silica Gel Clean Up
10	BRF_L2_SS5_C_SA1						21	11	26	11	53	Soil																	4	X		Silica Gel Clean Up
11	BRF_L2_SS5_D_SA1						21	11	26	11	57	Soil																	4	X		Silica Gel Clean Up
12	BRF_L2_SS6_SA1						21	11	26	13	5	Soil																	4			Silica Gel Clean Up

\* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY.

LAB USE ONLY			Yes	No	°C	LAB USE ONLY			Yes	No	°C	LAB USE ONLY			Yes	No	°C	Temperature reading by:
Seal present						Seal present						Seal present						
Seal intact						Seal intact						Seal intact						
Cooling media present					Cooling media present					Cooling media present								

Relinquished by: (Signature/ Print)						Received by: (Signature/ Print)						Special instructions													
YY		MM		DD		HH		MM		YY		MM		DD		HH		MM							
21		11		29						21		11		29											
<i>A. Brunskill</i>						<i>K. Miller</i>																			





CONTINUED

[PAGE 1 REFERENCE]

Company:	Golder Associates
Contact Name:	Belinda Cuijin
Project #:	21497139

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Sample Identification	Date Sampled			Time (24hr)		Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
	YY	MM	DD	HH	MM		FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-M5 (total metals) well /SW	RCAP-M5 (dissolved metals) - GW	Total metals (default)-well/SW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext)	PHS boron (CCME agr/landfill)	RBGA HC (BTEX, C6-C32)	CCME HC (F2/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (P/A)	Total coliform/E.coli (count)	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE			
	Comments																													
13	BRF_L2_SS6_SA2	21	11	26	13	10	soil									x		x		x							4	x	Silica Gel Clean Up	
14	BRF_L2_SS6_A_SA1	21	11	26	13	15	soil									x		x		x							4	x	Silica Gel Clean Up	
15	BRF_L2_SS6_B_SA1	21	11	26	13	20	soil									x		x		x							4	x	Silica Gel Clean Up	
16	BRF_L2_SS6_C_SA1	21	11	26	13	25	soil									x		x		x							4	x	Silica Gel Clean Up	
17	BRF_L2_SS6_D_SA1	21	11	26	13	30	soil									x		x		x							4	x	Silica Gel Clean Up	
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*Keller*





# Project Details for External Facility Redirection

Sent to:

AGAT - DARTMOUTH

Chain of Custodies received with this form are to be reported to the name name on the coc and the Bureau Veritas

ALL Invoices are to be directed to Bureau Veritas only

Bureau Veritas Contact Details	<b>BV Location:</b>	BEDFORD	
	<b>BV Contact #:</b> (for questions related to submission)	Marie Muise	
	<b>BV Phone #:</b> (for questions related to submission)	902-420-0203 ext 253	
Invoice to information	<b>BV Project Reference #:</b>	D1202-007 - D1202-013 (7 submissions)	
	<b>BV invoice to Email</b>	bvsubcontract@bureauveritas.com	
Report to information	<b>Client Report To Email:</b>	see attached chain of custoday form(s)	
	<b>BV Report To Email:</b>	bvsubcontract@bureauveritas.com	
Project details	<b>Analytical Tests</b>	See attached chain of custody form(s)	
	<b>Comments/ Job details</b>	7 submissions - 104 samples total	
	<b>Special Instructions</b>	<b>1</b>	Email data directly to COC client and BV simoultaneously
		<b>2</b>	Bureau Veritas reference must be providng on the invoice with a copy fo the coc in order to ensure payment.
<b>3</b>		Bureau Veritas must have received an email of the data to the listed email address in order to process invoices.	

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203

ATTENTION TO: Belinda Culgin

PROJECT: 21497139/D1202-007-D1202-013

AGAT WORK ORDER: 21X838807

SOIL ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

DATE REPORTED: Dec 20, 2021

PAGES (INCLUDING COVER): 16

VERSION\*: 2

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

VERSION 2: This report supersedes all previous reports. It is the complete data set.

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

# Certificate of Analysis

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-20

Parameter	Unit	G / S	BRF_L2_SS7_S		BRF_L2_SS8_S		BRF_L2_SS9_S	
			RDL	3284478	RDL	3284505	RDL	3284509
Aluminum	mg/kg		10.0	2550	100	3290	10.0	3670
Antimony	mg/kg		0.8	<0.8	0.8	<0.8	0.8	<0.8
Arsenic	mg/kg		1	<1	1	2	1	3
Barium	mg/kg		2.0	20.9	2.0	34.6	2.0	21.2
Beryllium	mg/kg		0.4	<0.4	0.4	<0.4	0.4	<0.4
Boron	mg/kg		5	<5	5	<5	5	<5
Cadmium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Chromium	mg/kg		5	<5	5	<5	5	<5
Cobalt	mg/kg		0.5	0.6	0.5	1.0	0.5	<0.5
Copper	mg/kg		1.0	29.8	1.0	36.5	1.0	55.2
Iron	mg/kg		50	871	50	837	50	682
Lead	mg/kg		1	8	1	7	1	14
Lithium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Manganese	mg/kg		5.0	<5.0	5.0	5.3	5.0	7.3
Mercury	mg/kg		0.03	0.13	0.03	0.13	0.03	0.15
Molybdenum	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Nickel	mg/kg		1	2	1	3	1	2
Selenium	mg/kg		0.8	1.7	0.8	2.5	0.8	3.4
Silver	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Strontium	mg/kg		5	11	5	12	5	18
Thallium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5
Tin	mg/kg		1	<1	1	<1	1	<1
Uranium	mg/kg		0.50	<0.50	0.50	<0.50	0.50	<0.50
Vanadium	mg/kg		0.4	4.1	0.4	3.2	0.4	5.2
Zinc	mg/kg		5	28	5	37	5	32

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284478-3284509

Analysis performed at AGAT Toronto (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-20

		BRF_L2_SS7_S	BRF_L2_SS8_S	BRF_L2_SS9_S		
SAMPLE DESCRIPTION:		A1	A1	A1		
SAMPLE TYPE:		Soil	Soil	Soil		
DATE SAMPLED:		2021-11-26 12:45	2021-11-26 12:25	2021-11-26 12:05		
Parameter	Unit	G / S	RDL	3284478	3284505	3284509
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	24	32	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	824	786	448
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	848	818	448
Resemblance Comment			LR, UC	LR, UC	LR, UC	LR, UC
Return to Baseline at C32			Y	Y	Y	Y
Silica Gel Cleanup			Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits				
Isobutylbenzene - EPH	%	60-140	102	103	104	
Isobutylbenzene - VPH	%	60-140	110	90	84	
n-Dotriacontane - EPH	%	60-140	131	133	127	

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CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284478-3284509 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

- Resemblance Comment Key:
- GF - Gasoline Fraction
  - WGF - Weathered Gasoline Fraction
  - GR - Product in Gasoline Range
  - FOF - Fuel Oil Fraction
  - WFOF - Weathered Fuel Oil Fraction
  - FR - Product in Fuel Oil Range
  - LOF - Lube Oil Fraction
  - LR - Lube Range
  - UC - Unidentified Compounds
  - NR - No Resemblance
  - NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-20

		BRF_L2_SS7_S	BRF_L2_SS8_S	BRF_L2_SS9_S
SAMPLE DESCRIPTION:		A1	A1	A1
SAMPLE TYPE:		Soil	Soil	Soil
DATE SAMPLED:		2021-11-26 12:45	2021-11-26 12:25	2021-11-26 12:05
Parameter	Unit	G / S	RDL	3284478
% Moisture	%	1	86	87
				82

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:


## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-20

Parameter	Unit	G / S	RDL	BRF_L2_SS7_S	BRF_L2_SS8_S	BRF_L2_SS9_S
				A1	A1	A1
SAMPLE DESCRIPTION:				A1	A1	A1
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2021-11-26 12:45	2021-11-26 12:25	2021-11-26 12:05
				3284478	3284505	3284509
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	0.005	0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	0.18
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	0.02	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140	81	89	103	
Terphenyl-d14	%	50-140	112	122	134	
Pyrene-d10 (%)	%	50-140	80	85	100	

Certified By:







**AGAT** Laboratories

# Certificate of Analysis

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11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-20

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3284478-3284509 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Soil Analysis

RPT Date: Dec 20, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Metals - Available metals (Halifax)															
Aluminum	3334444		12300	11500	6.7%	< 10.0	108%	70%	130%	116%	80%	120%	NA	70%	130%
Antimony	3334444		<0.8	<0.8	NA	< 0.8	102%	70%	130%	101%	80%	120%	78%	70%	130%
Arsenic	3334444		8	7	13.3%	< 1	95%	70%	130%	104%	80%	120%	97%	70%	130%
Barium	3334444		42.2	44.3	4.9%	< 2.0	99%	70%	130%	104%	80%	120%	100%	70%	130%
Beryllium	3334444		0.4	<0.4	NA	< 0.4	97%	70%	130%	88%	80%	120%	93%	70%	130%
Boron	3334444		7	7	NA	< 5	105%	70%	130%	97%	80%	120%	93%	70%	130%
Cadmium	3334444		<0.5	<0.5	NA	< 0.5	97%	70%	130%	101%	80%	120%	99%	70%	130%
Chromium	3334444		17	17	NA	< 5	100%	70%	130%	115%	80%	120%	97%	70%	130%
Cobalt	3334444		5.2	6.1	15.9%	< 0.5	100%	70%	130%	112%	80%	120%	102%	70%	130%
Copper	3334444		14.2	16.9	17.4%	< 1.0	82%	70%	130%	116%	80%	120%	94%	70%	130%
Iron	3334444		19400	18900	2.6%	< 50	104%	70%	130%	117%	80%	120%	NA	70%	130%
Lead	3334444		7	7	0.0%	< 1	98%	70%	130%	110%	80%	120%	99%	70%	130%
Lithium	3334444		17.0	17.0	0.0%	< 0.5	95%	70%	130%	87%	80%	120%	98%	70%	130%
Manganese	3334444		315	387	20.5%	< 5.0	102%	70%	130%	113%	80%	120%	92%	70%	130%
Mercury	3334444		0.10	0.10	NA	< 0.03	113%	70%	130%	100%	80%	120%	97%	70%	130%
Molybdenum	3334444		1.0	0.9	NA	< 0.5	100%	70%	130%	105%	80%	120%	104%	70%	130%
Nickel	3334444		13	14	7.4%	< 1	99%	70%	130%	109%	80%	120%	94%	70%	130%
Selenium	3334444		<0.8	<0.8	NA	< 0.8	98%	70%	130%	102%	80%	120%	99%	70%	130%
Silver	3334444		<0.5	<0.5	NA	< 0.5	97%	70%	130%	103%	80%	120%	89%	70%	130%
Strontium	3334444		310	292	6.0%	< 5	99%	70%	130%	105%	80%	120%	93%	70%	130%
Thallium	3334444		<0.5	<0.5	NA	< 0.5	96%	70%	130%	106%	80%	120%	91%	70%	130%
Tin	3334444		<1	<1	NA	< 1	108%	70%	130%	111%	80%	120%	87%	70%	130%
Uranium	3334444		0.71	0.70	NA	< 0.50	95%	70%	130%	111%	80%	120%	104%	70%	130%
Vanadium	3334444		23.6	23.5	0.4%	< 0.4	98%	70%	130%	112%	80%	120%	97%	70%	130%
Zinc	3334444		33	41	21.6%	< 5	87%	70%	130%	113%	80%	120%	97%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.  
 Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

### Certified By:



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Trace Organics Analysis

RPT Date: Dec 20, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel**

Benzene	1	3290439	< 0.02	< 0.02	NA	< 0.02	90%	60%	140%	125%	60%	140%			
Toluene	1	3290439	< 0.04	< 0.04	NA	< 0.04	72%	60%	140%	106%	60%	140%			
Ethylbenzene	1	3290439	0.01	0.01	NA	< 0.03	60%	60%	140%	103%	60%	140%			
Xylene (Total)	1	3290439	< 0.05	0.05	NA	< 0.05	71%	60%	140%	119%	60%	140%			
C6-C10 (less BTEX)	1	3290439	5	5	NA	< 3	120%	60%	140%	107%	60%	140%	30%	130%	
>C10-C16 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	90%	60%	140%	108%	60%	140%	118%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	103%	60%	140%	108%	60%	140%	118%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3284915	123	107	13.9%	< 15	88%	60%	140%	108%	60%	140%	118%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3284915	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	104%	50%	140%	102%	50%	140%
2-Methylnaphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	96%	50%	140%	95%	50%	140%
Acenaphthene	1	3284915	< 0.00671	< 0.00671	NA	< 0.00671	113%	50%	140%	99%	50%	140%	97%	50%	140%
Acenaphthylene	1	3284915	< 0.004	< 0.004	NA	< 0.004	98%	50%	140%	88%	50%	140%	89%	50%	140%
Acridine	1	3284915	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	113%	50%	140%	18%	50%	140%
Anthracene	1	3284915	< 0.03	< 0.03	NA	< 0.03	93%	50%	140%	84%	50%	140%	87%	50%	140%
Benzo(a)anthracene	1	3284915	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	86%	50%	140%
Benzo(a)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	79%	50%	140%	68%	50%	140%
Benzo(b)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	84%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	87%	50%	140%	89%	50%	140%
Benzo(e)pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	94%	50%	140%	73%	50%	140%
Benzo(ghi)perylene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	93%	50%	140%	66%	50%	140%
Chrysene	1	3284915	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	98%	50%	140%	83%	50%	140%
Dibenzo(a,h)anthracene	1	3284915	< 0.006	< 0.006	NA	< 0.006	100%	50%	140%	88%	50%	140%	77%	50%	140%
Fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	103%	50%	140%	99%	50%	140%
Fluorene	1	3284915	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	93%	50%	140%	94%	50%	140%
Indeno(1,2,3)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	97%	50%	140%	91%	50%	140%
Naphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	93%	50%	140%	93%	50%	140%
Perylene	1	3284915	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	89%	50%	140%	69%	50%	140%
Phenanthrene	1	3284915	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	98%	50%	140%	94%	50%	140%
Pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	105%	50%	140%	96%	50%	140%
Quinoline	1	3284915	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	133%	50%	140%	137%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

 CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X838807  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 20, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## QC Exceedance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

RPT Date: Dec 20, 2021														
					REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER					Sample Id	Measured Value	Acceptable Limits		Recovery		Acceptable Limits		Recovery	
							Lower	Upper			Lower	Upper		

Polycyclic Aromatic Hydrocarbons in Soil

Acridine	3284915	98%	50%	140%	113%	50%	140%	18%	50%	140%
----------	---------	-----	-----	------	------	-----	------	-----	-----	------

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838807  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Iron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lithium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Manganese	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Strontium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Tin	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838807

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS



6.0, 6.5, 4.8

21X838807 P



105-200 Bluewater Road, Bedford, NS B4B 1G9  
49-55 Elizabeth Avenue, St John's, NL A1A 1W9  
465 George Street, Unit G, Sydney, NS B1P 1K5

Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

CHAIN OF CUSTODY RECORD

ENV COC - 00016v2

Page 1 of 2

<b>Invoice Information</b>		<b>Invoice to (George report)</b> <input type="checkbox"/>		<b>Report Information (if differs from Invoice)</b>				<b>Project Information</b>				<b>LAB USE ONLY - PLACE STICKER HERE</b>
Company: Golder Associates		Company:		Quotation #: C04828				P.O. #/ AFE#:				
Contact Name: Belinda Culgin		Contact Name:		Project #: 21497139				Site #:				
Street Address: 201 Brownlow Ave, Suite 26		Street Address:		Site Location:				Site Location Province:				
City: Dartmouth Prov: NS Postal Code: B3B 1W2		City: Prov: Postal Code:		Site Location:				Rush Confirmation #:				
Phone: (902) 466-1668		Phone:		Sampled By: A Brunskill								

**Regulatory Criteria**

**\*\*Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal**

Regulation	Matrix

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Sample Identification	Date Sampled			Time (24hr)		Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Regular Turnaround Time (TAT)		
	YY	MM	DD	HH	MM																								5 to 7 Day	1 Day	3 Day
1 BRF_L2_SS7_SA1	21	11	26	12	45	Soil																						<input checked="" type="checkbox"/>			
2 BRF_L2_SS7_SA2	21	11	26	12	50	Soil																						<input type="checkbox"/>			
3 BRF_L2_SS7_A_SA1	21	11	26	12	55	Soil																						<input type="checkbox"/>			
4 BRF_L2_SS7_B_SA1	21	11	26	12	57	Soil																						<input type="checkbox"/>			
5 BRF_L2_SS7_D_SA1	21	11	26	13	0	Soil																						<input type="checkbox"/>			
6 BRF_L2_SS8_SA1	21	11	26	12	25	Soil																						<input type="checkbox"/>			
7 BRF_L2_SS8_SA2	21	11	26	12	28	Soil																						<input type="checkbox"/>			
8 BRF_L2_SS8_B_SA1	21	11	26	12	35	Soil																						<input type="checkbox"/>			
9 BRF_L2_SS8_D_SA1	21	11	26	12	40	Soil																						<input type="checkbox"/>			
10 BRF_L2_SS9_SA1	21	11	26	12	5	Soil																						<input type="checkbox"/>			
11 BRF_L2_SS9_SA2	21	11	26	12	7	Soil																						<input type="checkbox"/>			
12 BRF_L2_SS9_B_SA1	21	11	26	12	11	Soil																						<input type="checkbox"/>			

\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS AND CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

<b>LAB USE ONLY</b>		Yes	No	°C	<b>LAB USE ONLY</b>		Yes	No	°C	<b>LAB USE ONLY</b>		Yes	No	°C	Temperature reading by:
Seal present					Seal present					Seal present					
Seal intact					Seal intact					Seal intact					
Cooling media present				1	2	3	Cooling media present				1	2	3		
Relinquished by: (Signature/ Print)		YY	MM	DD	HH	MM	Received by: (Signature/ Print)		YY	MM	DD	HH	MM	Special Instructions	
1 A Brunskill		21	11	29			1 Kullen								
2							2								



CONTINUED

[PAGE 1 REFERENCE]

Company:	Goldier Associates
Contact Name:	Belinda Culgin
Project #:	21497139

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

13	Sample Identification	Date Sampled			Time (24hr)		Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Comments	
		YY	MM	DD	HH	MM		FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (total metals) well /SW	RCAP-MS (dissolved metals) - GW	Total metals (default)-well/SW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid eq.)	PHS boron (CCME agr/landfill)	RBGA HC (BTEX, C6-C12)	CCME HC (F1/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (P/A)	Total coliform/E.coli (count)	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE			
		Same as above																													
	BRF_L2_SS9_C_SA1	21	11	26	12	15	Soil										X		X		X							4	X	Silica Gel Cleanup	
	BRF_L2_SS9_D_SA1	21	11	26	12	20	Soil										X		X		X							4	X	Silica Gel Cleanup	
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*Kulkin*



CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203

ATTENTION TO: Belinda Culgin

PROJECT: 21497139/D1202-007-D1202-013

AGAT WORK ORDER: 21X838824

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

WATER ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

DATE REPORTED: Dec 13, 2021

PAGES (INCLUDING COVER): 20

VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

 11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

 DATE SAMPLED: 2021-11-27  
 12:15

3286987

Parameter	Unit	G / S	RDL	3286987
Benzene	mg/L		0.001	<0.001
Toluene	mg/L		0.001	<0.001
Ethylbenzene	mg/L		0.001	<0.001
Xylene (Total)	mg/L		0.002	<0.002
C6-C10 (less BTEX)	mg/L		0.01	<0.01
>C10-C16 Hydrocarbons	mg/L		0.05	<0.05
>C16-C21 Hydrocarbons	mg/L		0.05	<0.05
>C21-C32 Hydrocarbons	mg/L		0.1	<0.1
Modified TPH (Tier 1)	mg/L		0.1	<0.1
Sediment				TRACE
Resemblance Comment				NR
Return to Baseline at C32				Y
Surrogate	Unit	Acceptable Limits		
Isobutylbenzene - EPH	%	70-130		105
Isobutylbenzene - VPH	%	70-130		100
n-Dotriacontane - EPH	%	70-130		109

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3286987 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Resemblance Comment Key:

- GF - Gasoline Fraction
- WGF - Weathered Gasoline Fraction
- GR - Product in Gasoline Range
- FOF - Fuel Oil Fraction
- WFOF - Weathered Fuel Oil Fraction
- FR - Product in Fuel Oil Range
- LOF - Lube Oil Fraction
- LR - Lube Range
- UC - Unidentified Compounds
- NR - No Resemblance
- NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-27  
12:15

3286987

Parameter	Unit	G / S	RDL	3286987
1-Methylnaphthalene	ug/L		0.01	<0.01
2-Methylnaphthalene	ug/L		0.01	<0.01
Acenaphthene	ug/L		0.01	<0.01
Acenaphthylene	ug/L		0.01	<0.01
Acridine	ug/L		0.01	<0.01
Anthracene	ug/L		0.012	<0.012
Benzo(a)anthracene	ug/L		0.018	<0.018
Benzo(a)pyrene	ug/L		0.010	<0.010
Benzo(b)fluoranthene	ug/L		0.01	<0.01
Benzo(j+k)fluoranthene	µg/L		0.01	<0.01
Benzo(e)pyrene	ug/L		0.01	<0.01
Benzo(ghi)perylene	ug/L		0.01	<0.01
Chrysene	ug/L		0.01	<0.01
Dibenzo(a,h)anthracene	ug/L		0.01	<0.01
Fluoranthene	ug/L		0.01	<0.01
Fluorene	ug/L		0.01	<0.01
Indeno(1,2,3-cd)pyrene	ug/L		0.01	<0.01
Naphthalene	ug/L		0.01	<0.01
Perylene	ug/L		0.01	<0.01
Phenanthrene	ug/L		0.01	<0.01
Pyrene	ug/L		0.01	<0.01
Quinoline	ug/L		0.01	<0.01
Sediment				NO
Surrogate	Unit	Acceptable Limits		
Naphthalene-d8	%	50-140		101
Terphenyl-d14	%	50-140		91
Pyrene-d10	%	50-140		79

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Water - (PAH)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3286987 Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter. Sediment parameter is comment only based on visual inspection of the sample prior to extraction and is not an accredited test.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Mercury Analysis in Water (Total)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-27  
12:15

Parameter	Unit	G / S	RDL	3286987
Total Mercury	ug/L		0.026	<0.026

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-27  
12:15

Parameter	Unit	G / S	RDL	3286987
pH				4.85
Reactive Silica as SiO2	mg/L		0.5	1.4
Chloride	mg/L		1	8
Fluoride	mg/L		0.12	<0.12
Sulphate	mg/L		2	6
Alkalinity	mg/L		5	<5
True Color	TCU		5.00	46.8
Turbidity	NTU		0.5	1.4
Electrical Conductivity	umho/cm		1	80
Nitrate + Nitrite as N	mg/L		0.05	<0.05
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Ammonia as N	mg/L		0.03	<0.03
Ortho-Phosphate as P	mg/L		0.01	<0.01
Total Sodium	mg/L		0.1	5.0
Total Potassium	mg/L		0.1	0.4
Total Calcium	mg/L		0.1	1.2
Total Magnesium	mg/L		0.1	0.6
Bicarb. Alkalinity (as CaCO3)	mg/L		5	<5
Carb. Alkalinity (as CaCO3)	mg/L		10	<10
Hydroxide	mg/L		5	<5
Calculated TDS	mg/L		1	22
Hardness	mg/L			5.5
Langelier Index (@20C)	NA			-5.90
Langelier Index (@ 4C)	NA			-6.22
Saturation pH (@ 20C)	NA			10.7
Saturation pH (@ 4C)	NA			11.1
Anion Sum	me/L			0.35
Cation sum	me/L			0.39

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-27  
12:15

3286987

Parameter	Unit	G / S	RDL	3286987
% Difference/ Ion Balance	%			5.0
Total Aluminum	ug/L		5	210
Total Antimony	ug/L		2	<2
Total Arsenic	ug/L		2	<2
Total Barium	ug/L		5	<5
Total Beryllium	ug/L		2	<2
Total Bismuth	ug/L		2	<2
Total Boron	ug/L		5	7
Total Cadmium	ug/L	0.09		<0.09
Total Chromium	ug/L	1		<1
Total Cobalt	ug/L	1		<1
Total Copper	ug/L	1		2
Total Iron	ug/L	50		353
Total Lead	ug/L	0.5		<0.5
Total Manganese	ug/L	2		8
Total Molybdenum	ug/L	2		<2
Total Nickel	ug/L	2		<2
Total Phosphorous	mg/L	0.02		<0.02
Total Selenium	ug/L	1		<1
Total Silver	ug/L	0.1		<0.1
Total Strontium	ug/L	5		<5
Total Thallium	ug/L	0.1		<0.1
Total Tin	ug/L	2		<2
Total Titanium	ug/L	2		3
Total Uranium	ug/L	0.2		<0.2
Total Vanadium	ug/L	2		<2
Total Zinc	ug/L	5		<5

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Standard Water Analysis + Total Metals

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3286987 % Difference / Ion Balance, Hardness, Langelier Index, Nitrate + Nitrite, Hydroxide and Saturation pH are calculated parameters. The calculated parameters are non-accredited. The component parameters of the calculations are accredited. When the cation and anion sums are at, or below 1 me/L, the acceptable criteria is less than 0.3me/L

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Water Analysis - TOC

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-13

SAMPLE DESCRIPTION: BFR\_L2\_SW10

SAMPLE TYPE: Water

DATE SAMPLED: 2021-11-27  
12:15

Parameter	Unit	G / S	RDL	3286987
Total Organic Carbon	mg/L		1	7

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis														
RPT Date: Dec 13, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits
							Lower	Upper	Lower		Upper	Lower		Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Water (Version 3.1)**

Benzene	1	3309311	< 0.001	< 0.001	NA	< 0.001	87%	70%	130%	121%	70%	130%		
Toluene	1	3309311	< 0.001	< 0.001	NA	< 0.001	91%	70%	130%	125%	70%	130%		
Ethylbenzene	1	3309311	< 0.001	< 0.001	NA	< 0.001	98%	70%	130%	130%	70%	130%		
Xylene (Total)	1	3309311	< 0.002	< 0.002	NA	< 0.002	97%	70%	130%	124%	70%	130%		
C6-C10 (less BTEX)	1	3309311	0.02	0.02	NA	< 0.01	82%	70%	130%	105%	70%	130%	97%	70%
>C10-C16 Hydrocarbons	1	3290786	< 0.05	< 0.05	NA	< 0.05	87%	70%	130%	98%	70%	130%	105%	70%
>C16-C21 Hydrocarbons	1	3290786	< 0.05	< 0.05	NA	< 0.05	96%	70%	130%	98%	70%	130%	105%	70%
>C21-C32 Hydrocarbons	1	3290786	< 0.1	< 0.1	NA	< 0.1	77%	70%	130%	98%	70%	130%	105%	70%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

1-Methylnaphthalene	1	3286987	< 0.01	< 0.01	NA	< 0.01	124%	50%	140%	123%	50%	140%	130%	50%
2-Methylnaphthalene	1	3286987	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	111%	50%	140%	118%	50%
Acenaphthene	1	3286987	< 0.01	< 0.01	NA	< 0.01	112%	50%	140%	119%	50%	140%	122%	50%
Acenaphthylene	1	3286987	< 0.01	< 0.01	NA	< 0.01	85%	50%	140%	96%	50%	140%	98%	50%
Acridine	1	3286987	< 0.01	< 0.01	NA	< 0.01	88%	50%	140%	132%	50%	140%	159%	50%
Anthracene	1	3286987	< 0.012	< 0.012	NA	< 0.012	79%	50%	140%	92%	50%	140%	92%	50%
Benzo(a)anthracene	1	3286987	< 0.018	< 0.018	NA	< 0.018	89%	50%	140%	98%	50%	140%	102%	50%
Benzo(a)pyrene	1	3286987	< 0.010	< 0.010	NA	< 0.010	80%	50%	140%	86%	50%	140%	84%	50%
Benzo(b)fluoranthene	1	3286987	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	96%	50%	140%	99%	50%
Benzo(j+k)fluoranthene	1	3286987	< 0.01	< 0.01	NA	< 0.01	105%	50%	140%	99%	50%	140%	109%	50%
Benzo(e)pyrene	1	3286987	< 0.01	< 0.01	NA	< 0.01	118%	50%	140%	119%	50%	140%	113%	50%
Benzo(ghi)perylene	1	3286987	< 0.01	< 0.01	NA	< 0.01	103%	50%	140%	107%	50%	140%	75%	50%
Chrysene	1	3286987	< 0.01	< 0.01	NA	< 0.01	123%	50%	140%	132%	50%	140%	135%	50%
Dibenzo(a,h)anthracene	1	3286987	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	102%	50%	140%	61%	50%
Fluoranthene	1	3286987	< 0.01	< 0.01	NA	< 0.01	97%	50%	140%	112%	50%	140%	114%	50%
Fluorene	1	3286987	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	120%	50%	140%	116%	50%
Indeno(1,2,3-cd)pyrene	1	3286987	< 0.01	< 0.01	NA	< 0.01	92%	50%	140%	97%	50%	140%	92%	50%
Naphthalene	1	3286987	< 0.01	< 0.01	NA	< 0.01	125%	50%	140%	127%	50%	140%	132%	50%
Perylene	1	3286987	< 0.01	< 0.01	NA	< 0.01	100%	50%	140%	116%	50%	140%	106%	50%
Phenanthrene	1	3286987	< 0.01	< 0.01	NA	< 0.01	114%	50%	140%	130%	50%	140%	126%	50%
Pyrene	1	3286987	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	121%	50%	140%	119%	50%
Quinoline	1	3286987	< 0.01	< 0.01	NA	< 0.01	118%	50%	140%	128%	50%	140%	182%	50%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

 CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X838824  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 13, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Water Analysis															
RPT Date: Dec 13, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Standard Water Analysis + Total Metals**

pH	3277809		7.79	7.81	0.3%	<	101%	80%	120%	NA			NA		
Reactive Silica as SiO2	3285992		7.2	7.6	4.8%	< 0.5	94%	80%	120%	82%	80%	120%	116%	80%	120%
Chloride	3301853		12	11	6.0%	< 1	92%	80%	120%	NA	80%	120%	NA	70%	130%
Fluoride	3301853		0.37	0.39	NA	< 0.12	106%	80%	120%	NA	80%	120%	91%	70%	130%
Sulphate	3301853		6	3	NA	< 2	105%	80%	120%	NA	80%	120%	81%	70%	130%
Alkalinity	3277809		68	69	0.8%	< 5	88%	80%	120%	NA			NA		
True Color	3285992		<5.00	<5.00	NA	< 5	98%	80%	120%	90%	80%	120%	NA		
Turbidity	3286713		1.5	1.6	NA	< 0.5	96%	80%	120%	NA			NA		
Electrical Conductivity	3277809		2020	2030	0.8%	< 1	102%	90%	110%	NA			NA		
Nitrate as N	3301853		<0.05	<0.05	NA	< 0.05	94%	80%	120%	NA	80%	120%	100%	70%	130%
Nitrite as N	3301853		<0.05	<0.05	NA	< 0.05	92%	80%	120%	NA	80%	120%	104%	70%	130%
Ammonia as N	3285992		<0.03	<0.03	NA	<0.03	97%	80%	120%	96%	80%	120%	110%	70%	130%
Ortho-Phosphate as P	3285992		<0.01	<0.01	NA	< 0.01	92%	80%	120%	107%	80%	120%	104%	80%	120%
Total Sodium	3291973		91.6	88.7	3.2%	< 0.1	108%	80%	120%	119%	80%	120%	NA	70%	130%
Total Potassium	3291973		2.5	2.4	2.5%	< 0.1	102%	80%	120%	112%	80%	120%	NA	70%	130%
Total Calcium	3291973		89.7	83.5	7.1%	< 0.1	100%	80%	120%	110%	80%	120%	NA	70%	130%
Total Magnesium	3291973		10.7	10.6	1.3%	< 0.1	97%	80%	120%	109%	80%	120%	NA	70%	130%
Bicarb. Alkalinity (as CaCO3)	3277809		68	69	0.8%	< 5	NA	80%	120%	NA			NA		
Carb. Alkalinity (as CaCO3)	3277809		<10	<10	NA	< 10	NA	80%	120%	NA			NA		
Hydroxide	3277809		<5	<5	NA	< 5	NA	80%	120%	NA			NA		
Total Aluminum	3291973		<5	<5	NA	< 5	105%	80%	120%	115%	80%	120%	95%	70%	130%
Total Antimony	3291973		<2	<2	NA	< 2	120%	80%	120%	NA	80%	120%	NA	70%	130%
Total Arsenic	3291973		11	11	3.9%	< 2	98%	80%	120%	101%	80%	120%	NA	70%	130%
Total Barium	3291973		423	409	3.3%	< 5	87%	80%	120%	98%	80%	120%	NA	70%	130%
Total Beryllium	3291973		<2	<2	NA	< 2	99%	80%	120%	110%	80%	120%	89%	70%	130%
Total Bismuth	3291973		<2	<2	NA	< 2	96%	80%	120%	106%	80%	120%	90%	70%	130%
Total Boron	3291973		28	27	3.3%	< 5	101%	80%	120%	111%	80%	120%	88%	70%	130%
Total Cadmium	3291973		<0.09	<0.09	NA	< 0.09	94%	80%	120%	102%	80%	120%	94%	70%	130%
Total Chromium	3291973		<1	<1	NA	< 1	88%	80%	120%	100%	80%	120%	103%	70%	130%
Total Cobalt	3291973		<1	<1	NA	< 1	92%	80%	120%	100%	80%	120%	102%	70%	130%
Total Copper	3291973		5	5	7.7%	< 1	95%	80%	120%	102%	80%	120%	98%	70%	130%
Total Iron	3291973		2380	2360	0.6%	< 50	89%	80%	120%	100%	80%	120%	NA	70%	130%
Total Lead	3291973		0.8	0.8	NA	< 0.5	102%	80%	120%	114%	80%	120%	87%	70%	130%
Total Manganese	3291973		485	494	1.8%	< 2	93%	80%	120%	103%	80%	120%	NA	70%	130%
Total Molybdenum	3291973		<2	<2	NA	< 2	91%	80%	120%	102%	80%	120%	104%	70%	130%
Total Nickel	3291973		<2	<2	NA	< 2	92%	80%	120%	103%	80%	120%	105%	70%	130%
Total Phosphorous	3291973		<0.02	<0.02	NA	< 0.02	100%	80%	120%	115%	80%	120%	94%	70%	130%
Total Selenium	3291973		<1	<1	NA	< 1	91%	80%	120%	92%	80%	120%	79%	70%	130%
Total Silver	3291973		<0.1	<0.1	NA	< 0.1	89%	80%	120%	102%	80%	120%	86%	70%	130%

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838824  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

### Water Analysis (Continued)

RPT Date: Dec 13, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Total Strontium	3291973		458	472	3.0%	< 5	89%	80%	120%	99%	80%	120%	NA	70%	130%	
Total Thallium	3291973		<0.1	<0.1	NA	< 0.1	103%	80%	120%	111%	80%	120%	89%	70%	130%	
Total Tin	3291973		<2	<2	NA	< 2	92%	80%	120%	101%	80%	120%	95%	70%	130%	
Total Titanium	3291973		<2	<2	NA	< 2	100%	80%	120%	104%	80%	120%	93%	70%	130%	
Total Uranium	3291973		0.3	0.3	NA	< 0.2	102%	80%	120%	116%	80%	120%	91%	70%	130%	
Total Vanadium	3291973		<2	<2	NA	< 2	89%	80%	120%	100%	80%	120%	105%	70%	130%	
Total Zinc	3291973		<5	<5	NA	< 5	94%	80%	120%	101%	80%	120%	90%	70%	130%	

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

#### Mercury Analysis in Water (Total)

Total Mercury	3286711	3286711	<0.026	<0.026	NA	< 0.026	100%	80%	120%	NA	80%	120%	94%	70%	130%
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Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

#### Water Analysis - TOC

Total Organic Carbon	3290495		10	10	0.2%	< 1	93%	80%	120%	95%	80%	120%	99%	80%	120%
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Comments: Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.  
 Duplicate NA: results are less than 5X the RDL and RDP will not be calculated.

Certified By: \_\_\_\_\_





## QC Exceedance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

RPT Date: Dec 13, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper

**Polycyclic Aromatic Hydrocarbons in Water - (PAH)**

Acridine	3286987	88%	50%	140%	132%	50%	140%	159%	50%	140%
Quinoline	3286987	118%	50%	140%	128%	50%	140%	182%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution. Matrix spike performed on a different sample than the duplicate.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.  
 Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

Results relate only to the items tested. Results apply to samples as received.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
>C10-C16 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C21-C32 Hydrocarbons	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Sediment			GC/MS/FID
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
1-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Acridine	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5103	EPA SW-846 3510C & 8270	GC/MS
Benzo(e)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Chrysene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluoranthene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Fluorene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Perylene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Phenanthrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Pyrene	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Quinoline	ORG-120-5119	EPA SW846/3510/8270C	GC/MS
Naphthalene-d8	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Terphenyl-d14	ORG-120-5104	EPA SW846/3510/8270C	GC/MS
Pyrene-d10	ORG-120-5104	EPA SW846/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Mercury	MET-121-6100 & MET-121-6107	SM 3112 B	CV/AA
pH	INOR-121-6001	SM 4500 H+B	PC TITRATE
Reactive Silica as SiO <sub>2</sub>	INOR-121-6027	SM 4500-SiO <sub>2</sub> F	COLORIMETER
Chloride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Alkalinity	INOR-121-6001	SM 2320 B	
True Color	INOR-121-6008	SM 2120 B	LACHAT FIA
Turbidity	INOR-121-6022	SM 2130 B	NEPHELOMETER
Electrical Conductivity	INOR-121-6001	SM 2510 B	PC TITRATE
Nitrate + Nitrite as N	INORG-121-6005	SM 4110 B	CALCULATION
Nitrate as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INORG-121-6005	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-121-6047	SM 4500-NH <sub>3</sub> H	COLORIMETER
Ortho-Phosphate as P	INOR-121-6012	SM 4500-P G	COLORIMETER
Total Sodium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Potassium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Calcium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Magnesium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Bicarb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Carb. Alkalinity (as CaCO <sub>3</sub> )	INORG-121-6001	SM 2320 B	PC TITRATE
Hydroxide	INORG-121-6001	SM 2320 B	PC-TITRATE
Calculated TDS	CALCULATION	SM 1030E	CALCULATION
Hardness	CALCULATION	SM 2340B	CALCULATION
Langelier Index (@20C)	CALCULATION	CALCULATION	CALCULATION
Langelier Index (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 20C)	CALCULATION	CALCULATION	CALCULATION
Saturation pH (@ 4C)	CALCULATION	CALCULATION	CALCULATION
Anion Sum	CALCULATION	SM 1030E	CALCULATION
Cation sum	CALCULATION	SM 1030E	CALCULATION
% Difference/ Ion Balance	CALCULATION	SM 1030E	CALCULATION
Total Aluminum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Antimony	MET121-6104 & MET-121-6105	SM 3125	ICP-MS
Total Arsenic	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Barium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Beryllium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Bismuth	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Boron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cadmium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838824

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Chromium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Cobalt	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Copper	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Iron	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Lead	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Manganese	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Molybdenum	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Nickel	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Phosphorous	MET-121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Selenium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Silver	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Strontium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Thallium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Tin	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Titanium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Uranium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Vanadium	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Zinc	MET121-6104 & MET-121-6105	modified from SM 3125/SM 3030 B/SM 3030 D	ICP-MS
Total Organic Carbon	INST 0170	SM 5310 B	COMBUSTION



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49-55 Elizabeth Avenue, St John's, NL A1A 1W9  
465 George Street, Unit G, Sydney, NS B1P 1K5

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Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

7.0, 6.4, 6.9  
CHAIN OF CUSTODY RECORD  
ENV COC - 00016v2

21X838824 Page 1 of 1

Invoice Information				Report Information (If differs from invoice)				Project Information				LAB USE ONLY - PLACE STICKER HERE <b>'21 DEC 2 12:22PM</b>  Rush Confirmation #:					
Company: Golder Associates				Company:				Quotation #: C04828									
Contact Name: Belinda Culgin				Contact Name:				P.O. #/ AFE#:									
Street Address: 201 Brownlow Ave, Suite 26				Street Address:				Project #: 21497139									
City: Dartmouth		Prov: NS		Postal Code: B3B1W2		City:		Prov:		Postal Code:						Site #:	
Phone: (902) 466-1668				Phone:				Site Location:									
Email: belinda_culgin@golder.com				Email:				Site Location Province:									
Copies: james_doyle@golder.com				Copies:				Sampled By: A Brunskill									

Regulatory Criteria							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22														
**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal							Regulation	**Matrix																				Regular Turnaround Time (TAT)														
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS							Date Sampled		Time (24hr)		Matrix	FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (total metals) well / surface water	RCAP-MS (dissolved metals) - GW	Total metals (default)-well/SW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME agr/landfill)	RBCA HC (BTEX, C6-C13)	CCME HC (F1/BTEX, F2, F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (presence/absence)	Total coliform/E.coli (count)	General Chemistry	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	Rush Turnaround Time (TAT) Surcharges apply								
Sample Identification							YY	MM	DD	HH	MM																					Date Required: YY MM DD										
1	BFR_L2_SW10						21	11	27	12	15	Water - Surface	x			k																						<input checked="" type="checkbox"/> 5 to 7 Day	<input type="checkbox"/> 10 Day			
2																																				<input type="checkbox"/> Same Day	<input type="checkbox"/> 1 Day					
3																																				<input type="checkbox"/> 2 Day	<input type="checkbox"/> 3 Day					
4																																				<input type="checkbox"/> 4 Day						
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10																																										
11																																										
12																																										

\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY		Yes	No	°C	LAB USE ONLY		Yes	No	°C	LAB USE ONLY		Yes	No	°C	Temperature reading by:	
Seal present			Seal present				Seal present									
Seal intact			Seal intact				Seal intact									
Seal intact			Seal intact			Seal intact										
Cooling media present			Cooling media present			Cooling media present										
Relinquished by: (Signature/ Print)			Date		Time		Received by: (Signature/ Print)			Date		Time		Special instructions		
A. Brunskill			YY	MM	DD	HH	MM	1			YY	MM	DD	HH	MM	
								2								

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203  
ATTENTION TO: Belinda Culgin  
PROJECT: 21497139/D1202-007-D1202-013  
AGAT WORK ORDER: 21X838876  
SOIL ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer  
TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.  
DATE REPORTED: Jan 11, 2022  
PAGES (INCLUDING COVER): 20  
VERSION\*: 3

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

VERSION 3: This report supersedes all previous reports. It has been updated with the additional metals requested for sample BRF\_L2\_SS15\_SA2.

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

# Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

BRF_L2_SS15_				
SAMPLE DESCRIPTION:		SA2		
SAMPLE TYPE:		Soil		
DATE SAMPLED:		2021-11-23 13:00		
Parameter	Unit	G / S	RDL	3284912
Aluminum	mg/kg		10	2920
Antimony	mg/kg		1	2
Arsenic	mg/kg		1	4
Barium	mg/kg		5	21
Beryllium	mg/kg		2	<2
Boron	mg/kg		2	<2
Cadmium	mg/kg		0.3	1.7
Chromium	mg/kg		2	3
Cobalt	mg/kg		1	<1
Copper	mg/kg		2	5
Iron	mg/kg		50	1760
Lead	mg/kg		0.5	23.5
Lithium	mg/kg		5	<5
Manganese	mg/kg		2	23
Molybdenum	mg/kg		2	<2
Nickel	mg/kg		2	3
Selenium	mg/kg		1	2
Silver	mg/kg		0.5	<0.5
Strontium	mg/kg		5	12
Thallium	mg/kg		0.1	<0.1
Tin	mg/kg		2	4
Uranium	mg/kg		0.1	0.4
Vanadium	mg/kg		2	7
Zinc	mg/kg		5	11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 3284912 Results are based on the dry weight of the sample.  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:







## Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

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<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

Parameter	Unit	G / S	RDL	BRF_L2_SS11_		BRF_L2_SS12_		BRF_L2_SS13_		BRF_L2_SS14_		BRF_L2_SS15_		BRF_L2_SS16_			
				SAMPLE DESCRIPTION: SA1		SA1		SA1		SA1		SA1		SA1			
				SAMPLE TYPE: Soil		Soil		Soil		Soil		Soil		Soil		Soil	
				DATE SAMPLED: 2021-11-23 14:15		2021-11-23 12:10		2021-11-23 13:15		2021-11-23 12:40		2021-11-23 12:55		2021-11-23 11:45			
				3284891	RDL	3284905	RDL	3284907	3284909	3284911	3284913						
Aluminum	mg/kg		10.0	2910	100	3830	10.0	3570	3190	3540	2760						
Antimony	mg/kg		0.8	<0.8	0.8	<0.8	0.8	<0.8	<0.8	<0.8	<0.8						
Arsenic	mg/kg		1	2	1	<1	1	1	<1	1	1						
Barium	mg/kg		2.0	16.2	2.0	9.1	2.0	30.7	21.7	23.6	25.6						
Beryllium	mg/kg		0.4	<0.4	0.4	<0.4	0.4	<0.4	<0.4	<0.4	<0.4						
Boron	mg/kg		5	<5	5	<5	5	<5	<5	<5	<5						
Cadmium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5	<0.5	1.5	0.5						
Chromium	mg/kg		5	5	5	<5	5	<5	<5	<5	<5						
Cobalt	mg/kg		0.5	<0.5	0.5	<0.5	0.5	0.5	0.6	0.5	0.5						
Copper	mg/kg		1.0	4.9	1.0	2.5	1.0	4.3	3.3	4.2	4.3						
Iron	mg/kg		50	1050	50	397	50	688	713	1180	696						
Lead	mg/kg		1	33	1	4	1	7	7	12	16						
Lithium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5						
Manganese	mg/kg		5.0	11.0	5.0	6.2	5.0	5.4	<5.0	6.9	7.5						
Mercury	mg/kg		0.03	0.22	0.03	0.11	0.03	0.19	0.13	0.15	0.17						
Molybdenum	mg/kg		0.5	0.7	0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5						
Nickel	mg/kg		1	2	1	2	1	1	1	1	1						
Selenium	mg/kg		0.8	2.7	0.8	2.1	0.8	2.7	1.7	1.6	2.9						
Silver	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5						
Strontium	mg/kg		5	10	5	<5	5	11	10	11	15						
Thallium	mg/kg		0.5	<0.5	0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5						
Tin	mg/kg		1	<1	1	<1	1	<1	<1	<1	<1						
Uranium	mg/kg		0.50	0.53	0.50	0.79	0.50	0.87	<0.50	<0.50	<0.50						
Vanadium	mg/kg		0.4	5.3	0.4	3.1	0.4	3.2	3.1	2.9	3.3						
Zinc	mg/kg		5	10	5	6	5	9	7	8	12						

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
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 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Metals - Available metals (Halifax)

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

		BRF_L2_SS_DU		
	SAMPLE DESCRIPTION:	P1		
	SAMPLE TYPE:	Soil		
	DATE SAMPLED:	2021-11-23 12:45		
Parameter	Unit	G / S	RDL	3284915
Aluminum	mg/kg		10.0	3560
Antimony	mg/kg		0.8	<0.8
Arsenic	mg/kg		1	<1
Barium	mg/kg		2.0	20.5
Beryllium	mg/kg		0.4	<0.4
Boron	mg/kg		5	<5
Cadmium	mg/kg		0.5	<0.5
Chromium	mg/kg		5	<5
Cobalt	mg/kg		0.5	0.7
Copper	mg/kg		1.0	2.5
Iron	mg/kg		50	605
Lead	mg/kg		1	6
Lithium	mg/kg		0.5	<0.5
Manganese	mg/kg		5.0	<5.0
Mercury	mg/kg		0.03	0.10
Molybdenum	mg/kg		0.5	<0.5
Nickel	mg/kg		1	1
Selenium	mg/kg		0.8	1.6
Silver	mg/kg		0.5	<0.5
Strontium	mg/kg		5	10
Thallium	mg/kg		0.5	<0.5
Tin	mg/kg		1	<1
Uranium	mg/kg		0.50	<0.50
Vanadium	mg/kg		0.4	2.9
Zinc	mg/kg		5	<5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284891-3284915

Analysis performed at AGAT Toronto (unless marked by \*)

Certified By:



# Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

Parameter	Unit	G / S	RDL	BRF_L2_SS11_	BRF_L2_SS12_	BRF_L2_SS13_	BRF_L2_SS14_	BRF_L2_SS15_	BRF_L2_SS16_	BRF_L2_SS_DU
				SA1	SA1	SA1	SA1	SA1	SA1	P1
SAMPLE DESCRIPTION:				SA1	SA1	SA1	SA1	SA1	SA1	P1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				2021-11-23 14:15	2021-11-23 12:10	2021-11-23 13:15	2021-11-23 12:40	2021-11-23 12:55	2021-11-23 11:45	2021-11-23 12:45
				3284891	3284905	3284907	3284909	3284911	3284913	3284915
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3	<3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	<15	<15	<15	<15	<15	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	15	<15	<15	<15	<15	<15	<15
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	332	245	252	400	230	250	123
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	347	245	252	400	230	250	123
Resemblance Comment				LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC	LR, UC
Return to Baseline at C32				Y	Y	Y	Y	Y	Y	Y
Silica Gel Cleanup				Y	Y	Y	Y	Y	Y	Y
Surrogate	Unit	Acceptable Limits								
Isobutylbenzene - EPH	%	60-140	103	99	102	100	101	103	101	101
Isobutylbenzene - VPH	%	60-140	108	102	104	97	96	93	98	98
n-Dotriacontane - EPH	%	60-140	128	123	124	124	117	132	123	123

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3284891-3284915 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

Resemblance Comment Key:

GF - Gasoline Fraction

WGF - Weathered Gasoline Fraction

GR - Product in Gasoline Range

FOF - Fuel Oil Fraction

WFOF - Weathered Fuel Oil Fraction

FR - Product in Fuel Oil Range

LOF - Lube Oil Fraction

LR - Lube Range

UC - Unidentified Compounds

NR - No Resemblance

NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

				BRF_L2_SS11_	BRF_L2_SS12_	BRF_L2_SS13_	BRF_L2_SS14_	BRF_L2_SS15_	BRF_L2_SS16_	BRF_L2_SS_DU
	SAMPLE DESCRIPTION:			SA1	SA1	SA1	SA1	SA1	SA1	P1
	SAMPLE TYPE:			Soil	Soil	Soil	Soil	Soil	Soil	Soil
	DATE SAMPLED:			2021-11-23 14:15	2021-11-23 12:10	2021-11-23 13:15	2021-11-23 12:40	2021-11-23 12:55	2021-11-23 11:45	2021-11-23 12:45
Parameter	Unit	G / S	RDL	3284891	3284905	3284907	3284909	3284911	3284913	3284915
% Moisture	%		1	88	76	85	90	90	81	79

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
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<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

Parameter	Unit	G / S	RDL	BRF_L2_SS11_	BRF_L2_SS12_	BRF_L2_SS13_	BRF_L2_SS14_	BRF_L2_SS15_	BRF_L2_SS16_	BRF_L2_SS_DU	
				SAMPLE DESCRIPTION:	SA1	SA1	SA1	SA1	SA1	SA1	P1
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2021-11-23 14:15	2021-11-23 12:10	2021-11-23 13:15	2021-11-23 12:40	2021-11-23 12:55	2021-11-23 11:45	2021-11-23 12:45
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Acenaphthene	mg/kg		0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	
Acenaphthylene	mg/kg		0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Fluorene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Surrogate	Unit	Acceptable Limits									
Naphthalene-d8	%	50-140	93	112	92	110	93	79	96		
Terphenyl-d14	%	50-140	127	138	129	135	129	113	130		
Pyrene-d10 (%)	%	50-140	94	111	94	111	97	80	102		

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2022-01-11

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3284891-3284915 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838876  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

Soil Analysis															
RPT Date: Jan 11, 2022			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Metals - Available metals (Halifax)**

Aluminum	3284891	3284891	2910	2980	2.4%	< 10.0	101%	70%	130%	111%	80%	120%	97%	70%	130%
Antimony	3284891	3284891	<0.8	<0.8	NA	< 0.8	102%	70%	130%	109%	80%	120%	98%	70%	130%
Arsenic	3284891	3284891	2	2	NA	< 1	98%	70%	130%	106%	80%	120%	105%	70%	130%
Barium	3284891	3284891	16.2	16.3	0.6%	< 2.0	96%	70%	130%	114%	80%	120%	114%	70%	130%
Beryllium	3284891	3284891	<0.4	<0.4	NA	< 0.4	103%	70%	130%	82%	80%	120%	85%	70%	130%
Boron	3284891	3284891	<5	<5	NA	< 5	100%	70%	130%	87%	80%	120%	79%	70%	130%
Cadmium	3284891	3284891	<0.5	<0.5	NA	< 0.5	114%	70%	130%	109%	80%	120%	98%	70%	130%
Chromium	3284891	3284891	5	5	NA	< 5	100%	70%	130%	114%	80%	120%	109%	70%	130%
Cobalt	3284891	3284891	<0.5	<0.5	NA	< 0.5	101%	70%	130%	108%	80%	120%	109%	70%	130%
Copper	3284891	3284891	4.9	5.1	NA	< 1.0	101%	70%	130%	111%	80%	120%	104%	70%	130%
Iron	3284891	3284891	1050	1060	0.9%	< 50	102%	70%	130%	113%	80%	120%	107%	70%	130%
Lead	3284891	3284891	33	33	0.0%	< 1	102%	70%	130%	109%	80%	120%	94%	70%	130%
Lithium	3284891	3284891	<0.5	<0.5	NA	< 0.5	100%	70%	130%	80%	80%	120%	78%	70%	130%
Manganese	3284891	3284891	11.0	11.4	NA	< 5.0	101%	70%	130%	109%	80%	120%	105%	70%	130%
Mercury	3284891	3284891	0.22	0.22	0.0%	< 0.03	122%	70%	130%	109%	80%	120%	107%	70%	130%
Molybdenum	3284891	3284891	0.7	0.8	NA	< 0.5	97%	70%	130%	117%	80%	120%	114%	70%	130%
Nickel	3284891	3284891	2	2	NA	< 1	98%	70%	130%	105%	80%	120%	103%	70%	130%
Selenium	3284891	3284891	2.7	2.8	NA	< 0.8	98%	70%	130%	97%	80%	120%	97%	70%	130%
Silver	3284891	3284891	<0.5	<0.5	NA	< 0.5	95%	70%	130%	120%	80%	120%	100%	70%	130%
Strontium	3284891	3284891	10	10	NA	< 5	99%	70%	130%	96%	80%	120%	89%	70%	130%
Thallium	3284891	3284891	<0.5	<0.5	NA	< 0.5	98%	70%	130%	108%	80%	120%	106%	70%	130%
Tin	3284891	3284891	<1	<1	NA	< 1	112%	70%	130%	116%	80%	120%	111%	70%	130%
Uranium	3284891	3284891	0.53	0.56	NA	< 0.50	126%	70%	130%	111%	80%	120%	112%	70%	130%
Vanadium	3284891	3284891	5.3	5.6	5.5%	< 0.4	100%	70%	130%	112%	80%	120%	110%	70%	130%
Zinc	3284891	3284891	10	11	NA	< 5	99%	70%	130%	107%	80%	120%	98%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are less than 5X the RDL and will not be calculated.

**Available Metals in Soil**

Aluminum	3406493	3406493	5450	6220	13.2%	< 10	94%	80%	120%	95%	80%	120%	NA	70%	130%
Antimony	3406493	3406493	2	2	NA	< 1	80%	80%	120%	120%	80%	120%	NA	70%	130%
Arsenic	3406493	3406493	10	11	10.9%	< 1	100%	80%	120%	98%	80%	120%	NA	70%	130%
Barium	3406493	3406493	56	62	11.4%	< 5	85%	80%	120%	87%	80%	120%	NA	70%	130%
Beryllium	3406493	3406493	<2	<2	NA	< 2	94%	80%	120%	98%	80%	120%	NA	70%	130%
Boron	3406493	3406493	2	3	NA	< 2	94%	80%	120%	97%	80%	120%	NA	70%	130%
Cadmium	3406493	3406493	0.5	0.6	NA	< 0.3	99%	80%	120%	99%	80%	120%	NA	70%	130%
Chromium	3406493	3406493	32	37	13.0%	< 2	95%	80%	120%	97%	80%	120%	NA	70%	130%
Cobalt	3406493	3406493	6	6	9.6%	< 1	94%	80%	120%	96%	80%	120%	NA	70%	130%
Copper	3406493	3406493	69	77	11.9%	< 2	99%	80%	120%	101%	80%	120%	NA	70%	130%
Iron	3406493	3406493	18300	23700	25.7%	< 50	91%	80%	120%	99%	80%	120%	NA	70%	130%



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838876  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

Soil Analysis (Continued)																
RPT Date: Jan 11, 2022			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits		
								Lower	Upper		Lower	Upper		Lower	Upper	
Lead	3406493	3406493	157	179	12.9%	< 0.5	97%	80%	120%	101%	80%	120%	NA	70%	130%	
Lithium	3406493	3406493	13	15	NA	< 5	89%	70%	130%	93%	70%	130%	NA	70%	130%	
Manganese	3406493	3406493	591	586	1.0%	< 2	94%	80%	120%	96%	80%	120%	NA	70%	130%	
Molybdenum	3406493	3406493	<2	<2	NA	< 2	90%	80%	120%	97%	80%	120%	NA	70%	130%	
Nickel	3406493	3406493	30	38	22.2%	< 2	98%	80%	120%	100%	80%	120%	NA	70%	130%	
Selenium	3406493	3406493	<1	<1	NA	< 1	93%	80%	120%	107%	80%	120%	NA	70%	130%	
Silver	3406493	3406493	<0.5	<0.5	NA	< 0.5	99%	80%	120%	102%	80%	120%	NA	70%	130%	
Strontium	3406493	3406493	13	18	NA	< 5	91%	80%	120%	91%	80%	120%	NA	70%	130%	
Thallium	3406493	3406493	<0.1	<0.1	NA	< 0.1	96%	80%	120%	98%	80%	120%	NA	70%	130%	
Tin	3406493	3406493	14	12	12.5%	< 2	95%	80%	120%	96%	80%	120%	NA	70%	130%	
Uranium	3406493	3406493	0.4	0.4	NA	< 0.1	98%	80%	120%	99%	80%	120%	122%	70%	130%	
Vanadium	3406493	3406493	88	102	15.1%	< 2	95%	80%	120%	98%	80%	120%	NA	70%	130%	
Zinc	3406493	3406493	146	180	20.5%	< 5	97%	80%	120%	96%	80%	120%	NA	70%	130%	

Certified By: 

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis															
RPT Date: Jan 11, 2022			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel**

Benzene	1	3290478	0.02	0.02	NA	< 0.02	107%	60%	140%	129%	60%	140%			
Toluene	1	3290478	0.07	0.07	NA	< 0.04	112%	60%	140%	124%	60%	140%			
Ethylbenzene	1	3290478	0.03	0.02	NA	< 0.03	126%	60%	140%	134%	60%	140%			
Xylene (Total)	1	3290478	0.12	0.12	NA	< 0.05	115%	60%	140%	128%	60%	140%			
C6-C10 (less BTEX)	1	3290478	< 3	< 3	NA	< 3	95%	60%	140%	110%	60%	140%	89%	30%	130%
>C10-C16 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	90%	60%	140%	108%	60%	140%	118%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	103%	60%	140%	108%	60%	140%	118%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3284915	123	107	13.9%	< 15	88%	60%	140%	108%	60%	140%	118%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3284915	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	104%	50%	140%	102%	50%	140%
2-Methylnaphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	96%	50%	140%	95%	50%	140%
Acenaphthene	1	3284915	< 0.00671	< 0.00671	NA	< 0.00671	113%	50%	140%	99%	50%	140%	97%	50%	140%
Acenaphthylene	1	3284915	< 0.004	< 0.004	NA	< 0.004	98%	50%	140%	88%	50%	140%	89%	50%	140%
Acridine	1	3284915	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	113%	50%	140%	18%	50%	140%
Anthracene	1	3284915	< 0.03	< 0.03	NA	< 0.03	93%	50%	140%	84%	50%	140%	87%	50%	140%
Benzo(a)anthracene	1	3284915	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	86%	50%	140%
Benzo(a)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	79%	50%	140%	68%	50%	140%
Benzo(b)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	84%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	87%	50%	140%	89%	50%	140%
Benzo(e)pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	94%	50%	140%	73%	50%	140%
Benzo(ghi)perylene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	93%	50%	140%	66%	50%	140%
Chrysene	1	3284915	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	98%	50%	140%	83%	50%	140%
Dibenzo(a,h)anthracene	1	3284915	< 0.006	< 0.006	NA	< 0.006	100%	50%	140%	88%	50%	140%	77%	50%	140%
Fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	103%	50%	140%	99%	50%	140%
Fluorene	1	3284915	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	93%	50%	140%	94%	50%	140%
Indeno(1,2,3)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	97%	50%	140%	91%	50%	140%
Naphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	93%	50%	140%	93%	50%	140%
Perylene	1	3284915	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	89%	50%	140%	69%	50%	140%
Phenanthrene	1	3284915	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	98%	50%	140%	94%	50%	140%
Pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	105%	50%	140%	96%	50%	140%
Quinoline	1	3284915	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	133%	50%	140%	137%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

 CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X838876  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Jan 11, 2022			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## QC Exceedance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

RPT Date: Jan 11, 2022		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Soil										
Acridine	3284915	98%	50%	140%	113%	50%	140%	18%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Aluminum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Antimony	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Arsenic	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838876  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Barium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Beryllium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Boron	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cadmium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Chromium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Cobalt	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Copper	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Iron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Lithium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Manganese	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Mercury	MET-93-6103	modified from EPA 7471B and SM 3112 B	ICP-MS
Molybdenum	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Nickel	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Selenium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Silver	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Strontium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Thallium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Tin	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Uranium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Vanadium	MET-93-6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS
Zinc	MET 93 -6103	modified from EPA 3050B and EPA 6020B and ON MOECC	ICP-MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838876

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS



21X838876

21X8388000

96, 9.7, 88



www.BVNA.com 105-200 Bluewater Road, Bedford, NS B4B 1G9 49-55 Elizabeth Avenue, St John's, NL A1A 1W9 465 George Street, Unit G, Sydney, NS B1P 1K5

Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

CHAIN OF CUSTODY RECORD ENV COC - 00016v2

<b>Invoice Information</b>		<b>Report Information (If differs from Invoice)</b>				<b>Project Information</b>			
Company: Golder Associates		Company:				Quotation #: C04828			
Contact Name: Belinda Culgin		Contact Name:				P.O. #/ AFE#:			
Street Address: 201 Brownlow Ave. Suite 26		Street Address:				Project #: 21497139			
City: Dartmouth	Prov: NS	Postal Code: B3B 1W2	City:		Prov:	Postal Code:	Site #:		
Phone: (902) 466-1668		Phone:				Site Location:			
Email: belinda_culgin@golder.com		Email:				Site Location Province:			
Copies: james_doyle@golder.com		Copies:				Sampled By: A Brunskill			

LAB USE ONLY - PLACE STICKER HERE 21 DEC 2 12:22 PM

Regulatory Criteria		Regulation		**Matrix		Regular Turnaround Time (TAT)																								
**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal						<input checked="" type="checkbox"/> 5 to 7 Day <input type="checkbox"/> 10 Day <b>Rush Turnaround Time (TAT) Surcharges apply</b> <input type="checkbox"/> Same Day <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 4 Day																								
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																														
Sample Identification	Date Sampled			Time (24hr)		Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
	YY	MM	DD	HH	MM		FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-MS (total metals) well / surface water	RCAP-MS (dissolved metals) - GW	Total metals (default)-well/SW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME agr/ landfill)	RBGA HC (BTEX, C6-C32)	CCME HC (F1/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E.coli (presence/absence)	Total coliform/E.coli (count)	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE			
1	BRF_L2_SS11_SA1	21	11	23	14	15	Soil																					4		Silica Gel Cleanup
2	BRF_L2_SS11_SA2	21	11	23	14	20	Soil																					4	X	Silica Gel Cleanup
3	BRF_L2_SS11_A_SA1	21	11	23	14	30	Soil																					4	X	Silica Gel Cleanup
4	BRF_L2_SS11_B_SA1	21	11	23	14	40	Soil																					4	X	Silica Gel Cleanup
5	BRF_L2_SS11_C_SA1	22	11	23	14	50	Soil																					4	X	Silica Gel Cleanup
6	BRF_L2_SS11_D_SA1	22	11	23	15	0	Soil																					4	X	Silica Gel Cleanup
7	BRF_L2_SS12_SA1	22	11	23	12	10	Soil																					4		Silica Gel Cleanup
8	BRF_L2_SS12_SA2	22	11	23	12	15	Soil																					4	X	Silica Gel Cleanup
9	BRF_L2_SS13_SA1	22	11	23	13	15	Soil																					4		Silica Gel Cleanup
10	BRF_L2_SS13_SA2	22	11	23	13	20	Soil																					4	X	Silica Gel Cleanup
11	BRF_L2_SS14_SA1	22	11	23	12	40	Soil																					4		Silica Gel Cleanup
12	BRF_L2_SS14_SA2	22	11	23	12	45	Soil																					4	X	Silica Gel Cleanup

\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY.

<b>LAB USE ONLY</b>			Yes	No	°C	<b>LAB USE ONLY</b>			Yes	No	°C	<b>LAB USE ONLY</b>			Yes	No	°C	Temperature reading by:
Seal present						Seal present						Seal present						
Seal intact						Seal intact						Seal intact						
Cooling media present					Cooling media present					Cooling media present								
Relinquished by: (Signature/ Print) ↓			Date			Time			Received by: (Signature/ Print)			Date			Time			Special instructions
A Brunskill			YY	MM	DD	HH	MM	Kullen			YY	MM	DD	HH	MM			
			21	11	29													



CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203  
ATTENTION TO: Belinda Culgin  
PROJECT: 21497139/D1202-007-D1202-013  
AGAT WORK ORDER: 21X838936  
TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.  
DATE REPORTED: Dec 06, 2021  
PAGES (INCLUDING COVER): 15  
VERSION\*: 1

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

VERSION 1: Partial data-metals and Hg pending.

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.

# Certificate of Analysis

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-06

				BRF_L2_SS1_S	BRF_L2_SS2_S	BRF_L2_SS3_S
SAMPLE DESCRIPTION:				A1	A1	A1
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2021-11-25 13:00	2021-11-25 14:00	2021-11-25 13:30
Parameter	Unit	G / S	RDL	3285257	3285289	3285295
Benzene	mg/kg		0.02	<0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	27	<15
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	24	24	16
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	492	572	361
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	516	623	377
Resemblance Comment				LR, UC	LR, UC	LR, UC
Return to Baseline at C32				Y	Y	Y
Silica Gel Cleanup				Y	Y	Y
Surrogate	Unit	Acceptable Limits				
Isobutylbenzene - EPH	%	60-140	101	102	102	
Isobutylbenzene - VPH	%	60-140	97	91	90	
n-Dotriacontane - EPH	%	60-140	128	137	120	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-06

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3285257-3285295 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

- Resemblance Comment Key:
- GF - Gasoline Fraction
  - WGF - Weathered Gasoline Fraction
  - GR - Product in Gasoline Range
  - FOF - Fuel Oil Fraction
  - WFOF - Weathered Fuel Oil Fraction
  - FR - Product in Fuel Oil Range
  - LOF - Lube Oil Fraction
  - LR - Lube Range
  - UC - Unidentified Compounds
  - NR - No Resemblance
  - NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-03

		BRF_L2_SS1_S	BRF_L2_SS2_S	BRF_L2_SS3_S
SAMPLE DESCRIPTION:		A1	A1	A1
SAMPLE TYPE:		Soil	Soil	Soil
DATE SAMPLED:		2021-11-25 13:00	2021-11-25 14:00	2021-11-25 13:30
Parameter	Unit	G / S	RDL	3285257
% Moisture	%		1	89
				83
				75

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
 Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-03

Parameter	Unit	G / S	RDL	BRF_L2_SS1_S	BRF_L2_SS2_S	BRF_L2_SS3_S
				A1	A1	A1
SAMPLE DESCRIPTION:				A1	A1	A1
SAMPLE TYPE:				Soil	Soil	Soil
DATE SAMPLED:				2021-11-25	2021-11-25	2021-11-25
				13:00	14:00	13:30
				3285257	3285289	3285295
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	0.006	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	<0.01	0.02
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01	<0.01
Perylene	mg/kg		0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg		0.03	<0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits				
Naphthalene-d8	%	50-140	90	93	114	
Terphenyl-d14	%	50-140	127	127	136	
Pyrene-d10 (%)	%	50-140	90	87	105	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
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<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-03

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3285257-3285295 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis														
RPT Date:			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits
							Lower	Upper	Lower		Upper	Lower		Upper

**Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel**

Benzene	1	3290478	0.02	0.02	NA	< 0.02	107%	60%	140%	129%	60%	140%			
Toluene	1	3290478	0.07	0.07	NA	< 0.04	112%	60%	140%	124%	60%	140%			
Ethylbenzene	1	3290478	0.03	0.02	NA	< 0.03	126%	60%	140%	134%	60%	140%			
Xylene (Total)	1	3290478	0.12	0.12	NA	< 0.05	115%	60%	140%	128%	60%	140%			
C6-C10 (less BTEX)	1	3290478	< 3	< 3	NA	< 3	95%	60%	140%	110%	60%	140%	89%	30%	130%
>C10-C16 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	90%	60%	140%	108%	60%	140%	118%	30%	130%
>C16-C21 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	103%	60%	140%	108%	60%	140%	118%	30%	130%
>C21-C32 Hydrocarbons - 1X silica gel	1	3284915	123	107	13.9%	< 15	88%	60%	140%	108%	60%	140%	118%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

**Polycyclic Aromatic Hydrocarbons in Soil**

1-Methylnaphthalene	1	3284915	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	104%	50%	140%	102%	50%	140%
2-Methylnaphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	96%	50%	140%	95%	50%	140%
Acenaphthene	1	3284915	< 0.00671	< 0.00671	NA	< 0.00671	113%	50%	140%	99%	50%	140%	97%	50%	140%
Acenaphthylene	1	3284915	< 0.004	< 0.004	NA	< 0.004	98%	50%	140%	88%	50%	140%	89%	50%	140%
Acridine	1	3284915	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	113%	50%	140%	18%	50%	140%
Anthracene	1	3284915	< 0.03	< 0.03	NA	< 0.03	93%	50%	140%	84%	50%	140%	87%	50%	140%
Benzo(a)anthracene	1	3284915	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	86%	50%	140%
Benzo(a)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	79%	50%	140%	68%	50%	140%
Benzo(b)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	84%	50%	140%	90%	50%	140%
Benzo(j+k)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	87%	50%	140%	89%	50%	140%
Benzo(e)pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	94%	50%	140%	73%	50%	140%
Benzo(ghi)perylene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	93%	50%	140%	66%	50%	140%
Chrysene	1	3284915	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	98%	50%	140%	83%	50%	140%
Dibenzo(a,h)anthracene	1	3284915	< 0.006	< 0.006	NA	< 0.006	100%	50%	140%	88%	50%	140%	77%	50%	140%
Fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	103%	50%	140%	99%	50%	140%
Fluorene	1	3284915	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	93%	50%	140%	94%	50%	140%
Indeno(1,2,3)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	97%	50%	140%	91%	50%	140%
Naphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	93%	50%	140%	93%	50%	140%
Perylene	1	3284915	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	89%	50%	140%	69%	50%	140%
Phenanthrene	1	3284915	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	98%	50%	140%	94%	50%	140%
Pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	105%	50%	140%	96%	50%	140%
Quinoline	1	3284915	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	133%	50%	140%	137%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838936  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date:			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

Benzene	1	3290478	0.02	0.02	NA	< 0.02	107%	60%	140%	129%	60%	140%			
Toluene	1	3290478	0.07	0.07	NA	< 0.04	112%	60%	140%	124%	60%	140%			
Ethylbenzene	1	3290478	0.03	0.02	NA	< 0.03	126%	60%	140%	134%	60%	140%			
Xylene (Total)	1	3290478	0.12	0.12	NA	< 0.05	115%	60%	140%	128%	60%	140%			
C6-C10 (less BTEX)	1	3290478	< 3	< 3	NA	< 3	95%	60%	140%	110%	60%	140%	89%	30%	130%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: \_\_\_\_\_



## QC Exceedance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

RPT Date:		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Soil										
Acridine	3284915	98%	50%	140%	113%	50%	140%	18%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838936  
 ATTENTION TO: Belinda Culgin  
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838936

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Belinda Culgin

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS







21x838936



# Project Details for External Facility Redirection

Sent to: AGAT - DARTMOUTH

Chain of Custodies received with this form are to be reported to the name name on the coc and the Bureau Veritas

ALL Invoices are to be directed to Bureau Veritas only

Bureau Veritas Contact Details	<b>BV Location:</b>	BEDFORD
	<b>BV Contact #:</b> (for questions related to submission)	Marie Muise
	<b>BV Phone #:</b> (for questions related to submission)	902-420-0203 ext 253
Invoice to information	<b>BV Project Reference #:</b>	D1202-007 - D1202-013 (7 submissions)
	<b>BV invoice to Email</b>	bvsubcontract@bureauveritas.com
Report to information	<b>Client Report To Email:</b>	see attached chain of custoday form(s)
	<b>BV Report To Email:</b>	bvsubcontract@bureauveritas.com
Project details	<b>Analytical Tests</b>	See attached chain of custody form(s)
	<b>Comments/ Job details</b>	7 submissions - 104 samples total
	<b>Special Instructions</b>	<b>1</b> Email data directly to COC client and BV simultaneously
		<b>2</b> Bureau Veritas reference must be providing on the invoice with a copy fo the coc in order to ensure payment.
<b>3</b> Bureau Veritas must have received an email of the data to the listed email address in order to process invoices.		

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
200 BLUEWATER ROAD  
BEDFORD, NS B4B1G9  
(902) 420-0203

ATTENTION TO: Marie Muise

PROJECT: 21497139/D1202-007-D1202-013

AGAT WORK ORDER: 21X838948

SOIL ANALYSIS REVIEWED BY: Ashley Dussault, Report Writer

TRACE ORGANICS REVIEWED BY: Amy Hunter, Trace Organics Supervisor, B.Sc.

DATE REPORTED: Dec 22, 2021

PAGES (INCLUDING COVER): 19

VERSION\*: 2

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

\*Notes

VERSION 2: This report supersedes all previous reports. It is the complete data set.

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
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- The test results reported herewith relate only to the samples as received by the laboratory.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



## Certificate of Analysis

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

### Available Metals in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

Parameter	Unit	G / S	RDL	BRF_L2_SS10_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS16_	BFR_L1_SS16_	
				SAMPLE DESCRIPTION:	SA1	SA2	A_SA1	B_SA1	C_SA1	D_SA1	SA2	A_SA1
				SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2021-11-25 14:50	2021-11-27 13:06	2021-11-27 13:10	2021-11-27 13:13	2021-11-27 13:20	2021-11-27 13:23	2021-11-27 13:44	2021-11-27 13:50
				3285423	3285440	3285446	3285447	3285448	3285449	3285461	3285523	
Aluminum	mg/kg		10	6570	7510	4370	6820	4560	7710	7850	1080	
Antimony	mg/kg		1	2	1	1	1	1	1	<1	2	
Arsenic	mg/kg		1	2	5	3	6	5	5	2	5	
Barium	mg/kg		5	11	15	22	18	22	15	<5	14	
Beryllium	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2	
Boron	mg/kg		2	<2	4	3	3	6	3	<2	6	
Cadmium	mg/kg	0.3	<0.3	0.5	1.6	0.8	0.8	0.8	0.8	0.4	0.8	
Chromium	mg/kg		2	4	4	<2	4	3	4	9	<2	
Cobalt	mg/kg		1	<1	<1	<1	<1	<1	<1	1	<1	
Copper	mg/kg		2	14	7	5	10	5	8	4	5	
Iron	mg/kg		50	594	4180	2400	2520	7150	2820	3570	581	
Lead	mg/kg		0.5	28.9	44.6	36.4	76.2	22.1	73.6	18.7	12.8	
Lithium	mg/kg		5	<5	<5	<5	<5	<5	<5	6	<5	
Manganese	mg/kg		2	5	26	19	23	29	24	81	5	
Molybdenum	mg/kg		2	<2	<2	<2	<2	<2	<2	<2	<2	
Nickel	mg/kg		2	<2	2	<2	2	<2	2	2	<2	
Selenium	mg/kg		1	2	4	2	5	3	5	2	3	
Silver	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Strontium	mg/kg		5	9	21	25	22	26	18	<5	37	
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Tin	mg/kg		2	3	4	3	5	4	4	4	4	
Uranium	mg/kg		0.1	0.7	1.2	0.6	1.2	0.6	1.5	1.9	0.1	
Vanadium	mg/kg		2	9	10	6	10	10	13	21	6	
Zinc	mg/kg		5	6	12	14	14	16	13	12	39	

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# Certificate of Analysis

AGAT WORK ORDER: 21X838948

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 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
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<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

## Available Metals in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

Parameter	Unit	G / S	RDL	BFR_L1_SS16_	BFR_L1_SS16_	BFR_L1_SS16_	BFR_L2_SS_DU	
				SAMPLE DESCRIPTION:	B_SA1	C_SA1	D_SA1	P2
				SAMPLE TYPE:	Soil	Soil	Soil	Soil
				DATE SAMPLED:	2021-11-27 13:55	2021-11-27 13:57	2021-11-27 14:00	2021-11-25 14:50
				3285524	3285525	3285526	3285527	
Aluminum	mg/kg		10	3000	12100	4720	6990	
Antimony	mg/kg		1	<1	<1	<1	<1	
Arsenic	mg/kg		1	2	3	2	3	
Barium	mg/kg		5	<5	6	<5	13	
Beryllium	mg/kg		2	<2	<2	<2	<2	
Boron	mg/kg		2	<2	<2	3	<2	
Cadmium	mg/kg	0.3	<0.3	1.7	<0.3	<0.3	<0.3	
Chromium	mg/kg		2	3	4	2	3	
Cobalt	mg/kg		1	<1	<1	<1	<1	
Copper	mg/kg		2	<2	14	<2	6	
Iron	mg/kg		50	492	2390	406	489	
Lead	mg/kg		0.5	12.2	59.4	4.1	7.9	
Lithium	mg/kg		5	<5	<5	<5	<5	
Manganese	mg/kg		2	29	41	3	4	
Molybdenum	mg/kg		2	<2	2	<2	<2	
Nickel	mg/kg		2	<2	<2	<2	<2	
Selenium	mg/kg		1	1	8	3	2	
Silver	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
Strontium	mg/kg		5	<5	14	11	9	
Thallium	mg/kg		0.1	<0.1	<0.1	<0.1	<0.1	
Tin	mg/kg		2	5	3	4	3	
Uranium	mg/kg		0.1	0.5	9.8	0.5	0.8	
Vanadium	mg/kg		2	12	8	4	9	
Zinc	mg/kg		5	<5	7	<5	7	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3285423-3285527 Results are based on the dry weight of the sample.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

### Mercury in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

		BRF_L2_SS10_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS12_	BFR_L1_SS16_	BFR_L1_SS16_	
SAMPLE DESCRIPTION:		SA1	SA2	A_SA1	B_SA1	C_SA1	D_SA1	SA2	A_SA1		
SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	
DATE SAMPLED:		2021-11-25 14:50	2021-11-27 13:06	2021-11-27 13:10	2021-11-27 13:13	2021-11-27 13:20	2021-11-27 13:23	2021-11-27 13:44	2021-11-27 13:50		
Parameter	Unit	G / S	RDL	3285423	3285440	3285446	3285447	3285448	3285449	3285461	3285523
Mercury	mg/kg		0.03	0.04	0.18	0.14	0.17	0.18	0.17	0.04	0.12
		BFR_L1_SS16_	BFR_L1_SS16_	BFR_L1_SS16_	BFR_L2_SS_DU						
SAMPLE DESCRIPTION:		B_SA1	C_SA1	D_SA1	P2						
SAMPLE TYPE:		Soil	Soil	Soil	Soil						
DATE SAMPLED:		2021-11-27 13:55	2021-11-27 13:57	2021-11-27 14:00	2021-11-25 14:50						
Parameter	Unit	G / S	RDL	3285524	3285525	3285526	3285527				
Mercury	mg/kg		0.03	0.03	0.09	0.06	<0.03				

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3285423-3285527 Results are based on the dry weight of the soil.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

# Certificate of Analysis

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
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<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

## Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

Parameter	Unit	G / S	RDL	BRF_L2_SS10_ BFR_L2_SS_DU	
				SA1	P2
SAMPLE DESCRIPTION:				SA1	P2
SAMPLE TYPE:				Soil	Soil
DATE SAMPLED:				2021-11-25 14:50	2021-11-25 14:50
				3285423	3285527
Benzene	mg/kg		0.02	<0.02	<0.02
Toluene	mg/kg		0.04	<0.04	<0.04
Ethylbenzene	mg/kg		0.03	<0.03	<0.03
Xylene (Total)	mg/kg		0.05	<0.05	<0.05
C6-C10 (less BTEX)	mg/kg		3	<3	<3
>C10-C16 Hydrocarbons - 1X silica gel	mg/kg		15	<15	19
>C16-C21 Hydrocarbons - 1X silica gel	mg/kg		15	15	42
>C21-C32 Hydrocarbons - 1X silica gel	mg/kg		15	359	675
Modified TPH (Tier 1) - 1X silica gel	mg/kg		15	374	736
Resemblance Comment				LR, UC	LR, UC
Return to Baseline at C32				Y	Y
Silica Gel Cleanup				Y	Y
Surrogate	Unit	Acceptable Limits			
Isobutylbenzene - EPH	%	60-140	100	103	
Isobutylbenzene - VPH	%	60-140	91	90	
n-Dotriacontane - EPH	%	60-140	137	128	

Certified By:





# Certificate of Analysis

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3285423-3285527 Modified TPH, Xylene(Total)and C6-C10(less BTEX) are calculated parameters. The calculated parameter is non-accredited. The component parameters of the calculation are accredited.

Results are based on the dry weight of the soil.

- Resemblance Comment Key:
- GF - Gasoline Fraction
  - WGF - Weathered Gasoline Fraction
  - GR - Product in Gasoline Range
  - FOF - Fuel Oil Fraction
  - WFOF - Weathered Fuel Oil Fraction
  - FR - Product in Fuel Oil Range
  - LOF - Lube Oil Fraction
  - LR - Lube Range
  - UC - Unidentified Compounds
  - NR - No Resemblance
  - NA - Not Applicable

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:



## Certificate of Analysis

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
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CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

### Moisture

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

		BRF_L2_SS10_		BFR_L2_SS_DU	
SAMPLE DESCRIPTION:		SA1		P2	
SAMPLE TYPE:		Soil		Soil	
DATE SAMPLED:		2021-11-25 14:50		2021-11-25 14:50	
Parameter	Unit	G / S	RDL	3285423	3285527
% Moisture	%		1	85	87

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:





## Certificate of Analysis

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

11 Morris Drive, Unit 122  
 Dartmouth, Nova Scotia  
 CANADA B3B 1M2  
 TEL (902)468-8718  
 FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

### Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

Parameter	Unit	G / S	RDL	BRF_L2_SS10_ BFR_L2_SS_DU	
				SA1	P2
SAMPLE DESCRIPTION:				Soil	Soil
SAMPLE TYPE:				2021-11-25	2021-11-25
DATE SAMPLED:				14:50	14:50
				3285423	3285527
1-Methylnaphthalene	mg/kg		0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg		0.01	<0.01	<0.01
Acenaphthene	mg/kg	0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg		0.004	<0.004	<0.004
Acridine	mg/kg		0.05	<0.05	<0.05
Anthracene	mg/kg		0.03	<0.03	<0.03
Benzo(a)anthracene	mg/kg		0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg		0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg		0.05	<0.05	<0.05
Benzo(j+k)fluoranthene	mg/kg		0.05	<0.05	<0.05
Benzo(e)pyrene	mg/kg		0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg		0.01	<0.01	<0.01
Chrysene	mg/kg		0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg		0.006	<0.006	<0.006
Fluoranthene	mg/kg		0.05	<0.05	<0.05
Fluorene	mg/kg		0.01	<0.01	<0.01
Indeno(1,2,3)pyrene	mg/kg		0.01	<0.01	<0.01
Naphthalene	mg/kg		0.01	<0.01	<0.01
Perylene	mg/kg		0.05	0.11	0.18
Phenanthrene	mg/kg		0.03	<0.03	<0.03
Pyrene	mg/kg		0.05	<0.05	<0.05
Quinoline	mg/kg		0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits			
Naphthalene-d8	%	50-140	95	89	
Terphenyl-d14	%	50-140	133	124	
Pyrene-d10 (%)	%	50-140	98	91	

Certified By:



# Certificate of Analysis

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Dartmouth, Nova Scotia  
CANADA B3B 1M2  
TEL (902)468-8718  
FAX (902)468-8924  
<http://www.agatlabs.com>

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

## Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2021-12-02

DATE REPORTED: 2021-12-22

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard  
3285423-3285527 Results are based on the dry weight of the soil.

Benzo(b)fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample. Benzo(j+k)fluoranthene is not an accredited parameter.

Analysis performed at AGAT Halifax (unless marked by \*)

Certified By:

## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

AGAT WORK ORDER: 21X838948  
 ATTENTION TO: Marie Muise  
 SAMPLED BY:

Soil Analysis															
RPT Date: Dec 22, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

**Available Metals in Soil**

Aluminum	3281777		9920	9860	0.7%	< 10	107%	80%	120%	120%	80%	120%	NA	70%	130%
Antimony	3281777		<1	<1	NA	< 1	80%	80%	120%	NA	80%	120%	NA	70%	130%
Arsenic	3281777		4	4	NA	< 1	103%	80%	120%	106%	80%	120%	112%	70%	130%
Barium	3281777		8	9	NA	< 5	82%	80%	120%	94%	80%	120%	88%	70%	130%
Beryllium	3281777		<2	<2	NA	< 2	105%	80%	120%	112%	80%	120%	124%	70%	130%
Boron	3281777		9	10	NA	< 2	101%	80%	120%	112%	80%	120%	126%	70%	130%
Cadmium	3281777		<0.3	<0.3	NA	< 0.3	101%	80%	120%	106%	80%	120%	119%	70%	130%
Chromium	3281777		9	9	NA	< 2	95%	80%	120%	102%	80%	120%	NA	70%	130%
Cobalt	3281777		5	6	10.2%	< 1	99%	80%	120%	108%	80%	120%	112%	70%	130%
Copper	3281777		16	11	NA	< 2	100%	80%	120%	108%	80%	120%	NA	70%	130%
Iron	3281777		19300	21000	8.4%	< 50	97%	80%	120%	96%	80%	120%	NA	70%	130%
Lead	3281777		7.2	6.9	4.3%	< 0.5	96%	80%	120%	107%	80%	120%	104%	70%	130%
Lithium	3281777		36	36	0.8%	< 5	106%	70%	130%	120%	70%	130%	NA	70%	130%
Manganese	3281777		649	702	7.8%	< 2	97%	80%	120%	106%	80%	120%	NA	70%	130%
Molybdenum	3281777		<2	<2	NA	< 2	88%	80%	120%	99%	80%	120%	122%	70%	130%
Nickel	3281777		11	12	10.1%	< 2	97%	80%	120%	104%	80%	120%	109%	70%	130%
Selenium	3281777		<1	<1	NA	< 1	106%	80%	120%	104%	80%	120%	120%	70%	130%
Silver	3281777		<0.5	<0.5	NA	< 0.5	95%	80%	120%	100%	80%	120%	113%	70%	130%
Strontium	3281777		99	96	3.2%	< 5	96%	80%	120%	103%	80%	120%	NA	70%	130%
Thallium	3281777		<0.1	<0.1	NA	< 0.1	94%	80%	120%	105%	80%	120%	NA	70%	130%
Tin	3281777		4	4	NA	< 2	93%	80%	120%	96%	80%	120%	112%	70%	130%
Uranium	3281777		0.4	0.4	NA	< 0.1	95%	80%	120%	107%	80%	120%	103%	70%	130%
Vanadium	3281777		12	13	4.4%	< 2	95%	80%	120%	102%	80%	120%	NA	70%	130%
Zinc	3281777		60	67	9.7%	< 5	100%	80%	120%	105%	80%	120%	106%	70%	130%

**Mercury in Soil**

Mercury	3284887	3284887	< 0.03	< 0.03	0.0%	< 0.03	101%	70%	130%	106%	70%	130%	102%	70%	130%
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Certified By: \_\_\_\_\_



## Quality Assurance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis														
RPT Date: Dec 22, 2021			DUPLICATE				Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Measured Value		Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits
							Lower	Upper	Lower		Upper	Lower		Upper

Atlantic RBCA Tier 1 Hydrocarbons in Soil (Version 3.1) - Field Preserved + 1X Silica Gel														
Benzene	1	3290478	0.02	0.02	NA	< 0.02	107%	60%	140%	129%	60%	140%		
Toluene	1	3290478	0.07	0.07	NA	< 0.04	112%	60%	140%	124%	60%	140%		
Ethylbenzene	1	3290478	0.03	0.02	NA	< 0.03	126%	60%	140%	134%	60%	140%		
Xylene (Total)	1	3290478	0.12	0.12	NA	< 0.05	115%	60%	140%	128%	60%	140%		
C6-C10 (less BTEX)	1	3290478	< 3	< 3	NA	< 3	95%	60%	140%	110%	60%	140%	89%	30%
>C10-C16 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	90%	60%	140%	108%	60%	140%	118%	30%
>C16-C21 Hydrocarbons - 1X silica gel	1	3284915	< 15	< 15	NA	< 15	103%	60%	140%	108%	60%	140%	118%	30%
>C21-C32 Hydrocarbons - 1X silica gel	1	3284915	123	107	13.9%	< 15	88%	60%	140%	108%	60%	140%	118%	30%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

### Polycyclic Aromatic Hydrocarbons in Soil

1-Methylnaphthalene	1	3284915	< 0.05	< 0.05	NA	< 0.05	117%	50%	140%	104%	50%	140%	102%	50%
2-Methylnaphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	96%	50%	140%	95%	50%
Acenaphthene	1	3284915	< 0.00671	< 0.00671	NA	< 0.00671	113%	50%	140%	99%	50%	140%	97%	50%
Acenaphthylene	1	3284915	< 0.004	< 0.004	NA	< 0.004	98%	50%	140%	88%	50%	140%	89%	50%
Acridine	1	3284915	< 0.05	< 0.05	NA	< 0.05	98%	50%	140%	113%	50%	140%	18%	50%
Anthracene	1	3284915	< 0.03	< 0.03	NA	< 0.03	93%	50%	140%	84%	50%	140%	87%	50%
Benzo(a)anthracene	1	3284915	< 0.01	< 0.01	NA	< 0.01	96%	50%	140%	90%	50%	140%	86%	50%
Benzo(a)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	87%	50%	140%	79%	50%	140%	68%	50%
Benzo(b)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	84%	50%	140%	90%	50%
Benzo(j+k)fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	105%	50%	140%	87%	50%	140%	89%	50%
Benzo(e)pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	107%	50%	140%	94%	50%	140%	73%	50%
Benzo(ghi)perylene	1	3284915	< 0.01	< 0.01	NA	< 0.01	107%	50%	140%	93%	50%	140%	66%	50%
Chrysene	1	3284915	< 0.01	< 0.01	NA	< 0.01	111%	50%	140%	98%	50%	140%	83%	50%
Dibenzo(a,h)anthracene	1	3284915	< 0.006	< 0.006	NA	< 0.006	100%	50%	140%	88%	50%	140%	77%	50%
Fluoranthene	1	3284915	< 0.05	< 0.05	NA	< 0.05	116%	50%	140%	103%	50%	140%	99%	50%
Fluorene	1	3284915	< 0.01	< 0.01	NA	< 0.01	106%	50%	140%	93%	50%	140%	94%	50%
Indeno(1,2,3)pyrene	1	3284915	< 0.01	< 0.01	NA	< 0.01	99%	50%	140%	97%	50%	140%	91%	50%
Naphthalene	1	3284915	< 0.01	< 0.01	NA	< 0.01	108%	50%	140%	93%	50%	140%	93%	50%
Perylene	1	3284915	< 0.05	< 0.05	NA	< 0.05	101%	50%	140%	89%	50%	140%	69%	50%
Phenanthrene	1	3284915	< 0.03	< 0.03	NA	< 0.03	113%	50%	140%	98%	50%	140%	94%	50%
Pyrene	1	3284915	< 0.05	< 0.05	NA	< 0.05	118%	50%	140%	105%	50%	140%	96%	50%
Quinoline	1	3284915	< 0.05	< 0.05	NA	< 0.05	111%	50%	140%	133%	50%	140%	137%	50%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.  
 If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Quality Assurance

 CLIENT NAME: BUREAU VERITAS CANADA (2019) INC  
 PROJECT: 21497139/D1202-007-D1202-013  
 SAMPLING SITE:

 AGAT WORK ORDER: 21X838948  
 ATTENTION TO: Marie Muise  
 SAMPLED BY:

### Trace Organics Analysis (Continued)

RPT Date: Dec 22, 2021			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE				
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:



## QC Exceedance

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Marie Muise

RPT Date: Dec 22, 2021		REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
			Lower	Upper		Lower	Upper		Lower	Upper
Polycyclic Aromatic Hydrocarbons in Soil										
Acridine	3284915	98%	50%	140%	113%	50%	140%	18%	50%	140%

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Matrix spike: More than 90% of the elements met acceptance limits and overall data quality is acceptable for use. For a multi-element scan up to 10% of analytes may exceed the quoted limits.

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA

## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C16 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
>C16-C21 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Modified TPH (Tier 1) - 1X silica gel	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	CALCULATION
Resemblance Comment	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Return to Baseline at C32	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	ORG-120-5101	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	CSSS 70.2	GRAVIMETRIC
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(j+k)fluoranthene	ORG-120-5119	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS



## Method Summary

CLIENT NAME: BUREAU VERITAS CANADA (2019) INC

AGAT WORK ORDER: 21X838948

PROJECT: 21497139/D1202-007-D1202-013

ATTENTION TO: Marie Muise

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Naphthalene-d8	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene-d10 (%)	ORG-120-5119	EPA SW846/3510/8270C	GC/MS

2.3.1.5.2.0

21x838948



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105-200 Bluewater Road, Bedford, NS B4B 1G9  
 49-55 Elizabeth Avenue, St John's, NL A1A 1W9  
 465 George Street, Unit G, Sydney, NS B1P 1K5

Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 1-800-565-7227  
 Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-888-492-7227  
 Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-888-535-7770

CHAIN OF CUSTODY RECORD  
 ENV COC - 00016v2

Page 1 of 2

<b>Invoice Information</b>		<b>Report Information (if differs from invoice)</b>		<b>Project Information</b>	
Company:	Golder Associated	Company:		Quotation #:	C04828
Contact Name:	Belinda Culgin	Contact Name:		P.O. #/ AFE#:	
Street Address:	201 Brownlow Ave, Suite 26	Street Address:		Project #:	21497139
City:	Dartmouth	City:		Site #:	
Prov:	NS	Prov:		Site Location:	
Postal Code:	B3B 1W2	Postal Code:		Site Location Province:	
Phone:	(902) 466-1668	Phone:		Sampled By:	A Brunskill
Email:	belinda_culgin@golder.com	Email:			
Copies:	james_doyle@golder.com	Copies:			

LAB USE ONLY - PLACE STICKER HERE  
 21 DEC 2012 12:22 PM

Regulatory Criteria							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal		Regulation		**Matrix			FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	RCAP-M3 (total metals) well / surface water	RCAP-M3 (dissolved metals) - GW	Total metals (default-well/SW)	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME agr/ landfill)	BBGA HC (BTEX, C6-C12)	CCME HC (F1/BTEX, F2-F4)	PAHs (default for water/soil)	PCBs - default	PCBs - CCME sediment	VOCs	Total coliform/E coli (presence/absence)	Total coliform/E coli (count)	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE	Regular Turnaround Time (TAT)	Rush Turnaround Time (TAT) Surcharges apply
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS																													
Sample Identification		Date Sampled			Time (24hr)		Matrix																						
YY	MM	DD	HH	MM																									
21	11	25	14	50		Soil																				4		Silica Gel Cleanup	
21	11	25	14	52		Soil																				4	x	Silica Gel Cleanup	
21	11	25	15	0		Soil																				4	x	Silica Gel Cleanup	
21	11	25	15	5		Soil																				4	x	Silica Gel Cleanup	
21	11	25	15	11		Soil																				4	x	Silica Gel Cleanup	
21	11	25	15	20		Soil																				4	x	Silica Gel Cleanup	
21	11	27	13	6		Soil																				4			
21	11	27	13	10		Soil																				4			
21	11	27	13	13		Soil																				4			
21	11	27	13	20		Soil																				4			
21	11	27	13	23		Soil																				4			
21	11	27	13	44		Soil																				4			

\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS AND CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY.

LAB USE ONLY		Yes	No	°C	LAB USE ONLY		Yes	No	°C	LAB USE ONLY		Yes	No	°C	Temperature reading by:
Seal present			Seal present				Seal present								
Seal intact			Seal intact				Seal intact								
Cooling media present			1	2	3	Cooling media present			1	2	3	Cooling media present			
Relinquished by: (Signature/ Print)		Date			Time		Received by: (Signature/ Print)		Date			Time		Special instructions	
A. Brunskill		YY	MM	DD	HH	MM	Kuller		YY	MM	DD	HH	MM		
		21	11	29											





# Project Details for External Facility Redirection

Sent to:

AGAT - DARTMOUTH

21x 838948

Chain of Custodies received with this form are to be reported to the name name on the coc and the Bureau Veritas

ALL Invoices are to be directed to Bureau Veritas only

Bureau Veritas Contact Details	<b>BV Location:</b>	BEDFORD	
	<b>BV Contact #:</b> (for questions related to submission)	Marie Muise	
	<b>BV Phone #:</b> (for questions related to submission)	902-420-0203 ext 253	
Invoice to information	<b>BV Project Reference #:</b>	D1202-007 - D1202-013 (7 submissions)	
	<b>BV invoice to Email</b>	bvsubcontract@bureauveritas.com	
Report to information	<b>Client Report To Email:</b>	see attached chain of custody form(s)	
	<b>BV Report To Email:</b>	bvsubcontract@bureauveritas.com	
Project details	<b>Analytical Tests</b>	See attached chain of custody form(s)	
	<b>Comments/ Job details</b>	7 submissions - 104 samples total	
	<b>Special Instructions</b>	<b>1</b>	Email data directly to COC client and BV simultaneously
		<b>2</b>	Bureau Veritas reference must be providing on the invoice with a copy fo the coc in order to ensure payment.
<b>3</b>		Bureau Veritas must have received an email of the data to the listed email address in order to process invoices.	



Your Project #: 21497139  
Your C.O.C. #: N/A

**Attention: Belinda Culgin**

Golder Associates Ltd  
201 Brownlow Ave.  
Suites 25-26  
Dartmouth, NS  
CANADA B3B 1W2

Report Date: 2022/01/28  
Report #: R6981120  
Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: C1AF026**

**Received: 2021/12/24, 10:59**

Sample Matrix: Ground Water  
# Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Carbonate, Bicarbonate and Hydroxide	2	N/A	2022/01/11	N/A	SM 23 4500-CO2 D
Carbonate, Bicarbonate and Hydroxide	2	N/A	2022/01/07	N/A	SM 23 4500-CO2 D
Alkalinity	3	N/A	2022/01/12	ATL SOP 00013	EPA 310.2 R1974 m
Alkalinity	1	N/A	2022/01/08	ATL SOP 00013	EPA 310.2 R1974 m
Benzo(b/j)fluoranthene Sum (water)	4	N/A	2022/01/05	N/A	Auto Calc.
Chloride	3	N/A	2022/01/12	ATL SOP 00014	SM 23 4500-Cl- E m
Chloride	1	N/A	2022/01/07	ATL SOP 00014	SM 23 4500-Cl- E m
Colour	3	N/A	2022/01/12	ATL SOP 00020	SM 23 2120C m
Colour	1	N/A	2022/01/07	ATL SOP 00020	SM 23 2120C m
Conductance - water	2	N/A	2022/01/10	ATL SOP 00004	SM 23 2510B m
Conductance - water	2	N/A	2022/01/07	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	4	2021/12/29	2021/12/30	ATL SOP 00113	Atl. RBCA v3.1 m
Hardness (calculated as CaCO3)	4	N/A	2022/01/11	ATL SOP 00048	Auto Calc
Mercury - Total (CVAA,LL)	4	2022/01/24	2022/01/24	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Diss. MS (as rec'd)	4	N/A	2022/01/10	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	3	N/A	2022/01/14	N/A	Auto Calc.
Ion Balance (% Difference)	1	N/A	2022/01/17	N/A	Auto Calc.
Anion and Cation Sum	3	N/A	2022/01/11	N/A	Auto Calc.
Anion and Cation Sum	1	N/A	2022/01/12	N/A	Auto Calc.
Nitrogen Ammonia - water	1	N/A	2022/01/10	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen Ammonia - water	3	N/A	2022/01/05	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	3	N/A	2022/01/12	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrate + Nitrite	1	N/A	2022/01/07	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	3	N/A	2022/01/12	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrite	1	N/A	2022/01/07	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	3	N/A	2022/01/14	ATL SOP 00018	ASTM D3867-16
Nitrogen - Nitrate (as N)	1	N/A	2022/01/17	ATL SOP 00018	ASTM D3867-16
PAH in Water by GC/MS (SIM)	4	2021/12/24	2021/12/31	ATL SOP 00103	EPA 8270E R6 m
pH (1)	2	N/A	2022/01/10	ATL SOP 00003	SM 23 4500-H+ B m
pH (1)	2	N/A	2022/01/07	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	3	N/A	2022/01/12	ATL SOP 00021	SM 23 4500-P E m



Your Project #: 21497139  
 Your C.O.C. #: N/A

**Attention: Belinda Culgin**

Golder Associates Ltd  
 201 Brownlow Ave.  
 Suites 25-26  
 Dartmouth, NS  
 CANADA B3B 1W2

Report Date: 2022/01/28  
 Report #: R6981120  
 Version: 1 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: C1AF026**

**Received: 2021/12/24, 10:59**

Sample Matrix: Ground Water  
 # Samples Received: 4

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Phosphorus - ortho	1	N/A	2022/01/08	ATL SOP 00021	SM 23 4500-P E m
Sat. pH and Langelier Index (@ 20C)	3	N/A	2022/01/14	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 20C)	1	N/A	2022/01/17	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	3	N/A	2022/01/14	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	1	N/A	2022/01/17	ATL SOP 00049	Auto Calc.
Reactive Silica	3	N/A	2022/01/12	ATL SOP 00022	EPA 366.0 m
Reactive Silica	1	N/A	2022/01/07	ATL SOP 00022	EPA 366.0 m
Sulphate	3	N/A	2022/01/12	ATL SOP 00023	ASTM D516-16 m
Sulphate	1	N/A	2022/01/07	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc)	3	N/A	2022/01/14	N/A	Auto Calc.
Total Dissolved Solids (TDS calc)	1	N/A	2022/01/17	N/A	Auto Calc.
Organic carbon - Total (TOC) (2)	4	N/A	2022/01/06	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	4	N/A	2021/12/31	N/A	Atl. RBCA v3 m
Turbidity	4	N/A	2022/01/10	ATL SOP 00011	EPA 180.1 R2 m
VPH in Water (PIRI)	4	N/A	2021/12/29	ATL SOP 00130	Atl. RBCA v3.1 m

**Remarks:**

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

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

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

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



Your Project #: 21497139  
Your C.O.C. #: N/A

**Attention: Belinda Culgin**

Golder Associates Ltd  
201 Brownlow Ave.  
Suites 25-26  
Dartmouth, NS  
CANADA B3B 1W2

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dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

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

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

- (1) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
- (2) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key



**AUTHORIZED REPORT  
RAPPORT AUTORISÉ**

Bureau Veritas  
28 Jan 2022 16:59:51

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Marie Muise, Key Account Specialist  
Email: Marie.MUISE@bureauveritas.com  
Phone# (902)420-0203 Ext:253

=====  
This report has been generated and distributed using a secure automated process.

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



**RESULTS OF ANALYSES OF GROUND WATER**

Bureau Veritas ID		RMJ319		RMJ320		RMJ321		
Sampling Date		2021/12/19 13:18		2021/12/19 15:37		2021/12/19 17:13		
COC Number		N/A		N/A		N/A		
	UNITS	BFR_L1_GW1	QC Batch	BFR_L1_GW2	QC Batch	BFR_L1_GW3	RDL	QC Batch
<b>Calculated Parameters</b>								
Anion Sum	me/L	0.770	7756330	0.530	7756330	0.640	N/A	7756330
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	22	7756326	13	7756326	18	1.0	7756326
Calculated TDS	mg/L	50	7756334	36	7756334	43	1.0	7756334
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	7756326	<1.0	7756326	<1.0	1.0	7756326
Cation Sum	me/L	0.790	7756330	0.530	7756330	0.630	N/A	7756330
Hardness (CaCO3)	mg/L	21	7756325	11	7756325	15	1.0	7756325
Ion Balance (% Difference)	%	1.28	7756329	0.00	7756329	0.790	N/A	7756329
Langelier Index (@ 20C)	N/A	-2.22	7756332	-3.39	7756332	-2.99		7756332
Langelier Index (@ 4C)	N/A	-2.47	7756333	-3.64	7756333	-3.24		7756333
Nitrate (N)	mg/L	0.41	7756331	<0.050	7756331	0.33	0.050	7756331
Saturation pH (@ 20C)	N/A	9.16	7756332	9.69	7756332	9.50		7756332
Saturation pH (@ 4C)	N/A	9.41	7756333	9.95	7756333	9.75		7756333
<b>Inorganics</b>								
Total Alkalinity (Total as CaCO3)	mg/L	23	7770072	13	7774806	18	5.0	7774806
Dissolved Chloride (Cl-)	mg/L	8.2	7771605	9.5	7776826	6.8	1.0	7776826
Colour	TCU	<5.0	7771608	23	7776830	<5.0	5.0	7776830
Nitrate + Nitrite (N)	mg/L	0.42	7771610	<0.050	7776833	0.33	0.050	7776833
Nitrite (N)	mg/L	0.012	7771611	<0.010	7776834	<0.010	0.010	7776834
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	7772493	0.064	7764861	0.072	0.050	7764858
Total Organic Carbon (C)	mg/L	5.8	7767340	5.1	7767339	1.4	0.50	7767339
Orthophosphate (P)	mg/L	<0.010	7771609	<0.010	7776831	<0.010	0.010	7776831
pH	pH	6.94	7769440	6.31	7769440	6.50		7772374
Reactive Silica (SiO2)	mg/L	7.2	7771607	6.5	7776829	7.0	0.50	7776829
Dissolved Sulphate (SO4)	mg/L	2.7	7771606	<2.0	7776827	2.6	2.0	7776827
Turbidity	NTU	3.0	7772526	4.1	7772526	6.3	0.10	7772526
Conductivity	uS/cm	83	7769439	58	7769439	65	1.0	7772373
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable								





**RESULTS OF ANALYSES OF GROUND WATER**

<b>Bureau Veritas ID</b>		RMJ322		
<b>Sampling Date</b>		2021/12/19 13:18		
<b>COC Number</b>		N/A		
	<b>UNITS</b>	<b>BFR_L1_GW_DUP1</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Calculated Parameters</b>				
Anion Sum	me/L	0.830	N/A	7756330
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	25	1.0	7756326
Calculated TDS	mg/L	53	1.0	7756334
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	1.0	7756326
Cation Sum	me/L	0.780	N/A	7756330
Hardness (CaCO3)	mg/L	21	1.0	7756325
Ion Balance (% Difference)	%	3.11	N/A	7756329
Langelier Index (@ 20C)	N/A	-2.02		7756332
Langelier Index (@ 4C)	N/A	-2.27		7756333
Nitrate (N)	mg/L	0.47	0.050	7756331
Saturation pH (@ 20C)	N/A	9.11		7756332
Saturation pH (@ 4C)	N/A	9.36		7756333
<b>Inorganics</b>				
Total Alkalinity (Total as CaCO3)	mg/L	25	5.0	7774806
Dissolved Chloride (Cl-)	mg/L	8.9	1.0	7776826
Colour	TCU	<5.0	5.0	7776830
Nitrate + Nitrite (N)	mg/L	0.47	0.050	7776833
Nitrite (N)	mg/L	<0.010	0.010	7776834
Nitrogen (Ammonia Nitrogen)	mg/L	0.081	0.050	7764861
Total Organic Carbon (C)	mg/L	5.2	0.50	7767339
Orthophosphate (P)	mg/L	<0.010	0.010	7776831
pH	pH	7.09		7772374
Reactive Silica (SiO2)	mg/L	7.7	0.50	7776829
Dissolved Sulphate (SO4)	mg/L	2.6	2.0	7776827
Turbidity	NTU	5.1	0.10	7772526
Conductivity	uS/cm	84	1.0	7772373
RDL = Reportable Detection Limit QC Batch = Quality Control Batch N/A = Not Applicable				



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
Report Date: 2022/01/28

Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

### MERCURY BY COLD VAPOUR AA (GROUND WATER)

Bureau Veritas ID		RMJ319	RMJ320	RMJ321	RMJ322		
Sampling Date		2021/12/19 13:18	2021/12/19 15:37	2021/12/19 17:13	2021/12/19 13:18		
COC Number		N/A	N/A	N/A	N/A		
	UNITS	BFR_L1_GW1	BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW_DUP1	RDL	QC Batch
<b>Metals</b>							
Total Mercury (Hg)	ug/L	<0.013 (1)	<0.013 (1)	<0.013 (1)	<0.013 (1)	0.013	7781498
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							
(1) Mercury analyzed past recommended hold time.							



**ELEMENTS BY ICP/MS (GROUND WATER)**

Bureau Veritas ID		RMJ319	RMJ320	RMJ321	RMJ322		
Sampling Date		2021/12/19 13:18	2021/12/19 15:37	2021/12/19 17:13	2021/12/19 13:18		
COC Number		N/A	N/A	N/A	N/A		
	UNITS	BFR_L1_GW1	BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW_DUP1	RDL	QC Batch
<b>Metals</b>							
Dissolved Aluminum (Al)	ug/L	23	200	140	17	5.0	7760583
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	7760583
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	7760583
Dissolved Barium (Ba)	ug/L	5.3	8.7	13	4.4	1.0	7760583
Dissolved Beryllium (Be)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	7760583
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	7760583
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	50	7760583
Dissolved Cadmium (Cd)	ug/L	0.030	0.79	0.10	0.031	0.010	7760583
Dissolved Calcium (Ca)	ug/L	6300	3000	3500	6400	100	7760583
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	7760583
Dissolved Cobalt (Co)	ug/L	<0.40	9.9	0.55	<0.40	0.40	7760583
Dissolved Copper (Cu)	ug/L	2.0	2.9	1.3	0.99	0.50	7760583
Dissolved Iron (Fe)	ug/L	73	650	79	<50	50	7760583
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	7760583
Dissolved Magnesium (Mg)	ug/L	1200	910	1500	1200	100	7760583
Dissolved Manganese (Mn)	ug/L	24	420	120	21	2.0	7760583
Dissolved Molybdenum (Mo)	ug/L	5.2	<2.0	<2.0	<2.0	2.0	7760583
Dissolved Nickel (Ni)	ug/L	4.0	9.5	<2.0	4.0	2.0	7760583
Dissolved Phosphorus (P)	ug/L	<100	<100	<100	<100	100	7760583
Dissolved Potassium (K)	ug/L	1500	1200	3400	1500	100	7760583
Dissolved Selenium (Se)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	7760583
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	7760583
Dissolved Sodium (Na)	ug/L	7800	5600	5600	7200	100	7760583
Dissolved Strontium (Sr)	ug/L	22	16	18	22	2.0	7760583
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	7760583
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	7760583
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	4.8	<2.0	2.0	7760583
Dissolved Uranium (U)	ug/L	0.96	1.7	<0.10	0.98	0.10	7760583
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	7760583
Dissolved Zinc (Zn)	ug/L	6.8	11	5.1	<5.0	5.0	7760583
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



**SEMI-VOLATILE ORGANICS BY GC-MS (GROUND WATER)**

Bureau Veritas ID		RMJ319	RMJ320	RMJ321	RMJ322		
Sampling Date		2021/12/19 13:18	2021/12/19 15:37	2021/12/19 17:13	2021/12/19 13:18		
COC Number		N/A	N/A	N/A	N/A		
	UNITS	BFR_L1_GW1	BFR_L1_GW2	BFR_L1_GW3	BFR_L1_GW_DUP1	RDL	QC Batch
<b>Polyaromatic Hydrocarbons</b>							
1-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	7757785
2-Methylnaphthalene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	7757785
Acenaphthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Acenaphthylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Benzo(a)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Benzo(a)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Benzo(b)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Benzo(b/j)fluoranthene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	7756200
Benzo(g,h,i)perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Benzo(j)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Benzo(k)fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Chrysene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Dibenzo(a,h)anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Fluorene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Indeno(1,2,3-cd)pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Naphthalene	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	7757785
Perylene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
Phenanthrene	ug/L	0.010	<0.010	<0.010	<0.010	0.010	7757785
Pyrene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	7757785
<b>Surrogate Recovery (%)</b>							
D10-Anthracene	%	84	75	68	85		7757785
D14-Terphenyl	%	86	84	93	88		7757785
D8-Acenaphthylene	%	85	86	88	87		7757785
RDL = Reportable Detection Limit							
QC Batch = Quality Control Batch							



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
Report Date: 2022/01/28

Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

**ATLANTIC RBCA HYDROCARBONS (GROUND WATER)**

Bureau Veritas ID		RMJ319			RMJ319			RMJ320		
Sampling Date		2021/12/19 13:18			2021/12/19 13:18			2021/12/19 15:37		
COC Number		N/A			N/A			N/A		
	UNITS	BFR_L1_GW1	RDL	QC Batch	BFR_L1_GW1 Lab-Dup	RDL	QC Batch	BFR_L1_GW2	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>										
Benzene	mg/L	<0.0010	0.0010	7756779				<0.0010	0.0010	7756779
Toluene	mg/L	<0.0010	0.0010	7756779				<0.0010	0.0010	7756779
Ethylbenzene	mg/L	<0.0010	0.0010	7756779				<0.0010	0.0010	7756779
Total Xylenes	mg/L	<0.0020	0.0020	7756779				<0.0020	0.0020	7756779
C6 - C10 (less BTEX)	mg/L	<0.090	0.090	7756779				<0.090	0.090	7756779
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	7757326	<0.050	0.050	7757326	<0.050	0.050	7757326
>C16-C21 Hydrocarbons	mg/L	0.067	0.050	7757326	<0.050	0.050	7757326	<0.050	0.050	7757326
>C21-<C32 Hydrocarbons	mg/L	<0.090	0.090	7757326	<0.090	0.090	7757326	<0.090	0.090	7757326
Modified TPH (Tier1)	mg/L	<0.090	0.090	7756336				<0.090	0.090	7756336
Reached Baseline at C32	mg/L	NA	N/A	7757326				NA	N/A	7757326
Hydrocarbon Resemblance	mg/L	NA	N/A	7757326				NA	N/A	7757326
<b>Surrogate Recovery (%)</b>										
Isobutylbenzene - Extractable	%	83		7757326	90		7757326	91		7757326
n-Dotriacontane - Extractable	%	90		7757326	99		7757326	100		7757326
Isobutylbenzene - Volatile	%	108		7756779				107		7756779
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable										



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
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Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

### ATLANTIC RBCA HYDROCARBONS (GROUND WATER)

Bureau Veritas ID		RMJ321		RMJ322			RMJ322		
Sampling Date		2021/12/19 17:13		2021/12/19 13:18			2021/12/19 13:18		
COC Number		N/A		N/A			N/A		
	UNITS	BFR_L1_GW3	QC Batch	BFR_L1_GW_DUP1	RDL	QC Batch	BFR_L1_GW_DUP1 Lab-Dup	RDL	QC Batch
<b>Petroleum Hydrocarbons</b>									
Benzene	mg/L	<0.0010	7756779	<0.0010	0.0010	7756833	<0.0010	0.0010	7756833
Toluene	mg/L	<0.0010	7756779	<0.0010	0.0010	7756833	<0.0010	0.0010	7756833
Ethylbenzene	mg/L	<0.0010	7756779	<0.0010	0.0010	7756833	<0.0010	0.0010	7756833
Total Xylenes	mg/L	<0.0020	7756779	<0.0020	0.0020	7756833	<0.0020	0.0020	7756833
C6 - C10 (less BTEX)	mg/L	<0.090	7756779	<0.090	0.090	7756833	<0.090	0.090	7756833
>C10-C16 Hydrocarbons	mg/L	<0.050	7757326	<0.050	0.050	7757326			
>C16-C21 Hydrocarbons	mg/L	<0.050	7757326	<0.050	0.050	7757326			
>C21-<C32 Hydrocarbons	mg/L	<0.090	7757326	<0.090	0.090	7757326			
Modified TPH (Tier1)	mg/L	<0.090	7756336	<0.090	0.090	7756336			
Reached Baseline at C32	mg/L	NA	7757326	NA	N/A	7757326			
Hydrocarbon Resemblance	mg/L	NA	7757326	NA	N/A	7757326			
<b>Surrogate Recovery (%)</b>									
Isobutylbenzene - Extractable	%	98	7757326	92		7757326			
n-Dotriacontane - Extractable	%	108	7757326	101		7757326			
Isobutylbenzene - Volatile	%	107	7756779	104		7756833	103		7756833
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable									



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
Report Date: 2022/01/28

Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

### GENERAL COMMENTS

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

Package 1	1.7°C
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BFR\_L1\_GW1 ammonia aliquot obtained from preserved plastic bottle as original vial broke in transit. 2022/01/18 MMC

**Results relate only to the items tested.**



QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7756779	THL	Matrix Spike	Isobutylbenzene - Volatile	2021/12/29		112	%	70 - 130
			Benzene	2021/12/29		88	%	70 - 130
			Toluene	2021/12/29		90	%	70 - 130
			Ethylbenzene	2021/12/29		93	%	70 - 130
			Total Xylenes	2021/12/29		92	%	70 - 130
7756779	THL	Spiked Blank	Isobutylbenzene - Volatile	2021/12/29		106	%	70 - 130
			Benzene	2021/12/29		92	%	70 - 130
			Toluene	2021/12/29		92	%	70 - 130
			Ethylbenzene	2021/12/29		92	%	70 - 130
7756779	THL	Method Blank	Total Xylenes	2021/12/29		92	%	70 - 130
			Isobutylbenzene - Volatile	2021/12/29		104	%	70 - 130
			Benzene	2021/12/29	<0.0010		mg/L	
			Toluene	2021/12/29	<0.0010		mg/L	
			Ethylbenzene	2021/12/29	<0.0010		mg/L	
7756779	THL	RPD	Total Xylenes	2021/12/29	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2021/12/29	<0.090		mg/L	
			Benzene	2021/12/29	NC		%	40
			Toluene	2021/12/29	NC		%	40
			Ethylbenzene	2021/12/29	NC		%	40
7756833	THL	Matrix Spike	Total Xylenes	2021/12/29		NC	%	40
			C6 - C10 (less BTEX)	2021/12/29		NC	%	40
			Isobutylbenzene - Volatile	2021/12/29		112	%	70 - 130
			Benzene	2021/12/29		90	%	70 - 130
			Toluene	2021/12/29		93	%	70 - 130
7756833	THL	Spiked Blank	Ethylbenzene	2021/12/29		96	%	70 - 130
			Total Xylenes	2021/12/29		95	%	70 - 130
			Isobutylbenzene - Volatile	2021/12/29		108	%	70 - 130
			Benzene	2021/12/29		98	%	70 - 130
			Toluene	2021/12/29		97	%	70 - 130
7756833	THL	Method Blank	Ethylbenzene	2021/12/29		97	%	70 - 130
			Total Xylenes	2021/12/29		96	%	70 - 130
			Isobutylbenzene - Volatile	2021/12/29		110	%	70 - 130
			Benzene	2021/12/29	<0.0010		mg/L	
			Toluene	2021/12/29	<0.0010		mg/L	
7756833	THL	RPD [RMJ322-09]	Ethylbenzene	2021/12/29	<0.0010		mg/L	
			Total Xylenes	2021/12/29	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2021/12/29	<0.090		mg/L	
			Benzene	2021/12/29	NC		%	40
			Toluene	2021/12/29	NC		%	40
7757326	MGN	Matrix Spike [RMJ320-06]	Ethylbenzene	2021/12/29	NC		%	40
			Total Xylenes	2021/12/29	NC		%	40
			C6 - C10 (less BTEX)	2021/12/29	NC		%	40
			Isobutylbenzene - Extractable	2021/12/30		84	%	70 - 130
			n-Dotriacontane - Extractable	2021/12/30		100	%	70 - 130
7757326	MGN	Spiked Blank	>C10-C16 Hydrocarbons	2021/12/30		87	%	70 - 130
			>C16-C21 Hydrocarbons	2021/12/30		84	%	70 - 130
			>C21-<C32 Hydrocarbons	2021/12/30		86	%	70 - 130
			Isobutylbenzene - Extractable	2021/12/30		106	%	70 - 130
			n-Dotriacontane - Extractable	2021/12/30		117	%	70 - 130
7757326	MGN	Method Blank	>C10-C16 Hydrocarbons	2021/12/30		108	%	70 - 130
			>C16-C21 Hydrocarbons	2021/12/30		96	%	70 - 130
			>C21-<C32 Hydrocarbons	2021/12/30		97	%	70 - 130
			Isobutylbenzene - Extractable	2021/12/30		103	%	70 - 130
			n-Dotriacontane - Extractable	2021/12/30		110	%	70 - 130





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QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				>C10-C16 Hydrocarbons	2021/12/30	<0.050		mg/L	
				>C16-C21 Hydrocarbons	2021/12/30	<0.050		mg/L	
				>C21-<C32 Hydrocarbons	2021/12/30	<0.090		mg/L	
7757326	MGN	RPD	[RMJ319-06]	>C10-C16 Hydrocarbons	2021/12/30	NC		%	40
				>C16-C21 Hydrocarbons	2021/12/30	29		%	40
				>C21-<C32 Hydrocarbons	2021/12/30	NC		%	40
7757785	LGE	Matrix Spike		D10-Anthracene	2021/12/31		103	%	50 - 130
				D14-Terphenyl	2021/12/31		102	%	50 - 130
				D8-Acenaphthylene	2021/12/31		98	%	50 - 130
				1-Methylnaphthalene	2021/12/31		99	%	50 - 130
				2-Methylnaphthalene	2021/12/31		92	%	50 - 130
				Acenaphthene	2021/12/31		91	%	50 - 130
				Acenaphthylene	2021/12/31		99	%	50 - 130
				Anthracene	2021/12/31		91	%	50 - 130
				Benzo(a)anthracene	2021/12/31		85	%	50 - 130
				Benzo(a)pyrene	2021/12/31		87	%	50 - 130
				Benzo(b)fluoranthene	2021/12/31		89	%	50 - 130
				Benzo(g,h,i)perylene	2021/12/31		81	%	50 - 130
				Benzo(j)fluoranthene	2021/12/31		95	%	50 - 130
				Benzo(k)fluoranthene	2021/12/31		90	%	50 - 130
				Chrysene	2021/12/31		93	%	50 - 130
				Dibenzo(a,h)anthracene	2021/12/31		82	%	50 - 130
				Fluoranthene	2021/12/31		91	%	50 - 130
				Fluorene	2021/12/31		97	%	50 - 130
				Indeno(1,2,3-cd)pyrene	2021/12/31		80	%	50 - 130
				Naphthalene	2021/12/31		93	%	50 - 130
				Perylene	2021/12/31		93	%	50 - 130
				Phenanthrene	2021/12/31		97	%	50 - 130
				Pyrene	2021/12/31		95	%	50 - 130
7757785	LGE	Spiked Blank		D10-Anthracene	2021/12/31		104	%	50 - 130
				D14-Terphenyl	2021/12/31		102	%	50 - 130
				D8-Acenaphthylene	2021/12/31		99	%	50 - 130
				1-Methylnaphthalene	2021/12/31		108	%	50 - 130
				2-Methylnaphthalene	2021/12/31		101	%	50 - 130
				Acenaphthene	2021/12/31		99	%	50 - 130
				Acenaphthylene	2021/12/31		102	%	50 - 130
				Anthracene	2021/12/31		94	%	50 - 130
				Benzo(a)anthracene	2021/12/31		86	%	50 - 130
				Benzo(a)pyrene	2021/12/31		95	%	50 - 130
				Benzo(b)fluoranthene	2021/12/31		92	%	50 - 130
				Benzo(g,h,i)perylene	2021/12/31		91	%	50 - 130
				Benzo(j)fluoranthene	2021/12/31		98	%	50 - 130
				Benzo(k)fluoranthene	2021/12/31		93	%	50 - 130
				Chrysene	2021/12/31		97	%	50 - 130
				Dibenzo(a,h)anthracene	2021/12/31		85	%	50 - 130
				Fluoranthene	2021/12/31		93	%	50 - 130
				Fluorene	2021/12/31		101	%	50 - 130
				Indeno(1,2,3-cd)pyrene	2021/12/31		88	%	50 - 130
				Naphthalene	2021/12/31		100	%	50 - 130
				Perylene	2021/12/31		98	%	50 - 130
				Phenanthrene	2021/12/31		106	%	50 - 130
				Pyrene	2021/12/31		96	%	50 - 130
7757785	LGE	Method Blank		D10-Anthracene	2021/12/31		95	%	50 - 130
				D14-Terphenyl	2021/12/31		97	%	50 - 130



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			D8-Acenaphthylene	2021/12/31		94	%	50 - 130
			1-Methylnaphthalene	2021/12/31	<0.050		ug/L	
			2-Methylnaphthalene	2021/12/31	<0.050		ug/L	
			Acenaphthene	2021/12/31	<0.010		ug/L	
			Acenaphthylene	2021/12/31	<0.010		ug/L	
			Anthracene	2021/12/31	<0.010		ug/L	
			Benzo(a)anthracene	2021/12/31	<0.010		ug/L	
			Benzo(a)pyrene	2021/12/31	<0.010		ug/L	
			Benzo(b)fluoranthene	2021/12/31	<0.010		ug/L	
			Benzo(g,h,i)perylene	2021/12/31	<0.010		ug/L	
			Benzo(j)fluoranthene	2021/12/31	<0.010		ug/L	
			Benzo(k)fluoranthene	2021/12/31	<0.010		ug/L	
			Chrysene	2021/12/31	<0.010		ug/L	
			Dibenzo(a,h)anthracene	2021/12/31	<0.010		ug/L	
			Fluoranthene	2021/12/31	<0.010		ug/L	
			Fluorene	2021/12/31	<0.010		ug/L	
			Indeno(1,2,3-cd)pyrene	2021/12/31	<0.010		ug/L	
			Naphthalene	2021/12/31	<0.20		ug/L	
			Perylene	2021/12/31	<0.010		ug/L	
			Phenanthrene	2021/12/31	<0.010		ug/L	
			Pyrene	2021/12/31	<0.010		ug/L	
7757785	LGE	RPD	1-Methylnaphthalene	2021/12/31	8.8		%	40
			2-Methylnaphthalene	2021/12/31	NC		%	40
			Acenaphthene	2021/12/31	10		%	40
			Acenaphthylene	2021/12/31	1.0		%	40
			Anthracene	2021/12/31	NC		%	40
			Benzo(a)anthracene	2021/12/31	NC		%	40
			Benzo(a)pyrene	2021/12/31	NC		%	40
			Benzo(b)fluoranthene	2021/12/31	NC		%	40
			Benzo(g,h,i)perylene	2021/12/31	NC		%	40
			Benzo(j)fluoranthene	2021/12/31	NC		%	40
			Benzo(k)fluoranthene	2021/12/31	NC		%	40
			Chrysene	2021/12/31	NC		%	40
			Dibenzo(a,h)anthracene	2021/12/31	NC		%	40
			Fluoranthene	2021/12/31	9.9		%	40
			Fluorene	2021/12/31	11		%	40
			Indeno(1,2,3-cd)pyrene	2021/12/31	NC		%	40
			Naphthalene	2021/12/31	NC		%	40
			Perylene	2021/12/31	NC		%	40
			Phenanthrene	2021/12/31	0		%	40
			Pyrene	2021/12/31	10		%	40
7760583	BAN	Matrix Spike	Dissolved Aluminum (Al)	2022/01/07		101	%	80 - 120
			Dissolved Antimony (Sb)	2022/01/07		97	%	80 - 120
			Dissolved Arsenic (As)	2022/01/07		97	%	80 - 120
			Dissolved Barium (Ba)	2022/01/07		96	%	80 - 120
			Dissolved Beryllium (Be)	2022/01/07		98	%	80 - 120
			Dissolved Bismuth (Bi)	2022/01/07		91	%	80 - 120
			Dissolved Boron (B)	2022/01/07		98	%	80 - 120
			Dissolved Cadmium (Cd)	2022/01/07		98	%	80 - 120
			Dissolved Calcium (Ca)	2022/01/07		97	%	80 - 120
			Dissolved Chromium (Cr)	2022/01/07		99	%	80 - 120
			Dissolved Cobalt (Co)	2022/01/07		100	%	80 - 120
			Dissolved Copper (Cu)	2022/01/07		98	%	80 - 120
			Dissolved Iron (Fe)	2022/01/07		98	%	80 - 120



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Lead (Pb)	2022/01/07		95	%	80 - 120
			Dissolved Magnesium (Mg)	2022/01/07		102	%	80 - 120
			Dissolved Manganese (Mn)	2022/01/07		98	%	80 - 120
			Dissolved Molybdenum (Mo)	2022/01/07		99	%	80 - 120
			Dissolved Nickel (Ni)	2022/01/07		98	%	80 - 120
			Dissolved Phosphorus (P)	2022/01/07		108	%	80 - 120
			Dissolved Potassium (K)	2022/01/07		100	%	80 - 120
			Dissolved Selenium (Se)	2022/01/07		103	%	80 - 120
			Dissolved Silver (Ag)	2022/01/07		97	%	80 - 120
			Dissolved Sodium (Na)	2022/01/07		NC	%	80 - 120
			Dissolved Strontium (Sr)	2022/01/07		NC	%	80 - 120
			Dissolved Thallium (Tl)	2022/01/07		95	%	80 - 120
			Dissolved Tin (Sn)	2022/01/07		99	%	80 - 120
			Dissolved Titanium (Ti)	2022/01/07		101	%	80 - 120
			Dissolved Uranium (U)	2022/01/07		101	%	80 - 120
			Dissolved Vanadium (V)	2022/01/07		103	%	80 - 120
			Dissolved Zinc (Zn)	2022/01/07		98	%	80 - 120
7760583	BAN	Spiked Blank	Dissolved Aluminum (Al)	2022/01/07		103	%	80 - 120
			Dissolved Antimony (Sb)	2022/01/07		94	%	80 - 120
			Dissolved Arsenic (As)	2022/01/07		98	%	80 - 120
			Dissolved Barium (Ba)	2022/01/07		97	%	80 - 120
			Dissolved Beryllium (Be)	2022/01/07		100	%	80 - 120
			Dissolved Bismuth (Bi)	2022/01/07		95	%	80 - 120
			Dissolved Boron (B)	2022/01/07		97	%	80 - 120
			Dissolved Cadmium (Cd)	2022/01/07		101	%	80 - 120
			Dissolved Calcium (Ca)	2022/01/07		99	%	80 - 120
			Dissolved Chromium (Cr)	2022/01/07		101	%	80 - 120
			Dissolved Cobalt (Co)	2022/01/07		102	%	80 - 120
			Dissolved Copper (Cu)	2022/01/07		103	%	80 - 120
			Dissolved Iron (Fe)	2022/01/07		101	%	80 - 120
			Dissolved Lead (Pb)	2022/01/07		99	%	80 - 120
			Dissolved Magnesium (Mg)	2022/01/07		109	%	80 - 120
			Dissolved Manganese (Mn)	2022/01/07		105	%	80 - 120
			Dissolved Molybdenum (Mo)	2022/01/07		100	%	80 - 120
			Dissolved Nickel (Ni)	2022/01/07		103	%	80 - 120
			Dissolved Phosphorus (P)	2022/01/07		105	%	80 - 120
			Dissolved Potassium (K)	2022/01/07		98	%	80 - 120
			Dissolved Selenium (Se)	2022/01/07		104	%	80 - 120
			Dissolved Silver (Ag)	2022/01/07		98	%	80 - 120
			Dissolved Sodium (Na)	2022/01/07		105	%	80 - 120
			Dissolved Strontium (Sr)	2022/01/07		98	%	80 - 120
			Dissolved Thallium (Tl)	2022/01/07		97	%	80 - 120
			Dissolved Tin (Sn)	2022/01/07		96	%	80 - 120
			Dissolved Titanium (Ti)	2022/01/07		102	%	80 - 120
			Dissolved Uranium (U)	2022/01/07		104	%	80 - 120
			Dissolved Vanadium (V)	2022/01/07		105	%	80 - 120
			Dissolved Zinc (Zn)	2022/01/07		102	%	80 - 120
7760583	BAN	Method Blank	Dissolved Aluminum (Al)	2022/01/07	<5.0		ug/L	
			Dissolved Antimony (Sb)	2022/01/07	<1.0		ug/L	
			Dissolved Arsenic (As)	2022/01/07	<1.0		ug/L	
			Dissolved Barium (Ba)	2022/01/07	<1.0		ug/L	
			Dissolved Beryllium (Be)	2022/01/07	<0.10		ug/L	
			Dissolved Bismuth (Bi)	2022/01/07	<2.0		ug/L	
			Dissolved Boron (B)	2022/01/07	<50		ug/L	



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			Dissolved Cadmium (Cd)	2022/01/07	<0.010		ug/L	
			Dissolved Calcium (Ca)	2022/01/07	<100		ug/L	
			Dissolved Chromium (Cr)	2022/01/07	<1.0		ug/L	
			Dissolved Cobalt (Co)	2022/01/07	<0.40		ug/L	
			Dissolved Copper (Cu)	2022/01/07	<0.50		ug/L	
			Dissolved Iron (Fe)	2022/01/07	<50		ug/L	
			Dissolved Lead (Pb)	2022/01/07	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2022/01/07	<100		ug/L	
			Dissolved Manganese (Mn)	2022/01/07	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2022/01/07	<2.0		ug/L	
			Dissolved Nickel (Ni)	2022/01/07	<2.0		ug/L	
			Dissolved Phosphorus (P)	2022/01/07	<100		ug/L	
			Dissolved Potassium (K)	2022/01/07	<100		ug/L	
			Dissolved Selenium (Se)	2022/01/07	<0.50		ug/L	
			Dissolved Silver (Ag)	2022/01/07	<0.10		ug/L	
			Dissolved Sodium (Na)	2022/01/07	<100		ug/L	
			Dissolved Strontium (Sr)	2022/01/07	<2.0		ug/L	
			Dissolved Thallium (Tl)	2022/01/07	<0.10		ug/L	
			Dissolved Tin (Sn)	2022/01/07	<2.0		ug/L	
			Dissolved Titanium (Ti)	2022/01/07	<2.0		ug/L	
			Dissolved Uranium (U)	2022/01/07	<0.10		ug/L	
			Dissolved Vanadium (V)	2022/01/07	<2.0		ug/L	
			Dissolved Zinc (Zn)	2022/01/07	<5.0		ug/L	
7760583	BAN	RPD	Dissolved Aluminum (Al)	2022/01/07	3.4		%	20
			Dissolved Antimony (Sb)	2022/01/07	NC		%	20
			Dissolved Arsenic (As)	2022/01/07	NC		%	20
			Dissolved Barium (Ba)	2022/01/07	0.38		%	20
			Dissolved Beryllium (Be)	2022/01/07	NC		%	20
			Dissolved Bismuth (Bi)	2022/01/07	NC		%	20
			Dissolved Boron (B)	2022/01/07	NC		%	20
			Dissolved Calcium (Ca)	2022/01/07	1.1		%	20
			Dissolved Chromium (Cr)	2022/01/07	NC		%	20
			Dissolved Cobalt (Co)	2022/01/07	NC		%	20
			Dissolved Copper (Cu)	2022/01/07	3.0		%	20
			Dissolved Iron (Fe)	2022/01/07	2.4		%	20
			Dissolved Lead (Pb)	2022/01/07	NC		%	20
			Dissolved Magnesium (Mg)	2022/01/07	2.7		%	20
			Dissolved Manganese (Mn)	2022/01/07	0.83		%	20
			Dissolved Molybdenum (Mo)	2022/01/07	NC		%	20
			Dissolved Nickel (Ni)	2022/01/07	NC		%	20
			Dissolved Phosphorus (P)	2022/01/07	NC		%	20
			Dissolved Potassium (K)	2022/01/07	0.13		%	20
			Dissolved Selenium (Se)	2022/01/07	NC		%	20
			Dissolved Silver (Ag)	2022/01/07	NC		%	20
			Dissolved Sodium (Na)	2022/01/07	2.0		%	20
			Dissolved Strontium (Sr)	2022/01/07	0.96		%	20
			Dissolved Thallium (Tl)	2022/01/07	NC		%	20
			Dissolved Tin (Sn)	2022/01/07	NC		%	20
			Dissolved Titanium (Ti)	2022/01/07	NC		%	20
			Dissolved Uranium (U)	2022/01/07	NC		%	20
			Dissolved Vanadium (V)	2022/01/07	NC		%	20
			Dissolved Zinc (Zn)	2022/01/07	5.1		%	20
7764858	MKY	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2022/01/05		105 (1)	%	80 - 120
7764858	MKY	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2022/01/05		100	%	80 - 120



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7764858	MKY	Method Blank	Nitrogen (Ammonia Nitrogen)	2022/01/05	<0.050		mg/L	
7764858	MKY	RPD	Nitrogen (Ammonia Nitrogen)	2022/01/05	NC		%	20
7764861	MKY	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2022/01/05		90	%	80 - 120
7764861	MKY	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2022/01/05		101	%	80 - 120
7764861	MKY	Method Blank	Nitrogen (Ammonia Nitrogen)	2022/01/05	<0.050		mg/L	
7764861	MKY	RPD	Nitrogen (Ammonia Nitrogen)	2022/01/05	NC		%	20
7767339	NGI	Matrix Spike	Total Organic Carbon (C)	2022/01/06		98	%	85 - 115
7767339	NGI	Spiked Blank	Total Organic Carbon (C)	2022/01/06		101	%	80 - 120
7767339	NGI	Method Blank	Total Organic Carbon (C)	2022/01/06	<0.50		mg/L	
7767339	NGI	RPD	Total Organic Carbon (C)	2022/01/06	2.3		%	15
7767340	NGI	Matrix Spike	Total Organic Carbon (C)	2022/01/06		96	%	85 - 115
7767340	NGI	Spiked Blank	Total Organic Carbon (C)	2022/01/06		97	%	80 - 120
7767340	NGI	Method Blank	Total Organic Carbon (C)	2022/01/06	<0.50		mg/L	
7767340	NGI	RPD	Total Organic Carbon (C)	2022/01/06	2.8		%	15
7769439	SHW	Spiked Blank	Conductivity	2022/01/07		101	%	80 - 120
7769439	SHW	Method Blank	Conductivity	2022/01/07	<1.0		uS/cm	
7769439	SHW	RPD	Conductivity	2022/01/07	0.00078		%	10
7769440	SHW	Spiked Blank	pH	2022/01/07		100	%	97 - 103
7769440	SHW	RPD	pH	2022/01/07	0.55		%	N/A
7770072	MCN	Matrix Spike	Total Alkalinity (Total as CaCO3)	2022/01/08		98	%	80 - 120
7770072	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2022/01/08		103	%	80 - 120
7770072	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2022/01/08	<5.0		mg/L	
7770072	MCN	RPD	Total Alkalinity (Total as CaCO3)	2022/01/08	NC		%	20
7771605	MCN	Matrix Spike	Dissolved Chloride (Cl-)	2022/01/07		90	%	80 - 120
7771605	MCN	Spiked Blank	Dissolved Chloride (Cl-)	2022/01/07		88	%	80 - 120
7771605	MCN	Method Blank	Dissolved Chloride (Cl-)	2022/01/07	<1.0		mg/L	
7771605	MCN	RPD	Dissolved Chloride (Cl-)	2022/01/07	NC		%	20
7771606	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2022/01/07		107	%	80 - 120
7771606	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2022/01/07		103	%	80 - 120
7771606	MCN	Method Blank	Dissolved Sulphate (SO4)	2022/01/07	<2.0		mg/L	
7771606	MCN	RPD	Dissolved Sulphate (SO4)	2022/01/07	NC		%	20
7771607	MCN	Matrix Spike	Reactive Silica (SiO2)	2022/01/07		88	%	80 - 120
7771607	MCN	Spiked Blank	Reactive Silica (SiO2)	2022/01/07		90	%	80 - 120
7771607	MCN	Method Blank	Reactive Silica (SiO2)	2022/01/07	<0.50		mg/L	
7771607	MCN	RPD	Reactive Silica (SiO2)	2022/01/07	NC		%	20
7771608	MCN	Spiked Blank	Colour	2022/01/07		98	%	80 - 120
7771608	MCN	Method Blank	Colour	2022/01/07	<5.0		TCU	
7771608	MCN	RPD	Colour	2022/01/07	NC		%	20
7771609	MCN	Matrix Spike	Orthophosphate (P)	2022/01/08		99	%	80 - 120
7771609	MCN	Spiked Blank	Orthophosphate (P)	2022/01/08		99	%	80 - 120
7771609	MCN	Method Blank	Orthophosphate (P)	2022/01/08	<0.010		mg/L	
7771609	MCN	RPD	Orthophosphate (P)	2022/01/08	NC		%	20
7771610	MCN	Matrix Spike	Nitrate + Nitrite (N)	2022/01/07		94	%	80 - 120
7771610	MCN	Spiked Blank	Nitrate + Nitrite (N)	2022/01/07		94	%	80 - 120
7771610	MCN	Method Blank	Nitrate + Nitrite (N)	2022/01/07	<0.050		mg/L	
7771610	MCN	RPD	Nitrate + Nitrite (N)	2022/01/07	NC		%	20
7771611	MCN	Matrix Spike	Nitrite (N)	2022/01/07		97	%	80 - 120
7771611	MCN	Spiked Blank	Nitrite (N)	2022/01/07		99	%	80 - 120
7771611	MCN	Method Blank	Nitrite (N)	2022/01/07	<0.010		mg/L	
7771611	MCN	RPD	Nitrite (N)	2022/01/07	NC		%	20
7772373	SHW	Spiked Blank	Conductivity	2022/01/10		100	%	80 - 120
7772373	SHW	Method Blank	Conductivity	2022/01/10	1.1, RDL=1.0		uS/cm	
7772373	SHW	RPD	Conductivity	2022/01/10	0.57		%	10



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
Report Date: 2022/01/28

Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7772374	SHW	Spiked Blank	pH	2022/01/10		100	%	97 - 103
7772374	SHW	RPD	pH	2022/01/10	0.077		%	N/A
7772493	EMT	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2022/01/10		104	%	80 - 120
7772493	EMT	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2022/01/10		105	%	80 - 120
7772493	EMT	Method Blank	Nitrogen (Ammonia Nitrogen)	2022/01/10	<0.050		mg/L	
7772493	EMT	RPD	Nitrogen (Ammonia Nitrogen)	2022/01/10	NC		%	20
7772526	SHW	QC Standard	Turbidity	2022/01/10		102	%	80 - 120
7772526	SHW	Spiked Blank	Turbidity	2022/01/10		105	%	80 - 120
7772526	SHW	Method Blank	Turbidity	2022/01/10	<0.10		NTU	
7772526	SHW	RPD	Turbidity	2022/01/10	3.4		%	20
7774806	MCN	Matrix Spike	Total Alkalinity (Total as CaCO3)	2022/01/12		NC	%	80 - 120
7774806	MCN	Spiked Blank	Total Alkalinity (Total as CaCO3)	2022/01/12		111	%	80 - 120
7774806	MCN	Method Blank	Total Alkalinity (Total as CaCO3)	2022/01/12	<5.0		mg/L	
7774806	MCN	RPD	Total Alkalinity (Total as CaCO3)	2022/01/12	0.38		%	20
7776826	MCN	Matrix Spike	Dissolved Chloride (Cl-)	2022/01/12		93	%	80 - 120
7776826	MCN	Spiked Blank	Dissolved Chloride (Cl-)	2022/01/12		94	%	80 - 120
7776826	MCN	Method Blank	Dissolved Chloride (Cl-)	2022/01/12	<1.0		mg/L	
7776826	MCN	RPD	Dissolved Chloride (Cl-)	2022/01/12	2.1		%	20
7776827	MCN	Matrix Spike	Dissolved Sulphate (SO4)	2022/01/12		97	%	80 - 120
7776827	MCN	Spiked Blank	Dissolved Sulphate (SO4)	2022/01/12		95	%	80 - 120
7776827	MCN	Method Blank	Dissolved Sulphate (SO4)	2022/01/12	<2.0		mg/L	
7776827	MCN	RPD	Dissolved Sulphate (SO4)	2022/01/12	6.1		%	20
7776829	MCN	Matrix Spike	Reactive Silica (SiO2)	2022/01/12		88	%	80 - 120
7776829	MCN	Spiked Blank	Reactive Silica (SiO2)	2022/01/12		93	%	80 - 120
7776829	MCN	Method Blank	Reactive Silica (SiO2)	2022/01/12	<0.50		mg/L	
7776829	MCN	RPD	Reactive Silica (SiO2)	2022/01/12	6.9		%	20
7776830	MCN	Spiked Blank	Colour	2022/01/12		95	%	80 - 120
7776830	MCN	Method Blank	Colour	2022/01/12	<5.0		TCU	
7776830	MCN	RPD	Colour	2022/01/12	NC		%	20
7776831	MCN	Matrix Spike	Orthophosphate (P)	2022/01/12		91	%	80 - 120
7776831	MCN	Spiked Blank	Orthophosphate (P)	2022/01/12		96	%	80 - 120
7776831	MCN	Method Blank	Orthophosphate (P)	2022/01/12	<0.010		mg/L	
7776831	MCN	RPD	Orthophosphate (P)	2022/01/12	NC		%	20
7776833	MCN	Matrix Spike	Nitrate + Nitrite (N)	2022/01/12		96	%	80 - 120
7776833	MCN	Spiked Blank	Nitrate + Nitrite (N)	2022/01/12		97	%	80 - 120
7776833	MCN	Method Blank	Nitrate + Nitrite (N)	2022/01/12	<0.050		mg/L	
7776833	MCN	RPD	Nitrate + Nitrite (N)	2022/01/12	NC		%	20
7776834	MCN	Matrix Spike	Nitrite (N)	2022/01/12		97	%	80 - 120
7776834	MCN	Spiked Blank	Nitrite (N)	2022/01/12		98	%	80 - 120
7776834	MCN	Method Blank	Nitrite (N)	2022/01/12	<0.010		mg/L	
7776834	MCN	RPD	Nitrite (N)	2022/01/12	10		%	20
7781498	FJO	Matrix Spike	Total Mercury (Hg)	2022/01/24		91	%	80 - 120
7781498	FJO	Spiked Blank	Total Mercury (Hg)	2022/01/24		80	%	80 - 120
7781498	FJO	Method Blank	Total Mercury (Hg)	2022/01/24	<0.013		ug/L	



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
Report Date: 2022/01/28

Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

### QUALITY ASSURANCE REPORT(CONT'D)

QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
	7781498	FJO	RPD	Total Mercury (Hg)	2022/01/24	NC (2)		%	20
<p>N/A = Not Applicable</p> <p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.</p> <p>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.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>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)</p> <p>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 &lt;= 2x RDL).</p> <p>(1) High spike recovery due to sample matrix</p> <p>(2) Mercury analyzed past recommended hold time.</p>									



BUREAU  
VERITAS

Bureau Veritas Job #: C1AF026  
Report Date: 2022/01/28

Golder Associates Ltd  
Client Project #: 21497139  
Sampler Initials: AB

### VALIDATION SIGNATURE PAGE

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

Colleen Acker, B.Sc, Scientific Service Specialist

Mike MacGillivray, Scientific Specialist (Inorganics)

Phil Deveau, Scientific Specialist (Organics)

Rosemarie MacDonald, Scientific Specialist (Organics)



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105-200 Bluewater Road, Bedford, NS B4B 1G9  
49-55 Elizabeth Avenue, St John's, NL A1A 1W9  
465 George Street, Unit G, Sydney, NS B1P 1K5

Tel: 902-420-0203 Fax: 902-420-8612 Toll Free: 800-565-7227  
Tel: 709-754-0203 Fax: 709-754-8612 Toll Free: 1-867-952-7227  
Tel: 902-567-1255 Fax: 902-539-6504 Toll Free: 1-800-535-7770

CHAIN OF CUSTODY RECORD

ENV COC - 00016V2

Page 1 of 1

Invoice Information		Invoice to (requires report) <input type="checkbox"/>		Report Information (if differs from invoice)				Project Information			
Company: Golder Associates		Company:		Quotation #: C04828				LAB USE ONLY - PLACE STICKER HERE <b>Job #: CIAF026</b>			
Contact Name: Belinda Culgin		Contact Name:		P.O. #/ A/FER:							
Street Address: 201 Brownlow Ave, Suite 26		Street Address:		Project #: 21497139							
City: Dartmouth	Prov: NS	Postal Code: B3B1W2	City:	Prov:	Postal Code:	Site #:					
Phone: (902) 466-1668		Phone:		Site Location:							
Email: belinda_culgin@golder.com		Email:		Site Location Province:							
Copies: james_doyle@golder.com		Copies:		Sampled By: A Brunskill							

Regulatory Criteria		Regulation		Matrix		Regular Turnaround Time (TAT)																						
**Specify matrix for each regulation: surface water (SW)/groundwater (GW)/tap water/sewage/effluent/seawater/potable water/non-potable water/tissue/soil/sludge/metal						<input checked="" type="checkbox"/> 5 to 7 Day <input type="checkbox"/> 10 Day <b>Rush Turnaround Time (TAT) Surcharges apply</b> <input type="checkbox"/> Same Day <input type="checkbox"/> 1 Day <input type="checkbox"/> 2 Day <input type="checkbox"/> 3 Day <input type="checkbox"/> 4 Day Date Required: YY MM DD Comments																						
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS						HOLD - DO NOT ANALYZE																						
Sample Identification	Date Sampled			Time (24hr)		Matrix	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
	YY	MM	DD	HH	MM		FIELD FILTERED	FIELD PRESERVED	LAB FILTRATION REQUIRED	ICAP MS (total metals) well / surface water	ICAP MS (dissolved metals) SW	Total metals (default) SW / GW	Dissolved metals for ground water	Total mercury - water	Dissolved mercury - water	Metals/mercury default (acid ext.)	HWS boron (CCME - gr/ landfill)	BBCA HC (BTEX, LC-C32)	CCME HC (F1/BTEX, F2-F4)	PAHs (default: 20 water/soil)	PEBS - default	PCBs - CCME sediment	VOCs	Total coliform/ fec (presence/absence)	Total coliform/ col (count)	General Chemistry	# OF CONTAINERS SUBMITTED	HOLD - DO NOT ANALYZE
1 BFR_L1_GW1	21	12	19	13	18	Water - Ground	x						x	x				x	x								x	12
2 BFR_L1_GW2	21	12	19	15	37	Water - Ground	x						x	x				x	x								x	12
3 BFR_L1_GW3	21	12	19	17	13	Water - Ground	x						x	x				x	x								x	12
4 BFR_L1_GW_DUP1	21	12	19	13	18	Water - Ground	x						x	x				x	x								x	12
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

\*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY.

LAB USE ONLY		Yes	No	Seal present		Seal intact		Cooling media present		LAB USE ONLY		Yes	No	Seal present		Seal intact		Cooling media present		LAB USE ONLY		Yes	No	Seal present		Seal intact		Cooling media present		Temperature reading by:
				2		1		2																						
Relinquished by: (Signature/ Print)				Date				Time				Received by: (Signature/ Print)				Date				Time				Special instructions						
				YY MM DD HH MM								Pen YVES ROUSSELS				YY MM DD HH MM														

2021 DEC 24 10:59

**APPENDIX D**

**NCSCS**

**CCME National Classification System for Contaminated Sites (2008) version 1.3**  
**Pre-Screening Checklist**

Question	Response (yes / no)	Comment
1. Are <b>Radioactive material, Bacterial contamination or Biological hazards</b> likely to be present at the site?	No	If yes, do not proceed through the NCSCS. Contact applicable regulatory agency immediately.
2. Are there <b>no contamination exceedances</b> (known or suspected)? Determination of exceedances may be based on: 1) CCME environmental quality guidelines; 2) equivalent provincial guidelines/standards if no CCME guideline exists for a specific chemical in a relevant medium; or 3) toxicity benchmarks derived from the literature for chemicals not covered by CCME or provincial guidelines/standards; or 4) background concentration.	No	If yes ( <i>i.e.</i> , there are no exceedances), do not proceed through the NCSCS.
3. Have <b>partial/incompleted or no environmental site investigations</b> been conducted for the Site?	No	If yes, do not proceed through the NCSCS.
4. Is there direct and significant evidence of <b>impacts to humans</b> at the site, or off-site due to migration of contaminants from the site?	No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated.
5. Is there direct and significant evidence of <b>impacts to ecological receptors</b> at the site, or off-site due to migration of contaminants from the site?	No	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are considered to be severe, the site may be categorized as Class 1, regardless of the numerical total NCSCS score. For the purpose of application of the NCSCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction.
6. Are there indicators of significant <b>adverse effects in the exposure zone</b> ( <i>i.e.</i> , the zone in which receptors may come into contact with contaminants)? Some examples are as follows: -Hydrocarbon sheen or NAPL in the exposure zone -Severely stressed biota or devoid of biota; -Presence of material at ground surface or sediment with suspected high concentration of contaminants such as ore tailings, sandblasting grit, slag, and coal tar.	No	To answer "yes", two scenarios should be satisfied; (1) there has to be a high probability that receptors will be exposed to the contaminant source in the near future, and (2) the predicted impacts to ecological receptors after exposure must be significant (see question 5). A low probability of exposure resulting in significant impacts, or a high probability of exposure but with only low to moderate effects expected should not result in a Class 1 designation, neither would a low probability of exposure resulting in low-to-moderate effects.  If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated.
7. Do measured concentrations of volatiles or unexploded ordnances represent an <b>explosion hazard</b> ?	No	If yes, do not proceed through the NCSCS. Do not continue until the safety risks have been addressed. Consult your jurisdiction's occupational health and safety guidance or legislation on explosive hazards and measurement of lower explosive limits.

**CCME National Classification System for Contaminated Sites (2008) version 1.3  
Pre-Screening Checklist**

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**Rationale for not proceeding with NCSCS**  
(document any assumptions, reports, or site-specific information to support selection of "Yes" in Pre-Screening checklist)

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If none of the above applies, proceed with the NCSCS scoring.

**CCME National Classification System for Contaminated Sites (2008) version 1.3**  
**Summary of Site Conditions**

<b>Site:</b>	Site will be identified by:	Site Common Name
Civic Address: <i>(or other description of location)</i>	Reach Road, Burgeo, NL	
Site Common Name: <i>(if applicable)</i>	Burgeo Range	
Code identifier: <i>(e.g., FCSI 8-digit identifier)</i>		
Site Owner or Custodian: <i>(Organization and Contact Person)</i>	Department of National Defence	
Legal description or metes and bounds:	Burgeo Range is located on the east and west side of Reach Road (Route 480), approximately 3.5 km north of the Town of Burgeo.	
Approximate Site area:	638 Ha	
Parcel Identifier(s) [PID]: <i>(or Parcel Identification Numbers [PIN] if untitled Crown land)</i>		
Centre of site: <i>(provide latitude/longitude or UTM coordinates)</i>	Latitude: _____ degrees _____ min _____ secs; Longitude: _____ degrees _____ min _____ secs	
	UTM Coordinate: Northing 5277505.16 Easting 452616.85	
Site Land Use:	Current:	Agricultural
	Proposed:	Agricultural
<b>Site Plan</b>	<b>To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.</b>	
Provide a brief description of the Site:	<p>The Burgeo Range - Location 1 - is located on the east side of Reach Road (Route 480), approximately 3.5 km north of the Town of Burgeo. There is a small, approximately 200 m long, gravel access road on the far west side of the Site extending from Reach Road. There are "No Trespassing" and "Range Closed" signs present at the entrance to the Range. A second location (Location 2), near Location 1 but across the road, was also been used as a firing range by 5CRPG.</p> <p>The Site has a total approximate area of 638 Ha (319 Ha in Location 1 and 319 Ha in Location 2) and is an open area comprised mostly of boggy terrain with exposed bedrock outcrops and several waterbodies. There are no buildings or structures onsite.</p>	

**CCME National Classification System for Contaminated Sites (2008) version 1.3  
Summary of Site Conditions**

Affected media and Contaminants of Potential Concern (COPC):	Soil - PHCs, PAHs, metals Sediment - PHCs, PAHs, metals Surface water - PHCs, PAHs, metals Groundwater - PHCs, PAHs, metals
--	--

Please fill in the "letter" that best describes the level of information available for the site being assessed

Site Letter Grade

**C**

***If letter grade is F, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent***

Scoring Completed By:	Golder Associates Ltd.
Date Scoring Completed:	01-Feb-21

(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<b>1. Residency Media (replaces physical state)</b>				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? <b>yes</b> = has an exceedance or strongly suspected to have an exceedance <b>no</b> = does not have an exceedance or strongly suspected not to have an exceedance		It should be noted that exceedances are based on the guidelines provided by the province of Newfoundland - including Atlantic RBCA and CCME guidelines, where applicable. Exceedances include:  Soil - metals Sediment - PHC, PAHs, metals Surface water - metals Groundwater - metals	The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline).  Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at <a href="http://st-ts.ccme.ca/">http://st-ts.ccme.ca/</a>  For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at <a href="http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php">http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php</a>	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	Yes			
Yes No Do Not Know				
B. Groundwater	Yes			
Yes No Do Not Know				
C. Surface water	Yes			
Yes No Do Not Know				
D. Sediment	Yes			
Yes No Do Not Know				
"Known" -score	8			
"Potential" - score	---			
<b>2. Chemical Hazard</b>				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)?	High	Exceedances reported include:  Soil - metals Sediment - PHC, PAHs, metals Surface water - metals Groundwater - metals	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site.  The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file.  <i>See Attached Reference Material for Contaminant Hazard Rankings.</i>	Hazard as defined in the revised NCSCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
High Medium Low Do Not Know				
"Known" -score	8			
"Potential" - score	---			

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(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<b>3. Contaminant Exceedance Factor</b>				
<p>What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")?</p> <p>NAPL (mobile or immobile)                      High (&gt;100x)                      Medium (10x to 100x)                      Low (1x to 10x)                      Do Not Know</p>	<p>Medium (10x to 100x)</p>	<p>Soil:                      modified total petroleum hydrocarbons (mTPH) exceeded applicable guidelines by 1.11 times at BFR_SS21_SA1. Samples with mTPH exceedances contained organic peat (i.e., natural hydrocarbons) and the elevated concentrations are attributed to this as per communication with the laboratory.                      Cadmium exceeded applicable guidelines up to 2.21 times                      Lead exceeded applicable guidelines by up to 11.14 times                      Selenium exceeded applicable guidelines up to 8.0 times                      Tin exceeded applicable guidelines by 3.20 times                      Zinc exceeded applicable guidelines by 1.35 times</p> <p>Sediment:                      mTPH exceeded applicable guidelines by up to 69.77. However, these elevated concentrations are attributed to organic material present in the samples.                      Lead exceeded applicable guidelines by up to 22.00 times</p> <p>Surface water:                      Aluminum exceeded applicable guidelines by up to 78.00 times                      Copper exceeded applicable guidelines by up to 1.10 times                      Iron exceeded applicable guidelines by up to 1.23 times                      Lead exceeded applicable guidelines by up to 8.60 times</p> <p>Groundwater:                      Aluminum exceeded applicable guidelines by up to 2.0 times                      Cadmium exceeded applicable guidelines by up to 8.78 times                      Copper exceeded applicable guidelines by up to 1.45 times                      Lead exceeded applicable guidelines by up to 2.17 times</p>	<p>Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the <i>most conservative media-specific and land-use appropriate CCME</i> environmental quality guidelines. <b>Ranking should be based on contaminant with greatest exceedance of CCME guidelines.</b></p> <p>Ranking of contaminant hazard as high, medium and low is as follows:                      High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines                      Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines                      Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines</p> <p>NAPL (LNAPL or DNAPL) = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Any amount of NAPL should be scored, i.e. small amounts and sheens cannot be ignored.</p> <p>The presence of a NAPL (mobile or immobile or regardless of amount) may be considered unacceptable by some jurisdictions. If NAPL is present, consult jurisdiction on how to proceed with NCSCS.</p> <p>Other standards may include local background concentration or published toxicity benchmarks.</p> <p>Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels.                      High = lethality observed.                      Medium = no lethality, but sub lethal effects observed.                      Low = neither lethal nor sub lethal effects observed.</p>	<p>In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria.</p> <p>Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=&gt;1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.</p>
<p>"Known" -score                      "Potential" - score</p>	<p>4                      ---</p>			
<b>4. Contaminant Quantity (known or strongly suspected)</b>				
<p>What is the known or strongly suspected quantity of all contaminants?</p> <p>&gt;10 hectare (ha) or 5000 m<sup>3</sup>                      2 to 10 ha or 1000 to 5000 m<sup>3</sup>                      &lt;2 ha or 1000 m<sup>3</sup>                      Do Not Know</p>	<p>Do Not Know</p>	<p>Estimated areas of impact were not calculated as delineation was not completed.</p>	<p>Measure or estimate the area or quantity of total contamination (i.e., all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.</p>	<p>A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.</p>
<p>"Known" -score                      "Potential" - score</p>	<p>---                      4</p>			



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(I) Contaminant Characteristics

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
<b>5. Modifying Factors</b>				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment?  Yes No Do Not Know	No		Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days.  Elements do not degrade, therefore treat any metal, metalloid, or halogen COPC as persistent.	<i>Examples of Persistent Substances are provided in attached Reference Materials</i>
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location?  Yes No Do Not Know	No	Based on the known COCs for the Site, damage (corrosion, etc.) to utilities and infrastructure is not anticipated.	If answered Yes, in Rationale for Score column document the location and extent of the infrastructure that is/may be damaged, verify the mode of contact between contaminants of potential concern (COPCs) and infrastructure, list the specific COPCs that could cause damage, and note the expected effect on specific infrastructure.	Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances?  one two to four five or more Do Not Know	two to four	PHCs, PAHs, metals.	For the purposes of the revised NCSCS, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	<i>Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.</i>
"Known" - Score	2			
"Potential" - Score	---			

**Contaminant Characteristic Total**

Raw Total Score- "Known"	22	
Raw Total Score- "Potential"	4	
Raw Combined Total Score (Known + Potential)	26	
<b>Adjusted Total Score (Raw Combined / 40 * 33)</b>	<b>21.5</b>	maximum 33

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>1. Groundwater Movement</b>				
<b>A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.</b>				
i) For <b>potable groundwater environments</b> , 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For <b>non-potable environments</b> (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non-potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts.  ii) Same as (i) except the information is not known but <b>strongly suspected</b> based on indirect observations.  iii) Meets GCDWQ for potable environments; meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for non-potable environments or Absence of groundwater exposure pathway ( <i>i.e.</i> , there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight).	12	Select metals (aluminum, cadmium, cobalt, copper, iron, and zinc) exceeded the applicable groundwater standards.	Review chemical data and evaluate groundwater quality.  The evaluation method concentrates on 1) a potable or non-potable groundwater environment; 2) the groundwater flow system and its potential to be an exposure pathway to known or potential receptors  An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis.  Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils.  Seeps and springs are considered part of the groundwater pathway.  In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.	The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries.  Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links.  Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered.  <b>Selected References</b>  <u>Potable Environments</u>  Guidelines for Canadian Drinking Water Quality: <a href="http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php">http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php</a>  <u>Non-Potable Environments</u>  CCME. 1999. Canadian Water Quality Guidelines for Protection of Aquatic Life. <a href="http://ceqg-rcqe.ccome.ca/">http://ceqg-rcqe.ccome.ca/</a>  Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.
	9			
	0			
	Score			
<b>NOTE: If a score is assigned here for Known COPC Exceedances, then you should skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)</b>				
<b>B. Potential for groundwater pathway.</b>				
a. Relative mobility of contaminant High Moderate Low Insignificant Do Not Know	Do Not Know		Organics Koc (L/kg)  Koc < 500 ( <i>i.e.</i> , log Koc < 2.7) Koc = 500 to 5000 ( <i>i.e.</i> , log Koc = 2.7 to 3.7) Koc = 5,000 to 100,000 ( <i>i.e.</i> , log Koc = 3.7 to 5) Koc > 100,000 ( <i>i.e.</i> , log Koc > 5)  For PHC fractions; score F1 as Moderate, F2 as Low, and F3 and F4 as Insignificant.	Reference: US EPA Soil Screening Guidance (Part 5 - Table 39)  If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.
	Score			
b. Presence of engineered sub-surface containment? No containment Partial containment Full containment Do Not Know	No containment		Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved. Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for "Full Containment" scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.	Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links.  <b>Selected Resources:</b> United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128.
	Score			
c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway 3 m or less including no confining layer or discontinuous confining layer 3 to 10 m > 10 m Do Not Know	3 m or less	Shallowest groundwater level 2.30 m.	The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow.  Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway. The evaluation of this category is based on: 1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or 2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone ( <i>e.g.</i> , water table aquifer, first hydrostratigraphic unit or other groundwater pathway).	
	Score			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
d. Hydraulic conductivity of confining layer >10 <sup>-4</sup> cm/s or no confining layer 10 <sup>-4</sup> to 10 <sup>-6</sup> cm/s <10 <sup>-6</sup> cm/s Do Not Know	Do Not Know	Water located within bedrock. Hydraulic conductivity above unknown	Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on: 1) The presence and hydraulic conductivity ("K") of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or 2) The presence and permeability ("k") of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.	
Score	0.5			
<b>B. Potential for groundwater pathway.</b>				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High (infiltration score > 0.6) Moderate (0.4 < infiltration score ≤ 0.6) Low (0.2 < infiltration score ≤ 0.4) Very Low (0 < infiltration score ≤ 0.2) None (infiltration score = 0) Do Not Know	High 1	Burnt Pond Climate Station (1981-2010) used - closest to site. Avg. rainfall = 1087.9 mm Avg. snowfall = 362.4 cm = 3624 mm Total avg. precipitation = 4711.9 mm Score = 4711.9/1000 = 4.7  Permeability: assume 0.6 for sand  4.7 x 0.6 = 2.82	<u>Precipitation</u> Refer to Environment Canada precipitation records for relevant areas (30 year average preferred). Divide annual precipitation (rainfall + snowfall) by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score).  <u>Permeability</u> For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0).  Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate (e.g., precipitation factor of 0.7 from above x 0.6 (sand) = 0.42 or "Moderate").	Selected Sources:  Environment Canada web page link: <a href="http://climate.weather.gc.ca/climate_normals/index_e.html">http://climate.weather.gc.ca/climate_normals/index_e.html</a>  Snow to rainfall conversion apply ratio of 10(snow):1(water) <a href="https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1">https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1</a>
Score	1			
f. Hydraulic conductivity of aquifer >10 <sup>-2</sup> cm/s 10 <sup>-2</sup> to 10 <sup>-4</sup> cm/s <10 <sup>-4</sup> cm/s Do Not Know	Do Not Know	Water located within bedrock. Hydraulic conductivity unknown	Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Score	1			
Potential groundwater pathway total	8.5			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
<b>Groundwater pathway total</b>	<b>12</b>			
<b>2. Surface Water Movement</b>				
<b>A. Demonstrated migration of COPC in surface water above background conditions</b>				
Known concentrations of surface water:  i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g., toxicity testing; or other indicator testing of exposure).  ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations.  iii) Meets CWQG or absence of surface water exposure pathway (e.g., Distance to nearest surface water is > 5 km.)	12  8  0  12 12	Metals (aluminum, copper, iron, lead, and zinc) in surface water are >1x applicable guidelines.	Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.  Examples of indirect evidence may include observed staining of sediment and/or river banks, but surface water has not been tested.	General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.  Selected References:  CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life <a href="http://ceqg-rcqe.come.ca/">http://ceqg-rcqe.come.ca/</a>  CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) <a href="http://ceqg-rcqe.come.ca/">http://ceqg-rcqe.come.ca/</a>  Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality. <a href="http://www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php">http://www.hc-sc.gc.ca/ewh-semt/water-eau/recreat/index-eng.php</a>
Score	12			
<b>NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you should skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)</b>				

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>B. Potential for migration of COPCs in surface water</b>				
a. Presence of containment No containment Partial containment Full containment Do Not Know	Do Not Know 3		Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know	Do Not Know 2		Review available mapping and survey data to determine distance to nearest surface water bodies.	
c. Topography Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is intermediate Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know	Do Not Know 1		Review engineering documents on the topography of the site and the slope of surrounding terrain. Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (e.g., trench, above ground, etc.).	
d. Run-off potential High (run-off score > 0.6) Moderate (0.4 < run-off score ≤ 0.6) Low (0.2 < run-off score ≤ 0.4) Very Low (0 < run-off score ≤ 0.2) None (run-off score = 0) Do Not Know	Do Not Know 0.4		<u>Precipitation</u> Refer to Environment Canada precipitation records for relevant areas (30 year average preferred). Divide precipitation (rainfall + snowfall) by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). <u>Permeability</u> For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the permeability (infiltration) factor with precipitation factor to obtain Run-off potential score (e.g., precipitation factor of 0.7 from above x 0.6 (loam) = 0.42 or "Moderate").	Selected Sources: Environment Canada web page link: <a href="http://climate.weather.gc.ca/climate_normals/index_e.html">http://climate.weather.gc.ca/climate_normals/index_e.html</a> Snow to rainfall conversion apply ratio of 10(snow):1(water) <a href="https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1">https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&amp;n=108C6C74-1</a>
e. Flood potential 1 in 2 years 1 in 10 years 1 in 50 years not in floodplain Do Not Know	Do Not Know 0.5		Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.	
Potential surface water pathway total	6.9			
Allowed Potential score	--	Note: If a "known" score is provided, the "potential" score is disallowed.		
<b>Surface water pathway total</b>	<b>12</b>			
<b>3. Surface Soils (potential for dust, dermal and ingestion exposure)</b>				
<b>A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)</b>				
COPCs measured in surface soils exceed the CCME soil quality guideline.	12	Metals (antimony, cadmium, copper, boron, iron, lead, manganese, selenium, tin, vanadium) exceed applicable criteria.	Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e., agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).	Selected References: CCME. 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. <a href="http://ceqg-rcqe.ccm.ca/">http://ceqg-rcqe.ccm.ca/</a>
Strongly suspected that soils exceed guidelines.	9			
COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).	0		Examples of strongly suspected exceedences of soil guidelines may include evidence of staining, odours, or significant debris infill materials.	
	12			
Score	12			
<b>NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you should skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)</b>				

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>B. Potential for a surface soils (top 1.5 m) migration pathway</b>				
a. Are the soils in question covered? Exposed Vegetated Landscaped Paved Do Not Know  Score	Exposed		Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit.  Landscaped surface soils must include a minimum of 0.5 m of topsoil.	The possibility of contaminants in blowing snow have not been included in the revised NCSCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.
	6			
b. For what proportion of the year does the site remain covered by snow? 0 to 10% of the year 10 to 30% of the year More than 30% of the year Do Not Know  Score	10-30% of year		Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).	
	3			
Potential surface soil pathway total	9			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
<b>Soil pathway total</b>	<b>12</b>			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>4. Vapour</b>				
<b>A. Demonstrated COPCs in vapour.</b>				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	Data not available.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured (i.e. not detected) and volatile hydrocarbons have not been found in site soils or groundwater, or vapour has been measured (indoor or outdoor) in concentrations not exceeding risk based concentrations.	0		Due to the potential for significant spatial and temporal variation in soil vapour concentrations, limited vapour monitoring studies (e.g., single point in time "snap-shot") that do not detect vapour at sites where volatiles are suspected, does not necessarily mean that vapours are not an issue at the site. In this case, section B "Potential for COPCs in vapour" should be completed.	
	0			
Score	0			
<b>NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you should skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)</b>				
<b>B. Potential for COPCs in vapour</b>				
a. Relative Volatility based on Henry's Law Constant, H' (dimensionless) High (H' > 1.0E-1) Moderate (H' = 1.0E-1 to 1.0E-3) Low (H' < 1.0E-3) Not Volatile Do Not Know	Not Volatile		Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) <i>Provided in Attached Reference Materials</i>  For PHC fractions; score F1 as High, F2 as Moderate, and F3 and F4 as Not Volatile.  Substance is considered Not Volatile (i.e., pathway not a concern) if the product of the water solubility and unitless Henry's law constant does not exceed published or derived tolerable concentration or risk-specific concentration. If NAPL is present, see Appendix D of the CCME soil vapour quality guideline protocol (CCME 2014) for further guidance.	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.  Selected References: CCME. 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. Winnipeg, Manitoba. <a href="http://cegg-rcqe.ccm.ca">http://cegg-rcqe.ccm.ca</a>
Score	0			
b. What is the soil grain size? Fine Coarse Do Not Know	Coarse	Lab grain size analysis determined predominantly coarse soil onsite.	Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours.  Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
Score	0			
c. Is the depth to the source less than 10m? Yes No Do Not Know	Yes		Review groundwater depths below grade for the site.	
Score	0			
d. Are there any preferential pathways? Yes No Do Not Know	No	No preferential pathways were identified.	Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	0			
Potential vapour pathway total	0			
Allowed Potential score	---	<b>Note: If a "known" score is provided, the "potential" score is disallowed.</b>		
<b>Vapour pathway total</b>	<b>0</b>			
<b>5. Sediment Movement</b>				
<b>A. Demonstrated migration of sediments containing COPCs</b>				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	Not assessed.	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future. or Sediment meets CCME sediment quality guidelines or absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
	Go to Potential			
Score	---			
<b>NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you should skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)</b>				

(II) Migration Potential (Evaluation of contaminant migration pathways)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>B. Potential for sediment migration</b>				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")? Yes No Do Not Know	No 4	Only small to very small waterbodies onsite.	Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash? Yes No Do Not Know	No 0			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring? Yes No Do Not Know	No 0			
Potential sediment pathway total	4	<b>Note: If a "known" score is provided, the "potential" score is disallowed.</b>		
Allowed Potential score	4			
<b>Sediment pathway total</b>	<b>4</b>			
<b>6. Modifying Factors</b>				
Are there subsurface utility conduits in the area affected by contamination? Yes No Do Not Know	No		Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Known Potential	0 ---			

Migration Potential Total		
Raw Total Score- "Known"	36	<b>Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.</b>
Raw Total Score- "Potential"	4	
Raw Combined Total Score (Known + Potential)	40	
<b>Adjusted Total Score (Raw Combined / 64 * 33)</b>	<b>20.6</b>	

maximum 33

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>1. Human</b>				
<b>A. Known exposure</b>				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*)	22	<p>*Where adverse effects on humans are documented, the site should be automatically designated as a Class 1 site (i.e., action required). Known impacts could include blood test results (e.g., blood lead &gt; 10 µg/dL) or results of other health based studies and tests. There is no need to proceed through the NCSCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired. A score of 22 can also be assigned when Hazard Quotients (or Hazard Index) &gt;&gt; 1.0 or incremental lifetime cancer risks considerably exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals.</p> <p>The category, "Strongly suspected", can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients (or Hazard Index) &gt; 0.2 (excluding the Estimated Daily Intake) or &gt; 1.0 with Estimated Daily Intake and/or incremental lifetime cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either &gt;10<sup>-5</sup> or &gt;10<sup>-6</sup>).</p> <p>The category, no exposure/impacts, can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients (or Hazard Index) of ≤ 0.2 (excluding the Estimated Daily Intake) or ≤ 1.0 with Estimated Daily Intake AND incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10<sup>-6</sup> or 10<sup>-5</sup>).</p>	<p>Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet.</p> <p>Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site.</p> <p><b>Selected References:</b>                      Health Canada – Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Health Screening Level Risk Assessments, available at <a href="http://www.hc-sc.gc.ca/ewh-semt/pubs/contam/site/index-eng.php">http://www.hc-sc.gc.ca/ewh-semt/pubs/contam/site/index-eng.php</a>                      United States Environmental Protection Agency, Integrated Risk Information System (IRIS), available at <a href="http://toxnet.nlm.nih.gov">http://toxnet.nlm.nih.gov</a></p>	
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	10			
No quantified or suspected exposures/impacts in humans.	0			
Score	---			
<p><b>NOTE: If a score is assigned here for Known Exposure, then you should skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)</b></p>				
<b>B. Potential for human exposure</b>				
a) Land use (provides an indication of potential human exposure scenarios)  Agricultural Residential / Parkland Commercial Industrial Do Not Know	Agricultural  3	Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place.  Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Parkland includes campgrounds, but excludes wildlands such as national or provincial parks. Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
b) Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination)  Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered  Do Not Know	Access, not covered  2	Site is easily accessible although "Range Closed" and "No Trespassing" signs are erected at entrance. Site has vegetation cover.		
<b>B. Potential for human exposure</b>				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential).  i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know	Yes  3	Metals impacts in surface soils.	If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.



(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<p>ii) inhalation (i.e., inhalation of dust, vapour)</p> <p>Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Dust - If there is contaminated surface soil (e.g., top 1.5 m), indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero.</p> <p>Fine Coarse Surface soil is not contaminated or absent (bedrock) Do Not Know Texture</p> <p>Score</p> <p>inhalation total</p>	<p>No</p> <p>0</p> <p>Coarse</p> <p>1</p> <p>1</p>	<p>Metals impacts in surface soils. Soils are coarse grained.</p>	<p>If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) relative to buildings. Refer to (II) Migration Potential worksheet, 4B.a), <i>Potential for COPCs in Vapour</i> for a definition of volatility.</p> <p>Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts.</p>	<p>Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion.</p> <p>Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts.</p> <p>General Notes; Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.</p> <p>Selected References; Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332. <a href="http://ceag-rcqe.ccme.ca/">http://ceag-rcqe.ccme.ca/</a> Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC</p>
B. Potential for human exposure				
<p>iii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods.</p> <p>Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future).</p> <p>0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present No potential for aquifer contamination Do Not Know</p> <p>Score</p> <p>Is an alternative water supply readily available?</p> <p>Yes No Not Applicable Do Not Know</p> <p>Score</p> <p>Is human ingestion of contaminated soils possible?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings?</p> <p>Yes No Do Not Know</p> <p>Score</p> <p>Ingestion total</p>	<p>300 m to 1 km</p> <p>2</p> <p>No</p> <p>1</p> <p>Yes</p> <p>3</p> <p>Do Not Know</p> <p>0.5</p> <p>6.5</p>	<p>Town of Burgeo municipal water supply approx 1 km south of Site.</p> <p>Metals impacts in surface soils.</p> <p>Hunting wildlife from the site is possible however we do not have information to support this statement at this time.</p>	<p>Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure.</p> <p>The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of flow and contaminant transport.</p> <p>For aquifers, examples of "No drinking water present" includes municipal bylaws prohibiting water wells for potable water use and naturally non-potable (e.g., saline) shallow groundwater.</p> <p>Groundwater used for drinking water may not be at risk from contamination due to a lack of hydrological connection between contaminated soil or groundwater, or the drinking water is sufficiently up-gradient of the contamination source. Selection of "No potential for aquifer contamination" must be supported with sufficient documentation, e.g., lithological and contaminant properties, well capture zones (map drawn to scale), and capture zone delineation methodology.</p> <p>Answer Not Applicable if "No drinking water present" or "No potential for aquifer contamination" was selected in previous question.</p> <p>If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.</p> <p>Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.</p>	<p><b>Selected References:</b> Guidelines for Canadian Drinking Water Quality: <a href="http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php">http://hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php</a></p> <p>Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable.</p> <p>Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.</p>
<p>Human Health Total "Potential" Score</p> <p>Allowed "Potential" Score</p>	<p>15.5</p> <p>15.5</p>	<p>Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.</p>		

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>2. Human Exposure Modifying Factors</b>				
a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.) in contaminated area.	No	The Site is not intended for public access and has "No Trespassing" and "Range Closed" signs at entrance.		
Yes				
No				
Do Not Know				
Human Exposure Modifying Factors - "Known"	0			
Human Exposure Modifying Factors - "Potential"	---			
Raw Human "Known" total	0			
Raw Human "Potential" total	15.5			
Raw Combined Total Human Score	15.5			
<b>Adjusted Total Human Score (max 22)</b>	<b>15.5</b>			
<b>3. Ecological</b>				
<b>A. Known exposure</b>				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.	18	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired.	This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.	CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life. CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses. <a href="http://ceqg-rcqe.ccm.ca/">http://ceqg-rcqe.ccm.ca/</a> Sensitive receptors- review: Canadian Council on Ecological Areas; <a href="http://www.ccea.org">www.ccea.org</a> Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in <i>A Framework for Ecological Risk Assessment: General Guidance</i> (CCME 1996).  Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	12			
No quantified or suspected exposures/impacts in terrestrial or aquatic organisms	0			
Score	---			
<b>NOTE: If a score is assigned here for Known Exposure, then you should skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)</b>				
<b>B. Potential for ecological exposure (for the contaminated portion of the site)</b>				
a) Terrestrial		Review zoning and land use maps. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration).	Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
i) Land use				
Agricultural (or Wild lands)				
Residential / Parkland				
Commercial				
Industrial				
Do Not Know				
Score	Agricultural (or Wild lands) 3			
ii) Uptake potential		Metals impacts in surface soils.		
Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site?	Yes	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.		
Yes				
No				
Do Not Know				
Score	1			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water) Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know Score	Yes 1	Metals impacts in surface soils, surface water, and groundwater. Metals and PAH impacts in sediment.	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.  Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.  Substances can be considered bioaccumulative if; • There is a Tissue Residue Guideline (TRG) or Soil Quality Guideline for Soil and Food Ingestion for the protection of secondary (SQG <sub>2c</sub> ) and/or tertiary consumers (SQG <sub>3c</sub> ). • Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000. • If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5.  If a literature review indicates that a substance biomagnifies, it should be treated as biomagnifying regardless of whether or not it meets the criteria above. It should also be noted that some substances with a log Kow greater than 5 do not biomagnify. If studies on a substance with a high Kow demonstrate a lack of biomagnification in upper trophic levels, then the substance can be considered not bioaccumulative.  Petroleum hydrocarbons F1 to F4 are not considered bioaccumulative.	See attached Reference Material including log(Kow)  Consult CEPA (1999) Persistence and Bioaccumulation Regulations for additional guidance; <a href="http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html">http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html</a>
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know Score	Yes 1			
Can the contamination identified bioaccumulate? Yes No Do Not Know Score	Do Not Know 0.5			
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know Score	1 to 5 km 1			
Raw Terrestrial "Potential" total Allowed Terrestrial "Potential" total	7.5 7.5			
<b>B. Potential for ecological exposure (for the contaminated portion of the site)</b>				
b) Aquatic i) Classification of aquatic environment Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know Score	Typical 1	Town of Burgeo municipal water supply approx 1 km south of Site.	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species.  "Typical aquatic environments" include those in areas other than those listed above.	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments.
ii) Uptake potential  Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know Score	Do Not Know 0.5			
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know Score	300 m to 1 km 2	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: <a href="http://www.ccea.org">www.ccea.org</a>	Substances can be considered bioaccumulative if; • There is a Tissue Residue Guideline (TRG) • Bioaccumulation factor (BAF) or bioconcentration factor (BCF) greater than 5000. • If BAF or BCF is not available, or reliable, the log Kow is equal to or greater than 5.  If a literature review indicates that a substance biomagnifies, it should be treated as biomagnifying regardless of whether or not it meets the criteria above. It should also be noted that some substances with a log Kow greater than 5 do not biomagnify. If studies on a substance with a high Kow demonstrate a lack of biomagnification in upper trophic levels, then the substance can be considered not bioaccumulative.	See attached Reference Material including log(Kow) Consult CEPA (1999) Persistence and Bioaccumulation Regulations for additional guidance; <a href="http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html">http://laws-lois.justice.gc.ca/eng/regulations/SOR-2000-107/page-1.html</a>
Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues?  Yes No Do Not Know Score	Do Not Know 0.5			
Raw Aquatic "Potential" total Allowed Aquatic "Potential" total	4 4	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Site: Burgeo Range

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
<b>4. Ecological Exposure Modifying Factors</b>				
a) Known, or potential, occurrence of a species at risk.  Is there a potential for a species at risk to be present at the site, or a known presence? Yes No Do Not Know	No 0 ---	SAR assessment has not been completed at the Site; however, based on the size and habitat present at the Site, it is unlikely to provide critical habitat for SAR. SAR to be completed as part of final report	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as NatureServe Explorer ( <a href="http://explorer.natureserve.org/">http://explorer.natureserve.org/</a> ). Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.  To assess the potential for a species at risk to be present, the site (or surroundings) should be located within range of a species at risk (using on-line resources and consultation with knowledgeable government departments or biologists, see above), and there should be an assessment of habitat suitability for any identified potential species at risk.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act, available at: <a href="http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1">http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1</a> Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCMWLAP. 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection. <a href="http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk">http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/species-ecosystems-at-risk</a>
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavour).  Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know  Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know  Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know  Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	No 0 --- No 0 --- No 0 --- No 0 ---	Hunting or fishing not allowed onsite.	Documentation may consist of environmental investigation reports, press articles, petitions or other records.  Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.  A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer.  Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	This Item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
Ecological Modifying Factors Total - Known	0			
Ecological Modifying Factors Total - Potential	---			
Raw Ecological "Known" total	0			
Raw Ecological "Potential" total	11.5			
Raw Combined Total Ecological Score	11.5			
<b>Adjusted Total Ecological Score (Max 18)</b>	<b>11.5</b>			
<b>5. Other Potential Contaminant Receptors</b>				
a) Exposure of permafrost (leading to erosion and structural concerns)  Are there improvements (roads, buildings) at the site dependant upon the permafrost for structural integrity? Yes No Do Not Know  Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment? Yes No Do Not Know	No 0 --- No 0 ---		Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.  Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
Other Potential Receptors Total - Known	0			
Other Potential Receptors Total - Potential	---			
<b>Exposure Total</b>				
Raw Human Health + Ecological Total + Other Receptors - "Known"	0			
Raw Human Health + Ecological Total + Other Receptors - "Potential"	27	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.		
<b>Raw Total Exposure Score (not adjusted)</b>	<b>27</b>	HH or Eco Total score has not yet been capped at 22 and 18, respectively.		
<b>Adjusted Total Score (Adjusted Total Exposure / 46 * 34)</b>	<b>20.0</b>	maximum 34		

**CCME National Classification System (2008) version 1.3  
Score Summary**

Site: Burgeo Range

Scores from individual worksheets are tallied in this worksheet.  
Refer to this sheet after filling out the revised NCSCS completely.

I. Contaminant Characteristics	Known	Potential
1. Residency Media	8	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	4	---
4. Contaminant Quantity	---	4
5. Modifying Factors	2	---
<b>Raw Total Score</b>	<b>22</b>	<b>4</b>
<b>Raw Combined Total Score (Known + Potential)</b>	<b>26</b>	
<b>Adjusted Total Score (Raw Combined Total/40*33)</b>	<b>21.5</b> (max 33)	

II. Migration Potential	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	12	---
3. Soil	12	---
4. Vapour	0	---
5. Sediment Movement	---	4
6. Modifying Factors	0	---
<b>Raw Total Score</b>	<b>36</b>	<b>4</b>
<b>Raw Combined Total Score (Known + Potential)</b>	<b>40</b>	
<b>Adjusted Total Score (Raw Combined Total/64*33)</b>	<b>20.6</b> (max 33)	

III. Exposure	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B. Potential		
a. Land Use		3
b. Accessibility		2
c. Exposure Route		
i. Direct Contact		3
ii. Inhalation		1
iii. Ingestion		6.5
2. Human Receptors Modifying Factors	0	---
<b>Raw Total Human Score</b>	<b>0</b>	<b>15.5</b>
<b>Raw Combined Total Human Score (Known + Potential)</b>	<b>15.5</b>	
<b>Adjusted Total Human Score</b>	<b>15.5</b> (maximum 22)	
3. Ecological Receptors		
A. Known Impact	---	
B. Potential		
a. Terrestrial		7.5
b. Aquatic		4
4. Ecological Receptors Modifying Factors	0	---
<b>Raw Total Ecological Score</b>	<b>0</b>	<b>11.5</b>
<b>Raw Combined Total Ecological Score (Known + Potential)</b>	<b>11.5</b>	
<b>Adjusted Total Ecological Score</b>	<b>11.5</b> (maximum 18)	
5. Other Receptors	0	---
<b>Total Other Receptors Score (Known + Potential)</b>	<b>0</b>	
<b>Total Exposure Score (Human + Ecological + Other)</b>	<b>27</b>	
<b>Adjusted Total Score (Total Exposure/46*34)</b>	<b>20.0</b> (maximum 34)	

Site Score	
Site Letter Grade	<b>C</b>
Certainty Percentage	<b>75%</b>
% Responses that are "Do Not Know"	<b>9%</b>
<b>Total NCSCS Score for site</b>	<b>62.0</b>
<b>Site Classification Category</b>	<b>2</b>

Site Classification Categories\*:

- Class 1 - High Priority for Action (Total NCS Score >70)
- Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
- Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
- Class N - Not a Priority for Action (Total NCS Score <37)
- Class INS - Insufficient Information (≥15% of responses are "Do Not Know", or a site letter grade of F has been assigned)

\* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

**APPENDIX E**

# Species at Risk Assessment

## TECHNICAL MEMORANDUM

**DATE** March 03, 2022

**Project No.** 21497139

**TO** James Doyle  
Golder WSP

**CC**

**FROM** Fergus Nicoll

**EMAIL** [fergus.nicoll@wsp.com](mailto:fergus.nicoll@wsp.com)

### **SPECIES AT RISK ASSESSMENT AT THE BURGEO RANGE, BURGEO, NEWFOUNDLAND AND LABRADOR**

## **1.0 INTRODUCTION AND BACKGROUND**

A desktop review was undertaken to provide an assessment of the potential for Species at Risk (SAR) as listed under the Canada *Species at Risk Act* (SARA), and the Newfoundland and Labrador *Endangered Species Act* (ESA), at the Burgeo Range, Burgeo, Newfoundland and Labrador. There are two properties in the same vicinity, that were considered as part of these assessments, hereafter referred to as the "Site".

### **1.1 Species at Risk Act**

The SARA was created in 2003 as part of a strategy for protecting species at risk (SAR), in conjunction with an Accord for the Protection of Species at Risk and a Habitat Stewardship Program for Species at Risk. SARA is intended to prevent the extinction of species, subspecies or distinct populations, as well as provide populations with the opportunity to recover. This was accomplished through the establishment of an independent body to assess and identify SAR in Canada: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

### **1.2 Endangered Species Act**

The Newfoundland and Labrador Endangered Species Act (ESA) was created in 2001 and provides protection for plant and animal SAR in the province, and fulfils a commitment made under the National Accord for the Protection of Species at Risk. Species are designated under the ESA following recommendations from COSEWIC and/or the Species Status Advisory Committee (SSAC).

## **2.0 APPROACH**

Screening for SAR was undertaken based on a desktop review of available habitat information, records, and range maps of SAR that may occur within the vicinity of the Site. Sources of information included:

- Results of a Data Request from the Atlantic Canada Conservation Center Data Centre (ACDC)
- The Canada Species at Risk Public Registry
- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), including status reports and the online SAR public registry
- DFO Aquatic Species at Risk Maps

- eBird
- Bat Conservation International
- Newfoundland Department of Environment and Conservation web tools, including management plans
- Site photos and available aerial imagery for the Site and surrounding area

Information from the above sources was used to identify SAR that have been observed and documented in the area, as well as species with the potential to occur. Habitat information, including a review of site photographs and available aerial imagery, was used to assess the suitability for SAR based on their known habitat requirements. Professional opinion was used where necessary, based on an understanding of and experience with SAR, plants, plant communities, and their ecology.

The potential for the species to occur was determined through a probability of occurrence methodology. A ranking of Low indicates no suitable habitat availability for that species in the Study Area and no specimens identified. Moderate probability indicates greater potential for the species to occur, as suitable habitat appeared to be present in the Study Area, but no occurrence of the species recorded. High potential indicates a known species record in the Study Area (including identifications made during field surveys or during background data review) and good quality habitat is present. If a category could not be clearly determined based on the definitions above, professional opinion was used to make an assessment. Species screened as having a moderate to high potential to occur are considered to have suitable habitat conditions present and may require further confirmation to determine their status on the Site.

## 3.0 RESULTS

### 3.1 Habitat Description

The Site is a mosaic of open barrens, meadows, open wetlands, small disturbed areas, and scattered scrubby trees and shrubs. The Site also includes several ponds, a small watercourse, and a portion of Grandy Brook. Adjacent lands are made up of similar habitats than that of the Site.

### 3.2 Species at Risk

Based on the habitat assessment and records review of the Site and vicinity, four SAR have a moderate likelihood of occurring. This includes boreal felt lichen (*Erioderma pedicellatum*), short-eared owl (*Asio flammeus*), banded killifish (*Fundulus diaphanus*), and American eel (*Anguilla rostrata*). Stunted scattered trees on the Site, may be suitable habitat for boreal felt lichen. The open habitats that dominate the Site may be suitable nesting and foraging habitat for short-eared owl. All of the water bodies on the Site may be suitable habitat for banded killifish, and Grandy Brook may be habitat for American eel. Several other species have ranges that overlap the Site, but suitable habitat was not identified through this desktop assessment. Table 1 attached to this memorandum provides a summary of these species, their SARA and ESA status, and their likelihood of occurrence on the Site.

## 4.0 LIMITATIONS

The outcomes of this review and assessment are based on information available to Golder Associates Ltd. at the time of the review and the status of species listed in the noted Acts and Regulations effective as of the date of this technical memo. This assessment was based on a desktop study, and we were unable to confirm detailed habitat characteristics and the presence of SAR. A site visit and/or taxa-specific studies by a qualified ecologist would be required to complete a more comprehensive assessment.



**Golder Associates Ltd.**



Fergus Nicoll  
*Ecology Technical Specialist*

FN

Attachments: Table 1: Species At Risk Assessment

## 5.0 REFERENCES

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c:\users\fnicoll\documents\sar screening examples\2022\burgeo sar 2022.docx

**Table 1: Species at Risk Assessment**

Common Name	Scientific Name	COSEWIC <sup>a</sup>	SARA <sup>b</sup>	ESA <sup>c</sup>	Likelihood of Occurrence on the Site
Boreal felt lichen	<i>Erioderma pedicellatum</i>	Endangered	Endangered	Vulnerable	Moderate – stunted trees on the Site may be suitable habitat for this species.
Short-eared owl	<i>Asio flammeus</i>	Special Concern	Special Concern	Vulnerable	Moderate– the open areas that make up the majority of the Site may provide suitable foraging and nesting habitat for this species.
American eel	<i>Anguilla rostrata</i>	Threatened	No Status	Vulnerable	Moderate – the portion of Grandy Brook that overlaps with the Site, may be suitable habitat for this species.
Banded killifish	<i>Fundulus diaphanus</i>	Special Concern	Special Concern	Vulnerable	Moderate – The ponds and other waterbodies on the Site may be suitable habitat for this species.

**Notes:**

<sup>a</sup> Committee on the Status of Endangered Wildlife in Canada

<sup>b</sup> Canada *Species at Risk Act* (Schedule 1)

<sup>c</sup> Newfoundland and Labrador *Endangered Species Act* (ESA)

**APPENDIX F**

**Remediation & Risk Management  
Strategy**



**FINAL REPORT**

**Preliminary Remedial and Risk Management Strategy**  
*Former Burgeo Rifle Range, Burgeo, NL*

Submitted to:

**Defence Construction Canada**

Annette Murphy  
175 Western Parkway, Suite 100  
Bedford, NS  
B4B 0V1

Submitted by:

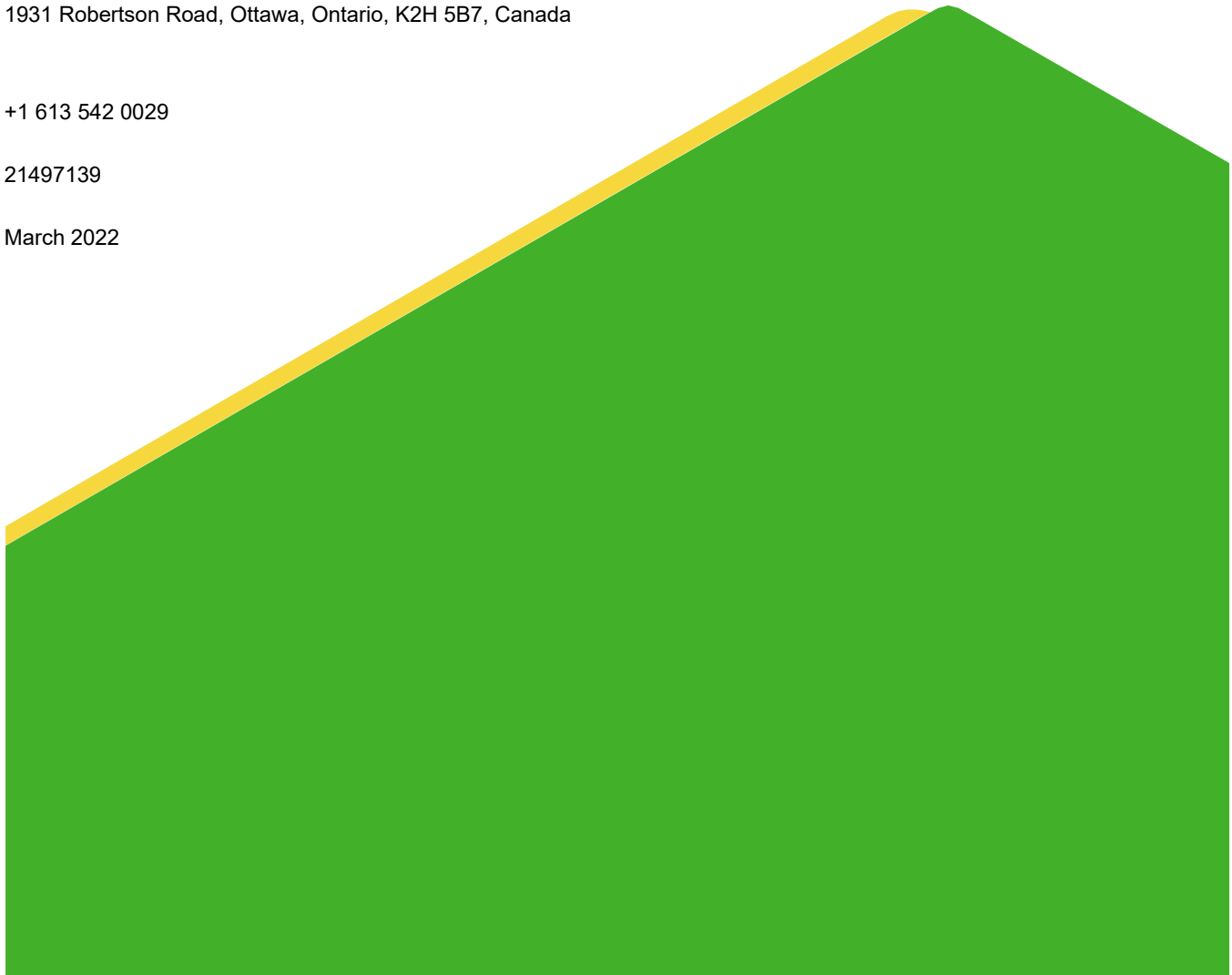
**Golder Associates Ltd.**

1931 Robertson Road, Ottawa, Ontario, K2H 5B7, Canada

+1 613 542 0029

21497139

March 2022



## Distribution List

1 e-copy - Defence Construction Canada

1 e-copy - Golder Associates Ltd.

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## 1.0 INTRODUCTION

Golder Associates Ltd. (Golder) is pleased to submit this Preliminary Remedial and Risk Management Strategy (RRMS) to Defence Construction Canada (DCC), on behalf of the Department of National Defence (DND), for the Burgeo Range, Burgeo, NL, in accordance with the Contaminated Site Management Working Group's Federal Approach to Contaminated Sites (FACS). This report is based on the Statement of Work (SOW) provided by DCC, dated September 2021 (file number GR082101), and Golder's proposal dated October 5, 2021.

### 1.1 Scope of Work

The RRMS includes the following main items:

- A summary of previous investigations, identifying substances of concern (SOCs), affected media, and quality of materials to be managed. As of the writing of this report, not enough information exists to quantify the impacted media present on-Site.
- A summary of the quantity and make-up of debris to be managed.
- A road map of the approach to take the Site to closure – through remediation and risk management.
- Details on remedial excavation, backfilling, sediment dredging, surface water pumping, and Site restoration. This includes an implementation plan for remediation which outlines control measures to minimize risks of contaminant release into the environment, and logistics management.
- Details on the process of debris clean-up.
- Details on regulatory and administrative requirements for the proposed undertaking.
- Existing data gaps and proposed investigation to address said gaps.
- Description of risk assessment required.
- High-level schedule and cost estimate for implementation of the next steps of the RRMS.

## 2.0 BACKGROUND

### 2.1 Site Description

DND is responsible for a former small arms rifle range set up near the Town of Burgeo (the Burgeo range). The property was leased from the Government of Newfoundland and Labrador (Crown lands) for use by the 5<sup>th</sup> Canadian Ranger Patrol Group (5CRPG) in 2008 (referred to as Location 1 – see Site plan provided in Figure 1). Use of the Burgeo range was discontinued by 5CRPG in approximately 2010. DND was contacted by the Province of NL (Water Resources Division) when it became apparent that part of this leased land encroached on the provincially protected watershed that forms part of the Town of Burgeo's municipal water supply. It is DND's intent to decommission the Range and obtain closure from the Province, if required. The actual firing range is located just to the south of the property boundary of the leased lands. A number of ponds/lakes and wetland areas are located within Location 1.

A second location (Location 2), near Location 1 but across the road, to the north and west, was also used as a firing range by 5CRPG. This range was originally put in place by the Local Wildlife Office and 5 CRPG planned to use a portion of this range. There is a small stream flowing through Location 2, as well as a few small ponds and marshes. Figure 1 shows the Site plan, including Locations 1 and 2.



In 2019, historical information was limited to anecdotal correspondence between Real Property Operations Detachment Gander (RPOD (GD)) with 5CRPG and some community members who indicated that the range (Location 1) was still used by local hunters and community members as a target practice area even though 'No Trespassing' and 'Range Closed' signs had been installed at the Range. Initial assessment work was completed at Location 1 in 2020 (Golder, 2021), along with additional assessment at Location 1 and initial assessment at Location 2 in 2021 (Golder, 2022). General findings indicated soil, groundwater, sediment and/or surface water impacts for various metals and/or Polycyclic Aromatic Hydrocarbons (PAHs) in comparison to applicable guidelines.

There is limited infrastructure on Site (a gravel access road to Location 1) and no engineered controls.

### 2.1.1 Golder 2021 Report on Steps 1 to 4 of the FACS

The Golder 2021 report entitled "Steps 1 to 4 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL" provided an initial testing program for the Site. The Site was divided into three zones based on expected risk rating resulting from former/current activities at the Site – high (zone 1), medium (zone 2), and low (zone 3). The high-risk area (zone 1) included more sampling locations compared to the medium and low risk zones. Zone 3 is located approximately 1,150 m away from the zone 1 high-risk area and is considered to be representative of background conditions. Based on the findings of the analytical program, petroleum hydrocarbon (PHC) exceedances were identified in soil and sediment at the Site. However, additional analyses conducted by the laboratory indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Several elevated concentrations of metals were identified in soil, sediment, and surface water were identified, but many were considered naturally occurring due to elevated background concentrations common to the Site and surrounding area. The concentrations of selenium and cadmium in the soil samples were fairly consistent across the Site, with some of the higher concentrations located in zone 3. The concentrations of aluminum and iron in surface water were also fairly consistent across the Site. Analytical data suggested that the elevated concentrations of these metals are common to the Site and suggested that zone 3 can be considered representative of background conditions. However, presence of lead, tin and zinc in soil, lead in sediment, and lead and copper in surface water at the Site, all in Zone 1, were attributed to bullets and casings from firing activities which included the former DND firing range and shooting practice by town residents. It is understood that the Site was used by community members as an informal firing range even prior to the 2000s, when it was leased by DND.

Soil, surface water and sediment exceedances on the Site that are not considered naturally occurring are located in the area of the former firing range. Lead and iron concentrations in surface water are present in the pond adjacent to the former firing range, which discharges to the south toward Long Pond (a drinking water source for the Town of Burgeo), located approximately 1.2 km hydraulically down-gradient of the Site. Elevated iron concentrations are noted in the source water database for Long Pond from the WRMD's Newfoundland and Labrador Water Resources Portal (collected from 1998 to 2018) suggesting iron is associated with background concentrations in the region. Lead concentrations in Long Pond source water data have been below the Guidelines for Canadian Drinking Water Quality.

Data gaps were identified with regards to site-specific background concentrations, potential leachate from soil to groundwater and delineation of localized metals contamination in soil, sediment, and surface water. As such, additional assessment was recommended to mitigate the identified impacts at the Site including collection of soil samples to laterally delineate the identified impacts and evaluate potential leaching into groundwater. In order to evaluate groundwater quality at the Site, installation of monitoring wells was recommended. Additional soil, sediment and surface water samples to establish Site-specific background concentrations were also recommended. A species at risk public registry search was recommended to be completed to confirm if species at risk are documented on or near the Site and to identify if the Site is considered critical habitat. It was noted that mitigation measures may involve risk assessment followed by remedial option evaluation.

### 2.1.2 Golder 2022 Report on Steps 5 to 7 of the FACS

The Golder 2022 report entitled “Steps 5 to 7 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL” provided an extended testing program for the Site in addition to previous testing. This testing program included additional assessment (at Location 1) and initial assessment (at Location 2), delineation of previously found contamination, and a re-classification of the Site.

Based on the findings of the analytical program, PHC and PAH concentrations in all soil samples analyzed were below the applicable guidelines. Several metal exceedances in soil were identified and many were attributed to the elevated background concentrations common to the Site and surrounding area. Exceedances of boron, cadmium, iron, and selenium were inferred to be due to naturally elevated background concentrations. However, the elevated presence of antimony, copper, lead, manganese, tin, vanadium and zinc in soil at Location 1 and Location 2 was identified and attributed to site activities. Exceedances near the firing locations and bullet catches were considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice. The same metals exceedances found in samples collected outside of the immediate vicinity of the firing area may be due to firing activities at the Site, however, this was not confirmed. Given the distance from the firing area, it is possible that firing activity not related to the DND firing range, wind transport and deposition from the firing area, or other sources may be the reasons for impacts outside the immediate vicinity of the firing area.

Based on the findings of the analytical program, PHC exceedances were identified in sediment at the Site. However, additional analyses conducted by the laboratory indicated that these exceedances did not resemble any petroleum products and appeared to be of natural and organic origin. Exceedances of PAHs were identified and likely related to historical activities that occurred at the DND firing range. Sediment exceedances of arsenic, cadmium, lead, and mercury in samples collected from waterbodies in the vicinity of the firing area in Location 1 – Zone 1 and Location 2 were considered to have resulted from firing activities associated with the former DND firing range as well as use of the Site by local hunters and community members for target practice (or possible hunting). Sediment exceedances of chromium, iron, and selenium were considered elevated due to naturally occurring background concentrations that were not associated with historical activities at the Site. Full delineation was not achieved as there were delineation samples with results similar to what was found in previous sampling programs.

The PHCs and PAHs concentrations in all surface water samples analyzed were below the applicable guidelines and regulations. Exceedances of iron, copper, lead, and zinc were identified. The exceedances of lead and copper are considered to have likely resulted from the firing activities; exceedances of iron and zinc are considered background for the region.

The PHCs and PAHs concentrations in all groundwater samples analyzed were below the applicable guidelines and regulations. Exceedances of the applicable guidelines of cadmium, cobalt, copper, iron and zinc were found in groundwater samples collected on Site. It is possible that exceedances are related to firing activities; however, comparisons to background data have yet to be completed, and therefore the source of the exceedances cannot be confirmed as of the writing of this report.

Based on the findings of the assessment, a NCSCS score of 62.0 was calculated for the Burgeo Range, leading to a Site Letter Grade C Class 2 site with a medium priority for action. Elevated impacts in soil, sediment, and surface water in the high-activity firing area in Location 1 were recommended to be addressed through remedial measures, while scattered impacts in soil, sediment, and surface water in areas of the Site not in close proximity to the former DND firing range were recommended to be addressed through a risk management approach. Additional assessment was recommended to assess data gaps to support both the remediation strategy in the high-activity firing area as well as future risk management work for the farther out areas. This report addresses the aforementioned recommendations.

### 2.1.3 Site Setting, Topography, and Geology

Most of the Site consists of vacant tundra-type landscape. The site is vegetated with grasses, shrubs, and small trees. Bedrock outcrops are present on Site and makeup a significant portion of the Site area. Location 1 is accessed by a gravel road off of the highway. Location 2 does not have an access road. It was previously access directly off the highway, through a small parking lot, however, a ditch was constructed between the highway and parking lot that blocked off vehicle access to the Site. A water reservoir for the Town of Burgeo is located approximately 1.2 km south of the Site.

Based on area mapping, the surficial geology in the vicinity of the Site is expected to consist predominantly of exposed bedrock with little or no soil or vegetation cover and with rare patches of till and other surficial soil types (Liverman and Taylor, 1994). The bedrock geology in the vicinity of the Site consists of weakly foliated to massive, coarse grained, variably K-feldspar porphyritic, biotite granite and adamellite (Gander Zone, Burgeo Granite) (O'Brien and Dickson, 1986).

Based on observations made during previous field programs, the surficial geology at the Site consisted of dark brown silt to silty sand. Much of the Site was also covered by peat/bog.

The topography of Location 1 is undulating hills with rocky outcrops and low-lying pond/wetland areas. In Location 2, a large rocky outcrop is found to the west of the firing point and acts as a natural backstop for rifle fire.

## 3.0 REMEDIAL / RISK MANAGEMENT OBJECTIVE

The overall objective for the Site is to address contamination to support DND in receiving regulatory closure of the Site from Government of Newfoundland (provincial regulator). In addition, surficial debris on the Site require management because of concerns such as safety and aesthetic issues. This RRMS has been developed to outline the approach for remediation and risk management required to bring the Site to closure.

### 3.1 Approach to Site Closure

To achieve the overall objective, the following remedial options were considered available for the Site:

- Remediation of impacted media (soil, sediment, and surface water) to meet applicable criteria, specifically:
  - **Soil Excavation and Off-Site Disposal:** impacted soil is excavated using heavy machinery where accessible, or smaller equipment on steep and difficult to access areas, and loaded into trucks for transport and disposal at engineered landfills licensed to accept the contaminants present at the Site. Clean fill can be imported to the Site and used to backfill the excavated areas.
  - **Sediment Dredging and Off-Site Disposal:** impacted sediment is dredged, using off-shore or in-water (dredging barge) heavy machinery where accessible, and loaded into trucks for transport and disposal at engineered landfills licensed to accept the contaminants present at the Site. If aquatic habitat removal occurs, replacement habitat would need to be reinstated and/or other compensation measures implemented.
  - **Removal of Impacted Surface Water by Pumping for On-Site Treatment:** impacted surface water to be pumped out of ponds/wetlands on Site for treatment on-Site. On-Site treatment would involve treating water with an on-Site water treatment system, and recycling of the treated water back to the water bodies.
- Risk Management, specifically:
  - Human-Health and Ecological Risk Assessment completed in accordance with federal guidance to identify risks associated with the impacts present on Site. Based on the results of the risk assessment, identification of risk management measures required to address unacceptable risks that may be present.

To assess the feasibility and practicality of the site management approach, as described above, the following factors were taken into account:

- The extent of impacted media is widespread across zone 1 of Location 1, and the area of Location 2 closest to the firing point. In Location 1, identified impacts in soil and sediment were found up to 1.2 km from the firing point. It should be noted that delineation of the extent of impacts has not been achieved.
- Given the widespread contamination in the area of Location 1 not in the immediate vicinity of the firing range, significant investigative effort would be required to delineate impacts. Soil investigation to date in zone 1 of Location 1 included one sample location for approximately every 80,000 m<sup>2</sup>. Sediment investigation to date generally included one or two shallow (0-0.15 m) samples in each of the many ponds/wetlands located on Site. While the previous sampling programs achieved their objective of characterizing the Site, significant additional assessment would be required to properly delineate impacts in soil and sediment.
- Given that impacts were found in numerous locations in soil, sediment, and surface water in Location 1 and Location 2, a full-scale remediation of impacts to meet applicable criteria would be a large and unsustainable undertaking (>\$50M effort, ecosystem/habitat destruction, etc).
- Metals and PAH exceedances found in impacted media, outside of the immediate vicinity of the firing area of Location 1, were generally found to marginally exceed the applicable criteria. In addition, given the exceedances found, it appears as though impacts in soil are localized and heterogenous, as opposed to being found in consistent concentrations across wider areas.

- Full-scale remediation using heavy equipment would be logistically challenging due to the boggy and rocky landscape. Use of heavy equipment would also likely result in habitat destruction to the areas that are to be traversed or excavated/dredged.

Based on the above factors, full-scale remediation is not practical or cost-effective. It is recommended to pursue a blended approach of a remediation of the high-activity firing area of Location 1 (where the highest concentrations of contaminants are found) with risk management to address the areas of Location 1 outside of the immediate vicinity of the firing area, as well as Location 2 (where contaminant concentrations are found to be only marginally above the applicable criteria in select locations). At the time of writing of this report, there is insufficient data to delineate the high-activity firing area; however, the area can be generally described as the immediate vicinity found in Location 1 around the gravel access road, firing area, bullet catches, and firing point used by locals to fire shotguns. These features are noted on Figure 2. Also included in this area are the two small ponds located adjacent to the north of the firing range bullet catch in Location 1.

The report sections below detail the proposed approach for the following:

- Remediation of soil, sediment, and surface water in the high-activity firing area;
- Removal of debris from Site;
- The approach for risk assessment (including species at risk/habitat considerations) and risk management;
- Existing data gaps remaining and proposed investigation to address said gaps; and
- High-level schedule and cost estimate for implementation of the next steps of the RRMS.

## 4.0 REMEDIATION OF HIGH-ACTIVITY FIRING AREA

The impacts found in the high-activity firing area, as described in Section 3.1, are proposed to be addressed through remediation of soil, sediment, and surface water.

### 4.1 Material and Infrastructure to be Removed and/or Decommissioned

The Golder 2022 Report on Steps 5 to 7 of the FACS was completed to assess the impacts found on Site and create an inventory of debris material to be removed.

As discussed in Section 3.1, the extent of impacts in the high-activity firing area have yet to have been delineated, and therefore extents and quantities of impacted material are not fully known. A data gap investigation to achieve delineation in support of quantifying impacted material is discussed in Section 7.0.

Based on the information collected as of the writing of this report, the following impacted material exists on-Site, within the high-activity firing area:

- Metals (antimony, copper, lead, manganese, tin, vanadium) impacted soil.
- Metals (lead, mercury) impacted sediment in the two small ponds located adjacent to the north of the firing range bullet catch.
- Metals (copper, lead) impacted surface water in the two small ponds located adjacent to the north of the firing range bullet catch.

Debris to be removed from Location 1 and Location 2 primarily includes materials related to firing activities, consisting of wooden stakes, stands and targets, metal targets, spent rifle as well as shotgun ammunition and shells.

## 4.2 Description of Remedial Work

This section provides a summary of the scope of work and sequence of main operations for the remediation of impacted soil, sediment, and surface water in the high-activity firing area. As noted in Section 4.1, the extent of impacts in this area has yet to be delineated, and therefore the contents of the following sections are subject to change.

### 4.2.1 Definition of Roles

For the purposes of this report, the following roles are defined:

- “Engineer” (also referred to as Departmental Representative): suitably qualified consultant or equivalent, responsible for remedial oversight and approval of work completed by excavation contractor.
- “Contractor”: excavation/dredging/surface water extraction contractor responsible for execution of specifications.

### 4.2.2 Mobilization, Utility Locates and Site Preparation

Activities will include the completion of the layout of access as well as equipment lay-down and storage areas. There are no utilities expected to be within the remediation area. The Contractor is responsible for obtaining confirmatory locates.

### 4.2.3 Fencing

The Contractor may wish to enclose the laydown areas at the site with fencing. Temporary construction fencing will be placed around active excavation areas to limit access to pedestrians and vehicles.

### 4.2.4 Protection of Utilities

There are no utilities expected to be within the remediation area requiring protection. The Contractor is responsible for obtaining confirmatory locates.

### 4.2.5 Groundwater Seepage or Stormwater Run-Off into Excavation

Excavation below the water table is not anticipated to be required at the Site. Groundwater depth on the Site was found to be between 2.3 and 6.7 mbgs, within the bedrock.

It is important to keep all excavations dry and free of groundwater or storm water runoff. If groundwater is encountered within the excavation, it should be pumped and removed from the excavation. Contractors should also be prepared to treat excavation water prior to discharge to reduce potential contaminants to acceptable levels.

### 4.2.6 Decommissioning of Groundwater Monitoring Wells

Groundwater monitoring wells located within the limits of excavation must be decommissioned by a licenced well technician prior to removal. Decommissioning must adhere to provincial guidance. Groundwater monitoring wells outside of the limit of the excavation should be protected for use as part of post-remediation monitoring, if post-remediation monitoring is deemed required.

## 4.2.7 Removal of Surficial Debris

18 debris items were observed as part of the Golder 2022 Report on Steps 5 to 7 of the FACS. Debris at Location 1 amounts to approximately 5 m<sup>3</sup> of debris, including, but not limited to general refuse found at firing backstop, consisting of household waste, wooden stakes, cardboard and plastic targets, rusted material used as a target, spent shotgun shells, spent rifle cartridges, and spent ammunition. Debris at Location 2 amounts to approximately 13 m<sup>3</sup> of debris, including, but not limited to wooden stakes and gun stands, cardboard, plastic and wooden (plywood) targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.

Remediation will include removal of the debris. Manual removal, by hand, will be required for the debris. Debris will need to be disposed of as waste to a licenced waste disposal site.

The locations of the debris items are shown in Figures 3 and 4. The debris inventory is provided below, in Table 1.

**Table 1: Debris Inventory**

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m <sup>3</sup>
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m <sup>3</sup>
L1_DEB_3	Wooden stakes and cardboard target	~1m <sup>3</sup>
L1_DEB_4	Rusted drum used as target. Includes spent ammunition, spent rifle cartridges, and spent ammunition.	~1m <sup>3</sup>
L1_DEB_5	Rusted sink used as target. Includes spent ammunition.	<1m <sup>3</sup>
L2_DEB_1	Wooden stake target and spent ammunition.	<1m <sup>3</sup>
L2_DEB_2	Wooden stakes and spent shotgun shells	<1m <sup>3</sup>
L2_DEB_3	Wooden stakes and cardboard target.	<1m <sup>3</sup>
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m <sup>3</sup>
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_6	Wooden plank target	<1m <sup>3</sup>
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m <sup>3</sup>
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m <sup>3</sup>
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m <sup>3</sup>
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_13	Wooden stake and spent shot gun shells	~1m <sup>3</sup>

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Checked by: JTD

#### 4.2.8 Clearing and Grubbing of Vegetation

It is not expected that clearing or grubbing of vegetation will be required prior to the soil excavation for the remedial scope of work.

#### 4.2.9 Excavation of Contaminated Soil

Contaminated soil is to be removed from Site and will require the use of an excavator and/or backhoe. The soil will be excavated to the extent prescribed by the Engineer. Certain areas may be hard to access with large excavators due to naturally occurring obstacles or severe sloping of bedrock – in these cases, manual removal or use of smaller machinery may be required. Where bedrock is encountered, it is to be mechanically scraped of contaminated soil.

#### 4.2.10 Dredging of Contaminated Sediment

Contaminated sediment is to be removed by dredging. Given that the only areas currently proposed to be dredged as part of the remediation (the two small ponds located adjacent to the north of the firing range bullet catch) are approximately only 9 m across, it is not expected that a dredging barge will be required. Dredging should be achievable using an excavator (mechanical dredging) from the shoreline or pumping system (hydraulic dredging). The depth of the impacted sediment (and depth of pondbeds) has not been identified.

When dredging, sediment removal must be conducted slowly to minimize the amount of sediment that is dispersed into surface water. Low turbidity methods should be employed whenever possible.

#### 4.2.11 Pumping and Treatment/Disposal of Contaminated Surface Water

Contaminated surface water is to be pumped and treated (either on-Site or off-Site). The only waterbodies currently proposed to be pumped as part of the remediation are the two small ponds located adjacent to the north of the firing range bullet catch. The depth of the ponds are currently unknown, and as such, water quantities have not yet been estimated. Surface water can be handled concurrently with sediment if hydraulic dredging is performed.

No fish habitat is expected to be encountered in the two ponds that will be dewatered, and as such, no alternative considerations are required. If habitat assessment work (see Section 6.1) indicates that fish habitat exists, this section will be updated in the final report.

#### 4.2.12 Confirmatory Sampling of Excavated/Dredged Areas

The total extent of impacted soil and sediment to be removed has yet to be determined. The final limits, both vertical and horizontal, will be determined in the field by the Engineer based on extents of contamination that will be specified as part of the final report. Once the limits of the extent of impacts have been reached, soil and sediment samples will be collected to confirm that the impacted material has been removed. If the samples collected have concentrations exceeding the applicable criteria, further excavation/dredging will be required.

In absence of local requirements, sampling will be conducted in accordance with the sampling frequency outlined in the Nova Scotia Confirmation of Remediation Protocol (NSE, 2013). These sampling requirements are provided in Table 2 below.



**Table 2: Minimum Confirmation Sampling Requirements for Excavation**

Floor Area (m <sup>2</sup> )	Floor Samples	Sidewall Samples
<25	1	1
>25-50	1	2
>50-100	2	2
>100-250	2	4
>250-500	3	5
>500-750	3	6
>750-1000	4	7

Sidewall samples should not all be taken from the same wall and should represent worst-case. The final number of verification samples will depend on the final excavation size. The Contractor will be required to facilitate and allow reasonable time in their project schedule to collect soil verification samples using excavation equipment as the direction of the Engineer. If excavation is terminated on bedrock, no sampling will be required as there will be no soil to sample. Sufficient removal of impacted soil will be confirmed by visual inspection.

#### 4.2.13 Excavation Support

Excavation support will be required where the excavation depths are too great to maintain a safe excavation face. Excavations less than 1.2 metres may be able to be near vertical however excavations greater than 1.2 metres can remain unsupported if sloped at a slope of 1:1 (above the water table). Where excavation extends below the water table or water inflow is present, a three horizontal to one vertical slope will be required. Excavation support for deeper excavation is subject to Engineer's approval.

#### 4.2.14 Air Quality Monitoring and Dust Control

In addition to the nuisance caused by dust, the presence of contamination in the overburden to be excavated will require strict control of dust. Use of water and dust suppressants will be required. Any stockpiles of contaminated material will need to be lined beneath, and covered atop, to prevent leaching. If weather conditions require it, air monitoring will be implemented at the discretion of the Engineer. The Contractor will be required to implement corrective actions to manage unacceptable dust generation.

#### 4.2.15 Material Tracking

Waste and recyclables will be tracked with manifests from the disposal facilities. Overburden material will be measured by weight as measured at the disposal facility. Quantities will be used for pricing by the Contractor. Copies of tracking manifests from the disposal or treatment facility will be collected for each truck load to track the transport of the impacted material and prevent illegal dumping.

#### 4.2.16 Backfilling and Site Restoration

It is not expected that backfill will be required, as impacts are only expected to be found in shallow soil & sediment/surface water (although vertical delineation has not yet been achieved). Should it be determined (after vertical delineation) that backfill is required, all imported material used within the remediation limits must comply with the applicable criteria for background Site conditions. Imported fill will be tested by the Engineer in

accordance with the requirements. Testing of backfill will include, at a minimum, select metals, pH, PAHs and PHCs. The testing suite may be reduced based on the nature and source of fill. A Phase I ESA can be completed at the fill source to determine a more appropriate testing package, at the discretion of the Engineer.

Material used for backfilling must be selected material from excavation or other sources, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse, recycled materials (such as reused asphalt) or other deleterious materials with minimal fines.

Backfill should be placed in 300 mm lifts and compacted to a minimum of 95% Standard Proctor Maximum Dry Density (SPMDD). The areas on Site that are currently graveled shall be reinstated with gravel following the remediation. In the areas outside of the gravel, the backfilled areas will be covered with not less than a 15-centimetre thickness of topsoil and seeded with a mix of native grass and sedge species, as appropriate for the Site characteristics and local climate.

Results of the verification samples should be confirmed to meet the applicable criteria for the Site prior to an area being backfilled.

#### **4.2.16.1 Gravel Lot**

The areas on Site that are currently gravel lot shall be reinstated as gravel lot following the remediation, should they require to be excavated. Subgrade backfill material used in areas of asphalt roadway should match the existing thickness of subgrade material found on Site.

#### **4.2.17 Landscaping**

In the areas outside of the roadway/parking lot, the backfilled areas will be covered with not less than a 15-centimetre thickness of topsoil sourced from a licenced topsoil provider and seeded with a mix of native grass species, as appropriate for the Site characteristics and local climate.

#### **4.2.18 Demobilization**

Upon completion of the scope of work, all equipment and wastes will be removed from Site.

#### **4.2.19 Reporting**

Following completion of the remediation, the Engineer will prepare a remediation report documenting the final condition of the Site, including:

- A summary of Site activities;
- Photo documentation;
- Analytical results from confirmatory sampling;
- Quality control testing results; and,
- Dewatering discharge water sampling results, should they be required.

The Contractor will be responsible for all final submittals including:

- Final volumes of materials;
- Soil quality sampling results for any imported material; and,
- A summary of work and Site activities.

## 5.0 ENVIRONMENTAL MONITORING

The following activities will be monitored by the Engineer during remediation.

### 5.1 Soil

The Engineer will be present during all excavation works to monitor that site activities are completed in accordance with the technical specifications. The Engineer will also collect confirmatory soil samples ensuring that all contaminated soil has been excavated in the remediation area.

### 5.2 Seepage Water in Excavation

The excavation will be conducted in a manner that minimizes the suspension of soils in water (groundwater or stormwater runoff) that has seeped into the excavation and minimizes the spread of suspended solids. The Engineer will monitor turbidity in seepage water pumped out of the active excavation and inform the Contactor when elevated turbidity is identified, and treatment of the water (filtering) is required in order to remove the suspended solids from the water before discharge.

Confirmatory sampling will be required to verify the disposal method of any seepage water removed from the excavation. Seepage Water should be held on site until level of contamination, and disposal method, can be confirmed by the Engineer.

Upon completion of an excavation area where water seepage has occurred (e.g. below water table or area draining stormwater), the excavation should promptly be backfilled to a level to inhibit seepage, following inspection by the Engineer. It is not expected that groundwater monitoring will be required post-remediation; however, based on evidence of potential groundwater impacts in the field during excavation, the Engineer may recommend installing a monitoring well in the area of the remedial excavation, for post-remedial monitoring.

### 5.3 Sediment and Surface Water

Remediation of impacted sediment and surface water, whether conducted by shoreline excavation and pumping, or hydraulic dredging, will be conducted in a manner that minimizes the suspension of soils in water and minimizes the spread of suspended solids. The Engineer will monitor turbidity in water pumped out of water bodies and inform the Contactor when elevated turbidity is identified, and treatment of the water (filtering) is required in order to remove the suspended solids from the water before discharge. Dewatering of the dredged sediment may be required before disposal.

Confirmatory sampling will be required to verify the disposal method of sediment, surface water, or sediment/surface water slurry removed from the excavation. Removed impacted media should be held on site until level of contamination, and disposal method, can be confirmed by the Engineer.

## 6.0 RISK ASSESSMENT APPROACH

A human health and ecological risk assessment (HHERA) will be completed for the Site that incorporates the site characterization (including characterization of priority contaminants of concerns), habitat assessment (including species at risk) and toxicity testing (surface water and sediment). The risk assessment will be completed in accordance with applicable federal guidelines (e.g., Federal Contaminated Sites Action Plan [FCSAP] and Canadian Council of Ministers of the Environment [CCME]). The HHERA will include a problem formulation which documents the contaminants of concern, human and ecological receptors and exposure pathways.

The HHERA will evaluate potential risks to the local ecosystem and consider potential human exposure and risks associated with site visitors (trespassers, hunters, recreational users, etc.).

Potential risk to site-specific ecological receptors will be evaluated using a weight of evidence (WOE) approach which is consistent with the recent FCSAP and CCME ecological risk assessment guidance. The WOE approach gathers and evaluates information from different lines of evidence to determine the possibility or degree of harm to receptors of concern. Specific lines of evidence will include: comparison of measured chemical concentrations compared to literature-based toxicity values; results of the aquatic and terrestrial habitat assessment completed at the Site (described in Section 6.1); eco-toxicity testing (described in Section 6.2) and food chain modelling.

## 6.1 Species at Risk and Habitat Considerations

A desktop species at risk survey has already been completed for the Site. To confirm the results and provide additional information characterizing terrestrial and aquatic habitat at the Site, a qualitative habitat assessment will be carried out to support the HHERA and will include the following objectives:

- Summary of general terrestrial and aquatic habitat characteristics and quality at the Site and surrounding area;
- A vegetation survey will be used to characterize the terrestrial habitat on the Site and in the surrounding area, and will include:
  - Vascular species present;
  - Percent cover of all strata (trees, shrubs, forbs, graminoids, bryophytes and lichens);
  - Vigour (health) of all observed species; and,
  - Percent cover of surface substrate (e.g., percent cover of surface water, litter, decaying wood and live ground cover).
- Determination of whether lakes and ponds are likely to support aquatic receptors (i.e., fish, aquatic vegetation, pelagic and benthic invertebrates);
- Determine similarities and differences between waterbodies to identify two lakes in the exposure area that are representative of the waterbodies on the Site and will be assessed as a “worst case” in the aquatic ecological risk assessment;
- Determine a candidate reference waterbody that is considered uninfluenced by Site activities;
- Identification of potential terrestrial and aquatic receptors through incidental observations, visual evidence (e.g., scat) and presence of suitable habitat; and
- Identification of species at risk through a desktop survey, with any results to be confirmed in the field with visual observations.

There are several lakes and ponded areas on the Site. The aquatic habitat assessment will characterize the lakes to determine whether they will fully freeze in winter and are expected to be present throughout the year. Potential habitats for wildlife receptors will be identified and an assessment of whether wildlife may prefer to use certain water bodies over another (e.g., if ponds thaw in spring sooner than lakes) will be conducted.

The habitat assessment and SAR survey will be prepared as a factual technical memorandum and appended to the HHERA report.

## 6.2 Toxicity Testing

Based on the exceedances of sediment and surface water guidelines for the protection of aquatic life (e.g., metals), toxicity testing of sediment and surface water samples is recommended to assess the potential chronic toxicity of sediment in surface water in two representative lakes. This will be used as a line of evidence to support the assessment of aquatic ecological receptors in the HHERA.

Relevant chronic toxicity tests for sediment include the following standardized tests:

- 14-day *Hyalella azteca* (freshwater amphipod) survival, growth and reproduction (EPS 1/RM/33; ECCC 2017); and
- 10-day *Chironomus dilutus* (freshwater midge) survival and growth (EPS 1/RM/32; ECCC 1997).

Relevant chronic toxicity tests for surface water include the following standardized tests:

- 7-day *Pimephales promelas* (fathead minnow) survival and biomass (EPS 1/RM/22; ECCC, 2011);
- 6- to 8-day *Ceriodaphnia dubia* (freshwater cladoceran) survival and reproduction (EPS 1/RM/21; ECCC 2007a); and
- 72-hour *Pseudokirchneriella subcapitata* (unicellular freshwater algae) growth inhibition (EPS 1/RM/25; ECCC 2007b).

Test species were selected as representative surrogate species for aquatic taxa in the lakes, and included representative taxa consistent with CCME guidance (e.g., fish, invertebrates, plants). These tests have standardized environment test protocols available.

Two sediment and two surface water samples for toxicity testing will be collected from each of two representative lakes on the Site, and three sediment and surface water samples will be collected from a reference waterbody (n=7). The locations of samples collected for toxicity testing will correspond to a subset of the locations sampled for sediment and surface water quality analysis. Surface water samples will be submitted to the laboratory for toxicity testing within the holding time of three days. Sediment samples will be submitted to the laboratory for toxicity testing within the holding time of six weeks. AquaTox Testing and Consulting Inc. is recommended as they offer toxicity testing in their Guelph, Ontario laboratory and is accredited in accordance with ISO/IEC Guide 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) for tests listed in their scope of accreditation.

## 7.0 DATA GAP INVESTIGATION

Based on the information collected to date, and the proposed approach as discussed in the sections above, data gaps identified, and proposed activities to address said gaps are presented in Table 3, below:

**Table 3: Data Gaps**

Data Gap	Proposed Activity to Address Data Gap
<p>Delineation of impacts in soil in the high-activity firing area has not been achieved.</p>	<p>One to two soil samples per investigation location to be collected from 25 soil sample locations in the vicinity of the high-activity firing area. Samples should be analyzed for metals. 15 samples to be collected along the boundaries of the area for purposes of horizontal delineation. 10 samples to be collected in a grid-like pattern throughout the area, for purposes of vertical delineation. All samples should be collected by means of pionjar, to collect information on depth to bedrock. It is not recommended that a larger drill be used as larger drills may have issues traversing the landscape and/or may negatively affect the landscape.</p>
<p>Delineation of impacts in sediment in the two small ponds located adjacent to the north of the firing range bullet catch has not been achieved.</p>	<p>Four additional sediment samples per water body should be collected, from each of four locations, to be advanced to a depth of 1 m into the sediment to achieve vertical delineation/depth of sediment bed. Samples should be collected using sediment coring methods, as opposed to grab samples, to achieve necessary depth and assess sediment composition throughout vertical profile. Samples should be analyzed for metals. A composite sample from each sample location should also have a hydrometer/grain size test conducted, to assess the feasibility of hydraulic dredging.</p>
<p>Evaluation of hazardous/non-hazardous waste</p>	<p>Two composite soil samples and one composite sediment sample should have a toxicity characteristic leaching procedure (TCLP) sample collected and analyzed for leachate metals, to determine whether the soil/sediment can be disposed of as non-hazardous waste.</p>
<p>The depth of water in the two small ponds located adjacent to the north of the firing range bullet catch is unknown. Hydraulic conductivity of the two small ponds is also unknown.</p>	<p>Measurement of depth of water in the two small ponds. A groundwater monitoring well should be installed in the overburden, along the shoreline of each of the two ponds for the purpose of characterization of groundwater in this area as well as an assessment of the hydraulic conductivity. Groundwater samples should be analyzed for metals – and will be used to support HHERA. Hydraulic conductivity testing should be conducted to support calculation of expected pumping volumes.</p>

Data Gap	Proposed Activity to Address Data Gap
<p>Additional characterization of soil outside the high-activity firing area in Location 1, to supplement the data set to be used in the HHERA.</p>	<p>Ten additional shallow soil samples (0 – 0.15 m) in Location 1, Zone 1, to be analyzed for metals.</p>
<p>Additional characterization of sediment and surface water in the waterbodies located to the south of the high activity firing area (previously unevaluated and located hydraulically downgradient from the high-activity firing area).</p>	<p>Seven additional grab sediment and surface water samples to be collected from seven waterbodies. Samples should be analyzed for metals and PAHs.</p>
<p>Additional sediment/surface water assessment of two waterbodies in the exposure area that are representative of the waterbodies on the Site and will be assessed as a “worst case” in the aquatic ecological risk assessment (as discussed in Section 6.1)</p>	<p>Two additional grab sediment/surface water samples in each of the two waterbodies identified. Sediment samples should be analyzed for metals, PAHs, total organic carbon (TOC). One sediment sample from each waterbody should have a grain size analysis conducted. Surface water samples should be analyzed for metals, PAHs, pH, and general chemistry parameters. Toxicity testing (as described in Section 6.2) will also be conducted on the samples collected.</p>
<p>Additional sediment/surface water assessment of a reference waterbody, to use in the aquatic ecological risk assessment (as discussed in Section 6.1)</p>	<p>Two additional grab sediment/surface water samples in the waterbody identified. Sediment samples should be analyzed for metals, PAHs, total organic carbon (TOC). One sediment sample from each waterbody should have a grain size analysis conducted. Surface water samples should be analyzed for metals, PAHs, pH, and general chemistry parameters. Toxicity testing (as described in Section 6.2) will also be conducted on the samples collected.</p>
<p>Evaluation of groundwater and surface water</p>	<p>Groundwater analytical data was collected in three monitoring wells in the high-activity firing area. Metals (cadmium, cobalt, copper, iron, and zinc) exceedances of the applicable criteria were found. An analysis of results compared to regional background data is to be conducted. Should it be found that exceedances are not related to background concentrations, groundwater will be evaluated as part of the HHERA.</p> <p>In addition, a comparison of surface water and groundwater to applicable drinking water standards will be conducted, to screen data for possible risks to downstream reservoir.</p>

## 8.0 APPROXIMATE SCHEDULE FOR IMPLEMENTATION OF NEXT STEPS

The following is an approximate timeline for implementation of next steps of the RRMS and remediation:

- Summer 2022: Data gap investigation (including delineation of soil impacts and further site characterization to support risk assessment), on-Site habitat assessment, toxicity testing
- Summer/Fall 2022: Human health and ecological risk assessment, updated assessment report, updated Remedial & Risk Management Strategy
- Fall 2022: Risk management plan (if required)
- Fall/Winter 2022-23: Finalization of specifications and tender documents for remediation, and class A cost estimate
- Winter 2022-23: Remediation tendering process
- Summer 2023: Remediation

## 9.0 HIGH-LEVEL COST ESTIMATE FOR IMPLEMENTATION OF NEXT STEPS

A high-level cost estimate for the data gap investigation, on-Site habitat assessment, toxicity testing, human health and ecological risk assessment, 100% specifications documents for tender, and a Class A cost estimate is found in Appendix A.

## 10.0 CONCLUSIONS

A Preliminary Remedial and Risk Management Strategy has been developed. This report is a preliminary document and is intended to be updated once data gaps are addressed and preliminary risk assessment has been completed. The updated version of this document should include extents of impacts in the high-activity firing area, quantities of impacted material to be excavated, and a Class-A cost estimate for remediation. Results of the risk assessment will be covered under a separate report.

## 11.0 LIMITATIONS

This letter report (the "Report") was prepared for the exclusive use of DCC and DND for the express purpose of providing advice with respect to the environmental condition of the Site. In evaluating the Site, Golder Associates Ltd. has relied in good faith on information provided by others as noted in the Report. We have assumed that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

Any use which a third party makes of this Report, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties. If a third party require reliance on this Report, written authorization from Golder is required. Failing such authorization, Golder disclaims responsibility to third parties of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.



The scope and the period of Golder's assessment are described in this Report, and are subject to the restrictions, assumptions and limitations described herein. Except as noted herein, the work was conducted in accordance with the scope of work and terms and conditions within Golder's proposal. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the Site referenced in the Report. Conditions may therefore exist which were not detected given the limited nature of the assessment Golder was retained to undertake with respect to the Site and additional environmental studies and actions may be required. In addition, it is recognized that the passage of time affects the information provided in the Report. Golder's opinions are based upon information that existed at the time of the writing of the Report. It is understood that the services provided for in the scope of work allowed Golder to form no more than an opinion of the actual conditions at the Site at the time the Site was visited, and cannot be used to assess the effect of any subsequent changes in any laws, regulations, the environmental quality of the Site or its surroundings. If a service is not expressly indicated, do not assume it has been provided.

The results of an assessment of this nature should in no way be construed as a warranty that the Site is free from any and all contamination from past or current practices.

## 12.0 REFERENCES

Golder, 2021. Steps 1 to 4 of the Federal Approach to Contaminated Sites at the Former Burgeo Range, NL. Golder Project Number 20439355. March 5, 2021.

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Liverman, D. and Taylor, D., 1994. Surficial Geology of the Burgeo Map Area (NTS 11P). Government of Newfoundland and Labrador, Department of Mines and Energy, Geological Survey Open File 11P (163), Map 94-235. Scale 1:250,000.

O'Brien, S.J. and Dickson, W.L. (compilers), 1986. Geology, Burgeo, Newfoundland. Map 86-32. Scale: 1:250,000. Government of Newfoundland and Labrador, Department of Mines and Energy, Mineral Development Division. GS# 011P/0119.

## Signature Page

### Golder Associates Ltd.



James Doyle, B.Eng., M.A.Sc.  
*Environmental Consultant*

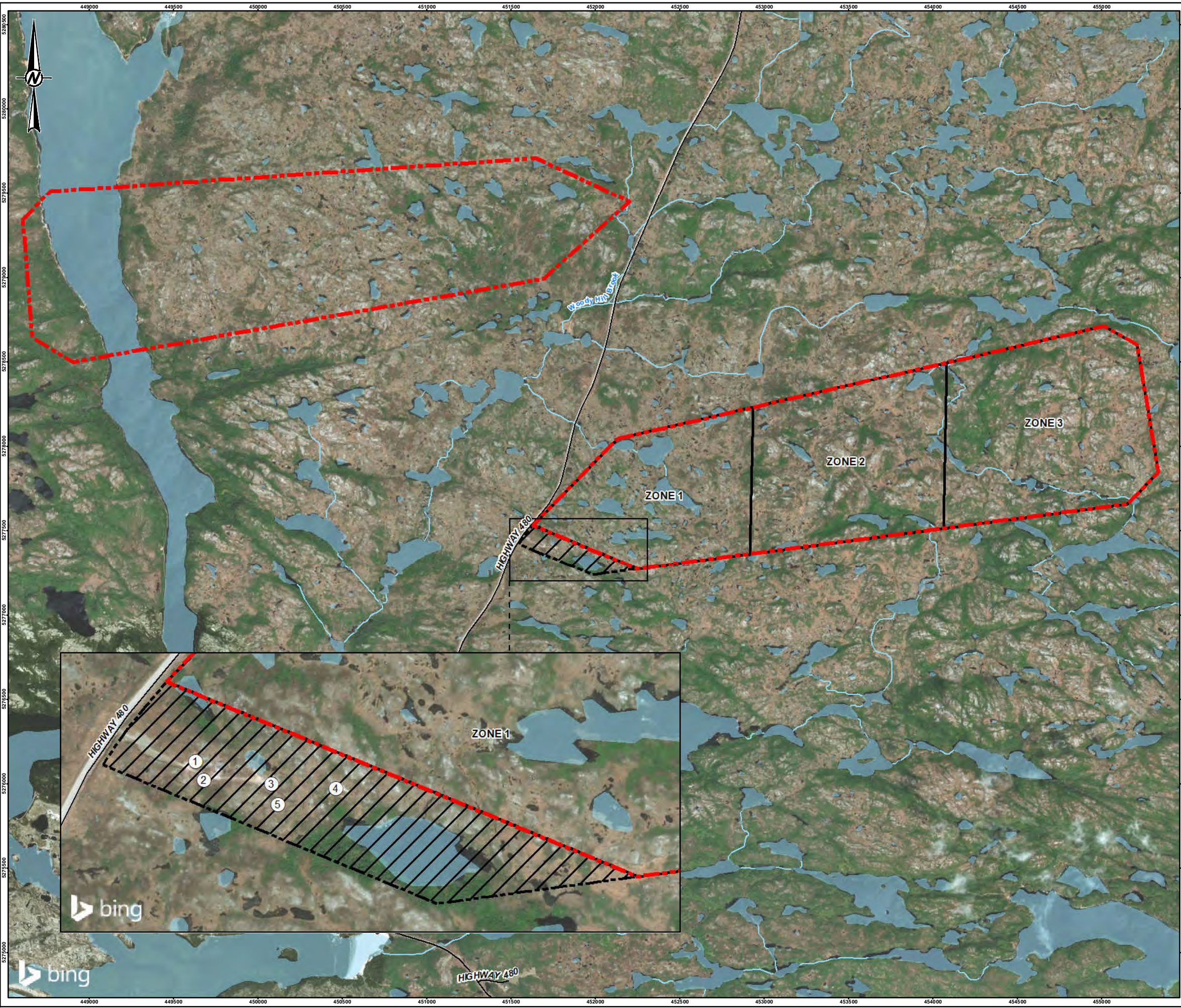


Stefano Marconetto, M.Sc., P.Eng. (ON, BC)  
*Sr. Principal Environmental Engineer*

JD/CW/SG/MZ

[https://golderassociates.sharepoint.com/sites/153673/project files/6 deliverables/4. remediation strategy/21497139 burgeo remedial strategy\\_mar 2022.docx](https://golderassociates.sharepoint.com/sites/153673/project%20files/6%20deliverables/4.%20remediation%20strategy/21497139%20burgeo%20remedial%20strategy_mar%202022.docx)

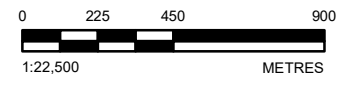
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- LEGEND**
- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
  - ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
  - ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
  - ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
  - ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
  - ROADWAY
  - WATERCOURSE
  - WATERBODY
  - ▨ PROPOSED ADDITIONAL LEASE AREA
  - ▭ ZONE BOUNDARY
  - ⋯ SITE

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. KEY MAP: 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  
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4. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
**DEFENCE CONSTRUCTION CANADA (DCC)**

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PROJECT  
**BURGEO FIRING RANGE  
9 WING GANDER, NL**

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TITLE  
**SITE PLAN**

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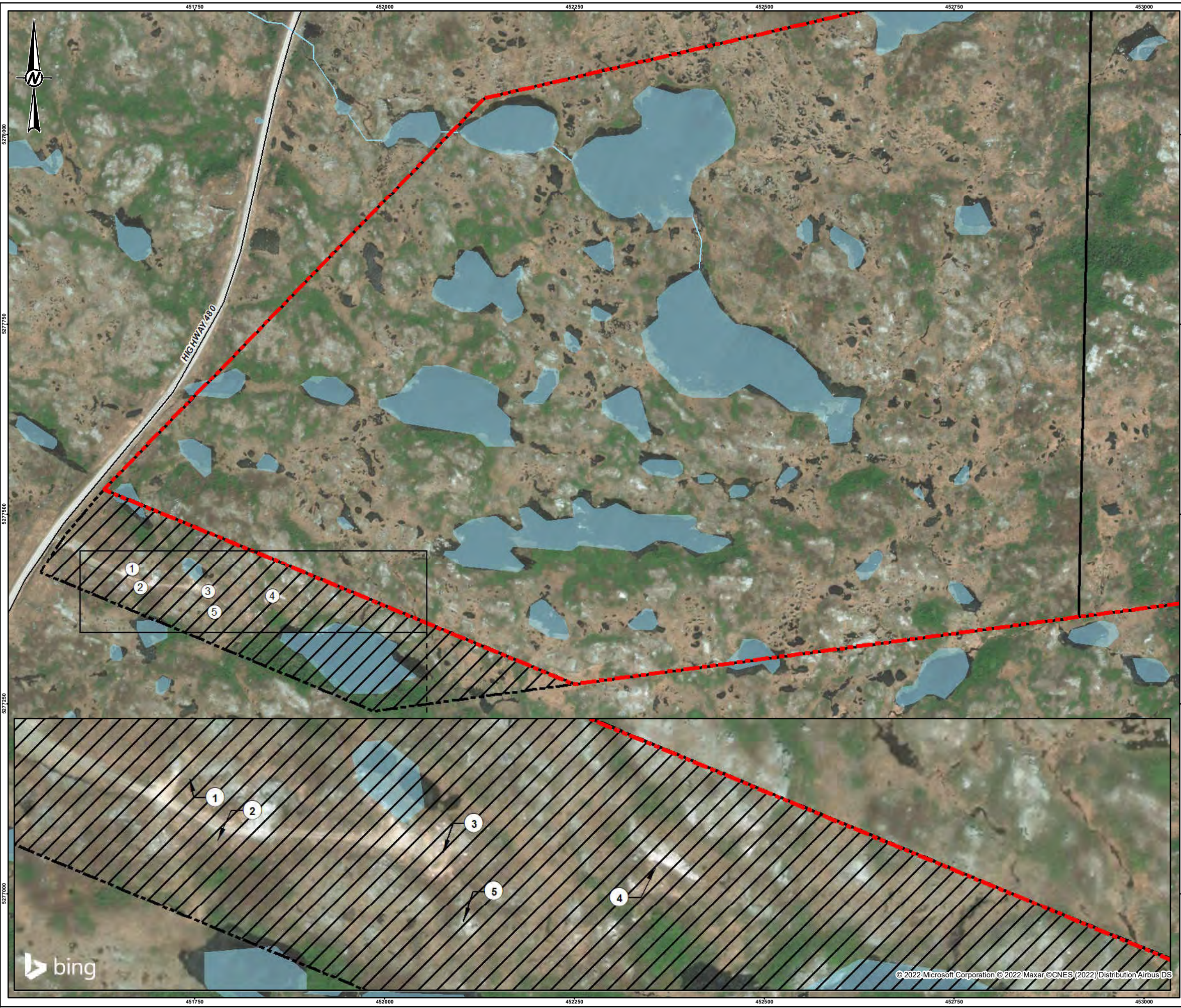
CONSULTANT	YYYY-MM-DD	2022-03-29
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

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PROJECT NO. 21497139	CONTROL 0002	REV. 0	FIGURE <b>1</b>
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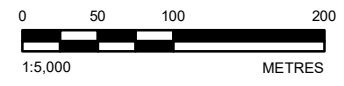


**LEGEND**

- ① APPROXIMATE RANGERS TARGET PRACTICE SHOOTING LOCATION
- ② APPROXIMATE LOCATION OF LOCAL RESIDENTS' CLAY TARGET SHOOTING AREA
- ③ APPROXIMATE LOCATION OF BACKSTOP (BULLET CATCH)
- ④ APPROXIMATE FORMER LOCATION OF WOODEN TARGETS USED BY LOCAL RESIDENTS
- ⑤ APPROXIMATE LOCATION WHERE LOCAL RESIDENTS SETUP TO SHOOT ACROSS WATERBODY
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
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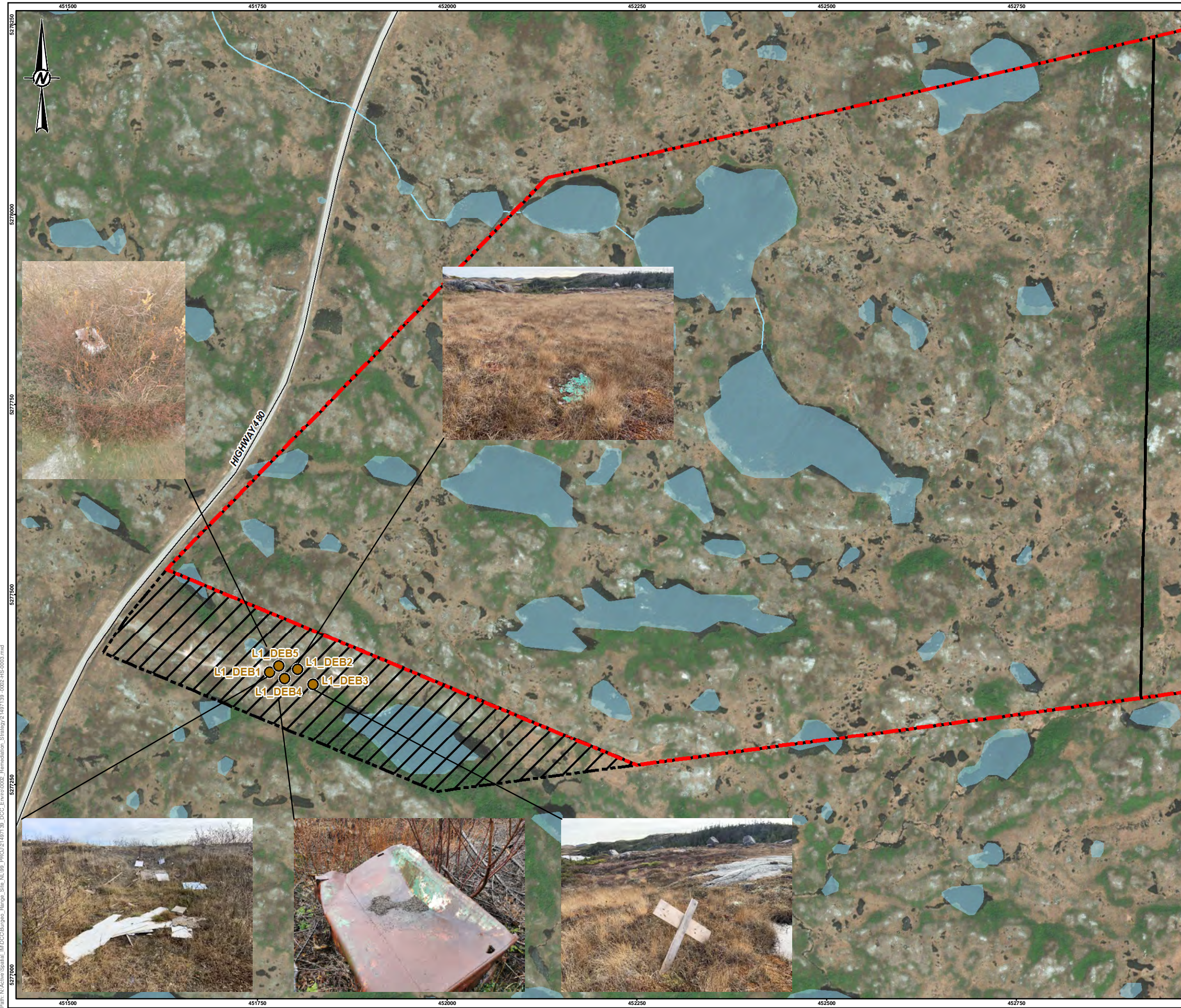
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<b>PROJECT</b> BURGEO FIRING RANGE 9 WING GANDER, NL		
<b>TITLE</b> SITE PLAN - LOCATION 1 - ZONE 1		
<b>CONSULTANT</b>	YYYY-MM-DD	2022-03-29
	DESIGNED	---
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC
<b>PROJECT NO.</b> 21497139	<b>CONTROL</b> 0002	<b>REV.</b> 0
		<b>FIGURE</b> 2

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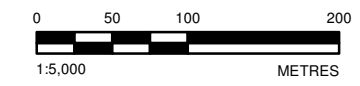
**LEGEND**

- APPROXIMATE DEBRIS LOCATION
- ROADWAY
- WATERCOURSE
- WATERBODY
- ▨ PROPOSED ADDITIONAL LEASE AREA
- ▭ ZONE BOUNDARY
- ▭ SITE

Debris ID	Description	Approximate Quantity
L1_DEB_1	General refuse found at firing backstop. Includes household waste, targets, spent shotgun shells, spent rifle cartridges, and spent ammunition.	~1m <sup>3</sup>
L1_DEB_2	Plastic target behind backstop. Includes spent shotgun shells.	~1m <sup>3</sup>
L1_DEB_3	Wooden stakes and cardboard target.	~1m <sup>3</sup>
L1_DEB_4	Rusted tank used as target. Includes spent ammunition, spent rifle cartridges and spent ammunition.	~1m <sup>3</sup>
L1_DEB_5	Rusted Kitchen sink used as target. Includes spent ammunition.	<1m <sup>3</sup>

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
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3. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

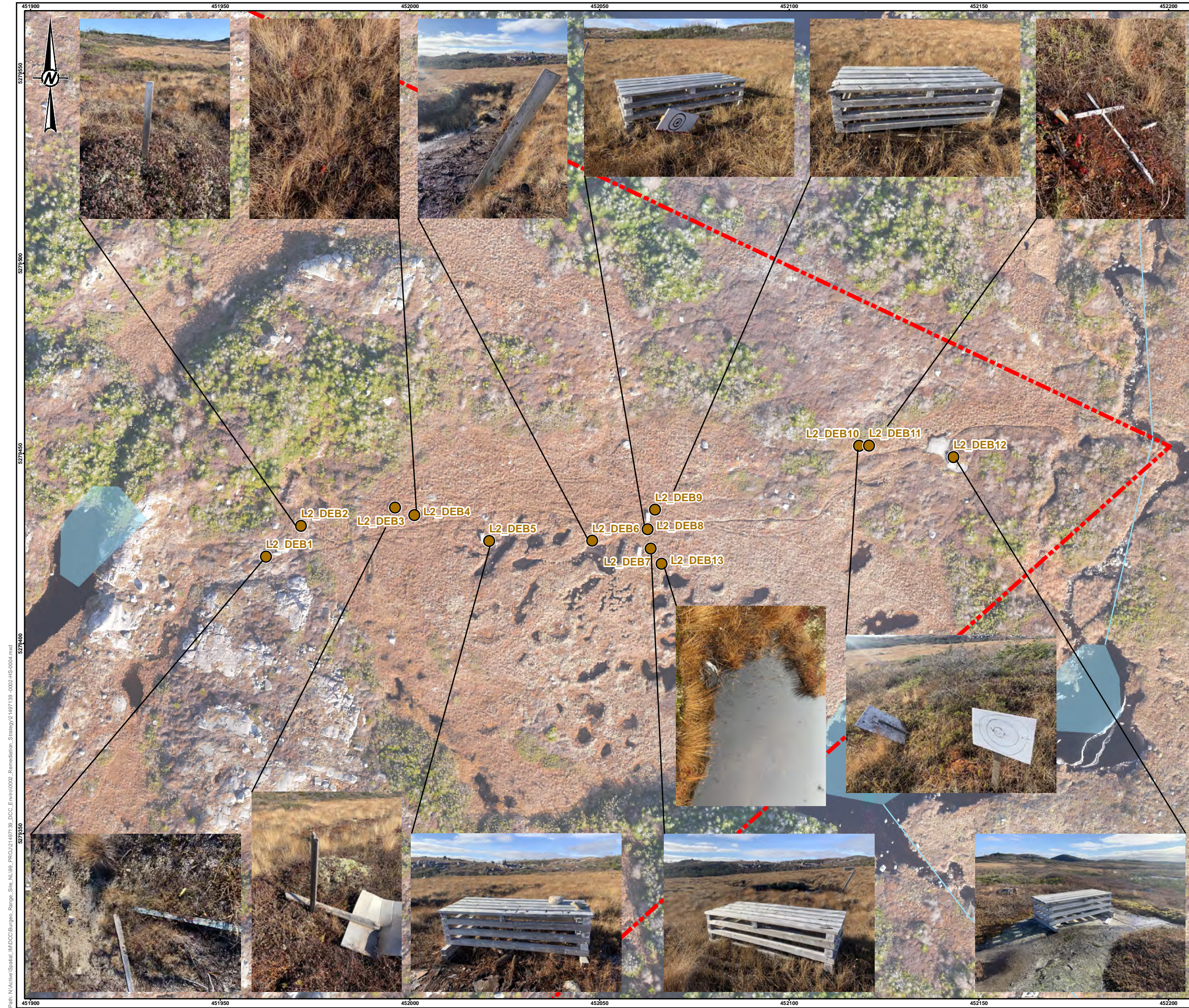
TITLE  
**LOCATION 1 - DEBRIS LOCATIONS**

CONSULTANT	YYYY-MM-DD	2022-03-29
	DESIGNED	----
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

PROJECT NO. 21497139 CONTROL 0002 REV. 0 FIGURE 3

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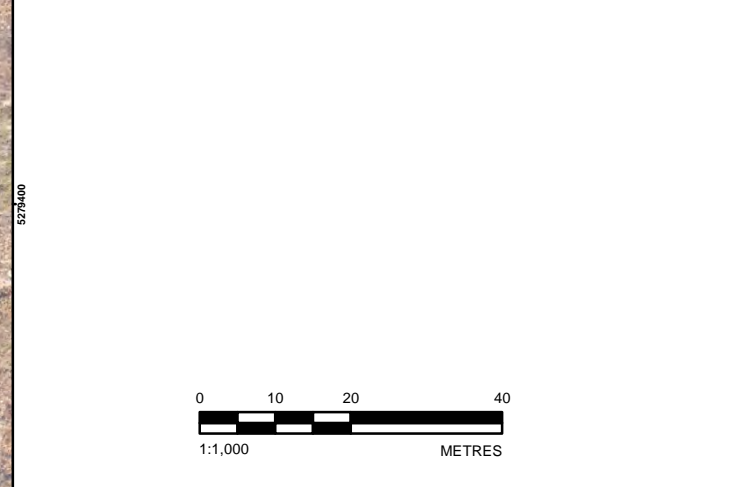
**LEGEND**

- APPROXIMATE DEBRIS LOCATION
- WATERCOURSE
- WATERBODY
- SITE

Debris ID	Description	Approximate Quantity
L2_DEB_1	Wooden stake target and spent ammunition.	<1m <sup>3</sup>
L2_DEB_2	Wooden stakes and spent shotgun shells.	<1m <sup>3</sup>
L2_DEB_3	Wooden stakes and cardboard target.	<1m <sup>3</sup>
L2_DEB_4	Wooden target, spent rifle cartridges and spent ammunition found on pathway towards firing backstop.	<1m <sup>3</sup>
L2_DEB_5	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_6	Wooden plank target	<1m <sup>3</sup>
L2_DEB_7	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_8	Wooden gun stand, composite target, spent rifle cartridges and spent ammunition	~1m <sup>3</sup>
L2_DEB_9	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_10	Wooden stakes with plastic targets and spent ammunition	<1m <sup>3</sup>
L2_DEB_11	Wooden stakes and spent shotgun shells.	<1m <sup>3</sup>
L2_DEB_12	Wooden gun stand, plywood targets and spent rifle cartridges	~1m <sup>3</sup>
L2_DEB_13	Wooden stake and spent shot gun shells	~1m <sup>3</sup>

**NOTE(S)**  
1. ALL LOCATIONS ARE APPROXIMATE

**REFERENCE(S)**  
1. BASE DATA - CANVEC PROVIDED BY HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES  
2. PROJECTION: TRANSVERSE MERCATOR, DATUM: NAD 83, COORDINATE SYSTEM: UTM ZONE 21, VERTICAL DATUM: CGVD28



CLIENT  
DEFENCE CONSTRUCTION CANADA (DCC)

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PROJECT  
BURGEO FIRING RANGE  
9 WING GANDER, NL

TITLE  
**LOCATION 2 - DEBRIS LOCATIONS**

---

CONSULTANT	YYYY-MM-DD	2022-03-29
<b>GOLDER</b> MEMBER OF WSP	DESIGNED	----
	PREPARED	JEM
	REVIEWED	JTD
	APPROVED	BMC

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PROJECT NO. 21497139	CONTROL 0002	REV. 0	FIGURE <b>4</b>
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**APPENDIX A**

**Data Gap Estimate**



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