

Sediment Rico Lake 2018/Historical Rieberger 1982-1987

| Parameter | CCME & BC Sediment | | Rico | Mclvor | Echo | Mirror | John Hart |
|-----------------|--------------------|-------|-------|---------|---------|---------|-----------|
| | ISQG | PEL | mg/kg | ug/g | Ug/g | ug/g | |
| Aluminum (Al) | | | 19700 | 10.20 | 12.40 | 14.60 | |
| Antimony (Sb) | | | 0.74 | | | | |
| Arsenic (As) | 5.9 | 17 | 6.48 | 25.00 | 21.00 | 25.00 | |
| Barium (Ba) | | | 96.4 | 27.00 | 31.00 | 26.00 | |
| Beryllium (Be) | | | 0.19 | | | | |
| Bismuth (Bi) | | | <0.20 | | | | |
| Boron (B) | | | <5.0 | | | | |
| Cadmium (Cd) | 0.6 | 3.5 | 0.981 | | 1.00 | 1.00 | |
| Calcium (Ca) | | | 8830 | 6.32 | 4.48 | 6.59 | |
| Chromium (Cr) | 37.3 | 90 | 22.6 | 220.00 | 250.00 | 200.00 | |
| Cobalt (Co) | | | 20.5 | 10.00 | 14.00 | 10.00 | |
| Copper (CU) | 35.7 | 197 | 138 | 360.00 | 360.00 | 380.00 | |
| Iron (Fe) | 21200 | 43466 | 40800 | 104.00 | 262.00 | 140.00 | |
| Lead (Pb) | 35 | 91.3 | 34.3 | | | | |
| Lithium (Li) | | | 3.1 | | | | |
| Magnesium (Mg) | | | 6410 | 0.05 | 22.40 | 32.40 | |
| Manganese (Mn) | 460 | 1100 | 670 | 623.00 | 485.00 | 224.00 | |
| Mercury (Hg) | 0.17 | 0.486 | 0.168 | | 0.11 | 0.12 | |
| Molybdenum (Mo) | | | 1.56 | 3.00 | 6.00 | 2.00 | |
| Nickel (Ni) | 16 | 75 | 24.5 | 13.00 | 15.00 | 17.00 | |
| Phosphorus (p) | | | 1100 | 660.00 | 1240.00 | 1290.00 | |
| Potassium (K) | | | 500 | | | | |
| Selenium (Se) | alert is 2ug/g | | 1.98 | | 15.00 | 10.00 | |
| Silver (Ag) | 1 | 2.2 | 0.22 | | | | |
| Sodium (Na) | | | 450 | | | | |
| Strontium (Sr) | | | 29.1 | | 16.00 | 19.00 | |
| Sulfur (S) | | | 4800 | 2950.00 | 2150.00 | 2050.00 | |
| Thallium (Ti) | | | 0.058 | | | | |
| Tin (Sn) | | | 3.3 | | 5.00 | | |
| Titanium (Ti) | | | 1550 | | | | |
| Tungsten (W) | | | <0.50 | | | | |
| Uranium (U) | | | 0.268 | | | | |
| Vanadium (V) | | | 103 | | | 43.00 | |
| Zinc (Zn) | 123 | 315 | 158 | 36.00 | 127.00 | 58.00 | |
| Zirconium (Zr) | | | 7.1 | | | | |

mg/kg and ug/g are the same value

over ISQG
Over PEL



GHD Limited
ATTN: Airesse MacPhee
400 - 179 Colonnade Road
Ottawa ON K2E 7J4

Date Received: 21-SEP-18
Report Date: 11-OCT-18 16:47 (MT)
Version: FINAL

Client Phone: 613-727-0510

Certificate of Analysis

Lab Work Order #: L2169573
Project P.O. #: NOT SUBMITTED
Job Reference: 88877-03-10
C of C Numbers: G111791
Legal Site Desc:

Comments: ADDITIONAL 10-OCT-18 18:03
Analyses request has been revised from the CofC.

Selam Worku
Account Manager

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ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

| Sample Details/Parameters | Result | Qualifier* | D.L. | Units | Extracted | Analyzed | Batch |
|--|--------|------------|-------|--------|-----------|-----------|----------|
| L2169573-2 SED-170918-88877-RMR-02 | | | | | | | |
| Sampled By: Rosemarie Rocca on 17-SEP-18 @ 11:50 | | | | | | | |
| Matrix: Sediment | | | | | | | |
| Physical Tests | | | | | | | |
| Moisture | 93.0 | | 0.25 | % | | 01-OCT-18 | R4256989 |
| pH (1:2 soil:water) | 5.18 | | 0.10 | pH | | 09-OCT-18 | R4266048 |
| Inorganic Parameters | | | | | | | |
| Acid Volatile Sulphides | 6.8 | | 2.2 | umol/g | 28-SEP-18 | 28-SEP-18 | R4258518 |
| Saturated Paste Extractables | | | | | | | |
| Bicarbonate (as CaCO3) | <64 | | 64 | mg/kg | | 10-OCT-18 | R4268149 |
| Carbonate (as CaCO3) | <64 | | 64 | mg/kg | | 10-OCT-18 | R4268149 |
| Chloride (Cl) | 83 | | 21 | mg/kg | | 09-OCT-18 | R4268168 |
| Conductivity | 0.903 | | 0.030 | dS/m | | 09-OCT-18 | R4267260 |
| Paste pH | 5.40 | | 0.10 | pH | | 09-OCT-18 | R4267263 |
| % Saturation | 212 | | 1.0 | % | 05-OCT-18 | 09-OCT-18 | R4267231 |
| Sulfate (SO4) | 514 | | 53 | mg/kg | | 09-OCT-18 | R4268168 |
| Metals | | | | | | | |
| Aluminum (Al) | 19700 | | 50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Antimony (Sb) | 0.74 | | 0.10 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Arsenic (As) | 6.48 | | 0.10 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Barium (Ba) | 96.4 | | 0.50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Beryllium (Be) | 0.19 | | 0.10 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Bismuth (Bi) | <0.20 | | 0.20 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Boron (B) | <5.0 | | 5.0 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Cadmium (Cd) | 0.981 | | 0.020 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Calcium (Ca) | 8830 | | 50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Chromium (Cr) | 22.6 | | 0.50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Cobalt (Co) | 20.5 | | 0.10 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Copper (Cu) | 138 | | 0.50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Iron (Fe) | 40800 | | 50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Lead (Pb) | 34.3 | | 0.50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Lithium (Li) | 3.1 | | 2.0 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Magnesium (Mg) | 6410 | | 20 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Manganese (Mn) | 670 | | 1.0 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Mercury (Hg) | 0.168 | | 0.050 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266228 |
| Molybdenum (Mo) | 1.56 | | 0.10 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Nickel (Ni) | 24.5 | | 0.50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Phosphorus (P) | 1100 | | 50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Potassium (K) | 500 | | 100 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Selenium (Se) | 1.98 | | 0.20 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Silver (Ag) | 0.22 | | 0.10 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Sodium (Na) | 450 | | 50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Strontium (Sr) | 29.1 | | 0.50 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Sulfur (S) | 4800 | | 1000 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Thallium (Tl) | 0.058 | | 0.050 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |
| Tin (Sn) | 3.3 | | 2.0 | mg/kg | 08-OCT-18 | 09-OCT-18 | R4266908 |

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

| QC Type Description | Parameter | Qualifier | Applies to Sample Number(s) |
|---------------------|----------------|-----------|-----------------------------|
| Duplicate | Aluminum (Al) | DUP-H | L2169573-2 |
| Duplicate | Arsenic (As) | DUP-H | L2169573-2 |
| Duplicate | Cadmium (Cd) | DUP-H | L2169573-2 |
| Duplicate | Calcium (Ca) | DUP-H | L2169573-2 |
| Duplicate | Chromium (Cr) | DUP-H | L2169573-2 |
| Duplicate | Cobalt (Co) | DUP-H | L2169573-2 |
| Duplicate | Copper (Cu) | DUP-H | L2169573-2 |
| Duplicate | Iron (Fe) | DUP-H | L2169573-2 |
| Duplicate | Magnesium (Mg) | DUP-H | L2169573-2 |
| Duplicate | Manganese (Mn) | DUP-H | L2169573-2 |
| Duplicate | Nickel (Ni) | DUP-H | L2169573-2 |
| Duplicate | Phosphorus (P) | DUP-H | L2169573-2 |
| Duplicate | Uranium (U) | DUP-H | L2169573-2 |
| Duplicate | Vanadium (V) | DUP-H | L2169573-2 |
| Duplicate | Zinc (Zn) | DUP-H | L2169573-2 |

Sample Parameter Qualifier key listed:

| Qualifier | Description |
|-----------|---|
| DUP-H | Duplicate results outside ALS DQO, due to sample heterogeneity. |

Test Method References:

| ALS Test Code | Matrix | Test Description | Method Reference** |
|---|--------|--|--|
| ALK-PASTE-VA | Soil | Alkalinity in Soil (Paste) by Colour | Carter-CSSS / EPA 310.2 (modified) |
| A soil extract produced by the saturated paste extraction procedure is analyzed for alkalinity by methyl orange colourimetry. | | | |
| AVS-COL-VA | Soil | Acid volatile sulphide by colourimetric | EPA 821/R-91-100 |
| This analysis is carried out in accordance with the method described in EPA 821/R-91-100. Hydrochloric acid is added to sediment samples within a purge and trap system. The evolved hydrogen sulphide (H ₂ S) is carried into a basic solution by argon gas. The acid volatile sulfide is then determined colourimetrically. | | | |
| CL-PASTE-IC-VA | Soil | Chloride in Soil (Paste) by IC | Carter-CSSS / EPA 300.1 (modified) |
| A soil extract produced by the saturated paste extraction procedure is analyzed for chloride by Ion Chromatography with conductivity detection. | | | |
| EC-PASTE-VA | Soil | Conductivity in Soil (Paste) by Meter | Carter-CSSS / APHA 2510B |
| A soil extract produced by the saturated paste extraction procedure is analyzed by conductivity meter. | | | |
| HG-200.2-CVAF-VA | Soil | Mercury in Soil by CVAAS | EPA 200.2/1631E (mod) |
| Soil samples are digested with hot nitric and hydrochloric acids, followed by CVAAS analysis. This method is fully compliant with the BC SALM strong acid leachable metals digestion method. | | | |
| MET-200.2-CCMS-VA | Soil | Metals in Soil by CRC ICPMS | EPA 200.2/6020A (mod) |
| Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS. | | | |
| Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H ₂ S) may be excluded if lost during sampling, storage, or digestion. | | | |
| MOISTURE-VA | Soil | Moisture content | CWS for PHC in Soil - Tier 1 |
| This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours. | | | |
| NH3-PASTE-F-VA | Soil | Ammonia (as N) in Soil (Paste) by Fluore | CARTER-CSSS / J. ENVIRON. MONIT., 2005 |
| A soil extract produced by the saturated paste extraction procedure is analyzed for ammonia (as N) by using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al. | | | |
| NO2-PASTE-IC-VA | Soil | Nitrite (N) in Soil (Paste) by IC | CARTER-CSSS / EPA 300.1 (MODIFIED) |
| A soil extract produced by the saturated paste extraction procedure is analyzed for nitrite (as N) by Ion Chromatography with conductivity or UV detection. | | | |
| NO3-PASTE-IC-VA | Soil | Nitrate (N) in Soil (Paste) by IC | Carter-CSSS / EPA 300.1 (modified) |
| A soil extract produced by the saturated paste extraction procedure is analyzed for nitrate (as N) by Ion Chromatography with conductivity or UV detection. | | | |

Reference Information

PH-1:2-VA Soil pH in Soil (1:2 Soil:Water Extraction) BC WLAP METHOD: PH, ELECTROMETRIC, SOIL
 This analysis is carried out in accordance with the procedures described in the pH, Electrometric in Soil and Sediment method - Section B Physical/Inorganic and Misc. Constituents, BC Environmental Laboratory Manual 2007. The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PH-PASTE-VA Soil pH in Soil (Paste) by Meter Carter-CSSS / APHA 4500 H
 A soil extract produced by the saturated paste extraction procedure is analyzed by pH meter.

SAT-PCNT-VA Soil Saturation Percentage Carter-CSSS
 Saturation Percentage (SP) is the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage, as described in "Soil Sampling and Methods of Analysis" by M. Carter.

SO4-PASTE-IC-VA Soil Sulfate in Soil (Paste) by IC Carter-CSSS / EPA 300.1 (modified)
 A soil extract produced by the saturated paste extraction procedure is analyzed for sulfate by Ion Chromatography with conductivity detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

| Laboratory Definition Code | Laboratory Location |
|----------------------------|---|
| VA | ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA |

Chain of Custody Numbers:

G111791

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid weight of sample

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

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

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

Page 1 of 7

Client: GHD Limited
400 - 179 Colonnade Road
Ottawa ON K2E 7J4

Contact: Airesse MacPhee

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-------------|------------------------|---------|-----------|--------|-----|--------|-----------|
| ALK-PASTE-VA | Soil | | | | | | | |
| Batch | R4268149 | | | | | | | |
| WG2896854-1 MB | | | | | | | | |
| Bicarbonate (as CaCO3) | | | <3.0 | | mg/kg | | 3 | 10-OCT-18 |
| Carbonate (as CaCO3) | | | <3.0 | | mg/kg | | 3 | 10-OCT-18 |
| AVS-COL-VA | Soil | | | | | | | |
| Batch | R4258518 | | | | | | | |
| WG2889658-3 DUP | | L2169573-1 | | | | | | |
| Acid Volatile Sulphides | | N/A | <0.60 | RPD-NA | umol/g | N/A | 45 | 28-SEP-18 |
| WG2889658-2 LCS | | | | | | | | |
| Acid Volatile Sulphides | | | 87.2 | | % | | 70-130 | 28-SEP-18 |
| WG2889658-1 MB | | | | | | | | |
| Acid Volatile Sulphides | | | <0.20 | | umol/g | | 0.2 | 28-SEP-18 |
| CL-PASTE-IC-VA | Soil | | | | | | | |
| Batch | R4268168 | | | | | | | |
| WG2896854-2 LCS | | | | | | | | |
| Chloride (Cl) | | | 95.0 | | % | | 80-120 | 09-OCT-18 |
| WG2896854-1 MB | | | | | | | | |
| Chloride (Cl) | | | <1.0 | | mg/kg | | 1 | 09-OCT-18 |
| EC-PASTE-VA | Soil | | | | | | | |
| Batch | R4267260 | | | | | | | |
| WG2896854-1 MB | | | | | | | | |
| Conductivity | | | <0.030 | | dS/m | | 0.03 | 09-OCT-18 |
| WG2899018-1 MB | | | | | | | | |
| Conductivity | | | <0.030 | | dS/m | | 0.03 | 09-OCT-18 |
| HG-200.2-CVAF-VA | Soil | | | | | | | |
| Batch | R4266228 | | | | | | | |
| WG2897856-4 CRM | | VA-CANMET-TILL1 | | | | | | |
| Mercury (Hg) | | | 117.6 | | % | | 70-130 | 09-OCT-18 |
| WG2897856-2 DUP | | L2173681-28 | | | | | | |
| Mercury (Hg) | | 0.102 | 0.075 | | mg/kg | 31 | 40 | 09-OCT-18 |
| WG2897856-3 LCS | | | | | | | | |
| Mercury (Hg) | | | 106.4 | | % | | 80-120 | 09-OCT-18 |
| WG2897856-1 MB | | | | | | | | |
| Mercury (Hg) | | | <0.0050 | | mg/kg | | 0.005 | 09-OCT-18 |
| MET-200.2-CCMS-VA | Soil | | | | | | | |



Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

Page 2 of 7

Client: GHD Limited
400 - 179 Colonnade Road
Ottawa ON K2E 7J4

Contact: Airesse MacPhee

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-----------------|------------------------|--------|-----------|-------|-----|------------|-----------|
| MET-200.2-CCMS-VA | | | | | | | | |
| | Soil | | | | | | | |
| Batch | R4266908 | | | | | | | |
| WG2897856-4 | CRM | VA-CANMET-TILL1 | | | | | | |
| Aluminum (Al) | | | 100.9 | | % | | 70-130 | 09-OCT-18 |
| Antimony (Sb) | | | 101.9 | | % | | 70-130 | 09-OCT-18 |
| Arsenic (As) | | | 102.6 | | % | | 70-130 | 09-OCT-18 |
| Barium (Ba) | | | 103.0 | | % | | 70-130 | 09-OCT-18 |
| Beryllium (Be) | | | 0.46 | | mg/kg | | 0.34-0.74 | 09-OCT-18 |
| Bismuth (Bi) | | | 97.8 | | % | | 70-130 | 09-OCT-18 |
| Boron (B) | | | 2.9 | | mg/kg | | 0-8.2 | 09-OCT-18 |
| Cadmium (Cd) | | | 97.0 | | % | | 70-130 | 09-OCT-18 |
| Calcium (Ca) | | | 100.8 | | % | | 70-130 | 09-OCT-18 |
| Chromium (Cr) | | | 106.3 | | % | | 70-130 | 09-OCT-18 |
| Cobalt (Co) | | | 102.7 | | % | | 70-130 | 09-OCT-18 |
| Copper (Cu) | | | 102.4 | | % | | 70-130 | 09-OCT-18 |
| Iron (Fe) | | | 101.7 | | % | | 70-130 | 09-OCT-18 |
| Lead (Pb) | | | 101.0 | | % | | 70-130 | 09-OCT-18 |
| Lithium (Li) | | | 99.7 | | % | | 70-130 | 09-OCT-18 |
| Magnesium (Mg) | | | 102.7 | | % | | 70-130 | 09-OCT-18 |
| Manganese (Mn) | | | 108.0 | | % | | 70-130 | 09-OCT-18 |
| Molybdenum (Mo) | | | 99.3 | | % | | 70-130 | 09-OCT-18 |
| Nickel (Ni) | | | 103.6 | | % | | 70-130 | 09-OCT-18 |
| Potassium (K) | | | 102.1 | | % | | 70-130 | 09-OCT-18 |
| Selenium (Se) | | | 0.33 | | mg/kg | | 0.11-0.51 | 09-OCT-18 |
| Silver (Ag) | | | 0.25 | | mg/kg | | 0.13-0.33 | 09-OCT-18 |
| Sodium (Na) | | | 102.2 | | % | | 70-130 | 09-OCT-18 |
| Strontium (Sr) | | | 101.7 | | % | | 70-130 | 09-OCT-18 |
| Thallium (Tl) | | | 0.126 | | mg/kg | | 0.077-0.18 | 09-OCT-18 |
| Tin (Sn) | | | 1.0 | | mg/kg | | 0-3 | 09-OCT-18 |
| Titanium (Ti) | | | 113.2 | | % | | 70-130 | 09-OCT-18 |
| Tungsten (W) | | | 0.19 | | mg/kg | | 0-0.66 | 09-OCT-18 |
| Uranium (U) | | | 102.2 | | % | | 70-130 | 09-OCT-18 |
| Vanadium (V) | | | 104.7 | | % | | 70-130 | 09-OCT-18 |
| Zinc (Zn) | | | 103.6 | | % | | 70-130 | 09-OCT-18 |
| Zirconium (Zr) | | | 0.8 | | mg/kg | | 0-1.8 | 09-OCT-18 |
| WG2897856-2 | DUP | L2173681-28 | | | | | | |
| Aluminum (Al) | | 21200 | 14000 | DUP-H | mg/kg | 41 | 40 | 09-OCT-18 |



Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

Page 3 of 7

Client: GHD Limited
 # 400 - 179 Colonnade Road
 Ottawa ON K2E 7J4

Contact: Aïresse MacPhee

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-----------------|--------------------|--------|-----------|-------|------|-------|-----------|
| MET-200.2-CCMS-VA | | | | | | | | |
| | Soil | | | | | | | |
| Batch | R4266908 | | | | | | | |
| WG2897856-2 | DUP | L2173681-28 | | | | | | |
| Antimony (Sb) | | 0.76 | 0.60 | | mg/kg | 23 | 30 | 09-OCT-18 |
| Arsenic (As) | | 16.9 | 11.7 | DUP-H | mg/kg | 37 | 30 | 09-OCT-18 |
| Barium (Ba) | | 500 | 353 | | mg/kg | 34 | 40 | 09-OCT-18 |
| Beryllium (Be) | | 1.21 | 0.96 | | mg/kg | 23 | 30 | 09-OCT-18 |
| Bismuth (Bi) | | 0.39 | 0.27 | J | mg/kg | 0.12 | 0.4 | 09-OCT-18 |
| Boron (B) | | 22.5 | 18.5 | | mg/kg | 19 | 30 | 09-OCT-18 |
| Cadmium (Cd) | | 0.734 | 0.503 | DUP-H | mg/kg | 37 | 30 | 09-OCT-18 |
| Calcium (Ca) | | 28300 | 20200 | DUP-H | mg/kg | 33 | 30 | 09-OCT-18 |
| Chromium (Cr) | | 35.9 | 25.1 | DUP-H | mg/kg | 36 | 30 | 09-OCT-18 |
| Cobalt (Co) | | 15.5 | 10.7 | DUP-H | mg/kg | 37 | 30 | 09-OCT-18 |
| Copper (Cu) | | 44.6 | 31.0 | DUP-H | mg/kg | 36 | 30 | 09-OCT-18 |
| Iron (Fe) | | 36500 | 25000 | DUP-H | mg/kg | 38 | 30 | 09-OCT-18 |
| Lead (Pb) | | 20.0 | 13.7 | | mg/kg | 38 | 40 | 09-OCT-18 |
| Lithium (Li) | | 28.4 | 21.6 | | mg/kg | 27 | 30 | 09-OCT-18 |
| Magnesium (Mg) | | 11000 | 7740 | DUP-H | mg/kg | 35 | 30 | 09-OCT-18 |
| Manganese (Mn) | | 431 | 288 | DUP-H | mg/kg | 40 | 30 | 09-OCT-18 |
| Molybdenum (Mo) | | 3.20 | 2.31 | | mg/kg | 32 | 40 | 09-OCT-18 |
| Nickel (Ni) | | 49.0 | 33.3 | DUP-H | mg/kg | 38 | 30 | 09-OCT-18 |
| Phosphorus (P) | | 992 | 694 | DUP-H | mg/kg | 35 | 30 | 09-OCT-18 |
| Potassium (K) | | 3900 | 2780 | | mg/kg | 34 | 40 | 09-OCT-18 |
| Selenium (Se) | | 1.01 | 0.67 | J | mg/kg | 0.35 | 0.4 | 09-OCT-18 |
| Silver (Ag) | | 0.33 | 0.24 | | mg/kg | 32 | 40 | 09-OCT-18 |
| Sodium (Na) | | 219 | 168 | | mg/kg | 26 | 40 | 09-OCT-18 |
| Strontium (Sr) | | 152 | 110 | | mg/kg | 32 | 40 | 09-OCT-18 |
| Sulfur (S) | | <1000 | <1000 | RPD-NA | mg/kg | N/A | 30 | 09-OCT-18 |
| Thallium (Tl) | | 0.291 | 0.219 | | mg/kg | 28 | 30 | 09-OCT-18 |
| Tin (Sn) | | <2.0 | <2.0 | RPD-NA | mg/kg | N/A | 40 | 09-OCT-18 |
| Titanium (Ti) | | 48.3 | 42.5 | | mg/kg | 13 | 40 | 09-OCT-18 |
| Tungsten (W) | | <0.50 | <0.50 | RPD-NA | mg/kg | N/A | 30 | 09-OCT-18 |
| Uranium (U) | | 2.30 | 1.57 | DUP-H | mg/kg | 38 | 30 | 09-OCT-18 |
| Vanadium (V) | | 65.2 | 46.3 | DUP-H | mg/kg | 34 | 30 | 09-OCT-18 |
| Zinc (Zn) | | 144 | 99.0 | DUP-H | mg/kg | 37 | 30 | 09-OCT-18 |
| Zirconium (Zr) | | 9.0 | 7.3 | | mg/kg | | | 09-OCT-18 |



Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

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Client: GHD Limited
400 - 179 Colonnade Road
Ottawa ON K2E 7J4

Contact: Aïresse MacPhee

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-----------------|--------------------|--------|-----------|-------|-----|--------|-----------|
| MET-200.2-CCMS-VA | | | | | | | | |
| | Soil | | | | | | | |
| Batch | R4266908 | | | | | | | |
| WG2897856-2 | DUP | L2173681-28 | | | | | | |
| Zirconium (Zr) | | 9.0 | 7.3 | | mg/kg | 21 | 30 | 09-OCT-18 |
| WG2897856-3 | LCS | | | | | | | |
| Aluminum (Al) | | | 106.2 | | % | | 80-120 | 09-OCT-18 |
| Antimony (Sb) | | | 97.4 | | % | | 80-120 | 09-OCT-18 |
| Arsenic (As) | | | 95.5 | | % | | 80-120 | 09-OCT-18 |
| Barium (Ba) | | | 100.5 | | % | | 80-120 | 09-OCT-18 |
| Beryllium (Be) | | | 95.4 | | % | | 80-120 | 09-OCT-18 |
| Bismuth (Bi) | | | 92.1 | | % | | 80-120 | 09-OCT-18 |
| Boron (B) | | | 93.2 | | % | | 80-120 | 09-OCT-18 |
| Cadmium (Cd) | | | 97.8 | | % | | 80-120 | 09-OCT-18 |
| Calcium (Ca) | | | 94.2 | | % | | 80-120 | 09-OCT-18 |
| Chromium (Cr) | | | 97.6 | | % | | 80-120 | 09-OCT-18 |
| Cobalt (Co) | | | 96.3 | | % | | 80-120 | 09-OCT-18 |
| Copper (Cu) | | | 95.1 | | % | | 80-120 | 09-OCT-18 |
| Iron (Fe) | | | 93.3 | | % | | 80-120 | 09-OCT-18 |
| Lead (Pb) | | | 93.6 | | % | | 80-120 | 09-OCT-18 |
| Lithium (Li) | | | 95.1 | | % | | 80-120 | 09-OCT-18 |
| Magnesium (Mg) | | | 96.2 | | % | | 80-120 | 09-OCT-18 |
| Manganese (Mn) | | | 98.4 | | % | | 80-120 | 09-OCT-18 |
| Molybdenum (Mo) | | | 98.5 | | % | | 80-120 | 09-OCT-18 |
| Nickel (Ni) | | | 96.1 | | % | | 80-120 | 09-OCT-18 |
| Phosphorus (P) | | | 93.8 | | % | | 80-120 | 09-OCT-18 |
| Potassium (K) | | | 100.0 | | % | | 80-120 | 09-OCT-18 |
| Selenium (Se) | | | 94.1 | | % | | 80-120 | 09-OCT-18 |
| Silver (Ag) | | | 92.2 | | % | | 80-120 | 09-OCT-18 |
| Sodium (Na) | | | 96.8 | | % | | 80-120 | 09-OCT-18 |
| Strontium (Sr) | | | 96.4 | | % | | 80-120 | 09-OCT-18 |
| Sulfur (S) | | | 99.7 | | % | | 80-120 | 09-OCT-18 |
| Thallium (Tl) | | | 90.8 | | % | | 80-120 | 09-OCT-18 |
| Tin (Sn) | | | 95.0 | | % | | 80-120 | 09-OCT-18 |
| Titanium (Ti) | | | 95.8 | | % | | 80-120 | 09-OCT-18 |
| Tungsten (W) | | | 97.4 | | % | | 80-120 | 09-OCT-18 |
| Uranium (U) | | | 94.9 | | % | | 80-120 | 09-OCT-18 |
| Vanadium (V) | | | 98.7 | | % | | 80-120 | 09-OCT-18 |



Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

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Client: GHD Limited
400 - 179 Colonnade Road
Ottawa ON K2E 7J4

Contact: Aïresse MacPhee

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------|-----------------|-----------|--------|-----------|-------|-----|--------|-----------|
| MET-200.2-CCMS-VA | Soil | | | | | | | |
| Batch | R4266908 | | | | | | | |
| WG2897856-3 | LCS | | | | | | | |
| Zinc (Zn) | | | 96.9 | | % | | 80-120 | 09-OCT-18 |
| Zirconium (Zr) | | | 98.5 | | % | | 70-130 | 09-OCT-18 |
| WG2897856-1 | MB | | | | | | | |
| Aluminum (Al) | | | <50 | | mg/kg | | 50 | 09-OCT-18 |
| Antimony (Sb) | | | <0.10 | | mg/kg | | 0.1 | 09-OCT-18 |
| Arsenic (As) | | | <0.10 | | mg/kg | | 0.1 | 09-OCT-18 |
| Barium (Ba) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Beryllium (Be) | | | <0.10 | | mg/kg | | 0.1 | 09-OCT-18 |
| Bismuth (Bi) | | | <0.20 | | mg/kg | | 0.2 | 09-OCT-18 |
| Boron (B) | | | <5.0 | | mg/kg | | 5 | 09-OCT-18 |
| Cadmium (Cd) | | | <0.020 | | mg/kg | | 0.02 | 09-OCT-18 |
| Calcium (Ca) | | | <50 | | mg/kg | | 50 | 09-OCT-18 |
| Chromium (Cr) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Cobalt (Co) | | | <0.10 | | mg/kg | | 0.1 | 09-OCT-18 |
| Copper (Cu) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Iron (Fe) | | | <50 | | mg/kg | | 50 | 09-OCT-18 |
| Lead (Pb) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Lithium (Li) | | | <2.0 | | mg/kg | | 2 | 09-OCT-18 |
| Magnesium (Mg) | | | <20 | | mg/kg | | 20 | 09-OCT-18 |
| Manganese (Mn) | | | <1.0 | | mg/kg | | 1 | 09-OCT-18 |
| Molybdenum (Mo) | | | <0.10 | | mg/kg | | 0.1 | 09-OCT-18 |
| Nickel (Ni) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Phosphorus (P) | | | <50 | | mg/kg | | 50 | 09-OCT-18 |
| Potassium (K) | | | <100 | | mg/kg | | 100 | 09-OCT-18 |
| Selenium (Se) | | | <0.20 | | mg/kg | | 0.2 | 09-OCT-18 |
| Silver (Ag) | | | <0.10 | | mg/kg | | 0.1 | 09-OCT-18 |
| Sodium (Na) | | | <50 | | mg/kg | | 50 | 09-OCT-18 |
| Strontium (Sr) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Sulfur (S) | | | <1000 | | mg/kg | | 1000 | 09-OCT-18 |
| Thallium (Tl) | | | <0.050 | | mg/kg | | 0.05 | 09-OCT-18 |
| Tin (Sn) | | | <2.0 | | mg/kg | | 2 | 09-OCT-18 |
| Titanium (Ti) | | | <1.0 | | mg/kg | | 1 | 09-OCT-18 |
| Tungsten (W) | | | <0.50 | | mg/kg | | 0.5 | 09-OCT-18 |
| Uranium (U) | | | <0.050 | | mg/kg | | 0.05 | 09-OCT-18 |



Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

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Client: GHD Limited
 # 400 - 179 Colonnade Road
 Ottawa ON K2E 7J4

Contact: Airesse MacPhee

| Test | Matrix | Reference | Result | Qualifier | Units | RPD | Limit | Analyzed |
|--------------------------------|---------------------|-----------|--------|-----------|-------|------|-----------|-----------|
| MET-200.2-CCMS-VA Soil | | | | | | | | |
| Batch R4266908 | | | | | | | | |
| WG2897856-1 MB | | | | | | | | |
| | Vanadium (V) | | <0.20 | | mg/kg | | 0.2 | 09-OCT-18 |
| | Zinc (Zn) | | <2.0 | | mg/kg | | 2 | 09-OCT-18 |
| | Zirconium (Zr) | | <1.0 | | mg/kg | | 1 | 09-OCT-18 |
| MOISTURE-VA Soil | | | | | | | | |
| Batch R4256989 | | | | | | | | |
| WG2891642-9 DUP L2171896-18 | | | | | | | | |
| | Moisture | 15.1 | 14.6 | | % | 3.6 | 20 | 01-OCT-18 |
| WG2891642-8 LCS | | | | | | | | |
| | Moisture | | 99.2 | | % | | 90-110 | 01-OCT-18 |
| WG2891642-7 MB | | | | | | | | |
| | Moisture | | <0.25 | | % | | 0.25 | 01-OCT-18 |
| PH-1:2-VA Soil | | | | | | | | |
| Batch R4266048 | | | | | | | | |
| WG2897856-2 DUP L2173681-28 | | | | | | | | |
| | pH (1:2 soil:water) | 7.89 | 7.89 | J | pH | 0.00 | 0.2 | 09-OCT-18 |
| WG2897856-5 IRM VA-ALP-SRS1507 | | | | | | | | |
| | pH (1:2 soil:water) | | 7.78 | | pH | | 7.34-7.94 | 09-OCT-18 |
| PH-PASTE-VA Soil | | | | | | | | |
| Batch R4267263 | | | | | | | | |
| WG2896854-3 IRM VA-ALP-SRS1507 | | | | | | | | |
| | Paste pH | | 7.28 | | pH | | 6.85-7.45 | 09-OCT-18 |
| WG2896854-2 LCS | | | | | | | | |
| | Paste pH | | 5.96 | | pH | | 5.7-6.3 | 09-OCT-18 |
| SAT-PCNT-VA Soil | | | | | | | | |
| Batch R4267231 | | | | | | | | |
| WG2896854-3 IRM VA-ALP-SRS1507 | | | | | | | | |
| | % Saturation | | 105.7 | | % | | 80-120 | 09-OCT-18 |
| WG2896854-1 MB | | | | | | | | |
| | % Saturation | | 50.0 | | % | | 50 | 09-OCT-18 |
| SO4-PASTE-IC-VA Soil | | | | | | | | |
| Batch R4268168 | | | | | | | | |
| WG2896854-2 LCS | | | | | | | | |
| | Sulfate (SO4) | | 105.5 | | % | | 80-120 | 09-OCT-18 |
| WG2896854-1 MB | | | | | | | | |
| | Sulfate (SO4) | | <2.5 | | mg/kg | | 2.5 | 09-OCT-18 |

Quality Control Report

Workorder: L2169573

Report Date: 11-OCT-18

Client: GHD Limited
400 - 179 Colonnade Road
Ottawa ON K2E 7J4

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Contact: Airesse MacPhee

Legend:

| | |
|-------|---|
| Limit | ALS Control Limit (Data Quality Objectives) |
| DUP | Duplicate |
| RPD | Relative Percent Difference |
| N/A | Not Available |
| LCS | Laboratory Control Sample |
| SRM | Standard Reference Material |
| MS | Matrix Spike |
| MSD | Matrix Spike Duplicate |
| ADE | Average Desorption Efficiency |
| MB | Method Blank |
| IRM | Internal Reference Material |
| CRM | Certified Reference Material |
| CCV | Continuing Calibration Verification |
| CVS | Calibration Verification Standard |
| LCSD | Laboratory Control Sample Duplicate |

Sample Parameter Qualifier Definitions:

| Qualifier | Description |
|-----------|---|
| DUP-H | Duplicate results outside ALS DQO, due to sample heterogeneity. |
| J | Duplicate results and limits are expressed in terms of absolute difference. |
| RPD-NA | Relative Percent Difference Not Available due to result(s) being less than detection limit. |

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CHAIN OF CUSTODY RECORD

Burnaby: 4606 Canada Way, Burnaby, BC V5G 1K5. Toll Free (800) 665-8566

BBY FCD-00077/05

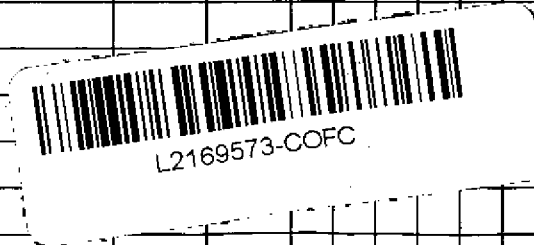
Page 1 of 1

| Invoice Information | Report Information (if differs from invoice) | Project Information (where applicable) | Turnaround Time (TAT) Required |
|---|--|---|---|
| Company Name: #163 GHD Limited Contact Name: Airse MacPhee Address: 651 Corby Drive Waterloo ON PC: N2V 1C2 Phone: 519 984 0510 Email: airse.macphee@ghd.com | Company Name: Contact Name: Address: PC: Phone: Email: and national EDD Support | Quotation #: B61455 P.O. #/ AFE#: 735 66780-3 Project #: 88877-03-10 Site Location: Upland Landfill Site #: Sampled By: Rose Marie Rocca | <input checked="" type="checkbox"/> Regular TAT 5 days (Most analyses) PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS Rush TAT (Surcharges will be applied) <input type="checkbox"/> Same Day <input type="checkbox"/> 2 Days <input type="checkbox"/> 1 Day <input type="checkbox"/> 3 Days Date Required: |

| Regulatory Criteria | Special Instructions | Analysis Requested | Rush Confirmation #: |
|---|---|--|---|
| <input type="checkbox"/> BC CSR Soil <input type="checkbox"/> BC CSR Water <input type="checkbox"/> CCME (Specify) <input type="checkbox"/> Other (Specify) <input type="checkbox"/> Drinking Water <input type="checkbox"/> BC Water Quality | <input checked="" type="checkbox"/> Keep Extra Sample Volume <input type="checkbox"/> Return Cooler <input type="checkbox"/> Ship Sample Bottles (Please Specify) GHD may request the sample to be returned. | Analysis Requested: VOC/PH <input type="checkbox"/> MTBE <input type="checkbox"/> EPH <input type="checkbox"/> PAH <input type="checkbox"/> CCME-PHC <input type="checkbox"/> BTEX/F1 <input type="checkbox"/> F2-F4 <input type="checkbox"/> Preserved? Dissolved Metals <input type="checkbox"/> Filtered? <input type="checkbox"/> Preserved? Dissolved Mercury <input type="checkbox"/> Filtered? <input type="checkbox"/> Preserved? Total Metals <input type="checkbox"/> Field Preserved? Total Mercury <input type="checkbox"/> Field Preserved? Chloride <input type="checkbox"/> Fluoride <input type="checkbox"/> Sulphate <input type="checkbox"/> COD <input type="checkbox"/> TSS <input type="checkbox"/> BOD <input type="checkbox"/> Conductivity <input type="checkbox"/> Alkalinity <input type="checkbox"/> pH <input type="checkbox"/> Nitrate <input type="checkbox"/> Ammonia <input type="checkbox"/> Nitrite <input type="checkbox"/> | LABORATORY USE ONLY CUSTODY SEAL Y/N Present Intact COOLER TEMPERATURES COOLING MEDIA PRESENT = Y / N = |

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

| Sample Identification | Lab Identification | Date Sampled (YYYY/MM/DD) | Time Sampled (HH:MM) | Matrix | BTEX/PH | EPH | PAH | CCME-PHC | BTEX/F1 | F2-F4 | Preserved? | Dissolved Metals | Filtered? | Preserved? | Dissolved Mercury | Filtered? | Preserved? | Total Metals | Field Preserved? | Total Mercury | Field Preserved? | Chloride | Fluoride | Sulphate | COD | TSS | BOD | Conductivity | Alkalinity | pH | Nitrate | Ammonia | Nitrite | # OF CONTAINERS SUBMITTED | HOLD - DO NOT ANALYZE | COMMENTS |
|---------------------------|--------------------|---------------------------|----------------------|--------|---------|-----|-----|----------|---------|-------|------------|------------------|-----------|------------|-------------------|-----------|------------|--------------|------------------|---------------|------------------|----------|----------|----------|-----|-----|-----|--------------|------------|----|---------|---------|---------|---------------------------|-----------------------|----------|
| 1 SED-170918-88877-RMR-01 | | 2018/09/17 | 1115 | SEDIM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | X | |
| 2 SED-170918-88877-RMR-02 | | 2018/09/17 | 1150 | SEDIM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | X | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



| RELINQUISHED BY: (Signature/Print) | DATE: (YYYY/MM/DD) | TIME: (HH:MM) | RECEIVED BY: (Signature/Print) | DATE: (YYYY/MM/DD) | TIME: (HH:MM) | MAXXAM JOB # |
|------------------------------------|--------------------|---------------|--------------------------------|--------------------|---------------|--------------|
| RMR Rose Marie Rocca | 2018/09/19 | 10:30am | | | | |
| | 2018/09/21 | | | | | |