



HYDROGEOLOGICAL ASSESSMENT

December 6, 2022

Project: 2315A

Coast Mountain Resources Ltd.
300 – 19923 80A Avenue, Langley, BC
V2Y 0E2

ATTENTION: Kyle Dolan

REFERENCE: Bamberton Quarry – Hydrogeological
Assessment

1 INTRODUCTION

Active Earth Engineering Ltd. (Active Earth) has been retained by Coast Mountain Resources Ltd. (CMR) to complete a hydrogeological and acid rock drainage (ARD) assessment at the Bamberton Quarry, Malahat on Vancouver Island (the “Site”) to support a permit amendment to the existing BC Mines Act Permit Q-8-24.

The purpose of the assessment was to determine whether any impacts to the on-Site and surrounding hydrogeological conditions and surface water conditions could occur as a result of the proposed mine expansion. In addition, ARD potential was assessed to determine if any risk is present to adversely effect groundwater and surface water quality from the mine activity and proposed mine expansion.

It is understood the current quarry expansion plans consists of lowering the existing quarry footprint down to a base of approximately 72m geodetic elevation across the northern portion of the existing footprint. In addition to a vertical expansion, relatively minor lateral expansion is proposed to support the required sloping/benching of the quarry walls.

2 SCOPE

Active Earth has completed the following scope of work to assess site hydrogeological conditions:

- Review of readily available pertinent information such as iMapBC, climate normals, published geological maps and aquifer information, and existing nearby wells.
- Installed six groundwater monitoring wells within and surrounding the quarry footprint.
- Performed packer tests within the boreholes immediately after drilling and completed rising head tests in the newly installed monitoring wells to determine the hydraulic conductivity of the bedrock.

- Collected core samples and submitted for ARD testing.
- Collected groundwater samples for chemical analysis at ALS Geochemistry Laboratories to determine background (up-gradient) groundwater quality and water quality within and down-gradient of the existing quarry operation.
- Collected and analyzed two surface water samples to assess for impacts from the existing quarry operations.
- Prepared a summary report presenting our findings.

3 SITE SETTING

3.1 Climate

Climate normal for the period of 1981 to 2010 were obtained from the Saanichton CDA Station, located approximately 8.7 km to the east from the Site. Average temperatures and precipitation are summarized in the table below.

TABLE A – CLIMATE NORMALS (1981 – 2010) FOR SAANICHTON CDA STATION

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average Temperature (°C)	4.8	5.3	7.1	9.3	12.2	14.9	17.0	17.1	14.6	10.3	6.6	4.5	10.3
Rainfall (mm)	136.9	85.4	77.4	51.5	41.5	34.7	20.5	26.5	29.6	92.6	155.0	134.7	886.3
Snowfall (cm)	8.1	4.1	1.9	0	0	0	0	0	0	0.4	0.8	6.7	22.0
Total Precipitation (mm)	217.9	126.4	96.4	51.5	41.5	34.7	20.5	26.5	29.6	96.6	163.0	201.7	1,106.3

The area receives approximately 886.3 mm of rainfall and 22 cm of snowfall annually. The wettest months are January and December, with average monthly rainfall amounts ranging from 20.5 mm (July) to 217.9 mm (January). The maximum monthly precipitation is 217.9 mm in January, of which 63% falls as rain.

3.2 Geology and Hydrogeology

3.2.1 Geological Setting

The Site is situated on the eastern slope of the Malahat Ridge on Vancouver Island, dipping down towards the Saanich Inlet. Mount Wood is located to the west of the Site and is the highest point in the surrounding area. Most of the bedrock consists of metamorphic bedrock of Jurassic age and older with the oldest dated bedrock being the Wark Gneiss of Lower Paleozoic age.

Two large fault lines cut through the metamorphic bedrock and are located to the north (Shawnigan Fault) and to the south (Malahat Fault) of the Site. The fault lines do not intercept the Site.

The Geological map of Victoria (map 1553a) shows that the bedrock at the Site falls within three groups:

J_B – Jurassic – Bonanza group – Basaltic to rhyolitic tuff, breccia, flows, minor argillite, greywacke

P_G – Lower Devonian and older – Saltspring Intrusions – metagranodiorite, metaquartz porphyry, quartz sericite schist

P_w – Lower Paleozoic – Wark Gneiss – massive and gneissic metadiorite, metagabbro, amphibolite

3.2.2 Hydrogeological Setting

A search of the IMapBC interface indicates that the Site is situated above Aquifer #208.

Aquifer #208 – Malahat Ridge – The aquifer is located along the east and southeast slopes of Malahat Ridge. The aquifer is bound along the east by Saanich Inlet. The western portion of the aquifer follows the watershed boundaries for Shawnigan Creek and Goldstream River. The aquifer description based on the 2019 Mapping Report indicates that the aquifer consists of fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock.

The Malahat Ridge Aquifer is classified as moderately vulnerable. The median depth to water table is moderately deep at 12.19 m. Aquifer productivity and aquifer classification (confined or unconfined) is not documented. Reported well yields indicate a median well yield of 0.38 L/s indicating the aquifer has low productivity. A total of 289 wells have been correlated to the aquifer, with a median well depth of 92.96 m.

Recharge to the Aquifer is predominantly from direct infiltration of precipitation where the Aquifer is exposed at surface or from lateral groundwater movement from the upland areas.

3.2.3 Groundwater Use

The BC Water Resource Atlas (WRA) revealed three wells within a 500 m radius of the Site. The closest well, Well Tag Number (WTN) 69045, is located approximately 50 m to the west of the proposed permit boundary. Well 109033 is listed for private domestic use.

The following table summarizes pertinent information for the wells located around the Site. A map of the surrounding wells and their well records are presented in Appendix A.

TABLE B – WELL SUMMARY

Address	Well Tag Number	Yield* (USgpm)	Well Depth (ft)	Depth to Water (ft)	Aquifer No.	Distance to permit boundary
Unknown	69043	3	230	unknown	208	20 m
Unknown	69045	1	190	unknown	208	60 m
1239 Trans Canada Highway, Malahat	109033	10	260	unknown	208	60 m

*Driller's Estimate

3.2.4 Surface Water Use

The nearest surface water body to the Site is the Saanich Inlet, approximately 50-100 m to the east. The nearest freshwater body is Bamber Creek located approximately 250 m to the south of the Site and an unnamed creek located 300 m north of the Site. Both creeks flow towards the Saanich Inlet. The iMapBC data tool was used to search for any records of surface water licensing in the area. No records were found in a 4 km radius from the site.

4 HYDROGEOLOGICAL INVESTIGATIONS

4.1.1 Borehole data and water table measurements

Active Earth has installed six groundwater wells in at the Site between November 2021 and May 2022 to measure groundwater table depths, determine hydraulic conductivity and gradient, and to determine groundwater quality. The well locations are given in Figure 2 and the borehole logs are presented in Appendix C. Table C summarizes the borehole information while Table D summarizes monitoring well details.

TABLE C – BOREHOLE SUMMARY

Monitoring Well ID	Surface Elevation (m geodetic)	Borehole depth (mBGL)	End of Borehole Depth (m Geodetic)	Thickness overburden (m)	Observations
AE21-MW101S/ AE21-MW101D*	146	24.2	121.8	8.5	-
AE21-MW102S/ AE21-MW102D	188	30.0	158	1.8	Fractures at 7.9m and between 13.4m and 14.0m
AE22-MW103S/ AE22-MW103D	132	53.4	78.6	2.4	Fracture at 12.5m
AE22-MW104S/ AE22-MW104D	94	22.9	71.1	1.2	Fractures between 4.6m and 9.1m

AE22-MW105	72	12.8	59.2	3.0	-
AE22-MW106	106	36.6	69.4	6.1	-

(*) This monitoring well is labelled as TH21-01 in the 2021 report by GeoPacific.

Groundwater monitoring wells AE22-MW104 – AE220MW106 were drilled with in the quarry footprint to a depth of below 72m to assess hydrogeological conditions in the newly proposed quarry extent.

TABLE D - SUMMARY OF GROUNDWATER MONITORING WELLS

Monitoring Well ID	Screen Interval (mBGL)	Stick-Up (m)	Measurement Date	Depth to Groundwater (mBTPVC)	Depth to Groundwater (m-BGL)
AE21-MW101S	11.9 – 15.2	0.75	22-Feb-22	Artesian	Artesian
			3-Mar-22		
			29-Apr-22		
			11-May-22		
			27-May-22		
AE21-MW101D	20.4 – 24.1	0.75	22-Feb-22	Artesian	Artesian
			3-Mar-22		
			29-Apr-22		
			11-May-22		
			27-May-22		
AE21-MW102S	11.9 – 15.2	0.905	22-Feb-22	2.86	1.955
			3-Mar-22	3.285	2.38
			29-Apr-22	4.54	3.635
			11-May-22	4.37	3.465
			27-May-22	4.66	3.755
AE21-MW102D	27.0 – 30.0	0.91	22-Feb-22	3.34	2.43
			3-Mar-22	4.96	4.05
			29-Apr-22	5.2	4.29
			11-May-22	4.93	4.02
			27-May-22	5.2	4.29
AE22-MW103S	25.9 – 28.9	0.8	3-Mar-22	15.61	14.81
AE22-MW103D	50.3 – 53.3	0.8	3-Mar-22	21.14	20.34
AE22-MW104S	4.6 – 10.7	0.75	26-May-22	4.61	3.86

AE22-MW104D	16.8 – 22.9	0.76	26-May-22	7.49	6.73
AE22-MW105	6.7 – 12.8	0.75	26-May-22	4.27	3.52
			27-May-22	4.98	4.23
AE22-MW106	27.4 – 36.6	0.75	26-May-22	6.32	5.57
			27-May-22	6.45	5.7

4.1.2 Hydraulic conductivity measurements

The following table summarizes the results of the hydraulic response testing of the on-Site monitoring wells.

TABLE E - SUMMARY OF HYDRAULIC TESTING RESULTS

Monitoring Well ID	Screen Depth/Test section (mBGL)	Method	Static Depth to Water (mBTPVC)	Initial Residual Head (m)	K (m/s)
AE21-MW102S	11.9 – 15.2	Rising Head	4.40	11.67	8.47×10^{-7}
AE21-MW102D	6.1 – 7.6	Rising Head	5.20	25.62	3.69×10^{-6}
AE22-MW104S	4.6 – 10.7	Packer test			1.97×10^{-7}
AE22-MW104D	16.8 – 22.9	Packer test			
AE22-MW105	6.7 – 12.8	Packer test			Impermeable ($<1 \times 10^{-10}$)
AE22-MW106	27.4 – 36.6	Packer test			

The hydraulic conductivity from the rising head tests were based on the Hvorslev (1951) method. The monitoring wells were bailed to create a head displacement relative to the static groundwater level, and the recovery was measured using dataloggers installed and programmed to record pressure readings every second. The rise in water table was simultaneously measured manually. The rising head data was analyzed to determine the elapsed time for 63% recovery to occur. The Hvorslev (1951) approximation, which also considers the geometries of the well and borehole, was then used to calculate the estimated hydraulic conductivity of the sand aquifer as shown in the above table.

Packer tests (or Lugeon tests)¹ are carried out in-situ in the borehole prior to installation of the monitoring wells. A section of the borehole is isolated by inflatable packers after which water flow is induced into or out of the test section. Flow rate and pressure are monitored during

¹ Preene, M (2019). Design and interpretation of packer permeability tests for geotechnical purposes. Quarterly Journal Of Engineering Geology, 52, 2, May, 182-200

testing. Hydraulic conductivity values for the test section can be obtained by monitoring the flow rate to maintain a specific pressure in the test section. The observed flow rate during the packer tests in the boreholes at locations AE22-MW105 and AE22-MW106 were less than 1L per 10 minutes, which indicated that no water is able to flow in and out of the test section. This indicates that the bedrock in the test section is practically impermeable (hydraulic conductivity $\sim 1E-10$ m/s). Assuming an average hydraulic conductivity of $9.5E-07$ m/s (taken over all hydraulic testing results and a hydraulic gradient of 31.4% (calculated between AE22-MW106 and the Saanich inlet), we estimated the average Darcy flux to be 2.5×10^{-2} m/day. This represents the discharge rate of groundwater from the quarry which is proportional to the hydraulic head and hydraulic conductivity.

4.2 Groundwater and Surface Water Quality

Five groundwater samples and two surface water samples were collected during the site investigations. All samples from were submitted to ALS Environmental laboratories for chemical analyses of general water quality parameters. Samples were analyzed for dissolved metals, LEPH/HEPH/PAHs, chloride, total nitrogen, nitrite, nitrate and ammonia. Nitrogen compounds including the de-nitrification daughter products were analyzed to assess the potential impacts from blasting.

Laboratory analyses were performed on samples in a selection of wells. Groundwater samples from well locations AE21-MW101 and AE21-MW102, located up-gradient of the existing quarry, represent the background groundwater quality, while groundwater samples from well locations AE22-MW104, AE22-MW105 and AE22-MW106 represent the groundwater quality within the quarry. Two locations were chosen to represent the surface water quality: one surface water settlement pond inside the quarry (SW1) and a pipe outlet near the Saanich Inlet (SW2).

The analytical results (Table 2) from all the groundwater samples were within BC Contaminated Sites Regulation (CSR) standards considering the protection of Drinking Water (DW) and Aquatic Life (AW), with the sole exception of dissolved lithium exceeding DW standards at AE21-MW102D, AE22-MW104D and AE22-MW106 ($8.8 - 9.5 \mu\text{g/L}$). The elevated concentrations of dissolved lithium were identified in deeper bedrock groundwater and is attributed to natural background concentrations in the region. The Ministry of Environment and Climate Change Strategy (ENV) Protocol 9 provide regional estimates for local background concentrations in groundwater for inorganic substances for the Southern Vancouver Island Region, in which dissolved lithium is noted to be $33 \mu\text{g/L}$. This ENV defined region does not explicitly include the Site, however, it does surround the Site in all directions and is considered appropriate in determining that the concentrations of dissolved lithium identified during the investigations on-site are naturally occurring background concentrations and not anthropogenic.

The analytical results from both surface water samples were within BC Water Quality Guidelines (WQG), except for location SW1 (settlement pond within the quarry) which identified concentrations of total nitrite above the Freshwater long-term (chronic) BC WQG. The Total Nitrite concentrations identified at this location were within the Freshwater Short-Term (Acute) BC WQG. SW2 was collected from a discharge pipe flowing from SW1 into a secondary settlement pond near the inlet. The surface water in the second settlement has been observed to infiltrate through the surface gravels and crushed rock before entering the groundwater table. SW2 did not identify elevated concentrations of Total Nitrite, Total Nitrate, Total Ammonia, and Total Nitrogen, indicating that this impacted water does not flow into the Saanich Inlet or any freshwater water courses.

Nitrite, Nitrate, and Nitrogen exhibited higher concentrations in the settlement pond and in groundwater monitoring wells located within the quarry compared to background groundwater monitoring wells.

Overall, the existing quarry operations appear to have a minimal impact on the overall quality of both surface water and groundwater, however further monitoring and mitigation measures are warranted to ensure the conditions stabilize or improve.

5 EVALUATION OF ACID ROCK DRAINAGE POTENTIAL

5.1 Assessment Criteria

The assessment criteria used to develop an informed opinion as to whether acid rock drainage (ARD) may be present on Site includes the site investigation, site setting, geology, site operations and laboratory analytical results. Each of the aforementioned criteria will be discussed in more detail in the following sections.

5.2 Laboratory Analytical Results

Primary evaluation of ARD was accomplished by way of chemical analysis of one representative core sample collected from AE21-MW101 and a bulk sample collected from an aggregate stockpile originating from the northwest corner of the quarry at the 92m bench. This well was located just outside the mine permit boundary, but it is considered to be representative of the rock within the quarry boundaries based on petrology. These samples were submitted to AGAT Laboratories Inc. for analysis of Acid Base Accounting (ABA) following the modified ABA (Lawrence 1989-1991) method, Shake Flask Extraction, and Acid Digest Metals. The sample at AE21-MW101 was un-weathered solid drill core and collected between 24-25m in depth. The stockpile sample (SS-ARD-220901) was aggregate (product) collected from a stockpile on September 1, 2022. Laboratory analytical results are presented in Appendix C.

The ABA analysis method included maximum potential acidity (MPA), fizz rating, net neutralization potential, neutralization potential (NP), paste pH, total sulphur, total carbon, sulphate sulphur, and inorganic carbon. The neutralization potential ratio (NPR) is the neutralization potential divided by the maximum potential acidity ($NPR = NP/MPA$). This ratio is considered the primary screening tool in the evaluation of ABA results, in conjunction with site specific information.

Based on the summarized results presented in Table F, the NPR results are 120 (AE21-MW101), 20.8 (AE21-MW102) and 34.6 (SS-ARD-220901). An NPR result less than 1 indicates a sample has a high potential to produce ARD; an NPR result greater than 1 and less than 2 indicates a level of uncertainty with the sample's potential to produce ARD; and an NPR result greater than 2, such as in this case, indicates the sample has a low potential to produce ARD.

In addition, the Shake Flask Extraction results did not identify any elevated concentrations of dissolved metals nor did any of the groundwater or surface waster analytical results.

Furthermore, the paste pH results indicate that the rock samples have high pH, 9.0 and 8.9, respectively. A pH result of less than 5.5 would be suspect of ARD.

The following table summarizes the laboratory analytical results.

TABLE F – SUMMARY OF LABORATORY ANALYTICAL RESULTS

Parameter	Units	AE22-MW101	AE22-MW102	SS-ARD-220901
Acid Base Accounting				
Max. Potential Acidity (MPA)	tCaCO ₃ / 1Kt	<0.2	1.3	5.0
Fizz Rating	-	Slight	Slight	Moderate
Neutralization Potential (NP)	tCaCO ₃ / 1Kt	24	27	168.1
NPR Ratio (NP: MPA)	-	120	20.8	34.6
pH				
Paste pH	pH units	9.0	8.9	8.94
Sulfate - Sulphur				
Total Sulphur	%	0.01	0.04	0.16
Sulphate Sulfur	%	<0.01	<0.01	<0.01
Carbon				
Inorganic Carbon (C)	%	0.254	0.248	1.09

6 MONITORING AND RESPONSE PLANS

Active Earth proposes the following plans to monitor the effects of the quarry on groundwater and surface water, to monitor the ARD potential of blast rock and aggregate, and to manage stockpiles of aggregate in such a way that minimizes contact with runoff.

6.1 Water Monitoring Plan

The purposes of this plan is to monitor the effect of quarrying on groundwater levels, groundwater quality, and surface water quality.

Active Earth proposes the following scope for the groundwater monitoring plan:

- Quarterly monitoring of groundwater levels in the upslope domestic wells (WTN 69043, 69045 and 109033), AE21-MW102, downgradient wells (MWA and MWB), and any intact wells within the quarry footprint. The first year of monitoring will form the baseline readings. After the first year of readings, monitoring frequency will be re-evaluated. The locations of the monitoring wells are given in Figure 2.
- Quarterly monitoring of groundwater quality in down gradient wells and any intact wells in the quarry footprint. General parameters such as pH, turbidity, electrical conductivity and alkalinity will be recorded during sampling. Groundwater samples should be analyzed for:
 - LEPH/HEPH/PAH and dissolved metals
 - Total nitrogen, nitrite, nitrate and ammonia
- In the case of unexpected drops in water levels or unexpected changes in groundwater chemistry in any of the wells, CMR will be notified, and operations will cease until the issue can be resolved.

Active Earth proposes the following scope for the surface water monitoring plan:

- Quarterly monitoring of surface water quality in the 1st settlement pond and at the outlet discharging into the 2nd settlement pond. General parameters such as pH, turbidity, electrical conductivity and alkalinity will be recorded during sampling. Water samples should be analyzed for:
 - LEPH/HEPH/PAH and total metals
 - Total nitrogen, nitrite, nitrate and ammonia
- If during monitoring elevated concentrations are identified exceeding BC WQG at the outlet discharging into the 2nd settlement pond, a surface water sample will be collected directly from the 2nd settlement pond. If the surface water sample collected directly from the 2nd settlement pond exceeds BC WQG for short-term (acute) or multiple times for long-term (chronic), CMR will be notified, and steps will be taken immediately to rectify the issue, including but not limited to the following:
 - Elimination or minimization of the source

- Increasing efficacy of settlement ponds (clearing out sediment)
- Adding a tertiary settlement pond
- Adding active treatment

6.2 High Flow Response

If high flows are encountered from the quarry walls and/or base during quarrying activities the following procedure will be followed:

1. Stop all blasting and excavation activities
2. Measure seepage flows
3. Increase monitoring schedule for nearby wells to monthly
4. Determine if increased flows are affecting the groundwater levels at surround monitoring/domestic wells, whether the quantity of water can be safely managed, and whether operations can continue.

6.3 Material Monitoring and Management Plan

Blasted rock will be stockpiled at the active mining face for a period of approximately 1 to 2 months before being crushed. In addition, finished (aggregate) product can be stored on Site for the same period of time. Stockpiles of material should be placed on surfaces where run-off is directed away from the stockpiles area.

To ensure the chemical composition of on-Site material does not pose a risk to the environment, Active Earth proposes the following monitoring plan:

- Quarterly monitor on-Site stockpiled aggregate material for the first two years of monitoring and bi-annually for subsequent years. Aggregate material should be analysed for:
 - Acid Base Accounting Parameters (NP and MPA)
 - Sulphate – Sulphur HCl leach (%)
 - Dissolved metals through Shake Flask Extraction
 - 4 Acid Digest – metals package, ICP-OES/ICP-MS finish
 - Toxicity Characteristics Leaching Procedure (TCLP) for metals

In case other rock types, previously untested for ARD, are encountered during the quarry operation, additional ARD testing will be conducted to ensure proper management of the material.

If ARD is considered a risk, then the material will be deemed unsuitable for product and a plan to manage it will be put in place. This plan will be developed on a case-by-case basis but will

generally consist of placing ARD waste rock above the water table and covered with clay/silt soil at 1 m in thickness. Ongoing down gradient monitoring will be established.

7 CONCLUSIONS AND RECOMMENDATIONS

The proposed quarry vertical expansion to 72m geodetic across the northern portion of the existing footprint and relatively minimal lateral expansion in certain areas is considered to have a minimal risk of affecting local groundwater levels and quality based on the low hydraulic conductivity of the bedrock, the current and proposed operations, and the existing chemical quality observed in background groundwater monitoring wells, groundwater monitoring situated within the existing quarry, and down-gradient surface water.

Based on the ARD evaluation, it has been determined that the ARD potential at Bamberton Quarry is considered low. Should site operations change or significant staining on rock surfaces or base of pit start to develop, an additional investigation may be warranted.

Furthermore, Active Earth makes the following conclusions regarding the hydrogeological and environmental factors involving the Site;

1. The average hydraulic conductivity of the bedrock is estimated to be approximately $9.5E-07$ m/s. At several locations to bedrock was estimated to be practically impermeable ($1E-10$ m/s). Higher conductivities values are contributed to the presence of local (smaller) faults in the bedrock allowing for higher groundwater flow.
2. Groundwater is expected to flow easterly towards the Saanich Inlet. The Darcy flux is estimated to be approximately 2.5×10^{-2} m/day.
3. Based on this low groundwater flow discharge, combined with a very low transmissivity, the expected radius of influence from dewatering the excavation will be low. Therefore, we expect no negative impacts on nearby surface water and the receiving environment (streams etc.)
4. All existing wells are located up-stream at higher elevations from the Site, no substantial negative impacts on the productivity of these wells are expected.

Active Earth puts forth the following recommendations for the Site:

1. Implement a groundwater and surface monitoring program for the Site (included in this report), including surrounding domestic wells, to assess for impacts from ARD, blasting, and general quarry operations on bi-annual basis. Specifically for monitoring Nitrate, Nitrite, and Total Nitrogen concentrations.
2. Surface water runoff should always be directed away from active mining or stockpiles.

3. Material placement and disposal locations should be situated in gently sloping (~4%) areas which are not prone to significant runoff.
4. Manage rock and water based on the management and response plans outlined in section 6 of this report.

8 LIMITATIONS

The use of this report by anyone is subject to the following conditions and limitations:

1. This report has been prepared for Coast Mountain Resources Ltd., for the specific use referred to herein. The client and appropriate authorities, including the BC Ministry of Energy, Mines, and Low Carbon Innovation, may rely on this report. It is not reasonable for any other party to rely on the contents of this report without first obtaining written authorization from the client and Active Earth Engineering Ltd.
2. Liability is expressly denied to any person other than the parties indicated above and those who obtain written consent. Accordingly, Active Earth Engineering Ltd. does not accept responsibility for any damage suffered by any such person as a result of decisions made or actions based on this report. Diligence by all intended users is assumed.
3. This report is believed to provide a reasonable representation of the general environmental condition at the Site. The conclusions made in this report reflect Active Earth's best judgment in light of the information available at the time of reporting. Should additional information become available or Site conditions change, the conclusions and recommendations of this report may be subject to change.
4. Active Earth Engineering Ltd. has agreed to conduct this assessment and prepare this report as requested by the client named in the report for the use specified by the client, which is stated in the report. The client has agreed that the performance of this work and the report format are appropriate for the intended use.
5. Written consent from Active Earth Engineering Ltd. must be obtained before any part of the report can be used for any purpose by anyone other than the client and other intended users identified in the report. Liability to any other party or for any other use is expressly denied regardless of who pays Active Earth Engineering Ltd.'s fee. Written consent and approval of Active Earth Engineering Ltd. must also be obtained before the report (or any part of it) can be altered or conveyed to other parties or the public through prospectus, offering memoranda, advertising, public relations, news, sales or other media.

9 CLOSURE

We trust this provides the information required at this time. If you have any questions, or require additional clarification, please contact the undersigned.

Yours truly,

ACTIVE EARTH ENGINEERING LTD.

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ATTACHMENTS

LIST OF ACRONYMS

FIGURES

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Figure 3	Existing Surface Plan
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Appendix B	Laboratory Analytical Results
Appendix C	Borehole Logs
Appendix D	Rising Head Test and Packer Test Results



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LIST OF ACRONYMS

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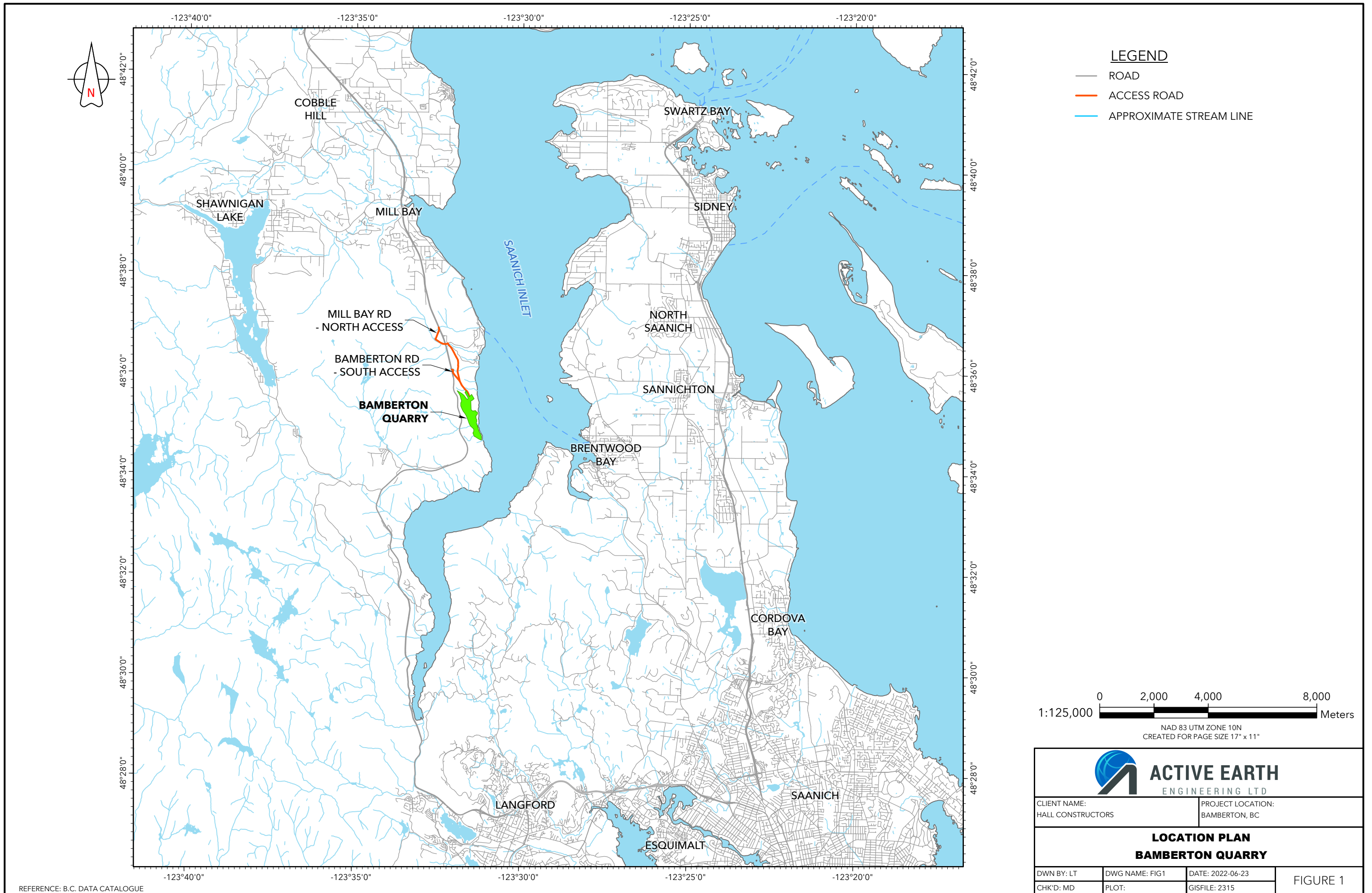
AEC	Area of Environmental Concern
AiP	Approval in Principle
AL	Agricultural Land Use Standards (CSR), or Agricultural Guidelines/Standards (CCME CSQG or CWS)
APEC	Area of Potential Environmental Concern
AST	Above Ground Storage Tank
AWfw/m	Aquatic Life Standards (CSR) (fw – freshwater, m – marine)
BCWQG	British Columbia Water Quality Guidelines
BTEXS	Benzene, Toluene, Ethylbenzene, Xylenes, and Styrene
CCME	Canadian Council of Ministers of the Environment
CL	Commercial Land Use Standards (CSR), or Commercial Guidelines/Standards (CCME CSQG or CWS)
CoC	Certificate of Compliance
COC	Contaminant of Concern
CSM	Conceptual Site Model
CSQG	Canadian Soil Quality Guidelines (CCME)
CSR	Contaminated Sites Regulation
CWS	Canada Wide Standards (CCME)
DSI	Detailed Site Investigation
DW	Drinking Water Standards (CSR)
ENV	BC Ministry of Environment & Climate Change Strategy
EPHw	Extractable Petroleum Hydrocarbons (w – water)
ESA	Environmental Site Assessment
GCDWQ	Guidelines for Canadian Drinking Water Quality
HBM	Hazardous Building Materials
HDPE	High-Density Polyethylene
HEPHs	Heavy Extractable Petroleum Hydrocarbons (s – soil)
HWR	BC Hazardous Waste Regulation
IL	Industrial Land Use Standards (CSR), or Industrial Guidelines/Standards (CCME CSQG or CWS)
IW	Irrigation Water Standards (CSR)
LEPHs/w	Light Extractable Petroleum Hydrocarbons (s – soil, w – water)
LW	Livestock Watering Standards (CSR)
MDL	Method Detection Limit
MTBE	Methyl Tertiary Butyl Ether (also referred to as Methyl Tert-Butyl Ether)
NIR	Notification of Independent Remediation
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCOC	Potential Contaminant of Concern
PERC	Tetrachloroethylene
Phase I	Phase I Environmental Site Assessment
Phase II	Phase II Environmental Site Assessment
PL	Urban Park Land Use Standards (CSR), or Parkland Guidelines/Standards (CCME CSQG or CWS)
PSI	Preliminary Site Investigation
RL	Residential Guidelines/Standards (CCME CSQG or CWS)
RLld	Residential Low-Density Land Use Standards (CSR)
RLhd	Residential High-Density Land Use Standards (CSR)
Stage 1	Stage 1 Preliminary Site Investigation
Stage 2	Stage 2 Preliminary Site Investigation
TCE	Trichloroethylene
VOC	Volatile Organic Compounds
VHw	Volatile Hydrocarbons (w – water)
VPHs/w/v	Volatile Petroleum Hydrocarbons (s – soil, w – water, v – vapour)
UST	Underground Storage Tank
WLn	Wildlands Natural Land Use Standards (CSR)
WLR	Wildlands Reverted Land Use Standards (CSR)
WTN	Well Tag Number

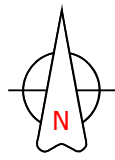
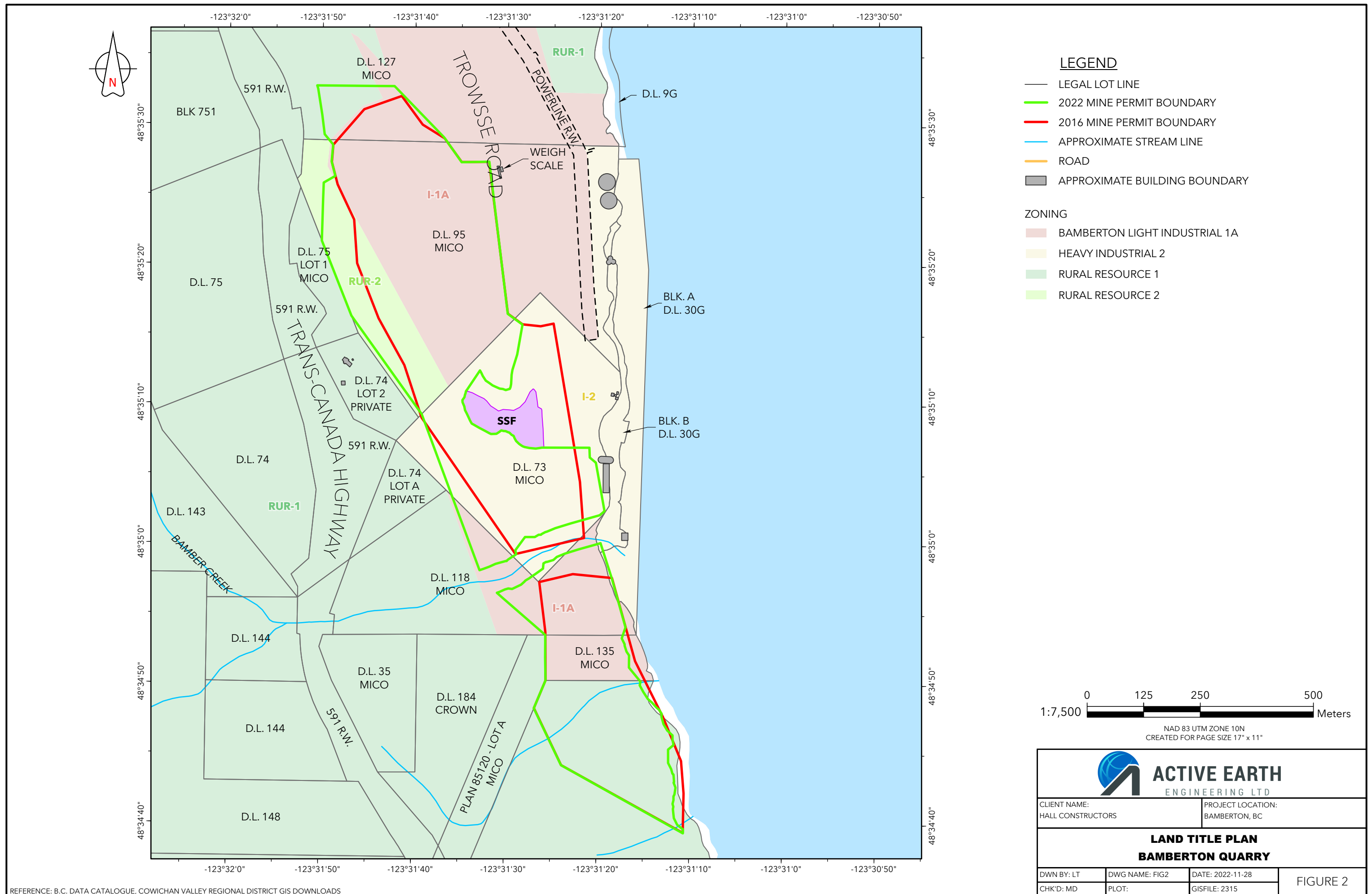


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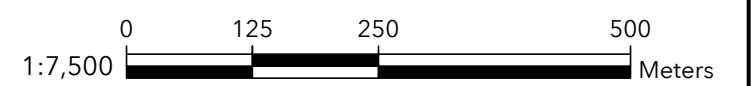
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FIGURES





- LEGEND**
- LEGAL LOT LINE
 - 2022 MINE PERMIT BOUNDARY
 - 2016 MINE PERMIT BOUNDARY
 - APPROXIMATE STREAM LINE
 - ROAD
 - APPROXIMATE BUILDING BOUNDARY
- ZONING**
- BAMBERTON LIGHT INDUSTRIAL 1A
 - HEAVY INDUSTRIAL 2
 - RURAL RESOURCE 1
 - RURAL RESOURCE 2



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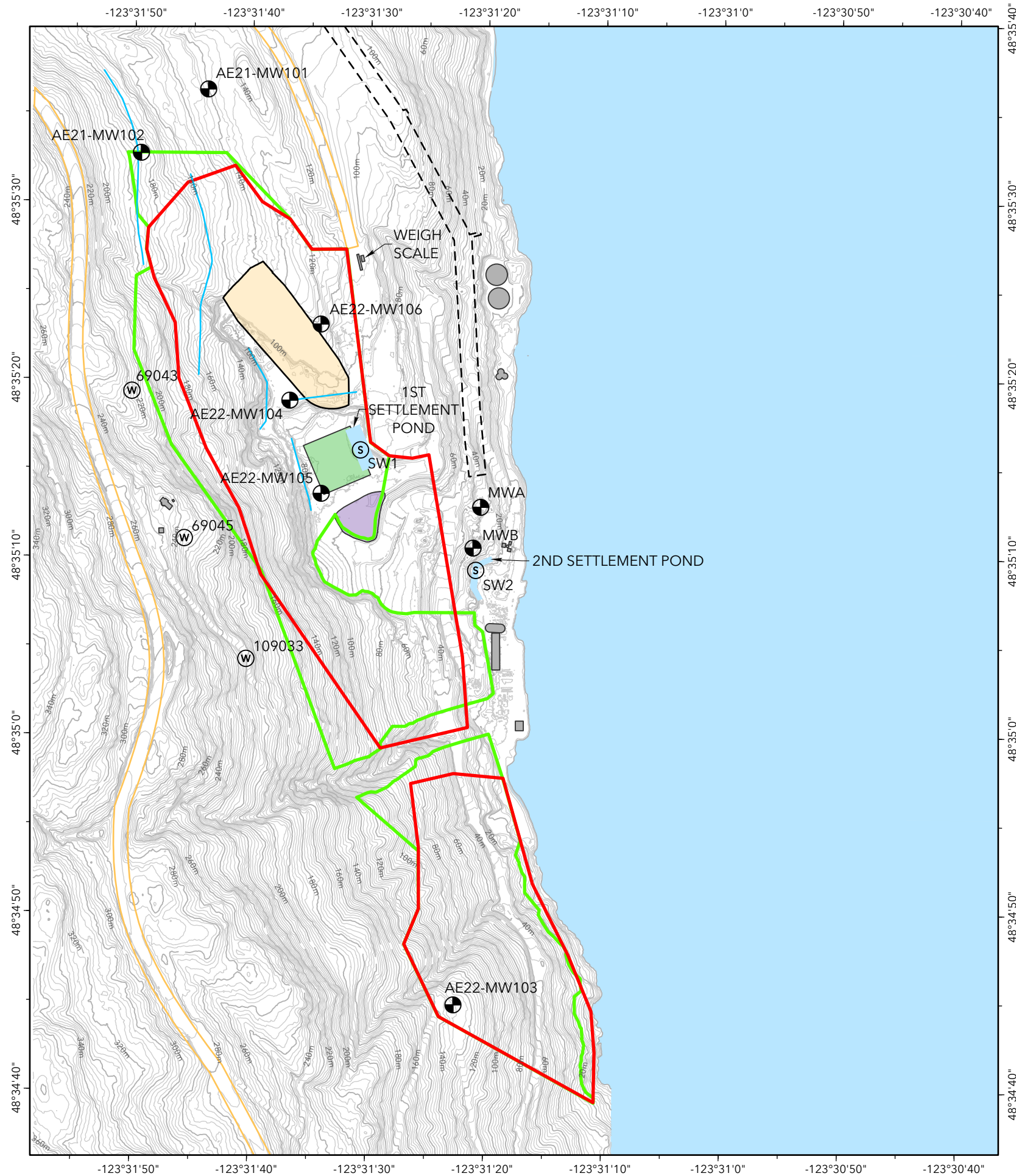
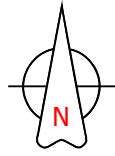


<small>CLIENT NAME:</small> HALL CONSTRUCTORS	<small>PROJECT LOCATION:</small> BAMBERTON, BC
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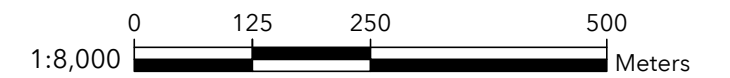
**LAND TITLE PLAN
BAMBERTON QUARRY**

<small>DWN BY:</small> LT	<small>DWG NAME:</small> FIG2	<small>DATE:</small> 2022-11-28	FIGURE 2
<small>CHK'D:</small> MD	<small>PLOT:</small>	<small>GISFILE:</small> 2315	

REFERENCE: B.C. DATA CATALOGUE, COWICHAN VALLEY REGIONAL DISTRICT GIS DOWNLOADS



- LEGEND**
- MONITORING WELL
 - SURFACE WATER SAMPLE
 - WATER WELL
 - CONTOUR (2m)
 - DRAINAGE DITCH
 - 2016 MINE PERMIT BOUNDARY
 - 2022 MINE PERMIT BOUNDARY
 - ROAD
 - APPROXIMATE BUILDING BOUNDARY
 - EXISTING DISTURBANCE
 - CRUSHER LOCATION
 - STOCKPILE



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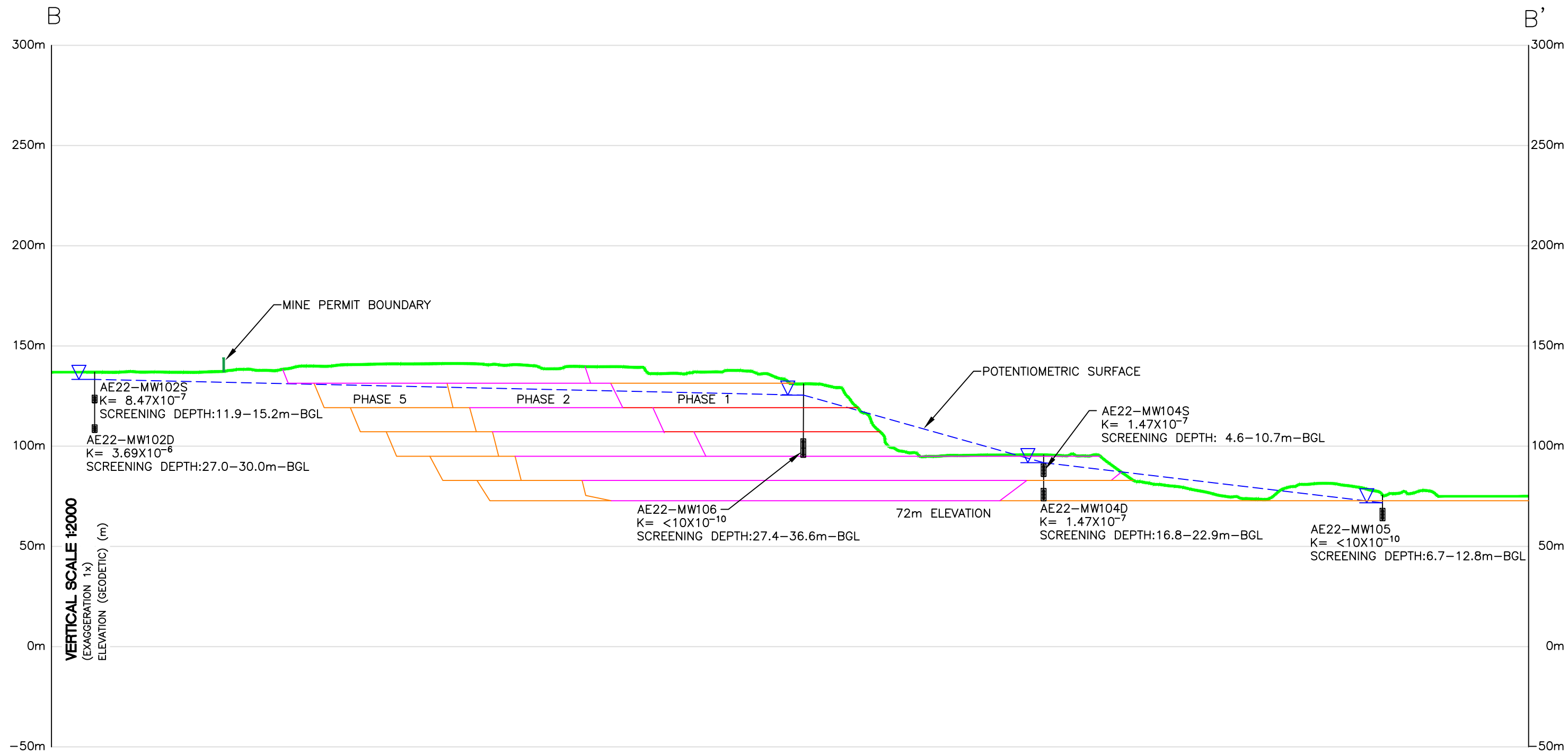


CLIENT NAME: HALL CONSTRUCTORS PROJECT LOCATION: BAMBERTON, BC

**EXISTING SURFACE PLAN
BAMBERTON QUARRY**

DWN BY: LT DWG NAME: FIG3 DATE: 2022-12-06
CHK'D: MD PLOT: GISFILE: 2315

FIGURE 3



LEGEND

- APPROXIMATE GROUND SURFACE
- ▽ GROUNDWATER ELEVATION
- K HYDRAULIC CONDUCTIVITY (m/s)




 ACTIVE EARTH ENGINEERING LTD		
CLIENT NAME: HALL CONSTRUCTION	PROJECT LOCATION: BAMBERTON, BC	
CROSS SECTION B-B' BAMBERTON QUARRY		
DWN BY: WS	DWG NAME: -2	DATE: 2022-07-21
CHK'D: MD	PLOT:	CADFILE: 2315

FIGURE 4



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TABLES

Analytical Table Footnotes: Analytical Results for Groundwater

Tables should be viewed and printed in colour.
 All concentrations in µg/L, except where otherwise noted.
 All terms defined within the body of Active Earth's report.

- < Result is less than the laboratory detection limit indicated.
- Parameter not analyzed or no standard or guideline applies.
- * RPDs are not normally calculated where one or more concentrations are less than five times MDL.

- (1) BC Contaminated Sites Regulation (CSR BC Reg. 375/96 effective up to the date of this report), General Numerical Water Standards (Schedule 3.2). The water use standards that are considered to apply to the Site are indicated below.

Water Use Standards (CSR)	
Standards that apply at all sites irrespective of water use (IWU)	Applicable to the Site
Aquatic Life - Freshwater (AWf)	Applicable to the Site
Aquatic Life - Marine (AWm)	Applicable to the Site
Drinking Water (DW)	Applicable to the Site

- (2) Standard applies to all sites irrespective of water use.
- (3) Standards for dissolved iron and manganese only apply at sites with specified uses listed in CSR Schedule 2, as indicated in CSR Schedule 3.2 footnotes 43 (iron) and 46 (manganese).
- (4) Where total chromium analysis has been conducted, results are compared to the more conservative of the standards for hexavalent and trivalent chromium.
- (5) Standard varies with crop. See CSR Schedule 3.2 footnote 17 for further details.
- (6) Standard varies with crop, soil drainage, and Mo:Cu ratio. Consult a director for further advice.
- (7) Standard is for continuous application on crops. Standard for intermittent application is 50 µg/L.
- (8) Interim provincial background standard for dissolved cobalt in groundwater (per Protocol 9 dated February 1, 2021 and ENV Technical Bulletin 3, dated July 31, 2019). This supersedes the Drinking Water standard of 1 µg/L, provided in CSR Schedule 3.2. for all regions outside the Protocol 9 Local Background Concentrations Regions.
- (9) Standard varies with pH, temperature, and substance isomer. Consult an MOE director for further advice.
- (10) Standard for chloride ion applies only to Freshwater Aquatic Life, not to Marine Aquatic Life, as indicated in CSR Schedule 3.2 footnotes (5).

- (11) Protocol 9 for Contaminated Sites - Local Background Concentrations in Groundwater (Version 2), Section 64 of the Environmental Management Act (dated February 1, 2021). Regional estimates for local background concentrations in groundwater for inorganic substances. Groundwater that contains concentrations above the applicable numerical water standards, but below the applicable regional background concentrations as determined under this Protocol, would not be considered contaminated.

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWf) Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Standard

Associated Lab Files: VA22B1894, VA22B0421

Table 1: Analytical Results for Hydrocarbons in Groundwater

Sample Location					AE22-MW101	AE22-MW102D	AE22-MW102S	AE22-MW104S
Sample ID					MW101-220511	MW102D-220511	MW102S-220511	MW104S-220526
Screened Interval Depth (m)					11.7-14.9	12.1-15.1	27.0-30.0	4.6-10.7
Date Sampled					11-May-22	11-May-22	11-May-22	26-May-22
CSR Water Use Standards ⁽¹⁾								
Completed by: MM Review by: AL								
	Aquatic Life Freshwater (AWf)	Aquatic Life Marine (AWm)	Drinking Water (DW)	Irrespective of Water Use (IWU)				
Extractible Petroleum Hydrocarbons (ug/L)								
EPHW ₁₀₋₁₉	-	-	-	5,000	<250	<250	<250	<250
EPHW ₁₉₋₃₂	-	-	-	-	<250	<250	<250	<250
LEPH _w	500	500	-	-	<250	<250	<250	<250
HEPH _w	-	-	-	-	<250	<250	<250	<250
Polycyclic Aromatic Hydrocarbons (ug/L)								
acenaphthene	60	60	250	-	<0.010	<0.010	<0.010	<0.010
acenaphthylene	-	-	-	-	<0.010	<0.010	<0.010	<0.010
acridine	0.5	0.5	-	-	<0.010	<0.010	<0.010	<0.010
anthracene	1	1	1,000	-	<0.010	<0.010	<0.010	<0.010
benz(a)anthracene	1	1	0.07	-	<0.010	<0.010	<0.010	<0.010
benzo(a)pyrene	0.1	0.1	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthenes	-	-	0.07	-	<0.010	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthenes	-	-	-	-	<0.015	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	-	-	-	-	<0.010	<0.010	<0.010	<0.010
benzo(k)fluoranthene	-	-	-	-	<0.010	<0.010	<0.010	<0.010
chrysene	1	1	7	-	<0.010	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	-	-	0.01	-	<0.0050	<0.0050	<0.0050	<0.0050
fluoranthene	2	2	150	-	<0.010	<0.010	<0.010	<0.010
fluorene	120	120	150	-	<0.010	<0.010	<0.010	<0.010
indeno(1,2,3-cd)pyrene	-	-	-	-	<0.010	<0.010	<0.010	<0.010
1-methylnaphthalene	-	-	5.5	-	<0.010	<0.010	<0.010	<0.010
2-methylnaphthalene	-	-	15	-	<0.010	<0.010	<0.010	<0.010
naphthalene	10	10	80	-	<0.050	<0.050	<0.050	<0.050
phenanthrene	3	3	-	-	<0.020	<0.020	<0.020	<0.020
pyrene	0.2	0.2	100	-	<0.010	<0.010	<0.010	<0.010
quinoline	34	34	0.05	-	<0.050	<0.050	<0.050	<0.050

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWf) Water Use Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Water Use Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Water Use Standard

Table 1: Analytical Results for Hydrocarbons in Groundwater

Sample Location					AE22-MW104D	AE22-MW105	AE22-MW106
Sample ID					MW104D-220526	MW105-220527	MW106-220527
Screened Interval Depth (m)					16.8-22.9	6.7-12.8	27.4-36.6
Date Sampled					26-May-22	26-May-22	26-May-22
CSR Water Use Standards ⁽¹⁾							
Completed by: MM Review by: AL							
	Aquatic Life Freshwater (AWf)	Aquatic Life Marine (AWm)	Drinking Water (DW)	Irrespective of Water Use (IWU)			
Extractible Petroleum Hydrocarbons (ug/L)							
EPHW ₁₀₋₁₉	-	-	-	5,000	<250	<250	<250
EPHW ₁₉₋₃₂	-	-	-	-	<250	<250	<250
LEPH _W	500	500	-	-	<250	<250	<250
HEPH _W	-	-	-	-	<250	<250	<250
Polycyclic Aromatic Hydrocarbons (ug/L)							
acenaphthene	60	60	250	-	<0.010	<0.010	<0.010
acenaphthylene	-	-	-	-	<0.010	<0.010	<0.010
acridine	0.5	0.5	-	-	<0.010	<0.010	<0.010
anthracene	1	1	1,000	-	<0.010	<0.010	<0.010
benz(a)anthracene	1	1	0.07	-	<0.010	<0.010	<0.010
benzo(a)pyrene	0.1	0.1	0.01	-	<0.0050	<0.0050	<0.0050
benzo(b+j)fluoranthenes	-	-	0.07	-	<0.010	<0.010	<0.010
benzo(b+j+k)fluoranthenes	-	-	-	-	<0.015	<0.015	<0.015
benzo(g,h,i)perylene	-	-	-	-	<0.010	<0.010	<0.010
benzo(k)fluoranthene	-	-	-	-	<0.010	<0.010	<0.010
chrysene	1	1	7	-	<0.010	<0.010	<0.010
dibenz(a,h)anthracene	-	-	0.01	-	<0.0050	<0.0050	<0.0050
fluoranthene	2	2	150	-	<0.010	<0.010	<0.010
fluorene	120	120	150	-	<0.010	<0.010	<0.010
indeno(1,2,3-cd)pyrene	-	-	-	-	<0.010	<0.010	<0.010
1-methylnaphthalene	-	-	5.5	-	<0.010	<0.010	<0.010
2-methylnaphthalene	-	-	15	-	<0.010	<0.010	<0.010
naphthalene	10	10	80	-	<0.050	<0.050	<0.050
phenanthrene	3	3	-	-	<0.020	<0.020	<0.020
pyrene	0.2	0.2	100	-	<0.010	<0.010	<0.010
quinoline	34	34	0.05	-	<0.050	<0.050	<0.050

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWf) Water Use Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Water Use Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Water Use Standard

Table 2: Analytical Results for Dissolved Metals in Groundwater

						Sample Location	AE22-MW101	AE22-MW102S	AE22-MW102D	AE22-MW104S				
						Sample ID	MW101-220511	MW102S-220511	MW102D-220511	MW104S-220526				
						Screened Interval Depth (m)	11.7-14.9	12.1-15.1	27.0-30.0	4.6-10.7				
						Date Sampled	11-May-22	11-May-22	11-May-22	26-May-22				
						CSR Water Use Standards ⁽¹⁾	Regional Estimates for Local Background Concentrations ⁽¹¹⁾							
						Aquatic Life - Freshwater (AWF)	Aquatic Life - Marine (AWm)	Drinking Water (DW)	Irrespective of Water Use (WU)	Interim Cobalt Standard ⁽⁸⁾				
Completed by: MM Review by: AL														
Physical Tests														
Hardness (as CaCO3)-mg/L						-	-	-	-	-	144	228	266	171
Dissolved Metals (ug/L)														
aluminum (Al)-dissolved						-	-	9,500	-	-	<1.0	3.9	3.8	5.3
antimony (Sb)-dissolved						90	2,500	6	-	-	<0.10	<0.10	<0.10	0.32
arsenic (As)-dissolved						50	125	10	-	-	1.71	<0.10	0.6	2.86
barium (Ba)-dissolved						10,000	5,000	1,000	-	-	3.36	20.3	48.7	50.1
beryllium (Be)-dissolved						1.5	1,000	8	-	-	<0.100	<0.100	<0.100	<0.020
bismuth (Bi)-dissolved						-	-	-	-	-	<0.050	<0.050	<0.050	<0.050
boron (B)-dissolved						12,000	12,000	5,000	-	-	45	12	37	34
cadmium (Cd)-dissolved						0.5 @ H <30 1.5 @ H 30-<90 2.5 @ H 90-<150 3.5 @ H 150-<210 4 @ H >210	15	5	-	-	0.0092	0.0056	0.0137	0.0109
calcium (Ca)-dissolved						-	-	-	-	-	47,800	85,400	96,900	58,400
cesium (Cs)-dissolved						-	-	-	-	-	<0.010	<0.010	<0.010	0.062
chloride (Cl)-dissolved						1,500,000	-	250,000	-	-	12,300	127,000	128,000	-
chromium (Cr)-dissolved (Total) ⁽¹⁴⁾						10	15	50	-	-	<0.50	<0.50	<0.50	<0.50
cobalt (Co)-dissolved						40	50	1	-	20	<0.10	<0.10	<0.10	0.21
copper (Cu)-dissolved						20 @ H <50 30 @ H 50-<75 40 @ H 75-<100 50 @ H 100-<125 60 @ H 125-<150 70 @ H 150-<175 80 @ H 175-<200 90 @ H >200	20	1,500	-	-	<0.20	1.49	2.08	3.18
iron (Fe)-dissolved ⁽³⁾						-	-	-	-	-	<10	<10	<10	<10
lead (Pb)-dissolved						40 @ H <50 50 @ H 50-<100 60 @ H 100-<200 110 @ H 200-<300 160 @ H >300	20	10	-	-	<0.050	<0.050	0.062	0.053
lithium (Li)-dissolved						-	-	8	-	-	1.4	<1.0	9.5	3.7
magnesium (Mg)-dissolved						-	-	-	-	-	6,020	3,850	5,860	6,150
manganese (Mn)-dissolved ⁽¹³⁾						-	-	-	-	-	0.72	0.75	33.2	92.8
mercury (Hg)-dissolved						0.25	0.25	1	-	-	<0.0050	<0.0050	<0.0050	-
molybdenum (Mo)-dissolved						10,000	10,000	250	-	-	3.55	0.22	4.34	12
nickel (Ni)-dissolved						250 @ H <60 650 @ H 60-<120 1,100 @ H 120-<180 1,500 @ H >180	83	80	-	-	<0.50	<0.50	0.53	0.53
phosphorus (P)-dissolved						-	-	-	-	-	<50	<50	<50	<50
potassium (K)-dissolved						-	-	-	-	-	422	740	1,030	10700
rubidium (Rb)-dissolved						-	-	-	-	-	0.35	0.27	0.82	34
selenium (Se)-dissolved						20	20	10	-	-	0.076	0.109	0.206	0.076
silicon (Si)-dissolved						-	-	-	-	-	6,910	3,700	5,380	5200
silver (Ag)-dissolved						0.5 @ H < 100 15 @ H > 100	15	20	-	-	<0.010	<0.010	<0.010	<0.010
sodium (Na)-dissolved						-	-	200,000	-	-	6,710	53,100	109,000	11,700
strontium (Sr)-dissolved						-	-	2,500	-	-	269	184	450	494
sulphur (S)-dissolved						-	-	-	-	-	6,320	5,088	60,700	16,200
tellurium (Te)-dissolved						-	-	-	-	-	<0.20	<0.20	<0.20	<0.20
thallium (Tl)-dissolved						3	3	-	-	-	<0.010	<0.010	<0.010	0.031
thorium (Th)-dissolved						-	-	-	-	-	<0.10	<0.10	<0.10	<0.10
tin (Sn)-dissolved						-	-	2,500	-	-	<0.10	<0.10	0.17	0.24
titanium (Ti)-dissolved						1,000	1,000	-	-	-	<0.30	<0.30	<0.30	<0.30
tungsten (W)-dissolved						-	-	3	-	-	0.63	<0.10	0.22	<0.10
uranium (U)-dissolved						85	85	20	-	-	0.263	0.186	6.6	3.2
vanadium (V)-dissolved						-	-	20	-	-	1.34	<0.50	0.59	<0.50
zinc (Zn)-dissolved						75 @ H < 90 150 @ H 90-<100 900 @ H 100-<200 1,650 @ H 200-<300 2,400 @ H 300-<400 3150 @ H 400-<500	100	3,000	-	-	<1.0	4.2	2.6	3.5
zirconium (Zr)-dissolved						-	-	-	-	-	<0.20	<0.20	<0.20	<0.30

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
BLUE ETCHING	Concentration greater than one or more applicable CSR Water Use Standard but less than Regional Estimates for Local Background Concentrations
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWF) Water Use Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Water Use Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Water Use Standard

Table 2: Analytical Results for Dissolved Metals in Groundwater

	Sample Location					AE22-MW104D	AE22-MW105	AE22-MW106
	Sample ID					MW104D-220526	MW105-220527	MW106-220527
	Screened Interval Depth (m)					16.8-22.9	6.7-12.8	27.4-36.6
Date Sampled					26-May-22	26-May-22	26-May-22	
Completed by: MM Review by: AL	CSR Water Use Standards ⁽¹⁾				Regional Estimates for Local Background Concentrations ⁽¹¹⁾			
	Aquatic Life - Freshwater (AWF)	Aquatic Life - Marine (AWm)	Drinking Water (DW)	Irrespective of Water Use (WLU)	Interim Cobalt Standard ⁽⁶⁾			
Physical Tests								
Hardness (as CaCO ₃)-mg/L	-	-	-	-	-	151	263	90.9
Dissolved Metals (ug/L)								
aluminum (Al)-dissolved	-	-	9,500	-	-	5.4	7.7	12.4
antimony (Sb)-dissolved	90	2,500	6	-	-	0.25	1.89	0.72
arsenic (As)-dissolved	50	125	10	-	-	3.41	3	0.44
barium (Ba)-dissolved	10,000	5,000	1,000	-	-	37	52.4	21
beryllium (Be)-dissolved	1.5	1,000	8	-	-	<0.020	<0.020	<0.020
bismuth (Bi)-dissolved	-	-	-	-	-	<0.050	<0.050	<0.050
boron (B)-dissolved	12,000	12,000	5,000	-	-	100	38	107
cadmium (Cd)-dissolved	0.5 @ H <30 1.5 @ H 30-<90 2.5 @ H 90-<150 3.5 @ H 150-<210 4 @ H >210	15	5	-	-	0.0085	<0.0250	<0.0100
calcium (Ca)-dissolved	-	-	-	-	-	50,900	82,800	30,400
cesium (Cs)-dissolved	-	-	-	-	-	<0.010	<0.010	0.026
chloride (Cl)-dissolved	1,500,000	-	250,000	-	-	-	-	10,600
chromium (Cr)-dissolved (Total) ⁽¹⁴⁾	10	15	50	-	-	<0.50	<0.50	<0.50
cobalt (Co)-dissolved	40	50	1	-	20	0.14	0.49	0.3
copper (Cu)-dissolved	20 @ H <50 30 @ H 50-<75 40 @ H 75-<100 50 @ H 100-<125 60 @ H 125-<150 70 @ H 150-<175 80 @ H 175-<200 90 @ H >200	20	1,500	-	-	1.83	3.12	4.67
iron (Fe)-dissolved ⁽³⁾	-	-	-	-	-	13	<10	11
lead (Pb)-dissolved	40 @ H <50 50 @ H 50-<100 60 @ H 100-<200 110 @ H 200-<300 160 @ H >300	20	10	-	-	0.07	0.088	0.092
lithium (Li)-dissolved	-	-	8	-	-	8.7	3.3	8.8
magnesium (Mg)-dissolved	-	-	-	-	-	5,880	13,600	3,640
manganese (Mn)-dissolved ⁽¹³⁾	-	-	-	-	-	32.8	48.2	86.4
mercury (Hg)-dissolved	0.25	0.25	1	-	-	-	-	-
molybdenum (Mo)-dissolved	10,000	10,000	250	-	-	5.7	35.2	23.4
nickel (Ni)-dissolved	250 @ H<60 650 @ H 60 -<120 1,100 @ H 120-<180 1,500 @ H >180	83	80	-	-	<0.50	1.93	1.83
phosphorus (P)-dissolved	-	-	-	-	-	<50	<50	<50
potassium (K)-dissolved	-	-	-	-	-	1650	2360	1840
rubidium (Rb)-dissolved	-	-	-	-	-	1.67	1.03	1.48
selenium (Se)-dissolved	20	20	10	-	-	0.168	2.43	0.571
silicon (Si)-dissolved	-	-	-	-	-	7950	5990	4550
silver (Ag)-dissolved	0.5 @ H < 100 15 @ H > 100	15	20	-	-	<0.010	<0.010	<0.010
sodium (Na)-dissolved	-	-	200,000	-	-	16,000	28,600	22,300
strontium (Sr)-dissolved	-	-	2,500	-	-	1,770	327	382
sulphur (S)-dissolved	-	-	-	-	-	12,300	39,900	13,000
tellurium (Te)-dissolved	-	-	-	-	-	<0.20	<0.20	<0.20
thallium (Tl)-dissolved	3	3	-	-	-	0.011	0.019	0.013
thorium (Th)-dissolved	-	-	-	-	-	<0.10	<0.10	<0.10
tin (Sn)-dissolved	-	-	2,500	-	-	<0.10	0.49	1.06
titanium (Ti)-dissolved	1,000	1,000	-	-	-	<0.30	<0.30	<0.30
tungsten (W)-dissolved	-	-	3	-	-	0.57	<0.10	0.26
uranium (U)-dissolved	85	85	20	-	-	4.41	11.6	1.47
vanadium (V)-dissolved	-	-	20	-	-	<0.50	<0.50	<0.50
zinc (Zn)-dissolved	75 @ H < 90 150 @ H 90-<100 900 @ H 100-<200 1,650 @ H 200-<300 2,400 @ H 300-<400 3150 @ H 400 -<500	100	3,000	-	-	3.7	2.2	23.8
zirconium (Zr)-dissolved	-	-	-	-	-	<0.30	<0.30	<0.30

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
BLUE ETCHING	Concentration greater than one or more applicable CSR Water Use Standard but less than Regional Estimates for Local Background Concentrations
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWF) Water Use Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Water Use Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Water Use Standard

Table 3: Analytical Results for Nutrients in Groundwater

					Sample Location	AE22-MW101	AE22-MW102S	AE22-MW102D	AE22-MW104S			
					Sample ID	MW101-220526	MW102S-220526	MW102D-220526	MW104S-220526			
					Screened Interval Depth (m)	11.7-14.9	12.1-15.1	27.0-30.0	4.6-10.7			
					Date Sampled	26-May-22	26-May-22	26-May-22	26-May-22			
					CSR Water Use Standards ⁽¹⁾							
Completed by: MM Review by: AL					Aquatic Life - Freshwater (AWf)	Aquatic Life - Marine (AWm)	Drinking Water (DW)	Irrespective of Water Use (IWU)				
Physical Tests												
pH					-	-	-	-	8.12	7.71	7.87	8
Anions and Nutrients												
ammonia, total (N) - mg/L					18.4 (pH<7.0) 18.5 (pH=7.0-<7.5) 11.3 (pH=7.5-<8.0) 3.7 (pH=8.0-<8.5) 1.31 (pH>8.5)	200 (pH<7.0) 64 (pH=7.0-<7.5) 20 (pH=7.5-<8.0) 6.85 (pH=8.0-<8.5) 2.3 (pH>8.5)	-	-	<0.0050	0.0115	0.0843	0.0192
nitrate, total (N) - mg/L					400	-	10	-	0.0298	<0.0250	<0.0250	<0.0050
nitrite, total (N) - mg/L					0.2 (Cl< 2 mg/L) 0.4 (Cl=2-<4) 0.6 (Cl=4-<6) 0.8 (Cl=6-<8) 1 (Cl=8-<10) 2 (Cl>10)	0.2 (Cl< 2 mg/L) 0.4 (Cl=2-<4) 0.6 (Cl=4-<6) 0.8 (Cl=6-<8) 1 (Cl=8-<10) 2 (Cl>10)	1	-	<0.0010	<0.0050	<0.0050	<0.0010
nitrogen, total - mg/L					-	-	-	-	0.037	0.076	0.304	0.096

Note: all results on this table are in mg/L unless otherwise indicated.

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWf) Water Use Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Water Use Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Water Use Standard

Table 3: Analytical Results for Nutrients in Groundwater

					Sample Location	AE22-MW104D	AE22-MW105	AE22-MW106
					Sample ID	MW104D-220526	MW105-220527	MW106-220527
					Screened Interval Depth (m)	16.8-22.9	6.7-12.8	27.4-36.6
					Date Sampled	26-May-22	26-May-22	26-May-22
					CSR Water Use Standards ⁽¹⁾			
Completed by: MM Review by: AL	Aquatic Life - Freshwater (AWf)	Aquatic Life - Marine (AWm)	Drinking Water (DW)	Irrespective of Water Use (IWU)				
Physical Tests								
pH	-	-	-	-	8.01	7.96	7.98	
Anions and Nutrients								
ammonia, total (N) - mg/L	18.4 (pH<7.0) 18.5 (pH=7.0-<7.5) 11.3 (pH=7.5-<8.0) 3.7 (pH=8.0-<8.5) 1.31 (pH≥8.5)	200 (pH<7.0) 64 (pH=7.0-<7.5) 20 (pH=7.5-<8.0) 6.85 (pH=8.0-<8.5) 2.3 (pH≥8.5)	-	-	0.0117	<0.0050	0.0585	
nitrate, total (N) - mg/L	400	-	10	-	<0.0050	5.35	2.22	
nitrite, total (N) - mg/L	0.2 (Cl< 2 mg/L) 0.4 (Cl=2-<4) 0.6 (Cl=4-<6) 0.8 (Cl=6-<8) 1 (Cl=8-<10) 2 (Cl>10)	0.2 (Cl< 2 mg/L) 0.4 (Cl=2-<4) 0.6 (Cl=4-<6) 0.8 (Cl=6-<8) 1 (Cl=8-<10) 2 (Cl>10)	1	-	<0.0010	0.0229	0.221	
nitrogen, total - mg/L	-	-	-	-	0.069	4.96	2.37	

Note: all results on this table are in mg/L unless otherwise indicated.

GREY SHADING	Concentration greater than CSR standards that apply irrespective of water use
BLUE TEXT	Concentration less than Laboratory Method Detection Limit
BOLD, UNDERLINE	Laboratory Method Detection Limit exceeds one or more standard
RED SHADING	Concentration greater than CSR Aquatic Life - Freshwater (AWf) Water Use Standard
BOLD, RED SHADING	Concentration greater than CSR Aquatic Life - Marine (AWm) Water Use Standard
BOLD, BLUE SHADING	Concentration greater than CSR Drinking Water (DW) Water Use Standard

Analytical Table Footnotes: Analytical Results for Water

Tables should be viewed and printed in colour.
 All concentrations in µg/L, except where otherwise noted.
 All terms defined within the body of Active Earth's report.

- < Result is less than the laboratory detection limit indicated.
- Parameter not analyzed or no standard or guideline applies.
- * RPDs are not normally calculated where one or more concentrations are less than five times MDL.

- (1) BC Approved Water Quality Guidelines (BC WQG) for the Protection of Freshwater Aquatic Life (August 2019) and BC Working Water Quality Guidelines (BC WWQG) for the Protection of Freshwater Aquatic Life (June 2017), considering the guidelines for Chronic (long-term) exposure, Acute (short-term) exposure, and Phototoxicity.

Water Quality Guidelines (BC WQG) - Surface Water	
BC WQG - Freshwater	Applicable to the Site
BC WWQG - Freshwater	Applicable to the Site

- (2) Where total chromium analysis has been conducted, results are compared to the more conservative of the standards for hexavalent and trivalent chromium.
- (3) Standard varies with pH and temperature.

BLUE TEXT	Concentration less than Laboratory Method Detection Limit
<u>BOLD, UNDERLINE</u>	Laboratory Method Detection Limit exceeds one or more standard
GREY SHADING	Concentration greater than BC WQG - Freshwater Phototoxic Guideline
TEAL SHADING	Concentration greater than BC WQG - Freshwater Long-Term Guideline
TEAL SHADING	Concentration greater than BC WQG - Freshwater Short-Term Guideline

Associated Lab Files: VA22B2363

Table 1: Analytical Results for Surface Water - Inorganics

		Sample Location	SW1-220602	SW2-220602
		Date Sampled	2-Jun-22	2-Jun-22
Completed by: MM Review by: AL		BC Water Quality Guidelines⁽¹⁾		
	Freshwater Long-Term (Chronic)	Freshwater Short-Term (Acute)		
Anions (mg/L)				
Chloride (Cl)-dissolved	150	600	3.55	18.8
Nutrients (mg/L)				
Total Ammonia (N)	0.681-28.3⁽³⁾	-	0.124	<u><0.0050</u>
Total Nitrogen (N)	-	-	1.61	0.686
Total Nitrite (N)	0.02 @ CI < 2 0.04 @ CI 2-<4 0.06 @ CI 4-<6 0.08 @ CI 6-<8 0.10 @ CI 8-<10 0.20 @ CI >10	0.06 @ CI < 2 0.12 @ CI 2-<4 0.18 @ CI 4-<6 0.24 @ CI 6-<8 0.30 @ CI 8-<10 0.60 @ CI >10	0.0519	<u><0.0010</u>
Total Nitrate (N)	3	32.8	1.45	0.676

*25 mg/L above backgrd for 24 hr in clear flow
 5 mg/L above backgrd for 30 day in turbid flow
 10 mg/L above backgrd when backgrd 25-100
 10 mg/L above backgrd when backgrd >100

BLUE TEXT	Concentration less than Laboratory Method Detection Limit
<u>BOLD, UNDERLINE</u>	Laboratory Method Detection Limit exceeds one or more standard
TEAL SHADING	Concentration greater than BC WQG - Freshwater Long-Term Guideline
<u>BOLD, TEAL SHADING</u>	Concentration greater than BC WQG - Freshwater Short-Term Guideline

Table 2: Analytical Results for Total Metals & TSS in Surface Water

Sample Location		SW1-220602	SW2-220602
Date Sampled		2-Jun-22	2-Jun-22
Completed by: MM Review by: AL		BC Water Quality Guidelines⁽¹⁾	
	Freshwater Long-Term (Chronic)	Freshwater Short-Term (Acute)	
Physical Tests			
Hardness (as CaCO ₃)-mg/L	-	-	79.7
Total Metals (µg/L)			
aluminum (Al)	-	-	209
antimony (Sb)	9	-	2.49
arsenic (As)	5	5	1.56
barium (Ba)	1,000	-	23.1
beryllium (Be)	0.13	-	<0.100
bismuth (Bi)	-	-	<0.050
boron (B)	1,200	-	26
cadmium (Cd)	Hardness Dependent	Hardness Dependent	<0.0050
	<i>Hardness Dependent Long-Term (Chronic) Guideline</i>		0.18
	<i>Hardness Dependent Short-Term (Acute) Guideline</i>		0.47
calcium (Ca)	-	-	25,200
cesium (Cs)	-	-	0.038
chromium (Cr) ⁽²⁾	8.9	-	<0.50
cobalt (Co)	4	110	0.16
copper (Cu)	Hardness Dependent	Hardness Dependent	0.86
	<i>Hardness Dependent Long-Term (Chronic) Guideline</i>		3
	<i>Hardness Dependent Short-Term (Acute) Guideline</i>		9.49
iron (Fe)	-	1,000	<10
lead (Pb)	Hardness Dependent	Hardness Dependent	<0.050
	<i>Hardness Dependent Long-Term (Chronic) Guideline</i>		5.70
	<i>Hardness Dependent Short-Term (Acute) Guideline</i>		61.14
lithium (Li)	-	-	1.5
magnesium (Mg)	-	-	4,080
manganese (Mn)	Hardness Dependent	Hardness Dependent	8
	<i>Hardness Dependent Long-Term (Chronic) Guideline</i>		956
	<i>Hardness Dependent Short-Term (Acute) Guideline</i>		1418
mercury (Hg)	0.02 (assuming MeHg < 0.5% total Hg)	-	<0.0050
molybdenum (Mo)	1,000	2,000	15.6
nickel (Ni)	25 @ H<60	-	<0.50
	65 @ H60-<120	-	<0.50
	110 @ H120-<180	-	<0.50
	150 @ H≥180	-	<0.50
phosphorus (P)	-	-	<50
potassium (K)	-	-	6,370
rubidium (Rb)	-	-	4.21
selenium (Se)	2	-	0.351
silicon (Si)	-	-	2,130
silver (Ag)	0.05 @ H ≤ 100	0.1 @ H ≤ 100	<0.010
	1.5 @ H > 100	3.0 @ H > 100	<0.010
sodium (Na)	-	-	6,910
strontium (Sr)	-	-	158
sulfur (S)	-	-	10,300
tellurium (Te)	-	-	<0.20
thallium (Tl)	0.8	-	0.012
thorium (Th)	-	-	<0.10
tin (Sn)	-	-	<0.10
titanium (Ti)	-	-	<0.30
tungsten (W)	-	-	0.27
uranium (U)	8.5	-	0.358
vanadium (V)	50	-	0.69
zinc (Zn)	Hardness Dependent	Hardness Dependent	1.6
	<i>Hardness Dependent Long-Term (Chronic) Guideline</i>		8
	<i>Hardness Dependent Short-Term (Acute) Guideline</i>		33
zirconium (Zr)	-	-	<0.20

BLUE TEXT	Concentration less than Laboratory Method Detection Limit
<u>BOLD, UNDERLINE</u>	Laboratory Method Detection Limit exceeds one or more standard
TEAL SHADING	Concentration greater than BC WQG - Freshwater Long-Term Guideline
BOLD, TEAL SHADING	Concentration greater than BC WQG - Freshwater Short-Term Guideline

Table 3: Analytical Results for Hydrocarbons in Surface Water

		Sample Location		SW1-220602	SW2-220602
		Date Sampled		18-Mar-21	17-Jun-21
Completed by: MM Review by: AL		BC Water Quality Guidelines ⁽¹⁰⁾			
		Freshwater Long-Term (Chronic)	Freshwater Short-Term (Acute)	Freshwater Phototoxic	
Extractible Petroleum Hydrocarbons (µg/L)					
EPHW ₁₀₋₁₉	-	-	-	<250	<250
EPHW ₁₉₋₃₂	-	-	-	<250	<250
LEPH _w	-	-	-	<250	<250
HEPH _w	-	-	-	<250	<250
Polycyclic Aromatic Hydrocarbons (µg/L)					
acenaphthene	6	-	-	<0.010	0.033
acenaphthylene	-	-	-	<0.010	<0.010
acridine	3	-	0.05	<0.010	<0.010
anthracene	4	-	0.1	<0.010	<0.010
benz(a)anthracene	0.1	-	0.1	<0.010	<0.010
benzo(a)pyrene	0.01	-	-	<0.0050	<0.0050
benzo(b+j)fluoranthenes	-	-	-	<0.010	<0.010
benzo(b+j+k)fluoranthenes	-	-	-	<0.015	<0.015
benzo(g,h,i)perylene	-	-	-	<0.010	<0.010
benzo(k)fluoranthene	-	-	-	<0.010	<0.010
chrysene	-	-	-	<0.010	<0.010
dibenz(a,h)anthracene	-	-	-	<0.0050	<0.0050
fluoranthene	4	-	0.2	<0.010	<0.010
fluorene	12	-	-	<0.010	0.037
indeno(1,2,3-cd)pyrene	-	-	-	<0.010	<0.010
1-methylnaphthalene	-	-	-	<0.010	0.02
2-methylnaphthalene	-	-	-	<0.010	0.036
naphthalene	1	-	-	<0.050	0.085
phenanthrene	0.3	-	-	<0.020	0.041
pyrene	-	-	0.02	0.011	<0.010
quinoline	3.4	-	-	<0.050	<0.050

BLUE TEXT	Concentration less than Laboratory Method Detection Limit
<u>BOLD, UNDERLINE</u>	Laboratory Method Detection Limit exceeds one or more standard
GREY SHADING	Concentration greater than BC WQG - Freshwater Phototoxic Guideline
BLUE SHADING	Concentration greater than BC WQG - Freshwater Long-Term Guideline
BOLD, TEAL SHADING	Concentration greater than BC WQG - Freshwater Short-Term Guideline



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PHOTOGRAPHS

PHOTOGRAPHS

Photo 1: AE21-MW101S/D



Photo 2: Packer Testing



Client Name	Site Location	Project No.	Date
Coast Mountain Resources Ltd.	Bamberton Quarry, Bamberton, BC	2315A	July 2022

PHOTOGRAPHS

Photo 3: AE22-MW105 (after drilling)

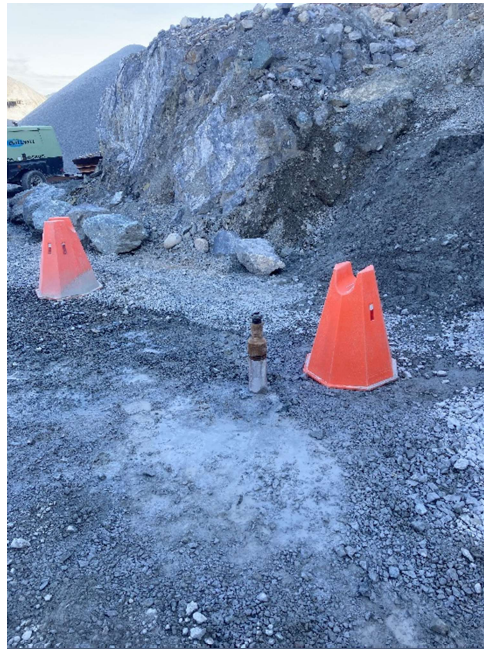


Photo 4: Overseeing Packer Testing



Client Name	Site Location	Project No.	Date
Coast Mountain Resources Ltd.	Bamberton Quarry, Bamberton, BC	2315A	July 2022

PHOTOGRAPHS

Photo 5: AE22-MW104S/D



Photo 6: Packer test in AE22-MW104



Client Name	Site Location	Project No.	Date
Coast Mountain Resources Ltd.	Bamberton Quarry, Bamberton, BC	2315A	July 2022



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APPENDIX A

BC Water Resource Atlas Search Results

1. AQUIFER DESCRIPTION FOR AQUIFER 208

Aquifer Name: Malahat Ridge

Date of Mapping: November 2018

1.1 Conceptual Understanding of Hydrostratigraphy

1.1.1 Aquifer Extents

The aquifer is located along the east and southeast slopes of Malahat Ridge. The aquifer is bound along the east by Saanich Inlet. The western aquifer extents follow the watershed boundaries for Shawnigan Creek and Goldstream River (Freshwater Atlas). Bedrock aquifer extents assume near-surface flow within the bedrock to justify the use of topographical features.

1.1.2 Geologic Formation (Overlying Materials)

Near surface bedrock (less than 1 m below surface) has been mapped within the majority of the aquifer area. A blanket of till and clay inferred to be Vashon till exists where surficial materials are present. Capilano Sediments consisting of gravel, sand, and clayey silt may overlie till at elevations below 100 to 150 masl.

1.1.3 Geologic Formation (Aquifer) – 6b Fractured Crystalline Rock

Bedrock belonging to Bonanza Group, Island Plutonic Suite, Westcoast Crystalline Complex, and Leech River Complex have been mapped within the aquifer extents along with several faults (Cui et. al. 2017).

Volcanic rocks of the Bonanza Group (erupted on land) include massive amygdaloidal and pillowed basalt to andesite flows, dacite to rhyolite massive or laminated lava, green and maroon tuff, feldspar crystal tuff, breccia, tuffaceous sandstone, argillite, pebble conglomerate and minor limestone.

The intrusive rocks of the Island Plutonic Suite include granodiorite, quartz diorite, quartz monzonite, diorite, agmatite, feldspar, feldspar porphyry, as well as minor gabbro and aplite.

Intrusive rocks of Westcoast Crystalline Complex include quartz diorite, tonalite, hornblende-plagioclase gneiss, quartz-feldspar gneiss, amphibolite, diorite, agmatite, gabbro, marble, and metasediments.

Volcanic rocks of the Leech River Complex consist of metabasalt, metarhyolite, chlorite schist, ribbon chert, and cherty argillite.

1.1.4 Vulnerability - Moderate

The DRASTIC method was used to complete intrinsic groundwater vulnerability mapping as part of the Vancouver Island Water Resources Vulnerability Mapping Project (Newton and Gilchrist, 2010). The intrinsic vulnerability for the majority of the area was classified as low to moderate.

Well lithology records indicate a confining layer of low permeability material (till, clay) exists, ranging from approximately 1 to 24 m thick but typically 5 m thick. However, the confining layer may be thin or absent in some areas. Water-bearing fracture zones are typically 90 m deep based on the median depth of existing wells. The hydraulic conductivity of the aquifer material is assumed to be relatively low (i.e. fracture dominated flow in the aquifer) Based on this description, the vulnerability of the aquifer to surface contamination is moderate.

12 Conceptual Understanding of Flow Dynamics

1.2.1 Groundwater Levels and Flow Direction

Water levels are considered shallow based on an average of 14.3 m with a range of 0.6 to 131.1 m. Groundwater is inferred to flow east towards Saanich Inlet predominantly through bedrock deformities (e.g. fractures). A saltwater-freshwater interface is expected to exist along the coastline. Groundwater flow may also occur at depth and across adjacent surface watersheds.

Mapped faults are inferred as enhanced permeability areas; however, they could potentially reduce permeability and create barriers to groundwater flow or act as combined conduit-barrier systems. Additional studies are required to confirm fault zone hydrogeology.

4.3 Recharge

Recharge is likely to occur where precipitation or runoff infiltrates through bedrock deformities, such as fractures. Lakes and wetlands in the mountainous area to the west may also act as a source of recharge.

4.3.1 Potential for Hydraulic Connection

Significant watersheds in the area include Arbutus Creek, Irving Creek, Johns Creek, and Spectacle Creek (MOE 2006). Additional studies are required to confirm/determine surface-ground water interactions for drainage features in the area. The extent of any hydraulic connections with seawater along the coastline and mapped faults is unknown.

4.4 Additional Information on Water Use and Management

Based on regional land-use, all groundwater use is expected to be conjunctive (drinking water, commercial/industrial and agricultural). Well records indicate a potential for sulphur odour. Deepening of a few wells is also noted.

Mapping of local water systems for the region is available from the Cowichan Valley Regional District (cvrdnewnormalcowichan.ca). Additional water use in the area includes licensed diversion of water from local creeks and springs.

4.5 Additional Assessments or Management Actions

The following groundwater characterization studies have been completed based on analytical methods:

- Carmichael, Vicki, March 2014. Compendium of Re-evaluated Pumping Tests in the Cowichan Valley Regional District, Vancouver Island, British Columbia. Environmental Sustainability Division, Ministry of Environment.
- Harris, M. & S. Usher, October 2017. Preliminary Groundwater Budgets, Cobble Hill/Mill Bay Area, Vancouver Island, BC.
- Ministry of Environment (MOE), February 2006. Shawnigan-Goldstream Water Allocation Plan.
- Newton, P. & A. Gilchrist, April 2010. Technical Summary of Intrinsic Vulnerability Mapping Methods for Vancouver Island.
- van der Gulik, T., Neilsen, D., Fretwell, R. and Tam, S. June 2013. Agricultural Water Demand Model, Report for the Cowichan Valley Regional District. Victoria, BC: BC Ministry of Agriculture and Agriculture and Agri-Food Canada.
- WorleyParsons, February 2009. South Cowichan Water Plan Study: A Preliminary Assessment of Water Supply & Needs within the South Cowichan Region.

4.6 Aquifer References

Blyth, H. E., N.W. Rutter, & L.M. Sankeralli, 1993. Surficial geology of the Shawnigan Lake Area. Victoria, BC: BC Ministry of Energy and Mines.

Cowichan Valley Regional District <http://cvrldnewnormalcowichan.ca/water-systems/> - accessed March 2019.

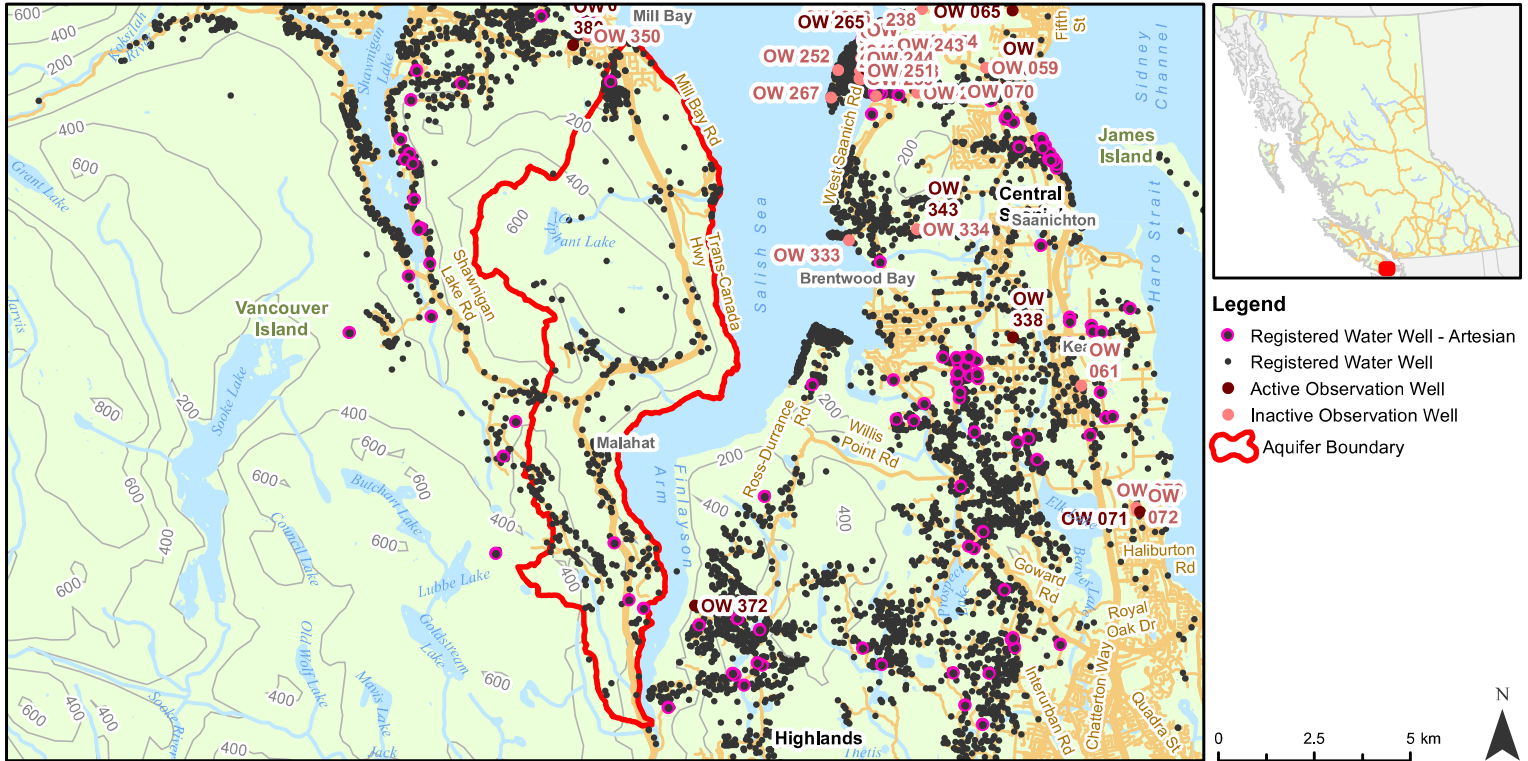
Cui, Y., D. Miller, P. Schiarizza, & L.J. Diakow, 2017. British Columbia digital geology. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Open File 2017- 8, 9p.

Geographic datasets from the BC Data Catalogue, accessed February 2017 <https://data.gov.bc.ca/>

Hammond, Z.M., A.C. Hinnell, J.J. Clague. 2018. Stage II Detailed Aquifer Mapping Study: Shawnigan Lake Area, Vancouver Island, B.C. Water Science Series, WSS2019-02. Prov. B.C., Victoria B.C.

Aquifer #208

Malahat Ridge



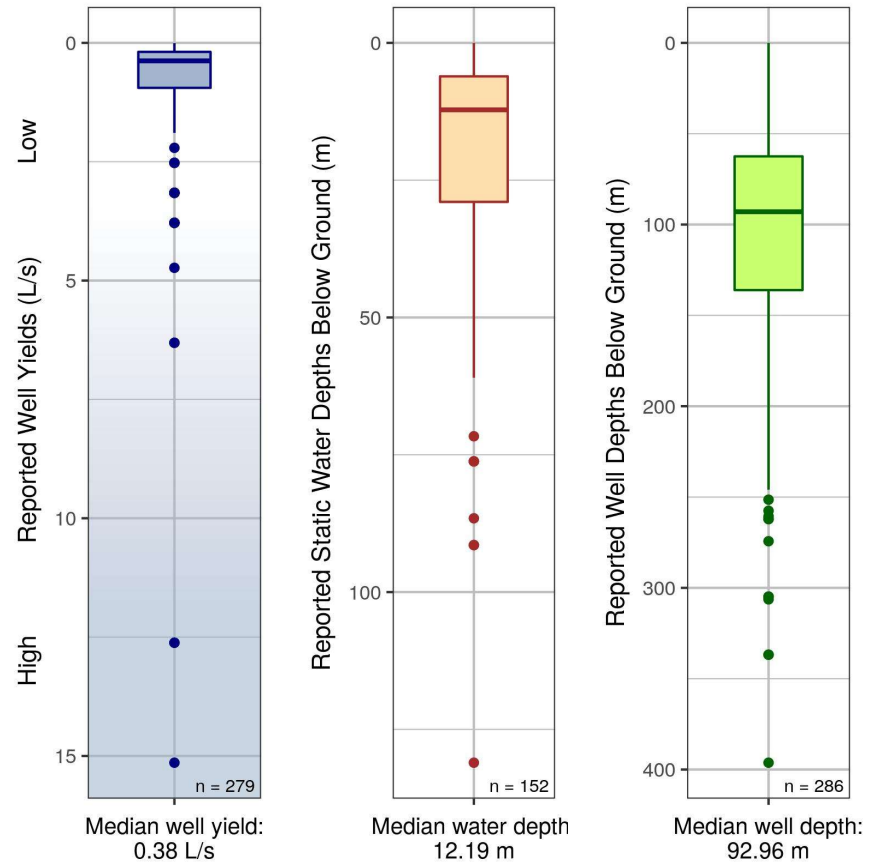
Aquifer Description (Mapping Report - 2019):

Fractured crystalline (igneous intrusive or metamorphic, meta-sedimentary, meta-volcanic, volcanic) rock aquifer (subtype = 6b).

Aquifer Details

Region	West Coast
Water District	Victoria
Aquifer Area	58 km ²
No. Wells Correlated to Aquifer	289
Vulnerability to Contamination	Moderate
Productivity	Unknown
Aquifer Classification	Unknown
Hydraulic Connectivity ¹	Not Likely
Aquifer Stress Index	Less stressed
No. Water Licences Issued to Wells	1
Observation Wells (Active, Inactive)	None

¹ Based on broad regional assessment



Disclaimer: Use of information from Aquifer factsheets (accessed by BC government website) is subject to limitation of liability provisions (further described on that website). That information is provided by the BC government as a public service on an "as is" basis, without warranty of any kind, whether express or implied, and its use is at your own risk. Under no circumstances will the BC government, or its staff, agents and contractors, be responsible or liable to any person or business entity, for any direct, indirect, special, incidental, consequential or any other loss or damages to any person or business entity based on this factsheet or any use of information from it.

Detailed methods for all figures are described in the companion document (Aquifer Factsheet - Companion Document.pdf).

Factsheet generated: 2020-08-06. Aquifers online: <https://apps.nrs.gov.bc.ca/gwells/aquifers>.



Groundwater Wells and Aquifers

Well Summary

Well Tag Number: 69043
 Well Identification Plate Number:
 Owner Name: REGENCY DEVELOPMENT
 Intended Water Use: Not Applicable
 Artesian Condition: No

Well Status: New
 Well Class: Unknown
 Well Subclass:
 Aquifer Number: 208

Observation Well Number:
 Observation Well Status:
 Environmental Monitoring System (EMS) ID:
 Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

Location Information

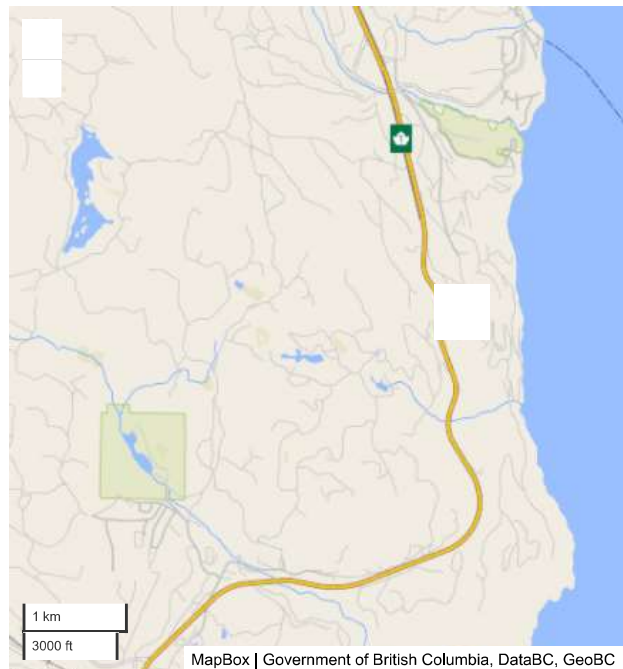
Street Address:

Town/City:

Legal Description:

Lot	1
Plan	45935
District Lot	74/75
Block	
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	009077162

Description of Well Location:



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.5887

Longitude: -123.530601

UTM Easting: 460872

UTM Northing: 5381871

Zone: 10

Coordinate Acquisition Code:

unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1987-09-22		Tri-K Drilling	August 13th 2003 at 8:57 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1987-09-22					

Well Completion Data

Total Depth Drilled:
 Finished Well Depth: 230 ft bgl
 Final Casing Stick Up:
 Depth to Bedrock:
 Ground elevation:

Estimated Well Yield: 3 USgpm
 Well Cap:
 Well Disinfected Status: Not Disinfected
 Drilling Method:
 Method of determining elevation: Unknown

Static Water Level (BTOC):
 Artesian Flow:
 Artesian Pressure (head):
 Artesian Pressure (PSI):
 Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	230	DEPTH OF WELL 10 FT CASING						
0	5	RED CLAY						
5	230	VOLCANIC ROCK						
0	0	FRACTURE AT 105 FT - 1/2 GPM WATER						
0	0	FRACTURE AT 170 FT WATER INCREASED TO 2						

Casing Details

From (ft bgl)	To (ft bgl)	Casing Type	Casing Material	Diameter (in)	Wall Thickness (in)	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:
 Surface Seal Installation Method:
 Surface Seal Thickness:
 Surface Seal Depth:

Backfill Material Above Surface Seal:
 Backfill Depth:

Liner Details

Liner Material:
 Liner Diameter:
 Liner from:

Liner Thickness:
 Liner to:

Liner perforations

From (ft bgl)	To (ft bgl)
There are no records to show	

Screen Details

Intake Method:
 Type:
 Material:
 Opening:
 Bottom:

Installed Screens

From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:

Development Total Duration:

Well Yield

Estimation Method:
 Static Water Level Before Test:
 Hydrofracturing Performed: No

Estimation Rate:
 Drawdown:
 Increase in Yield Due to Hydrofracturing:

Estimation Duration:

Well Decommission Information

Reason for Decommission:
 Sealant Material:
 Decommission Details:

Method of Decommission:
 Backfill Material:

Comments

CASING

Alternative Specs Submitted: Yes

Documents

- [WTN 69043 Well Record.pdf](#)

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.



Groundwater Wells and Aquifers

Well Summary

Well Tag Number: 69045	Well Status: New	Observation Well Number:
Well Identification Plate Number:	Well Class: Unknown	Observation Well Status:
Owner Name: REGENCY DEVELOPMENT	Well Subclass:	Environmental Monitoring System (EMS) ID:
Intended Water Use: Not Applicable	Aquifer Number: <u>208</u>	Alternative specs submitted: No
Artesian Condition: No		

Licensing Information

Licensed Status: Unlicensed **Licence Number:**

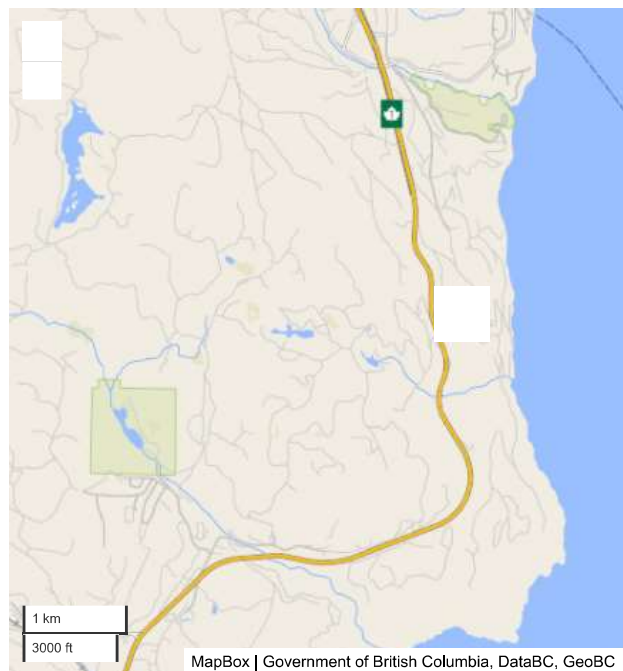
Location Information

Street Address:
Town/City:

Legal Description:

Lot	2
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	

Description of Well Location:



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.586402	Longitude: -123.529343
UTM Easting: 460963	UTM Northing: 5381615
Zone: 10	Coordinate Acquisition Code:
	unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	1987-09-22		Tri-K Drilling	August 13th 2003 at 8:57 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
1987-09-22					

Well Completion Data

Total Depth Drilled:	Estimated Well Yield: 1 USgpm	Static Water Level (BTOC):
Finished Well Depth: 190 ft bgl	Well Cap:	Artesian Flow:
Final Casing Stick Up:	Well Disinfected Status: Not Disinfected	Artesian Pressure (head):
Depth to Bedrock:	Drilling Method:	Artesian Pressure (PSI):
Ground elevation:	Method of determining elevation: Unknown	Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	190	DEPTH OF WELL 10 FT CASING						
0	80	VOLCANIC ROCK 1/2 GPM WATER AT 80 FT						
80	190	GRANITE						
0	0	WATER INCREASED TO 1 GPM AT 190 FT						

Casing Details

From (ft bgl)	To (ft bgl)	Casing Type	Casing Material	Diameter (in)	Wall Thickness (in)	Drive Shoe
There are no records to show						

Surface Seal and Backfill Details

Surface Seal Material:	Backfill Material Above Surface Seal:
Surface Seal Installation Method:	Backfill Depth:
Surface Seal Thickness:	
Surface Seal Depth:	

Liner Details

Liner Material:	Liner Thickness:	Liner perforations				
Liner Diameter:	Liner to:	<table border="1"> <thead> <tr> <th>From (ft bgl)</th> <th>To (ft bgl)</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From (ft bgl)	To (ft bgl)	There are no records to show	
From (ft bgl)	To (ft bgl)					
There are no records to show						
Liner from:						

Screen Details

Intake Method:	Installed Screens										
Type:	<table border="1"> <thead> <tr> <th>From (ft bgl)</th> <th>To (ft bgl)</th> <th>Diameter (in)</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size	There are no records to show				
From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size							
There are no records to show											
Material:											
Opening:											
Bottom:											

Well Development

Developed by:	Development Total Duration:
----------------------	------------------------------------

Well Yield

Estimation Method:	Estimation Rate:	Estimation Duration:
Static Water Level Before Test:	Drawdown:	
Hydrofracturing Performed: No	Increase in Yield Due to Hydrofracturing:	

Well Decommission Information

Reason for Decommission:	Method of Decommission:
Sealant Material:	Backfill Material:
Decommission Details:	

Comments

CASING

Alternative Specs Submitted: Yes

Documents

- [WTN 69045 Well Record.pdf](#)

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.



Groundwater Wells and Aquifers

Well Summary

Well Tag Number: 109033
 Well Identification Plate Number: 39137
 Owner Name: BOB ROTH
 Intended Water Use: Private Domestic
 Artesian Condition: No

Well Status: New
 Well Class: Water Supply
 Well Subclass: Not Applicable
 Aquifer Number: 208

Observation Well Number:
 Observation Well Status:
 Environmental Monitoring System (EMS) ID:
 Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

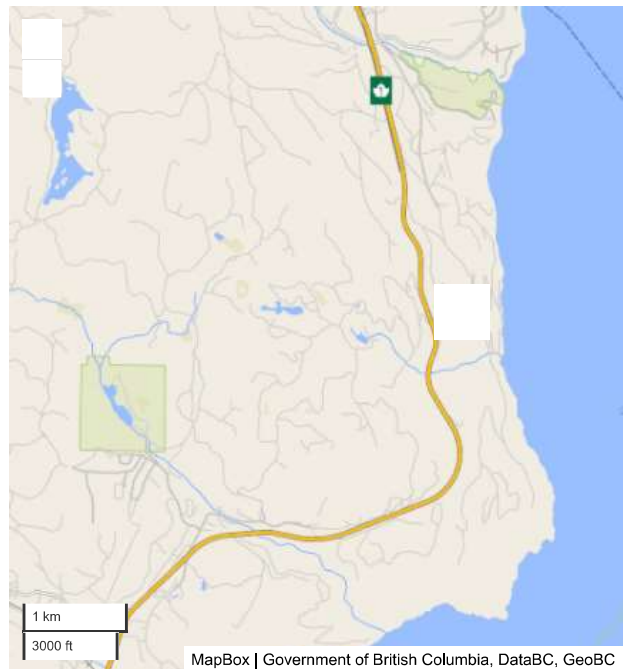
Location Information

Street Address: 1239 TRANS CANADA HIGHWAY
 Town/City: MALAHAT

Legal Description:

Lot	2
Plan	45935
District Lot	74
Block	
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	009077171

Description of Well Location: DOWN NEAR BOTTOM OF NEW ACCESS ROAD.



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.58452

Longitude: -123.527873

UTM Easting: 461070

UTM Northing: 5381405

Zone: 10

Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Legacy record	2014-04-16	2014-04-17	Drillwell Enterprises	June 6th 2014 at 8:16 AM

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2014-04-16	2014-04-17				

Well Completion Data

Total Depth Drilled: 260 ft bgl
Finished Well Depth: 260 ft bgl
Final Casing Stick Up: 24 inches
Depth to Bedrock: 1 feet bgl
Ground elevation: 691 feet

Estimated Well Yield: 10 USgpm
Well Cap: BOLTED
Well Disinfected Status: Not Disinfected
Drilling Method: Dual Rotary
Method of determining elevation: GPS

Static Water Level (BTOC):
Artesian Flow:
Artesian Pressure (head):
Artesian Pressure (PSI):
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	1	O. BURDEN						
1	260	BEDROCK (WHITE, GREEN)					FRACTURE @ 106'; FLOW AT 120': 3GPM; AT 140': 4GPM; AT 200': 4 GPM; FRACTURE AT 235'; FRACTURE AT 240': 7GPM; AT 260': 10GPM. GROUT IN 4" PVC WITH SHAKE TRAP AT 30 FT. CEMENT GROUT UP TO 4 FT.	

Casing Details

From (ft bgl)	To (ft bgl)	Casing Type	Casing Material	Diameter (in)	Wall Thickness (in)	Drive Shoe
0	18	Steel Removed		10		Not Installed
0	18		Steel	6	0.219	Not Installed
18	260		Open hole	6		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Pumped
Surface Seal Thickness: 2 inches
Surface Seal Depth: 18 feet

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material: PVC
Liner Diameter:
Liner from:

Liner Thickness:
Liner to:

Liner perforations

From (ft bgl)	To (ft bgl)
There are no records to show	

Screen Details

Intake Method:
 Uncased Hole
Type:
Material:
Opening:
Bottom:

Installed Screens

From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: Air lifting

Development Total Duration:

Well Yield

Estimation Method: Air Lifting
Static Water Level Before Test:
Hydrofracturing Performed: No

Estimation Rate:
Drawdown:
Increase in Yield Due to Hydrofracturing:

Estimation Duration:

Well Decommission Information

Reason for Decommission:
Sealant Material:
Decommission Details:

Method of Decommission:
Backfill Material:

Comments

CEMENT GROUT 4" WITH PACKER AT 30FT. FINAL FLOW AT 4GPM. WELL RECORD SUBMITTED THROUGH EWELLS.

Alternative Specs Submitted: Yes

Documents

No additional documentation available for this well.

Disclaimer

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ACTIVE EARTH
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APPENDIX B

Laboratory Analytical Results



CLIENT NAME: ACTIVE EARTH ENGINEERING
#304-2600 GLADYS AVE
ABBOTSFORD, BC V2S0E9
(778) 888-0473

ATTENTION TO: Steve Boyce

PROJECT: 2315A

AGAT WORK ORDER: 22V940974

ROCK ANALYSIS REVIEWED BY: Meredith White, Senior Technician

DATE REPORTED: Sep 23, 2022

PAGES (INCLUDING COVER): 16

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*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: 22V940974

PROJECT: 2315A

2910 12TH STREET NE
 CALGARY, ALBERTA
 CANADA T2E 7P7
 TEL (403)735-2005
 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Steve Boyce

(181-703) ABA Package (CGY)

DATE SAMPLED: Sep 01, 2022

DATE RECEIVED: Sep 02, 2022

DATE REPORTED: Sep 23, 2022

SAMPLE TYPE: Soil

Analyte:	Paste pH	Fizz Rating	Total Sulfur	Sulphate Sulphur	Maximum Potential Acidity (MPA)	Net Neutralization Potential	Net Neutralization Potential Ratio	Siderite NP	Total Carbon	Inorganic Carbon - Total	CaCO3 Equivalents
Unit:	pH units		%	%	kgCaCO3/tonne	kg CaCO3/tonne		kg CaCO3/tonne	%	%	kgCaCO3/tonne
Sample ID (AGAT ID)	RDL:	0.2	0.01	0.01	0.2				0.02	0.02	0.8
SS-ARD-220901/ No jat. 2/3 ziplock bag (4270286)	8.94	Moderate	0.16	<0.01	5.0	168.1	34.6	173.1	1.17	1.09	90.8

Comments: RDL - Reported Detection Limit

4270286 NA = A result is not calculated when the MPA is <0.2

Analysis performed at AGAT Calgary (unless marked by *)

Insufficient Sample : IS

Sample Not Received : SNR

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 22V940974

PROJECT: 2315A

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Steve Boyce

(181-706) Sulphate-Sulphur HCl Leach (%) (CGY)

DATE SAMPLED: Sep 01, 2022

DATE RECEIVED: Sep 02, 2022

DATE REPORTED: Sep 23, 2022

SAMPLE TYPE: Soil

Analyte:	Sulphate Sulphur
Unit:	%
Sample ID (AGAT ID)	RDL: 0.01
SS-ARD-220901/ No jat. 2/3 ziplock bag (4270286)	<0.01

Comments: RDL - Reported Detection Limit
Analysis performed at AGAT Calgary (unless marked by *)
Insufficient Sample : IS
Sample Not Received : SNR

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 22V940974

PROJECT: 2315A

2910 12TH STREET NE
 CALGARY, ALBERTA
 CANADA T2E 7P7
 TEL (403)735-2005
 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Steve Boyce

(181-752) Dissolved Metals - Shake Flask Extraction (mg/L) (CGY)

DATE SAMPLED:	DATE RECEIVED: Sep 02, 2022					DATE REPORTED: Sep 23, 2022					SAMPLE TYPE: Soil				
Analyte:	pH	Electrical Conductivity	Silver Dissolved	Aluminum Dissolved	Arsenic Dissolved	Boron Dissolved	Barium Dissolved	Beryllium Dissolved	Bismuth Dissolved	Calcium Dissolved	Cadmium Dissolved	Chromium Dissolved	Cobalt Dissolved	Copper Dissolved	
Unit:	pH units	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Sample ID (AGAT ID)	RDL:	0.01	2	0.00008	0.001	0.0002	0.01	0.0002	0.0001	0.0001	0.05	0.00001	0.0005	0.0001	0.0005
SFE ON SS-ARD-220901/ No jat. 2/3 ziplock bag (4274534)		8.39	41.37	<0.00008	0.367	0.0013	<0.01	0.0242	<0.0001	<0.0001	8.09	<0.00001	<0.0005	<0.0001	<0.0005
Analyte:	Iron Dissolved	Mercury Dissolved	Potassium Dissolved	Lithium Dissolved	Magnesium Dissolved	Manganese Dissolved	Molybdenum Dissolved	Sodium Dissolved	Nickel Dissolved	Phosphorus Dissolved	Lead Dissolved	Sulphur Dissolved	Antimony Dissolved	Selenium Dissolved	
Unit:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Sample ID (AGAT ID)	RDL:	0.01	0.00005	0.05	0.0005	0.05	0.001	0.0001	0.02	0.0005	0.05	0.0005	0.5	0.0001	0.0005
SFE ON SS-ARD-220901/ No jat. 2/3 ziplock bag (4274534)		<0.01	<0.00005	1.25	<0.0005	0.82	<0.001	0.0030	2.30	<0.0005	<0.05	<0.0005	2.3	0.0004	<0.0005
Analyte:	Silicon Dissolved	Tin Dissolved	Strontium Dissolved	Tellurium Dissolved	Thallium Dissolved	Thorium Dissolved	Titanium Dissolved	Uranium Dissolved	Vanadium Dissolved	Tungsten Dissolved	Zinc Dissolved	Zirconium Dissolved			
Unit:	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L			
Sample ID (AGAT ID)	RDL:	0.05	0.00005	0.0002	0.0002	0.0001	0.0001	0.0005	0.00005	0.001	0.0001	0.001	0.0001		
SFE ON SS-ARD-220901/ No jat. 2/3 ziplock bag (4274534)		1.38	<0.00005	0.0652	<0.0002	<0.0001	<0.0001	<0.0005	<0.00005	0.003	<0.0001	<0.001	<0.0001		

Comments: RDL - Reported Detection Limit
 Analysis performed at AGAT Calgary (unless marked by *)
 Insufficient Sample : IS
 Sample Not Received : SNR

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 22V940974

PROJECT: 2315A

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Steve Boyce

(283-071) 4 Acid Digest - Metals Package, ICP-OES/ICP-MS finish (CGY)

DATE SAMPLED: Sep 01, 2022	DATE RECEIVED: Sep 02, 2022							DATE REPORTED: Sep 23, 2022					SAMPLE TYPE: Soil		
Analyte:	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	
Unit:	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	
Sample ID (AGAT ID)	RDL:	0.001	0.001	0.005	0.05	0.02	0.0001	0.005	0.005	0.005	1.0	0.005	0.5	0.001	
SS-ARD-220901/ No jat. 2/3 ziplock bag (4270286)		0.087	6.95	5.24	511	0.62	0.081	4.78	0.117	24.9	19.9	157	0.862	41.7	4.44
Analyte:	Ga	Ge	Hf	In	K	La	Li	Mg	Mn	Mo	Na	Nb	Ni	P	
Unit:	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	
Sample ID (AGAT ID)	RDL:	0.005	0.01	0.001	0.001	0.001	0.05	0.05	0.001	1.0	0.005	0.001	0.005	1.0	10.0
SS-ARD-220901/ No jat. 2/3 ziplock bag (4270286)		15.6	0.05	1.84	0.064	1.41	12.0	10.9	2.43	1210	1.63	2.31	4.13	43.6	572
Analyte:	Pb	Rb	Re	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	
Unit:	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	
Sample ID (AGAT ID)	RDL:	0.005	0.005	0.0003	0.001	0.01	0.005	0.002	0.05	0.005	0.05	0.005	0.001	0.0001	0.005
SS-ARD-220901/ No jat. 2/3 ziplock bag (4270286)		5.23	48.3	0.0211	0.211	0.49	19.1	0.757	1.07	424	0.40	0.130	2.15	0.396	0.271
Analyte:	U	V	W	Y	Zn	Zr									
Unit:	ppm	ppm	ppm	ppm	ppm	ppm									
Sample ID (AGAT ID)	RDL:	0.001	0.5	0.005	0.005	0.5	0.02								
SS-ARD-220901/ No jat. 2/3 ziplock bag (4270286)		0.955	130	0.657	18.8	63.3	54.8								

Comments: RDL - Reported Detection Limit
4270286 As, Sb values may be low due to digestion losses.
Analysis performed at AGAT Calgary (unless marked by *)
Insufficient Sample : IS
Sample Not Received : SNR

Certified By:

Quality Assurance

CLIENT NAME: ACTIVE EARTH ENGINEERING
PROJECT: 2315A
SAMPLING SITE:

AGAT WORK ORDER: 22V940974
ATTENTION TO: Steve Boyce
SAMPLED BY:

Rock Analysis														
RPT Date: Sep 23, 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

(181-703) ABA Package (CGY)

Paste pH	1	4275437	8.82	8.84	0.2%	< 0.2	101%	90%	110%				
Fizz Rating	1	4275437	Moderate	Moderate	0.0%	<							
Total Sulfur	1	4215847	1.39	1.38	0.7%	< 0.01	100%	90%	110%				
Sulphate Sulphur	4270286	4270286	<0.01	<0.01	NA	< 0.01	98%	80%	120%	85%	115%		
Siderite NP	1	4275437	967.8	967.5	0.0%	<	99%	85%	115%				
Total Carbon	1	4215847	<0.02	<0.02	NA	< 0.02	106%	90%	110%				
Inorganic Carbon - Total	1	4215847	<0.02	<0.02	NA	< 0.02	94%	80%	120%				

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

(181-706) Sulphate-Sulphur HCl Leach (%) (CGY)

Sulphate Sulphur	4270286	4270286	<0.01	<0.01	NA	< 0.01	98%	80%	120%	85%	115%		
------------------	---------	---------	-------	-------	----	--------	-----	-----	------	-----	------	--	--

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

(181-752) Dissolved Metals - Shake Flask Extraction (mg/L) (CGY)

pH	1	4264202	8.14	8.28	1.7%	< 0.01	102%	90%	110%				
Electrical Conductivity	1	4264202	70.10	67.46	3.8%	< 2	102%	90%	110%				
Silver Dissolved	4264202	4264202	<0.00008	<0.00008	NA	< 0.00008	102%	80%	120%				
Aluminum Dissolved	4264202	4264202	0.091	0.099	8.4%	< 0.001	106%	80%	120%				
Arsenic Dissolved	4264202	4264202	0.0027	0.0024	11.8%	< 0.0002	102%	80%	120%				
Boron Dissolved	4264202	4264202	0.02	0.01	NA	< 0.01	104%	80%	120%				
Barium Dissolved	4264202	4264202	0.0120	0.0101	17.2%	< 0.0002	104%	80%	120%				
Beryllium Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	102%	80%	120%				
Bismuth Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	104%	80%	120%				
Calcium Dissolved	4264202	4264202	6.59	5.83	12.2%	< 0.05	102%	80%	120%				
Cadmium Dissolved	4264202	4264202	<0.00001	<0.00001	NA	< 0.00001	102%	80%	120%				
Chromium Dissolved	4264202	4264202	<0.0005	<0.0005	NA	< 0.0005	100%	80%	120%				
Cobalt Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	102%	80%	120%				
Copper Dissolved	4264202	4264202	0.0027	0.0024	NA	< 0.0005	102%	80%	120%				
Iron Dissolved	4264202	4264202	0.02	0.03	NA	< 0.01	109%	80%	120%				
Mercury Dissolved	4264202	4264202	<0.00005	<0.00005	NA	< 0.00005	102%	80%	120%				
Potassium Dissolved	4264202	4264202	1.44	1.40	2.8%	< 0.05	104%	80%	120%				
Lithium Dissolved	4264202	4264202	0.0006	<0.0005	NA	< 0.0005	102%	80%	120%				
Magnesium Dissolved	4264202	4264202	1.08	0.94	13.9%	< 0.05	109%	80%	120%				
Manganese Dissolved	4264202	4264202	0.003	0.004	NA	< 0.001	96%	80%	120%				
Molybdenum Dissolved	4264202	4264202	0.0006	0.0005	18.2%	< 0.0001	100%	80%	120%				
Sodium Dissolved	4264202	4264202	0.39	0.36	8.0%	< 0.02	105%	80%	120%				
Nickel Dissolved	4264202	4264202	0.0020	0.0017	NA	< 0.0005	102%	80%	120%				
Phosphorus Dissolved	4264202	4264202	0.08	0.08	NA	< 0.05	105%	80%	120%				
Lead Dissolved	4264202	4264202	<0.0005	<0.0005	NA	< 0.0005	104%	80%	120%				

Quality Assurance

CLIENT NAME: ACTIVE EARTH ENGINEERING

AGAT WORK ORDER: 22V940974

PROJECT: 2315A

ATTENTION TO: Steve Boyce

SAMPLING SITE:

SAMPLED BY:

Rock Analysis (Continued)

RPT Date: Sep 23, 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
Sulphur Dissolved	4264202	4264202	<0.5	<0.5	NA	< 0.5	106%	80%	120%						
Antimony Dissolved	4264202	4264202	0.0001	0.0001	NA	< 0.0001	98%	80%	120%						
Selenium Dissolved	4264202	4264202	<0.0005	<0.0005	NA	< 0.0005	104%	80%	120%						
Silicon Dissolved	4264202	4264202	1.57	1.41	10.7%	< 0.05	106%	80%	120%						
Tin Dissolved	4264202	4264202	<0.00005	<0.00005	NA	< 0.00005	98%	80%	120%						
Strontium Dissolved	4264202	4264202	0.0250	0.0209	17.9%	< 0.0002	100%	80%	120%						
Tellurium Dissolved	4264202	4264202	<0.0002	<0.0002	NA	< 0.0002	104%	80%	120%						
Thallium Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	106%	80%	120%						
Thorium Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	104%	80%	120%						
Titanium Dissolved	4264202	4264202	0.0014	0.0011	NA	< 0.0005	102%	80%	120%						
Uranium Dissolved	4264202	4264202	<0.00005	<0.00005	NA	< 0.00005	104%	80%	120%						
Vanadium Dissolved	4264202	4264202	0.001	0.001	NA	< 0.001	102%	80%	120%						
Tungsten Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	106%	80%	120%						
Zinc Dissolved	4264202	4264202	<0.001	<0.001	NA	< 0.001	104%	80%	120%						
Zirconium Dissolved	4264202	4264202	<0.0001	<0.0001	NA	< 0.0001	98%	80%	120%						

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

(283-071) 4 Acid Digest - Metals Package, ICP-OES/ICP-MS finish (CGY)

Ag	3	4307034	0.141	0.066	72.7%	< 0.001		80%	120%					
Al	4307034	4307034	2.01	2.00	0.5%	< 0.001	97%	80%	120%					
As	3	4307034	1.88	1.74	7.7%	< 0.005		80%	120%					
Ba	4307034	4307034	345	342	1.0%	< .05		80%	120%					
Be	4307034	4307034	0.32	0.36	10.8%	< 0.02		80%	120%					
Bi	3	4307034	0.057	0.017	109.3%	< 0.002		80%	120%					
Ca	4307034	4307034	1.06	1.05	0.9%	< 0.0001	105%	80%	120%					
Cd	3	4307034	0.049	0.047	4.5%	< 0.005		80%	120%					
Ce	4307034	4307034	14.6	16.1	9.8%	< 0.005		80%	120%					
Co	4307034	4307034	2.34	2.32	0.6%	< 0.005		80%	120%					
Cr	4307034	4307034	308	284	8.1%	< 1.0	105%	80%	120%					
Cs	4307034	4307034	0.310	0.303	2.3%	< 0.005		80%	120%					
Cu	4307034	4307034	5.4	5.4	0.0%	< 0.5	101%	80%	120%					
Fe	4307034	4307034	0.76	0.75	1.3%	< 0.001	106%	80%	120%					
Ga	3	4307034	4.00	3.93	1.8%	< 0.005		80%	120%					
Ge	4307034	4307034	0.01	0.02	29.1%	< 0.01		80%	120%					
Hf	3	4307034	0.854	0.844	1.1%	< 0.001		80%	120%					
In	3	4307034	0.005	0.006	16.4%	< 0.001		80%	120%					
K	4307034	4307034	0.87	0.89	2.3%	< 0.001	97%	80%	120%					
La	4307034	4307034	7.83	8.65	10.0%	< 0.05		80%	120%					
Li	4307034	4307034	4.83	4.89	1.3%	< 0.05		80%	120%					
Mg	4307034	4307034	0.20	0.19	5.1%	< 0.001	102%	80%	120%					

Quality Assurance

 CLIENT NAME: ACTIVE EARTH ENGINEERING
 PROJECT: 2315A
 SAMPLING SITE:

 AGAT WORK ORDER: 22V940974
 ATTENTION TO: Steve Boyce
 SAMPLED BY:

Rock Analysis (Continued)

RPT Date: Sep 23, 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
Mn	4307034	4307034	135	128	5.3%	< 1.0	105%	80%	120%						
Mo	3	4307034	3.17	3.02	4.7%	< 0.005		80%	120%						
Na	4307034	4307034	0.67	0.68	1.5%	< 0.001	105%	80%	120%						
Nb	4307034	4307034	0.833	0.829	0.5%	< 0.005		80%	120%						
Ni	4307034	4307034	15.0	13.9	7.6%	< 1.0	98%	80%	120%						
P	4307034	4307034	146	142	2.8%	< 10.0	99%	80%	120%						
Pb	4307034	4307034	6.01	6.00	0.3%	< 0.005		80%	120%						
Rb	4307034	4307034	25.3	24.8	2.0%	< 0.005		80%	120%						
Re	3	4307034	0.0193	0.0248	24.8%	< 0.0003		80%	120%						
S	4307034	4307034	0.02	0.02	0.0%	< 0.001	100%	80%	120%						
Sb	4307034	4307034	0.17	0.16	4.4%	< 0.01		80%	120%						
Sc	4307034	4307034	1.11	1.02	8.6%	< 0.005		80%	120%						
Se	3	4307034	0.240	0.134	56.5%	< 0.002		80%	120%						
Sn	3	4307034	0.45	0.36	23.5%	< 0.05		80%	120%						
Sr	4307034	4307034	102	99.7	2.2%	< 0.005		80%	120%						
Ta	4307034	4307034	0.05	0.05	0.2%	< 0.05		80%	120%						
Te	3	4307034	0.090	0.046	65.6%	< 0.005		80%	120%						
Th	4307034	4307034	1.89	2.86	40.7%	< 0.001		80%	120%						
Ti	4307034	4307034	0.03	0.03	0.0%	< 0.0001	101%	80%	120%						
Tl	3	4307034	0.179	0.178	0.5%	< 0.005		80%	120%						
U	4307034	4307034	0.470	0.509	8.0%	< 0.001		80%	120%						
V	3	4307034	6.6	6.1	8.0%	< 0.5		80%	120%						
W	4307034	4307034	0.309	0.302	2.2%	< 0.005		80%	120%						
Y	3	4307034	3.32	3.42	3.0%	< 0.005		80%	120%						
Zn	4307034	4307034	7.7	7.4	4.9%	< 0.5		80%	120%						
Zr	3	4307034	27.7	27.0	2.4%	< 0.02		80%	120%						

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: ACTIVE EARTH ENGINEERING
PROJECT: 2315A
SAMPLING SITE:

AGAT WORK ORDER: 22V940974
ATTENTION TO: Steve Boyce
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Rock Analysis			
Paste pH	ARD-283-18003	Sobek A.A. et al; Report EPA-600/2-78-054 (1978)	PH-METER
Fizz Rating	ARD-181-18000	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	PH-METER
Total Sulfur	MIN-283-12001		LECO
Sulphate Sulphur	ARD-181-18009; INOR-181-6028	MEND Report 1.20.1 (09); mod from SM 4500-SO4 E	ICP/OES
Maximum Potential Acidity (MPA)	ARD-181-18004	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	PH-METER
Net Neutralization Potential	ARD-181-18000	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	PH-METER
Neutralization Potential Ratio	ARD-181-18004	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	PH-METER
Siderite NP	ARD-181-18015	Skousen et al. J Env Quality 26: 673-681 (1997)	TITRATION
Total Carbon	MIN-283-12001		LECO
Inorganic Carbon - Total	MIN-283-12001	Modified from ASTM E1915-11	LECO
pH	ARD-283-18011	Modified from SM 4500-H+	PH METER
Electrical Conductivity	ARD-283-18012	Modified from SM 2510B	EC METER
Silver Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Aluminum Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Arsenic Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Boron Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Barium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Beryllium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Bismuth Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Calcium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Cadmium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Chromium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Cobalt Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Copper Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Iron Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Mercury Dissolved	ARD-181-18006, MIN-283-12026	Modified from EPA 245.7	ICP-MS
Potassium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Lithium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Magnesium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Manganese Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES

Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING

AGAT WORK ORDER: 22V940974

PROJECT: 2315A

ATTENTION TO: Steve Boyce

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Molybdenum Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Sodium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Nickel Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Phosphorus Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Lead Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Sulphur Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Antimony Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Selenium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Silicon Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Tin Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Strontium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Tellurium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Thallium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Thorium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Titanium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Uranium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Vanadium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Tungsten Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Zinc Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Zirconium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Ag	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Al	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
As	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ba	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Be	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Bi	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ca	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Cd	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS

Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING

AGAT WORK ORDER: 22V940974

PROJECT: 2315A

ATTENTION TO: Steve Boyce

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ce	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Co	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Cr	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Cs	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Cu	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Fe	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Ga	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ge	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Hf	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
In	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
K	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
La	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Li	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Mg	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Mn	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Mo	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Na	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Nb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ni	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
P	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Pb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Rb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Re	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
S	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Sb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Sc	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Se	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Sn	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS



Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING
PROJECT: 2315A
SAMPLING SITE:

AGAT WORK ORDER: 22V940974
ATTENTION TO: Steve Boyce
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Sr	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ta	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Te	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Th	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ti	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Tl	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
U	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
V	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
W	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Y	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Zn	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Zr	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS



AGAT

Laboratories

120 - 8600 Glenlyon Parkway
Burnaby, BC
V5J 0B6

P: 778.452.4000 • F: 778.452.4074

Laboratory Use Only

Arrival Temperature: 10^oC
 AGAT Job Number: 22V940974
 Notes: 25SEP 8:27AM

Chain of Custody Record

Report Information

Company: Active Earth Engineering Ltd.
 Contact: Thomas Boerman
 Address: #201-3583 Henning Drive
Burnaby, BC, V3C 0P8
 Phone: 778-842544 Fax: _____
 AGAT Quote #: _____
 Client Project #: 2315A

Report Information

1. Name: Thomas Boerman
 Email: thomas.boerman@activeearth.ca
 2. Name: Anouk Landry
 Email: labreports@activeearth.ca

Report Format

Single
 Sample per Page
 Multiple
 Samples per Page
 Excel Format Included

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days
 Rush TAT Same Business Day - 200%
 1 Business Day - 100%
 2 Business Days - 50%
 3 Business Days - 25%

Date Required: _____

PLEASE CONTACT LABORATORY IF RUSH REQUIRED SAMPLE SUBMISSION CUT OFF FOR EFFECTIVE DATE BY 3 PM

Invoice To

Same as above Yes / No

Company: Active Earth Engineering Ltd.
 Contact: ap@activeearth.ca
 Address: #304-2600 Gladys Avenue
Abbotsford BC, V2S 0E9
 Phone: 2207522222 Fax: _____
 PO/AFE#: same as project #

Requirements (Please Check)

BC CSR Soil BC CSR - Water
 AL DW
 IL AW
 PL IW
 CL LW
 RL-LD RL-HD
 WL-N WL-R

Schedule 3.3 (Please Specify) _____

CCME (Please Specify) _____

Other (Please Specify) _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	Modified ABA Package	Sulphate - Sulphur HCl leach	leach (%)	dissolved metals - shaker	flush extraction	4 Acid Digest - metals	package, ICP-OES/ICP-MS	finish	NUMBER OF CONTAINERS	PRESERVED (Y/N)	HAZARDOUS (Y/N)	Hold for: <input type="checkbox"/> 60 DAYS
	<u>SS-ARD-220901</u>	<u>soil</u>	<u>22/09/01</u>	<u>no jar, 2/3 of ziplock bag</u>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<u>1</u>	<u>N</u>	<u>N</u>	

Samples Relinquished By (Print Name and Sign): <u>Thomas Boerman</u>	Date/Time: <u>22/09/01</u>	Samples Received By (Print Name and Sign):	Date/Time:	Page _____ of _____ No: 047648
Samples Relinquished By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time:	
Samples Relinquished By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign): <u>TEAG</u>	Date/Time:	



AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: ACTIVE EARTH - TESFAY

Courier: ACE Prepaid Collect

Waybill# _____

Branch: EDM GP EN FM RD VAN LYD FSJ EST SASK Other:

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr Reg Other _____

Cooler Quantity: 1

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi, BOD, Nitrate/Nitrite, Turbidity, Color, Microtox, Ortho PO4, Tedlar Bag, Residual Chlorine, Chlorophyll*, Chloroamines*

Earliest Expiry: _____

Hydrocarbons: Earliest Expiry _____

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken: _____

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icepack Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) + ___ + ___ = 10 °C 2 (Bottle/Jar) ___ + ___ + ___ = ___ °C

3 (Bottle/Jar) ___ + ___ + ___ = ___ °C 4 (Bottle/Jar) ___ + ___ + ___ = ___ °C

5 (Bottle/Jar) ___ + ___ + ___ = ___ °C 6 (Bottle/Jar) ___ + ___ + ___ = ___ °C

7 (Bottle/Jar) ___ + ___ + ___ = ___ °C 8 (Bottle/Jar) ___ + ___ + ___ = ___ °C

9 (Bottle/Jar) ___ + ___ + ___ = ___ °C 10 (Bottle/Jar) ___ + ___ + ___ = ___ °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 22V940974

Samples Damaged: Yes No If YES why? _____

No Bubble Wrap Frozen Courier

Other: _____

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial _____

General Comments: _____



SAMPLE SUBMISSION CHECKLIST

Project Number	Samples Collected By	Submitted By	Submission Date
2315 A	TB	TB	22/09/01

Type of Sample			
<input checked="" type="checkbox"/> Soil	<input type="checkbox"/> Water	<input type="checkbox"/> Vapour	<input type="checkbox"/> Other:

- All containers labelled with Sample ID and listed on the COC in numerical order.
- ~~Y or N/A~~ ~~Blind field duplicate samples collected, submitted, and included on the COC.~~
- Sample IDs on COCs exactly match sample IDs on containers.
- Container count on COCs matches container count in cooler.
- Turnaround time selected and results date specified.
- ~~Different media submitted separately (soil, vapour, water, etc. on separate COCs).~~
- Samples from parcels/areas with different property owners are on separate COCs.
- Sufficient ice and/or freezer packs included. Ice is not loose.
- Cooler contains samples for one project only.
- COCs in cooler, in ziplock bag along with this form.
- ~~Y/N~~ Methanol vials include an Excepted Quantities Label on the outside of the cooler.

Analysis selected on COC or To be emailed by (name): _____

DELIVERY METHOD:

- Direct to laboratory by Active Earth staff
- Courier from Active Earth office (seal coolers with packing tape)
- Courier from Site
- Harbour Air / courier combination (seal coolers with packing tape)
- Other: *see carrier*

ADDITIONAL COMMENTS: *no soil jars, but ziplock bag*

Signature: *TB* Date: *22/09/01*

VANCOUVER ISLAND
105 - 4343 Tyndall Avenue
Victoria, BC V8N 3R9
Tel 778-430-5475

METRO VANCOUVER
160 - 2250 Boundary Road
Burnaby, BC V5M 3Z3
Tel 778-737-3488

FRASER VALLEY
304 - 2600 Gladys Avenue
Abbotsford, BC V2S 0E9
Tel 778-752-2222



WARNING:
 THIS SHIPMENT IS NOT COVERED BY LIABILITY
 INSURANCE FOR DELAYED DELIVERY, LOSS OF MARKET, OR
 PENALTY EXPENSE DUE TO LATE RECEIPT. PLEASE SEE ALL
 TERMS AND CONDITIONS OF CARRIER

Colisignee
 COPY

DATE:
 01/SEP/2022



AA1711475

SHIPPER 1103014		PREPAID <input checked="" type="checkbox"/> CONSIGNEE		AGAT LABS		COLLECT	
AGAT LABORATORIES/MIC & VAN ONLY		1103014		3681 E 1ST AVE			
C/O ACE VICTORIA COURIER		TIME		VANCOUVER, BC V5M 1C2			
VICTORIA, BC V8Z 1G1 (403) 736-2000		Link #		CONSIGNEE'S SIGNATURE		DATE	
SHIPPER'S SIGNATURE		Reference #		PLEASE PRINT NAME		TIME	
PIECES	PACKAGING WEIGHT (LBS)	LENGTH	WIDTH	HEIGHT	TOTAL WEIGHT	DELIVERY CHARGE	
1	COOLERS 22	0	0	0	22	DANGEROUS GOODS YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
						EXTRA CHARGES	
						CONNECT CARRIER	
						EXTRA INSURANCE YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>	
TOTAL # DELIVERY INSTRUCTION 1 9:00 AM DELIVERY						SUB TOTAL	
CITY MESSENGER						VALUE OF SHIPMENT \$ 0.00	
GROUND		INTER CITY		AIR		F. S. C.	
<input type="checkbox"/> Regular	<input type="checkbox"/> Regular			<input type="checkbox"/> Regular		GST /HST	
<input type="checkbox"/> Expedite	<input type="checkbox"/> Expedite			<input type="checkbox"/> Expedite		COD AMOUNT	
<input type="checkbox"/> Rush	<input type="checkbox"/> Direct (Hot Shot)			<input type="checkbox"/> Direct (Hot Shot)		COD FEE	
<input type="checkbox"/> Direct (Hot Shot)	<input type="checkbox"/> Direct (Hot Shot)			<input type="checkbox"/> Direct (Hot Shot)		TOTAL	

* RECEIVED: THE PROPERTY LISTED ABOVE (WHICH LIST IS A PART HEREOF) IN APPARENT GOOD ORDER, EXCEPT AS NOTED.

CLIENT NAME: ACTIVE EARTH ENGINEERING
#304-2600 GLADYS AVE
ABBOTSFORD , BC V2S 0E9
(250) 686-9850

ATTENTION TO: Marek

PROJECT: 2315-a

AGAT WORK ORDER: 22C857836

ROCK ANALYSIS REVIEWED BY: Jewel Shibu, Lab Supervisor

WATER ANALYSIS REVIEWED BY: Jewel Shibu, Lab Supervisor

DATE REPORTED: Feb 18, 2022

PAGES (INCLUDING COVER): 17

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*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: 22C857836

PROJECT: 2315-a

2910 12TH STREET NE
 CALGARY, ALBERTA
 CANADA T2E 7P7
 TEL (403)735-2005
 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

(181-704) Modified ABA Package (CGY)

DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

		SAMPLE DESCRIPTION:		MW101	MW102
		SAMPLE TYPE:		Rock	Rock
		DATE SAMPLED:		2022-01-27 10:08	2022-01-27 10:08
Parameter	Unit	G / S	RDL	3459282	3459284
Paste pH	pH units		0.2	9.04	8.87
Modified ABA NP	kgCaCO3/tonne		2	24	27
Fizz Rating				Slight	Slight
CaCO3 Equivalents	kgCaCO3/tonne		0.8	2.1	2.1
Maximum Potential Acidity (MPA)	kgCaCO3/tonne		0.2	<0.2	1.3
C	%		0.02	.28	.35
S	%		0.01	0.01	0.04
Inorganic Carbon - Total	%		0.020	0.254	0.248

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:


Jewel Shibu



Certificate of Analysis

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

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FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

(181-706) Sulphate-Sulphur HCl Leach (%) (CGY)

DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

		SAMPLE DESCRIPTION:		MW101	MW102
		SAMPLE TYPE:		Rock	Rock
		DATE SAMPLED:		2022-01-27 10:08	2022-01-27 10:08
Parameter	Unit	G / S	RDL	3459282	3459284
Sulphate Sulphur	%		0.01	<0.01	<0.01
Sulphate HCl Prep				Y	Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:

Jewel Shibu



Certificate of Analysis

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

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 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

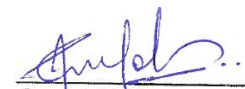
(181-752) Dissolved Metals - Shake Flask Extraction (mg/L) (CGY)

DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

Parameter	Unit	SAMPLE DESCRIPTION: SFE on MW101		SFE on MW102	
		G / S	RDL		
Weight of Dry Sample	g			250.03	249.92
Volume of DI Water	mL			750	750
pH	pH units		0.01	9.49	9.15
Electrical Conductivity	uS/cm		1	48	61
Silver Dissolved	mg/L		0.00008	<0.00008	<0.00008
Aluminum Dissolved	mg/L		0.001	0.796	0.764
Arsenic Dissolved	mg/L		0.0002	0.0005	0.0006
Boron Dissolved	mg/L		0.01	<0.01	<0.01
Barium Dissolved	mg/L		0.0002	0.0050	0.0091
Beryllium Dissolved	mg/L		0.0001	<0.0001	<0.0001
Bismuth Dissolved	mg/L		0.0001	<0.0001	<0.0001
Calcium Dissolved	mg/L		0.05	4.75	6.44
Cadmium Dissolved	mg/L		0.00001	0.00002	0.00001
Chromium Dissolved	mg/L		0.0005	<0.0005	<0.0005
Cobalt Dissolved	mg/L		0.0001	0.0001	0.0002
Copper Dissolved	mg/L		0.0005	0.0012	0.0017
Iron Dissolved	mg/L		0.01	0.21	0.30
Mercury Dissolved	mg/L		0.0005	<0.0005	<0.0005
Potassium Dissolved	mg/L		0.05	1.14	2.21
Lithium Dissolved	mg/L		0.0005	<0.0005	<0.0005
Magnesium Dissolved	mg/L		0.05	0.62	0.67
Manganese Dissolved	mg/L		0.001	0.018	0.037
Molybdenum Dissolved	mg/L		0.0001	0.0009	0.0009
Sodium Dissolved	mg/L		0.02	1.87	3.69
Nickel Dissolved	mg/L		0.0005	<0.0005	0.0006
Phosphorus Dissolved	mg/L		0.05	<0.05	<0.05
Lead Dissolved	mg/L		0.0005	<0.0005	0.0006
Sulphur Dissolved	mg/L		0.5	<0.5	1.3
Antimony Dissolved	mg/L		0.0001	0.0001	0.0002

Certified By:


Jewel Shibu



Certificate of Analysis

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

2910 12TH STREET NE
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 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

(181-752) Dissolved Metals - Shake Flask Extraction (mg/L) (CGY)

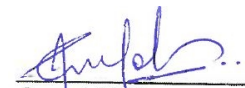
DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

Parameter	Unit	SAMPLE DESCRIPTION: SFE on MW101 SFE on MW102			
		G / S	RDL	3459285	3459286
Selenium Dissolved	mg/L		0.0005	<0.0005	<0.0005
Silicon Dissolved	mg/L		0.05	1.52	1.63
Tin Dissolved	mg/L		0.00005	<0.00005	<0.00005
Strontium Dissolved	mg/L		0.0002	0.0208	0.0135
Tellurium Dissolved	mg/L		0.0002	<0.0002	<0.0002
Thallium Dissolved	mg/L		0.0001	<0.0001	<0.0001
Thorium Dissolved	mg/L		0.0001	<0.0001	<0.0001
Titanium Dissolved	mg/L		0.0005	0.0022	0.0030
Uranium Dissolved	mg/L		0.00005	<0.00005	<0.00005
Vanadium Dissolved	mg/L		0.001	0.002	0.002
Tungsten Dissolved	mg/L		0.0001	0.0026	0.0230
Zinc Dissolved	mg/L		0.001	0.009	0.012
Zirconium Dissolved	mg/L		0.0001	<0.0001	<0.0001
Hardness	mgCaCO3/L		0.5	14.4	18.8

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 Analysis performed at AGAT Calgary (unless marked by *)

Certified By:


Jewel Shibu



Certificate of Analysis

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

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 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

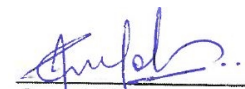
(283-071) 4 Acid Digest - Metals Package, ICP-OES/ICP-MS finish (CGY)

DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

Parameter	Unit	SAMPLE DESCRIPTION:		MW101	MW102
		G / S	RDL	3459282	3459284
Ag	ppm		0.001	0.100	0.656
Al	%		0.001	7.96	8.59
As	ppm		0.005	2.51	3.82
Ba	ppm		0.05	826	311
Be	ppm		0.02	0.85	0.95
Bi	ppm		0.002	0.086	0.076
Ca	%		0.0001	2.83	1.46
Cd	ppm		0.005	0.296	0.103
Ce	ppm		0.005	33.3	34.1
Co	ppm		0.005	14.1	12.0
Cr	ppm		1.0	195	60.4
Cs	ppm		0.005	0.727	0.834
Cu	ppm		0.5	19.3	24.0
Fe	%		0.001	4.16	3.67
Ga	ppm		0.005	16.6	17.6
Ge	ppm		0.01	0.17	0.16
Hf	ppm		0.001	1.44	1.40
In	ppm		0.001	0.075	0.092
K	%		0.001	1.57	1.87
La	ppm		0.05	14.1	14.0
Li	ppm		0.05	9.01	5.02
Mg	%		0.001	1.86	1.40
Mn	ppm		1.0	1820	1130
Mo	ppm		0.005	1.41	0.462
Na	%		0.001	1.92	3.08
Nb	ppm		0.005	6.96	4.50
Ni	ppm		1.0	10.6	7.7
P	ppm		10.0	798	140
Pb	ppm		0.005	6.42	5.81

Certified By:


Jewel Shibu



Certificate of Analysis

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

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CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

(283-071) 4 Acid Digest - Metals Package, ICP-OES/ICP-MS finish (CGY)

DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

Parameter	Unit	SAMPLE DESCRIPTION:		MW101	MW102
		G / S	RDL	3459282	3459284
Rb	ppm		0.005	39.2	46.4
Re	ppm		0.0003	0.0048	0.0042
S	%		0.001	0.002	0.045
Sb	ppm		0.01	0.39	0.30
Sc	ppm		0.005	19.7	20.6
Se	ppm		0.002	1.72	1.34
Sn	ppm		0.05	1.10	1.28
Sr	ppm		0.005	245	196
Ta	ppm		0.05	0.49	0.34
Te	ppm		0.005	0.043	0.069
Th	ppm		0.001	1.43	1.65
Ti	%		0.0001	0.448	0.355
Tl	ppm		0.005	0.235	0.191
U	ppm		0.001	0.627	0.121
V	ppm		0.5	84.3	95.2
W	ppm		0.005	0.875	6.66
Y	ppm		0.005	30.8	24.3
Zn	ppm		0.5	125	72.8
Zr	ppm		0.02	50.3	44.2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

3459282-3459284 As, Sb values may be low due to digestion losses.

Analysis performed at AGAT Calgary (unless marked by *)

Certified By:


 Jewel Shibu



Certificate of Analysis

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

2910 12TH STREET NE
 CALGARY, ALBERTA
 CANADA T2E 7P7
 TEL (403)735-2005
 FAX (403)735-2771
<http://www.agatlabs.com>

CLIENT NAME: ACTIVE EARTH ENGINEERING

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

ARD- Water Analysis

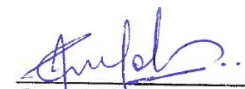
DATE RECEIVED: 2022-01-27

DATE REPORTED: 2022-02-18

Parameter	Unit	SAMPLE DESCRIPTION: SFE on MW101		SFE on MW102	
		G / S	RDL	G / S	RDL
T - Alkalinity (as CaCO3)	mg/L		5	25	33
Chloride	mg/L		1.0	<1.0	<1.0
Fluoride	mg/L		0.01	<0.01	<0.01
Sulfate	mg/L		1.0	<1.0	3.1

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
 Analysis performed at AGAT Calgary (unless marked by *)

Certified By:


Jewel Shibu

Quality Assurance

 CLIENT NAME: ACTIVE EARTH ENGINEERING
 PROJECT: 2315-a
 SAMPLING SITE:

 AGAT WORK ORDER: 22C857836
 ATTENTION TO: Marek
 SAMPLED BY:

Rock Analysis														
RPT Date: Feb 18, 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

(181-704) Modified ABA Package (CGY)

Paste pH	1	3459282	9.04	9.03	0.1%	< 0.2	99%							
Modified ABA NP	1	3459282	24	24	0.0%	< 2	95%	80%	120%					
C	1	3490489	.0285	.0319	11.3%	< 0.02	90%	90%	110%					
S	1	3490489	0.035	0.030	NA	< 0.01	91%	90%	110%					
Inorganic Carbon - Total		3211752	2.33	2.09	10.9%	< 0.02	85%	80%	120%					

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

(283-071) 4 Acid Digest - Metals Package, ICP-OES/ICP-MS finish (CGY)

Ag	3467682		0.051	0.030	52.2%	< 0.001	103%	80%	120%					
Al	3467682		5.84	6.14	4.9%	< 0.001	105%	80%	120%					70%
As	3467682		4.27	2.96	36.3%	< 0.005	106%	80%	120%					
Ba	3467682		829	840	1.3%	< .05	98%	80%	120%					
Be	3467682		1.04	0.85	20.2%	< 0.02	83%	80%	120%					
Bi	3467682		0.063	0.051	21.8%	< 0.002	123%	80%	120%					
Ca	3467682		6.58	6.82	3.6%	< 0.0001	112%	80%	120%					
Cd	3467682		0.065	0.072	10.5%	< 0.005	107%	80%	120%					70%
Ce	3467682		40.6	41.3	1.8%	< 0.005	103%	80%	120%					
Co	3467682		5.98	5.95	0.5%	< 0.005	91%	80%	120%					
Cr	3467682		328	387	16.3%	< 1.0	91%	80%	120%					
Cs	3467682		0.968	1.01	4.2%	< 0.005	97%	80%	120%					
Cu	3467682		16.5	13.3	21.6%	< 0.5	89%	80%	120%					
Fe	3467682		2.05	2.41	16.2%	< 0.001	84%	80%	120%					
Ga	3467682		13.8	13.8	0.3%	< 0.005	92%	80%	120%					
Ge	3467682		0.11	0.11	1.3%	< 0.01	NA	80%	120%					
Hf	3467682		0.495	0.496	0.1%	< 0.001	90%	80%	120%					
In	3467682		0.019	0.021	6.4%	< 0.001	97%	80%	120%					
K	3467682		2.02	2.41	17.6%	< 0.001	94%	80%	120%					
La	3467682		19.6	19.8	1.2%	< 0.05	99%	80%	120%					
Li	3467682		10.5	10.8	3.3%	< 0.05	87%	80%	120%					
Mg	3467682		1.77	2.01	12.9%	< 0.001	108%	80%	120%					
Mn	3467682		452	542	18.0%	< 1.0	101%	80%	120%					
Mo	3467682		2.93	2.92	0.4%	< 0.005	90%	80%	120%					
Na	3467682		2.49	2.91	15.5%	< 0.001	97%	80%	120%					
Nb	3467682		5.68	5.84	2.7%	< 0.005	NA	80%	120%					
Ni	3467682		17.3	19.6	12.7%	< 1.0	85%	80%	120%					
P	3467682		1220	1440	16.5%	< 10.0	99%	80%	120%					
Pb	3467682		8.22	7.82	5.0%	< 0.005	95%	80%	120%					
Rb	3467682		31.9	32.9	3.2%	< 0.005	96%	80%	120%					
Re	3467682		0.0018	0.0019	1.8%	< 0.0003	91%	80%	120%					

Quality Assurance

CLIENT NAME: ACTIVE EARTH ENGINEERING

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

Rock Analysis (Continued)

RPT Date: Feb 18, 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
S	3467682		<0.001	<0.001	0.0%	< 0.001	92%	80%	120%						
Sb	3467682		1.48	0.30	133.3%	< 0.01	130%	80%	120%						
Sc	3467682		3.34	3.34	0.0%	< 0.005	94%	80%	120%						
Se	3467682		0.626	0.496	23.2%	< 0.002	87%	80%	120%						
Sn	3467682		0.73	0.52	33.4%	< 0.05	85%	80%	120%						
Sr	3467682		511	514	0.5%	< 0.005	95%	80%	120%						
Ta	3467682		0.48	0.48	1.3%	< 0.05	104%	80%	120%						
Te	3467682		0.038	0.010	117.4%	< 0.005	167%	80%	120%						
Th	3467682		6.82	5.72	17.6%	< 0.001	96%	80%	120%						
Ti	3467682		0.245	0.298	19.7%	< 0.0001	93%	80%	120%						
Tl	3467682		0.226	0.261	14.5%	< 0.005	116%	80%	120%						
U	3467682		2.05	1.90	7.5%	< 0.001	99%	80%	120%						
V	3467682		41.5	42.2	1.8%	< 0.5	96%	80%	120%						
W	3467682		0.266	0.280	5.0%	< 0.005	93%	80%	120%						
Y	3467682		6.57	6.53	0.6%	< 0.005	94%	80%	120%						
Zn	3467682		46.5	47.9	2.9%	< 0.5	95%	80%	120%						
Zr	3467682		9.54	9.63	1.0%	< 0.02	88%	80%	120%						

(181-706) Sulphate-Sulphur HCl Leach (%) (CGY)

Sulphate Sulphur	3459282	3459282	<0.01	<0.01	0%	< 0.01	83%	80%	120%	85%	115%
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Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

(181-752) Dissolved Metals - Shake Flask Extraction (mg/L) (CGY)

pH	1	3423890	6.81	6.84	0.4%	< 0.01	100%	90%	110%					
Electrical Conductivity	1	3423890	10.50	10.59	0.9%	< 2	99%	90%	110%					
Silver Dissolved	1	3423890	<0.00008	<0.00008	0.0%	< 0.00008	104%	80%	120%					
Aluminum Dissolved	1	3423890	0.533	0.651	20.0%	< 0.001	104%	80%	120%					
Arsenic Dissolved	1	3423890	0.0032	0.0033	2.5%	< 0.0002	98%	80%	120%					
Boron Dissolved	1	3423890	<0.01	<0.01	0.0%	< 0.01	101%	80%	120%					
Barium Dissolved	1	3423890	0.0151	0.0175	14.4%	< 0.0002	91%	80%	120%					
Beryllium Dissolved	1	3423890	<0.0001	<0.0001	0.0%	< 0.0001	102%	80%	120%					
Bismuth Dissolved	1	3423890	<0.0001	<0.0001	0.0%	< 0.0001	103%	80%	120%					
Calcium Dissolved	1	3423890	0.40	0.40	0.5%	< 0.05	102%	80%	120%					
Cadmium Dissolved	1	3423890	0.00001	0.00001	0.4%	< 0.00001	97%	80%	120%					
Chromium Dissolved	1	3423890	0.0009	0.0011	NA	< 0.0005	94%	80%	120%					
Cobalt Dissolved	1	3423890	0.0003	0.0004	NA	< 0.0001	102%	80%	120%					
Copper Dissolved	1	3423890	0.0096	0.0112	15.3%	< 0.0005	95%	80%	120%					
Iron Dissolved	1	3423890	0.43	0.54	21.8%	< 0.01	111%	80%	120%					
Mercury Dissolved	1	3423890	<0.0005	<0.0005	0.0%	< 0.0005	99%	80%	120%					
Potassium Dissolved	1	3423890	1.20	1.20	0.4%	< 0.05	108%	80%	120%					

Quality Assurance

 CLIENT NAME: ACTIVE EARTH ENGINEERING
 PROJECT: 2315-a
 SAMPLING SITE:

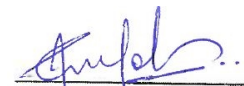
 AGAT WORK ORDER: 22C857836
 ATTENTION TO: Marek
 SAMPLED BY:

Rock Analysis (Continued)

RPT Date: Feb 18, 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
Lithium Dissolved	1	3423890	0.0007	0.0008	15.8%	< 0.0005	101%	80%	120%						
Magnesium Dissolved	1	3423890	0.28	0.33	16.0%	< 0.05	117%	80%	120%						
Manganese Dissolved	1	3423890	0.010	0.011	14.7%	< 0.001	102%	80%	120%						
Molybdenum Dissolved	1	3423890	0.0004	0.0005	14.3%	< 0.0001	100%	80%	120%						
Sodium Dissolved	1	3423890	0.88	0.83	5.1%	< 0.02	113%	80%	120%						
Nickel Dissolved	1	3423890	0.0010	0.0010	2.0%	< 0.0005	98%	80%	120%						
Phosphorus Dissolved	1	3423890	0.12	0.12	0.3%	< 0.05	109%	80%	120%						
Lead Dissolved	1	3423890	<0.0005	<0.0005	0.0%	< 0.0005	100%	80%	120%						
Sulphur Dissolved	1	3423890	<0.5	<0.5	0.0%	< 0.5	106%	80%	120%						
Antimony Dissolved	1	3423890	0.0001	0.0001	0.9%	< 0.0001	94%	80%	120%						
Selenium Dissolved	1	3423890	<0.0005	<0.0005	0.0%	< 0.0005	97%	80%	120%						
Silicon Dissolved	1	3423890	1.20	1.34	11.1%	< 0.05	107%	80%	120%						
Tin Dissolved	1	3423890	<0.00005	<0.00005	0.0%	< 0.00005	93%	80%	120%						
Strontium Dissolved	1	3423890	0.0022	0.0026	15.2%	< 0.0002	100%	80%	120%						
Tellurium Dissolved	1	3423890	<0.0002	<0.0002	0.0%	< 0.0002	99%	80%	120%						
Thallium Dissolved	1	3423890	<0.0001	<0.0001	0.0%	< 0.0001	103%	80%	120%						
Thorium Dissolved	1	3423890	<0.0001	<0.0001	0.0%	< 0.0001	100%	80%	120%						
Titanium Dissolved	1	3423890	0.0289	0.0414	35.4%	< 0.0005	99%	80%	120%						
Uranium Dissolved	1	3423890	<0.00005	0.00005	8.0%	< 0.00005	103%	80%	120%						
Vanadium Dissolved	1	3423890	0.003	0.003	10.1%	< 0.001	95%	80%	120%						
Tungsten Dissolved	1	3423890	<0.0001	<0.0001	0.0%	< 0.0001	104%	80%	120%						
Zinc Dissolved	1	3423890	0.015	0.014	8.5%	< 0.001	97%	80%	120%						
Zirconium Dissolved	1	3423890	<0.0001	<0.0001	0.0%	< 0.0001	94%	80%	120%						

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

Certified By:


Jewel Shibu



Quality Assurance

CLIENT NAME: ACTIVE EARTH ENGINEERING
 PROJECT: 2315-a
 SAMPLING SITE:

AGAT WORK ORDER: 22C857836
 ATTENTION TO: Marek
 SAMPLED BY:

Water Analysis																
RPT Date: Feb 18, 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	

ARD- Water Analysis

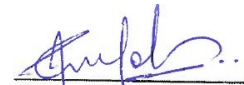
T - Alkalinity (as CaCO3)	3530698		146	149	2.0%	< 5	90%	80%	120%						
Bicarbonate	3530698		178	182	2.2%	< 5									
Chloride	3459285	3459285	<1.0	<1.0	NA	< 1.0	96%	70%	130%	96%	80%	120%	104%	70%	130%
Fluoride	3459285	3459285	<0.01	<0.01	NA	< 0.01	87%	70%	130%	93%	80%	120%	109%	70%	130%
Sulfate	3459285	3459285	<1.0	<1.0	NA	< 1.0	92%	70%	130%	92%	80%	120%	102%	70%	130%

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.

pH has been analyzed past the recommended holding time of 15 minutes from sampling (field measurement ideal if more accurate data required)

Nitrate and Nitrite: The regulatory hold time for the analysis of nitrate and/or nitrite in water is 72 hours.

Certified By:


Jewel Shibu

QC Exceedance

CLIENT NAME: ACTIVE EARTH ENGINEERING

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

ATTENTION TO: Marek

RPT Date: Feb 18, 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

(283-071) 4 Acid Digest - Metals Package, ICP-OES/ICP-MS finish (CGY)

Bi	123%	80%	120%
Sb	130%	80%	120%
Te	167%	80%	120%



Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING
PROJECT: 2315-a
SAMPLING SITE:

AGAT WORK ORDER: 22C857836
ATTENTION TO: Marek
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Rock Analysis			
Paste pH	ARD-283-18003	Sobek A.A. et al; Report EPA-600/2-78-054 (1978)	PH METER
Modified ABA NP	ARD-283-18000	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	TITRATION
Fizz Rating	ARD-181-18000	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	PH METER
CaCO3 Equivalents			CALCULATION
Maximum Potential Acidity (MPA)	ARD-181-18000	MEND Project 1.16.1b (Sect. 6.2.3) (March 1991)	CALCULATION
C	MIN-283-12001		LECO
S	MIN-283-12001		LECO
Inorganic Carbon - Total	INOR-181-6027	Modified from ASTM E1915-11	LECO
Sulphate Sulphur	ARD-181-18009; INOR-181-6028	MEND Report 1.20.1 (09); mod from SM 4500-SO4 E	ICP/OES
Sulphate HCl Prep			N/A
Weight of Dry Sample			BALANCE
Volume of DI Water			
pH	ARD-283-18011	Modified from SM 4500-H+	PH METER
Electrical Conductivity	ARD-283-18012	Modified from SM 2510B	EC METER
Silver Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Aluminum Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Arsenic Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Boron Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Barium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Beryllium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Bismuth Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Calcium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Cadmium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Chromium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Cobalt Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Copper Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Iron Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Mercury Dissolved	ARD-181-18006, MIN-283-12026	Modified from EPA 245.7	ICP-MS
Potassium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Lithium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Magnesium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES



Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING
 PROJECT: 2315-a
 SAMPLING SITE:

AGAT WORK ORDER: 22C857836
 ATTENTION TO: Marek
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Manganese Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Molybdenum Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Sodium Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Nickel Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Phosphorus Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Lead Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Sulphur Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Antimony Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Selenium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Silicon Dissolved	ARD-181-18006, MIN-283-12025	Modified from SM 3120 B	ICP-OES
Tin Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Strontium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Tellurium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Thallium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Thorium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Titanium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Uranium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Vanadium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Tungsten Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Zinc Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Zirconium Dissolved	ARD-181-18006, MIN-283-12026	Modified from SM 3125 B	ICP-MS
Hardness		SM 2340 B	N/A
Ag	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Al	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
As	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ba	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Be	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Bi	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS



Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING

AGAT WORK ORDER: 22C857836

PROJECT: 2315-a

ATTENTION TO: Marek

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Ca	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Cd	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ce	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Co	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Cr	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Cs	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Cu	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Fe	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Ga	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ge	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Hf	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
In	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
K	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
La	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Li	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Mg	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Mn	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Mo	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Na	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Nb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ni	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
P	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Pb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Rb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Re	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
S	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Sb	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Sc	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS



Method Summary

CLIENT NAME: ACTIVE EARTH ENGINEERING
 PROJECT: 2315-a
 SAMPLING SITE:

AGAT WORK ORDER: 22C857836
 ATTENTION TO: Marek
 SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Se	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Sn	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Sr	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ta	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Te	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Th	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Ti	MIN-283-12008.003 & MIN-283-12025.003		ICP/OES
Tl	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
U	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
V	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
W	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Y	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Zn	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Zr	MIN-283-12008.003 and MIN-283-12526.003		ICP-MS
Water Analysis			
T - Alkalinity (as CaCO ₃)	INST-0100, INST-0101	SM 2320 B	TITRATION
Chloride	INST 0150	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INST 0150	SM 4110 B	ION CHROMATOGRAPH
Sulfate	INST 0150	SM 4110 B	ION CHROMATOGRAPH

CERTIFICATE OF ANALYSIS

Work Order : **VA22B0421**
Client : **Active Earth Engineering Ltd.**
Contact : Marek Downarowicz
Address : 160-2250 Boundary Road
 Burnaby BC Canada V5M 3Z3
Telephone : ----
Project : 2315-A
PO : 2315-A
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 5
Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 13-May-2022 09:45
Date Analysis Commenced : 14-May-2022
Issue Date : 19-May-2022 16:36

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Christopher Li	Lab Assistant	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.



Analytical Results

Sub-Matrix: Water					Client sample ID	MW101-220511	MW102D-22051 1	MW102S-22051 1	----	----
(Matrix: Water)					Client sampling date / time	11-May-2022	11-May-2022	11-May-2022	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B0421-001	VA22B0421-002	VA22B0421-003	-----	-----	
					Result	Result	Result	----	----	
Physical Tests										
hardness (as CaCO ₃), dissolved	----	EC100	0.60	mg/L	144	266	228	----	----	
Anions and Nutrients										
chloride	16887-00-6	E235.Cl	0.50	mg/L	12.3	126	127	----	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	<1.0	3.8	3.9	----	----	
antimony, dissolved	7440-36-0	E421	0.10	µg/L	<0.10	<0.10	<0.10	----	----	
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	1.71	0.60	<0.10	----	----	
barium, dissolved	7440-39-3	E421	0.10	µg/L	3.36	48.7	20.3	----	----	
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	<0.100	----	----	
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	<0.050	----	----	
boron, dissolved	7440-42-8	E421	10	µg/L	45	37	12	----	----	
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	0.0092	0.0137	0.0056	----	----	
calcium, dissolved	7440-70-2	E421	50	µg/L	47800	96900	85400	----	----	
cesium, dissolved	7440-46-2	E421	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
chromium, dissolved	7440-47-3	E421	0.50	µg/L	<0.50	<0.50	<0.50	----	----	
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	<0.10	<0.10	<0.10	----	----	
copper, dissolved	7440-50-8	E421	0.20	µg/L	<0.20	2.08	1.49	----	----	
iron, dissolved	7439-89-6	E421	10	µg/L	<10	<10	<10	----	----	
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	0.062	<0.050	----	----	
lithium, dissolved	7439-93-2	E421	1.0	µg/L	1.4	9.5	<1.0	----	----	
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	6020	5860	3650	----	----	
manganese, dissolved	7439-96-5	E421	0.10	µg/L	0.72	33.2	0.75	----	----	
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----	
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	3.55	4.34	0.220	----	----	
nickel, dissolved	7440-02-0	E421	0.50	µg/L	<0.50	0.53	<0.50	----	----	
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	<50	----	----	
potassium, dissolved	7440-09-7	E421	50	µg/L	422	1030	740	----	----	
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	0.35	0.82	0.27	----	----	
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.076	0.206	0.109	----	----	
silicon, dissolved	7440-21-3	E421	50	µg/L	6910	5380	3700	----	----	
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	<0.010	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW101-220511	MW102D-22051 1	MW102S-22051 1	----	----
Client sampling date / time					11-May-2022	11-May-2022	11-May-2022	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22B0421-001	VA22B0421-002	VA22B0421-003	-----	-----	
					Result	Result	Result	---	---	
Dissolved Metals										
sodium, dissolved	7440-23-5	E421	50	µg/L	6710	109000	53100	----	----	
strontium, dissolved	7440-24-6	E421	0.20	µg/L	269	450	184	----	----	
sulfur, dissolved	7704-34-9	E421	500	µg/L	6320	60700	5080	----	----	
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	<0.20	----	----	
thallium, dissolved	7440-28-0	E421	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	<0.10	----	----	
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	0.17	<0.10	----	----	
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	<0.30	----	----	
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	0.63	0.22	<0.10	----	----	
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.263	6.60	0.186	----	----	
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	1.34	0.59	<0.50	----	----	
zinc, dissolved	7440-66-6	E421	1.0	µg/L	<1.0	2.6	4.2	----	----	
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	<0.20	----	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	<250	----	----	
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	<250	----	----	
HEPHw	----	EC600A	250	µg/L	<250	<250	<250	----	----	
LEPHw	----	EC600A	250	µg/L	<250	<250	<250	----	----	
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	99.5	103	97.2	----	----	
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----	
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L	<0.015	<0.015	<0.015	----	----	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW101-220511	MW102D-22051 1	MW102S-22051 1	----	----
Client sampling date / time					11-May-2022	11-May-2022	11-May-2022	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA22B0421-001	VA22B0421-002	VA22B0421-003	-----	-----	
					Result	Result	Result	---	---	
Polycyclic Aromatic Hydrocarbons										
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	<0.0050	----	----	
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----	
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	<0.020	----	----	
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	<0.010	----	----	
quinoline	91-22-5	E641A	0.050	µg/L	<0.050	<0.050	<0.050	----	----	
Polycyclic Aromatic Hydrocarbons Surrogates										
chrysene-d12	1719-03-5	E641A	0.1	%	83.3	88.4	85.2	----	----	
naphthalene-d8	1146-65-2	E641A	0.1	%	91.0	96.0	95.7	----	----	
phenanthrene-d10	1517-22-2	E641A	0.1	%	96.1	99.4	101	----	----	

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B0421	Page	: 1 of 7
Client	: Active Earth Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Marek Downarowicz	Account Manager	: Sneha Sansare
Address	: 160-2250 Boundary Road Burnaby BC Canada V5M 3Z3	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 2315-A	Date Samples Received	: 13-May-2022 09:45
PO	: 2315-A	Issue Date	: 19-May-2022 16:36
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA22-ACT1100-001 (Default Pricing 2022+)		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Chloride in Water by IC											
HDPE MW101-220511	E235.Cl	11-May-2022	----	----	----		14-May-2022	28 days	3 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW102D-220511	E235.Cl	11-May-2022	----	----	----		14-May-2022	28 days	3 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE MW102S-220511	E235.Cl	11-May-2022	----	----	----		14-May-2022	28 days	3 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
HDPE dissolved (nitric acid) MW101-220511	E509	11-May-2022	19-May-2022	28 days	8 days	✓	19-May-2022	20 days	0 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
HDPE dissolved (nitric acid) MW102D-220511	E509	11-May-2022	19-May-2022	28 days	8 days	✓	19-May-2022	20 days	0 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
HDPE dissolved (nitric acid) MW102S-220511	E509	11-May-2022	19-May-2022	28 days	8 days	✓	19-May-2022	20 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW101-220511	E421	11-May-2022	18-May-2022	----	----		18-May-2022	180 days	7 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW102D-220511	E421	11-May-2022	18-May-2022	----	----		18-May-2022	180 days	7 days	✔	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE dissolved (nitric acid) MW102S-220511	E421	11-May-2022	18-May-2022	----	----		18-May-2022	180 days	7 days	✔	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW101-220511	E601A	11-May-2022	18-May-2022	14 days	8 days	✔	19-May-2022	40 days	0 days	✔	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW102D-220511	E601A	11-May-2022	18-May-2022	14 days	8 days	✔	19-May-2022	40 days	0 days	✔	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW102S-220511	E601A	11-May-2022	18-May-2022	14 days	8 days	✔	19-May-2022	40 days	0 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW101-220511	E641A	11-May-2022	18-May-2022	14 days	8 days	✔	18-May-2022	40 days	0 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW102D-220511	E641A	11-May-2022	18-May-2022	14 days	8 days	✔	18-May-2022	40 days	0 days	✔	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW102S-220511	E641A	11-May-2022	18-May-2022	14 days	8 days	✔	18-May-2022	40 days	0 days	✔	

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Chloride in Water by IC	E235.Cl	487723	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	492799	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	491586	1	10	10.0	5.0	✔
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	491969	1	17	5.8	5.0	✔
Chloride in Water by IC	E235.Cl	487723	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	492799	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	491586	1	10	10.0	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	491970	1	13	7.6	5.0	✔
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	491969	1	17	5.8	5.0	✔
Chloride in Water by IC	E235.Cl	487723	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	492799	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	491586	1	10	10.0	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	491970	1	13	7.6	5.0	✔
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	487723	1	16	6.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	492799	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	491586	1	10	10.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chloride in Water by IC	E235.CI Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



QUALITY CONTROL REPORT

Work Order : **VA22B0421**

Client : Active Earth Engineering Ltd.
Contact : Marek Downarowicz
Address : 160-2250 Boundary Road
Burnaby BC Canada V5M 3Z3

Telephone : ----

Project : 2315-A
PO : 2315-A
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 12

Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9

Telephone : +1 604 253 4188
Date Samples Received : 13-May-2022 09:45
Date Analysis Commenced : 14-May-2022
Issue Date : 19-May-2022 16:36

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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Work Order : VA22B0421
Client : Active Earth Engineering Ltd.
Project : 2315-A



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 487723)											
VA22B0399-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	20.7	20.8	0.187%	20%	----
Dissolved Metals (QC Lot: 491586)											
VA22B0293-011	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
Dissolved Metals (QC Lot: 491586) - continued											
VA22B0293-011	Anonymous	thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 492799)											
CG2205881-006	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 487723)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
Dissolved Metals (QCLot: 491586)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 491586) - continued						
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 492799)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Hydrocarbons (QCLot: 491969)						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
Polycyclic Aromatic Hydrocarbons (QCLot: 491970)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	---
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	---
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	---
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	---
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	---
quinoline	91-22-5	E641A	0.05	µg/L	<0.050	---

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Client : Active Earth Engineering Ltd.
Project : 2315-A





Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Anions and Nutrients (QCLot: 487723)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	94.0	90.0	110	----
Dissolved Metals (QCLot: 491586)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	108	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.5	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	98.9	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.4	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.3	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.8	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.9	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.4	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.6	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.8	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.2	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	107	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100.0	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.7	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.9	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.2	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.5	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	104	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.8	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 491586) - continued									
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.5	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.1	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	90.4	80.0	120	----
Hydrocarbons (QCLot: 491969)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	104	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	115	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 491970)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	116	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	112	60.0	130	----
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	104	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	120	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	115	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	111	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	111	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	120	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
quinoline	91-22-5	E641A	0.05	µg/L	0.5 µg/L	120	60.0	130	----

Page : 10 of 12
Work Order : VA22B0421
Client : Active Earth Engineering Ltd.
Project : 2315-A





Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level $\geq 1 \times$ spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 487723)										
VA22B0399-002	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Dissolved Metals (QCLot: 491586)										
VA22B0293-010	Anonymous	aluminum, dissolved	7429-90-5	E421	0.214 mg/L	0.2 mg/L	107	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00920 mg/L	0.01 mg/L	92.0	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.108 mg/L	0.1 mg/L	108	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	0.968 mg/L	1 mg/L	96.8	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.2 mg/L	10 mg/L	102	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.09 mg/L	4 mg/L	102	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.43 mg/L	10 mg/L	94.3	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00435 mg/L	0.004 mg/L	109	70.0	130	----
		sodium, dissolved	7440-23-5	E421	1.91 mg/L	2 mg/L	95.7	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.6 mg/L	20 mg/L	103	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0426 mg/L	0.04 mg/L	106	70.0	130	----



Sub-Matrix: **Water**

					<i>Matrix Spike (MS) Report</i>					
					<i>Spike</i>		<i>Recovery (%)</i>	<i>Recovery Limits (%)</i>		
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>Concentration</i>	<i>Target</i>	<i>MS</i>	<i>Low</i>	<i>High</i>	<i>Qualifier</i>
Dissolved Metals (QCLot: 491586) - continued										
VA22B0293-010	Anonymous	thallium, dissolved	7440-28-0	E421	0.00382 mg/L	0.004 mg/L	95.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0218 mg/L	0.02 mg/L	109	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00410 mg/L	0.004 mg/L	102	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.427 mg/L	0.4 mg/L	107	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0426 mg/L	0.04 mg/L	106	70.0	130	----
Dissolved Metals (QCLot: 492799)										
FJ2201184-003	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000868 mg/L	0.0001 mg/L	86.8	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 -

Page of

Report To Contact and company name below will appear on the final report		Reports / Recipients		Turnaround Time (TAT) Requested		AFFIX ALS BARCODE LABEL HERE (ALS use only)									
Company:	Active Earth Engineering Ltd.	Select Report Format:	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)	<input checked="" type="checkbox"/> Routine [R] if received by 3pm M-F - no surcharges apply											
Contact:		Merge QC/QCI Reports with COA	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	<input type="checkbox"/> 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum											
Phone:	(778) 752-2222	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		<input type="checkbox"/> 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum											
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	<input type="checkbox"/> 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum											
Street:	304 - 2800 Gladys Avenue	Email 1 or Fax:	labreports@activeearth.ca	<input type="checkbox"/> 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum											
City/Province:	Abbotsford, BC	Email 2:	thomas.boerman@activeearth.ca	<input type="checkbox"/> Same day [E2] if received by 10am M-S - 200% rush surcharge.											
Postal Code:	V2S 0E9	Email 3:	march@activeearth.ca	Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.											
Invoice To:	Same as Report To <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Invoice Recipients		Date and Time Required for all E&P TATs:		dd-mmm-yy hh:mm am/pm									
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX	For all tests with rush TATs requested, please contact your AM to confirm availability.											
Company:	Active Earth Engineering Ltd.	Email 1 or Fax:	ap@activeearth.ca	Analysis Request											
Contact:	Angie Steidle	Email 2:		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below											
Project Information		Oil and Gas Required Fields (client use)		NUMBER OF CONTAINER							SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)		
ALS Account # / Quote #:	VA22-ACT1100-001	AFE/Cost Center:	N/A		PO#:	N/A									
Job #:	2315-A	Major/Minor Code:	N/A		Routing Code:	N/A									
PO / AFE:	(same as Job #)	Requisitioner:	N/A		Location:	N/A									
ALS Lab Work Order # (ALS use only):		ALS Contact:	Sneha Sansare	Sampler:											
ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type											
	MW101-220511	11-05-22		water	4	X	X	X							
	MW102D-220511				4										
	MW102S-220511				4										
Drinking Water (DW) Samples¹ (client use)		Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)			SAMPLE RECEIPT DETAILS (ALS use only)										
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input checked="" type="checkbox"/> ICE PACKS <input type="checkbox"/> FROZEN <input type="checkbox"/> COOLING INITIATED										
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input type="checkbox"/> NO										
					Cooler Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A Sample Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A										
					INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C						
									82						
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (ALS use only)				FINAL SHIPMENT RECEPTION (ALS use only)							
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:				
CB	22/05/12						May 13/12	9:45							

Environmental Division
Vancouver
Work Order Reference
VA22B0421

Telephone: +1 604 253 4188

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
WHITE - LABORATORY COPY YELLOW - CLIENT COPY
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.
FEB 2012 FRONT



SAMPLE SUBMISSION CHECKLIST

Project Number	Samples Collected By	Submitted By	Submission Date
2315-A	TB	TB	2022/05/12

Type of Sample			
<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water	<input type="checkbox"/> Vapour	<input type="checkbox"/> Other:

- All containers labelled with Sample ID and listed on the COC in numerical order.
- Y or ~~N/A~~ Blind field duplicate samples collected, submitted, and included on the COC.
- Sample IDs on COCs exactly match sample IDs on containers.
- Container count on COCs matches container count in cooler.
- Turnaround time selected and results date specified.
- ~~N/A~~ Different media submitted separately (soil, vapour, water, etc. on separate COCs).
- ~~N/A~~ Samples from parcels/areas with different property owners are on separate COCs.
- Sufficient ice and/or freezer packs included. Ice is not loose.
- Cooler contains samples for one project only.
- COCs in cooler, in ziplock bag along with this form.
- ~~Y/N~~ Methanol vials include an Excepted Quantities Label on the outside of the cooler.
- Analysis selected on COC or To be emailed by (name): _____

DELIVERY METHOD:

- Direct to laboratory by Active Earth staff
- Courier from Active Earth office (seal coolers with packing tape)
- Courier from Site
- Harbour Air / courier combination (seal coolers with packing tape)
- Other:

ADDITIONAL COMMENTS:

Signature:  Date: 2022/05/12

CERTIFICATE OF ANALYSIS

Work Order : VA22B1894 Amendment : 1 Client : Active Earth Engineering Ltd. Contact : Thomas Boerman Address : 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9 Telephone : ---- Project : 2315-A PO : 2315-A C-O-C number : ---- Sampler : ---- Site : ---- Quote number : VA22-ACT1100-001 (Default Pricing 2022+) No. of samples received : 7 No. of samples analysed : 7	Page : 1 of 8 Laboratory : Vancouver - Environmental Account Manager : Sneha Sansare Address : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9 Telephone : +1 604 253 4188 Date Samples Received : 30-May-2022 08:30 Date Analysis Commenced : 01-Jun-2022 Issue Date : 06-Jun-2022 12:58
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistor	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW101-220526	MW102S-220526	MW102D-220526	MW104S-220526	MW104D-220526
					6	6	6	6	6
Client sampling date / time					26-May-2022	26-May-2022	26-May-2022	26-May-2022	26-May-2022
Analyte	CAS Number	Method	LOR	Unit	VA22B1894-001	VA22B1894-002	VA22B1894-003	VA22B1894-004	VA22B1894-005
					Result	Result	Result	Result	Result
Physical Tests									
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	----	----	----	171	151
pH	----	E108	0.10	pH units	8.12	7.71	7.87	8.00	8.01
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0115	0.0843	0.0192	0.0117
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0298	<0.0250 ^{DLDS}	<0.0250 ^{DLDS}	<0.0050	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0050 ^{DLDS}	<0.0050 ^{DLDS}	<0.0010	<0.0010
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.037	0.076	0.304	0.096	0.069
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	----	----	----	5.3	5.4
antimony, dissolved	7440-36-0	E421	0.10	µg/L	----	----	----	0.32	0.25
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	----	----	----	2.86	3.41
barium, dissolved	7440-39-3	E421	0.10	µg/L	----	----	----	50.1	37.0
beryllium, dissolved	7440-41-7	E421	0.020	µg/L	----	----	----	<0.020	<0.020
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	----	----	----	<0.050	<0.050
boron, dissolved	7440-42-8	E421	10	µg/L	----	----	----	34	100
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	----	----	----	0.0109	0.0085
cesium, dissolved	7440-46-2	E421	0.010	µg/L	----	----	----	0.062	<0.010
chromium, dissolved	7440-47-3	E421	0.50	µg/L	----	----	----	<0.50	<0.50
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	----	----	----	0.21	0.14
copper, dissolved	7440-50-8	E421	0.20	µg/L	----	----	----	3.18	1.83
iron, dissolved	7439-89-6	E421	10	µg/L	----	----	----	<10	13
lead, dissolved	7439-92-1	E421	0.050	µg/L	----	----	----	0.053	0.070
lithium, dissolved	7439-93-2	E421	1.0	µg/L	----	----	----	3.7	8.7
manganese, dissolved	7439-96-5	E421	0.10	µg/L	----	----	----	92.8	32.8
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	----	----	----	12.0	5.70
nickel, dissolved	7440-02-0	E421	0.50	µg/L	----	----	----	0.53	<0.50
phosphorus, dissolved	7723-14-0	E421	50	µg/L	----	----	----	<50	<50
potassium, dissolved	7440-09-7	E421	50	µg/L	----	----	----	10700	1650
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	----	----	----	34.0	1.67
selenium, dissolved	7782-49-2	E421	0.050	µg/L	----	----	----	0.076	0.168
silicon, dissolved	7440-21-3	E421	50	µg/L	----	----	----	5200	7950



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW101-220526	MW102S-22052 6	MW102D-22052 6	MW104S-22052 6	MW104D-22052 6
Client sampling date / time					26-May-2022	26-May-2022	26-May-2022	26-May-2022	26-May-2022	
Analyte	CAS Number	Method	LOR	Unit	VA22B1894-001	VA22B1894-002	VA22B1894-003	VA22B1894-004	VA22B1894-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
silver, dissolved	7440-22-4	E421	0.010	µg/L	---	---	---	<0.010	<0.010	
sodium, dissolved	7440-23-5	E421	50	µg/L	---	---	---	11700	16000	
strontium, dissolved	7440-24-6	E421	0.20	µg/L	---	---	---	494	1770	
sulfur, dissolved	7704-34-9	E421	500	µg/L	---	---	---	16200	12300	
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	---	---	---	<0.20	<0.20	
thallium, dissolved	7440-28-0	E421	0.010	µg/L	---	---	---	0.031	0.011	
thorium, dissolved	7440-29-1	E421	0.10	µg/L	---	---	---	<0.10	<0.10	
tin, dissolved	7440-31-5	E421	0.10	µg/L	---	---	---	0.24	<0.10	
titanium, dissolved	7440-32-6	E421	0.30	µg/L	---	---	---	<0.30	<0.30	
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	---	---	---	<0.10	0.57	
uranium, dissolved	7440-61-1	E421	0.010	µg/L	---	---	---	3.20	4.41	
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	---	---	---	<0.50	<0.50	
zinc, dissolved	7440-66-6	E421	1.0	µg/L	---	---	---	3.5	3.7	
zirconium, dissolved	7440-67-7	E421	0.30	µg/L	---	---	---	<0.30	<0.30	
calcium, dissolved	7440-70-2	E421	50	µg/L	---	---	---	58400	50900	
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	---	---	---	6150	5880	
dissolved metals filtration location	---	EP421	-	-	---	---	---	Field	Field	
Hydrocarbons										
EPH (C10-C19)	---	E601A	250	µg/L	---	---	---	<250	<250	
EPH (C19-C32)	---	E601A	250	µg/L	---	---	---	<250	<250	
HEPHw	---	EC600A	250	µg/L	---	---	---	<250	<250	
LEPHw	---	EC600A	250	µg/L	---	---	---	<250	<250	
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	---	---	---	91.6	85.3	
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L	---	---	---	<0.010	<0.010	
acenaphthylene	208-96-8	E641A	0.010	µg/L	---	---	---	<0.010	<0.010	
acridine	260-94-6	E641A	0.010	µg/L	---	---	---	<0.010	<0.010	
anthracene	120-12-7	E641A	0.010	µg/L	---	---	---	<0.010	<0.010	
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	---	---	---	<0.010	<0.010	
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	---	---	---	<0.0050	<0.0050	
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L	---	---	---	<0.010	<0.010	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW101-220526	MW102S-220526	MW102D-220526	MW104S-220526	MW104D-220526
							6	6	6	6
Client sampling date / time					26-May-2022	26-May-2022	26-May-2022	26-May-2022	26-May-2022	26-May-2022
Analyte	CAS Number	Method	LOR	Unit	VA22B1894-001	VA22B1894-002	VA22B1894-003	VA22B1894-004	VA22B1894-005	
					Result	Result	Result	Result	Result	
Polycyclic Aromatic Hydrocarbons										
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L	----	----	----	<0.015	<0.015	
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
chrysene	218-01-9	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	----	----	----	<0.0050	<0.0050	
fluoranthene	206-44-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
fluorene	86-73-7	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
naphthalene	91-20-3	E641A	0.050	µg/L	----	----	----	<0.050	<0.050	
phenanthrene	85-01-8	E641A	0.020	µg/L	----	----	----	<0.020	<0.020	
pyrene	129-00-0	E641A	0.010	µg/L	----	----	----	<0.010	<0.010	
quinoline	91-22-5	E641A	0.050	µg/L	----	----	----	<0.050	<0.050	
Polycyclic Aromatic Hydrocarbons Surrogates										
chrysene-d12	1719-03-5	E641A	0.1	%	----	----	----	98.6	82.0	
naphthalene-d8	1146-65-2	E641A	0.1	%	----	----	----	104	85.8	
phenanthrene-d10	1517-22-2	E641A	0.1	%	----	----	----	116	92.3	

Please refer to the General Comments section for an explanation of any qualifiers detected.



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW105-220527	MW106-220527	----	----	----
Client sampling date / time					27-May-2022	27-May-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B1894-006	VA22B1894-007	-----	-----	-----
					Result	Result	---	---	---
Physical Tests									
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	263	90.9	----	----	----
pH	----	E108	0.10	pH units	7.96	7.98	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0585	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	----	10.6	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	5.35	2.22	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0229	0.221	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	4.96	2.37	----	----	----
Dissolved Metals									
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	7.7	12.4	----	----	----
antimony, dissolved	7440-36-0	E421	0.10	µg/L	1.89	0.72	----	----	----
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	3.00	0.44	----	----	----
barium, dissolved	7440-39-3	E421	0.10	µg/L	52.4	21.0	----	----	----
beryllium, dissolved	7440-41-7	E421	0.020	µg/L	<0.020	<0.020	----	----	----
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	----	----	----
boron, dissolved	7440-42-8	E421	10	µg/L	38	107	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	<0.0250 ^{DLM}	<0.0100 ^{DLM}	----	----	----
cesium, dissolved	7440-46-2	E421	0.010	µg/L	<0.010	0.026	----	----	----
chromium, dissolved	7440-47-3	E421	0.50	µg/L	<0.50	<0.50	----	----	----
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	0.49	0.30	----	----	----
copper, dissolved	7440-50-8	E421	0.20	µg/L	3.12	4.67	----	----	----
iron, dissolved	7439-89-6	E421	10	µg/L	<10	11	----	----	----
lead, dissolved	7439-92-1	E421	0.050	µg/L	0.088	0.092	----	----	----
lithium, dissolved	7439-93-2	E421	1.0	µg/L	3.3	8.8	----	----	----
manganese, dissolved	7439-96-5	E421	0.10	µg/L	48.2	86.4	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	35.2	23.4	----	----	----
nickel, dissolved	7440-02-0	E421	0.50	µg/L	1.93	1.83	----	----	----
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----
potassium, dissolved	7440-09-7	E421	50	µg/L	2360	1840	----	----	----
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	1.03	1.48	----	----	----
selenium, dissolved	7782-49-2	E421	0.050	µg/L	2.43	0.571	----	----	----
silicon, dissolved	7440-21-3	E421	50	µg/L	5990	4550	----	----	----



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW105-220527	MW106-220527	----	----	----
Client sampling date / time					27-May-2022	27-May-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B1894-006	VA22B1894-007	-----	-----	-----
					Result	Result	----	----	----
Dissolved Metals									
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	----	----	----
sodium, dissolved	7440-23-5	E421	50	µg/L	28600	22300	----	----	----
strontium, dissolved	7440-24-6	E421	0.20	µg/L	327	382	----	----	----
sulfur, dissolved	7704-34-9	E421	500	µg/L	39900	13000	----	----	----
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	----	----	----
thallium, dissolved	7440-28-0	E421	0.010	µg/L	0.019	0.013	----	----	----
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	----	----	----
tin, dissolved	7440-31-5	E421	0.10	µg/L	0.49	1.06	----	----	----
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	----	----	----
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	<0.10	0.26	----	----	----
uranium, dissolved	7440-61-1	E421	0.010	µg/L	11.6	1.47	----	----	----
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	<0.50	<0.50	----	----	----
zinc, dissolved	7440-66-6	E421	1.0	µg/L	2.2	23.8	----	----	----
zirconium, dissolved	7440-67-7	E421	0.30	µg/L	<0.30	<0.30	----	----	----
calcium, dissolved	7440-70-2	E421	50	µg/L	82800	30400	----	----	----
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	13600	3640	----	----	----
dissolved metals filtration location	----	EP421	-	-	Field	Field	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	----	----
HEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A	250	µg/L	<250	<250	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	90.8	91.1	----	----	----
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L	<0.010	<0.010	----	----	----



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					MW105-220527	MW106-220527	----	----	----
Client sampling date / time					27-May-2022	27-May-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B1894-006	VA22B1894-007	-----	-----	-----
					Result	Result	---	---	---
Polycyclic Aromatic Hydrocarbons									
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	<0.020	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
quinoline	91-22-5	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
chrysene-d12	1719-03-5	E641A	0.1	%	95.5	97.7	----	----	----
naphthalene-d8	1146-65-2	E641A	0.1	%	108	101	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.1	%	113	112	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B1894	Page	: 1 of 11
Amendment	: 1		
Client	: Active Earth Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Thomas Boerman	Account Manager	: Sneha Sansare
Address	: 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 2315-A	Date Samples Received	: 30-May-2022 08:30
PO	: 2315-A	Issue Date	: 06-Jun-2022 12:58
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA22-ACT1100-001 (Default Pricing 2022+)		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW105-220527	E298	27-May-2022	02-Jun-2022	3 days	6 days	* EHTL	02-Jun-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW106-220527	E298	27-May-2022	02-Jun-2022	3 days	6 days	* EHTL	02-Jun-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW101-220526	E298	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	02-Jun-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW102D-220526	E298	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	02-Jun-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW102S-220526	E298	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	02-Jun-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW104D-220526	E298	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	02-Jun-2022	28 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) MW104S-220526	E298	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	02-Jun-2022	28 days	0 days	✓



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Chloride in Water by IC										
HDPE MW106-220527	E235.Cl	27-May-2022	----	----	----		02-Jun-2022	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW105-220527	E235.NO3-L	27-May-2022	----	----	----		02-Jun-2022	3 days	6 days	* EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW106-220527	E235.NO3-L	27-May-2022	----	----	----		02-Jun-2022	3 days	6 days	* EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW101-220526	E235.NO3-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	* EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW102D-220526	E235.NO3-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	* EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW102S-220526	E235.NO3-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	* EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW104D-220526	E235.NO3-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	* EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE MW104S-220526	E235.NO3-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	* EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE MW105-220527	E235.NO2-L	27-May-2022	----	----	----		02-Jun-2022	3 days	6 days	* EHTL



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW106-220527	E235.NO2-L	27-May-2022	----	----	----		02-Jun-2022	3 days	6 days	*	EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW101-220526	E235.NO2-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	*	EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW102D-220526	E235.NO2-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	*	EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW102S-220526	E235.NO2-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	*	EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW104D-220526	E235.NO2-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	*	EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE MW104S-220526	E235.NO2-L	26-May-2022	----	----	----		02-Jun-2022	3 days	7 days	*	EHTR
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW105-220527	E366	27-May-2022	02-Jun-2022	3 days	6 days	*	03-Jun-2022	28 days	1 days	✓	EHTL
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW106-220527	E366	27-May-2022	02-Jun-2022	3 days	6 days	*	03-Jun-2022	28 days	1 days	✓	EHTL
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW101-220526	E366	26-May-2022	02-Jun-2022	3 days	7 days	*	03-Jun-2022	28 days	1 days	✓	EHTR



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW102D-220526	E366	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	03-Jun-2022	28 days	1 days	✓	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW102S-220526	E366	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	03-Jun-2022	28 days	1 days	✓	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW104D-220526	E366	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	03-Jun-2022	28 days	1 days	✓	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) MW104S-220526	E366	26-May-2022	02-Jun-2022	3 days	7 days	* EHTR	03-Jun-2022	28 days	1 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) MW105-220527	E421	27-May-2022	01-Jun-2022	----	----		01-Jun-2022	180 days	6 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) MW106-220527	E421	27-May-2022	01-Jun-2022	----	----		01-Jun-2022	180 days	6 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) MW104D-220526	E421	26-May-2022	01-Jun-2022	----	----		02-Jun-2022	180 days	8 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) MW104S-220526	E421	26-May-2022	01-Jun-2022	----	----		02-Jun-2022	180 days	8 days	✓	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW105-220527	E601A	27-May-2022	02-Jun-2022	14 days	7 days	✓	03-Jun-2022	40 days	1 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW106-220527	E601A	27-May-2022	02-Jun-2022	14 days	7 days	✓	03-Jun-2022	40 days	1 days	✓	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW104D-220526	E601A	26-May-2022	02-Jun-2022	14 days	8 days	✓	03-Jun-2022	40 days	1 days	✓	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) MW104S-220526	E601A	26-May-2022	02-Jun-2022	14 days	8 days	✓	03-Jun-2022	40 days	1 days	✓	
Physical Tests : pH by Meter											
HDPE MW105-220527	E108	27-May-2022	----	----	----		02-Jun-2022	0.25 hrs	150 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW106-220527	E108	27-May-2022	----	----	----		02-Jun-2022	0.25 hrs	150 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW101-220526	E108	26-May-2022	----	----	----		02-Jun-2022	0.25 hrs	174 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW102D-220526	E108	26-May-2022	----	----	----		02-Jun-2022	0.25 hrs	174 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW102S-220526	E108	26-May-2022	----	----	----		02-Jun-2022	0.25 hrs	174 hrs	* EHTR-FM	
Physical Tests : pH by Meter											
HDPE MW104D-220526	E108	26-May-2022	----	----	----		02-Jun-2022	0.25 hrs	174 hrs	* EHTR-FM	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Physical Tests : pH by Meter											
HDPE MW104S-220526	E108	26-May-2022	----	----	----		02-Jun-2022	0.25 hrs	174 hrs	*	EHTR-FM
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW105-220527	E641A	27-May-2022	02-Jun-2022	14 days	7 days	✓	03-Jun-2022	40 days	1 days	✓	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW106-220527	E641A	27-May-2022	02-Jun-2022	14 days	7 days	✓	03-Jun-2022	40 days	1 days	✓	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW104D-220526	E641A	26-May-2022	02-Jun-2022	14 days	8 days	✓	03-Jun-2022	40 days	1 days	✓	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS											
Amber glass/Teflon lined cap (sodium bisulfate) MW104S-220526	E641A	26-May-2022	02-Jun-2022	14 days	8 days	✓	03-Jun-2022	40 days	1 days	✓	

Legend & Qualifier Definitions

- EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended
- EHTR: Exceeded ALS recommended hold time prior to sample receipt.
- EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
- Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: * = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	508247	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	507954	1	2	50.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	506291	2	30	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	507951	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	507952	1	8	12.5	5.0	✓
pH by Meter	E108	507948	1	14	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	508248	1	11	9.0	5.0	✓
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	508247	1	18	5.5	5.0	✓
BC PHCs - EPH by GC-FID	E601A	509204	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	507954	1	2	50.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	506291	2	30	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	507951	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	507952	1	8	12.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	509205	1	16	6.2	5.0	✓
pH by Meter	E108	507948	1	14	7.1	5.0	✓
Total Nitrogen by Colourimetry	E366	508248	1	11	9.0	5.0	✓
Method Blanks (MB)							
Ammonia by Fluorescence	E298	508247	1	18	5.5	5.0	✓
BC PHCs - EPH by GC-FID	E601A	509204	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	507954	1	2	50.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	506291	2	30	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	507951	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	507952	1	8	12.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	509205	1	16	6.2	5.0	✓
Total Nitrogen by Colourimetry	E366	508248	1	11	9.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	508247	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	507954	1	2	50.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	506291	2	30	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	507951	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	507952	1	8	12.5	5.0	✓
Total Nitrogen by Colourimetry	E366	508248	1	11	9.0	5.0	✓



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



QUALITY CONTROL REPORT

Work Order : VA22B1894

Page : 1 of 16

Amendment : 1

Client : Active Earth Engineering Ltd.
Contact : Thomas Boerman
Address : 304-2600 Gladys Avenue
Abbotsford BC Canada V2S 0E9
Telephone : ----
Project : 2315-A
PO : 2315-A
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 7
No. of samples analysed : 7

Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 30-May-2022 08:30
Date Analysis Commenced : 01-Jun-2022
Issue Date : 06-Jun-2022 12:58

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
● Matrix Spike (MS) Report; Recovery and Data Quality Objectives
● Method Blank (MB) Report; Recovery and Data Quality Objectives
● Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Kevin Duarte, Kim Jensen, Kyle Chang, Lindsay Gung, and Ophelia Chiu.

Page : 2 of 16
Work Order : VA22B1894 Amendment 1
Client : Active Earth Engineering Ltd.
Project : 2315-A



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 507948)											
VA22B1934-001	Anonymous	pH	----	E108	0.10	pH units	9.26	9.23	0.292%	4%	----
Anions and Nutrients (QC Lot: 507951)											
VA22B1934-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<5.0 µg/L	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 507952)											
VA22B1934-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 507954)											
VA22B1934-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	13400 µg/L	13.6	0.948%	20%	----
Anions and Nutrients (QC Lot: 508247)											
FJ2201384-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0050	0.0051	0.00007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 508248)											
FJ2201384-001	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.666	0.688	3.27%	20%	----
Dissolved Metals (QC Lot: 506291)											
VA22B1601-009	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0020	mg/L	6.7 µg/L	0.0074	0.0007	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00020	mg/L	12.0 µg/L	0.0122	1.59%	20%	----
		barium, dissolved	7440-39-3	E421	0.00020	mg/L	756 µg/L	0.738	2.40%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.020	mg/L	1290 µg/L	1.28	0.752%	20%	----
		cadmium, dissolved	7440-43-9	E421	0.0000100	mg/L	<0.0100 µg/L	<0.0000100	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.100	mg/L	135000 µg/L	132	2.02%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000020	mg/L	0.234 µg/L	0.000229	2.51%	20%	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.74 µg/L	0.00075	0.00001	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00020	mg/L	1.70 µg/L	0.00168	0.00002	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00040	mg/L	<0.40 µg/L	<0.00040	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.020	mg/L	22000 µg/L	21.6	1.67%	20%	----
		lead, dissolved	7439-92-1	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0020	mg/L	<2.0 µg/L	<0.0020	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	26300 µg/L	26.2	0.390%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00020	mg/L	6950 µg/L	6.89	0.871%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000100	mg/L	1.29 µg/L	0.00126	2.05%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 506291) - continued											
VA22B1601-009	Anonymous	nickel, dissolved	7440-02-0	E421	0.00100	mg/L	6.60 µg/L	0.00642	0.00018	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.100	mg/L	<100 µg/L	<0.100	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	55700 µg/L	55.1	1.16%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00040	mg/L	39.4 µg/L	0.0381	3.31%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000100	mg/L	0.145 µg/L	0.000173	0.000027	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.100	mg/L	9580 µg/L	9.80	2.19%	20%	----
		silver, dissolved	7440-22-4	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.100	mg/L	114000 µg/L	112	1.97%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00040	mg/L	1140 µg/L	1.11	2.78%	20%	----
		sulfur, dissolved	7704-34-9	E421	1.00	mg/L	4300 µg/L	4.42	0.12	Diff <2x LOR	----
		tellurium, dissolved	13494-80-9	E421	0.00040	mg/L	<0.40 µg/L	<0.00040	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00020	mg/L	0.23 µg/L	0.00024	0.000007	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00060	mg/L	<0.60 µg/L	<0.00060	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000020	mg/L	0.988 µg/L	0.000979	0.930%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00100	mg/L	1.07 µg/L	0.00108	0.00001	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0020	mg/L	<2.0 µg/L	<0.0020	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00040	mg/L	<0.40 µg/L	<0.00040	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 506293)											
VA22B1894-006	MW105-220527	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	7.7 µg/L	0.0078	0.00009	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	1.89 µg/L	0.00196	3.69%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	3.00 µg/L	0.00295	1.76%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	52.4 µg/L	0.0532	1.47%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	38 µg/L	0.037	0.0004	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000250	mg/L	<0.0250 µg/L	<0.0000250	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	82800 µg/L	80.8	2.45%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.49 µg/L	0.00047	0.00002	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	3.12 µg/L	0.00303	2.83%	20%	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 506293) - continued											
VA22B1894-006	MW105-220527	lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.088 µg/L	0.000081	0.000007	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	3.3 µg/L	0.0032	0.00007	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13600 µg/L	13.2	3.22%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	48.2 µg/L	0.0474	1.78%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	35.2 µg/L	0.0365	3.42%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	1.93 µg/L	0.00188	0.00005	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	2360 µg/L	2.29	3.09%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	1.03 µg/L	0.00100	0.00003	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	2.43 µg/L	0.00255	5.12%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	5990 µg/L	6.20	3.42%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	28600 µg/L	28.1	1.70%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	327 µg/L	0.344	5.26%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	39900 µg/L	41.2	3.24%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.019 µg/L	0.000020	0.000001	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.49 µg/L	0.00047	0.00002	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	11.6 µg/L	0.0118	1.75%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	2.2 µg/L	0.0021	0.00007	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 507951)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 507952)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 507954)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 508247)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 508248)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Dissolved Metals (QCLot: 506291)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 506291) - continued						
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 506293)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	---
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	---
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	---
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	---
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	---
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	---
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 506293) - continued						
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	---
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	---
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	---
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	---
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Hydrocarbons (QCLot: 509204)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	---
EPH (C19-C32)	----	E601A	250	µg/L	<250	---
Polycyclic Aromatic Hydrocarbons (QCLot: 509205)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Polycyclic Aromatic Hydrocarbons (QCLot: 509205) - continued						
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	91-22-5	E641A	0.05	µg/L	<0.050	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water					Laboratory Control Sample (LCS) Report				
					Spike Concentration	Recovery (%)	Recovery Limits (%)		Qualifier
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 507948)									
pH	----	E108	----	pH units	7 pH units	99.5	98.0	102	----
Anions and Nutrients (QCLot: 507951)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 507952)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 507954)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 508247)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.9	85.0	115	----
Anions and Nutrients (QCLot: 508248)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	100	75.0	125	----
Dissolved Metals (QCLot: 506291)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	94.8	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.1	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.0	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.0	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.4	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	101	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	94.0	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.2	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	97.6	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	94.9	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	94.4	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.6	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.8	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.7	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.3	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	95.8	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	95.4	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.8	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.2	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 506291) - continued									
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	96.9	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	96.2	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	97.4	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.6	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.3	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	98.1	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	97.6	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	84.5	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.6	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	96.1	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.2	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.1	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	95.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	93.6	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.1	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.2	80.0	120	----
Dissolved Metals (QCLot: 506293)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.6	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.8	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.2	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.6	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	95.2	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.8	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.4	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.5	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.2	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.8	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.0	80.0	120	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Dissolved Metals (QCLot: 506293) - continued									
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.7	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	95.6	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	94.6	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	104	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.1	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	97.4	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	94.7	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.2	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	99.8	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.4	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.2	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
Hydrocarbons (QCLot: 509204)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	107	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	118	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 509205)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	109	60.0	130	----
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5 µg/L	114	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	93.2	60.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 509205) - continued									
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	104	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	105	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	110	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
quinoline	91-22-5	E641A	0.05	µg/L	0.5 µg/L	125	60.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 507951)										
VA22B1934-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.76 mg/L	2.5 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 507952)										
VA22B1934-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.544 mg/L	0.5 mg/L	109	75.0	125	----
Anions and Nutrients (QCLot: 507954)										
VA22B1934-001	Anonymous	chloride	16887-00-6	E235.Cl	109 mg/L	100 mg/L	109	75.0	125	----
Anions and Nutrients (QCLot: 508247)										
KS2201878-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 508248)										
KS2201878-001	Anonymous	nitrogen, total	7727-37-9	E366	0.383 mg/L	0.4 mg/L	95.6	70.0	130	----
Dissolved Metals (QCLot: 506291)										
VA22B1601-010	Anonymous	aluminum, dissolved	7429-90-5	E421	0.191 mg/L	0.2 mg/L	95.3	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0376 mg/L	0.04 mg/L	93.9	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00863 mg/L	0.01 mg/L	86.3	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00359 mg/L	0.004 mg/L	89.7	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.00950 mg/L	0.01 mg/L	95.0	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0373 mg/L	0.04 mg/L	93.3	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0182 mg/L	0.02 mg/L	91.2	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0181 mg/L	0.02 mg/L	90.6	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.83 mg/L	2 mg/L	91.7	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0174 mg/L	0.02 mg/L	87.3	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0924 mg/L	0.1 mg/L	92.4	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0358 mg/L	0.04 mg/L	89.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.44 mg/L	10 mg/L	94.4	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 506291) - continued										
VA22B1601-010	Anonymous	potassium, dissolved	7440-09-7	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0183 mg/L	0.02 mg/L	91.4	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.72 mg/L	10 mg/L	97.2	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00347 mg/L	0.004 mg/L	86.8	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.6 mg/L	20 mg/L	103	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00354 mg/L	0.004 mg/L	88.4	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00356 mg/L	0.004 mg/L	88.9	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0950 mg/L	0.1 mg/L	95.0	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.379 mg/L	0.4 mg/L	94.8	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 506293)										
VA22B1894-007	MW106-220527	aluminum, dissolved	7429-90-5	E421	0.192 mg/L	0.2 mg/L	95.8	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0209 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0380 mg/L	0.04 mg/L	94.9	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00954 mg/L	0.01 mg/L	95.4	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00388 mg/L	0.004 mg/L	97.1	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.7	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0929 mg/L	0.1 mg/L	92.9	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 506293) - continued										
VA22B1894-007	MW106-220527	manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.92 mg/L	10 mg/L	99.2	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.82 mg/L	4 mg/L	95.6	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0429 mg/L	0.04 mg/L	107	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.40 mg/L	10 mg/L	94.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00406 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	19.1 mg/L	20 mg/L	95.6	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00387 mg/L	0.004 mg/L	96.7	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0977 mg/L	0.1 mg/L	97.7	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.394 mg/L	0.4 mg/L	98.5	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0416 mg/L	0.04 mg/L	104	70.0	130	----



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 -

Page of

Contact and company name below will appear on the final report

Report To: Active Earth Engineering Ltd.
 Company: (778) 752-2222
 Phone: Company address below will appear on the final report

Street: 304 - 2600 Gladys Avenue
 City/Province: Abbotsford, BC
 Postal Code: V2S 0E9

Invoice To: Same as Report To
 Company: Copy of Invoice with Report
 Contact: Active Earth Engineering Ltd

ALS Account # / Quote #: VA22-ACT1100-001
 Job #: 2315-A
 PO / A/E: (same as Job #)
 LSD: N/A

ALS Lab Work Order # (ALS use only): 1894

Sample Identification and/or Coordinates (ALS use only):
 (This description will appear on the report)

Sample # ALS Sample #
 1 MW101-280526
 2 MW102S-220526
 3 MW102D-220526
 4 MW104S-220526
 5 MW104D-220526
 6 MW105-220527
 7 MW106-220527

Date (dd-mm-yy)
 26-05-22
 26-05-22
 27-05-22
 27-05-22
 27-05-22

Time (hh:mm)
 11:00
 11:00
 11:00
 11:00
 11:00

Sample Type
 WSKR
 WSKR
 WSKR
 WSKR
 WSKR
 WSKR

ALS Contact: Sneha Sansare
 Email 1 or Fax: ap@actveearth.ca
 Email 2: marrek@actveearth.ca

Oil and Gas Required Fields (client use)
 AFE/Cost Center: N/A
 Major/Minor Code: N/A
 Requisitioner: N/A
 Location: N/A

Reports / Recipients
 Select Report Format: PDF EXCEL EDD (DIGITAL)
 Merge QC/QCI Reports with COA YES NO N/A
 Compare Results to Criteria on Report - provide details below if box checked
 Select Distribution: EMAIL MAIL FAX

Turnaround Time (TAT) Requested
 Routine [R] if received by 3pm M-F - no surcharges apply
 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
 1 day [E1] if received by 3pm M-F - 100% rush surcharge minimum
 Same day [E2] if received by 10am M-S - 200% rush surcharge

Shipping Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED
 Submission Comments identified on Sample Receipt Notification: YES NO
 Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A
 INITIAL COOLER TEMPERATURES °C: 12.0
 FINAL COOLER TEMPERATURES °C: 12.0

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	ALS Contact	ALS use only
1	MW101-280526	26-05-22	11:00	WSKR	Sneha Sansare	1894
2	MW102S-220526	26-05-22	11:00	WSKR	Sneha Sansare	1894
3	MW102D-220526	27-05-22	11:00	WSKR	Sneha Sansare	1894
4	MW104S-220526	27-05-22	11:00	WSKR	Sneha Sansare	1894
5	MW104D-220526	27-05-22	11:00	WSKR	Sneha Sansare	1894
6	MW105-220527	27-05-22	11:00	WSKR	Sneha Sansare	1894
7	MW106-220527	27-05-22	11:00	WSKR	Sneha Sansare	1894

NUMBER OF CONTAINER
 N/NH3/NO2/NO3
 L/M/PAHs
 diss. metals

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.
 Date and Time Required for all EAP TATs:
 For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request
 Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

Environmental Division
 Vancouver
 Work Order Reference
 VA22B1894
 Telephone: +1 604 263 4188

AFIX ALS BARCODE LABEL HERE (ALS use only)

ES ON HOLD
 ED STORAGE REQUIRED
 SUSPECTED HAZARD (see notes)

Shipping Method: NONE ICE ICE PACKS FROZEN COOLING INITIATED
 Submission Comments identified on Sample Receipt Notification: YES NO
 Cooler Custody Seals Intact: YES N/A Sample Custody Seals Intact: YES N/A
 INITIAL COOLER TEMPERATURES °C: 12.0
 FINAL COOLER TEMPERATURES °C: 12.0



SAMPLE SUBMISSION CHECKLIST

Project Number	Samples Collected By	Submitted By	Submission Date
2315-A	TB	TB	27/05/22

Type of Sample			
<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water	<input type="checkbox"/> Vapour	<input type="checkbox"/> Other:

- All containers labelled with Sample ID and listed on the COC in numerical order.
- Blind field duplicate samples collected, submitted, and included on the COC.
- Sample IDs on COCs exactly match sample IDs on containers.
- Container count on COCs matches container count in cooler.
- Turnaround time selected and results date specified.
- Different media submitted separately (soil, vapour, water, etc. on separate COCs).
- Samples from parcels/areas with different property owners are on separate COCs.
- Sufficient ice and/or freezer packs included. Ice is not loose.
- Cooler contains samples for one project only.
- COCs in cooler, in ziplock bag along with this form.
- Methanol vials include an Excepted Quantities Label on the outside of the cooler.

Analysis selected on COC or To be emailed by (name): _____

DELIVERY METHOD:

- Direct to laboratory by Active Earth staff
- Courier from Active Earth office (seal coolers with packing tape)
- Courier from Site
- Harbour Air / courier combination (seal coolers with packing tape)
- Other:

ADDITIONAL COMMENTS:

Signature: [Signature] Date: 27/05/22

VANCOUVER ISLAND
105 - 4343 Tyndall Avenue
Victoria, BC V8N 3R9
Tel. 778-430-5475

METRO VANCOUVER
160 - 2250 Boundary Road
Burnaby, BC V5M 3Z3
Tel. 778-737-3488

FRASER VALLEY
304 - 2600 Gladys Avenue
Abbotsford, BC V2S 0E9
Tel. 778-752-2222



CERTIFICATE OF ANALYSIS

Work Order : **VA22B2363**
Amendment : **1**
Client : **Active Earth Engineering Ltd.**
Contact : Thomas Roberts
Address : 304-2600 Gladys Avenue
 Abbotsford BC Canada V2S 0E9
Telephone : ----
Project : 2315-A
PO : 2315-A
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 2
No. of samples analysed : 2

Page : 1 of 5
Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 03-Jun-2022 09:35
Date Analysis Commenced : 04-Jun-2022
Issue Date : 14-Jun-2022 16:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kyle Chang	Lab Assistant	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia



General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

<i>Unit</i>	<i>Description</i>
-	No Unit
µg/L	micrograms per litre
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Water samples for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).



Analytical Results

Sub-Matrix: Water					Client sample ID	SW1-220602	SW2-220602	----	----	----
(Matrix: Water)					Client sampling date / time	02-Jun-2022	02-Jun-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B2363-001	VA22B2363-002	-----	-----	-----	
					Result	Result	---	---	---	
Physical Tests										
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	79.7	203	----	----	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.124	<0.0050	----	----	----	
chloride	16887-00-6	E235.Cl	0.50	mg/L	3.55	18.8	----	----	----	
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.45	0.676	----	----	----	
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0519	<0.0010	----	----	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.61	0.686	----	----	----	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	1.0	µg/L	209	14.0	----	----	----	
antimony, dissolved	7440-36-0	E421	0.10	µg/L	2.49	2.06	----	----	----	
arsenic, dissolved	7440-38-2	E421	0.10	µg/L	1.56	3.11	----	----	----	
barium, dissolved	7440-39-3	E421	0.10	µg/L	23.1	36.4	----	----	----	
beryllium, dissolved	7440-41-7	E421	0.100	µg/L	<0.100	<0.100	----	----	----	
bismuth, dissolved	7440-69-9	E421	0.050	µg/L	<0.050	<0.050	----	----	----	
boron, dissolved	7440-42-8	E421	10	µg/L	26	17	----	----	----	
cadmium, dissolved	7440-43-9	E421	0.0050	µg/L	<0.0050	<0.0150 ^{DLM}	----	----	----	
calcium, dissolved	7440-70-2	E421	50	µg/L	25200	72100	----	----	----	
cesium, dissolved	7440-46-2	E421	0.010	µg/L	0.038	<0.010	----	----	----	
chromium, dissolved	7440-47-3	E421	0.50	µg/L	<0.50	1.15	----	----	----	
cobalt, dissolved	7440-48-4	E421	0.10	µg/L	0.16	<0.10	----	----	----	
copper, dissolved	7440-50-8	E421	0.20	µg/L	0.86	1.65	----	----	----	
iron, dissolved	7439-89-6	E421	10	µg/L	<10	<10	----	----	----	
lead, dissolved	7439-92-1	E421	0.050	µg/L	<0.050	<0.050	----	----	----	
lithium, dissolved	7439-93-2	E421	1.0	µg/L	1.5	<1.0	----	----	----	
magnesium, dissolved	7439-95-4	E421	5.0	µg/L	4080	5570	----	----	----	
manganese, dissolved	7439-96-5	E421	0.10	µg/L	8.01	0.24	----	----	----	
mercury, dissolved	7439-97-6	E509	0.0050	µg/L	<0.0050	<0.0050	----	----	----	
molybdenum, dissolved	7439-98-7	E421	0.050	µg/L	15.6	11.4	----	----	----	
nickel, dissolved	7440-02-0	E421	0.50	µg/L	<0.50	<0.50	----	----	----	
phosphorus, dissolved	7723-14-0	E421	50	µg/L	<50	<50	----	----	----	
potassium, dissolved	7440-09-7	E421	50	µg/L	6370	1500	----	----	----	



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SW1-220602	SW2-220602	----	----	----
Client sampling date / time					02-Jun-2022	02-Jun-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B2363-001	VA22B2363-002	-----	-----	-----
					Result	Result	---	---	---
Dissolved Metals									
rubidium, dissolved	7440-17-7	E421	0.20	µg/L	4.21	1.34	---	---	---
selenium, dissolved	7782-49-2	E421	0.050	µg/L	0.351	0.543	---	---	---
silicon, dissolved	7440-21-3	E421	50	µg/L	2130	5150	---	---	---
silver, dissolved	7440-22-4	E421	0.010	µg/L	<0.010	<0.010	---	---	---
sodium, dissolved	7440-23-5	E421	50	µg/L	6910	12000	---	---	---
strontium, dissolved	7440-24-6	E421	0.20	µg/L	158	337	---	---	---
sulfur, dissolved	7704-34-9	E421	500	µg/L	10300	18600	---	---	---
tellurium, dissolved	13494-80-9	E421	0.20	µg/L	<0.20	<0.20	---	---	---
thallium, dissolved	7440-28-0	E421	0.010	µg/L	0.012	<0.010	---	---	---
thorium, dissolved	7440-29-1	E421	0.10	µg/L	<0.10	<0.10	---	---	---
tin, dissolved	7440-31-5	E421	0.10	µg/L	<0.10	<0.10	---	---	---
titanium, dissolved	7440-32-6	E421	0.30	µg/L	<0.30	<0.30	---	---	---
tungsten, dissolved	7440-33-7	E421	0.10	µg/L	0.27	<0.10	---	---	---
uranium, dissolved	7440-61-1	E421	0.010	µg/L	0.358	4.49	---	---	---
vanadium, dissolved	7440-62-2	E421	0.50	µg/L	0.69	1.56	---	---	---
zinc, dissolved	7440-66-6	E421	1.0	µg/L	1.6	2.9	---	---	---
zirconium, dissolved	7440-67-7	E421	0.20	µg/L	<0.20	<0.20	---	---	---
dissolved mercury filtration location	----	EP509	-	-	Field	Field	---	---	---
dissolved metals filtration location	----	EP421	-	-	Field	Field	---	---	---
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	---	---	---
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	---	---	---
HEPHw	----	EC600A	250	µg/L	<250	<250	---	---	---
LEPHw	----	EC600A	250	µg/L	<250	<250	---	---	---
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	94.5	88.6	---	---	---
Polycyclic Aromatic Hydrocarbons									
acenaphthene	83-32-9	E641A	0.010	µg/L	<0.010	0.033	---	---	---
acenaphthylene	208-96-8	E641A	0.010	µg/L	<0.010	<0.010	---	---	---
acridine	260-94-6	E641A	0.010	µg/L	<0.010	<0.010	---	---	---
anthracene	120-12-7	E641A	0.010	µg/L	<0.010	<0.010	---	---	---
benz(a)anthracene	56-55-3	E641A	0.010	µg/L	<0.010	<0.010	---	---	---



Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					SW1-220602	SW2-220602	----	----	----
Client sampling date / time					02-Jun-2022	02-Jun-2022	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA22B2363-001	VA22B2363-002	-----	-----	-----
					Result	Result	----	----	----
Polycyclic Aromatic Hydrocarbons									
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
benzo(b+j)fluoranthene	n/a	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(b+j+k)fluoranthene	n/a	E641A	0.015	µg/L	<0.015	<0.015	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	<0.0050	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	0.037	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	<0.010	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	0.020	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	0.036	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	0.085	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	0.041	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	0.011	<0.010	----	----	----
quinoline	91-22-5	E641A	0.050	µg/L	<0.050	<0.050	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
chrysene-d12	1719-03-5	E641A	0.1	%	93.7	91.0	----	----	----
naphthalene-d8	1146-65-2	E641A	0.1	%	84.5	85.8	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.1	%	106	106	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: VA22B2363	Page	: 1 of 8
Amendment	: 1		
Client	: Active Earth Engineering Ltd.	Laboratory	: Vancouver - Environmental
Contact	: Thomas Roberts	Account Manager	: Sneha Sansare
Address	: 304-2600 Gladys Avenue Abbotsford BC Canada V2S 0E9	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: 2315-A	Date Samples Received	: 03-Jun-2022 09:35
PO	: 2315-A	Issue Date	: 14-Jun-2022 16:49
C-O-C number	: ----		
Sampler	: ----		
Site	: ----		
Quote number	: VA22-ACT1100-001 (Default Pricing 2022+)		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.



Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (lab preserved) SW1-220602	E298	02-Jun-2022	04-Jun-2022	3 days	2 days	✓	04-Jun-2022	28 days	0 days	✓	
Anions and Nutrients : Ammonia by Fluorescence											
Amber glass total (lab preserved) SW2-220602	E298	02-Jun-2022	04-Jun-2022	3 days	2 days	✓	04-Jun-2022	28 days	0 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW1-220602	E235.Cl	02-Jun-2022	----	----	----		04-Jun-2022	28 days	2 days	✓	
Anions and Nutrients : Chloride in Water by IC											
HDPE SW2-220602	E235.Cl	02-Jun-2022	----	----	----		04-Jun-2022	28 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW1-220602	E235.NO3-L	02-Jun-2022	----	----	----		04-Jun-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrate in Water by IC (Low Level)											
HDPE SW2-220602	E235.NO3-L	02-Jun-2022	----	----	----		04-Jun-2022	3 days	2 days	✓	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW1-220602	E235.NO2-L	02-Jun-2022	----	----	----		04-Jun-2022	3 days	2 days	✓	



Matrix: **Water** Evaluation: * = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times Rec Actual		Eval	Analysis Date	Holding Times Rec Actual		Eval	
Anions and Nutrients : Nitrite in Water by IC (Low Level)											
HDPE SW2-220602	E235.NO2-L	02-Jun-2022	----	----	----		04-Jun-2022	3 days	2 days	✓	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) SW1-220602	E366	02-Jun-2022	04-Jun-2022	3 days	2 days	✓	06-Jun-2022	28 days	2 days	✓	
Anions and Nutrients : Total Nitrogen by Colourimetry											
Amber glass total (lab preserved) SW2-220602	E366	02-Jun-2022	04-Jun-2022	3 days	2 days	✓	06-Jun-2022	28 days	2 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
HDPE - dissolved (lab preserved) SW1-220602	E509	02-Jun-2022	07-Jun-2022	28 days	5 days	✓	07-Jun-2022	23 days	0 days	✓	
Dissolved Metals : Dissolved Mercury in Water by CVAAS											
HDPE - dissolved (lab preserved) SW2-220602	E509	02-Jun-2022	07-Jun-2022	28 days	5 days	✓	07-Jun-2022	23 days	0 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) SW1-220602	E421	02-Jun-2022	06-Jun-2022	----	----		06-Jun-2022	180 days	5 days	✓	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS											
HDPE - dissolved (lab preserved) SW2-220602	E421	02-Jun-2022	06-Jun-2022	----	----		06-Jun-2022	180 days	5 days	✓	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SW1-220602	E601A	02-Jun-2022	06-Jun-2022	14 days	4 days	✓	07-Jun-2022	40 days	1 days	✓	
Hydrocarbons : BC PHCs - EPH by GC-FID											
Amber glass/Teflon lined cap (sodium bisulfate) SW2-220602	E601A	02-Jun-2022	06-Jun-2022	14 days	4 days	✓	07-Jun-2022	40 days	1 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) SW1-220602	E641A	02-Jun-2022	06-Jun-2022	14 days	4 days	✔	06-Jun-2022	40 days	0 days	✔
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) SW2-220602	E641A	02-Jun-2022	06-Jun-2022	14 days	4 days	✔	06-Jun-2022	40 days	0 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia by Fluorescence	E298	510695	1	16	6.2	5.0	✔
Chloride in Water by IC	E235.Cl	523269	0	2	0.0	5.0	✖
Dissolved Mercury in Water by CVAAS	E509	513323	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	511809	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	510755	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	510754	1	14	7.1	5.0	✔
Total Nitrogen by Colourimetry	E366	510696	1	4	25.0	5.0	✔
Laboratory Control Samples (LCS)							
Ammonia by Fluorescence	E298	510695	1	16	6.2	5.0	✔
BC PHCs - EPH by GC-FID	E601A	511940	1	9	11.1	5.0	✔
Chloride in Water by IC	E235.Cl	523269	1	2	50.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	513323	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	511809	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	510755	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	510754	1	14	7.1	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	511939	1	13	7.6	5.0	✔
Total Nitrogen by Colourimetry	E366	510696	1	4	25.0	5.0	✔
Method Blanks (MB)							
Ammonia by Fluorescence	E298	510695	1	16	6.2	5.0	✔
BC PHCs - EPH by GC-FID	E601A	511940	1	9	11.1	5.0	✔
Chloride in Water by IC	E235.Cl	523269	1	2	50.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	513323	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	511809	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	510755	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	510754	1	14	7.1	5.0	✔
PAHs by Hexane LVI GC-MS	E641A	511939	1	13	7.6	5.0	✔
Total Nitrogen by Colourimetry	E366	510696	1	4	25.0	5.0	✔
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	510695	1	16	6.2	5.0	✔
Chloride in Water by IC	E235.Cl	523269	0	2	0.0	5.0	✖
Dissolved Mercury in Water by CVAAS	E509	513323	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	511809	1	5	20.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	510755	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	510754	1	14	7.1	5.0	✔
Total Nitrogen by Colourimetry	E366	510696	1	4	25.0	5.0	✔



Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO ₃), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO ₃ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO ₃ .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.



QUALITY CONTROL REPORT

Work Order : VA22B2363

Page : 1 of 12

Amendment : 1

Client : Active Earth Engineering Ltd.
Contact : Thomas Roberts
Address : 304-2600 Gladys Avenue
Abbotsford BC Canada V2S 0E9
Telephone : ----
Project : 2315-A
PO : 2315-A
C-O-C number : ----
Sampler : ----
Site : ----
Quote number : VA22-ACT1100-001 (Default Pricing 2022+)
No. of samples received : 2
No. of samples analysed : 2

Laboratory : Vancouver - Environmental
Account Manager : Sneha Sansare
Address : 8081 Lougheed Highway
Burnaby, British Columbia Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 03-Jun-2022 09:35
Date Analysis Commenced : 04-Jun-2022
Issue Date : 14-Jun-2022 16:49

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
● Matrix Spike (MS) Report; Recovery and Data Quality Objectives
● Method Blank (MB) Report; Recovery and Data Quality Objectives
● Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Laboratory Department. Rows include Janice Leung, Kevin Duarte, Kyle Chang, Lindsay Gung, and Owen Cheng with their respective roles and departments.



General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.



Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 510695)											
VA22B2341-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0067	0.0057	0.0010	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 510696)											
VA22B2341-001	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.040	0.038	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 510754)											
VA22B2367-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0408	0.0411	0.596%	20%	----
Anions and Nutrients (QC Lot: 510755)											
VA22B2367-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	4.47	4.46	0.0421%	20%	----
Dissolved Metals (QC Lot: 511809)											
VA22B2363-001	SW1-220602	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	209 µg/L	0.208	0.656%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	2.49 µg/L	0.00250	0.658%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	1.56 µg/L	0.00157	0.508%	20%	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	23.1 µg/L	0.0231	0.190%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.100 µg/L	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	26 µg/L	0.026	0.0001	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	25200 µg/L	24.7	2.08%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.038 µg/L	0.000036	0.000002	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.16 µg/L	0.00016	0.000001	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.86 µg/L	0.00084	0.00002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	1.5 µg/L	0.0015	0.00004	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	4080 µg/L	4.04	0.922%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	8.01 µg/L	0.00788	1.72%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	15.6 µg/L	0.0159	1.84%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	6370 µg/L	6.29	1.14%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	4.21 µg/L	0.00424	0.728%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Dissolved Metals (QC Lot: 511809) - continued											
VA22B2363-001	SW1-220602	selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.351 µg/L	0.000395	0.000043	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	2130 µg/L	2.28	6.65%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	7440-23-5	E421	0.050	mg/L	6910 µg/L	6.73	2.52%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	158 µg/L	0.160	0.935%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10300 µg/L	11.4	10.5%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.012 µg/L	0.000012	0.0000001	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.30 µg/L	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	0.27 µg/L	0.00026	0.000006	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.358 µg/L	0.000359	0.470%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.69 µg/L	0.00071	0.00002	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	1.6 µg/L	0.0014	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 513323)											
CG2206854-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 510695)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 510696)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 510754)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 510755)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 523269)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 511809)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----



Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 511809) - continued						
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	---
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	---
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	---
sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	---
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	---
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	---
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	---
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	---
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	---
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	---
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	---
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	---
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	---
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	---
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	---
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	---
Dissolved Metals (QCLot: 513323)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
Hydrocarbons (QCLot: 511940)						
EPH (C10-C19)	---	E601A	250	µg/L	<250	---
EPH (C19-C32)	---	E601A	250	µg/L	<250	---
Polycyclic Aromatic Hydrocarbons (QCLot: 511939)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	---
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	---
acridine	260-94-6	E641A	0.01	µg/L	<0.010	---
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	---
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	---
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	---
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	---
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	---
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	---
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	---
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	---
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	---
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	---
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	---



Sub-Matrix: **Water**

<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Result</i>	<i>Qualifier</i>
Polycyclic Aromatic Hydrocarbons (QCLot: 511939) - continued						
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	91-22-5	E641A	0.05	µg/L	<0.050	----



Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
Anions and Nutrients (QCLot: 510695)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 510696)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.7	75.0	125	----
Anions and Nutrients (QCLot: 510754)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 510755)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 523269)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Dissolved Metals (QCLot: 511809)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.6	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.8	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	95.6	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.4	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	90.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.4	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.5	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.0	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.1	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.9	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.8	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	100	80.0	120	----



Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 511809) - continued									
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	93.5	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.8	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.2	80.0	120	----
sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	84.6	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	99.7	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	95.0	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	99.3	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	88.7	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	96.3	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.0	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.8	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	99.8	80.0	120	----
Hydrocarbons (QCLot: 511940)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	98.3	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	111	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 511939)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	123	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	110	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	106	60.0	130	----
benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	123	60.0	130	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	112	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	106	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	118	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	117	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 511939) - continued									
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	99.3	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	95.3	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	123	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	119	60.0	130	----
quinoline	91-22-5	E641A	0.05	µg/L	0.5 µg/L	120	60.0	130	----



Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level $\geq 1x$ spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 510695)										
VA22B2363-001	SW1-220602	ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
Anions and Nutrients (QCLot: 510696)										
VA22B2363-001	SW1-220602	nitrogen, total	7727-37-9	E366	1.95 mg/L	2 mg/L	97.6	70.0	130	----
Anions and Nutrients (QCLot: 510754)										
VA22B2367-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.59 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 510755)										
VA22B2367-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	12.5 mg/L	ND	75.0	125	----
Dissolved Metals (QCLot: 511809)										
VA22B2363-002	SW2-220602	aluminum, dissolved	7429-90-5	E421	0.199 mg/L	0.2 mg/L	99.6	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00932 mg/L	0.01 mg/L	93.2	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.097 mg/L	0.1 mg/L	97.3	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00398 mg/L	0.004 mg/L	99.6	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.98 mg/L	2 mg/L	98.9	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	11.2 mg/L	10 mg/L	112	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.95 mg/L	4 mg/L	98.7	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 511809) - continued										
VA22B2363-002	SW2-220602	selenium, dissolved	7782-49-2	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.74 mg/L	10 mg/L	97.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00421 mg/L	0.004 mg/L	105	70.0	130	----
		sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.3 mg/L	20 mg/L	102	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00393 mg/L	0.004 mg/L	98.3	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0200 mg/L	0.02 mg/L	99.9	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0371 mg/L	0.04 mg/L	92.9	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.396 mg/L	0.4 mg/L	99.1	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 513323)										
CG2206861-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000950 mg/L	0.0001 mg/L	95.0	70.0	130	----

Qualifiers

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

COC Number: 22 -

Page of

Contact and company name below will appear on the final report

Reports / Recipients

Turnaround Time (TAT) Requested

AFIX ALS BARCODE LABEL HERE (ALS use only)

Company: Active Earth Engineering Ltd.
 Contact: (778) 752-2222
 Phone: Company address below will appear on the final report

Select Report Format: PDF EXCEL EDD (ORIGINAL)
 Merge QC/QCII Reports with COA YES NO N/A
 Compare Results to Criteria on Report - provide details below if box checked
 Select Distribution: EMAIL MAIL FAX

Routine (R) if received by 3pm M-F - no surcharges apply
 4 day (P4) if received by 3pm M-F - 20% rush surcharge minimum
 3 day (P3) if received by 3pm M-F - 25% rush surcharge minimum
 2 day (P2) if received by 3pm M-F - 50% rush surcharge minimum
 1 day (P1) if received by 3pm M-F - 100% rush surcharge minimum
 Same day (E2) if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, statutory holidays and for non-routine tests.
 Date and Time Required for all EBP TATs:
 For all tests with rush TATs requested, please contact your ALS to confirm availability.
 Qd-mm-yy hh:mm am/pm

Street: 304 - 2600 Gladys Avenue
 City/Province: Abbotsford, BC
 Postal Code: V2S 0E9
 Invoice To: Same as Report To YES NO

Copy of Invoice with Report YES NO
 Select Invoice Distribution: EMAIL MAIL FAX
 Email 1 or Fax: labreports@activeearth.ca
 Email 2: Thomas Prohman@activeearth.ca
 Email 3: Harold.Activeearth.ca

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

Analysis Request
 Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below

Company: Active Earth Engineering Ltd.
 Contact: Angle Steidle

Project Information
 ALS Account # / Quote #: VA22-ACT100-001
 Job #: 2315-A
 PO / A/E: (same as Job #)
 LSD: N/A

Oil and Gas Required Fields (client use)
 A/E/Cost Center: N/A
 Major/Minor Code: N/A
 Requisitioner: N/A
 Location: N/A

ES ON HOLD
 ADDITIONAL STORAGE REQUIRED
 SELECTED HAZARD (see notes)

ALS Lab Work Order # (ALS use only):

ALS Contact: Sneha Sansare
 Date: 07-28-22
 Time: 11:00 AM
 Sample Type: Water

NUMBER OF CONTAINER
 L / A / PAMS
 dissolved metals
 N / NH3 / NO3 / NO2

Environmental Division
 Vancouver
 Work Order Reference
 VA22B2363
 Telephone: +1 604 253 4188

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type
	SW1-220602	07-28-22	11:00 AM	Water
	SV2-220602	07-28-22	11:00 AM	Water

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Sample Receipt Details (ALS use only)
Cooling Method: <input type="checkbox"/> NONE <input type="checkbox"/> ICE <input type="checkbox"/> FROZEN <input type="checkbox"/> COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: <input type="checkbox"/> YES <input type="checkbox"/> NO
Cooler Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A
Sample Custody Seals Intact: <input type="checkbox"/> YES <input type="checkbox"/> N/A
INITIAL COOLER TEMPERATURES °C
INITIAL COOLER TEMPERATURES °C

Shipping and Receipt Information
 Released by: TB Date: 22/06/22
 Received by: [Signature] Date: June 3, 2022
 Time: 9:35

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System? YES NO

Are samples for human consumption/ use? YES NO

SHIPMENT RELEASE (client use)
 Released by: TB Date: 22/06/22

INITIAL SHIPMENT RECEPTION (ALS use only)
 Received by: [Signature] Date: June 3, 2022

FINAL SHIPMENT RECEPTION (ALS use only)
 Received by: [Signature] Date: June 3, 2022

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION
 Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.
 1. If any water samples are taken from a Regulated Drinking Water (DW) system, please submit using an Authorized DW COC form.

WHITE - LABORATORY COPY
 YELLOW - CLIENT COPY

Environmental Division
 Vancouver
 Work Order Reference
 VA22B2363
 Telephone: +1 604 253 4188



SAMPLE SUBMISSION CHECKLIST

Project Number	Samples Collected By	Submitted By	Submission Date
2315-A	TB	TB	22/06/02

Type of Sample			
<input type="checkbox"/> Soil	<input checked="" type="checkbox"/> Water	<input type="checkbox"/> Vapour	<input type="checkbox"/> Other:

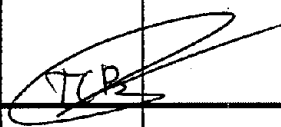
- All containers labelled with Sample ID and listed on the COC in numerical order.
- Y or ~~N/A~~ Blind field duplicate samples collected, submitted, and included on the COC.
- Sample IDs on COCs exactly match sample IDs on containers.
- Container count on COCs matches container count in cooler.
- Turnaround time selected and results date specified.
- ~~N/A~~ Different media submitted separately (soil, vapour, water, etc. on separate COCs).
- ~~N/A~~ Samples from parcels/areas with different property owners are on separate COCs.
- Sufficient ice and/or freezer packs included. Ice is not loose.
- Cooler contains samples for one project only.
- COCs in cooler, in ziplock bag along with this form.
- ~~Y/N~~ Methanol vials include an Excepted Quantities Label on the outside of the cooler.

Analysis selected on COC **or** To be emailed by (name): _____

DELIVERY METHOD:

- Direct to laboratory by Active Earth staff
- Courier from Active Earth office (seal coolers with packing tape)
- Courier from Site
- Harbour Air / courier combination (seal coolers with packing tape)
- Other:

ADDITIONAL COMMENTS:

Signature:  Date: 22/06/02

VANCOUVER ISLAND
105 - 4343 Tyndall Avenue
Victoria, BC V8N 3R9
Tel. 778-430-5475

METRO VANCOUVER
160 - 2250 Boundary Road
Burnaby, BC V5M 3Z3
Tel. 778-737-3488

FRASER VALLEY
304 - 2600 Gladys Avenue
Abbotsford, BC V2S 0E9
Tel. 778-752-2222



ACTIVE EARTH
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APPENDIX C

Borehole Logs



SUMMARY LOG

Borehole#: **AE21-MW101**

Project: **Bamberton Quarry**

Location: Bamberton, BC

Client: Coast Mountain Resources (2020) Ltd

Datum:

Northing/Easting: ,

Elevation:

AE Project No.
2315-A

Date(s) Drilled: Nov 29 2021
Company: TerraTech Drilling
Driller: Steve
Drill Make/Model:

Drilling Method: Odex
Hole Diameter: 4"
Sample Type:
* indicates sent for lab analysis

Logged by: SP Reviewed by: MD

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USCS	SOIL SYMBOL	SOIL DESCRIPTION	Deep Well	Shallow Well
						Flush Mount	Flush Mount
1					SILT, brown, firm, damp (NATIVE)		
2			ML				
3							
4			GW	●	silty GRAVEL, grey, dense, damp	3.4m	4.3m
5					SILT and CLAY, grey/blue, stiff		
6			ML				
7							
8			GW	●	GRAVEL, grey, very dense	7.9m	8.2m
9					wet	8.2m	8.5m
10							
11					BEDROCK		
12							
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14							
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16							
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20							
21							
22							
23							
24							
24.23					End of Borehole at 24.23m.	24.2m	
25							
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ACTIVE_EARTH_LOG_2315-A.GPJ ACTIVEEARTH.GDT 22-6-21

Legend

Sand	Grout	Cement	50mm Solid PVC
Drill Cuttings	Slough	Bentonite	10 Slot PVC Screen

Screen Intervals
 Deep Well: 21.0m to 24.1m
 Shallow Well: 12.2m to 15.2m



SUMMARY LOG

Borehole#: **AE21-MW102**

Project: **Bamberton Quarry**

Location: Bamberton, BC

Client: Coast Mountain Resources (2020) Ltd

Datum:

Northing/Easting: ,

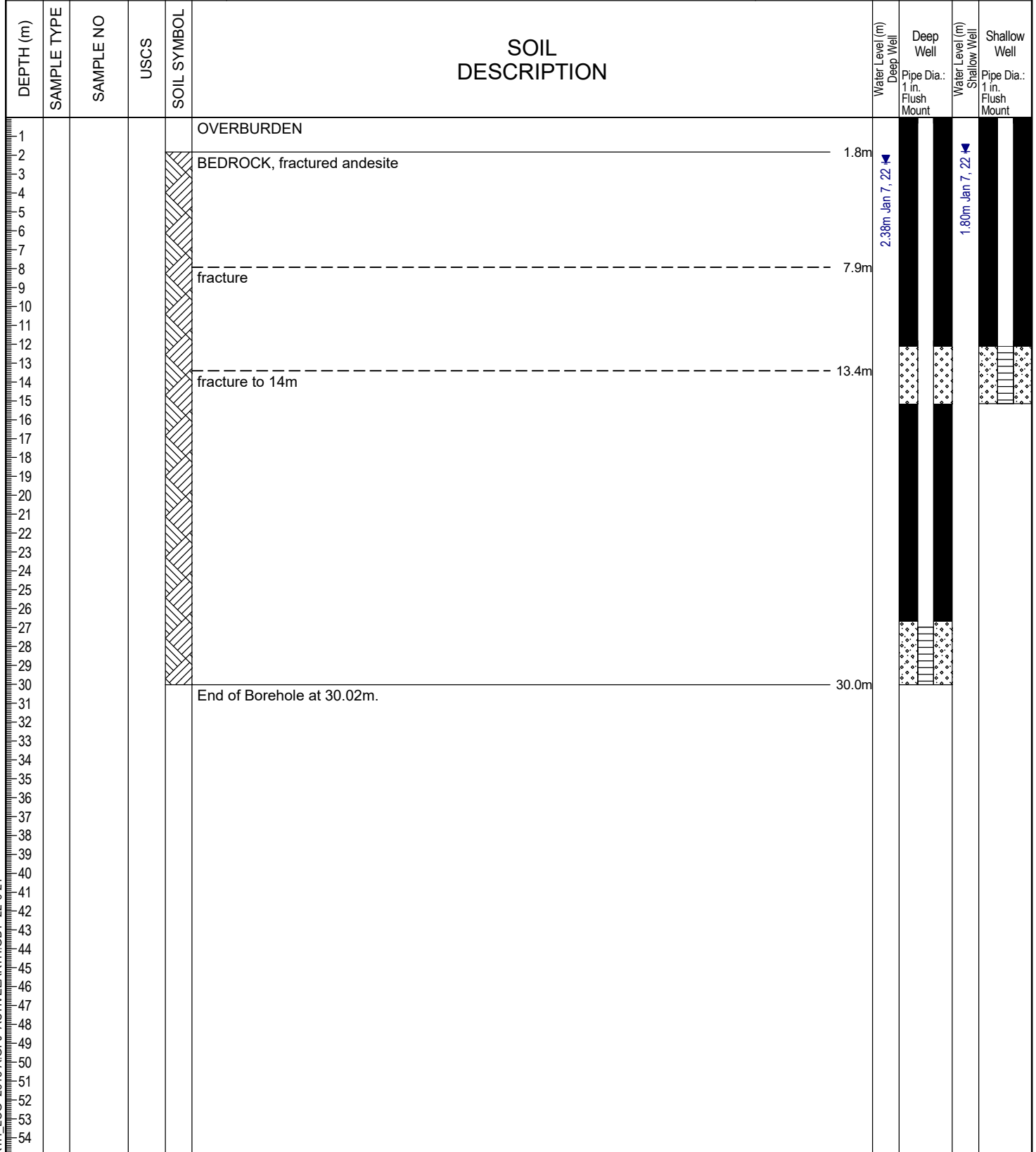
Elevation:

AE Project No.
2315-A

Date(s) Drilled: Dec 21 2021
Company: TerraTech Drilling
Driller: Steve
Drill Make/Model:

Drilling Method: Odex
Hole Diameter: 4"
Sample Type:
* indicates sent for lab analysis

Logged by: MD Reviewed by:



ACTIVE_EARTH_LOG_2315-A.GPJ ACTIVEEARTH.GDT 22-6-21

Legend

Sand	Grout	Cement	50mm Solid PVC
Drill Cuttings	Slough	Bentonite	10 Slot PVC Screen

Screen Intervals
 Deep Well: 27.0m to 30.0m
 Shallow Well: 12.1m to 15.1m



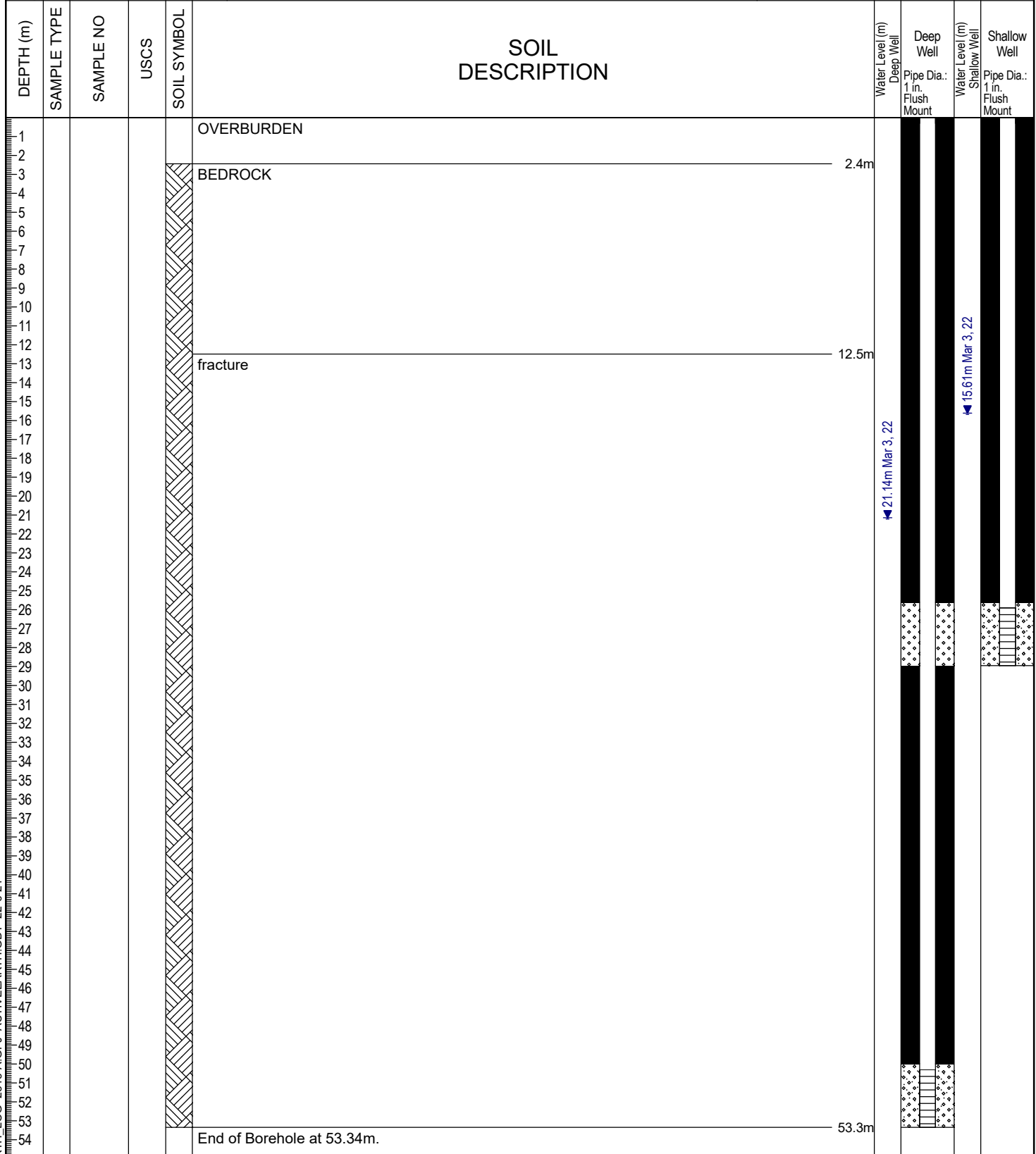
SUMMARY LOG

Borehole#: **AE22-MW103**

Project: **Bamberton Quarry**
 Location: Bamberton, BC Client: Coast Mountain Resources (2020) Ltd
 Date(s) Drilled: Feb 22 2022 Drilling Method: Odex
 Company: TerraTech Drilling Hole Diameter: 4"
 Driller: Steve Sample Type:
 Drill Make/Model: * indicates sent for lab analysis

Datum:
 Northing/Easting: ,
 Elevation:

AE Project No. 2315-A
 Logged by: MD Reviewed by:



ACTIVE_EARTH_LOG_2315-A.GPJ ACTIVEEARTH.GDT 22-6-21

Legend Well Installation: Sand (stippled) Grout (dotted) Cement (cross-hatched) Drill Cuttings (diagonal lines) Slough (wavy lines) Bentonite (solid black) 50mm Solid PVC (white) 10 Slot PVC Screen (horizontal lines)	Screen Intervals Deep Well: 50.3m to 53.3m Shallow Well: 25.9m to 29.0m
--	--



SUMMARY LOG

Borehole#: **AE22-MW104 S/D**

Project: **Bamberton Quarry**

Location: Bamberton, BC

Client: Coast Mountain Resources (2020) Ltd

Datum:

Northing/Easting: ,

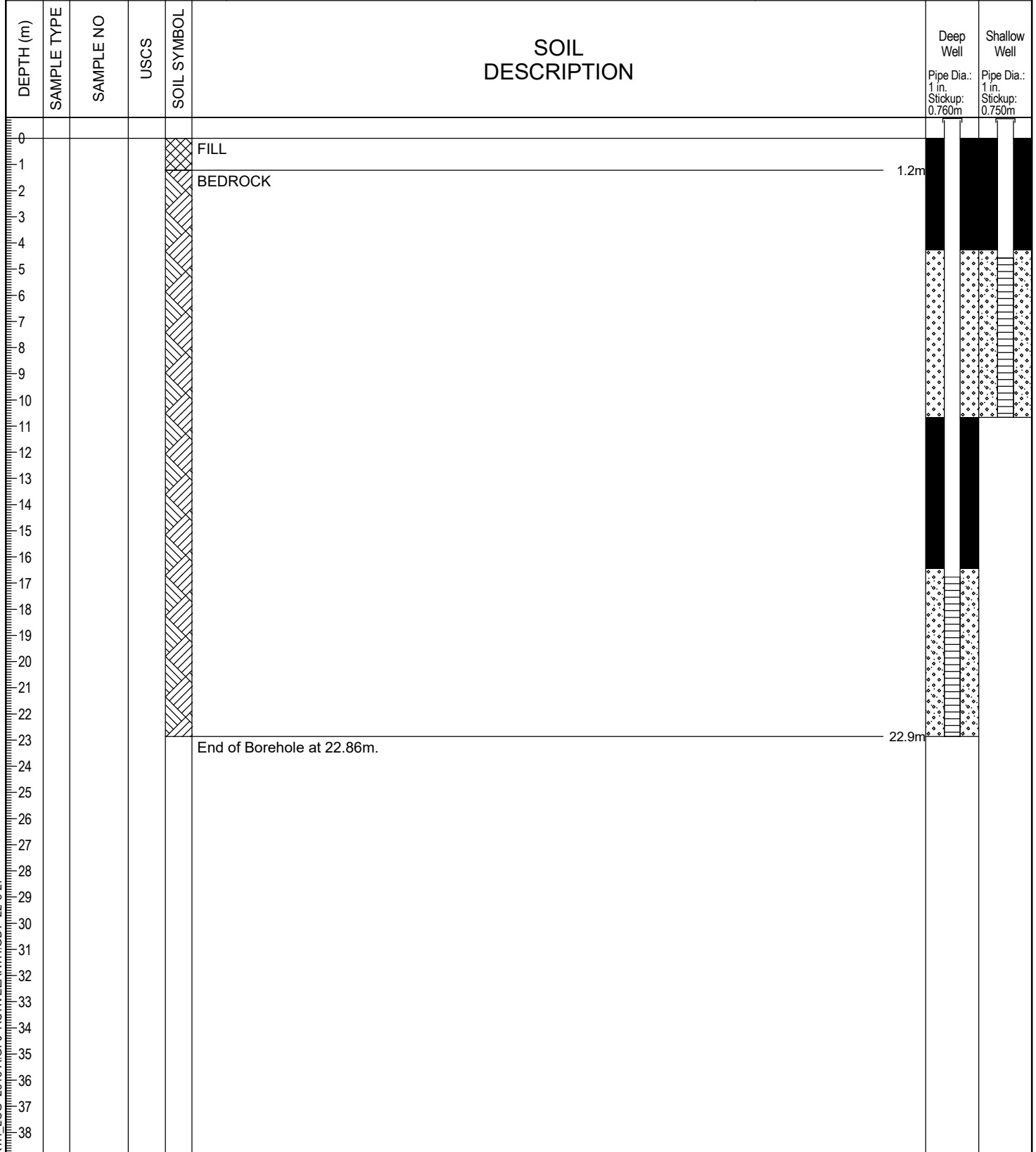
Elevation:

AE Project No.
2315-A

Date(s) Drilled: May 16 2022
Company: Drillwell
Driller: Steve
Drill Make/Model:

Drilling Method: Odex
Hole Diameter: 4"
Sample Type:
* indicates sent for lab analysis

Logged by: TB Reviewed by: MD



ACTIVE_EARTH_LOG_2315-A.GPJ ACTIVEEARTH.GDT 22-5-27

Legend

Sand	Grout	Cement	50mm Solid PVC
Drill Cuttings	Slough	Bentonite	10 Slot PVC Screen

Screen Intervals
 Deep Well: 16.8m to 22.9m
 Shallow Well: 4.6m to 10.7m



SUMMARY LOG

Borehole#: **AE22-MW105**

Project: **Bamberton Quarry**
 Location: Bamberton, BC Client: Coast Mountain Resources (2020) Ltd
 Date(s) Drilled: May 16 2022 Drilling Method: Odex
 Company: Drillwell Hole Diameter: 4"
 Driller: Steve Sample Type:
 Drill Make/Model: * indicates sent for lab analysis

Datum:
 Northing/Easting: ,
 Elevation:

AE Project No. 2315-A
 Logged by: TB Reviewed by: MD

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USCS	SOIL SYMBOL	SOIL DESCRIPTION	Monitoring Well
0					FILL	
1						
2						
3						
3.0					BEDROCK	
4						
5						
6						
7						
8						
9						
10						
11						
12						
12.8					End of Borehole at 12.8m.	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						

Legend

Sand	Grout	Cement	50mm Solid PVC
Drill Cuttings	Slough	Bentonite	10 Slot PVC Screen

Screen Intervals Well: 6.7m to 12.8m

ACTIVE_EARTH_LOG_2315-A.GPJ ACTIVEEARTH.GDT 22-5-27



SUMMARY LOG

Borehole#: **AE22-MW106**

Project: **Bamberton Quarry**

Location: Bamberton, BC

Client: Coast Mountain Resources (2020) Ltd

Datum:

Northing/Easting: ,

Elevation:

AE Project No.
2315-A

Date(s) Drilled: May 18 2022
Company: Drillwell
Driller: Steve
Drill Make/Model:

Drilling Method: Odex
Hole Diameter: 4"
Sample Type:
* indicates sent for lab analysis

Logged by: TB Reviewed by: MD

DEPTH (m)	SAMPLE TYPE	SAMPLE NO	USCS	SOIL SYMBOL	SOIL DESCRIPTION	Monitoring Well Pipe Dia.: 2 in. Stickup: 0.750m
0					FILL	
1						
2						
3						
4						
5						
6					BEDROCK	6.1m
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37					End of Borehole at 36.58m.	36.6m
38						

ACTIVE_EARTH_LOG_2315-A.GPJ ACTIVEEARTH.GDT 22-5-27

Legend

Sand	Grout	Cement	50mm Solid PVC
Drill Cuttings	Slough	Bentonite	10 Slot PVC Screen

Screen Intervals Well: 27.4m to 36.6m



ACTIVE EARTH
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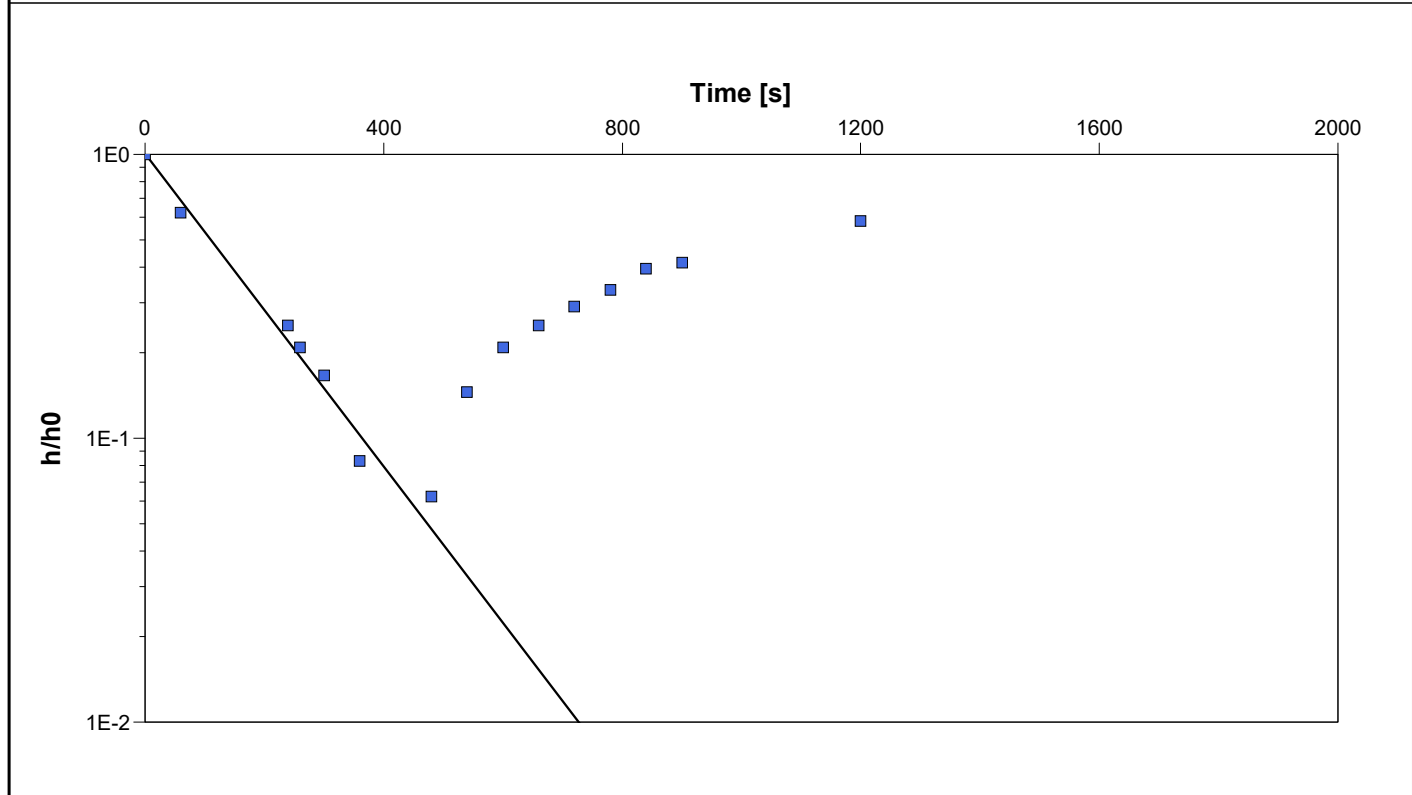
www.activeearth.ca

APPENDIX D

Rising Head Test and Packer Test Results

		Slug Test Analysis Report	
		Project: Bamberton Mine Permit	
		Number: 2315-A	
		Client:	

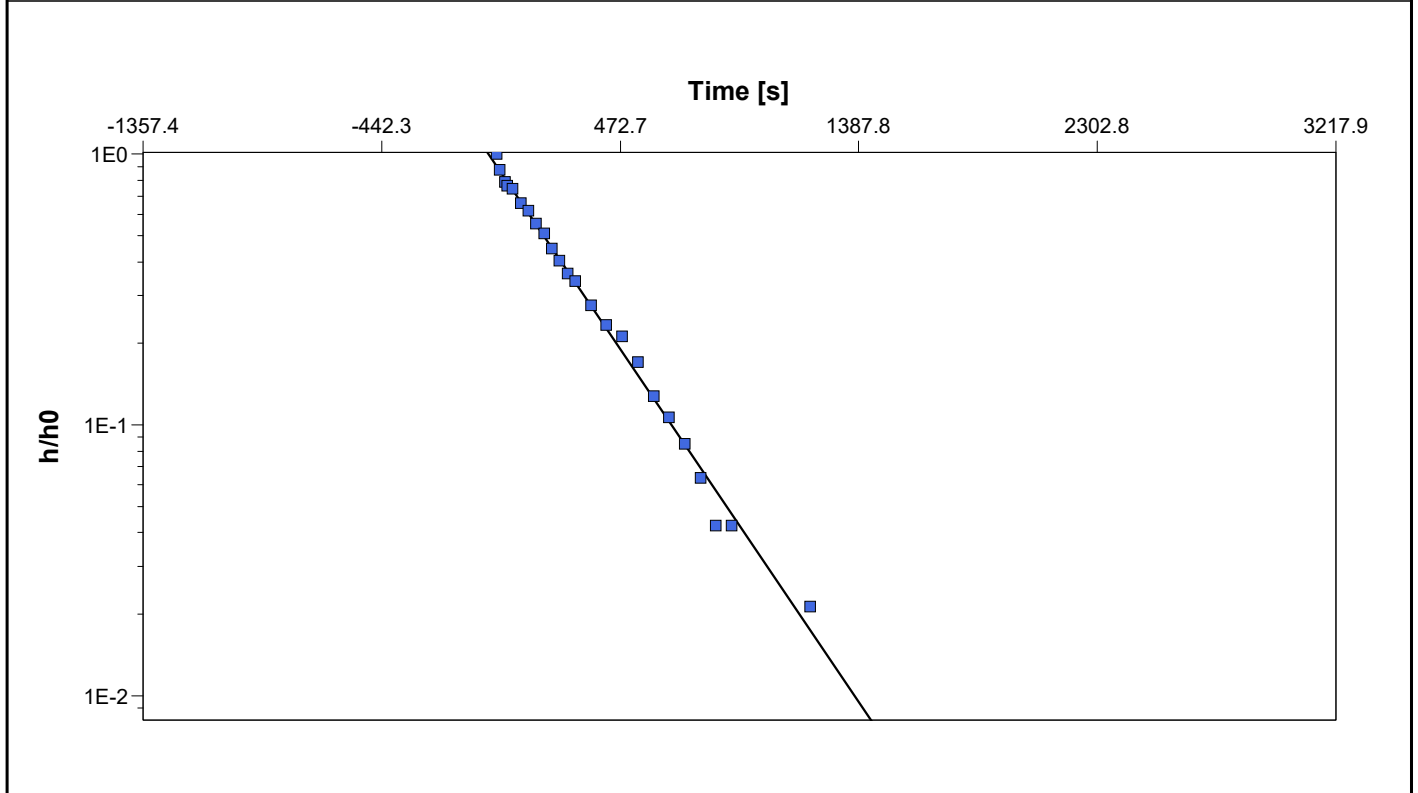
Location: Bamberton, BC	Slug Test: Rising Head Test	Test Well: Well 1
Test Conducted by: TB		Test Date: 5/17/2022
Analysis Performed by: TB	Rising Head Test	Analysis Date: 5/17/2022
Aquifer Thickness: 25.62 m		



Calculation using Hvorslev		
Observation Well	Hydraulic Conductivity [m/s]	
Well 1	3.69×10^{-6}	

		Slug Test Analysis Report	
		Project: Bamberton Mine Expansion	
		Number: 2315-A	
		Client:	

Location: Bamberton, BC	Slug Test: Rising Head Test MW102S	Test Well: Well 1
Test Conducted by: TB		Test Date: 5/17/2022
Analysis Performed by: TB	Rising Head Test	Analysis Date: 5/17/2022
Aquifer Thickness: 11.67 m		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
Well 1	8.46×10^{-7}	

--	--	--

Lugeon Test Summary - BH104

Project: Bamberton Quarry

Number: 2315a

Client: CMR

Test Interval Top Bottom	Graphs			Result
4.600 m 10.700 m	<p>Step</p> <p>Pressure [bar]</p>	<p>Flow [m³/s]</p> <p>Pressure [bar]</p>	<p>Step</p> <p>Lugeons</p>	
10.700 m 22.900 m	<p>Step</p> <p>Pressure [bar]</p>	<p>Flow [m³/s]</p> <p>Pressure [bar]</p>	<p>Step</p> <p>Lugeons</p>	
16.8000 m 22.9000 m	<p>Step</p> <p>Pressure [mm Hg]</p>	<p>Flow [m³/min]</p> <p>Pressure [mm Hg]</p>	<p>Step</p> <p>Lugeons</p>	

Lugeon Test Analysis Report

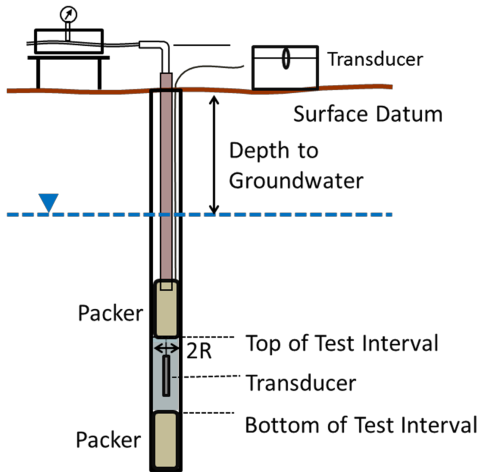
Project: Bamberton Quarry

Number: 2315a

Client: CMR

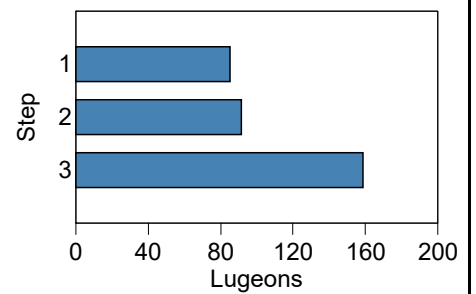
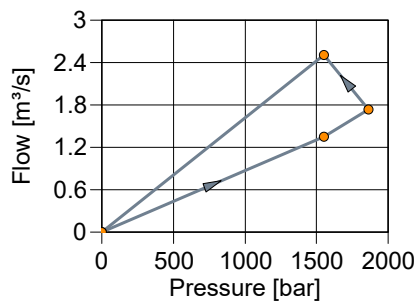
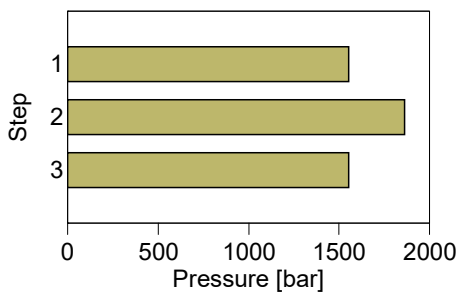
Location: Bamberton	Lugeon Test: Lugeon Test 3	Tested bore: BH104
Test Conducted by: DEK		Test Date: 5/18/2022
Analysis Performed by: DEK		Analysis Date: 5/18/2022

Lithology:



Top of Test Interval: 4.600 m
 Bottom of Test Interval: 10.700 m
 Length of Test Interval: 6.100 m
 Depth to Groundwater: 4.000 m
 Radius of Test Section: 0.114 m
 Dip of bore: 90° from vertical
 Vertical Top of Test Interval: 0.000 m
 Vertical Bottom of Test Interval: 0.000 m

Step	Pressure [bar]	Flow Meter Readings [m³/s]										Average Flow Rate [m³/s]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	1551.5	1.124	1.214	1.253	1.293	1.331	1.371	1.410	1.448	1.487	1.527	1.346	8.83×10^{-6}	7.63×10^{-1}	85.3
2	1861.7	1.608	1.607	1.226	1.291	1.853	1.853	1.982	2.046	2.109		1.731	9.47×10^{-6}	8.18×10^{-1}	91.4
3	1551.5	2.255	2.310	2.365	2.421	2.466	2.531	2.597	2.641	2.697	2.752	2.503	1.64×10^{-5}	1.42×10^0	158.7
												Average	1.16×10^{-5}	1.00×10^0	111.8



Lugeon Test Analysis Report

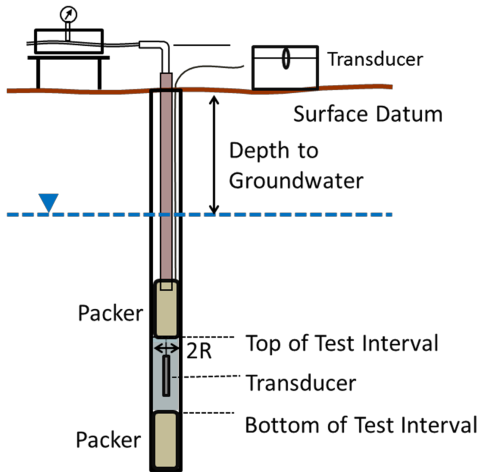
Project: Bamberton Quarry

Number: 2315a

Client: CMR

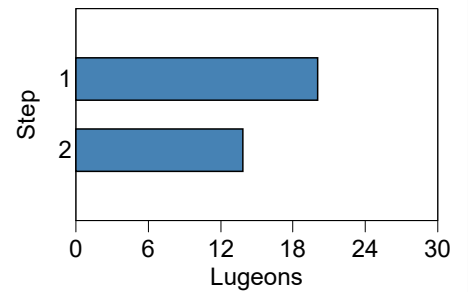
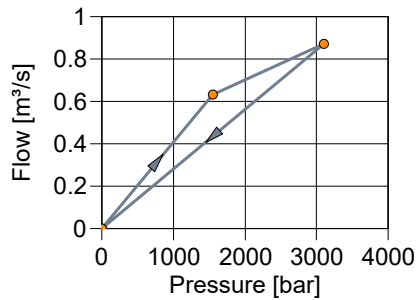
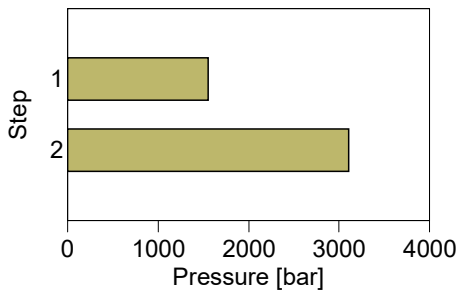
Location: Bamberton	Lugeon Test: Lugeon Test 2	Tested bore: BH104
Test Conducted by: DEK		Test Date: 5/18/2022
Analysis Performed by: DEK		Analysis Date: 5/18/2022

Lithology:



Top of Test Interval: 10.700 m
 Bottom of Test Interval: 22.900 m
 Length of Test Interval: 12.200 m
 Depth to Groundwater: 4.000 m
 Radius of Test Section: 0.114 m
 Dip of bore: 90° from vertical
 Vertical Top of Test Interval: 0.000 m
 Vertical Bottom of Test Interval: 0.000 m

Step	Pressure [bar]	Flow Meter Readings [m³/s]										Average Flow Rate [m³/s]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10		[m/s]	[m/d]	Lugeon
1	1551.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	2.4380×10^{-6}	2.106×10^{-1}	20.1
2	3102.9	0.8	0.8	0.8	0.9	0.8	0.9	0.9	0.9	0.9	1.0	0.9	1.6802×10^{-6}	1.452×10^{-1}	13.8
												Average	2.0591×10^{-6}	1.779×10^{-1}	16.9



Lugeon Test Analysis Report

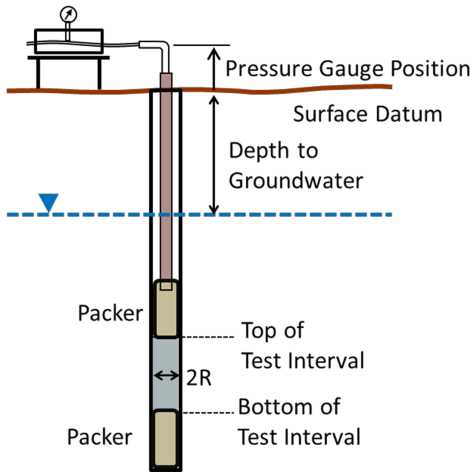
Project: Bamberton Quarry

Number: 2315a

Client: CMR

Location: Bamberton	Lugeon Test: Lugeon Test 1	Tested bore: BH104
Test Conducted by: DEK		Test Date: 5/18/2022
Analysis Performed by: DEK		Analysis Date: 5/18/2022

Lithology:



Top of Test Interval: 16.8000 m
 Bottom of Test Interval: 22.9000 m
 Length of Test Interval: 6.1000 m
 Gauge Position: 0.0000 m
 Depth to Groundwater: 4.0000 m
 Radius of Test Section: 0.1140 m
 Dip of bore: 90° from vertical
 Vertical Top of Test Interval: 0.0000 m
 Vertical Bottom of Test Interval: 0.0000 m

Step	Pressure [mm Hg]	Flow Meter Readings [m³]															Average Flow Rate [m³/min]	Hydraulic Conductivity		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		[m/s]	[m/s]	Lugeon
1	1551.5	5120	5140	5160	5220	5240	5275	5300	5330	5360	5385	5414	5440	5470	5495	5520	0.00286	1.971×10^{-7}	9.71114×10^{-7}	1.903873
											Average		1.971×10^{-7}	9.71114×10^{-7}	1.903873					

