HALIFAX REGIONAL MUNICIPALITY

Phase I/II Environmental Site Assessment

Port Wallace, Dartmouth, Nova Scotia

August2019 – 19-9183

August 15, 2019

137 Chain Lake Drive
Halifax, Nova Scotia
Canada
B3S 1B3
Telephone
902.450.4000
Fax
902.450.2008

Halifax Regional Municipality
P. O. Box 1749
Halifax, Nova Scotia
B3J 3A5

ATTENTION: Jim Hunter, P.Geo.
Environmental Performance Officer – Risk and Compliance
Energy and Environment

Phase I/II Environmental Site Assessment Report
Port Wallace, Dartmouth, Nova Scotia
Property Identification Designation Numbers (PID Nos.) 41301789 and 41376898

The following report documents the results of our Phase I/II Environmental Site Assessment activities completed at Port Wallace located in Dartmouth, Nova Scotia. Pursuant to the Nova Scotia Contaminated Site Regulations and associated Ministerial Protocols, the Notification of Contamination Form (FRM-100) is appended in Appendix G for submission to NSE.

Should you have any questions, please contact us.

Yours truly,

DILLON CONSULTING LIMITED

Original Signed | Original Signed

Michael Charles, P.Eng.
Senior Technical Reviewer

Rebecca Appleton, P.Eng.
Project Manager/Site Professional

SMG:jes

Our File: 19-9183-1000

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Executive Summary

Dillon Consulting Limited (Dillon) was retained by Halifax Regional Municipality (HRM) to conduct a Phase I/II Environmental Site Assessment (ESA) along the Mitchell's Brook and Barry's Run properties, which are located at Port Wallace within Dartmouth, Nova Scotia (herein referred to as the "subject property" or the "site"). The Site is being considered for future development of the adjoining lands. Historic information reviewed as part of the Phase I ESA has demonstrated there are metals impacts in soil, sediment, and surface water due to historic tailings operations up gradient of the Site (i.e., at the former Montague Gold Mines site). Prior to advancing the development around the Site, HRM needs to understand the existing human health and ecological risk, and also identify potential development controls or restrictions to manage future human health and ecological risk.

The Phase II ESA was completed to provide information regarding sediment contamination, general distribution, and metals concentrations in surface water on-site. Sediments were obtained using several sampling techniques to accommodate the various sediment matrices and recover acceptable quality sediment cores for analysis. In addition, the organic deposits (i.e., bog/fen complex), which is found adjacent to Mitchell's Brook and Barry's Run was manually probed to determine the depth of the organic material and potential presence of deeper underlying sediments containing metal impacted tailings.

The results of the sediment analytical results demonstrated that the bog/fen complex has been evolving over thousands of years and that sediment underlying it are typical of local geological formations. However, sediments in the channel were found to be impacted by heavy metals, both in the more recent organic deposits as well as the underlying tailings. Historic information and remnant debris at the outflow to Barry's Run indicates there was once a control structure present that may have been used to either control flows, or backup the surface water and flood the bog/fen complex to capture tailings, possibly up to the edge of the existing treeline. Although not part of the Phase II ESA scope, it is possible that tailings may have impacted the surface vegetation root zone of the bog/fen complex if historic flooding occurred, representing a potential human health or ecological risk. Due to the shallow water depths near the upstream brook areas, additional human or ecological health risks may be associated with sediments. Based on anecdotal information, local residents also fish within the Site area and this may represent a human health issue if fish are consumed.

Although the Phase II ESA was not meant to fully delineate or quantify volumes of impacted media, the study has made several conclusions and recommendations. As there is a concurrent study to assess the former Montague Gold Mines area and tailings, it is recommended that any final risk controls or management for this Site be coordinated with the outcomes of the mine study to provide an overall/consistent risk control framework. Additional information is required to confirm whether environmental risks are present, and include:

- Additional characterization for metals/TOC of near surface organics/peat from the bog/fen complex;

- Information on types of ecological receptors present onsite and their habits;
- Details of site-specific risk-based criteria currently being developed for the Montague Mines sites as part of the closure plan; and,
- The methods/approach being established for the Closure plan of properties that are “off Crown lands” included in the ongoing Montague Mines closure study.

Based on Dillon’s understanding of the Site, including the Site’s current uses and proposed future residential development on lands adjacent to the Site, the following exposure scenarios and receptor pathways are likely applicable to this site:

- Children playing in the bog/fen complex for recreational purposes;
- Children playing in shallow portions of Mitchell’s Brook for recreational purposes;
- Fishing activities and fish consumption in Mitchell’s Brook and Barry’s Run; and
- Impacts to ecological receptors.

Until further information is known about potential risks to human health and ecological receptors, the degree of uncontrolled recreational use/fishing should be carefully evaluated. A risk assessment is recommended to obtain data concerning potential risks to human health and ecological receptors. Pending the results of a risk assessment, a risk management plan that incorporates appropriate engineering and administrative controls is also recommended.

Acadia University conducted a supplemental study of near surface sediments to detail metal concentration distribution with depth (top 300mm sediment layer) in Barry’s Run. The study has evidence to suggest that, while there may have been a historic period where Barry’s Run was recovering, there are now near surface sediments with arsenic concentrations similar to old tailing deposits. This provides evidence that the fen is still acting as a sink for arsenic impacted tailings originating in upgradient areas and these materials continue to be mobilized into Barry’s Run. The upper sediment layers of Barry’s Run are also very fine with a mix of organic and clay-size particle fractions which can be readily mobilized if disturbed. The proposed development on the lands adjacent to the Site has the potential to increase stormwater flow volumes to the Site and increase mobilization of tailings material through the Site. The hydrology of the Site was not assessed as part of this study; however, the stability of the bog/fen complex is likely susceptible to changing hydrology on adjacent lands. In regards to future development of adjacent lands, the requirement for buffer zones to maintain stability of the bog/fen complex should also be considered. Any increase in stormwater flows from the adjacent development to the subject site should be prohibited unless it can be demonstrated to not disrupt the bog/fen complex integrity or mobilize more tailings into the system.

The initial findings of the Acadia University study for Lake Charles does provide evidence that lakebed sediments with arsenic impacted tailings from the 1900’s are now being covered by new cleaner material, with arsenic concentrations similar to those prior to mine or urban development.

This report was prepared by Dillon Consulting Limited for the sole benefit of our client, Halifax Regional Municipality (HRM). The conclusions reflect Dillon's judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report or any reliance on or decisions made based on it are the responsibilities of such third parties. Dillon accepts no responsibilities for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by Halifax Regional Municipality (HRM) to conduct a Phase I/II Environmental Site Assessment (ESA) of their property located adjacent to and including Mitchell's Brook and Barry's Run, which are located at Port Wallace within Dartmouth, Nova Scotia (herein referred to as the "subject property" or the "site"), as shown on **Figure 1**. According to Nova Scotia Property Online (accessed May 2019), the subject property is comprised of one land parcel zoned as resource (PID No. 41376898) and one land parcel without zoning (PID No. 41301789). The Phase I/II ESA was conducted to support HRM's requirement to further characterize environmental contamination and potential contamination, and develop appropriate risk management guidance prior to development near or on these properties.

The subject property is currently vacant, undeveloped, forested land. Barry's Run and Mitchell's Brook run through the centre of the subject property from the northeastern to the southern property boundary. Mitchell's Brook originates north of the Highway 107 Extension in the Community of Montague Mines and Lake Loon. Barry's Run discharges to Lake Charles and the Shubenacadie Canal System to the south. The remains of a former flow control structure exists between Barry's Run and Lake Charles.

Based on the finding of the Phase I ESA, Phase II ESA activities were recommended to assess whether contaminants of potential environmental concern, including various metals and cyanide were present in sediment, soil and surface water on-site at concentrations above the Nova Scotia Contaminated Site Regulations (NSCSRs) Tier 1 Environmental Quality Standards (EQS). In addition, select sediment and surface water samples collected at the top of Mitchell's Brook and the bottom of Barry's Run were analyzed for petroleum hydrocarbons to confirm presence or absence of these parameters on the subject site. Based on discussions with the Consultant leading the environmental site assessment and closure for the upstream former Montague Mines property, additional analytical parameters were added to assist with the interpretation of results and to aid in determining potential risk management or remedial strategies. These parameters include total organic carbon (TOC), sulphate, sulphur, and sulphide, and collecting pore water samples for metals analyses.

The assessment work was conducted in accordance with the Environmental Site Assessment for Limited Remediation Protocol (L2 category) associated with the NSCSRs.

As a supplement to this work, detailed near-surface sediment studies were conducted concurrently by Dr. Ian Spooner of Acadia University. The purpose of that study was to provide a finer level of detail for arsenic distribution in the sediments over depth. This information provides improved understanding of both the nature of deposition in Barry's Run and Lake Charles and how long-term attenuation was progressing. The results of the study are presented in **Appendix I** of this report.

The following report summarizes the results of the Phase I/II ESA. Photographs of the subject site and surrounding properties are presented in **Appendix A**. Historical records are presented in **Appendix B** to **Appendix D**. Laboratory analytical results tables and sediment stratigraphy logs are presented in **Appendix E**. Laboratory analytical certificates are presented in **Appendix F**. The Notification of Contamination Form (FRM-100) is presented in **Appendix G**.

HALIFAX REGIONAL MUNICIPALITY

PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

SITE LOCATION MAP
FIGURE 1

DILLON CONSULTING

MAP/DRAWING INFORMATION
National Topographic System Mapsheet 11D/12.

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CHECKED BY: RMA
DESIGNED BY: SMG

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2.0 Site Background

2.1 Property Description

The subject property is located along the Mitchell's Brook and Barry's Run which are located at Port Wallace within Dartmouth, Nova Scotia in a mixed residential/resource area of Dartmouth. As mentioned above, the property includes one land parcel zoned as resource, legally identified by property identification designation number (PID Nos.) 41376898 and 41301789 based on the Service Nova Scotia and Municipal Relations Property Online database (accessed May 16, 2019). The subject property occupies a combined land area of approximately 10 hectares.

The subject property is owned by HRM (contact: Jim Hunter, P. Geo., Halifax Regional Municipality, P.O. Box 1749, Halifax, NS, B3J 3A5, Tel: 902-292-3111). The surrounding properties and their corresponding land uses are presented in **Figure 2**. Photographs of the subject property are presented in **Appendix A**.

2.2 Onsite Features

The subject property is currently vacant, undeveloped, forested land. Barry's Run and Mitchell's Brook run through the centre of the subject property from the northeastern to the southern property boundary. The watercourse narrows as it transitions between Mitchell's Brook and Barry's Run. Remains of a rough foot/ATV bridge exists in this narrow transition zone (**Photos 8** and **9** in **Appendix A**). Remanence of a former flow control structure exists at the downstream end of Barry's Run before crossing under Waverley Road and discharging into Lake Charles.

Adjoining vacant forested lands to the southeast of the subject property contain a small borrow pit. Many paths are present through the forested lands surrounding the subject property, including the area between Barry's Run and Mitchell's Brook that are used for all-terrain vehicles and hikers.

2.3 Adjoining Properties

The subject property is bordered to the north by vacant, undeveloped, forested land with Highway 107 Extension and the Conrad Brothers Quarry property adjacent to the northwest. To the northeast is Highway 107 Extension, with the former Montague Mines region adjacent to the Highway to the east. To the south is vacant, undeveloped, forested land and a small borrow pit area. To the west, the site is bordered by residential dwellings along Waverley Road (Highway 318) and Lake Charles.

As presented on **Figures 2** and **3**, Pinnacle Properties Limited own the land parcels to the immediate northeast of the HRM owned portion of Mitchell's Brook. These land parcels include a portion of Mitchell's Brook and the outflow of surface waters from the former Montague Mines site, through a double culvert under Highway 107 (**Photo 3** in **Appendix A**). Historic gold mining in the region has reportedly resulted in significant arsenic and mercury impacted mine tailings throughout the region encompassing the upper sub-watershed of Mitchell's Brook and Barry's Run. The extent of these impacts is unknown.

Port Wallace Holdings Limited (Clayton Developments) owns much of the remaining properties located directly adjacent to the subject site. Future multi-use residential development is proposed for these lands.

2.4 Water Supply/Groundwater Usage

The subject property lies within the municipal servicing boundary of HRM. Surrounding properties are also serviced by municipal water and sewer.

2.5 Regulatory Framework

2.5.1 Nova Scotia Contaminated Site Regulations and Associated Ministerial Protocols

The ESA for the subject property was conducted in accordance with the NSCSRs and associated Ministerial Protocols. The assessment work was conducted in accordance with the Ministerial Protocol PRO-200 (Environmental Site Assessment for Limited Remediation), specifically for an L2 ESA, which applies to the assessment of contamination from a single source with single or multiple contaminants of concern (e.g., metals and cyanide associated with the former operation of the Montague Mines site).

The criteria used to assess metals, TOC, sulphur, sulphide, and sulphate in soil; metals, TOC, sulphur, sulphide, sulphate, benzene, toluene, ethylbenzene, and xylenes (BTEX), modified total petroleum hydrocarbons (TPH), and cyanide in sediment; and metals (dissolved and total), cyanide, BTEX, and modified TPH in surface water were the NSCSR Tier 1 EQS for soil, sediment, and surface water. Specifically, sediment results were compared to the Tier 1 EQS for freshwater sediment as well as the Tier 1 EQS for soil on a property having residential land-use (i.e., the proposed future land-use of the site is residential noting that it is currently zoned as resource), non-potable groundwater usage, and coarse-grained soil; and surface water results were compared to the Tier 1 EQS for freshwater surface water.

2.5.2 United States Environmental Protection Agency National Recommended Water Quality Criteria for Aquatic Life

The NSCSR Tier 1 EQS for surface water generally apply to total metals analyses; therefore, the criteria used to assess dissolved metals in pore water and surface water samples were the United States Environmental Protection Agency National Recommended Water Quality Criteria for Aquatic Life (specifically, the criterion continuous concentration or CCC) (herein referred to as the US EPA FWAL criteria). In absence of a US EPA FWAL criteria for dissolved metals, the dissolved metals results for pore water and surface water were compared to the NSCSR Tier 1 EQS for total metals in surface water.

HALIFAX REGIONAL MUNICIPALITY

PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

SUBJECT PROPERTY LINES

PROPERTY LINES

SUBJECT and SURROUNDING PROPERTIES

FIGURE 2

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MAP/DRAWING INFORMATION
Nova Scotia Property Online and Dillon Consulting Limited site visits. Property lines are approximate only. This is not a legal survey.

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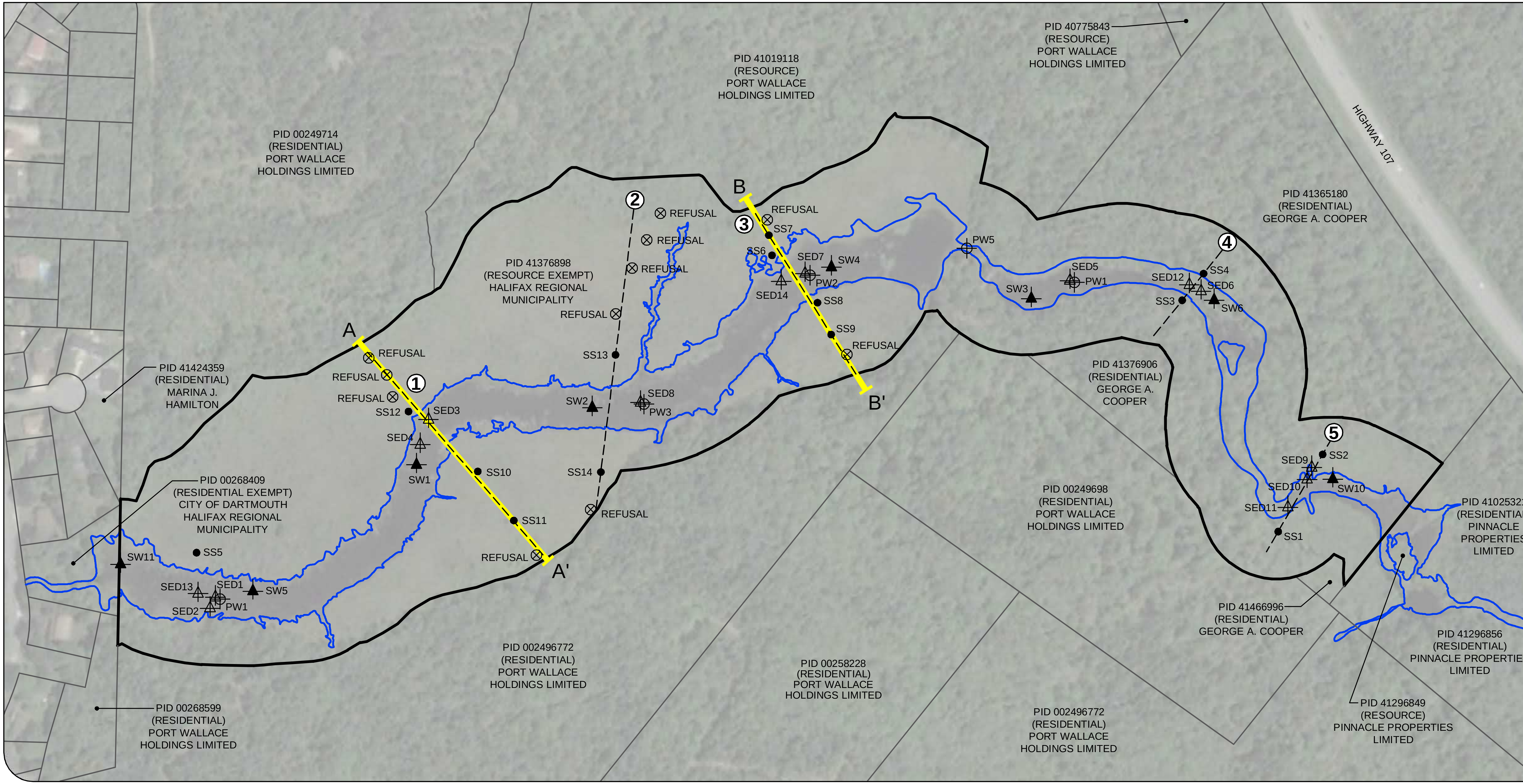

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

SUBJECT PROPERTY LINE
PROPERTY LINE
TRANSECT LINE
CROSS SECTION
SOIL SAMPLE
SURFACE WATER SAMPLE
SEDIMENT SAMPLE
REFUSAL IN COBBLES AND/OR ROCK
PORE WATER SAMPLE

SITE PLAN
FIGURE 3

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MAP/DRAWING INFORMATION
Nova Scotia Property Online and Dillon Consulting Limited site visits. Property lines are approximate only. This is not a legal survey.

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PROJECT: 19-9183
DATE: AUGUST 2019

3.0 Phase I Environmental Site Assessment Activities

3.1 Objectives and Scope of Work

The objective of the Phase I ESA was to assess whether actual sources or potential sources of environmental contamination are present on the subject property resulting from current or historic activities. Contamination is defined as "the presence of a substance of concern, or a condition, in concentrations above appropriate pre-established criteria in soil, sediment, surface water, groundwater, air, or structures" (CSA, 2016).

To fulfill the objective of the Phase I ESA, the following scope of work was agreed to:

- Review of records that were reasonably attainable for the site and surrounding area;
- A site visit to observe the site and surrounding properties;
- Interviews of persons knowledgeable with respect to past and current uses of the site; and,
- Evaluation of the findings and reporting.

3.2 Standards and Limiting Conditions

This Phase I ESA was performed in accordance with the Phase I ESA guideline document produced by the Canadian Standards Association (CSA Z768-01 - reaffirmed in 2016). As such, this report is based on limited visual observations made during the site visit, a review of available historical records, and requests for information filed with government or other regulatory agencies. The Phase I ESA did not include sample collection, analysis or measurements, and was not intended to be a definitive investigation of contamination or other environmental concerns at the site. It is noted that observations of heavily wooded areas on the subject property were limited to what was visible from paths through the areas and less dense portions of the wooded areas.

3.3 Methodology

This section describes the methods used to conduct the historical records review, site visits, and interview activities.

3.3.1 Records Review

The records review consisted of requesting and reviewing information available from HRM, other government, public and other agencies or parties. Information was reviewed from the following sources:

Agencies, Information, Source Documents and Publications

- Nova Scotia Environment (NSE) Information Access and Privacy Environmental Registry;
- National Air Photo Library via Environmental Risk Information Services (ERIS);

- City directories via ERIS;
- Fire insurance maps via ERIS;
- Surficial and bedrock geology mapping; and,
- Topographic mapping.

Documentation obtained through these sources is provided in **Appendix B** to **Appendix D.**

3.4 Site Reconnaissance

Dillon conducted a site visit on January 28, 2019. Activities conducted during the site visit included:

- Observation of the subject property and surrounding land to identify (as applicable) stressed vegetation, spills, stained areas, air emissions, odours, pits, lagoons, watercourses, ditches, and standing water; and,
- Observation of the properties adjacent to the site (to the extent possible) to assess use, as could be viewed from the site and adjoining public lands.

Photographs taken during the site visit are presented in **Appendix A**.

3.5 Interviews

The interview portion of the Phase I ESA consisted of interviewing a Senior Project Manager with HRM, Darren Young, P. Eng.; and the Director of Operations, Scott MacCallum, P.Eng., MBA, and the Director of Planning and Development, Kevin Neatt, BA, MA from Clayton Developments Limited/Port Wallace Holdings Limited (i.e., the property owner of the majority of the surrounding lands). Information obtained during the interviews has been incorporated into the following report sections.

3.6 Phase I ESA Findings

This section presents and discusses findings of the Phase I ESA. A summary of the significant environmental issues that were identified is presented in **Section 3.10**.

3.6.1 Historical Records Review

3.6.1.1 Records from Clayton Developments (Adjacent Landowners/Developers)

Records were received from Clayton Developments (i.e., the property owner of the majority of the surrounding lands, which has been registered as Port Wallace Holdings Limited on property online) pertaining to the subject property, the adjacent properties owned by Port Wallace Holdings Limited, Lake Charles (considered a Shubenacadie Headwaters Lake), and the former Montague Mines property. Documents pertinent to a Phase I/II ESA were reviewed and summarized in **Table 1**. The following documents were reviewed (**Appendix B**):

- Dale, J.M and Freedman, B. Arsenic Pollution Associated with Tailings at an Abandoned Gold Mine in Halifax Country, Nova Scotia. Proc. N.S Inst. Sci. Volume 32, pp 337-349. 1982.
- R. R. Brooks, J. E. Fergusson, J. Holzbecher, D. E. Ryan and H. F. Zhang. Pollution by Arsenic in a Gold Mining District in Nova Scotia. Environmental Pollution (Series B) 4 pp 109-117. 1982.
- DeSisto, Stephanie. Hydrogeochemical Evaluation And Impact of Remediation Design on Arsenic Mobility at Historical Gold Mine Sites. Thesis. Queen's University. Kingston, Ontario, Canada. 2014.
- Drage, J. Review of the Environmental Impacts of Historic Gold Mine Tailings in Nova Scotia. Open File Report ME 2015-04. Nova Scotia Natural Resources. October 2015.
- M.B. Parsons, K.W.G. LeBlanc, G.E.M Hall, A.L. Sangster, J.E. Vaive and P. Pelchat. Environmental geochemistry of tailings, sediments and surface waters collected from 14 historical gold mining districts in Nova Scotia. Geological Survey of Canada Open File 7150. 2012.
- Nova Scotia Environment. The Impact of Past Gold Mining Activities on the Shubenacadie River Headwaters Ecosystem. IWD-AR-WQB-85-81. 1985.
- Lay T and Nolan, W. Technical Report #26. Groundwater Resources Shubenacadie-Stewiake River Basin. Shubenacadie-Stewiacke River Basin Board. May 1979.
- Shubenacadie Lakes Planning/Pollution Control Study prepared by Vaughan Engineering Associates Limited and dated May 1993.
- AECOM. Halifax Regional Municipality Shubenacadie Lakes Subwatershed Study. April 2013.
- T. Lay and Nolan, White & Associates. Technical Report #26 – Groundwater Resources: Shubenacadie-Stewiacke River Basin. May 1979.
- Cultural Resource Management Group Limited. Port Wallace Holdings Limited, Left Bank of Barry's Run Archaeological Assessment, Port Wallace, Nova Scotia. December 2014.
- Englobe. Port Wallace Holdings Limited Soil Sample Location Plan. October 5, 2018.
- Stantec Consulting Limited. An Analysis of the HRM Lakes Water Quality Monitoring Program Data (2006-2011). October 2012.
- Englobe. Port Wallace, NS Surface Water Quality Monitoring. January 5, 2018.

Table 1: Historical Record Review Summary

Document Title	Summary of Relevant Information
Dale, J.M and Freedman, B. Arsenic Pollution Associated with Tailings at an Abandoned Gold Mine in Halifax Country, Nova Scotia. Proc. N.S Inst. Sci. Volume 32, pp 337-349. 1982	• High concentrations of arsenic were found at the Montague Mine site (up to 7.2% by weight) • Biological uptake of arsenic was observed in plant samples taken along Mitchell's Brook and throughout the tailings areas.
R. R. Brooks, J. E. Fergusson, J. Holzbecher, D. E. Ryan and H. F. Zhang. Pollution by Arsenic in a Gold Mining District in Nova Scotia. Environmental Pollution (Series B) 4 pp 109-117. 1982.	• Thirty sample locations were selected from the Montague Mines Sites, downstream through Mitchell's Brook and Barry's Run, to the outflow at Lake Charles. The last sample location is at the entrance of Lake Charles. • Samples were collected of surface water, stream sediments, twigs of alder, tailings and larvae. • At its origin at Lake Loon, surface water in Mitchell's Brook contained a relatively high (37 µg/L) background level of arsenic. These levels

Document Title	Summary of Relevant Information
	steadily decreased throughout Mitchell's Brook until the tailings were encountered at which point the concentration within the water column increased to 140 µg/L at a distance of approximately 1400m from Lake Charles. Levels steadily decreased until they were less than 50 µg/L. • Arsenic levels within sediment were found to be elevated but relatively consistent, with concentrations being at their highest within the Montague Mine tailings (~1600mg/kg). It is worth noting that at the exit to Lake Charles arsenic levels dropped to ~150 mg/kg. • Elevated arsenic was found within fly larvae and twig samples taken along Mitchell's Brook.
DeSisto, Stephanie. Hydrogeochemical Evaluation And Impact of Remediation Design on Arsenic Mobility at Historical Gold Mine Sites. Thesis. Queen's University. Kingston, Ontario, Canada. 2014.	• This study looked at two sites, Montague Mines and Goldenville. For the purpose of this summary, only information relating to Montague Mines will be provided. • The main objectives of the study were to characterize pre-remediation geochemical controls on arsenic mobility in subsurface tailings; establish hydrogeological influences on arsenic mobility; and identify geochemical changes that result when a low organic soil cover is applied to the tailings. • It was identified that in 1938 there was redevelopment of the Montague mine, specifically the building of a heap leach cyanidation plant to extract gold from stockpiled concentration. • The effluent from this process was sluiced directly into Mitchell's Brook, through Barry's Run and into Lake Charles, without treatment or controls. • The study evaluates issues such as geochemistry, linear groundwater flow in the tailings, concentrations, and remediation options. Challenges to remediation are outlined and discussed. • Elevated arsenic was found throughout the Montague mine site, and within Mitchell's Brook. Speciation studies were conducted in conjunction with hydrogeological testing. It was found that while natural attenuation was occurring due to subsurface and groundwater conditions, natural attenuation was not proceeding fast enough to drop concentrations in the soil and water at the Montague Mine below relevant health guidelines.
Drage, J. Review of the Environmental Impacts of Historic Gold Mine Tailings in Nova Scotia. Open File Report ME 2015-04. Nova Scotia Natural Resources. October 2015.	• Provides the following information about the Montague Mines site: o Date of Operation: 1863-1940 o Tailings Mass (Tonnes): 121,816 o Gold Produced (oz): 68,139 o Average Arsenic Level in Tailings (mg/kg): 13,651 o Max Arsenic Level in Tailings (mg/kg): 41,299
M.B. Parsons, K.W.G. LeBlanc, G.E.M Hall, A.L. Sangster, J.E. Vaive and P. Pelchat. Environmental geochemistry of tailings, sediments and surface waters collected from 14 historical gold mining districts in Nova Scotia. Geological Survey of Canada Open File 7150. 2012.	• Upstream of the subject property, at Montague, it appears sulfide concentrates were disposed of on top of tailings following cyanide leaching. • Concentrations of arsenic in the tailings at Montague in the drainage area of Mitchell's Brook were found to be elevated (up to 4.1% by weight). • Concentrations of mercury in the tailings at Montague in the

Document Title	Summary of Relevant Information
	drainage area of Mitchell's Brook were found to be elevated (up to 8,390 mg/kg). • No cyanide sampling was completed.
Nova Scotia Environment. The Impact of Past Gold Mining Activities on the Shubenacadie River Headwaters Ecosystem. IWD-AR-WQB-85-81. 1985.	• In the early 1860s, the discovery of a boulder weighing less than 100 pounds and yielding $1600.00 in gold initiated careful prospecting in the Montague area. Soon after, other gold-bearing boulders were found in the area and active mining commenced in 1863. • A crusher was erected in 1865. Significant mining occurred in 1873 when a ten stamp mill was erected and proceeded for 10 years. After that small scale mining occurred on and off. • The operation generated a large tailings delta which extended in a westerly direction through the swamps and streams making up Mitchell's Brook. • Figures within the report identify the entirety of the Barry's Run and Mitchell's Brook as being within the area of tailings deposition. • The gold mining techniques used at Montague have been identified as "crude and wasteful" with large amounts of cyanide and mercury allowed to escape with the tailings. • Elevated arsenic (580 mg/kg), mercury (1 mg/kg), and cyanide (11.5 mg/kg) levels were reportedly identified in sediment in Mitchell's Brook at unspecified locations. • Sediment in Lake Charles identified a layer of mine slime between 20–80 cm below the Lake bottom.
Lay T and Nolan, W. Technical Report #26. Groundwater Resources Shubenacadie-Stewiacke River Basin. Shubenacadie-Stewiacke River Basin Board. May 1979.	• Groundwater samples were collected at Montague Mines at unspecified locations. Arsenic in groundwater ranged in concentration from 0.005 mg/L to 0.008 mg/L.
Vaughan Engineering Associates Limited. Shubenacadie Lakes Planning/Pollution Control Study. May 1993.[1]	• During mining operations, water from Mitchell's Brook flowed to Lake Charles, depositing contaminated sediments in the Lake. The main pollutants of concern were identified as arsenic and mercury. Report suggests, any development activity that would disturb these sediments on land or on the Lake bottom may pose a human health threat.
Aecom. Halifax Regional Municipality Shubenacadie Lakes Subwatershed Study. April 2013.[1]	• Lake Charles is the headwater lake for the Shubenacadie watershed but discharges north and south due to the presence of the Shubenacadie Canal control structures at its north and south ends. • Potential sources of pollution for Lake Charles were identified as the Conrad Brothers Quarry located east of Lake Charles and historical mining operations at the Montague Gold Mines, which discharges from Mitchell's Brook and Barry's Run.
Englobe. Port Wallace Holdings Limited Soil Sample Location Plan. October 5, 2018.	• Soil samples collected on adjacent properties owned by Port Wallace Holdings Limited, in the vicinity of Barry's Run and Mitchell's Brook, exhibited aluminum, iron, and vanadium above the NSE Tier 1 Environmental Quality Standards (EQS) for a residential site with non-potable groundwater use and coarse-grained soils.

Document Title	Summary of Relevant Information
Stantec Consulting Limited. An Analysis of the HRM Lakes Water Quality Monitoring Program Data (2006-2011). October 2012.[1]	• The overall CCME Water Quality Index (WQI) was considered good for Lake Charles (i.e., 80-94). It is noted that arsenic exceeded the WQI.
Englobe. Port Wallace, NS Surface Water Quality Monitoring. January 5, 2018.	• Historically, Barry's Run was impounded through a dam at its downgradient extent and used for milling operations during the 1800s and later gold mining operations at the Montague site. • Surface water samples were collected from Barry's Run and assessed for mercury, metals, general inorganic parameters, total phosphorus, and TSS. • Aluminum, arsenic, cadmium, copper, iron, lead, manganese, and/or mercury exceeded the applicable CCME guidelines and/or NSE Tier 1 EQS in one or more samples collected along Barry's Run and Mitchell's Brook. pH in two samples (i.e., March 2014 and October 2015) were below the CCME Freshwater Aquatic Life range.

1. Potential environmental issues associated with Lake Charles due to transportation, residential development, recreational boating, and aggregate quarry and gravel operations are not expected to be an environmental concern for the site since the site is located upstream of Lake Charles and these operations. Should the Port Wallace area surrounding Barry's Run and Mitchell's Brook be developed in the future (and similar operations occur in the new development), the chemicals of concern addressed with respect to Lake Charles and these operations could be assessed as indicator parameters throughout proposed developments to monitor the water quality of Barry's Run and Mitchell's Brook.

3.6.1.2 Summary of Historical Records Study

As detailed in **Table 1**, a significant number of studies of the Montague Mine site upstream of the subject site have been completed in the last 50 years. The need for these studies has arisen from concerns about naturally occurring and anthropogenic arsenic and mercury sources originating from former operations and tailings managements at the Montague Mine site.

These studies illustrate that the Barry's Run and Mitchell's Brook properties have been an area of historical deposition for tailings and tailings related effluent from 1863 until 1940, and beyond. The historical information reviewed identifies the Montague Mines site, Mitchell's Brook, Barry's Run, and Lake Charles as containing elevated concentrations of arsenic and mercury within sediment, vegetation, wildlife, surface water, and/or groundwater. One sediment sample for cyanide was observed in the literature at the Montague mine site (NSE, 1985) and the observed concentration exceeded modern environmental protection criteria.

The outflow from the Montague mine site (which includes the subject property into the Lake Charles outflow) has been identified as containing significant volumes of mine tailings and associated sediment slimes. **Figure 4** was extracted from the NSE study completed in 1985 of the impact of past gold mining activities on the Shubenacadie River ecosystem. As presented in the figure, past studies suggest the majority of Barry's Run and Mitchell's Brook had been identified as containing tailings.

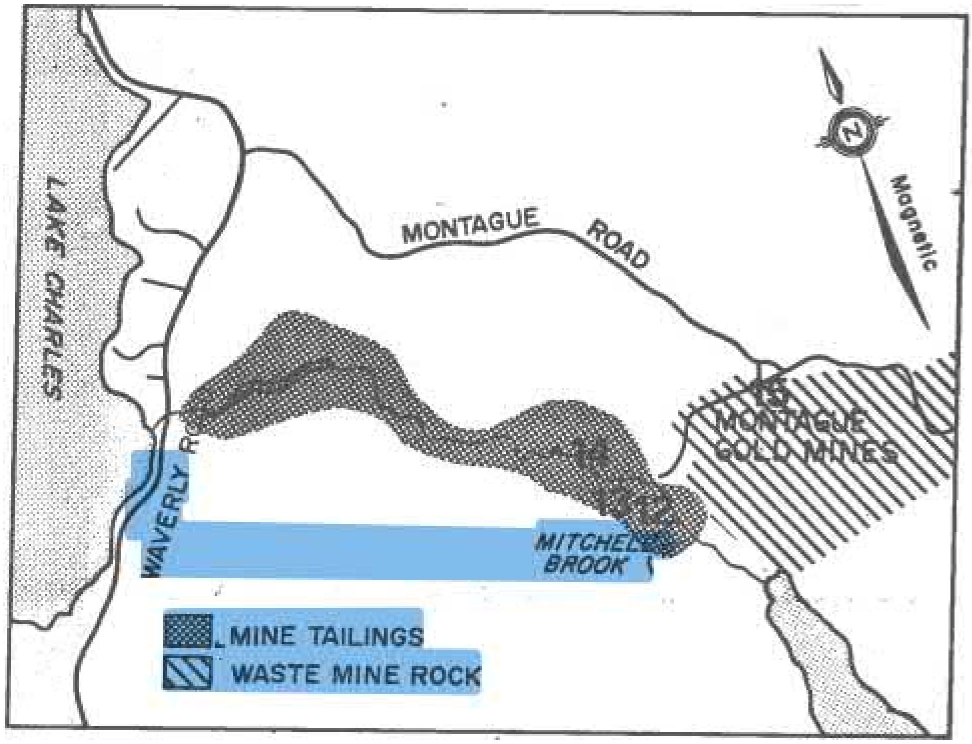

Figure 4: Inferred Distribution of Tailings from the Montague Mine Site (NSE, 1985).

3.6.1.3 Records from Nova Scotia Environment

NSE Information Access and Privacy was contacted on January 31, 2019 to request an Environmental Registry Search for historical information regarding environmental infractions, reported spills, approvals and/or orders issued at the site or on the immediately surrounding property, and if the lands have been used for waste disposal. No information was located through the Environmental Registry with regard to the subject property (**Appendix D**). It is noted that information was requested through Nova Scotia Information Access and Privacy (IAP) Services pertaining to 105 Lethbridge Avenue (i.e., the former horse race track property located further south of the subject property (PID No. 00249664)) and a property on Waverley Road (the borrow pit area located immediately south of the subject property i.e., PID No. 00249672). No records were located for 105 Lethbridge Avenue. It is noted that the results reported no records for 195 Lethbridge, which is the former civic number for 105 Lethbridge Avenue. Information pertaining to the Waverley Road property was located via Nova Scotia IAP Services and is included in **Appendix D**. Pertinent records are summarized in the following paragraphs.

Information pertaining to 650 Waverley Road owned by Port Wallace Holdings Limited (the vacant treed land parcels located north of the site, which includes PID Nos. 00249714, 00275347, and 41019118) was located through the Environmental Registry Search and included an approval from Nova Scotia Environment (NSE) to construct a wetland alteration (i.e., to infill 5,694 m^2 of wetland at or near 650 Waverley Road) dated November 23, 2016 with an expiry date of November 20, 2026. In the approval to construct a wetland alteration, a site specific condition outlined preconstruction/baseline and post-construction monitoring report requirements and that the alteration was to be completed on or before November 25, 2018. On February 16, 2018, an environmental warning report was issued to Port Wallace Holdings Limited in contravention of a term or condition of an approval. No further details were provided in the environmental warning report. However, on March 28, 2018, NSE issued a directive to Port Wallace Holdings Limited (i.e., property owner of PID Nos. 00249714, 00275347, and 41019118) to provide the preconstruction/baseline monitoring report prior to any wetland alterations as specified in the approval to construct a wetland alteration.

Information pertaining to the current Conrad Brothers Limited Quarry property (i.e., PID No. 00276105 located further north of the site across Highway 107) was located through the Environmental Registry Search and included two approvals from NSE to Ocean Contractors Limited for the operation and reclamation of a Ready Mix Concrete Plant, and associated works, at or near 204 Cono Drive, Montague Gold Mines dated January 11, 2013 with an expiry date of November 16, 2016; and December 14, 2016 with an expiry date of November 16, 2026. Two approvals dated April 6, 2009 (effective date of August 12, 2005) with an expiry date of August 12, 2015; and August 12, 2015 (effective date of August 12, 2005) with an expiry date of August 12, 2015 were issued from NSE to Ocean Contractors Limited for the construction, operation, and reclamation of an asphalt plant, and associated works, at or near 204 Cono Drive, Conrad Brother's Limited Quarry, Montague Gold Mines. An approval was issued from NSE to Ocean Contractors Limited dated November 2, 2015 with an expiry date of August 12, 2025 for the construction and operation of an asphalt plant, and associated works, at or near 204 Cono Drive, Montague Gold Mines. Each of the approvals specified discharge limits including those for effluent and surface water, sound levels, and particulate emissions.

Petroleum Storage Tank Certificates of Registration, dated between April 23, 2003 and May 26, 2017 were located via the Environmental Registry Search for the current Conrad Brothers Quarry property (i.e., PID Nos. 00276105, 00275966, and 40174286 located further north of the site across Highway 107). Details are provided in **Appendix D.**

3.6.2 Chain-of-Title Search

A chain of title search for the site was not requested as part of this assessment. Historical information was derived from aerial photography and additional sources as noted.

3.6.3 City Directories

City directories were requested from ERIS. City directories indicated that the subject property and surrounding properties were not listed in the city directory archives. No listings were available prior to the 1960 directory.

3.6.4 Aerial Photographs

Aerial photographs obtained from the National Air Photo Library via ERIS included photographs for the years 1931, 1947, 1954, 1965, 1975, 1982 and 1993 (**Appendix B**). Google Earth images for 2004 and 2016 were also reviewed. A summary of the review of the available aerial photographs and images is presented in **Table 2**. It is noted that the scale and resolution of the photographs varied and did not always allow for a detailed evaluation of the surface conditions at the site or adjacent properties.

Table 2: Aerial Photograph Review Summary

Aerial Photograph Review Summary	
Year	**Observations**
1931	The site is vacant and unoccupied. The high water mark is visible surrounding Barry's Run and Mitchell's Brook. Forested areas surround the subject property to the north, east, and south. Highway 318 is visible to the west of the subject property followed by Lake Charles. There are few buildings scattered along Highway 318. A cleared corridor is visible further south of the subject property.
1947 and 1954	The site remains vacant and unoccupied. More buildings are visible along Highway 318. A cleared area is visible in the vicinity of the current Conrad Brothers Quarry property located further north of the subject property across Cono Drive in the 1947 aerial photograph. Cleared areas are also visible in the vicinity of the former Montague Mines located further east of the subject property in the 1947 aerial photograph.
1965 and 1975	Additional side streets are visible to the south and southwest of the subject property. The former horse race track is visible to the south of the subject property. A larger clearing has developed in the vicinity of the former Montague Mines property. In the 1965 aerial photograph, there are more access roads in the vicinity of the former horse race track. In the 1975 aerial photograph, the beginning of a clearing is visible immediately south of the subject property in the vicinity of the current borrow pit location.
1982	Montague Mines Road is visible off of Montague Road.
1993, 2004, 2016	The Conrad Brothers Quarry property is visible further north of the subject property across Highway 107. Highway 107 is visible in the 1993 and 2004 aerial photographs and runs north of the subject property adjacent to the eastern property boundary and away from the site to the southeast. The residential area to the south of the subject property is more densely populated with buildings and roads. In the 2004 aerial photograph, the Conrad Brothers Quarry property appears to have expanded and in the 2016 aerial photograph, the Conrad Brothers Quarry property appears to have expanded again.

3.6.5 Fire Insurance Plans and Inspection Reports

Fire insurance mapping was not available for this site or the former Montague Gold Mines property (i.e., PID No. 00315085) (**Appendix B**).

3.7 Site Visit

The site visit was conducted January 28, 2019 to identify visual or other physical evidence of actual or potential sources of environmental impact from current or historical site use, as well as surrounding land uses.

3.8 Site Description

The subject property is currently vacant, undeveloped, forested land. Barry's Run and Mitchell's Brook run through the centre of the subject property from the eastern to the southern property boundary. Remnant of a rough walking bridge (miscellaneous wood debris) was noted within the narrow transition between Mitchell's Brook and Barry's Run at the time of the site visit (**Photos 8** and **9** in **Appendix A**). Remanence of a former flow control structure also exists at the downstream end of Barry's Run near the discharge point to Lake Charles.

Many paths are present through the forested lands surrounding the subject property and within the wetland area in between Barry's Run and Mitchell's Brook that are used for all-terrain vehicles and hikers.

The area surrounding the channel of Barry's Run and portions of Mitchell's Brook is a bog/fen complex (herein referred to as the fen). This area runs from the channel to the property boundary (**Figure 3**). Reportedly, the channel was dammed at some point in time.

3.8.1 Special Attention Items

Materials such as asbestos, polychlorinated biphenyls (PCBs), lead, ozone depleting substances (ODS), mercury, urea formaldehyde foam insulation (UFFI), radon, excess noise and electric/magnetic fields may be of special significance, if present, because of the heightened public concern regarding their use. The following paragraphs address these materials relative to the site.

3.8.1.1 Polychlorinated Biphenyls

PCBs are commonly associated with dielectric fluids within electrical equipment manufactured in Canada prior to approximately 1979. No buildings or electrical equipment were present on-site at the time of the site visit and no historical records of buildings on-site were located.

No pole-mounted transformers were observed on or adjacent to the site.

3.8.1.2 Mercury

Mercury was a common gold ore processing reagent, used for the mercury amalgam gold process that was in widespread use from the late 1800s onwards, but has fallen out of use in the last 30 years as the environmental impacts of mercury have become more known and mine effluent regulations have become more stringent (Metal Mining Effluent Regulation). Mercury was historically used at the Montague Mines property where gold was extracted using stamp milling and mercury amalgamation (Little, M.E., *et al*., 2015). Therefore mercury is a contaminant of concern at this site given the historical uses of upstream sites (i.e., Montague Mines site) and available historical information as detailed in **Section 3.7.1**.

Mercury is a metal with a tendency to bioaccumulate in the environment, and is listed in Schedule I of the Canadian Environmental Protection Act (1999), the list of toxic substances. Depending on the concentration and exposure pathway, some species of mercury can pose a risk to human health in the soil, vapour and aqueous phases.

3.8.1.3 Cyanide

Cyanide is used extensively in many industries, such as electroplating, chemical production, and gold processing. Specific to gold production, cyanide is used in the MacArthur-Forrest process, which is a leaching process used to process low grade ore and historical tailings. Gold cyanidation has been in widespread use since the early 1900s. Modern gold processing mills use cyanide remediation processes such as the Inco method to treat tailings and water effluent from refining processes and convert free cyanide into forms that are less bioavailable and toxic to the environment.

There are indications that cyanide was used at the upstream Montague mines property in the 1950s in an attempt to reprocess historical tailings to extract gold (NSE, 1985). Given the time period of when cyanide was used at the Montague Mines site, it is unlikely that cyanide remediation processes were implemented and historical literature agrees with this assumption (NSE, 1985). As such cyanide is a contaminant of concern given the historical uses of upstream sites and available historical information.

Cyanide is listed in Schedule I of the Canadian Environmental Protection Act (1999), the list of toxic substances. Free cyanide and precursors of free cyanide are proposed to be harmful to the environment, and other species can pose a concern depending on the concentration and exposure pathways.

3.8.1.4 Noise

No issues pertaining to noise were identified.

3.8.1.5 Magnetic Fields

The environmental effects of magnetic fields have been the subject of extensive study and are the subject of heightened public concern, particularly in residential areas. There are no generally accepted guidelines at present to provide specific guidance on this issue. No potential sources of magnetic fields were observed during the site visit.

3.8.1.6 Radon

Radon is produced due to the natural decay of radium or uranium from some soil and rock types. Radon gas may be a concern in buildings if there is an unventilated space for gas to accumulate, such as a basement or crawlspace. Due to the local geology, radon is not suspected. Testing of radon was not completed as part of this Phase I ESA. Testing would be required to confirm the presence/absence of radon; however, no buildings are present on-site; therefore, radon is not expected to be an environmental concern for the site.

3.8.2 Unidentified Substances

No unidentified substances were observed at the time of the site visit.

3.8.3 Pesticides

No evidence of pesticide usage was observed on-site.

3.8.4 Fill Materials

No fill material or infilled areas were observed on the subject property at the time of the site visit. No potential concerns related to on-site fill were identified. A borrow pit was noted to the southeast of the subject property. According to a Senior Project Manager with HRM, Darren Young, in 2010/2011, pyritic slates were discovered during the construction of the Metro Transit Bridge Terminal in Dartmouth, NS between Nantucket Avenue and Thistle Street. The pyritic slates were ultimately disposed of in the Halifax Harbour; however, the material was reportedly stored temporarily on this borrow pit property formerly owned by Whebby (registered as Blue Chip Developments Limited), located south of the subject properties (PID No. 00249672). Reportedly, the pyritic slates were stockpiled on the former Whebby property for a few days before disposal. No pyritic slates were disposed of on the former Whebby property.

3.8.5 Spills, Stained Areas and Stressed Vegetation

No spills, stained areas, or stressed vegetation were observed on-site. It is noted that observations of heavily wooded areas on the subject property were limited to what was visible from paths through the areas and less dense portions of the wooded areas.

3.8.6 Pits or Lagoons

No pits or lagoons were observed on-site.

3.8.7 Watercourses, Ditches, or Standing Water

Barry's Run and Mitchell's Brook run through the centre of the subject property from the eastern to southern property boundary. No ditches, or standing water were observed on the subject property. A ditch was observed through a small section of the borrow pit located south of the subject property, which was assumed to manage surface water flow near the bottom of the slope of the former borrow area.

3.8.8 Air Emissions and Odours

No air emissions were noted at the time of the site visit.

3.8.9 Observation of Adjoining Properties

Properties adjacent to the site are described below:

- **North**: Vacant, undeveloped, forested land followed by Highway 107 and the Conrad Brothers Quarry property;
- **East**: Highway 107 followed by the former Montague Mines property;
- **Southeast**: Highway 107;
- **South**: Vacant, undeveloped, forested land and a small borrow pit followed by a residential subdivision and the former horse race track; and,
- **West**: Residential dwellings followed by Highway 318 and Lake Charles.

3.9 Phase I ESA Summary and Recommendations

The following is a summary of the findings and potential sources of environmental contamination identified during the Phase I ESA conducted at the site and the associated recommendations.

- A significant number of studies of the Montague Mines site upstream of the study area have been completed in the last 50 years. The outflow from the Montague Mines site, located upgradient of the subject site, has been identified as containing significant volumes of mine tailings and associated sediment slimes. The historical information reviewed identifies the Montague Mines site, Mitchell's Brook and Lake Charles (downgradient of the subject site) as containing elevated concentrations of arsenic and mercury within sediment, vegetation, wildlife, surface water, and/or groundwater.
- Historical reports indicated that cyanide was used at the upstream Montague Mines property in the 1950s as part of a project to reprocess historical tailings to extract gold (NSE, 1985). Given the time period of when cyanide was used at the Montague mine site, it is unlikely that cyanide remediation processes were implemented. As such, cyanide is considered a contaminant of concern given the historical uses of upstream sites and available historical information.
- Historical soil samples collected on adjacent properties, in the vicinity of Barry's Run and Mitchell's Brook, exhibited aluminum, iron, and vanadium above the NSE Tier 1 Environmental Quality Standards (EQS) for a residential site with non-potable groundwater use and coarse-grained soils. Metals should be assessed in soil in the vicinity of the subject site to confirm whether these metals are present on-site.

No further recommendations, other than those noted above, are made for the subject property.

4.0 Phase II Environmental Site Assessment Activities

In April 2019, following the Phase I ESA, Dillon completed Phase II ESA activities that included the following components:

- Completion of thirteen sediment cores for the purpose of obtaining representative sediment and pore water samples in Barry's Run and Mitchell's Brook;
- Completion of fourteen manual boreholes for the purpose of obtaining representative soil samples and identifying current subsurface conditions in the fen surrounding the channel of Barry's Run and Mitchell's Brook; and,
- Collection and analysis of surface water from Barry's Run and Mitchell's Brook.

Soil, sediment, pore water, and surface water samples were collected in five transects along Mitchell's Brook and Barry's Run as well as the surrounding fen (**Figure 3**).

The methodology and results of the soil, sediment, surface water, and pore water assessments are described herein.

4.1 Objectives

The objective of the assessment was to assess whether contaminants of potential concern (COPCs) are present at concentrations above the Tier 1 EQS in areas of potential environmental concern identified during the Phase I ESA. Based on the information retrieved in relation to the Phase I ESA (presented above), metals and cyanide were identified as COPCs in soil, sediment, and surface water. Screening of additional site data collected during the Phase II ESA was conducted to confirm the COPCs identified during the Phase I ESA and to ensure the data collected was consistent with the environmental sampling programs and closure planning activities being completed at the upstream Montague Mines property, in parallel to this study.

Additional screening included petroleum hydrocarbon analysis of select sediment and surface water samples collected at the top of Mitchell's Brook and the bottom of Barry's Run. Additional analytical parameters were added to assist with the interpretation of results and to ensure data consistency with the Montague Mines closure study. These parameters include total organic carbon (TOC), sulphide, sulphate, sulphur, and collecting pore water samples for metals analyses.

4.2 Methodology

4.2.1 Soil/Sediment Sampling Program in the Fen

On April 25, 26, and 29, 2019, Dillon conducted a manual borehole advancement program. Fourteen boreholes were advanced by manually advancing split spoons through the fen to depths ranging from 0.1 metres below ground surface (mbgs) at SS1 to 5.18 mbgs at SS9.

Due to the stratigraphy (i.e., saturated organic overburden), typical continuous split-spoon soil sampling could not be achieved. The organic overburden resulted in inconsistent recovery until minerogenic material was reached. As such, target levels were identified prior to the advancement of the split spoon on an individual basis by pre-probing until competent (minerogenic) material was encountered in the fen and measuring to that depth as the beginning of the sampling intervals. The split spoon was then advanced to the desired depth and then manually advanced through the minerogenic material. As such, the organic overburden recovered during split spoon sampling could not be relied on to represent a specific depth interval. It is noted that a limitation of the manual split spoon was that it could not be advanced past 6.1 mbgs.

Dillon field personnel logged subsurface conditions encountered in each borehole in the fen at the time of sampling. Based on visual observations of minerogenic material (i.e., suspected tailings), select soil samples from the boreholes were submitted to Maxxam Analytics in Bedford, Nova Scotia (NS) for laboratory analysis of metals, TOC, sulphur, sulphide, and sulphate. It is noted that visual observations of the soil (i.e., SS) samples collected in the fen are more consistent with the description of a sediment sample and will; therefore, be referred to as sediment samples going forward; however, these samples were more terrestrial than aquatic in comparison to the SED samples. The Canadian Council of Ministers of the Environment (CCME, 1995) defines a sediment as “at least periodically or seasonally, underwater or saturated with water and/or may be routinely suspended in water,” which was consistent with the visual observations of the “SS” samples.

Refusal on cobbles and/or rock was encountered in several sample locations in the fen area towards the treeline. Refusal was encountered at depths ranging from approximately 0.61 to 2.1 meters below top of fen.

Details of borehole locations are presented on **Figure 3**. Sample locations where refusal in cobbles and/or rock was encountered are also presented on **Figure 3**.

4.2.2 Sediment and Pore Water Sampling Program in the Channel

On April 16 and 25-26, 2019, Dillon field personnel conducted a sediment coring program at nineteen locations (SED01-14 and PW01-05 respectively). It is noted that the sediment cores from PW01-05 were used to collect pore water samples. Based on sampling objectives, three unique sampling methods were used. Specifically SED01 to SED08 and PW01 to PW04 were advanced using a Glew Gravity Corer, SED09 to SED14 were advanced using a 2” diameter Shelby Tube, and PW05 was collected as a grab sample. Details of sediment core locations are presented on **Figure 8**. It is noted that generally each pore water sample was collected in conjunction with a sediment sample location (i.e., PW01 was collected in the vicinity of SED05, PW02 was collected in the vicinity of SED07, PW03 was collected in the vicinity of SED08, and PW04 was collected in the vicinity of SED01) and PW05 was collected in the vicinity of the rough walking bridge.

4.2.2.1 Glew Gravity Corer

The Glew Gravity Corer (“Glew”) is a sediment coring device used to collect sediment cores for the purpose of environmental monitoring programs (Glew, J.R., 1991). On April 16, 2019, the Glew was used by Dillon field personnel alongside a sub-contractor, Dr. Ian Spooner of Acadia University, to collect sediment on the channel bottom of Barry’s Run and Mitchel’s Brook.

The Glew was attached to a rope and lowered into the water column from a field boat until it reached the channel bottom. The Glew was then raised approximately 1-meter above the channel bottom and then released which allowed the Glew to penetrate into the sediment layer. A weight was then dropped which triggered the spring-loaded stopper. The stopper was coated in high vacuum silicon grease to create a seal which held the sediment in by negative pressure. The core was then lifted to the surface and a bung was inserted at the bottom to hold the sediment in place. This was completed at twelve locations (SED01 to SED08 and PW01 to PW04 respectively) to depths ranging from 0.20 mbgs at SED05 to 0.29 mbgs at SED07, and SED08. This method was used to collect both sediment samples (labelled SED) and pore water samples (labelled PW).

Upon completion of pore water locations, Dillon field personnel extruded the cores (PW01 to PW04) on site. Cores were drained of excess water and then placed into laboratory supplied containers as a composite sample. Each sample was submitted to Maxxam Analytics in Burnaby, British Columbia (BC) for pore water extraction and laboratory analysis of metals, pH, and conductivity.

On April, 19, 2019, Dillon field personnel extruded the sediment cores (SED01 to SED08) using the Glew Gravity Corer Extrusion device. Samples were collected from each core at three intervals (0 - 0.1, 0.1 - 0.2, and 0.2 - 0.3 mbgs) and labeled A, B, and C respectively. The A interval (0 – 0.1 mbgs) of each sample was submitted to Maxxam Analytics in Bedford, Nova Scotia (NS) for laboratory analysis of metals and TOC, sulphur, and/or sulphate at specific locations. The A interval submitted to the laboratory was brown, peaty, organic material present in the top 0-0.1 meters of material in the channel of Barry’s Run.

4.2.2.2 Shelby Tube Corer

The Shelby Tube Corer is a 2” thin-walled, hollow steel tube used for collecting fine cohesive soils and clays. On April 25-26, 2019, the Shelby Tube Corer was used by Dillon field personnel to collect sediment

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on the channel bottom of Barry's Run and Mitchel's Brook. Due to the nature of the minerogenic material in the channel below the organics, the Glew could not penetrate the minerogenic material with enough force to recover a representative sample for lab analysis.

The Shelby Tube was manually advanced into the sediment of the channel by wading out to the desired location. The Shelby Tube was inserted to depth and then lifted to the surface. This was completed at six separate locations (SED09 to SED14 respectively) to depths ranging from 0.1 mbgs at SED09 to 1.8 m bgs at SED13. Samples from SED09 to SED14 consisted of grey, fine grained minerogenic soil material collected from the top 0-0.25 meters below the organics layer in the channel of Barry's Run and Mitchell's Brook. It should be noted that the organic layer over these "soils" varied in thickness throughout the channel typically ranging from 0.01 to 0.5m.

Upon completion, each sediment core was extruded on-site. Based on visual identification, selected sediment samples from the Shelby Tube were submitted to Maxxam Analytics in Bedford, Nova Scotia (NS) for laboratory analysis of metals, TPH/BTEX, cyanide, TOC, sulphur, sulphide, and/or sulphate at specific locations.

4.2.2.3 Grab Sample

On April 26, 2019, Dillon field personnel waded into the stream and collected visual minerogenic material from the stream bottom with a spade shovel. This was completed for PW05 to a depth of 0.25 mbgs. Upon completion, the sample was drained of excess water and then placed into a laboratory supplied container as a composite sample. The sample was submitted to Maxxam Analytics in Burnaby, BC for pore water extraction and laboratory analysis of metals, pH, and conductivity.

4.2.3 Surface Water Sampling

On April 29, 2019, Dillon field personnel collected surface water samples at eight locations (**Figure 7**). Specifically, SW11, SW05, SW01, SW02, and SW04 were collected from Barry's Run, and SW03, SW06, and SW10 were collected from Mitchell's Brook. It is noted that there were no surface water samples collected and labelled SW08 or SW09. Surface water samples were typically collected mid-channel and at mid-depth at identified locations and sampled upstream of potential disturbance created by field staff.

Surface water samples were collected and placed into laboratory supplied containers. Each sample was submitted to Maxxam Analytics in Bedford, Nova Scotia (NS) for laboratory analysis of general chemistry, metals (dissolved and total), and/or cyanide. It is noted that in addition to metals and cyanide analyses, SW10 and SW11 were submitted for BTEX and modified TPH analyses to characterize the influent and effluent of the site.

4.2.4 Laboratory Analytical Program

Soil, sediment, and surface water samples were submitted to Maxxam Analytics in Bedford, NS. Pore water samples were submitted to Maxxam Analytics in Burnaby, BC. Maxxam Analytics' Bedford and Burnaby laboratories are accredited to ISO/IEC 17025 for soil, sediment, surface water, and pore water (Burnaby laboratory only) by the Standards Council of Canada (SCC). For each of the analytical methods utilized, Maxxam Analytics has internal QA/QC programs including laboratory duplicates, surrogate recoveries, reference materials, spiked method blanks, and matrix spikes to govern sample analysis and analytical data quality assurance.

Data precision was evaluated by Dillon by calculating the relative percent difference (RPD) between the sample results and their duplicate results (where collected).

4.3 Field Observations

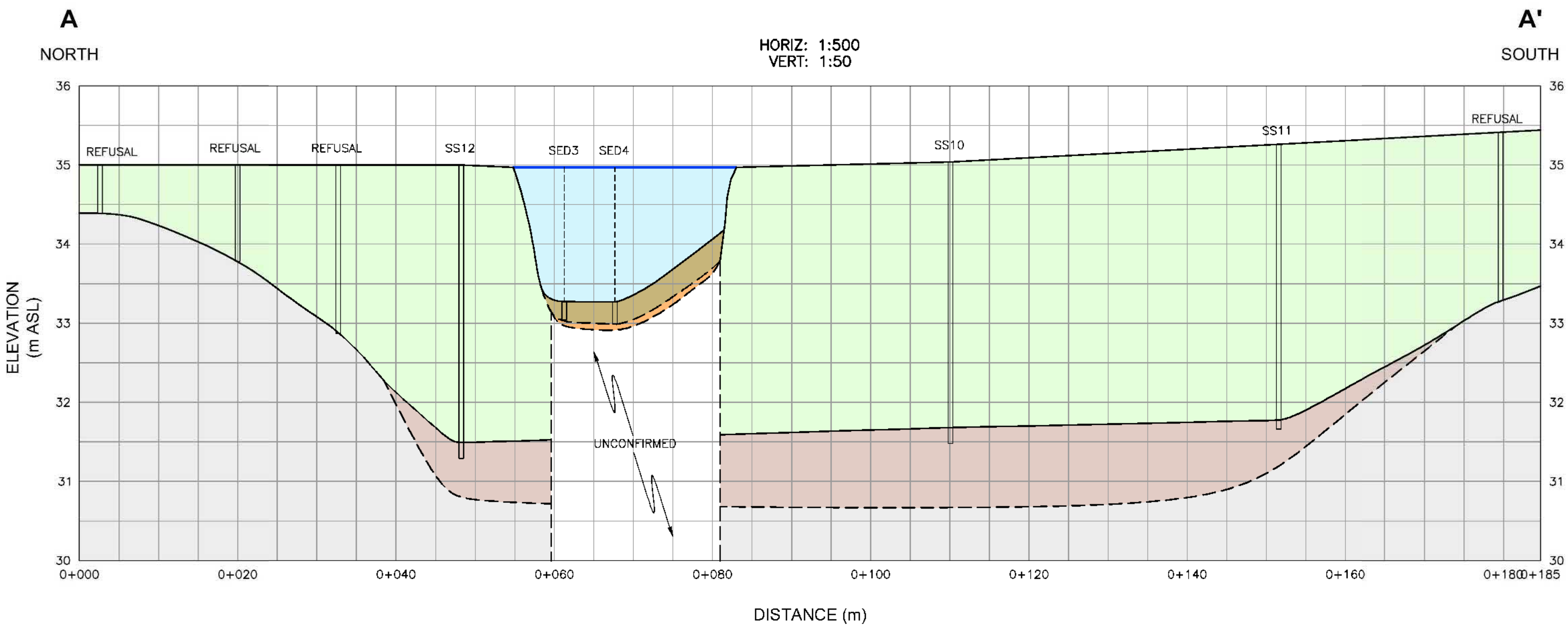
4.3.1 Stratigraphy

Stratigraphy encountered during the Phase II ESA activities is presented in **Table E1** in **Appendix E**. Cross sections of the stratigraphy along transect 1 and transect 3 are presented in **Figures 5** and **6**, respectively. For the cross section of transect 1 (**Figure 5**), the soil/sediment stratigraphy in the fen generally consists of brown, hydric soil with high organic matter and decomposed peat from surface to approximately 3.5 mbgs and grey, fine-grained minerogenic material from approximately 3.5 to 3.7 mbgs in and around Barry's Run. For the cross section of transect 3 (**Figure 6**), the soil/sediment stratigraphy in the fen generally consists of brown, hydric soil with high organic matter and decomposed peat from surface to approximately 5.0 mbgs and grey, fine-grained minerogenic material from approximately 5.0 to 5.18 mbgs (**Figure 6**).

As presented in **Figures 5** and **6,** the peaty, organic rich layer in the fen area becomes shallower at the edges of the subject property towards the treeline. Refusal in cobbles and/or rock was encountered in several locations towards the treeline. Sample locations where refusal in cobbles and/or rock was encountered are presented on **Figure 3**.

The depth of water in the channel of Barry's Run ranges from approximately 0.4 to 2 meters. Upwards 50 centimeters of organics deposition is present at the bottom of the channel. A grey, dense, clay-like material is present throughout Barry's Run and Mitchell's Brook at the bottom of the channel, beneath the organics (refer to **Photos 22** and **23** in **Appendix A**).This material appeared very similar in colour and texture to the grey, fine-grained minerogenic material encountered at depth beneath the fen.

As described in the Phase I ESA, the former Montague Mines operation used stamp mills combined with a mercury amalgam process for gold refining. This process results in a very fine tailings material (typically a fine grained, well sorted material that ranges from white-grey to red-brown in Nova Scotia) typically contaminated with arsenic and mercury that is deposited via flumes, channels, and/or temporary piping. This type of tailings material is readily identifiable by visual identification by its distinctive grain size distribution and deposition. As such, based on visual observation of Mitchell's Brook and Barry's Run during the Phase II ESA field program, the grey, dense, clay-like material present in Mitchell's Brook and Barry's Run is believed to be mine tailings that originated from the upstream former Montague Mines property. The stratigraphy beneath the tailings layer in Barry's Run and Mitchell's Brook channel was not confirmed during the field program. It should be noted that the appearance of similar grey, fine-grained minerogenic material identified at depth beneath the fen is assumed to be native soil as mine tailings impacts were not identified in these materials.



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PORT WALLACE
DARTMOUTH, NS

	ORGANICS		MINEROGENIC SOIL		TAILINGS
	WATER CHANNEL		NATIVE ROCK		FLUVIAL DEPOSITION

TRANSECT 1 CROSS SECTION
FIGURE 5

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MAP/DRAWING INFORMATION
Nova Scotia Property Online and Dillon Consulting Limited site visits. Property lines are approximate only. This is not a legal survey.

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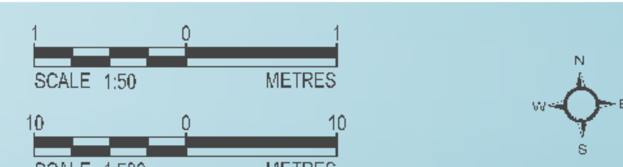
CHECKED BY: DSP
DESIGNED BY: CMD



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NOTE:
INFRASTRUCTURE LOCATIONS ARE APPROXIMATE ONLY.

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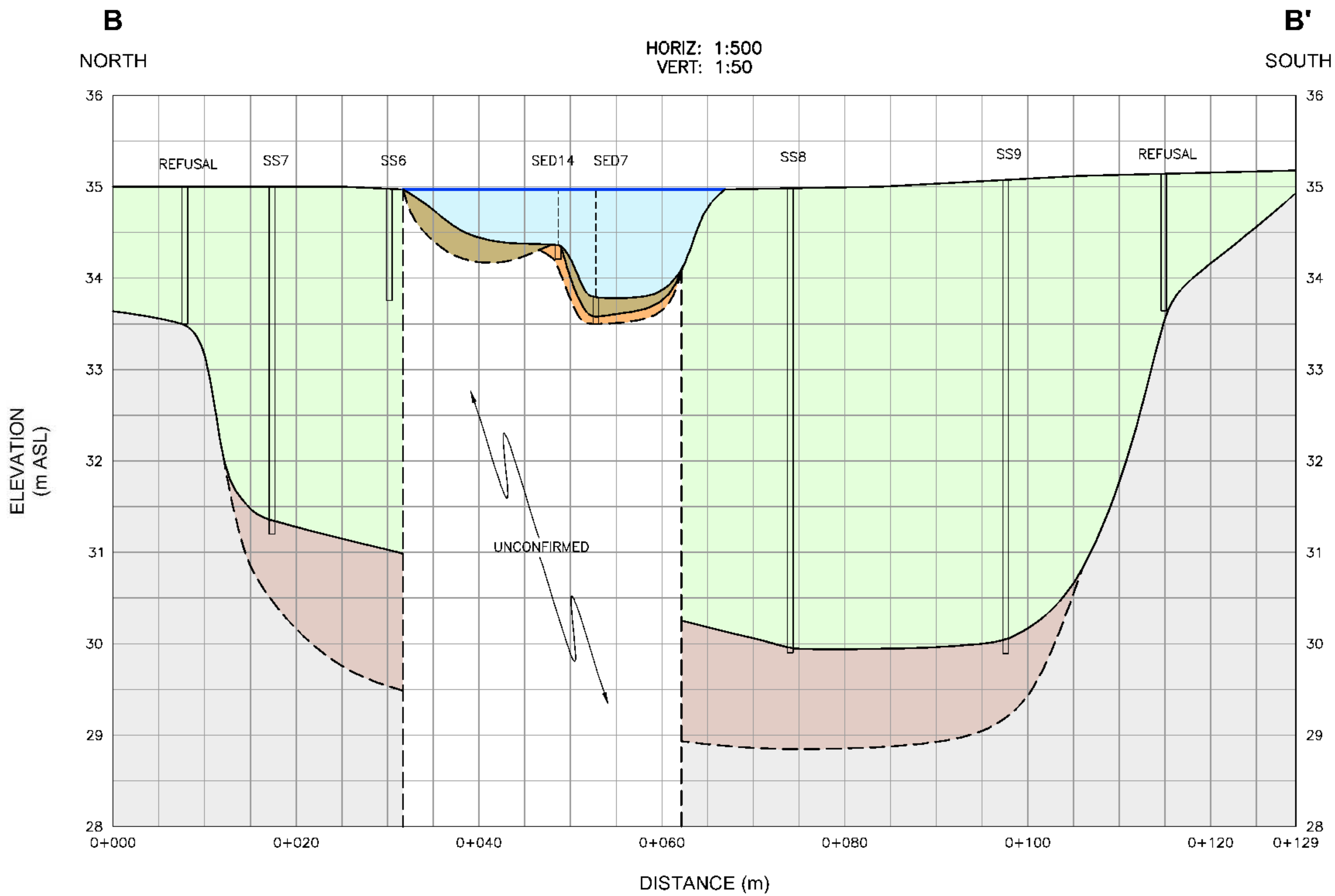
DATE: AUGUST 2019



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PORT WALLACE
DARTMOUTH, NS

TRANSECT 3 CROSS SECTION
FIGURE 6

ORGANICS	WATER CHANNEL
MINEROGENIC SOIL	NATIVE ROCK
TAILINGS	FLUVIAL DEPOSITION

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MAP/DRAWING INFORMATION
Nova Scotia Property Online and Dillon Consulting Limited site visits. Property lines are approximate only. This is not a legal survey.

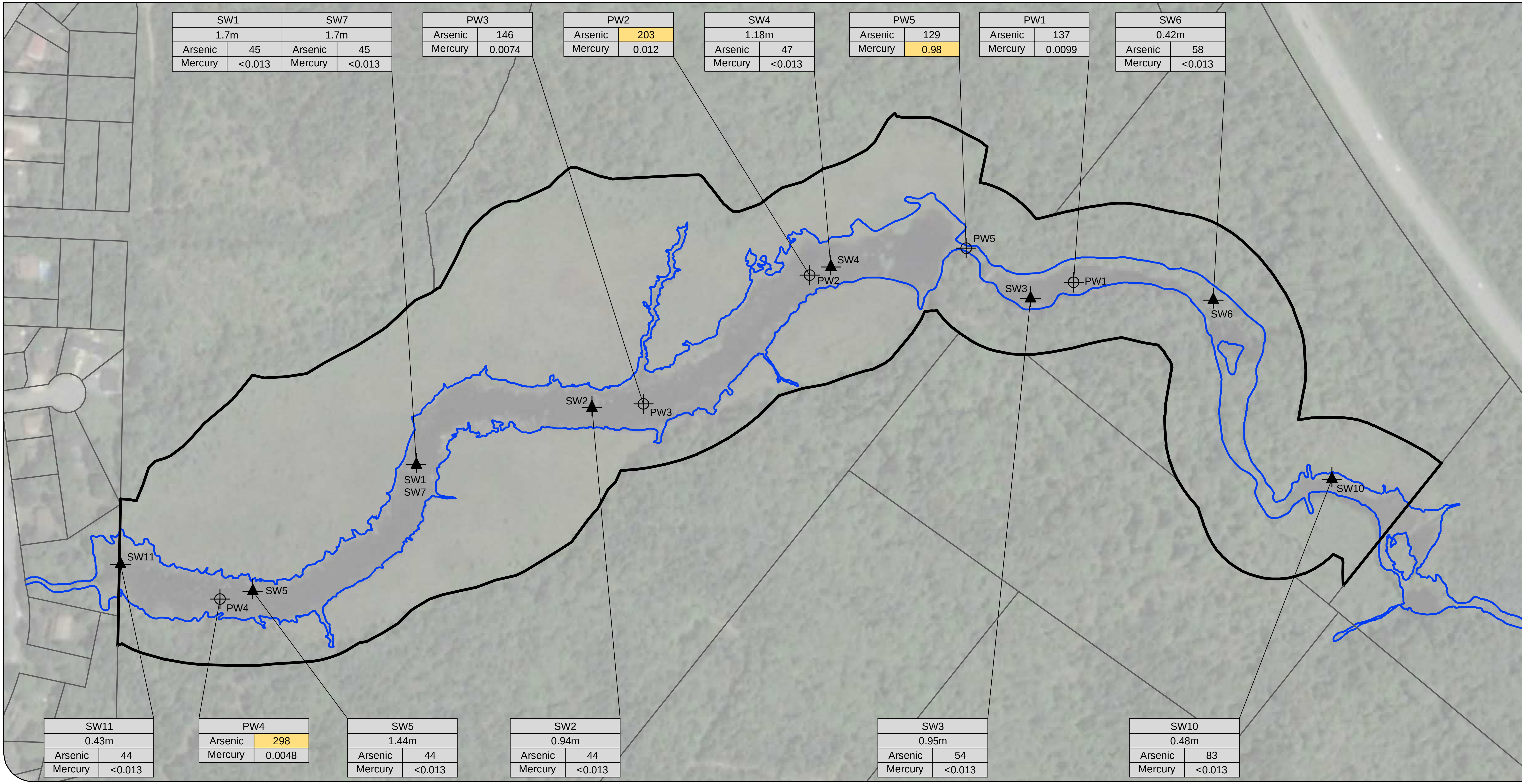
CREATED BY: TLR
CHECKED BY: DSP
DESIGNED BY: CMD

SCALE 1:50 METRES
SCALE 1:500 METRES

DILLON CONSULTING

NOTE:
INFRASTRUCTURE LOCATIONS ARE APPROXIMATE ONLY.

PROJECT: 19-9183
DATE: AUGUST 2019



HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

CONCENTRATIONS OF DISSOLVED ARSENIC AND MERCURY IN SURFACE WATER (SW) AND PORE WATER (PW)
FIGURE 7

SUBJECT PROPERTY LINES
PROPERTY LINES
SURFACE WATER SAMPLE
PORE WATER SAMPLE
EXCEEDS US EPA NATIONAL RECOMMENDED AQUATIC LIFE CRITERIA (As: 150 µg/L, Hg: 0.77 µg/L)
Units: µg/L

Sample ID	
Channel Depth (m)	
Sample ID	Criteria
Arsenic	150 µg/L
Mercury	0.77 µg/L

File Location:
c:\projectwise\working directory\projects 2019\50mec\dms04605\199183-05-03 fig 7 & 8.dwg
August, 12, 2019 3:01 PM

MAP/DRAWING INFORMATION
Nova Scotia Property Online and Dillon Consulting Limited site visits. Property lines are approximate only. This is not a legal survey.

CREATED BY: TLR
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DESIGNED BY: CMD

50 0 50
SCALE 1:2,500 METRES

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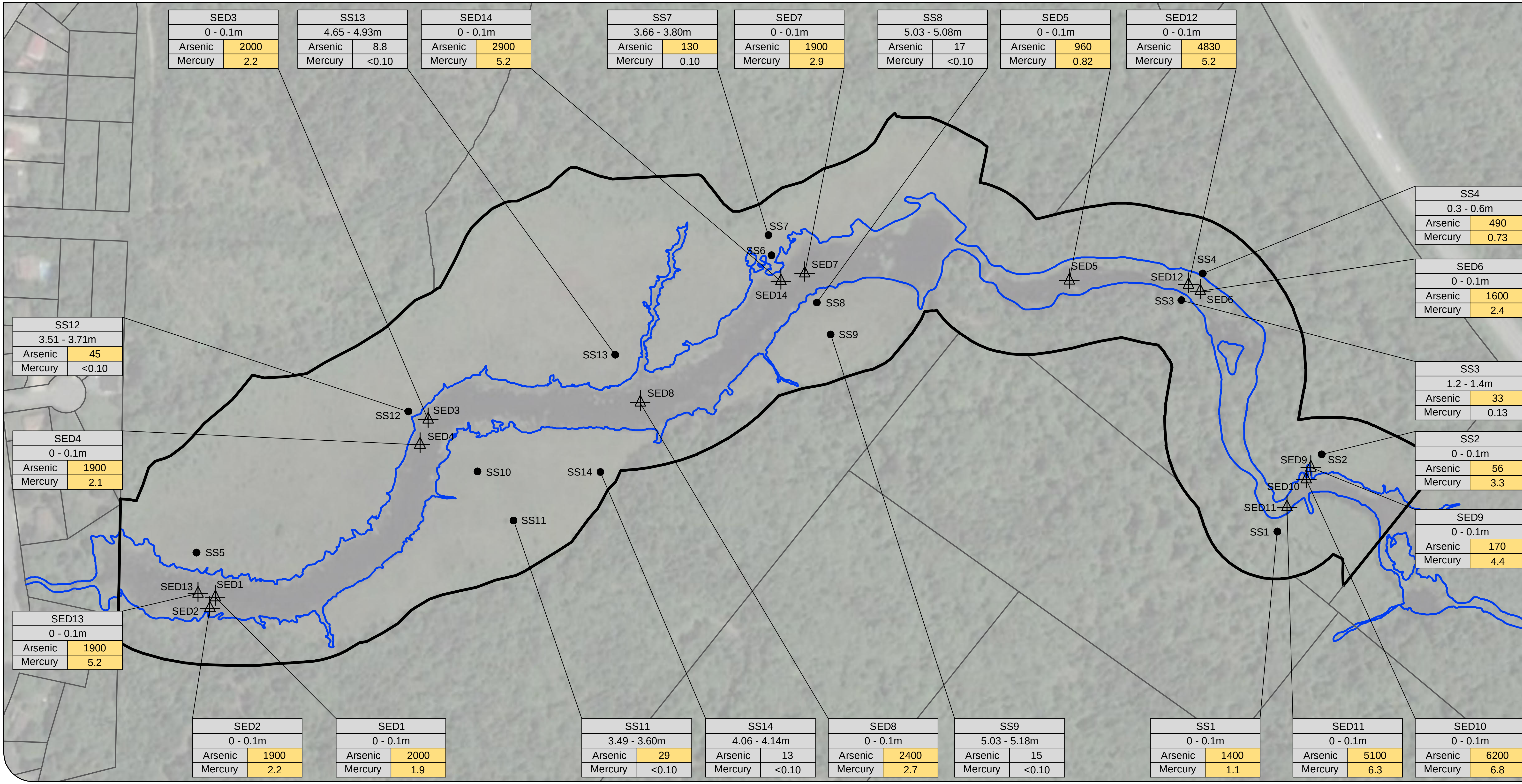
DILLON CONSULTING

NOTE:
INFRASTRUCTURE LOCATIONS ARE APPROXIMATE ONLY.

PROJECT: 19-9183
DATE: AUGUST 2019



HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

SUBJECT PROPERTY LINES
PROPERTY LINES
SEDIMENT SAMPLE
SOIL SAMPLE
EXCEEDS NS TIER 1 EQS FOR FRESHWATER SEDIMENT (As: 17 mg/kg, Hg: 0.486 mg/kg)
Units: mg/kg

Sample ID	
Depth (m bgs)	
Parameter	Criteria
Arsenic	17 mg/kg
Mercury	0.486 mg/kg

CONCENTRATIONS OF ARSENIC AND MERCURY IN SEDIMENT
FIGURE 8

File Location:
c:\projectwise\working directory\projects 2019\50mec\dms04605\199183-05-03 fig 7 & 8.dwg
August, 12, 2019 3:02 PM

MAP/DRAWING INFORMATION
Nova Scotia Property Online and Dillon Consulting Limited site visits. Property lines are approximate only. This is not a legal survey.

CREATED BY: TLR
CHECKED BY: DSP
DESIGNED BY: CMD

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SCALE 1:2,500 METRES

N E S W

DILLON CONSULTING

NOTE:
INFRASTRUCTURE LOCATIONS ARE APPROXIMATE ONLY.

PROJECT: 19-9183
DATE: AUGUST 2019

4.4 Laboratory Analytical Results

4.4.1 Surface Water

4.4.1.1 General Chemistry Parameters and Metals in Surface Water

Laboratory analytical results for general chemistry parameters and metals in surface water are presented in **Table E2 in Appendix E**. The results of arsenic and mercury in surface water are summarized on **Figure 7**. Laboratory analytical certificates are attached in **Appendix F**.

General Chemistry and Metals in Surface Water
9 Submitted (8 reg/1 QC) 9 Exceeded NSE Tier 1 EQS for Aluminum (total and dissolved) and Arsenic (total)

Total aluminum and arsenic concentrations exceeding the applicable NS Tier 1 EQS for a freshwater surface water body were identified in each of the surface water samples submitted for analysis (i.e., SW01 and its duplicate, SW02, SW03, SW04, SW05, SW06, SW10, SW11) (**Figure 7**).

As mentioned above, in the absence of US EPA FWAL criteria for dissolved metals (e.g., aluminum), the dissolved metals (e.g., aluminum) results for surface water were compared to the NSCSR Tier 1 EQS for total metals in surface water. Dissolved aaluminum concentrations exceeding the applicable NS Tier 1 EQS for a freshwater surface water body were identified in each of the surface water samples submitted for analysis.

The remaining parameters were below the applicable NS Tier 1 EQS or the US EPA FWAL criteria.

It is noted that dissolved and total metals were comparable for each metal at each surface water location indicating the metals present are generally dissolved in water rather than being bound to particulates.

4.4.1.2 BTEX and Petroleum Hydrocarbons in Surface Water

Laboratory analytical results for BTEX and modified TPH in surface water are presented in **Table E3 in Appendix E**. Laboratory analytical certificates are attached in **Appendix F**.

BTEX/Modified TPH in Surface Water
2 Submitted 0 Exceeded NSE Tier 1 EQS

BTEX and petroleum hydrocarbon concentrations were below the applicable NS Tier 1 EQS (i.e., freshwater surface water body).

4.4.2 Sediment

4.4.2.1 Total Organic Carbon and Sulphate in Sediment

TOC and Sulphate in Sediment
8 Submitted No NSE Tier 1 EQS available

Laboratory analytical results for total organic carbon (TOC) and sulphate in sediment are presented in **Table E4 in Appendix E**. Laboratory analytical certificates are attached in **Appendix F**.

Select sediment samples (i.e., SED01, SED07, SED10, SED12, SS08, SS10, and SS13) were submitted for TOC and sulphate analyses based on higher material recovery and to ensure horizontal coverage across the site. TOC measures the carbon contained within soil and sediment matter. TOC is one of the factors that influences the bioavailability of sediment-associated organic chemicals, with sediment TOC being generally inversely proportional to toxicity and uptake of sediment-associated organic contaminants by benthic organisms (Gunnarsson et al., 1999).

It is noted that there were no applicable NS Tier 1 EQS available for comparison. Review of the TOC results indicates that TOC is relatively low to moderate in the SS samples (i.e., the more terrestrial sediment samples) and low to high in the SED samples (i.e., the more aquatic sediment samples). TOC in SED samples ranged from 0.13% in SED10 to 17% in SED01. TOC in the SS samples ranged from <0.05% in SS13 to 0.68% in SS08. Higher TOC is indicative of a higher organic content in the sediments, which was consistent with visual observations in the field (i.e., brown, hydric soil with high organic matter and decomposed peat).

Sulphate results in the SED samples are generally moderate to high, while sulphate is low in the SS samples. The sulphate results also tend to coincide with arsenic results in the same sample with higher sulphate generally coinciding with higher arsenic and lower sulphate generally coinciding with lower arsenic. This is generally to be expected as arsenic minerals tend to be associated with sulphide minerals and sulphide minerals oxidize in the surface environment to sulphate minerals. The limiting factor for arsenic and sulphur correlation is that sulphates are more soluble than arsenates and can leach away from mine tailings under optimal conditions whereas arsenates tend to remain in place for a longer period.

4.4.2.2 Metals in Sediment

Metals in Sediment
28 Submitted (26 reg/2 QC) 26 Exceeded NSE Tier 1 EQS

Laboratory analytical results for metals in sediment are presented in **Table E4 in Appendix E** and **Figure 8** (for arsenic and mercury only). Laboratory analytical certificates are attached in **Appendix F**.

Results of metals in sediment were compared to the NS Tier 1 EQS for freshwater sediment and the NS Tier 1 EQS for soil (i.e., residential receptor with non-potable groundwater use, and coarse-grained soil).

Review of the metals results indicated concentrations of aluminum in SED01 to SED08 exceeded the Tier 1 EQS for soil. Iron in SED01 to SED14, SS07, SS09, SS10, SS11, SS12, and SS14 exceeded the Tier 1 EQS for soil and, of the samples that exhibited iron exceedances to the Tier 1 EQS for soil, four samples exceeded the Tier 1 EQS for freshwater sediment. Vanadium in SED01 to SED08 exceeded the Tier 1 EQS for soil. Aluminum, iron, and vanadium are identified in Table 3, Appendix 3 in the Notification of Contamination Protocol (PRO-100) as substances potentially considered as background occurrences. Aluminum, iron, and vanadium concentrations generally exceed the typical background concentrations for this region (i.e., 9,600 to 15,000 mg/kg for aluminum; 14,000 to 31,000 mg/kg for iron; and 18 to 25 mg/kg for vanadium) (Dillon Consulting Limited, 2011) with the exceptions of iron in SED09 to SED14, and iron in SS07, SS09, SS11, SS12, and SS14, which are below the background levels for the region. The ranges for the region containing the Site are based on a sample size of five. Background metal concentrations for the province are based on a sample size of 331, which reduces the uncertainty in our concentration estimates and were; therefore, used for comparison to background data. When compared to overall aluminum, iron, and vanadium concentrations for the province, the analytical results of these metals on the subject property are generally below background concentrations, with the exception of iron in SED03 and SED08 (i.e., 1,650 to 28,000 mg/kg for aluminum, 1,070 to 52,000 mg/kg for iron, and 2 to 110 mg/kg for vanadium). The concentration of iron in SED03 and SED08 (i.e., 54,000 mg/kg) is analytically equivalent to background levels (i.e., 54,000 mg/kg); therefore, it is concluded that iron concentrations (along with aluminum and vanadium) are due to background conditions.

Arsenic concentrations in SED01 to SED14, SS01 to SS04, SS07, SS11, and SS12 exceeded the Tier 1 EQS for freshwater sediment and, of the samples that exhibited arsenic exceedances to the Tier 1 EQS for freshwater sediment, sixteen samples exceeded the Tier 1 EQS for soil. For arsenic, a risk-specific human health soil quality guideline of 31 mg/kg dry soil is associated with a lifetime risk of 10^{-5} above background (National Guidelines and Standards Office, Environment Canada, 1999; NS Pathway specific standards, 2013) and the soil quality guideline for environmental health is 26 mg/kg (for a commercial property). Arsenic in the sediment samples submitted for analysis were generally above the risk-specific soil quality guideline and the soil quality guideline for environmental health, with the exception of arsenic in SS11 (**Figure 8**).

Arsenic concentrations in SS08, SS09, SS10, SS13, and SS14, collected at depth below the organic layer of the fen, were below both the Tier 1 EQS for freshwater sediment and the Tier 1 EQS for soil for a residential site. In addition, arsenic concentrations in SS11 (29 mg/kg) and SS12 (45 mg/kg) may be considered within background levels for the region.

Mercury concentrations in SED01 to SED14, SS01, SS02, and SS04 exceeded the Tier 1 EQS for freshwater sediment and, of the samples that exhibited mercury exceedances to the Tier 1 EQS for freshwater sediment, one sample exceeded the Tier 1 EQS for soil (**Figure 8**).

Other metals exceedances noted in sediment are:

- Antimony in SED10 and SED11 exceeding the Tier 1 EQS for soil;
- Cobalt in SED01 to SED08 exceeding the Tier 1 EQS for soil;
- Lead in SED05 exceeding the Tier 1 EQS for freshwater sediment;
- Manganese in SED01 to SED08 exceeding the Tier 1 EQS for freshwater sediment;
- Nickel in SED01 and SED02 exceeding the Tier 1 EQS for freshwater sediment;
- Zinc in SED07 and its duplicate exceeding the Tier 1 EQS for freshwater sediment; and,
- Selenium in SED05, SED06, and SED08 exceeding the Tier 1 EQS for freshwater sediment. However, it is noted that selenium in the SED06 and SED08 samples are analytically equivalent to the guideline.

4.4.2.3 BTEX and Petroleum Hydrocarbons in Sediment

Laboratory analytical results for metals in sediment are presented in **Table E5 in Appendix E**. Laboratory analytical certificates are attached in **Appendix F**.

BTEX/ Modified TPH in Sediment
2 Submitted 0 Exceeded NSE Tier 1 EQS

Results of BTEX and petroleum hydrocarbons in sediment were compared to the NS Tier 1 EQS for freshwater sediment and the NS Tier 1 EQS for soil (i.e., residential receptor with non-potable groundwater use, and coarse-grained soil).

Review of the BTEX results indicated that concentrations were below laboratory detection limits. Each of the two sediment samples submitted for analysis (i.e., SED10 and SED12) exhibited modified TPH (lube oil resemblance) exceedances to the Tier 1 EQS for freshwater sediments. Due to the high organic content visually observed in the sediment samples, each sediment sample was re-submitted for petroleum hydrocarbon analysis after applying a silica-gel treatment. Silica-gel treatments were used to evaluate naturally occurring organic matter (i.e., biogenic) contributions to the TPH detected in the sediment. The modified TPH results from SED10 remained the same after applying a silica-gel treatment. The modified TPH results from SED12 decreased marginally (results were analytically equivalent) after applying a silica-gel treatment; however, the concentrations remained above the applicable Tier 1 EQS for freshwater sediment at SED10 and SED12.

Field observations (visual and olfactory) did not identify observations consistent with petroleum hydrocarbons; rather, an abundance of organic material was observed throughout Mitchell's Brook and Barry's Run. Review of the gas chromatograms obtained from the laboratory and the analytical results indicate the presence of hydrocarbons mostly in the C16-32 range (lube oil range). Naturally occurring organic matter, also known as biogenic organic compounds (BOCs) (e.g., sterols, fatty acids, and fatty alcohols), are biosynthesized by living organisms such as plants and microbes and mainly elute in the C16-34 range with some eluting in the C34-50 range (Wang et al., 2008).

Despite applying a silica-gel treatment, false positives for the C16-34 range are still common for highly organic soils/sediments as the silica gel can only remove a fixed amount of BOC before being exhausted

(Maxxam, 2010). If more BOCs are present than the silica gel can remove, than the remaining BOCs will still be present and identified as hydrocarbons in the lube oil range. The field observance of abundant organic matter supports the strong likelihood that the detected hydrocarbons are biogenic and not petroleum hydrocarbon related. Further, conversations with Alan Stewart, the Organics Laboratory Department Manager at Maxxam, concluded that the petroleum hydrocarbons detected in the fuel/lube range do not appear to be associated with petroleum hydrocarbons and are likely associated with low levels of organic matter. According to Alan Stewart, review of the results indicate that the low hydrocarbon levels do not indicate the presence of the refined petroleum hydrocarbon signature peaks.

4.4.3 Pore Water

4.4.3.1 General Chemistry and Metals in Pore Water

Laboratory analytical results for general chemistry parameters and dissolved metals in pore water are presented in **Table E2 in Appendix E**. The results of dissolved arsenic and mercury in pore water are summarized on **Figure 7**. Laboratory analytical certificates are attached in **Appendix F**.

Dissolved arsenic concentrations exceeding the US EPA guideline were identified in PW02 and PW04. Dissolved mercury concentrations exceeding the applicable NS Tier 1 EQS for a freshwater surface water body were identified in PW01 to PW04.

Other metals exceedances noted in pore water are:

- Dissolved aluminum and manganese in PW01 to PW05 exceeding the Tier 1 EQS;
- Dissolved cobalt in PW01 to PW04 exceeding the Tier 1 EQS;
- Dissolved copper in PW05 exceeding the Tier 1 EQS;
- Dissolved iron in PW01 to PW04 exceeding the US EPA guideline; and,
- Dissolved lead in PW05 exceeding the US EPA guideline.

General Chemistry and Metals in Pore Water
5 Submitted 5 Exceeded NSE Tier 1 EQS for Aluminum and Manganese (dissolved) 4 Exceeded NSE Tier 1 EQS for Cobalt (dissolved) 1 Exceeded Tier 1 EQS for Copper (dissolved) 2 Exceeded US EPA guideline for Arsenic (dissolved) 4 Exceeded US EPA guideline for Iron (dissolved) 1 Exceeded US EPA guideline for Lead (dissolved) 1 Exceeded US EPA guideline for Mercury (dissolved)

As mentioned above, in the absence of a US EPA guideline for dissolved metals, the dissolved metals results for pore water were compared to the NSCSR Tier 1 EQS for total metals in surface water.

The remaining parameters were below the applicable NS Tier 1 EQS or the US EPA guideline.

4.4.4 QA/QC Discussion

Maxxam laboratory certificates of analysis (provided in **Appendix F**) indicate that a reasonable degree of accuracy was achieved in the sediment, pore water, and surface water analyses (based on results of method blanks, spiked blanks, and matrix spike surrogate recoveries).

Based on field procedures, laboratory methods, sampling program design, and field observations, the analytical results are concluded to be representative of the site conditions in general. Data precision was evaluated by calculating the relative percent difference (RPD) between the sample results and their duplicate results (where collected). Dillon established a RPD acceptance criterion (data quality objective) of <35% for sediment and surface water results (U.S. EPA, 2004). Duplicate sediment and surface water results indicated that results met the data quality objective with the exception of lead in SS13 and SS13B (RPD value of 44 %). Although, the lead RPD value is marginally higher than the acceptance criteria, lead concentrations were relatively low in comparison to the Tier 1 EQS and the other metals analyzed as part of the SS13 sample and its duplicate were within the acceptance criteria. Further, the laboratory quality assurance/quality control (QA/QC) results for blanks, spikes, matrix spikes, and duplicates for lead and the other metals included in the analysis were within the acceptable criteria.

Dillon concludes that the dataset of site sediment and surface water samples results are complete as analytical results were obtained for all of the samples submitted and all of the analytical parameters requested, including supporting laboratory documentation.

5.0 Summary of Environmental Conditions

5.1 Geology and Hydrogeology

The regional surficial geology of the area generally consists of a stony, sandy matrix, and material derived from local bedrock sources (Stea *et al*., 1992). The regional bedrock geology for the area is of the Goldenville Formation, consisting of sandstone turbidites and slate (Keppie, 2000).

The soil/sediment stratigraphy on the site is discussed in **Section 4.3.1**. Bedrock was not encountered during the 2019 ESA activities. Refusal in cobbles and/or rock was encountered in select sample locations, as presented on **Figure 3**.

5.2 Drainage

Lake Charles is the headwater lake for the Shubenacadie watershed. Mitchell's Brook receives water from Lake Loon, which then flows in a south-westerly direction into Barry's Run and ultimately Lake Charles.

5.3 Mitchell's Brook and Barry's Run Channel

Mitchell's Brook and Barry's Run form a defined channel on the Site. The channel depth in Mitchell's Brook ranges from approximately 0.4 – 3 metres deep, while the channel depth in Barry's Run ranges from approximately 1 to 2.5 metres deep. While the velocity of water in the channel was not quantified during the Phase II ESA, it was observed to be fast flowing and capable of mobilizing suspended sediments downstream from up gradient source areas.

On average, an estimated 30 centimetres of organics deposition is present at the bottom of the channel in Barry's Run. Visual observation and analytical results discussed in Section 4 confirmed the presence of suspected tailings underlying both Mitchell's Brook and Barry's Run. Elevated arsenic and mercury concentrations above the NS Tier 1 EQS were noted in both organics and tailings material present throughout Mitchell's Brook and Barry's Run. Concentrations of arsenic in tailings samples ranged from 1,900 to 6,200 mg/kg with the highest concentrations (As: 6,200 mg/kg) observed in a sample collected in Mitchell's Brook near the top portion of the HRM property (sediment sample SED10). The results indicate that there has been limited attenuation and that the tailings deposits are irregularly distributed across the Site. Through various physical mechanisms (e.g., currents, bioturbation), the organic material overlying the tailings deposition appears to have fairly consistent arsenic concentrations throughout the channel, ranging from 960 to 2,400 mg/kg.

Mercury concentrations in tailings samples collected in Mitchell's Brook and Barry's Run ranged from 4.4 to 6.8 mg/kg. Concentrations of mercury above the NS Tier 1 EQS were also noted in the organics overlaying the tailings in Barry's Run. These results are consistent with the arsenic results in that the tailings have irregular deposition patterns across the channel.

It should be noted that the up gradient source of tailings originating from Montague Mines has not been removed. It can be assumed that the rapid flow of water through Mitchell's Brook and Barry's Run, particularly during spring freshet, continues to mobilize tailings from the Montague Mines site and deposit them in the Site channel along with other organic materials.

Reportedly, an environmental assessment and closure study for the Montague Mines property was commissioned by NS Lands and is currently being completed by a team of consultants led by Intrinsik. Conclusions regarding potential human health and ecological risks that arsenic and mercury impacts pose to receptors on the HRM property cannot be made until the details of the closure plan for the Montague Mines site is understood.

5.3.1 Bog/Fen Complex (Fen)

The stratigraphy in the fen generally consists of brown, hydric soil with high organic matter and decomposed peat from surface to approximately 3.5 – 5 mbgs, followed by grey, fine-grained minerogenic material. The peaty, organic rich layer in the fen area becomes shallower at the edges of the subject property towards the treeline.

Reportedly, the channel was dammed at some point in time and the remnants of a flow control structure are located on site at the outflow of Barry's Run before water crosses under Waverley Road and discharges into Lake Charles. It is unclear if the control structure was used during mine operations to retain/elevate water levels or control flows historically (**Figure 4** in **Section 3.6.1.2**). If the structure was used to effectively flood the fen, it is possible that tailing fines may have impacted the near-surface organic peat material with arsenic or other contaminants. It is possible that organic material at the top of fen may be impacted by tailings and may pose a human or ecological health risk. Further characterization of the organics located at the top of the fen is required to confirm the presence or absence of tailings impacts.

Although the grey, dense, clay-like material underlying the fen at depth appeared to be visually consistent with tailings, it was not chemically similar; analytical results from this dense-clay material indicate that this deposit is much lower in metals concentration and likely derived from natural geological sources (very old stream bed material), and not tailings. This indicates that tailings in sediment are limited to the channel and have not impacted the fen at depth.

5.3.2 Surface Water

Arsenic and aluminum were consistently found to exceed the guidelines throughout the study area. Dissolved concentrations were found to be elevated as well as the total (unfiltered) results. This indicates there may be a potential risk to receptors through this operable pathway.

5.3.3 Pore Water

Results of metals in pore water were compared to the US EPA FWAL criteria (specifically the criterion continuous concentration or CCC), where available. The US EPA FWAL are based on dissolved water concentrations, while the Tier 1 EQS are generally based on total concentrations. Where no US EPA criteria was available, the Tier 1 EQS was used for comparison purposes.

Pore water is a major route of exposure for many benthic organisms to contaminants. While freshwater aquatic life surface water benchmarks are generally based on toxicity data for pelagic freshwater species, rather than species associated with sediments, they have been used here for comparison purposes to sediment pore water.

No freshwater aquatic life benchmarks were available for bismuth, calcium, lithium, magnesium, potassium, silicon, sodium, sulphur, tin or titanium. Bismuth, lithium, tin, and titanium were not detected in the pore water samples and are not generally associated with sulphide mine tailings, and are; therefore, not considered to be of concern. Calcium, magnesium, potassium, silicon, and sodium were detected in each of the pore water samples, but represent the major cations present and are more indicative of general water quality parameters than potential influence of mine tailings on the Site, and as such, were not considered further. Total sulphur has no guideline and is not speciated and therefore discussion is centred around the speciated sulphur forms specifically sulphate and sulphide.

When compared to the water quality benchmarks, exceedances were noted in at least one pore water sample for aluminum, arsenic, cobalt, copper, iron, lead, manganese and mercury (**Appendix E**). Dissolved criteria were only available for arsenic, iron, lead, and mercury. Elevated aluminum and iron in sediments have been discussed previously and were determined to be related to elevated background concentrations. As such, aluminum (five of five samples) and iron (four of five samples) in sediment pore water exceed the applicable benchmarks and are also likely related to elevated background sediment concentrations. Copper, lead, and mercury were each exceeded in one of five pore water samples (PW05), while arsenic was elevated in two samples (PW02 and PW04). Arsenic, lead, and mercury exceedances were less than twice the applicable benchmark, while copper exceeded the benchmark by 2.6-fold. Manganese exceeded the US EPA FWAL criteria in each of the five pore water samples submitted for analysis, with exceedances ranging from approximately 2 to 63-fold; however, manganese is likely to be associated with background. While these exceedances indicate that pore water concentrations could be at levels that may pose potential risks to freshwater aquatic life, these comparisons should be interpreted with caution since the species upon which the benchmarks are based were generally pelagic rather than benthic. The presence of these metals in sediment pore water indicates that some leaching of the metals from sediments into pore water is occurring and these metals may be bioavailable for uptake by benthic organisms. However, when metals concentrations are compared for each pore water sample and its corresponding sediment location (**Table E1** and **E3** in **Appendix E**), pore water concentrations are generally orders of magnitude lower than sediments. The same trend is observed in surface water metals concentrations compared to sediments (**Table E1** and **E3** in **Appendix E**). This indicates that while some metals are leaching into pore water the amount is low relative to the sediment concentration. Given the age of the tailings; the sediments can be considered to be in a stable phase of leaching (i.e., the most readily available metals have already leached from the tailings) and while metals will continue to leach, the rate is likely to remain relatively constant or decline with time unless the tailings are disturbed.

5.4 Outcomes and Discussion of Acadia University Study

A summary of methods and chemistry results from the Acadia University study are presented in **Appendix I**. As noted, titanium and lead provide useful surrogates to assist in identifying potential changes to sediment chemistry quality due to urban development (titanium increases) or industrialization (increasing lead). Dr. Spooner estimates that a sediment history dating back 200 years can be assessed in the upper approximately 300mm layer of Lake Charles, which is downgradient of Site. For Lake Charles, the arsenic concentrations over depth follow an expected trend in which a distinctive depositional period occurred in the 1900's and then gradually returned to pre-1900 levels over the intervening years. This suggests that in deeper areas of the lake, old tailing deposits are being slowly buried with new material resulting in arsenic concentrations in upper sediment zones that are similar to background (pre-mining) values. This process has positive implications for overall lake health with respect to benthic organism interaction with sediments.

The vertical arsenic chemistry trends in Lake Charles are not reflected in the cores obtained in Barry's Run. The Barry's Run cores are all similar with respect to total arsenic and portray a distinct concentration profile from the surface water/sediment interface to the 100 to 300mm depths. The near-surface sediments appeared as a mixture of very fine organic to coarser sand fractions which overlay more coarse tailing deposits (Figure 6).

The arsenic distribution for all three cores generally follows a "C" profile over depth, where high concentrations are found at the near surface and lower portion of the vertical core, and are lower in the mid-zone. Two mechanisms may be influencing the vertical distribution of arsenic; the first may be the effects of a reducing condition starting 50mm below top of sediment causing changes in the arsenic valence state and enabling it to become more soluble and mobile. However, if this was completely the case, one would expect the decrease to be more pronounced with depth, which is not the case. The second mechanism may be associated with re-deposition of tailings in more recent years. If we assumed reducing conditions were not influencing arsenic concentrations, then the data could be interpreted as demonstrating that Barry's Run was recovering, and in more recent (past 20-30 years) fresh tailing material was being deposited in the Run due to an increase in upstream development, off-road vehicles disturbing upgradient tailings deposits, and/or general increase in erosion from intense weather events. Although the exact reasons for the arsenic profiles remain speculative, it is clear that Barry's Run is not recovering in a manner similar to Lake Charles and remains an active sink for arsenic impacted tailing material.

6.0 Discussion and Recommendations

The results of sediment and surface water samples indicate there may be potential risks to human health and ecological receptors on the Site due to historic tailings deposition originating from the former upstream Montague Mines operations. Although the Phase II ESA was not meant to fully delineate or quantify volumes of impacted media, the study has made several conclusions and recommendations. As there is a concurrent study to assess the former mine area and tailings, it is recommended that any final risk controls or management for this Site be coordinated with the outcomes of the mine study to provide an overall/consistent risk control framework. Additional information is required to confirm whether actual environmental risks are present, and include:

- Characterization for metals/TOC of near surface fen organics/peat;
- Information on types of ecological receptors present on-site and their habits;
- Details of site-specific risk-based criteria currently being developed for the Montague Mines sites as part of the closure plan; and,
- The methods/approach being established for the Closure plan of properties “off Crown lands” included in the ongoing Montague Mines closure study.

Results from the pore water testing indicate that while some leaching of metals in sediment pore water is occurring, and these metals may be bioavailable for uptake by benthic organisms, the amount of leaching relative to sediment metals concentrations is very low. Given the age of the tailings contamination, the sediments can be considered to be into a stable phase of leaching; however, further sulphur speciation samples from pore water are recommended to address the potential for sulphide in tailings.

Some sediment and sediment pore water results exceed applicable benchmarks indicating potential risks to aquatic life, particularly benthic species. The potential for risks to aquatic life should be examined in an ecological risk assessment given that:

- Limited information is available on the quality of available habitat for benthic species in the area;
- Due to the age of contamination, any potential impacts to aquatic species have likely already occurred; and,
- The reference area in addition to the Site will need to be looked at to examine potential impacts.

Sediment exposure to humans as a result of swimming/boating, etc. is expected to be minimal but should be addressed more formally using a risk assessment approach, particularly if these activities are to occur in the area once developed.

There is anecdotal evidence that fishing occurs along both Barry’s Run and Mitchel’s Brook. If fishing occurs in the area, and depending on the types of fish/aquatic species that are present/caught, there may be some accumulation of metals in fish tissue which could then be ingested by human receptors. The following recommendations concerning fishing on-site are:

- To confirm whether fishing occurs in the area;
- To identify types of fish/aquatic species that may be present in the area and whether these species could be ingested. This information will be useful to assess the need for fish tissue sampling (e.g., some eels eat benthic species which could be impacted by sediment concentrations);
- To evaluate potential risks as a result of fish consumption in a HHRA. Even if fish ingestion does not occur, fish consumption could potentially occur in the future; therefore, the potential risks via this pathway should be evaluated;
- The collection of invertebrate tissue data if fish are benthic feeders, will help indicate the potential for contribution of benthic food ingestion from the Site to fish ingestion; and,
- The collection of fish tissue samples if fishing occurs, even if there is unlikely to be accumulation into fish tissue, may be warranted from a public relations perspective.

Based on Dillon's understanding of the Site, current uses and proposed future residential development on lands adjacent to the Site, the following exposure scenarios and receptor pathways are likely applicable to this site:

- Children playing in fen for recreational purposes;
- Children playing in shallow portions of Mitchell's Brook for recreational purposes;
- Fishing activities and fish consumption in Mitchell's Brook and Barry's Run; and,
- Impacts to ecological receptors.

Until further information is known about potential risks to human health and ecological receptors, the degree in which the Site is planned to be used for uncontrolled recreational purposes should be carefully evaluated. A risk assessment is recommended to obtain data concerning potential risks to human health and ecological receptors. Pending the results of a risk assessment, a risk management plan that incorporates appropriate engineering and administrative controls is recommended.

As discussed in Section 5.4, there is reasonable evidence to suggest that the fen is still acting as a sink for arsenic impacted tailings originating in upgradient areas. The upper sediment layers are also very fine with a mix of organic and clay-size particle fractions which can be readily mobilized if disturbed. The proposed development on adjacent lands has the potential to increase stormwater flow volumes to the site and increase mobilization of tailings material through the site. The hydrology of the site was not assessed as part of this study; however, the stability of the fen is likely susceptible to changing hydrology on adjacent lands. In regards to future development of adjacent lands, the requirement for buffer zones to maintain stability of the fen should be also considered. In addition, any increase in stormwater flows from the adjacent development to the Site should be prohibited unless they can be demonstrated to not disrupt the fen integrity or mobilize more tailings into the system.

6.1 Closing Remarks

This report was prepared by Shauna Gallant, MREM and Rebecca Appleton, P.Eng., and was reviewed by Brad MacLean, M.Sc., Lisa Marshall, MES, Darren Parker, B.D.Env.Plan, and Mike Charles, P.Eng.

Dillon has prepared this report for the exclusive use of HRM and its agents for specific application to the site. The Dillon investigation was conducted in accordance with Dillon's scope of work and accepted environmental practices. Limitations to this report are included in the disclaimer presented in **Appendix H**. No other warranty, expressed or implied, is made.

Yours truly,

DILLON CONSULTING LIMITED

Original Signed	Original Signed
Michael Charles, P.Eng. Senior Technical Reviewer	Rebecca Appleton, P.Eng. Project Manager/Site Professional

SMG:jes

Appendix A

Site Photographs

Photo 1. View of the small tributaries upstream of Mitchell's Brook to the southeast of the subject property (January 28, 2019).

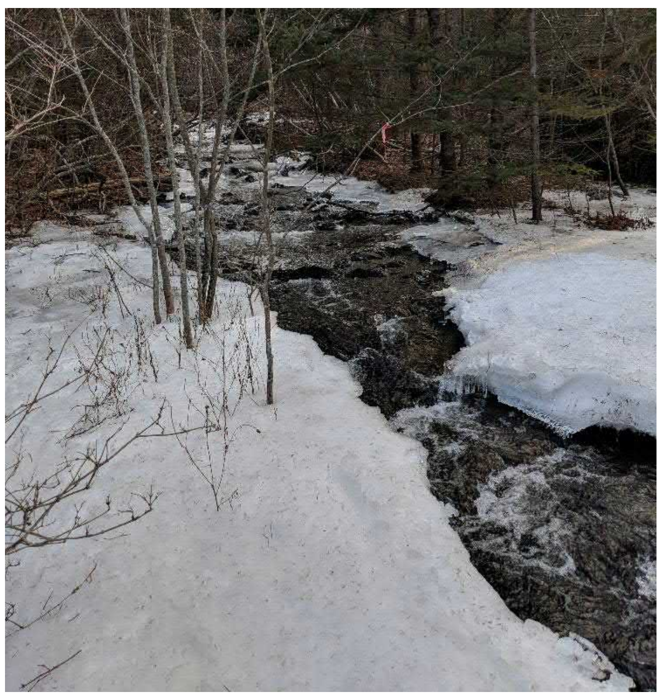


Photo 2. View of the small tributaries upstream of Mitchell's Brook to the southeast of the subject property. Small shrubs and alders are present in the high water line area (January 28, 2019).

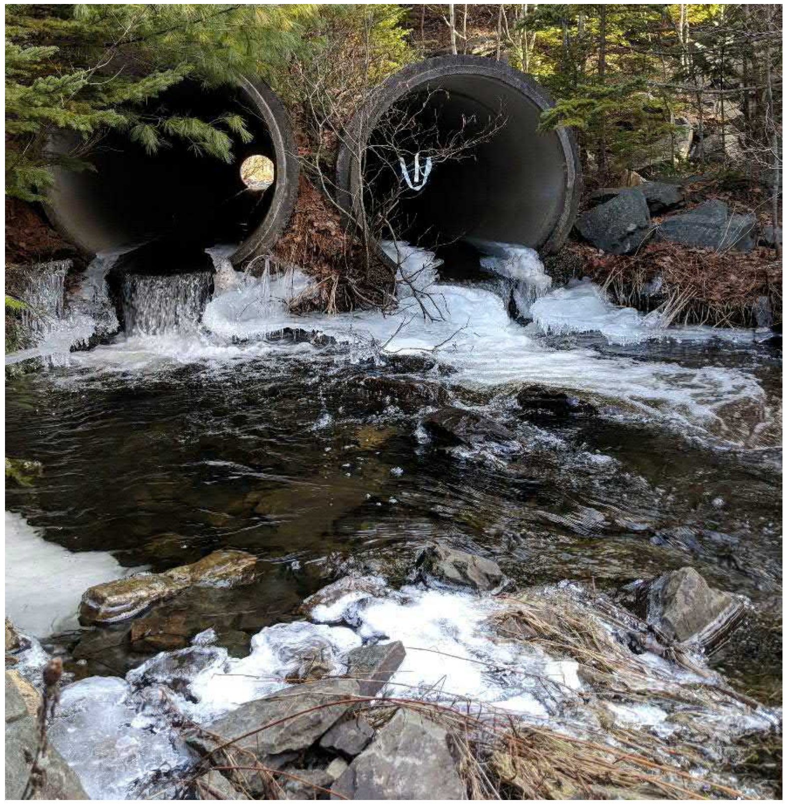


Photo 3. View of the culverts running under Highway 107 to the southeast of the subject property (January 28, 2019).

Photo 4. View of the forested area to the south of the subject property (January 28, 2019).

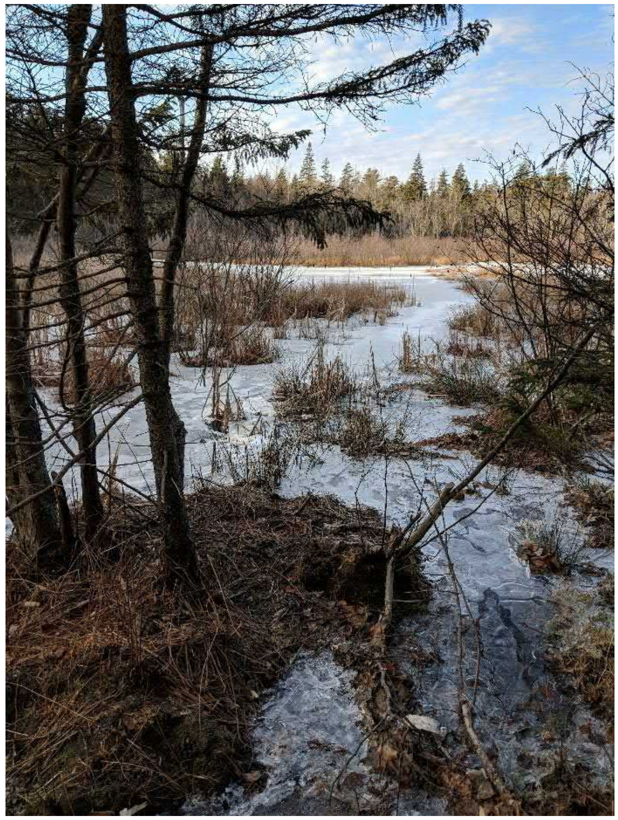


Photo 5. View of the small tributaries upstream of Mitchell's Brook to the southeast of the subject property (January 28, 2019).

Photo 6. View of wetland area located on the subject property in between Barry's Run and Mitchell's Brook (January 28, 2019).

Photo 7. View of all-terrain vehicle tracks in the wetland area located on the subject property in between Barry's Run and Mitchell's Brook (January 28, 2019).

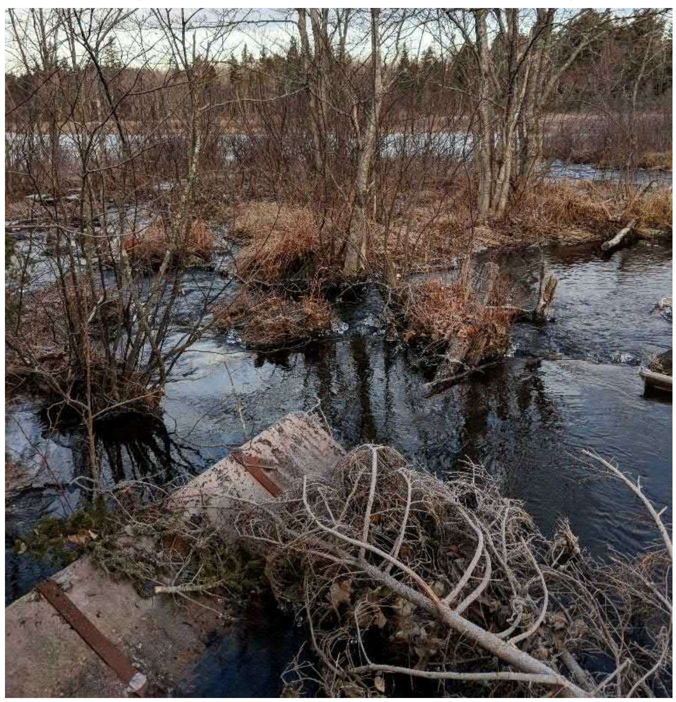


Photo 8. Debris observed in the wetland area located on the subject property in between Barry's Run and Mitchell's Brook (January 28, 2019).

Photo 9. Small wooden bridge crossing Mitchell's Brook that is used for all-terrain vehicles (January 28, 2019).

Photo 10. View of the bottom of the shallow wetland area in between Barry's Run and Mitchell's Brook (January 28, 2019).

Photo 11. View of Barry's Run facing west (January 28, 2019).

Photo 12. View of a path in the surrounding forested area to the south of the site used for all-terrain vehicles (January 28, 2019).

Photo 13. One of the boats used for the sediment sampling program (April 16, 2019).

Photo 14. One of the boats used for the sediment sampling program (April 25, 2019).

Photo 15. Glew Gravity Corer used for the sediment sampling program (April 16, 2019).

Photo 16. Glew Gravity Corer used for the sediment sampling program (April 16, 2019).

Photo 17. Sediment cores collected using the Glew Gravity Corer (April 16, 2019).

Photo 18. Manual split spoon used to collect soil samples (April 25, 2019).

Photo 19. SS03 (April 25, 2019).

Photo 20. SS12 (April 25, 2019).

Photo 21. SED07 (April 25, 2019).

Photo 22. SED09 (April 25, 2019).

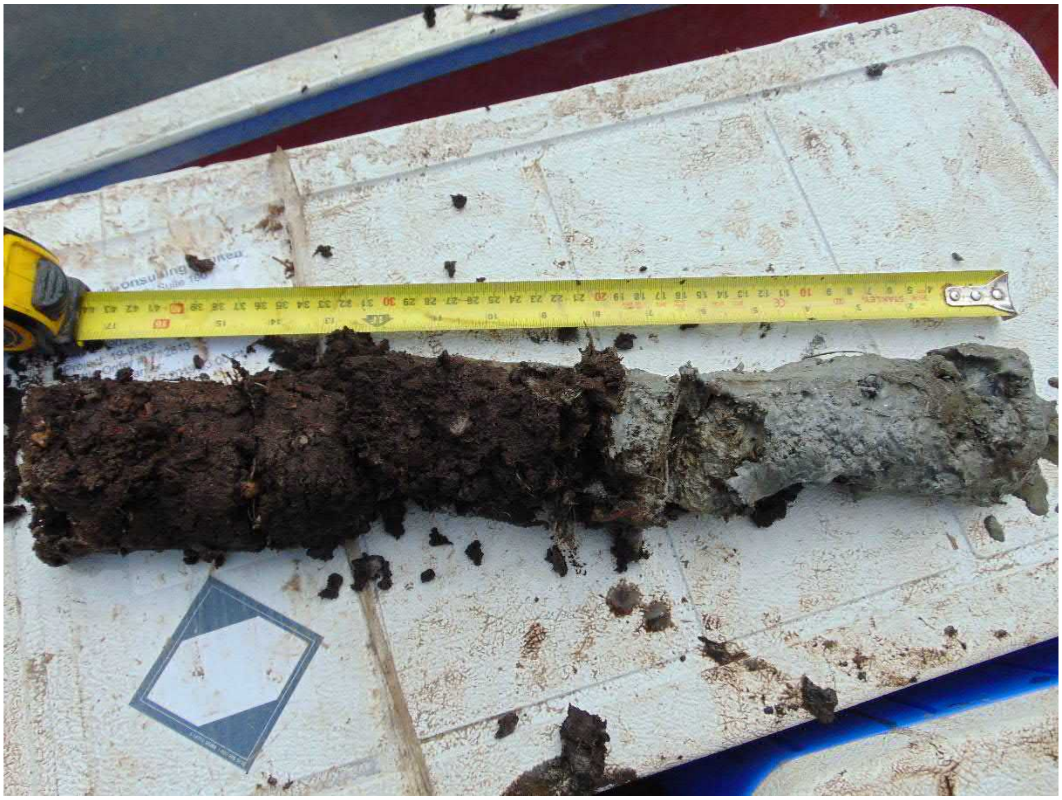


Photo 23. SED10 (April 25, 2019).

Appendix B

ERIS Report

ERIS
ENVIRONMENTAL RISK INFORMATION SERVICES

CITY DIRECTORY

Project Property: *Port Wallace, Nova Scotia*
Report Type: *City Directory*
Order No: *20190121115*
Information Source: *Polk's Halifax Regional Municipality East, NS City Directory*
Date Completed: *23/01/2019*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

City Directory Information Source
Polk’s Halifax Regional Municipality East, Nova Scotia City Directory

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 2000	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1995	
Site Listing:	-No Civic Address

Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1990	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1985	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1980	
Site Listing:	-No Civic Address
Adjacent Properties:	

31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1974	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS

Year: 1970	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

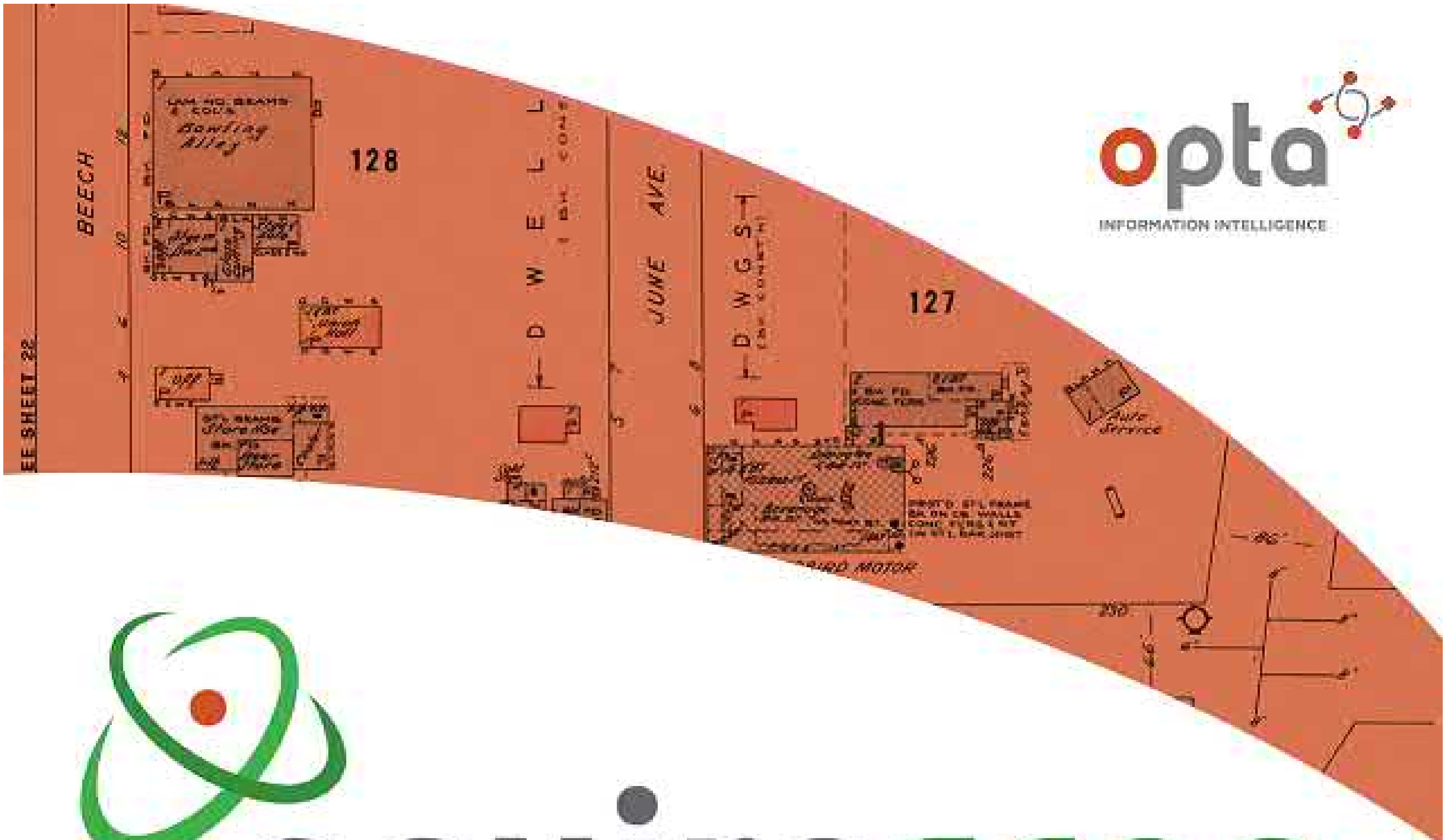
PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1965	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed

105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

PROJECT NUMBER: 20190121115	
Site Address:	Port Wallace, NS
Year: 1960	
Site Listing:	-No Civic Address
Adjacent Properties:	
31 Cono Drive	-Address Not Listed
105 Lethbridge Avenue	-Address Not Listed
650 Waverley Road	-Address Not Listed

-All listings for businesses were listed as they are in the city directory.

-Listings that are residential are listed as “residential” with the number of tenants. The name of the residential tenant is not listed in the above city directory.



enviroscan

An SCM Company

175 Commerce Valley Drive W
Markham, Ontario L3T 7Z3

T: 905-882-6300
W: www.optaintel.ca

Report Completed By:

Swati

Site Address:

Port Wallace Halifax NS

Project No:

20190121115

Opta Order ID:

58178

Requested by:

Eleanor Goolab
Ecolog ERIS

Date Completed:

2/12/2019 5:32:05 AM

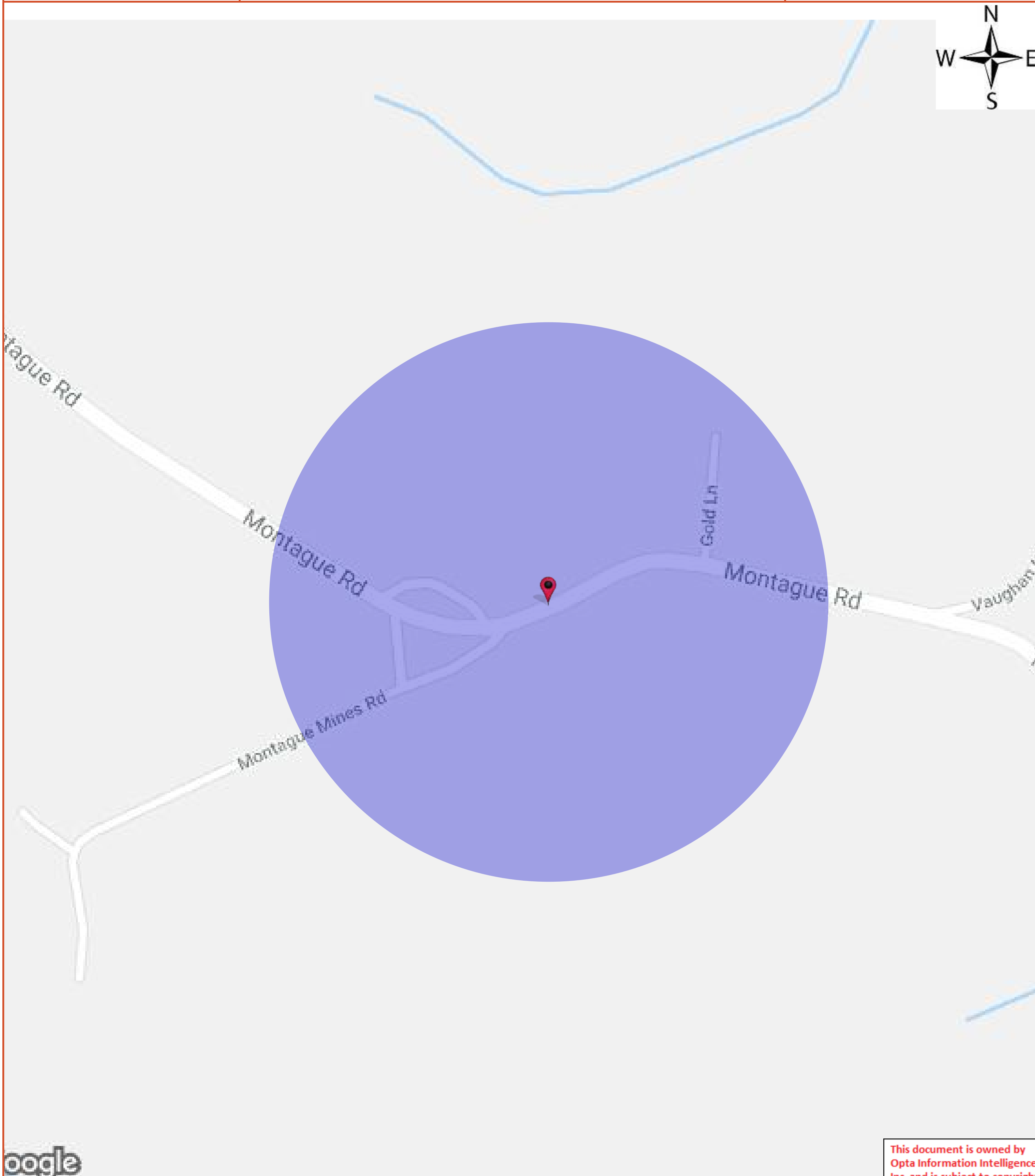
ENVIROSCAN Report

Search Area: Port Wallace Halifax NS

Project #: 20190121115

Requested by:
Eleanor Goolab
Date Completed: 02/12/2019 05:32:05

OPTA INFORMATION INTELLIGENCE



Opta Historical Environmental Services Enviroscan ™
Terms and Conditions

Report

The documents (hereinafter referred to as the "Documents") to be released as part of the report (hereinafter referred to as the "Report") to be delivered to the purchaser as set out above are documents in Opta's records relating to the described property (hereinafter referred to as the "Property"). Opta makes no representations or warranties respecting the Documents whatsoever, including, without limitation, with respect to the completeness, accuracy or usefulness of the Documents, and does not represent or warrant that these are the only plans and reports prepared in association with the Property or in Opta's possession at the time of Report delivery to the purchaser. The Documents are current as of the date(s) indicated on them. Interpretation of the Documents, if any, is by inference based upon the information which is apparent and obvious on the face of the Documents only. Opta does not represent, warrant or guarantee that interpretations other than those referred to do not exist from other sources. The Report will be prepared for use by the purchaser of the services as shown above hereof only.

Disclaimer

Opta disclaims responsibility for any losses or damages of any kind whatsoever, whether consequential or other, however caused, incurred or suffered, arising directly or indirectly as a result of the services (which services include, but are not limited to, the preparation of the Report provided hereunder), including but not limited to, any losses or damages arising directly or indirectly from any breach of contract, fundamental or otherwise, from reliance on Opta Reports or from any tortious acts or omissions of Opta's agents, employees or representatives.

Entire Agreement

The parties hereto acknowledge and agree to be bound by the terms and conditions hereof. The request form constitutes the entire agreement between the parties pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, negotiations and discussions, whether oral or written, and there are no representations or warranties, or other agreements between the parties in connection with the subject matter hereof except as specifically set forth herein. No supplement, modification, waiver, or termination of the request shall be binding, unless confirmed in writing by the parties hereto.

Governing Document

In the event of any conflicts or inconsistencies between the provisions hereof and the Reports, the rights and obligations of the parties shall be deemed to be governed by the request form, which shall be the paramount document.

Law

This agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

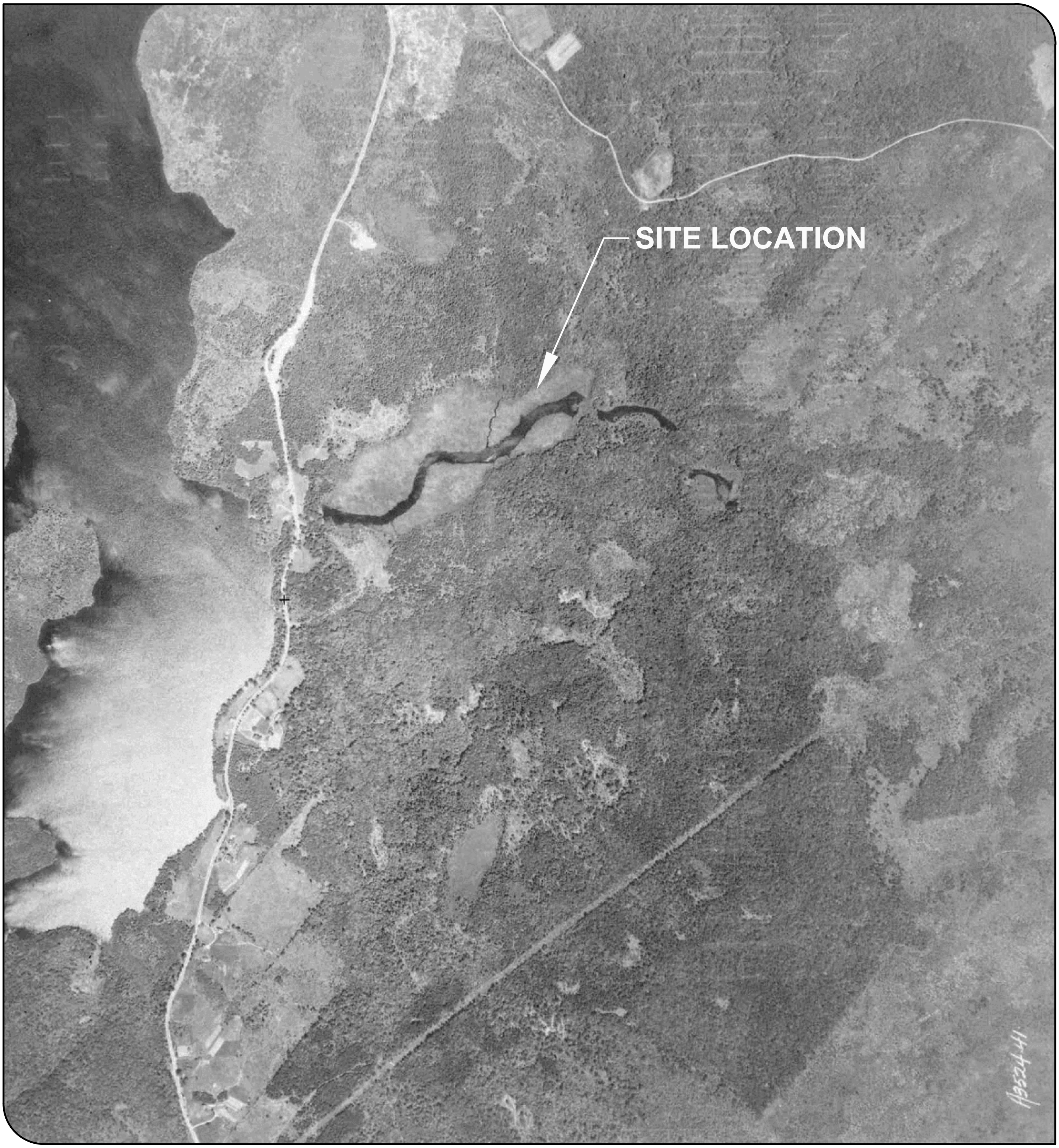
175 Commerce Valley Drive W
Markham, Ontario
L3T 7Z3
T: 905.882.6300
Toll Free: 905.882.6300
F: 905.882.6300
An SCM Company
www.optaintel.ca

No Records Found

N
W E
S

Appendix C

Aerial Photography and Images



HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1931
FIGURE C1

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

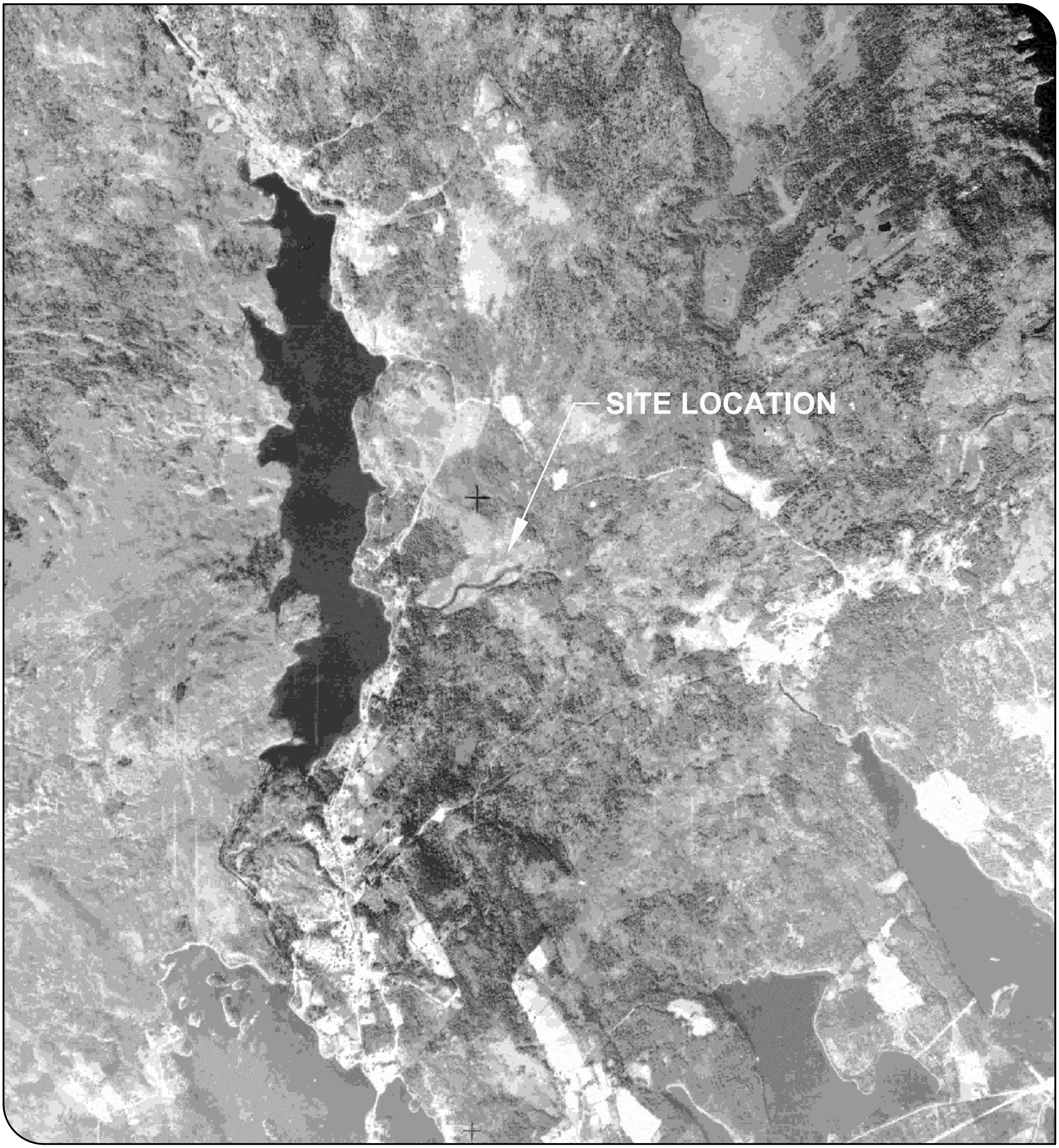
File Location:
c:\projectwise\working directory\projects 2019\50tlr\dms04605\199183-05-03-aerials.dwg
May, 16, 2019 1:09 PM

DILLON CONSULTING

N W E S

PROJECT: 19-9183

DATE: MAY 2019



HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1947
FIGURE C2

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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May, 16, 2019 1:09 PM

DILLON CONSULTING

N W E S

PROJECT: 19-9183

DATE: MAY 2019

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1954
FIGURE C3

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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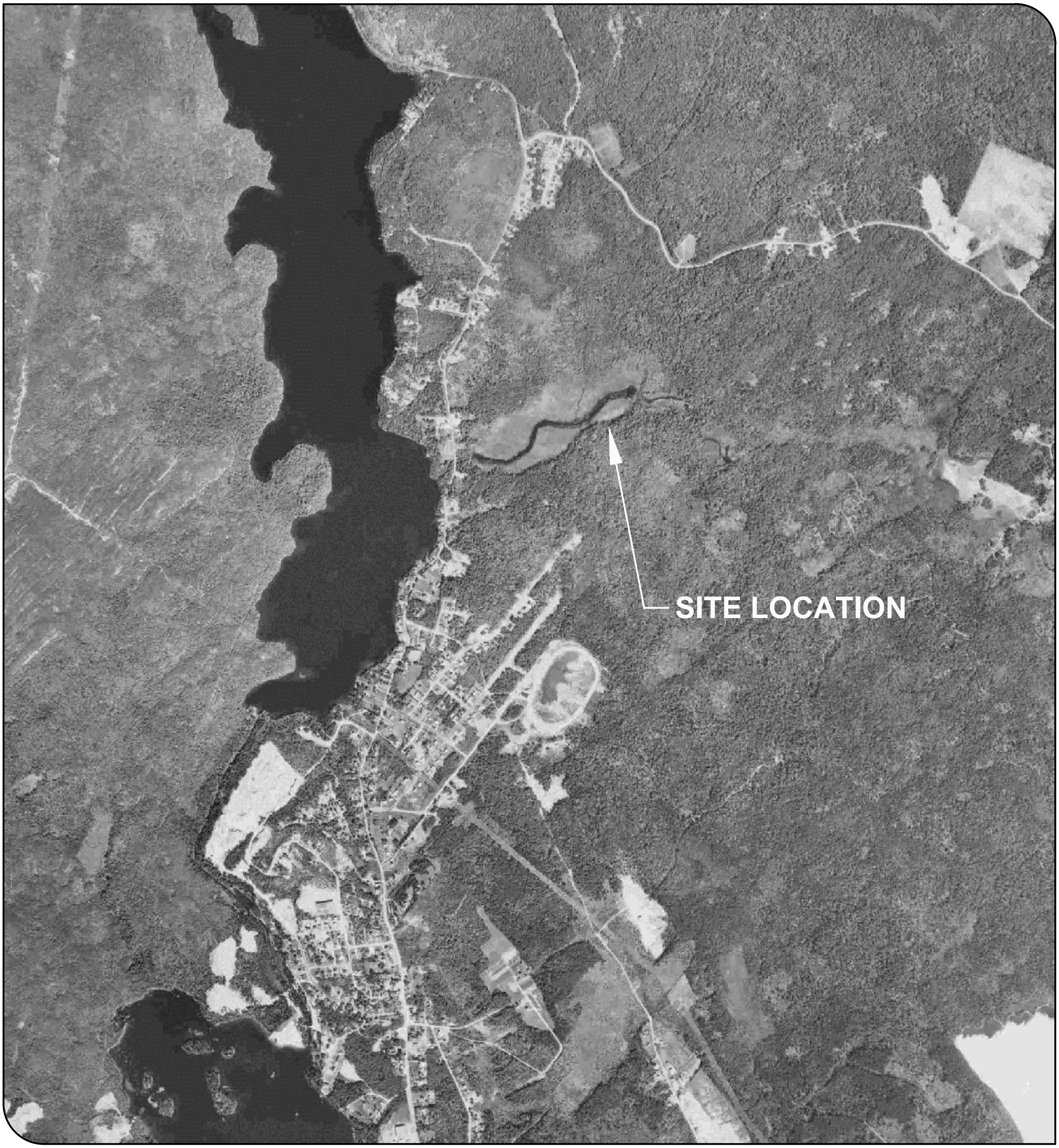
DILLON CONSULTING

PROJECT: 19-9183

DATE: MAY 2019



HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1965
FIGURE C4

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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May, 16, 2019 1:09 PM

DILLON CONSULTING

PROJECT: 19-9183

DATE: MAY 2019

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1975
FIGURE C5

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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DILLON CONSULTING

N W E S

PROJECT: 19-9183

DATE: MAY 2019

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1982
FIGURE C6

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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May, 16, 2019 1:09 PM

DILLON CONSULTING

N W E S

PROJECT: 19-9183

DATE: MAY 2019

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 1993
FIGURE C7

DILLON CONSULTING

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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May, 16, 2019 1:10 PM

N E S W

PROJECT: 19-9183

DATE: MAY 2019

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 2004
FIGURE C8

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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May, 16, 2019 1:10 PM

DILLON CONSULTING

N W E S

PROJECT: 19-9183

DATE: MAY 2019

HALIFAX REGIONAL MUNICIPALITY
PHASE I/II ESA
PORT WALLACE
DARTMOUTH, NS

AERIAL PHOTOGRAPH - 2016
FIGURE C9

MAP/DRAWING INFORMATION
Internal Services: Information, Communications and Technology Services, Nova Scotia Geomatics Centre - Amherst.

CREATED BY: TLR
CHECKED BY: RMA
DESIGNED BY: SMG

File Location:
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May, 16, 2019 1:10 PM

DILLON CONSULTING

PROJECT: 19-9183

DATE: MAY 2019

Appendix D

NSE Registry Search Documentation

NOVA SCOTIA
Environment

**Information Access
and Privacy**

PO Box 442
Halifax, Nova Scotia
B3J 2P8

ph: (902) 424-2549
fax: (902) 424-6925

January 31, 2019 Our file # ENV-2019-0175/0181

Email: sgallant@dillon.ca

Shauna Gallant
Dillon Consulting Ltd.
137 Chain Lake Dr.
Suite 100
Halifax NS B3S 1B3

Dear Ms. Gallant:

RE: Waverley Rd. (PID 41301789); Waverley Rd. (PID 00249672); 105 Lethbridge Ave. (PID 00249664); 650 Waverley Rd. (PID 00249714); Montague Rd. (PID 00249706); Montague Rd. (PID 00315085); and 31 Cono Dr. (PID 00275966), Dartmouth

I refer to your enquiry of the Environmental Registry received January 21, 2019. We acknowledge receipt of payment for 7 properties.

Enclosed is the information that was located through the Environmental Registry with regards to 650 Waverley Rd. and 31 Cono Dr., Dartmouth.

No information was located through the Environmental Registry with regards to the remaining above referenced properties.

An industrial file (file# 92100-01-3751169) pertaining to Waverley Rd. (PID00249672), Dartmouth was located. An environmental health file (file# 97000-35-TRU-2013-0081) pertaining to 105 Lethbridge Ave., Dartmouth was located. A water resource management investigation/enforcement file (file# 95100-35-BED-3798211) containing inspection reports and correspondence pertaining to 650 Waverley Rd., Dartmouth was located. Two industrial files (file# 92100-30-BED-2005-045741- 3 volumes, 92100-30-BED-2005-045743-001) containing application, audits, photos, reports, renewal, notices & MSDS sheets, and correspondence; a contaminated sites investigation/enforcement file (file# 33000-35-BED-3099147-001) containing inspection reports, correspondence, notes, and photos; and a contaminated sites complaint file (file# 33000-40-BED-2015-3099540) pertaining to 31 Cono Dr., Dartmouth were also located.

These records, while not in the Environmental Registry, may be relevant to your request. Should you feel you require these records, they are subject to the Freedom of Information and Protection of Privacy (FOIPOP) Act. FOIPOP applications can be submitted by filling out the attached application form. Please quote the Environmental Registry number in your FOIPOP application.

Nova Scotia Environment makes no representations or warranties on the accuracy or completeness of the information provided.

Sincerely,

Original Signed

Tina Skeir
Information Access Officer

NOVA SCOTIA
Environment

APPROVAL

Province of Nova Scotia

Environment Act, S.N.S. 1994-95, c.1

APPROVAL HOLDER: **PORT WALLACE HOLDINGS LIMITED**

SITE PIDs: **249714, 275347 and 41019118**

APPROVAL NO: **2016-098287**

EXPIRY DATE: **20 November 2026**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Construction of a wetland alteration - infill in WL 10 (5694 m^2)at or near 650 Waverley Rd, Dartmouth, Halifax Regional Municipality in the Province of Nova Scotia (see above PIDs).

Original Signed

Administrator

Norma Bennett

Effective Date Nov 23, 2016

The Minister has delegated his powers and responsibilities under the *Act* with respect to this Approval to the Administrator named above. Therefore any information or notifications required to be provided to the Minister under this approval can be provided to the Administrator unless otherwise advised in writing.

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Approval Holder: PORT WALLACE HOLDINGS LIMITED

Project: Wetland alteration - infill (5694 m^2)

Site: WL 10
650 Waverley Rd,
Dartmouth, Halifax Regional Municipality
PID # 249714, 275347 and 41019118

Approval No: 2016-098287

File No: 95100-30-BED-2016-098287

Map Series: 11D/12

Grid Reference: E - 456, 975 N - 4, 952, 485

Reference Documents:

- Application dated 2 September 2016 and attachments.
- Supplemental information recieved from Aven Cole (Englobe Project Manager and this applications contact) on 17 and 19 October 2016, 10 and 14 November 2016.

1.0 Definitions:

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time, and includes all regulations made pursuant to the *Act*.

b) "Administrator" means a person appointed pursuant to subsection 21(1) of the *Act*.

c) "Approval" means an Approval issued pursuant to subsection 56(2) of the *Act*.

d) "Department" means the Central Region, Bedford Office, of Nova Scotia Environment located at the following address:

Nova Scotia Environment
Inspection, Compliance, and Enforcement Division
Central Region, Bedford Office,
Suite 115, 30 Damascus Road,
Bedford, Nova Scotia, B4A 0C1.
Phone: (902) 424-7773
Fax: (902) 424-0597

e) "Minister" means the Minister of Nova Scotia Environment and includes a designate of the Minister.

f) 'Watercourse" means;

(i) the bed banks and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and;

(ii) all groundwater.

g) "Wetland" means lands commonly referred to as marshes, swamps, fens, bogs, and shallow water areas that are saturated with water long enough to promote wetland of aquatic processes which are indicated by poorly drained soil, vegetation and various kinds of activity which are adapted to a wet environment.

2.0 Scope of Approval

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above, to construct the wetland alteration - infill of 5694 m^2 in WL 10 situated at or near 650 Waverley Rd, Dartmouth, Halifax Regional Municipality.

b) Under authority of this Approval, the watercourse alterations specified in 2 a) shall be conducted between June 1st and September 30th (inclusive) of the same calendar year unless otherwise stated in the site specific terms and conditions.

3.0 General Terms and Conditions

a) The Approval Holder shall construct the wetland alteration - infill in accordance with provisions of the most recent version of:

i) *Environment Act* S.N.S. 1994-1995, c.1 as amended from time to time;
ii) Regulations pursuant to the above *Act*;
iii) Nova Scotia Watercourse Alteration Specifications

b) Nothing in this Approval relieves the Approval Holder of the responsibility for obtaining and paying for all licenses, permits, approvals or authorizations necessary for carrying out the work authorized to be performed by this

Approval which may be required by municipal by-laws or provincial or federal legislation. The Minister does not warrant that such licenses, permits, approvals or other authorizations will be issued.

c) No authority is granted by this Approval to enable the Approval Holder to construct the wetland alteration on lands which are not in the control or ownership of the Approval Holder. It is the responsibility of the Approval Holder to ensure that such a contravention does not occur. The Approval shall provide, to the Department, proof of such control or ownership upon expiry of any relevant lease or agreement. Failure to retain said authorization may result in this Approval being cancelled or suspended.

d) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

e) The Minister may modify, amend or add conditions to this Approval at any time pursuant to Section 58 of the *Act*.

f) This Approval is not transferable without the consent of the Minister.

g) (i) If the Minister determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister may cancel or suspend the Approval pursuant to subsections 58(A)(1) and 58(A)(2) of the *Act*, until such time as the Minister is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the *Act* and regulations.

h) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the activities outlined in the original Application for Approval.

i) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Minister any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

j) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

k) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

l) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

m) Unless written approval is received otherwise from the Minister, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

n) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, all monitoring results shall be submitted within 30 days following the month of monitoring.

o) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the wetland alteration are made fully aware of the terms and conditions which pertain to this Approval.

p) Failure to comply with the Terms and Conditions is an offence under the *Environment Act*.

q) The Approval Holder shall notify the Department three business days prior to commencing construction of the Activity. The notification must include the Approval Number.

r) Within 14 days of completion of the work authorized under this Approval, the Approval Holder is required to submit, to the Department, the enclosed form entitled "Completion of the Approved Work".

4.0 Covenant Conditions

a) The Approval Holder may alter the wetland as authorized and, without limiting the generality of the foregoing, shall not alter or use the wetland so as to:

   (i) prejudice any riparian rights of any owner or of any person lawfully in possession of or holding any lands abutting the wetland and/or watercourse or any rights therein;

   (ii) suffer any loss, damage or nuisance to adjacent or abutting lands.

b) The Approval Holder shall not, at any time or for any purpose, place a pecuniary value on or claim any pecuniary value for the rights and privileges granted by this Approval, whether considered alone or in conjunction with any other property rights or privileges, over and above the amounts, if any, actually paid to the Minister by the Approval Holder for said rights and privileges.

c) It is recognized and agreed that this Approval does not give sole or exclusive rights to any watercourse, and the Minister reserves the right to use the watercourse and water therein for any purpose and to allow others to use the watercourse and water for any purpose, provided that such use or purpose does not constitute a substantial interference with the rights granted to the Approval Holder.

d) The Approval Holder shall be responsible for obtaining and paying the costs of any and all approvals, services, easements, rights of way and authorizations of any kind necessary for the performance of any activities undertaken pursuant to this Approval. The Minister does not covenant that such approvals, services, easements, rights of way and authorizations of any kind will be issued by the Province of Nova Scotia, any other body or person.

e) The Approval Holder shall maintain any road, bridge, culvert, dam, sluice, flume, conduit or other structure built or used in or on the wetland in a state of good repair and in a clean and tidy condition to the satisfaction of the Minister. The Approval Holder shall conform to any and all directions of the Minister concerning the rehabilitation of a wetland and/or watercourse or the construction, reconstruction, maintenance, removal, operation and location of any bridge, culvert, dam, sluice, flume, conduit or other structure built, used or maintained in and on the wetland.

f) The Approval Holder shall indemnify and save harmless the Minister against any loss, cost or damage occasioned by the Approval Holder's relocation of a watercourse and/or wetland or the construction of, repair, alteration or addition to any road, culvert, bridge, dam, sluice, flume, conduit or other structure. Such indemnity shall include, but not be restricted to, all losses, costs or damages occasioned by the improper or faulty relocation of a watercourse or the improper or faulty construction of repair, alteration or addition to any road, culvert, bridge, dam, sluice, flume, conduit or other structure in or on the wetland and/or watercourse, or by any trespass, negligence or wilful act of the Approval Holder or any employees, agents, contractors, or guests of the Approval Holder.

g) On the expiry or termination of this Approval or at the end of the useful life of the structure, as determined by the Minister, the Approval Holder shall immediately cease operations and peaceably and quietly yield up and deliver possession of the watercourse and/or wetland in a condition satisfactory to the Minister, and the Minister shall incur no further expense, liability or cost in this regard.

h) The Approval Holder shall remove any bridge, culvert, dam, sluice, flume, conduit or other structure or remnants thereof, and any equipment or personal property built, used or maintained in and on the watercourse and/or wetland at the end of the useful life of the structure, to the satisfaction of the Minister. In the event the Approval Holder fails to remove such bridge, culvert, dam, sluice, flume, conduit or other structure or remnants thereof and any equipment or personal property, the Minister may, without any attaching liability, remove or demolish the same in whatever manner the Minister deems necessary. The Approval Holder shall pay all expenses and costs of such removal or demolition.

i) The Minister or any employee, servant or agent of the Department will not be liable for any damage, loss or claim of any kind which may or hereafter arise.

j) If the Approval Holder assigns or sublets their Approval or any part thereof except as is expressly provided herein, if the contractor becomes bankrupt or insolvent, if a receiver is appointed for any part of the assets of the Approval Holder, if any assignment is made for the benefit of the creditors of the Approval Holder, or if it is wound up or goes into liquidation, the Minister may terminate the Approval.

k) This Approval shall ensure to the benefit of and be binding upon the Minister, the Minister's successors, assigns and authorized representatives, and upon the Approval Holder, and the heirs, administrators, executors and assigns of the Approval Holder.

l) The failure of the Minister to insist upon a strict performance of any covenant, proviso or Terms and Conditions contained in this Approval shall not be deemed a waiver of any rights or remedies that the Minister may have and shall not be deemed a waiver of any subsequent breach or default in the covenants, provisos or Terms and Conditions contained in this Approval.

5.0 Construction

a) All construction activities within or immediately adjacent to the watercourse channel must be carried out in isolation of the streamflow (in the dry).

b) Prior to the commencement of the proposed activity, sediment control measures shall be installed to prevent sedimentation of the wetlands and/or watercourses and maintained as required until all exposed erodible soil adjacent to both wetlands and/or watercourses and the road surface are stabilized. Erosion control measures include but are not limited to flow checks, sediment traps and/or filters.

c) Erosion control materials shall be clean, non-erodible, non-ore-bearing, non-watercourse derived and non-toxic materials. The Approval Holder shall ensure the materials for this project, (i.e. aggregate, etc.) is suitable for the purpose intended.

d) Sulphide bearing materials are not to be used without prior written consent from the Minister. The Approval Holder shall notify the Department immediately when sulphide bearing materials are encountered during any part of construction.

e) All potentially erodible areas shall be stabilized with erosion protection material as work progresses (not at the end of the project).

f) All work operations shall be conducted in a manner to protect the wetlands and/or watercourses from siltation and disturbance to the adjacent and downstream areas. Silted water is not to be released directly into the wetland and/or watercourse. Any silt laden water pumped from work areas is to be directed to heavily vegetated areas, settling ponds, or other treatment devices (not wetlands).

g) Any overland flow which has the potential to enter the construction area is to be diverted away from the construction site and into vegetated areas (not wetlands).

h) All construction site and roadway runoff shall be directed through natural vegetation before it reaches the watercourse. Where direction through natural vegetation is not possible, runoff shall be treated through erosion and sediment control devices to prevent siltation of watercourses (not wetlands).

i) Road drainage must not be discharged over a cut or fill unless appropriate vertically staged erosion control measures are in place on the slope from the crest to the toe along the face of the embankment.

j) Settling ponds shall meet a minimum requirement of 1/16 acre-ft. of storage for every acre of exposed construction area. Settling ponds are to be cleaned out when they are half full of sediment or when they no longer provide for the precipitation of solids.

k) The Approval Holder shall ensure that the following discharge limits are met for any water which is discharged from the Site to a watercourse or wetland:

i) **Total Suspended Solids Clear Flows (Normal Background Conditions):**

1) Maximum increase of 25 mg/L from background levels for any short term exposure (24 hours or less)
2) Maximum average increase of 5 mg/L from background levels for longer term exposure (inputs lasting between 24 hours and 30 days)

ii) **Total Suspended Solids High Flow (Spring Freshets and Storm Events):**

1) Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 mg/L and 250 mg/L

2) Shall not increase more than 10% over background levels when background is >250 mg/L.

l) The Department reserves the right to modify and/or specify the monitoring locations, parameters and frequency. Monitoring results shall be provided to the Department upon request.

m) Non-compliance with effluent discharge limits outlined in this Approval shall be immediately reported to the Department.

n) The Approval Holder shall limit the size of the disturbed area to the area of the wetland alteration. Once the soils in the area of installation (road construction) have been exposed for installation (road construction), the structure installation (road construction) shall commence immediately.

o) The Approval Holder shall limit the removal of riparian vegetation to the area of the wetland alteration only.

p) All excavated material shall be placed in a location where it will not enter the wetland and/or any watercourse. All debris resulting from construction activities shall be disposed of at a facility which is approved to accept the specific material. Any material not regulated by the Department shall be removed to an area where flood water will not come in contact with the debris and excavated material must be removed from the areas adjacent to the wetland and/or any watercourse and be disposed of in a manner acceptable to the Department.

q) On-site machinery and potential pollutants are to be stored in an area above the flood water or other water limits.

r) Fuel storage and refuelling or lubrication of equipment is to take place in an area such that an accidental pollutant discharge will not enter surface water or domestic water supplies or wetlands. Under no circumstances will the designated area be within 30 metres of a watercourse or wetland. Note: this clause is not applicable to pile-driving equipment.

s) Blasting in or near a watercourse is not permitted unless authorized in writing by the Minister.

t) Machinery and equipment (e.g., concrete trucks) are not to be washed out within 30 metres of a body of water or in an area where wash water will run into a watercourse and/or wetland.

u) Equipment required to work within a wetland and/or watercourse is to be mechanically sound, having no leaking fuel tanks or leaking hydraulic connections.

6.0 Spills or Releases

a) All spills or releases shall be reported in accordance with the *Act* (Part VI) and the *Environmental Emergency Regulations.*

b) Spills or releases shall be cleaned up in accordance with the *Act.*

7.0 Site Specific Terms and Conditions

a) This Approval does not authorize alteration or impact to a watercourse. A separate and unique Approval is required for a watercourse alteration.

b) Wetland alteration - infill of 5694 m^2 in WL10 situated at or near 650 Waverley Rd, Dartmouth, NS is permitted as detailed in application materials. The alteration - infill can occur at any time of year, but all efforts should be made to complete the alteration - infill during dry or frozen conditions and outside breading seasons.

c) Wetland alteration - infill shall be completed on/before 25 November 2018.

d) The Approval Holder shall conduct on-site pre-construction meetings to ensure all persons involved in wetland alterations are aware of the terms and conditions of this Approval.

e) Where a wetland is partially altered, WL 10, the Approval Holder is responsible to ensure the continued function and health of any unaltered portions and is responsible for demonstrating the continued function and health to the satisfaction of the Department.

f) Preconstruction/baseline and post-construction (i.e., after alteration - infil) monitoring shall be undertaken in partially altered wetland WL10. Monitoring of WL10 is required for a period of no less than 5 years post alteration - infill. If yearly monitoring reports do not provide sufficient detail and quantifiable evidence of the continuing functioning and health of WL10, the Department reserves the right to require the approval holder to hire a qualified person to conduct additional monitoring, change or alter monitoring methods and/or undertake wetland restorations and/or compensations as directed by the Department.

g) Preconstruction/baseline and post-construction (i.e., after alteration - infil) monitoring reports are due on/before 15 January of each calendar year. The first report related to preconstruction/baseline conditions in WL 10 is due 15 January 2017. The next report is due 15 January 2018 and this would include sampling and evaluation of post alteration - infill conditions on either side of the road and within WL10; four additional post-construction monitoring reports are therefore due and shall be submitted 15 January in each subsequent year.

h) The Approval Holder shall provide the Department with a complete and detailed wetland compensation plan and/or an LOU with a recognized wetland restoration specialist that demonstrates how they will compensate for the loss of 5694 m^2 of wetlands, on/before 25 May 2017. The minimum amount of wetland compensation required is 11,388 m^2. Information shall include details of the compensation project and monitoring methods to be used to demonstrate the success of any wetland compensation(s). The Department shall provide written notice to the Approval holder if the wetland compensation plan has been accepted or not.

i) The Department reserves the right to modify the amount of compensation required based on the type of compensation proposed, area of wetland alteration and type of wetland losses.

j) After the wetland compensation(s) plan has been approved by the Department, the wetland compensation shall be completed on/before 25 November 2018.

k) The compensation plan must be prepared and compensation work managed and regularly overseen by a recognized wetland specialist or a person the Department recognizes as having suitable qualifications, knowledge and experience in wetland restoration and construction.

l) The Department reserves the right to extend the length of monitoring of the monitoring methods used if success and/or failures of compensations cannot be demonstrated to the satisfaction of the Department. It is the responsibility of the approval holder to ensure wetland compensations are successful, in the amount required, and to demonstrate the compensated wetlands will remain viable in future.

m) Where the Approval holder or qualified person becomes aware of indirectly impacted wetlands, wetland losses or impacts to a watercourse(s) or water resources from this development, the Approval Holder shall immediately notify the Department.

n) The approval holder is responsible for remediation and/or compensation for any indirectly impacted wetlands or watercourses and remediation and/or compensation required is at the discretion of the Department.

o) The Approval Holder is responsible for demonstrating wetland alteration - infill and wetland compensations were completed as Approved. The Approval Holder shall submit GIS compatible digital data that accurately depicts pre-construction and unaltered conditions of wetlands compared to altered/infilled wetland conditions and digital data showing area of successful compensation(s). The meta (GIS) data shall be included to demonstrate calculations (i.e., areas) for each altered or indirectly impacted wetland and for compensation(s).

p) The Approval Holder shall be available to immediately respond to and mitigate unforseen events or environmental emergencies.

NOVA SCOTIA
Environment

30 Damascus Road, Suite 115
Bedford, N.S.B4A 0C1

Phone: (902) 424-7773
Fax: (902) 424-0597

Process RSN Number: 11387629

Environment Act
DIRECTIVE

APPROVAL HOLDER: PORT WALLACE HOLDINGS LIMITED

APPROVAL NUMBER: 2016-098287-01

DATE ISSUED: March 28, 2018

SITE NAME: Port Wallace Subdivision

SITE ADDRESS: DARTMOUTH NS

Pursuant to Environment Act 122A(1) the following action(s) must be completed by

Provide the preconstruction/baseline monitoring report for Wetland 10 prior to any alteration of the wetland. This report must be submitted and accepted by the department in writing prior to alteration of the wetland.

The action(s) outlined in this Directive are the minimum required. Additional actions may be needed to address the non-compliance item(s) identified in this report. Where necessary, you may need to secure the services of a firm/person with sufficient knowledge, experience, and certification to address any item (s) of non-compliance.

Be advised that failing to undertake all action(s) within the time frame specified in this Directive is an offence and may result in further enforcement. An investigation involving the non-compliance item(s) identified in this report continues and is separate from the requirements of this Directive.

Original Signed

Signature of Issuing Inspector: ______________________

This Directive was issued by Stephanie Barkhouse, Inspector with Nova Scotia Environment, who may be contacted at:

Nova Scotia Environment
30 Damascus Road, Suite 115
Bedford, N.S. B4A 0C1
Phone: (902) 424-7773
Fax: (902) 424-0597
http://www.gov.ns.ca/nse

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Supporting text where applicable:

Prohibition s.67 - (1) No person shall knowingly release or permit the release into the environment of a substance in an amount, concentration or level or at a rate of release that causes or may cause an adverse effect, unless authorized by an approval or the regulations.(2) No person shall release or permit the release into the environment of a substance in an amount, concentration or level or at a rate of release that causes or may cause an adverse effect, unless authorized by an approval or the regulations. Environment Act 1994-95, c. 1

Duty to take remedial measures s.71 - Any person responsible for the release of a substance under this Part shall, at that person's own cost, and as soon as that person knows or ought to have known of the release of a substance into the environment that has caused, is causing or may cause an adverse effect, (a) take all reasonable measures to(i) prevent, reduce and remedy the adverse effects of the substance, and (ii) remove or otherwise dispose of the substance in such a manner as to minimize adverse effects; (b) take any other measures required by an inspector or an administrator; and (c) rehabilitate the environment to a standard prescribed or adopted by the Department. Environment Act 1994-95, c. 1

Assistance to inspectors s.118 - The owner or occupier of any place, or any person the inspector reasonably believes is related to or associated with any activity at the place, in respect of which an inspector is exercising powers or carrying out duties pursuant to this Part shall(a)give the inspector all reasonable assistance to enable the inspector to exercise those powers and carry out those duties(b) furnish all information relative to the exercising of those powers and the carrying out of those duties that the inspector may reasonably require. Environment Act, 1994-95, c.1

Right of entry and inspection s.119 (1) - For the purpose of ensuring compliance with this Act, the regulations, a standard or an order made under Part XIII, an inspector, subject to Sections 22 and 120, may, at any reasonable time, (g) where the inspector believes that any thing may release, is releasing or has released into the environment a substance that may cause, is causing or has caused an adverse effect,(i) require the person having care, management or control of the thing to detain the thing at the place where it is found. Environment Act, 1994-95, c.1

Right of entry and inspection s.119 (1) - For the purpose of ensuring compliance with this Act, the regulations, a standard or an order made under Part XIII, an inspector, subject to Sections 22 and 120, may, at any reasonable time (h) require the production of any documents that are required to be kept pursuant to this Act or any other documents that are related to the purpose for which the inspector is exercising any power under clauses (a) to (g). Environment Act, 1994-95, c.1

Inspector Directives s. 122A (1) - An inspector may issue a directive to a person requiring the person to
(a) take such measures in accordance with clause 71(b) as the inspector may specify;
(b) furnish the inspector with information in accordance with clause 118(b);
(c) detain a thing in accordance with subclause 119(1)(g)(i);
(d) produce a document in accordance with clause 119(1)(h); or
(e) take any action prescribed by the regulations in any circumstance prescribed by the regulations.
(2) A directive is not subject to appeal or review under this Act. Environment Act, 1994-95, c.1

NOVA SCOTIA
Environment

Warning Report Number: 11417132

ENVIRONMENTAL WARNING REPORT

Date of Offence
February 16, 2018

Time of Offence:
N/A

Offence Location: PID 00249714

County: Halifax

Name:

Company: PORT WALLACE HOLDINGS LIMITED

Issued To: Lindsay Hawker, Recognized Agent

Address: 1101 Hwy #2
Lantz, Nova Scotia, B2S 1M9

Date of Birth:

Telephone No.:

Act or Regulation Violated

Contrary to: Environment Act **Section** 158(f)

A person who

(f) contravenes a term or condition of an approval, an environmental assessment approval, a temporary approval, a certificate of variance or a certificate of qualification is guilty of an offence.

Notice: *This is an official warning to the individual/company named above and is not a Summary Offence Ticket.*

Issuing Officer: Stephanie Barkhouse

Original Signed

COPY

Signature of Issuing Officer: ____________________

Issue Date: 3/28/18

NOVA SCOTIA
Environment

APPROVAL

Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1, s.1**

APPROVAL HOLDER: **Ocean Contractors Limited**

SITE PID: **00276105**

APPROVAL NO: **2005-045741-R01**

EXPIRY DATE: **November 16, 2026**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1, s.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Operation and reclamation of a Ready Mix Concrete Plant, and associated works, at or near 204 Cono Drive, Montague Gold Mines, Halifax Regional Municipality in the Province of Nova Scotia.

Original Signed

Administrator ______ Date Signed Dec 14, 2016

Name (please print) Kevin Garroway

The Minister has delegated her powers and responsibilities under the *Act* with respect to this Approval to the Administrator named above. Therefore any information or notifications required to be provided to the Minister under this Approval can be provided to the Administrator unless otherwise advised in writing.

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Approval Holder: Ocean Contractors Limited
Project: Ready Mix Concrete Plant
Site: 204 Cono Drive,
Montague Gold Mines, Halifax Regional Municipality
PID # 00276105

Approval No: 2005-045741-R01

File No: 92100-30-045741 vol. 3

Map Reference: 11D/12

Grid Reference E 457 290 N 4 953 558

Reference Documents:

- Application for renewal dated November 15, 2016 and attachments.
- Original Application for approval dated April 29, 2005
- Correspondence from Englobe Corp. dated December 5, 2016.

1. **Definitions**

a) "Act" means Environment Act, Chapter 1 of the Acts of 1994-95, and includes, unless the context otherwise requires, all regulations made pursuant to the *Act.*

b) "Administrator" means a person appointed by the Minister for the purpose of this *Act*, and includes an acting administrator.

c) "Approval" means an approval issued pursuant to this *Act* with respect to an activity.

d) "Associated works" means any building, machinery, equipment, device, tank, system, stockpile, or other related infrastructure.

e) "Department" means the Department of Environment, and the contact for the Department for this approval is:

Nova Scotia Environment
Inspection, Compliance, and Enforcement Division
Central Region, Bedford Office
Suite 115, 30 Damascus Road,
Bedford, Nova Scotia, B4A 0C1.

Phone: (902) 424-7773
Fax: (902) 424-0597

f) "Extension" means an increase in size, volume or other physical dimensions of an activity such that the increase may cause an adverse effect if not properly mitigated.

g) "Facility" means the Ready Mix Concrete Facility and associated works.

h) "Minister" means the Minister of Environment and includes any person appointed as a designate of the Minister.

I) "Modification" means a change to an activity that may cause an adverse effect if not properly mitigated an includes, but is not limited to, the expansion of the same process, addition of product lines and replacement of equipment with different technology other than that presently in use.

j) "Reclamation" means work performed or to be performed in accordance with an approved plan, and includes rehabilitation of a site or facility.

k) "Site" means the lands where an activity or proposed activity will take place.

l) "Water Resource" means all fresh and marine waters comprising all surface water, groundwater, and coastal water.

m) "Watercourse" means the bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therin, within the jurisdiction of the Province, whether it contains water or not, and all groundwater.

n) "Wetland" means land commonly referred to as a marsh, swamp, fen or bog that either periodically or permanently has a water table at, near or above the land's surface or that is saturated with water, and sustains aquatic processes as indicated by the presence of poorly drained soils, hydrophytic vegetation and biological activities adapted to wet conditions.

2. **Scope of Approval**

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above, to construct, operate and reclaim the Facility, situated at or near 204 Cono Drive, Montague Gold Mines, Halifax Regional Municipality (the "Site").

b) The Facility shall be operated as outlined in the application for approval dated November 15, 2016 and supporting reference documentation.

c) The Site shall not exceed the area as outlined in the application and supporting documentation.

3. **General Terms and Conditions**

a) The Approval Holder shall construct, operate and reclaim the Facility in accordance with the following provisions:
   i) *Environment Act* S.N.S. 1994-1995, c.1, s.1, as amended from time to time;
   ii) Regulations pursuant to the above *Act*, as amended from time to time.

b) No authority is granted by this Approval to enable the Approval Holder to construct, operate and reclaim the Facility on lands which are not in the control or ownership of the Approval Holder. It is the responsibility of the Approval Holder to ensure that such a contravention does not occur.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) Any request for renewal or extension of this Approval is to be made in writing, to the Department, at least ninety (90) days prior to the Approval expiry.

e) The Minister may modify, amend or add conditions to this Approval at any time pursuant to Section 58 of the Act.

f) This Approval is not transferable without consent of the Minister.

g) i) If the Minister determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister may cancel or suspend the Approval pursuant to subsections

58A(1) and 58A(2) of the Act, until such time as the Minister is satisfied that all terms and conditions have been met.

ii) If the Minister cancels or suspends this Approval, the Approval Holder remains subject to the penalty provisions of the *Act* and regulations.

h) The Approval Holder shall notify the Department prior to any proposed extensions or modifications to the Facility, including, but not limited to, the active area, operating area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval may be required before implementing any change.

I) Extensions or modifications to the Facility may be subject to the *Environmental Assessment Regulations*. Written approval from the Minister may be required before implementing any change.

j) Pursuant to Section 60 of the Act, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

k) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

l) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

m) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

n) Unless written authorization is received otherwise from the Minister, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

o) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

p) Upon any changes to the Registry of Joint Stock Companies information, the Approval Holder shall provide a copy to the Department.

4. **Surface Water**

a) The Site shall be developed and maintained to prevent surface water contaminants from being discharged into a watercourse, wetland, water resource, or beyond the property boundary, in excess of the following criteria:

i) **Total Suspended Solids: Clear Flows (Normal Background Conditions)**

1) Maximum increase of 25 mg/l from background levels for any short term exposure (24 hour or less);
2) Maximum average increase of 5 mg/l from background levels for long term exposure (inputs lasting between 24 hours and 30 days);

ii) **Total Suspended Solids: High Flow (Spring Freshets and Storm Events)**

1) Maximum increase of 25 mg/l from background levels at any time when background levels are between 25 mg/l and 250 mg/l;
2) Maximum increase of 10% over background levels when background is >250 mg/l;

iii) **pH (Outfall Identified by Department)**

1) Maximum 5 to 9 in grab sample;
2) Maximum 6 to 9 as a Monthly Arithmetic Mean;

b) The Approval Holder shall ensure surface water is monitored at the following locations and frequency:

i) **Monitoring Locations**

1) Station OCL-1 prior to discharge from the Conrad's Quarry into the municipal storm sewer system.
Station OCL-2 (the background sampling station) upstream of the confluence of the Conrad's Quarry runoff collection system.

ii) **Monitoring Frequency**

1) Quarterly

c) Erosion and sedimentation control devices shall be installed prior to construction at the Site and shall remain in place and be maintained until disturbed areas are stabilized.

d) The Department reserves the right to require modifications including, but not limited to, monitoring locations, monitoring frequency, contaminants of concern, and surface water criteria.

e) No authority is granted by this Approval to enable the Approval Holder to discharge surface water onto adjoining lands without the authorization of the affected landowner(s). It is the responsibility of the Approval Holder to ensure authorizations are current and valid.

f) The Approval Holder shall immediately contact the Department should sulphide bearing material be encountered on the Site and shall include planned remedial measures in conformance with the *Sulphide Bearing Material Disposal Regulations.*

5. **Spills or Releases**

a) Spills or releases shall be reported in accordance with the *Act* and the *Environmental Emergency Regulations.*

b) Spills or releases shall be cleaned up in accordance with the *Act* and the *Contaminated Sites Regulations.*

6. **Particulate Emissions (Dust)**

a) Particulate emissions shall not contribute to an ambient concentration of total suspended particulate matter that exceed the following limits (in micrograms per cubic metre of air) at or beyond the Site property boundaries:

Annual Geometric Mean	70 µg/m^3
Daily Average (24 hr.)	120 µg/m^3

b) The use of used oil as a dust suppressant is prohibited.

c) Monitoring of ambient total suspended particulate matter shall be conducted at the request of the Department. The location of the monitoring station(s) for total suspended particulate matter will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval, this may include point(s) beyond the property boundary of the Site.

d) When requested, ambient total suspended particulate matter shall be measured by the EPA standard; EPA/625/R-96/010a; Sampling of Ambient

Air for Total Suspended Particulate Matter (SPM) and PM_{10} shall be done using a High Volume (HV) Sampler.

7. **Sound Levels**

a) Sound levels measured at the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

Leq 65 dBA 0700-1900 hours
60 dBA 1900-2300 hours
55 dBA 2300-0700 hours

b) Monitoring of sound levels shall be conducted at the request of the Department. The location of the monitoring station(s) for sound will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval, this may include point(s) beyond the property boundary of the Site.

8. **Groundwater**

a) If so directed by the Department, the Approval Holder shall be required to prepare and implement a groundwater monitoring and mitigation program.

9. **Solid Waste**

a) Waste concrete shall be recycled within the Facility operation or disposed of in accordance with requirements of the Department.

10. **Reclamation**

a) The Approval Holder shall submit a reclamation plan to the Department for approval within 60 days of final abandonment of the Facility.

b) The Approval Holder shall reclaim the Site within six (6) months of abandonment and in accordance with the approved reclamation plan or other terms as specified by the Department.

11. Site Specific Conditions

a) The Approval Holder shall direct liquid effluent from the following sources into settling ponds, the waste containment structure or alternate approved location for treatment prior to discharge:

i) liquid effluent from the truck washout areas,
ii) liquid effluent from the truck loadout areas, and
iii) liquid effluent from solid waste de-watering, and
iv) other areas on the Site as directed by the Department.

b) The Approval Holder shall prepare a contingency plan to meet the minimum requirements of the *Contingency Planning Guidelines published* by Nova Scotia Environment.

c) The Approval Holder shall provide notification to the Department that the contingency plan meets the requirements of section 11 b) on or before February 27, 2016.

12. Reporting

a) The Approval Holder shall provide an annual report summarizing the following information, as required by the terms and conditions of this approval, each calendar year:

i) results of any surface water monitoring,
ii) summary of any complaints received and any methods used to mitigate them,
iii) any emergency conditions, upset conditions or spills that occurred on the Site, and corrective measures taken ,
iv) results of any other monitoring conducted at the Site ,and
v) any changes made to the contingency plan, or emergency plans

b) The annual report shall be submitted to the Department annually, on January 30, for the previous calendar year, commencing in 2018.

NOVA SCOTIA
Department of Environment and Labour

APPROVAL

Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1**

APPROVAL HOLDER: **Ocean Contractors Ltd.**

APPROVAL NO: **2005-045741**

EXPIRY DATE: **November 16, 2016**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

operation and reclamation of a ready mix concrete plant, and associated works, at or near 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality in the Province of Nova Scotia.

Original Signed

Administrator: GLEN WARNER, Envir.

Effective Date: January 11, 2013

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Department of Environment and Labour

Project:	Ocean Contractors Ltd. Ready Mixed Concrete Plant 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality
Approval No:	2005-045741
File No:	92100-30-/BED-147
Map Series:	11D/12
Grid Reference:	E457300 N4953600
PID # :	00276105

Reference Documents:

- Application dated April 29, 2005 and attachments.
- Letter from Maritime Testing Ltd. dated July 22,2005

1. Definitions

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1 and includes all regulations made pursuant to the Act.

b) "Associated works" means any building, structure, processing facility, pollution abatement system or stockpiles of aggregate.

c) "Department" means the Central Region, Bedford Office, of the Nova Scotia Department of Environment and Labour located at the following address:

Nova Scotia Department of Environment and Labour
Environmental Monitoring and Compliance Division
Central Region, Bedford Office,
Suite 224, 1595 Bedford Highway,
Bedford, Nova Scotia, B4A 3Y4.

Phone: (902) 424-7773
Fax: (902) 424-0597

d) "Facility" means the ready mix concrete plant and associated works.

e) "Minister" means the Minister of the Nova Scotia Department of Environment and Labour.

f) "Rehabilitation" means restorative work performed or to be performed in accordance with the rehabilitation plan.

2. Scope of Approval

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above, to operate and reclaim the Facility, situated at or near 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality (the "Site").

b) The Facility shall be constructed and operated as outlined in the application for industrial approval dated April 29, 2005 and supporting documentation.

c) The Site shall not exceed the lease area as outlined in the application and supporting documentation.

3. General Terms and Conditions

a) The Approval Holder shall construct, operate and reclaim its Facility in accordance with provisions of the:

i) *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time;

ii) Regulations, as amended from time to time, pursuant to the above Act;

b) The Approval holder is responsible for ensuring that they operate the facility on lands which they own or have a lease or written agreement with the landowner or occupier. The Approval holder shall be responsible for ensuring that the Department has, at all times, a copy of the most recent lease or written agreement with the landowner or occupier. Breach of this condition may result in cancellation or suspension of the Approval.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister or Administrator may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

e) This Approval is not transferable without the consent of the Minister or Administrator.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(2)(b) and 58(4) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the operating area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Regional or District Manager of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) All samples required by this Approval shall be analysed by a laboratory that is:

i) Accredited by the Standards Council of Canada; or

ii) Accredited by another agency recognized by the Nova Scotia Department of Environment and Labour to be equivalent to the Standards Council of Canada; or

iii) Maintaining an acceptable standard in a proficiency testing program conducted by the Canadian Association for Environmental Analytical Laboratories for all parameters being reported; or

iv) Maintaining an acceptable standard in a proficiency or performance testing in another program considered acceptable to the Nova Scotia Department of Environment and Labour for all parameters being reported

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, All monitoring results shall be submitted within 30 days following the month of monitoring.

n) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

4. **Particulate Emissions**

a) Particulate emissions shall not exceed the following limits at or beyond the Site property boundaries:

Annual Geometric Mean	70 $\mu g/m^3$
Daily Average (24 hr.)	120 $\mu g/m^3$

b) The use of used oil as a dust suppressant is strictly prohibited. The generation of dust from the Site shall be suppressed as required.

c) Monitoring of ambient particulate emissions shall be conducted at the request of the Department. The location of the monitoring station(s) for particulate will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval, this may include point(s) beyond the property boundary of the Site.

d) When requested, suspended ambient particulate matter shall be measured by the EPA standard; EPA/625/R-96/010a; Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM_{10} Using High Volume (HV) Sampler.

5. **Sound Levels**

a) Sound levels measured at the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

Leq	65 dBA 0700-1900 hours (Days)
	60 dBA 1900-2300 hours (Evenings)
	55 dBA 2300-0700 hours (Nights)

b) Monitoring of sound levels shall be conducted at the request of the Department. The location of the monitoring station(s) for sound will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval. This may include point(s) beyond the property boundary of the Site.

6. **Surface Water**

a) The Site shall be developed and maintained to prevent siltation of the surface water which is discharged from the property boundaries into the nearest watercourse or wetland or beyond the property boundary. Additional controls shall be implemented if site runoff exceeds the discharge limits contained herein.

b) No authority is granted by this Approval to enable the Approval Holder to discharge surface water beyond the property boundary and onto adjoining lands without the authorization of the affected landowner(s). It is the responsibility of the Approval Holder to ensure that the authorization of said landowner(s) is current and valid. Failure to maintain said authorization will result in this Approval being null and void. The Approval Holder shall provide, to the Department, proof of the continued authorization of the adjoining landowner(s) when the current agreement has expired.

c) Erosion and sedimentation control devices shall be installed if necessary to collect or control Site runoff.

d) The Approval Holder shall direct the following wastewater streams into settling ponds for treatment prior to discharge from the Site:

(i) wastewater from the concrete reclaimer,
(ii) wastewater from the truck wash area,
(iii) wastewater from the waste solids de-watering and
(iv) Site runoff

e) The Approval Holder shall ensure the following liquid effluent levels are met and that the effluent is monitored at the approved stations as requested by the Department.

Total Suspended Solids
Clear Flows (Normal Background Conditions):

i) Maximum increase of 25 mg/L from background levels for any short term exposure (24 hour or less)
ii) Maximum average increase of 5 mg/L from background levels for longer term exposure (inputs lasting between 24 hours and 30 days)

High Flow (Spring Freshets and Storm Events)

i) Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 mg/L and 250 mg/L
ii) Shall not increase more than 10% over background levels when background is > 250 mg/L

ii) pH

i) Maximum 5 to 9 in grab sample
ii) Maximum 6 to 9 as a Monthly Arithmetic Mean

iii) Monitoring Locations and Sampling Frequency

The effluent monitoring station shall be established at the discharge to the final settling ponds and the background sampling station upstream of the confluence of the Conrads Quarry runoff collection system.

f) Additional stations or parameters for liquid effluent or surface water monitoring may be specified as required by the Department.

g) A quarterly summary of results of monitoring shall be submitted to the Department.

7. Groundwater

a) A groundwater monitoring program shall be implemented at the direction of the Department.

b) The Approval Holder shall replace at their expense any water supply which has been lost or damaged as a result of the facility operation.

8. Solid Waste

a) Waste concrete shall be recycled within the Facility operation or disposed in accordance with requirements of the Department.

9. Spills or Releases

a) All spills or releases shall be reported in accordance with the *Act* (Part VI) and the *Emergency Spill Regulations*.

b) Spills or releases shall be cleaned up immediately in accordance with the *Act*.

c) A quantity of spill/release response material is to be maintained on Site at all times.

10. Rehabilitation

a) The Proponent shall submit a rehabilitation plan to the Department for approval within 60 days of final abandonment of the Facility.

b) The Proponent shall rehabilitate the Facility within six (6) months of abandonment and in accordance with the approved rehabilitation plan or other terms as specified by the Department,

11. Pollution Prevention Program

a) The Approval Holder shall have the option to prepare and submit to the Department a pollution prevention plan for their Facility within 90 days of the date of this Approval. The plan shall be developed considering terms of reference outlined in guidance documents supplied by the Department and evaluated using accepted environmental management practises for the concrete ready mixed industry outlined in the Canadian Ready Mixed Concrete Association, Environmental Management Practices for Ready Mixed Concrete Operations in Canada, May 2004. .

b) The plan and it's implementation shall identify and address any non-compliance that currently exists with terms and conditions of this Approval.

c) The schedule for implementation of recommendations of the above referenced plan shall be determined by the Department in consultation with the Approval Holder.

NOVA SCOTIA

Department of Environment and Labour

APPROVAL

Province of Nova Scotia
Environment Act, **S.N.S. 1994-95, c.1**

APPROVAL HOLDER: **Ocean Contractors Ltd.**

APPROVAL NO: **2005-045743**

EFFECTIVE DATE: **August 12, 2005**

EXPIRY DATE: **August12, 2015**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Construction, operation and reclamation of an Asphalt Plant, and associated works, at or near 204 Cono Dr. Conrad Brother's Ltd. Quarry, Dartmouth, Halifax Regional Municipality in the Province of Nova Scotia.

Original Signed

Administrator ______________________

Date Signed April 6, 2009

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Department of Environment and Labour

Project:	Ocean Contractors Ltd. Asphalt Plant 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality
Approval No:	2005-045743
File No:	92100-30-/BED-144
Map Series:	11D/12
Grid Reference:	E458 000 N 4953 000
PID # :	00275966

Reference Documents:

- Application dated April 29, 2005 and attachments.
- Fax from Maritime Testing Ltd. dated July 22, 2005

1. **Definitions**

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1 and includes all regulations made pursuant to the Act.

b) "Department" means the Central Region, Bedford Office, of the Nova Scotia Department of Environment and Labour located at the following address:

Nova Scotia Department of Environment and Labour
Environmental Monitoring and Compliance Division
Central Region, Bedford Office,
Suite 224, 1595 Bedford Highway,
Bedford, Nova Scotia, B4A 3Y4.

Phone: (902) 424-7773
Fax: (902) 424-0597

c) "Facility" means the Asphalt Plant and associated works.

d) "Minister" means the Minister of the Nova Scotia Department of Environment and Labour.

2. **Scope of Approval**

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above, to construct, operate and reclaim the Facility, situated at or near 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality (the "Site").

b) The Facility shall be constructed, operated and reclaimed as outlined in the application for industrial approval dated April 29, 2005 and supporting documentation.

c) The Site shall not exceed the area as outlined in the application and supporting documentation.

d) Should the work authorized by this Approval not be commenced within a year, this Approval shall automatically be null and void, unless extended in writing by an Administrator.

3. **General Terms and Conditions**

a) The Approval Holder shall construct, operate and reclaim its Facility in accordance with provisions of the:

i) *Environment Act* S.N.S. 1994-1995, c.1;
ii) Regulations pursuant to the above Act;
iii) Any future amendments to the Act and regulations

b) No authority is granted by this Approval to enable the Approval Holder to construct the Facility on lands which are not in the control or ownership of the Approval Holder. It is the responsibility of the Approval Holder to ensure that such a contravention does not occur. The Approval Holder shall provide, to the Department, proof of such control or ownership upon expiry of any relevant lease or agreement. Failure to retain said authorization will result in this Approval being null and void.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister or Administrator may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

e) This Approval is not transferable without the consent of the Minister or Administrator.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(2)(b) and 58(4) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the operating area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) All samples required by this Approval shall be analysed by a laboratory that is:

i) Accredited by the Standards Council of Canada; or

ii) Accredited by another agency recognized by the Nova Scotia Department of Environment and Labour to be equivalent to the Standards Council of Canada; or

iii) Maintaining an acceptable standard in a proficiency testing program conducted by the Canadian Association for Environmental Analytical Laboratories for all parameters being reported; or

iv) Maintaining an acceptable standard in a proficiency or performance testing in another program considered acceptable to the Nova Scotia Department of Environment and Labour for all parameters being reported

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, All monitoring results shall be submitted within 30 days following the month of monitoring.

n) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

4. **Separation Distances**

(a) The Facility, loading, unloading and discharge areas of aggregate stockpiles shall not be located within the following minimum separation distances:

(i) 360 metres from any area zoned for residential, commercial, park or recreational use
(ii) 90 metres from any residential property boundary
(iii) 30 metres from any surface watercourse
(iv) 90 metres from any domestic water supply
(v) 30 metres from any other property boundary
(vi) 30 metres from any common or public highway

(b) No settling pond shall be located closer than:

(i) 30 metres from any surface watercourse
(ii) 90 metres from any domestic water supply
(iii) 30 metres from any other property boundary

5. **Air Emissions**

Ambient Air

a) The Approval Holder must ensure that air emissions from the Facility do not contribute to an exceedance of the maximum permissible ground level concentrations specified in Schedule "A" (attached) of the *Air Quality Regulations.*

b) Where it is the opinion of the Department that the Approval Holder is contributing to exceedances of the Schedule "A" concentrations, the Approval Holder will be required to implement a corrective action plan which may include ambient air monitoring.

Operation and Stack Emissions:

c) The Facility shall only be operated in accordance with the manufacturers instructions.

d) Visible emissions from any individual stack at the Facility shall not exceed a maximum opacity of 20%. For purposes of compliance monitoring, the opacity will be determined visually using the Nova Scotia Department of Environment and Labour Smoke Chart with 20% opacity corresponding to level 1 of the smoke chart. If this limit is exceeded frequently on any of the stacks, the Department may require continuous opacity monitoring on those stacks and/or installation of emission controls.

e) Emissions of particulate matter from the Facility shall not exceed 230 milligrams per cubic metre of dry, undiluted exhaust gas at standard conditions from any stack. Stack testing for compliance with this limit may be required where opacity levels indicate potential exceedences of this limit.

6. **Odour Control**

a) The Approval Holder shall operate the Facility in a manner which will not result in the generation of unpleasant, offensive or hazardous odours.

b) The Approval Holder shall be required to reduce or cease operation if odour generation is deemed excessive by the Department. This reduction or cession of operations will continue until the Approval Holder has installed additional odour control measures.

7. **Particulate Emissions (Dust)**

a) Particulate emissions shall not exceed the following limits at or beyond the Site property boundaries:

Annual Geometric Mean	70 $\mu g/m^3$
Daily Average (24 hr.)	120 $\mu g/m^3$

b) The generation of fugitive dust from the Site will be suppressed by the application of water sprays, or the application of other suitable dust suppressants approved by the Department.

c) Site access road(s) shall be maintained to minimize dust generation. The use of used oil is <u>not</u> permitted.

d) Monitoring of particulate emissions shall be conducted at the request of the Department. The location of the monitoring station(s) for particulate will be established by the Administrator and may include point(s) beyond the property boundary of the Site.

e) When requested, suspended particulate matter shall be measured by the high volume method as described in report No. E.P.S. 1-AP-73-2.

8. **Sound Levels**

a) Sound levels measured at the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

Leq 65 dBA 0700-1900 hours (Days)
60 dBA 1900-2300 hours (Evenings)
55 dBA 2300-0700 hours (Nights)

b) Monitoring of sound levels shall be conducted at the request of the Department. The location of the monitoring station(s) for sound will be established by the Administrator and may include point(s) beyond the property boundary.

9. **Surface Water**

a) The Site shall be developed and maintained to prevent siltation of the surface water which is discharged from the property boundaries into the nearest watercourse or beyond the property boundary. The Nova Scotia Department of the Environment "Erosion and Sedimentation Control Handbook For Construction Sites" shall serve as the reference document for all erosion control measures. These measures are minimum requirements and additional controls shall be implemented if Site runoff exceeds the discharge limits contained herein.

b) No authority is granted by this Approval to enable the Approval Holder to discharge surface water beyond the property boundary and onto adjoining lands without the authorization of the affected landowner(s). It is the responsibility of the Approval Holder to ensure that the authorization of said landowner(s) is current and valid. Failure to retain said authorization will result in this Approval being null and void. The Approval Holder shall provide, to the Department, proof of the continued authorization of the adjoining landowner(s) when the current agreement has expired.

c) All erosion and sedimentation control devices shall be installed prior to any excavation of material.

d) The Approval Holder shall ensure the liquid effluent levels in Table 1 are met and that the effluent is monitoring at the frequency and locations indicated.

Table 1				
Final Effluent Discharge Limits				
Parameters	**Maximum in a Grab Sample**	**Monthly Arithmetic Mean**	**Monitoring Frequency**	**Monitoring Station**
Total Suspended Solids	50 mg/l	25 mg/l	monthly	lease boundary
pH	5 - 9	6 - 9	monthly	lease boundary

e) All wash water systems shall be arranged in closed circuit.

f) Additional monitoring stations for liquid effluent may be specified as required by the Department.

g) A monthly summary of results of monitoring shall be submitted to the Department.

10. **Spills Or Releases**

a) All spills or releases shall be reported in accordance with the *"Emergency Spill Regulations"*.

b) Any liquid or solid material resulting from a spill or release is to be collected, and placed in drums and stored on Site until final disposal has been authorized by the Department.

11. **Fuel Storage**

a) All fuel storage and handling facilities shall be installed in accordance with the requirements of the "*Petroleum Storage Regulations*".'

12. **Reject Asphalt**

a) All reject asphalt shall be disposed of in a manner acceptable to the Department.

13. **Rehabilitation**

a) The Approval Holder shall rehabilitate the Site including access roads immediately following abandonment or removal of the plant. The Approval Holder shall submit a rehabilitation plan to the Department for review within six months of final abandonment of the Facility .

SCHEDULE "A"

MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATIONS

CONTAMINANT	AVERAGING PERIOD	MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATION	
		ug/m^3	pphm
Carbon Monoxide (CO)	1 hour	34 600	3000
	8 hours	12 700	1100
Hydrogen Sulphide (H_2S)	1 hour	42	3
	24 hours	8	0.6
Nitrogen Dioxide (NO_2)	1 hour	400	21
	Annual	100	5
Ozone (O_3)	1 hour	160	8.2
Sulphur Dioxide (SO_2)	1 hour	900	34
	24 hours	300	11
	Annual	60	2
Total Suspended Particulate (TSP)	24 hours	120	-
	Annual	70*	-

* - Geometric mean
ug/m^3 - micrograms per cubic metre
pphm - parts per hundred million

NOVA SCOTIA
Environment

APPROVAL

Province of Nova Scotia
Environment Act, **S.N.S. 1994-95, c.1**

APPROVAL HOLDER: **Ocean Contractors Ltd.**

APPROVAL NO: **2005-045743**

EFFECTIVE DATE: **August 12, 2015**

EXPIRY DATE: **August 12, 2015**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Construction, operation and reclamation of an Asphalt Plant, and associated works, at or near 204 Cono Dr, Conrad Brother's Ltd. Quarry, Montague Gold Mines, Halifax Regional Municipality in the Province of Nova Scotia.

Original Signed

Administrator ____________

Date Signed August 12, 2015

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Department of Environment and Labour

Project:	Ocean Contractors Ltd. Asphalt Plant 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality
Approval No:	2005-045743
File No:	92100-30-/BED-144
Map Series:	11D/12
Grid Reference:	E458 000 N 4953 000
PID # :	00275966

Reference Documents:

- Application dated August 11, 2015
- Original Application dated April 29, 2005 and attachments.
- Fax from Maritime Testing Ltd. dated July 22, 2005

1. **Definitions**

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1 and includes all regulations made pursuant to the Act.

b) "Department" means the Central Region, Bedford Office, of the Nova Scotia Department of Environment and Labour located at the following address:

Nova Scotia Department of Environment and Labour
Environmental Monitoring and Compliance Division
Central Region, Bedford Office,
Suite 224, 1595 Bedford Highway,
Bedford, Nova Scotia, B4A 3Y4.

Phone: (902) 424-7773
Fax: (902) 424-0597

c) “Facility” means the Asphalt Plant and associated works.

d) "Minister" means the Minister of the Nova Scotia Department of Environment and Labour.

2. **Scope of Approval**

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above, to construct, operate and reclaim the Facility, situated at or near 204 Cono Dr, Montague Gold Mines, Halifax Regional Municipality (the "Site").

b) The Facility shall be constructed, operated and reclaimed as outlined in the application for industrial approval dated April 29, 2005 and supporting documentation.

c) The Site shall not exceed the area as outlined in the application and supporting documentation.

d) Should the work authorized by this Approval not be commenced within a year, this Approval shall automatically be null and void, unless extended in writing by an Administrator.

3. **General Terms and Conditions**

a) The Approval Holder shall construct, operate and reclaim its Facility in accordance with provisions of the:

i) *Environment Act* S.N.S. 1994-1995, c.1;
ii) Regulations pursuant to the above Act;
iii) Any future amendments to the Act and regulations

b) No authority is granted by this Approval to enable the Approval Holder to construct the Facility on lands which are not in the control or ownership of the Approval Holder. It is the responsibility of the Approval Holder to ensure that such a contravention does not occur. The Approval Holder shall provide, to the Department, proof of such control or ownership upon expiry of any relevant lease or agreement. Failure to retain said authorization will result in this Approval being null and void.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister or Administrator may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

e) This Approval is not transferable without the consent of the Minister or Administrator.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(2)(b) and 58(4) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the operating area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) All samples required by this Approval shall be analysed by a laboratory that is:

i) Accredited by the Standards Council of Canada; or

ii) Accredited by another agency recognized by the Nova Scotia Department of Environment and Labour to be equivalent to the Standards Council of Canada; or

iii) Maintaining an acceptable standard in a proficiency testing program conducted by the Canadian Association for Environmental Analytical Laboratories for all parameters being reported; or

iv) Maintaining an acceptable standard in a proficiency or performance testing in another program considered acceptable to the Nova Scotia Department of Environment and Labour for all parameters being reported

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, All monitoring results shall be submitted within 30 days following the month of monitoring.

n) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

4. **Separation Distances**

(a) The Facility, loading, unloading and discharge areas of aggregate stockpiles shall not be located within the following minimum separation distances:

(i) 360 metres from any area zoned for residential, commercial, park or recreational use
(ii) 90 metres from any residential property boundary
(iii) 30 metres from any surface watercourse
(iv) 90 metres from any domestic water supply
(v) 30 metres from any other property boundary
(vi) 30 metres from any common or public highway

(b) No settling pond shall be located closer than:

(i) 30 metres from any surface watercourse
(ii) 90 metres from any domestic water supply
(iii) 30 metres from any other property boundary

5. **Air Emissions**

Ambient Air

a) The Approval Holder must ensure that air emissions from the Facility do not contribute to an exceedance of the maximum permissible ground level concentrations specified in Schedule "A" (attached) of the *Air Quality Regulations*.

b) Where it is the opinion of the Department that the Approval Holder is contributing to exceedances of the Schedule "A" concentrations, the Approval Holder will be required to implement a corrective action plan which may include ambient air monitoring.

Operation and Stack Emissions:

c) The Facility shall only be operated in accordance with the manufacturers instructions.

d) Visible emissions from any individual stack at the Facility shall not exceed a maximum opacity of 20%. For purposes of compliance monitoring, the opacity will be determined visually using the Nova Scotia Department of Environment and Labour Smoke Chart with 20% opacity corresponding to level 1 of the smoke chart. If this limit is exceeded frequently on any of the stacks, the Department may require continuous opacity monitoring on those stacks and/or installation of emission controls.

e) Emissions of particulate matter from the Facility shall not exceed 230 milligrams per cubic metre of dry, undiluted exhaust gas at standard conditions from any stack. Stack testing for compliance with this limit may be required where opacity levels indicate potential exceedences of this limit.

6. **Odour Control**

a) The Approval Holder shall operate the Facility in a manner which will not result in the generation of unpleasant, offensive or hazardous odours.

b) The Approval Holder shall be required to reduce or cease operation if odour generation is deemed excessive by the Department. This reduction or cession of operations will continue until the Approval Holder has installed additional odour control measures.

7. **Particulate Emissions (Dust)**

a) Particulate emissions shall not exceed the following limits at or beyond the Site property boundaries:

Annual Geometric Mean	70 $\mu g/m^3$
Daily Average (24 hr.)	120 $\mu g/m^3$

b) The generation of fugitive dust from the Site will be suppressed by the application of water sprays, or the application of other suitable dust suppressants approved by the Department.

c) Site access road(s) shall be maintained to minimize dust generation. The use of used oil is not permitted.

d) Monitoring of particulate emissions shall be conducted at the request of the Department. The location of the monitoring station(s) for particulate will be established by the Administrator and may include point(s) beyond the property boundary of the Site.

e) When requested, suspended particulate matter shall be measured by the high volume method as described in report No. E.P.S. 1-AP-73-2.

8. **Sound Levels**

a) Sound levels measured at the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

Leq 65 dBA 0700-1900 hours (Days)
60 dBA 1900-2300 hours (Evenings)
55 dBA 2300-0700 hours (Nights)

b) Monitoring of sound levels shall be conducted at the request of the Department. The location of the monitoring station(s) for sound will be established by the Administrator and may include point(s) beyond the property boundary.

9. **Surface Water**

a) The Site shall be developed and maintained to prevent siltation of the surface water which is discharged from the property boundaries into the nearest watercourse or beyond the property boundary. The Nova Scotia Department of the Environment "Erosion and Sedimentation Control Handbook For Construction Sites" shall serve as the reference document for all erosion control measures. These measures are minimum requirements and additional controls shall be implemented if Site runoff exceeds the discharge limits contained herein.

b) No authority is granted by this Approval to enable the Approval Holder to discharge surface water beyond the property boundary and onto adjoining lands without the authorization of the affected landowner(s). It is the responsibility of the Approval Holder to ensure that the authorization of said landowner(s) is current and valid. Failure to retain said authorization will result in this Approval being null and void. The Approval Holder shall provide, to the Department, proof of the continued authorization of the adjoining landowner(s) when the current agreement has expired.

c) All erosion and sedimentation control devices shall be installed prior to any excavation of material.

d) The Approval Holder shall ensure the liquid effluent levels in Table 1 are met and that the effluent is monitoring at the frequency and locations indicated.

Table 1

Final Effluent Discharge Limits

Parameters	Maximum in a Grab Sample	Monthly Arithmetic Mean	Monitoring Frequency	Monitoring Station
Total Suspended Solids	50 mg/l	25 mg/l	monthly	lease boundary
pH	5 - 9	6 - 9	monthly	lease boundary

e) All wash water systems shall be arranged in closed circuit.

f) Additional monitoring stations for liquid effluent may be specified as required by the Department.

g) A monthly summary of results of monitoring shall be submitted to the Department.

10. **Spills Or Releases**

a) All spills or releases shall be reported in accordance with the *"Emergency Spill Regulations".*

b) Any liquid or solid material resulting from a spill or release is to be collected, and placed in drums and stored on Site until final disposal has been authorized by the Department.

11. **Fuel Storage**

a) All fuel storage and handling facilities shall be installed in accordance with the requirements of the "*Petroleum Storage Regulations*".'

12. **Reject Asphalt**

a) All reject asphalt shall be disposed of in a manner acceptable to the Department.

13. **Rehabilitation**

a) The Approval Holder shall rehabilitate the Site including access roads immediately following abandonment or removal of the plant. The Approval Holder shall submit a rehabilitation plan to the Department for review within six months of final abandonment of the Facility .

SCHEDULE "A"

MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATIONS

CONTAMINANT	AVERAGING PERIOD	MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATION	
		ug/m^3	pphm
Carbon Monoxide (CO)	1 hour	34 600	3000
	8 hours	12 700	1100
Hydrogen Sulphide (H_2S)	1 hour	42	3
	24 hours	8	0.6
Nitrogen Dioxide (NO_2)	1 hour	400	21
	Annual	100	5
Ozone (O_3)	1 hour	160	8.2
Sulphur Dioxide (SO_2)	1 hour	900	34
	24 hours	300	11
	Annual	60	2
Total Suspended Particulate (TSP)	24 hours	120	-
	Annual	70*	-

* - Geometric mean
ug/m^3 - micrograms per cubic metre
pphm - parts per hundred million

NOVA SCOTIA
Environment

APPROVAL
Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1**

APPROVAL HOLDER:	**OCEAN CONTRACTORS LIMITED**
SITE PID:	**00276105**
APPROVAL NO:	**2005-045743-R01**
EXPIRY DATE:	**AUGUST 12, 2025**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Construction and operation of an Asphalt Plant, and associated works, at or near 204 Cono Drive, Montague Gold Mines, Halifax Regional Municipality in the Province of Nova Scotia.

Original Signed

Administrator

Rachel Bower

Effective Date November 2, 2015

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Approval Holder: Ocean Contractors Limited
Project: Asphalt Plant
Site: 204 Cono Drive,
Montague Gold Mines, Halifax Regional Municipality
PID # 00276105

Approval No: 2005-045743-R01

File No: 92100-30-/BED-045743-R01

Map Series: 11D/12

Grid Reference: E458 000 N4 953 000

Reference Documents:

- Application dated August 11, 2015 and attachments.
- Application for original Approval April 29, 2005.

1. **Definitions**

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1 and includes all regulations made pursuant to the Act.

b) "Department" means the Central Region, Bedford Office, of Nova Scotia Environment located at the following address:

Nova Scotia Environment
Compliance Division
Central Region, Bedford Office,
Suite 115, 30 Damascus Road,
Bedford, Nova Scotia, B4A 0C1.

Phone: (902) 424-7773
Fax: (902) 424-0597

c) "Facility" means the Asphalt Plant and associated works.

d) "Minister" means the Minister of Nova Scotia Environment.

2. **Scope of Approval**

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above, to construct and operate the Facility, situated at or near 204 Cono Drive, Montague Gold Mines, Halifax Regional Municipality (the "Site").

b) The Facility shall be constructed and operated as outlined in the application for industrial approval dated August 11, 2015 and supporting documentation.

c) The Site shall not exceed the area as outlined in the application and supporting documentation.

d) Should the work authorized by this Approval not be commenced within a year, this Approval shall automatically be null and void, unless extended in writing by an Administrator.

3. **General Terms and Conditions**

a) The Approval Holder shall construct, operate and reclaim its Facility in accordance with provisions of the:

i) *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time;
ii) Regulations, as amended from time to time, pursuant to the above Act;

b) The Approval Holder is responsible for ensuring that they operate the facility on lands which they own or have a lease or written agreement with the landowner or occupier. The Approval Holder shall be responsible for ensuring that the Department has, at all times, a copy of the most recent lease or written agreement with the landowner or occupier. Breach of this condition may result in cancellation or suspension of the Approval.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister or Administrator may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

e) This Approval is not transferable without the consent of the Minister or Administrator.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(A)(1) and 58(A)(2) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the operating area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) Unless written approval is received otherwise from the Administrator, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, All monitoring results shall be submitted within 30 days following the month of monitoring.

n) The Approval Holder shall ensure that this Approval, or a copy, is kept on Site at all times and that personnel directly involved in the Facility operation are made fully aware of the terms and conditions which pertain to this Approval.

4. **Separation Distances**

a) The Facility, loading, unloading and discharge areas of aggregate stockpiles shall not be located within the following minimum separation distances:

(i) 360 metres from any area zoned for residential, commercial, park or recreational use
(ii) 90 metres from any residential property boundary
(iii) 30 metres from any surface watercourse
(iv) 90 metres from any domestic water supply
(v) 30 metres from any other property boundary
(vi) 30 metres from any common or public highway

b) No settling pond shall be located closer than:

(i) 30 metres from any surface watercourse
(ii) 90 metres from any domestic water supply
(iii) 30 metres from any other property boundary

5. **Air Emissions**

Ambient Air

a) The Approval Holder must ensure that air emissions from the Facility do not contribute to an exceedance of the maximum permissible ground level concentrations specified in Schedule "A" (attached) of the *Air Quality Regulations.*

b) Where it is the opinion of the Department that the Approval Holder is contributing to exceedances of the Schedule "A" concentrations, the Approval Holder will be required to implement a corrective action plan which may include ambient air monitoring.

Operation and Stack Emissions:

c) The Facility shall only be operated in accordance with the manufacturers instructions.

d) Visible emissions from any individual stack at the Facility shall not exceed a maximum opacity of 20%. For purposes of compliance monitoring, the opacity will be determined visually using Nova Scotia Environment Smoke Chart with 20% opacity corresponding to level 1 of the smoke chart. If this limit is exceeded frequently on any of the stacks, the Department may require continuous opacity monitoring on those stacks and/or installation of emission controls.

e) Emissions of particulate matter from the Facility shall not exceed 230 milligrams per cubic metre of dry, undiluted exhaust gas at standard conditions from any stack. Stack testing for compliance with this limit may be required where opacity levels indicate potential exceedences of this limit.

6. Odour Control

a) The Approval Holder shall operate the Facility in a manner which will not result in the generation of unpleasant, offensive or hazardous odours.

b) The Approval Holder shall be required to reduce or cease operation if odour generation is deemed excessive by the Department. This reduction or cession of operations will continue until the Approval Holder has installed additional odour control measures.

7. Particulate Emissions (Dust)

a) Particulate emissions shall not exceed the following limits at or beyond the Site property boundaries:

Annual Geometric Mean	70 μg/m^3
Daily Average (24 hr.)	120 μg/m^3

b) The use of used oil as a dust suppressant is strictly prohibited. The generation of dust from the Site shall be suppressed as required.

c) Monitoring of particulate emissions shall be conducted at the request of the Department. The location of the monitoring station(s) for particulate will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval, this may include point(s) beyond the property boundary of the Site.

d) When requested, suspended particulate matter shall be measured by the EPA standard EPA/625/R-96/010a. Sampling of Ambient Air for Total Suspended Particulate Matter (SPM) and PM_{10}. Using High Volume (HV) Sampler

8. **Sound Levels**

a) Sound levels measured at the Site property boundaries shall not exceed the following equivalent sound levels (Leq):

Leq 65 dBA 0700-1900 hours (Days)
60 dBA 1900-2300 hours (Evenings)
55 dBA 2300-0700 hours (Nights)

b) Monitoring of sound levels shall be conducted at the request of the Department. The location of the monitoring station(s) for sound will be established by a qualified person retained by the Approval Holder and submitted to the Department for approval, this may include point(s) beyond the property boundary of the Site.

9. **Surface Water**

a) The Site shall be developed and maintained to prevent siltation of the surface water which is discharged from the property boundaries into the nearest watercourse or beyond the property boundary. Additional controls shall be implemented if Site runoff exceeds the discharge limits contained herein.

b) No authority is granted by this Approval to enable the Approval Holder to discharge surface water beyond the property boundary and onto adjoining lands without the authorization of the affected landowner(s). It is the responsibility of the Approval Holder to ensure that the authorization of said landowner(s) is current and valid. Failure to retain said authorization will result in this Approval being null and void. The Approval Holder shall provide, to the Department, proof of the continued authorization of the adjoining landowner(s) when the current agreement has expired.

c) Erosion and sedimentation control devices shall be installed prior to any excavation of material.

d) The Approval Holder shall ensure the following liquid effluent levels are met and that the effluent is monitoring at the frequency and locations indicated.

i) **Total Suspended Solids**

Clear Flows (Normal Background Conditions):

1) Maximum increase of 25 mg/l from background levels for any short term exposure (24 hour or less)
2) Maximum average increase of 5 mg/l from background levels for longer term exposure (inputs lasting between 24 hours and 30 days)

High Flow (Spring Freshets and Storm Events)

1) Maximum increase of 25 mg/l from background levels at any time when background levels are between 25 mg/l and 250 mg/l
2) Shall not increase more than 10% over background levels when background is >250 mg/l

ii) **pH**

1) Maximum 5 to 9 in grab sample
2) Maximum 6 to 9 as a Monthly Arithmetic Mean

iii) **Monitoring Locations**

1) The Approval Holder shall sample at the following locations:

Station OCL-1 at the discharge from the final settling ponds
Station OCL-2 (the background sampling station) upstream of the confluence of the Conrad's Quarry runoff collection system.

iv) **Sampling Frequency**

1) The Approval Holder shall sample at the following frequency:

As directed by the Department.

e) If it becomes necessary to drain the Site, the wastewater shall be treated to meet the limits outlined in this Approval.

f) Additional monitoring stations for liquid effluent may be specified as required by the Department.

g) An annual summary of results of monitoring, if required, shall be submitted to the Department on January 30 of each year.

11. **Spills Or Releases**

a) All spills or releases shall be reported in accordance with the *Act* (Part VI) and the *Emergency Spill Regulations.*

b) Spills or releases shall be cleaned up immediately in accordance with the *Act.*

c) A quantity of spill/release response material is to be maintained on Site at all times.

12. **Fuel Storage**

a) All fuel storage and handling facilities shall be installed in accordance with the requirements of the "*Petroleum Management Regulations*".

13. **Reject Asphalt**

a) All reject asphalt shall be recycled or disposed in a manner acceptable to the Department. The Approval Holder shall submit a plan to the Department for the disposal of all reject asphalt in the event that reject asphalt is not recycled at the Facility.

14. **Rehabilitation**

a) The Approval Holder shall rehabilitate the Site including access roads immediately following abandonment or removal of the plant. The Approval Holder shall submit a rehabilitation plan to the Department for review within six months prior to final abandonment of the Facility.

SCHEDULE "A"

MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATIONS

CONTAMINANT	AVERAGING PERIOD	MAXIMUM PERMISSIBLE GROUND LEVEL CONCENTRATION	
		ug/m^3	pphm
Carbon Monoxide (CO)	1 hour	34 600	3000
	8 hours	12 700	1100
Hydrogen Sulphide (H_2S)	1 hour	42	3
	24 hours	8	0.6
Nitrogen Dioxide (NO_2)	1 hour	400	21
	Annual	100	5
Ozone (O_3)	1 hour	160	8.2
Sulphur Dioxide (SO_2)	1 hour	900	34
	24 hours	300	11
	Annual	60	2
Total Suspended Particulate (TSP)	24 hours	120	-
	Annual	70*	-

* - Geometric mean
ug/m^3 - micrograms per cubic metre
pphm - parts per hundred million

786

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

1030 Upper Prince St.
Sydney, Nova Scotia
Canada B1P 5P6

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R09

May 26, 2017

Conrad Brothers Limited
31 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

Dear Sir or Madame:

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R09

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers, 31 Cono Drive, Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence. Please have a copy of this Certificate of Registration **posted at the site location** or ensure it is **made available** to individuals upon request.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris
Program Administrator - PST

Attachment

cc: Regional/District Office

JUN 2 6 2017

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Limited
Owner Mailing Address: 31 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R09

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
05-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
05-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
05-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
05-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
05-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
05-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

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JUN 2 6 2017
Central Region

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Limited

Owner Mailing Address: 31 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:

Site Location: Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial

Dyking Details

Site Registration No.: 2005-049508

Appl./Appr. No.: 2005-049508-R09

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
05-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
05-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
05-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
05-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
05-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil*	*Last Used -2003*
05-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Secondary Containment* Double Wall Unknown	*Diesel*	

786

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Environment
Environmental Monitoring and Compliance

1030 Upper Prince St
Sydney, Nova Scotia
Canada B1P 5P6

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-048237
Registration #: 2005-048237-R08

December 2, 2016

Ocean Contractors Ltd.

700 -33 Alderney Drive
PO Box 604
Dartmouth, NS
B2Y 3Y9

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-048237-R08

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Ocean Contractors Ltd., Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

Please have a copy of this Certificate of Registration **posted at the location** or ensure that it is **made available** to individuals upon request.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

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APR 11 2017
Central Region
Bedford

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Ocean Contractors Ltd.
Owner Mailing Address: 700 -33 Alderney Drive P. O. Box 604
Dartmouth, NS B2Y 3Y9

Site Operator:
Site Location: Ocean Contractors Ltd.
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-048237
Appl./Appr. No.: 2005-048237-R08

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
'005-048237-001	*Removed*	*Underground*	*1975*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Black/Bare Steel*	*Gasoline*	
'005-048237-002	*Removed*	*Underground*	*1984*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Black/Bare Steel*	*Gasoline*	
'005-048237-003	*Removed*	*Underground*	*1975*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Black/Bare Steel*	*Gasoline*	
'005-048237-004	*Removed*	*Underground*	*1984*	*9100 litres*	*Steel*	*None/Unknown*	*None*	*Black/Bare Steel*	*Diesel*	
'005-048237-005	*Currently In Use*	*Aboveground*	*1988*	*4500 litres*	*Welded Steel*	*None/Unknown*	*None*	*Black/Bare Steel*	*Fuel Oil Concrete plant*	
'005-048237-006	*Currently In Use*	*Aboveground*	*1998*	*17800 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Black/Bare Steel*	*Fuel Oil Asphalt plant*	
'005-048237-007	*Currently In Use*	*Aboveground*	*1990*	*22700 litres*	*Welded Steel*	*None/Unknown*	*None*	*Unknown*	*Diesel*	

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Ocean Contractors Ltd.
Owner Mailing Address: 700 -33 Alderney Drive P. O. Box 604
Dartmouth, NS B2Y 3Y9

Site Operator:
Site Location: Ocean Contractors Ltd.
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-048237
Appl./Appr. No.: 2005-048237-R08

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-048237-008	*Currently In Use*	*Aboveground*	*1990*	*9080 litres*	*Welded Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	
2005-048237-009	*Currently In Use*	*Aboveground*	*2001*	*13600 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil Maintenace shop*	
2005-048237-010	*Currently In Use*	*Aboveground*	*1998*	*45400 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil Asphalt plant*	
2005-048237-011	*Currently In Use*	*Aboveground*	*1999*	*13883 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil Asphalt plant*	

NOVA SCOTIA
Department of Environment

7786

Petroleum Storage Tank Registry
Certificate of Registration

RECEIVED
NSE
APR 30 2015
Central Region
Bedford

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R07

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used - 1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used - 1994*

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

RECEIVED
NSE
Central Region

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R07

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

NOVA SCOTIA
Department of Environment

2013- 786

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Limited
Owner Mailing Address: 31 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R08

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner:	Conrad Brothers Limited
Owner Mailing Address:	31 Cono Drive P. O. Box 2129 Dartmouth, NS B2W 3Y2
Site Operator:	
Site Location:	Conrad Brothers 31 Cono Drive Montague Gold Mines, Halifax County

Type of Installation:	Commercial
Dyking Details	
Site Registration No.:	2005-049508
Appl./Appr. No.:	2005-049508-R08

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Secondary Containment* *Double Wall* *Unknown*	*Diesel*	

36400-30-BED-2013-786

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

MAY 16 2013

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R05

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used - 1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used - 1994*

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R05

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

1030 Upper Prince St.
Sydney, Nova Scotia
Canada B1P 5P6

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R08

May 20, 2016

Conrad Brothers Limited
31 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

Dear Sir or Madame:

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R08

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers, 31 Cono Drive, Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

Please have a copy of this Certificate of Registration **posted at the location** or ensure that it is **made available** to individuals upon request.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Nancy J Harris
Original Signed

for Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Limited
Owner Mailing Address: 31 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R08

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Limited
Owner Mailing Address: 31 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R08

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

1030 Upper Prince St.
Sydney, Nova Scotia
Canada B1P 5P6

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R07

April 21, 2015

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

Dear Mr. Sir or Madame:

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R07

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers, 31 Cono Drive, Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

Please have a copy of this Certificate of Registration **posted at the location** or ensure that it is **made available** to individuals upon request.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,
Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R07

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used - 1990*
005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used - 1994*

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.

Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:

Site Location: Conrad Brothers
31 Cono Drive
Montague Gold Mines, Halifax County

Type of Installation: Commercial

Dyking Details

Site Registration No.: 2005-049508

Appl./Appr. No.: 2005-049508-R07

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* <u>*Secondary Containment*</u> *Double Wall*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

VA SCOTIA
artment of Environment

Petroleum Storage Tank Registry
Certificate of Registration

stered Owner: Conrad Brothers Ltd.
er Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R06

Operator: Conrad Brothers - Cono Drive, Dartmouth
Location: Montague Gold Mines, Halifax County

umber	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
05-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used - 1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used - 1994*

VA SCOTIA
artment of Environment

Petroleum Storage Tank Registry
Certificate of Registration

tered Owner: Conrad Brothers Ltd.
er Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Operator: Conrad Brothers - Cono Drive, Dartmouth
Location: Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R06

umber	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
)5-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
!005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Secondary Containment* *Double Wall* *Unknown*	*Diesel*	

Printed Friday, May 30, 2014

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

1030 Upper Prince St.
Sydney, Nova Scotia
Canada B1P 5P6

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R05

April 16, 2013

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R05

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers - Cono Drive, Dartmouth, Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

Please have a copy of this Certificate of Registration **posted at the location** or ensure that it is **made available** to individuals upon request.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R05

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R05

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil*	*Last Used -2003*
								Secondary Containment *Double Wall*		
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

1030 Upper Prince St.
Sydney, Nova Scotia
Canada B1P 5P6

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R04

February 7, 2013

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R04

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers - Cono Drive, Dartmouth, Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

Please have a copy of this Certificate of Registration **posted at the location** or ensure that it is **made available** to individuals upon request.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R04

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	Removed	Underground	1978	15000 litres	Steel	None/Unknown	None	Galvanized Steel	Gasoline	Last Used - 1990
2005-049508-002	Removed	Underground	1986	22750 litres	Steel	None/Unknown	None	Galvanized Steel	Fuel Oil	Last Used - 1990
2005-049508-003	Removed	Underground	1982	32000 litres	Steel	None/Unknown	None	Galvanized Steel	Fuel Oil	Last Used - 1990
2005-049508-004	Removed	Underground	1988	9000 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Galvanized Steel	Fuel Oil	Last Used - 1990
2005-049508-005	Removed	Underground	1968	4550 litres	Steel	None/Unknown	None	Galvanized Steel	Fuel Oil	Last Used - 1990
2005-049508-006	Removed	Underground	1990	4540 litres	Steel	Sacrificial Anode	None	Cathodically Protected	Used Oil	Last Used - 1994

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R04

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Secondary Containment* *Double Wall* *Unknown*	*Diesel*	

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

295 Charlotte Street
PO Box 714
Sydney, Nova Scotia
Canada B1P 6H7

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R03

June 1, 2011

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

Dear Sir or Madame:

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R03

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers - Cono Drive, Dartmouth, Montague Gold Mines, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.

Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:

Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R03

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R03

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Secondary Containment* *Double Wall* *Unknown*	*Diesel*	

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.

Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:

Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial

Dyking Details

Site Registration No.: 2005-049508

Appl./Appr. No.: 2005-049508-R03

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R03

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	Currently In Use	Underground	1990	9080 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Cathodically Protected	Gasoline	
2005-049508-008	Currently In Use	Underground	1990	45400 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Unknown	Diesel	
2005-049508-009	Currently In Use	Underground	1990	45400 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Unknown	Diesel	
2005-049508-010	Removed	Underground	1990	22700 litres	Steel	None/Unknown	None	Unknown	Gasoline	Last Used -2003
2005-049508-011	Removed	Aboveground	1999	17816 litres	Welded Steel	None/Unknown	Double Wall	Unknown	Fuel Oil	Last Used -2003
2005-049508-012	Currently In Use	Aboveground	2006	45460 litres	Welded Steel	None/Unknown	Double Wall	Secondary Containment Double Wall Unknown	Diesel	

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

295 Charlotte Street
PO Box 714
Sydney, Nova Scotia
Canada B1P 6H7

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R02

May 3, 2010

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R02

The Department has received the renewal fee associated with the registration and issuance of tank tags for the storage tank system located at Conrad Brothers - 150 Cono Drive, Dartmouth, Halifax Regional Municipality. Enclosed is a receipt and a Certificate of Registration for each registered petroleum storage tank on this property.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R02

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R02

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used -2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	*Last Used -2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R01

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used - 1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used - 1994*

NOVA SCOTIA

Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R01

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Removed*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	*Last Used - 2003*
2005-049508-011	*Removed*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	*Last Used - 2003*
2005-049508-012	*Currently In Use*	*Aboveground*	*2006*	*45460 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown*	*Diesel*	

April 25, 2008

PETROLEUM STORAGE TANK REGISTRATION

REGISTRATION # 5443

OWNER OF TANKS

LOCATION OF TANKS 2005-049508

CONRAD BROTHERS LIMITED
150 CONO DRIVE
DARTMOUTH, NS B2W 3Y2

QUARRY

~~PID 276105~~ both sites are Conrad Bros. on Cono Drive but there is no longer a 150 Cono Dr.
275966 Monatque Gold Mines?

TYPE OF INSTALLATION: Commercial

	TANK NO. 1	TANK NO. 2	TANK NO. 3
INSTALLATION YEAR	1978	1986	1982
STATUS OF TANK	Removed	Removed	Removed
TYPE OF TANK	Underground	Underground	Underground
DYKE NUMBER			
EST. CAPACITY (L)	15000	22750	32000
CONST MATERIAL	Steel	Steel	Steel
EXTERNAL PROTECTION	Unknown	Unknown	Unknown
INTERNAL PROTECTION	Unknown	Unknown	Unknown
PIPING	Galvanized	Galvanized	Galvanized
SECONDARY CONTAINMENT			
SUBSTANCE STORED	Gasoline	Fuel Oil	Fuel oil
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL	1990	1990	1990
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER	Unknown		

	TANK NO. 4	TANK NO. 5	TANK NO. 6
INSTALLATION YEAR	1988	1968	1990
STATUS OF TANK	Removed	Removed	Removed
TYPE OF TANK	Underground	Underground	Underground
DYKE NUMBER			
EST. CAPACITY (L)	9000	4550	4540
CONST MATERIAL	Fibreglass	Steel	Steel
EXTERNAL PROTECTION	None	Unknown	Cathodic
INTERNAL PROTECTION	None	Unknown	Unknown
PIPING	Galvanized	Galvanized	Cathodic
SECONDARY CONTAINMENT			
SUBSTANCE STORED	Fuel Oil	Fuel oil	Waste oil
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL	1990	1990	1994
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER	Unknown		Nicholson

	TANK NO. 7	TANK NO. 8	TANK NO. 9
INSTALLATION YEAR	1990	1990	1990
STATUS OF TANK	Current	Current	Current
TYPE OF TANK	Underground	Underground	Underground
DYKE NUMBER			
EST. CAPACITY (L)	9080	45400	45400
CONST MATERIAL	Fibreglass	Fibreglass	Fibreglass
EXTERNAL PROTECTION	Cathodic	Unknown	Unknown
INTERNAL PROTECTION	Unknown	Unknown	Unknown
PIPING	Cathodic	Unknown	Unknown
SECONDARY CONTAINMENT			
SUBSTANCE STORED	Gasoline	Diesel	Diesel
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL			
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER			

	TANK NO. 10	TANK NO. 11	TANK NO. 12
INSTALLATION YEAR	1990	1999	2006
STATUS OF TANK	Removed	Removed	Current
TYPE OF TANK	Underground	Aboveground	Aboveground
DYKE NUMBER			
EST. CAPACITY (L)	27240	17816	45460
CONST MATERIAL	Steel	Welded steel	Welded steel
EXTERNAL PROTECTION	Unknown	None	Unknown
INTERNAL PROTECTION	Unknown	None	Double walled-vacuum seal
PIPING	Unknown	Unknown	Unknown
SECONDARY CONTAINMENT		Double wall	
SUBSTANCE STORED	Gasoline	Fuel oil	Diesel
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL	2003	2003	
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER	Unknown	ITS Construction	Unknown

NOVA SCOTIA
Environment
Environmental Monitoring and Compliance

295 Charlotte Street
PO Box 714
Sydney, Nova Scotia
Canada B1P 6H7

902 563-2100 T
902 563-2387 F
www.gov.ns.ca

NSE File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R01

January 22, 2009

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R01

The Department has received the administration fee associated with the registration and issuance of tank tags for your storage tank system located at Conrad Brothers - Cono Drive, Dartmouth, Montague Gold Mines, Halifax Regional Municipality. Enclosed is your receipt, a Certificate of Registration, and registration tag(s) for each registered petroleum storage tank on your property. The tag shall be affixed to the petroleum storage tank(s) in such a manner as to make it readily accessible to anyone transferring a petroleum product into the tank(s). Please note, it is illegal for a fuel supplier to deliver a petroleum product to an unregistered storage tank system.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,
Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R01

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used - 1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used - 1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used - 1994*

NOVA SCOTIA
Department of Environment

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location:
Conrad Brothers - Cono Drive, Dartmouth
Montague Gold Mines, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R01

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	Currently In Use	Underground	1990	9080 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Cathodically Protected	Gasoline	
2005-049508-008	Currently In Use	Underground	1990	45400 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Unknown	Diesel	
2005-049508-009	Currently In Use	Underground	1990	45400 litres	Fiberglass Reinforced Plastic	None/Unknown	None	Unknown	Diesel	
2005-049508-010	Removed	Underground	1990	22700 litres	Steel	None/Unknown	None	Unknown	Gasoline	Last Used -2003
2005-049508-011	Removed	Aboveground	1999	17816 litres	Welded Steel	None/Unknown	Double Wall	Unknown Secondary Containment Double Wall	Fuel Oil	Last Used -2003
2005-049508-012	Currently In Use	Aboveground	2006	45460 litres	Welded Steel	None/Unknown	Double Wall	Unknown	Diesel	

NOVA SCOTIA
Environment and Labour
Environmental Monitoring and Compliance

295 Charlotte Street
P. O. Box 714
Sydney, NS B1P 6H7

Tel: (902) 563-2100
Fax: (902) 563-2387

Environmental Monitoring and Compliance Division
Nancy J Harris

NSDEL File #: 36400-30-BED-2005-049508
Registration #: 2005-049508-R01

February 25, 2008

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

RE: Petroleum Storage Tank Registry - Certificate of Registration
Site Registration # 2005-049508-R01

The Department has received the administration fee associated with the registration and issuance of tank tags for your storage tank system located at 150 Cono Drive, Dartmouth, Halifax Regional Municipality. Enclosed is your receipt, a Certificate of Registration, and registration tag(s) for each registered petroleum storage tank on your property. The tag shall be affixed to the petroleum storage tank(s) in such a manner as to make it readily accessible to anyone transferring a petroleum product into the tank(s). Please note, it is illegal for a fuel supplier to deliver a petroleum product to an unregistered storage tank system.

Please take notice of the ***Site Registration Number*** and the ***Tank Numbers*** which have been assigned to this site. Please refer to these numbers on any future correspondence.

If any information on the Certificate of Registration is incorrect or if you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

Attachment

cc: Regional/District Office

NOVA SCOTIA
Department of
Environment and Labour

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: 150 Cono Drive, Dartmouth
150 Cono Drive
Dartmouth, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R01

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-001	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
2005-049508-002	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-003	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-004	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-005	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
2005-049508-006	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

NOVA SCOTIA
Department of Environment and Labour

Petroleum Storage Tank Registry
Certificate of Registration

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: 150 Cono Drive, Dartmouth
150 Cono Drive
Dartmouth, Halifax County

Type of Installation: Commercial
Dyking Details
Site Registration No.: 2005-049508
Appl./Appr. No.: 2005-049508-R01

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
2005-049508-007	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Gasoline*	
2005-049508-008	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-009	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
2005-049508-010	*Currently In Use*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	
2005-049508-011	*Currently In Use*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	

Feb. 17/04

NOVA SCOTIA
Department of Environment and Labour
Environmental Monitoring and Compliance Division

PO Box 714
295 Charlotte Street
Sydney, NS B1P 6H7

Tel: (902) 563-2100
Fax: (902) 563-2387

NSDEL File #:
Approval #: PST-5443-C

2005-049508-R01

January 7, 2004

Roll over

Conrad Brothers Ltd.
150 Cono Drive
PO Box 2129
Dartmouth, NS
B2W 3Y2

RE: Petroleum Storage Tank Registry - Tank Information Validation Report
150 Cono Drive, Dartmouth - Halifax Regional Municipality

The Department of Environment and Labour is implementing a new Petroleum Storage Tank Registry database, a tank tagging program, and annual administration fees in order to track petroleum storage tanks in the province and ensure compliance with the *Petroleum Management Regulations*. In order to implement these initiatives, the Department needs to verify the petroleum storage tank registration information currently on file for your site.

The attached Petroleum Storage Tank Information Validation report has been prepared based on the information in the Department's Petroleum Storage Tank Registry for the site located at 150 Cono Drive, Dartmouth, Halifax Regional Municipality. Please review the attached Validation Report and contact the Department if you are aware of any errors in, or changes that should be made to, this information. If you are returning the attached *Tank Information Validation Report* with changes, please sign the bottom of the form in the space provided.

If the Department has not been contacted or received a response from you within 30 days of this letter, staff will proceed on the basis that the information regarding your tanks is correct.

If you have any questions regarding this issue, please contact me at (902) 563-2100.

Yours truly,

Original Signed

Nancy J Harris

Attachment

File: PST-5443-C_tank_info_Validation

NOVA SCOTIA

Department of Environment and Labour

Petroleum Storage Tank Registry
Tank Information Validation Report

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: 150 Cono Drive, Dartmouth
150 Cono Drive
Dartmouth, Halifax County

Type of Installation: Commercial
Dyking Details:
Registration Master No.: PST-5443-C

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
78544301	*Removed*	*Underground*	*1978*	*15000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Gasoline*	*Last Used -1990*
86544302	*Removed*	*Underground*	*1986*	*22750 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
82544303	*Removed*	*Underground*	*1982*	*32000 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
88544304	*Removed*	*Underground*	*1988*	*9000 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
68544305	*Removed*	*Underground*	*1968*	*4550 litres*	*Steel*	*None/Unknown*	*None*	*Galvanized Steel*	*Fuel Oil*	*Last Used -1990*
90544306	*Removed*	*Underground*	*1990*	*4540 litres*	*Steel*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Used Oil*	*Last Used -1994*

Signature: ____________________

NOVA SCOTIA

Department of Environment and Labour

Petroleum Storage Tank Registry
Tank Information Validation Report

Registered Owner: Conrad Brothers Ltd.
Owner Mailing Address: 150 Cono Drive P. O. Box 2129
Dartmouth, NS B2W 3Y2

Site Operator:
Site Location: 150 Cono Drive, Dartmouth
150 Cono Drive
Dartmouth, Halifax County

Type of Installation: Commercial
Dyking Details:
Registration Master No.: PST-5443-C

Tank Number	Status of Tank	Type of Tank	Year of Installation	Estimated Capacity	Construction Material	External Protection Details	Secondary Containment Details	Piping Details	Substance Stored	Additional Information
90544307	*Currently In Use*	*Underground*	*1990*	*9080 litres*	*Fiberglass Reinforced Plastic*	*Sacrificial Anode*	*None*	*Cathodically Protected*	*Gasoline*	
90544308	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
90544309	*Currently In Use*	*Underground*	*1990*	*45400 litres*	*Fiberglass Reinforced Plastic*	*None/Unknown*	*None*	*Unknown*	*Diesel*	
90544310	*Currently In Use*	*Underground*	*1990*	*22700 litres*	*Steel*	*None/Unknown*	*None*	*Unknown*	*Gasoline*	
99544311	*Currently In Use*	*Aboveground*	*1999*	*17816 litres*	*Welded Steel*	*None/Unknown*	*Double Wall*	*Unknown* *Secondary Containment* *Double Wall*	*Fuel Oil*	

Signature: ______________________

April 23, 2003

PETROLEUM STORAGE TANK REGISTRATION

REGISTRATION # 5443

OWNER OF TANKS

CONRAD BROTHERS LIMITED
150 CONO DRIVE
DARTMOUTH, NS B2W 3Y2

LOCATION OF TANKS

SAME

Needs Valid.

TYPE OF INSTALLATION: Commercial

	TANK NO. 1	TANK NO. 2	TANK NO. 3
INSTALLATION YEAR	1978	1986	1982
STATUS OF TANK	Removed	Removed	Removed
TYPE OF TANK	Underground	Underground	Underground
DYKE NUMBER			
EST. CAPACITY (L)	15000	22750	32000
CONST MATERIAL	Steel	Steel	Steel
EXTERNAL PROTECTION	Unknown	Unknown	Unknown
INTERNAL PROTECTION	Unknown	Unknown	Unknown
PIPING	Galvanized	Galvanized	Galvanized
SECONDARY CONTAINMENT			
SUBSTANCE STORED	Gasoline	Fuel Oil	Fuel oil
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL	1990 ✓	1990 ✓	1990 ✓
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER	Unknown		

NOVA SCOTIA DEPARTMENT
RECEIVED
OCT 23 2003
OF THE ENVIRONMENT

	TANK NO. 4	TANK NO. 5	TANK NO. 6
INSTALLATION YEAR	1988	1968	1990
STATUS OF TANK	Removed	Removed	Removed
TYPE OF TANK	Underground	Underground	Underground
DYKE NUMBER			
EST. CAPACITY (L)	9000	4550	4540
CONST MATERIAL	Fibreglass	Steel	Steel
EXTERNAL PROTECTION	None	Unknown	Cathodic
INTERNAL PROTECTION	None	Unknown	Unknown
PIPING	Galvanized	Galvanized	Cathodic
SECONDARY CONTAINMENT			
SUBSTANCE STORED	Fuel Oil	Fuel oil	Waste oil
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL	1990	1990	1994
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER	Unknown		Nicholson

	TANK NO. 7	TANK NO. 8	TANK NO. 9
INSTALLATION YEAR	1990	1990	1990
STATUS OF TANK	Current	Current	Current
TYPE OF TANK	Underground	Underground	Underground
DYKE NUMBER			
EST. CAPACITY (L)	9080	45400	45400
CONST MATERIAL	Fibreglass	Fibreglass	Fibreglass
EXTERNAL PROTECTION	Cathodic	Unknown	Unknown
INTERNAL PROTECTION	Unknown	Unknown	Unknown
PIPING	Cathodic	Unknown	Unknown
SECONDARY CONTAINMENT			
SUBSTANCE STORED	Gasoline	Diesel	Diesel
EST. DATE LAST USED			
EST. QUANTITY REMAINING			
FILLED WITH INERT MAT			
DATE OF REMOVAL			
ANY CONTAMINATION			
HOW MUCH			
DISPOSAL SITE			
TANK INSTALLER			

	TANK NO. 10	TANK NO. 11
INSTALLATION YEAR	1990	1999
STATUS OF TANK	Current	Current
TYPE OF TANK	Underground	Aboveground
DYKE NUMBER		
EST. CAPACITY (L)	27240	17816
CONST MATERIAL	Steel	Welded steel
EXTERNAL PROTECTION	Unknown	None
INTERNAL PROTECTION	Unknown	None
PIPING	Unknown	Unknown
SECONDARY CONTAINMENT		Double wall
SUBSTANCE STORED	Gasoline	Fuel oil
EST. DATE LAST USED		
EST. QUANTITY REMAINING		
FILLED WITH INERT MAT		
DATE OF REMOVAL		
ANY CONTAMINATION		
HOW MUCH		
DISPOSAL SITE		
TANK INSTALLER	Unknown	ITS Construction

NOVA SCOTIA DEPARTMENT
RECEIVED
OCT 23 2003
OF THE ENVIRONMENT

NOVA SCOTIA

On-site sewage system <u>24 hour construction alert</u>

Subsection 4(1) of the *OSSDS Regulations* require a qualified person or professional engineer to inform the Department at least 24 hours before a system is installed.

Notifier or applicant (QP/P.Eng)

QP/P.Eng contact: Ken Burrows

Telephone: 902-499-7479

Email: ken@terrafirmaconsultants.com

Installer contact: DJ Day.

Telephone: 902-471-6997

Email:

Approval holder, if different than notifier/applicant:

Notification or Approval Information:

- Notification number: 2018.2513351.00
- Approval number:

Date & time construction alert submitted:

dd/mm/yyyy & hh:mm (am or pm)
18/11/2018. 10:40AM.

Date & time of <u>start</u> of system installation:

dd/mm/yyyy & hh:mm (am or pm)
19/11/2018 11 AM

PID: 00276105

Original Signed

Information Taken By: ________ **(Internal use only)** Print name & sign initials ________

NOV 1 9 2018

NOVA SCOTIA

30 Damascus Road, Suite 115
Bedford, NS
Canada B4A 0C1

902-424-7773 T
902-424-0597 F
www.novascotia.ca

November 7, 2018

Our File Number: 96000-30-BED-2018-2513351

On-site Sewage Disposal Systems
NOTIFICATION RECEIPT

Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1**
On-site Sewage Disposal Systems

NOTIFIER:

NOTIFICATION #: 2018-2513351-00

SITE: 172 CONO DR. MONTAGUE GOLD MINES HALIFAX COUNTY
PID 00276105

EFFECTIVE DATE: November 7, 2018

EXPIRY DATE: November 7, 2021

DETAILS: Ecoflow St-650
1500 (L/D)
Other

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, notification from the Notifier is acknowledged. The work done under this notification must follow the Nova Scotia On-site Sewage Disposal Systems Standard.

This Notification or a copy is to be kept on-site at all times as required under Section 22(3) of the Approval and Notification Procedures Regulations. All personnel involved in the project must be made fully aware of the standards associated with this notification. It is the Notifier's responsibility to ensure that they are followed. Failure to comply with the standards is an offence under the *Environment Act*.

It is the Notifier's duty to advise the Department of any new and relevant information respecting any adverse effect that results or may result from the activity, which comes to the Notifier's attention after the issuance of the Notification. This is required under Section 60 of *the Environment Act*.

If the activity is altered, extended or modified beyond the description given in this Notification, please reapply as a new Notification is required.

Despite the issuance of this Notification, the Notifier is still responsible for obtaining any other authorization which may be required to carry out the activity, including those which may be necessary under provincial, federal or municipal law.

NOVA SCOTIA

In keeping with the privacy provisions of the *Nova Scotia Freedom of Information & Protection of Privacy Act*, Nova Scotia Environment will only use the personal information for the purpose for which the information was obtained or compiled, or for a use compatible with that purpose.

2018-2513351

NOTIFICATION FORM

On-Site Sewage Disposal System - Notification

Notifier contact information:

***effective May 1, 2016 notifier must be a professional engineer or qualified person**

First Name | Middle Initial | Last Name

Primary Phone Number | Ext | Secondary Phone Number | Ext

902-860-1663
Fax Number

jeff@terrafirmaconsultants.com
Email Address

P Eng
Professional designation (QP or P.Eng)

8025
QP or P.Eng #

Notifier mailing address:

Street name and type, PO Box, RR #, Site #, etc.

Canada	NS	HRM		
Country	Province	County	City/Town	Postal Code

Return Correspondence? (●) Yes ( ) No

Preferred Method of Contact? (●) Email ( ) Letter

Property details/location of activity

172
Civic number

Cono Drive
Street name and type

Halifax
County

Montague Gold Mines
Community

00276105
PID

ynalfonclid feet 0 Scale

NOV 0 7 20

Property details

Water supply: ● Existing ○ Proposed ○ Other, please specify: ______

Water supply type: ● Drilled well ○ Dug well ○ Other, please specify: ______

Development type: Residential: ○ Single Family

Number of bedrooms: ______ ○ Multiple dwelling ● Other, please specify: COMMERCIAL

System details

● Design ○ Selection

Design capacity (L/day): 1500

Depth of permeable soil (mm): 1700

Disposal field length (m): 8.45

Type of permeable soil: Sandy Silt

Depth to bedrock, water table, or too permeable soil (m): ● > or ○ = 1.8

Disposal field layout:

Multiple trench: ○ At grade ○ Partially trenched ○ Fully trenched

Areabed: ○ At grade ○ Partially trenched ○ Fully trenched

○ C1 ○ C1 raised ○ C2 ○ C2 raised

○ C3 ○ Mound ○ Sand filter

○ Holding tank ● Other, please specify: EcoFlow ST-650

Malfunction replacement? ● Yes (malfunction inspection form required) ○ No

All clearance distances required by the Standard will be maintained: ● Yes ○ No

Supporting documentation

All supporting documentation is to be submitted in accordance with the *Approvals and Notification Procedure Regulations*.

Attach for *ALL* notifications:

☑ Site plan **Site plan must include drawing of lot layout illustrating the location of the test pit(s), direction of and % slope, location of structures (proposed or existing), watercourse(s), well(s) and other confining features identified in the Standard including required clearance distances, in relation to the planned system location.**

☑ Malfunction inspection form (if system is replacing a malfunction).

______ Name (please print) ______ Signature 2018/11/06 Date (yyyy/mm/dd)

Notification declarations must be completed for each submission

Please select the option that applies to your situation I own the site ☐ I have a lease or other written agreement or option with the landowner or occupier that enables me to carry out the activity on the site ☑ I have the legal right or ability to carry out the activity without the consent of the landowner or occupier ☐
I consent to the use of the information I have provided on this form by Nova Scotia Environment and municipal government organizations as required for the purpose of processing my request to perform the activity indicated ☑
I understand that I must provide all information about the activity, such as sketches, plans, and calculations, if requested by Nova Scotia Environment for a compliance audit ☑
I have read and understand the regulations and standard that applies to the activity to which the notification relates including Nova Scotia Activities Designation Regulations, and the Nova Scotia Approval and Notification Procedures Regulations ☑
I will carry out the activity in compliance with the *Environment Act* and the applicable regulations and standard ☑
Original Signed Signature ______ Name (Please print or type) Mark Adcock

NOVA SCOTIA

In keeping with the privacy provisions of the *Nova Scotia Freedom of Information & Protection of Privacy Act*, Nova Scotia Environment will only use the personal information for the purpose for which the information was obtained or compiled, or for a use compatible with that purpose.

SUBMISSION DETAILS

On-site sewage system application for approval required attachment

QP/P.Eng. NAME: I ____________ PID: 00276105

Test pit profile (m)		Soil evaluation results				
Total depth:	1.8 m	soil layers	soil type	depth of soil (mm)	density	moisture
bedrock at:	N/A m	ORGANIC	organic mat	100	-	-
water table at:	1.8 m	first	Sandy Silt	1700	Mod	Mod
slope:	3 %	second				
roots to:	.5 m	third				
mottling at:	N/A m	fourth				

System selection or design specifications			
Type of Disposal Field:	EcoFlow St-650	Imported sand fill required	☒ YES ☐ NO
Distribution Trench Dimensions:	Length: 8.45 m Width: 6.68 m	Minimum permeability of imported sand	2x10-4 m/sec
Cut at Toe of Trench:	N/A mm	Width of Buffer - downslope - upslope	N/A m N/A m
Interceptor Trench Liner:	☐ YES ☒ NO depth: ____ mm ☐ YES ☒ NO thickness: ____	Depth of Buffer (at 5 m from trench)	N/A mm
Pump or Siphon Capacity Watertight Testing:	1500 litres ☐ YES ☒ NO	Septic Tank Capacity Watertight Testing:	4540 litres ☐ YES ☒ NO

Minimum clearance distances as illustrated on attached site plan								
From Nearest	To Field	To Tanks	From Nearest	To Field	To Tanks	From Nearest	To Field	To Tanks
Lot Boundary	>60 m	>60 m	Cistern	>60 m	>60 m	Water Distribution	6+ m	3+ m
Downslope Boundary	>60 m	>60 m	Watercourse	30+ m	15+ m	Foundation Drain	45 m	5 m
Drilled Well	>60 m	>60 m	Wetland	30+ m	15+ m	Other	m	m
Dug Well	>60 m	>60 m	Intermittent Drain	15 m	15+ m	Other	m	m

NOVA SCOTIA

On-site sewage system malfunction inspection form

Name & Designation of Assessor/Inspector: Jeff Burrows

☐ Inspector ☑ QP ☐ PEng ☐ Installer ☐ Cleaner

Submission Type

☐ Assessment/Inspection only

☑ Application or Notification for system to replace a malfunction

Property Information

Owners Name: Conrad Brothers Ltd

Date: Nov 1, 2018

Address: 172 Cono Drive

Telephone #:

County: Halifax

PID: 00276105

Property size/area: 77.7 acres

System Information

System Installer:

Approval #:

System Length:

System Selector/Designer:

☐ Pump ☐ Siphon

System age, or estimate: 28+ years

System type (e.g. C1): area bed

Interceptor/swale: ☐ Yes ☑ No

Pressurized: ☐ Yes ☑ No ☐ Dose device

Septic tank size: ?

# of chambers:

Tank constructed from: ✓ Concrete Fiberglass Plastic Other:

Condition of tank:

Watertight: Yes No

Effluent Filter: Yes No

Sewage pumped into tank? ☐ Yes ✓ No

Date tank pumped:

Regular pumping: Yes No

Usage Information

# of people using system: 30 employees

Occupancy:

✓ Full-time Part-time/seasonal Vacant Other:

Water Treatment: Yes ✓ No

Garbage Grinder: ☐ Yes ☑ No

Backwash connected to system: Yes No

Backwash connection corrected: Yes No

Malfunction Information

Problem first observed: October 2018 **Previous repairs:** ✓ Yes No

Nature of Problem: Breakout ✓ Backup ✓ Slow draining ✓ Clogged disposal field Odour Broken pipe Other, **please provide details:**

Frequency of Problem: ✓ Continuous Occasional After heavy rain Cold temperatures

☐ Other, describe:

Please provide comments/details including potential cause and action taken:

Existing area bed is no longer draining and is backing up into the tank. The pipe from the tank to the field has been repaired in the past. The malfunction appears to be due to the age of the field.

Original Signed

Signature Nov 6, 2018 **Date**

NOVA SCOTIA
Environment

30 Damascus Road, Suite 115
Bedford, N.S.B4A 0C1

Phone: (902) 424-7773
Fax: (902) 424-0597

Process RSN Number: 9069418

Environment Act
DIRECTIVE

ISSUED TO:	Ocean Contractors Limited
DATE ISSUED:	July 10, 2015
MAILING ADDRESS:	P O BOX 604, DARTMOUTH, NS B2Y 3Y9
SITE NAME:	Ocean Ready Mix Plant, Cono Drive, Dartmouth, NS
SITE ADDRESS:	360 CONO DR. MONTAGUE GOLD MINES NS

Pursuant to Environment Act 122A(1) the following action(s) must be completed by August 10, 2015

Obtain the services of a Site Professional to determine any environmental impacts associated with the by-products released from the activities to suppress the fire. This must include sampling for substances the Site Professional deems necessary from an assessment of materials that may have been released. Sampling must commence at the point of release to the settling ponds and any other point of release off the property or to any watercourse.

The Site professional must send a report with any recommendations to remediate to Nova Scotia Environment by the comply by date indicated.

The action(s) outlined in this Directive are the minimum required. Additional actions may be needed to address the non-compliance item(s) identified in this report. Where necessary, you may need to secure the services of a firm/person with sufficient knowledge, experience, and certification to address any item (s) of non-compliance.

Be advised that failing to undertake all action(s) within the time frame specified in this Directive is an offence and may result in further enforcement. An investigation involving the non-compliance item(s) identified in this report continues and is separate from the requirements of this Directive.

Original Signed

Signature of Issuing Inspector:

This Directive was issued by Joshua D Boudreau, Inspector Specialist with Nova Scotia Environment, who may be contacted at:

Nova Scotia Environment
30 Damascus Road, Suite 115
Bedford, N.S. B4A 0C1
Phone: (902) 424-7773
Fax: (902) 424-0597
http://www.gov.ns.ca/nse

****

Supporting text where applicable:

Prohibition s.67 - (1) No person shall knowingly release or permit the release into the environment of a substance in an amount, concentration or level or at a rate of release that causes or may cause an adverse effect, unless authorized by an approval or the regulations.(2) No person shall release or permit the release into the environment of a substance in an amount, concentration or level or at a rate of release that causes or may cause an adverse effect, unless authorized by an approval or the regulations. Environment Act 1994-95, c. 1

Duty to take remedial measures s.71 - Any person responsible for the release of a substance under this Part shall, at that person's own cost, and as soon as that person knows or ought to have known of the release of a substance into the environment that has caused, is causing or may cause an adverse effect, (a) take all reasonable measures to(i) prevent, reduce and remedy the adverse effects of the substance, and (ii) remove or otherwise dispose of the substance in such a manner as to minimize adverse effects; (b) take any other measures required by an inspector or an administrator; and (c) rehabilitate the environment to a standard prescribed or adopted by the Department. Environment Act 1994-95, c. 1

Assistance to inspectors s.118 - The owner or occupier of any place, or any person the inspector reasonably believes is related to or associated with any activity at the place, in respect of which an inspector is exercising powers or carrying out duties pursuant to this Part shall(a)give the inspector all reasonable assistance to enable the inspector to exercise those powers and carry out those duties(b) furnish all information relative to the exercising of those powers and the carrying out of those duties that the inspector may reasonably require. Environment Act, 1994-95, c.1

Right of entry and inspection s.119 (1) - For the purpose of ensuring compliance with this Act, the regulations, a standard or an order made under Part XIII, an inspector, subject to Sections 22 and 120, may, at any reasonable time, (g) where the inspector believes that any thing may release, is releasing or has released into the environment a substance that may cause, is causing or has caused an adverse effect,(i) require the person having care, management or control of the thing to detain the thing at the place where it is found. Environment Act, 1994-95, c.1

Right of entry and inspection s.119 (1) - For the purpose of ensuring compliance with this Act, the regulations, a standard or an order made under Part XIII, an inspector, subject to Sections 22 and 120, may, at any reasonable time (h) require the production of any documents that are required to be kept pursuant to this Act or any other documents that are related to the purpose for which the inspector is exercising any power under clauses (a) to (g). Environment Act, 1994-95, c.1

Inspector Directives s. 122A (1) - An inspector may issue a directive to a person requiring the person to
(a) take such measures in accordance with clause 71(b) as the inspector may specify;
(b) furnish the inspector with information in accordance with clause 118(b);
(c) detain a thing in accordance with subclause 119(1)(g)(i);
(d) produce a document in accordance with clause 119(1)(h); or
(e) take any action prescribed by the regulations in any circumstance prescribed by the regulations.
(2) A directive is not subject to appeal or review under this Act. Environment Act, 1994-95, c.1

DILLON CONSULTING

Gallant, Shauna <sgallant@dillon.ca>

File 2019-8441-ENV - Access to Information File Abandoned

2 messages

Westhaver, Erna B <Erna.Westhaver@novascotia.ca> Tue, Feb 12, 2019 at 8:31 AM
To: "sgallant@dillon.ca" <sgallant@dillon.ca>

Good morning Shauna:

This email is to notify you that we have closed the file for the following application as requested. Please see our letter of notice attached.

The request was for:

> ***"Two industrial files (file# 92100--30-BED-2005-045741-3 volumes, 92100-30-ED-2005-045743-001) containing inspection reports, correspondence, notes, and photos; and a contaminated site complaint file (file# 3300-40-BED-2015-3099540) pertaining to 31 Cono Dr., Dartmouth (PID No.00275966."***

If you have any question regarding this notice please contact me.

Sincerely,

Erna

NOVA SCOTIA
Internal Services
Information, Communications and Technology Services

Erna Westhaver

IAP Administrator

Information Access and Privacy (IAP) Services

ICT Services Branch, Department of Internal Services

5161 George Street, 9th Floor, Halifax, NS, B3J 1M7

(902) 424-6726

Erna.Westhaver@novascotia.ca

NOVA SCOTIA
Environment

Information Access
and Privacy

PO Box 442
Halifax, Nova Scotia
B3J 2P8

ph: (902) 424-3600
fax: (902) 424-6925

February 12, 2019

Shauna Gallant
137 Chain Lake Dr Suite 100
Halifax, NS B3S1B3

sgallant@dillon.ca

Dear Shauna Gallant:

Re: We have closed your file – *File* # 2019-08441-ENV

This is further to your email of February 11, 2019, in response to our fee estimate, in which you advised that you are not going to proceed with this request.

As a result, your application has been abandoned and accordingly, we have closed the file.

If you have any questions about this decision, please contact me at 902-424-6726 or e-mail Erna.Westhaver@novascotia.ca.

Yours truly,

Original Signed

Erna Westhaver
IAP Administrator

NOVA SCOTIA
Environment

Information Access
and Privacy

PO Box 442
Halifax, Nova Scotia
B3J 2P8

ph: (902) 424-3600
fax: (902) 424-6925

February 25, 2019

Shauna Gallant
Dillon Consulting
137 Chain Lake Drive
Halifax, Nova Scotia B3S 1B4

Dear Shauna Gallant:

Re: We do not have the information you asked for – 2019-08443-ENV

Environment received your application for access to information under the *Freedom of Information and Protection of Privacy Act* on February 8, 2019.

In your application, you requested a copy of the following records:

> *'An environmental health file (File # 97000-35-TRU-2013-0081) pertaining to 195 Lethbridge Avenue (PID No. 00249664), Dartmouth.'*

After a file search, we have located no records responsive to your application. Therefore, it is my understanding, pursuant to clause 7(2)(b) of the *Act*, that the Environment does not have custody or control of records which would respond to your application.

I am unaware of a department or agency which would hold such records.

You have the right to ask for a review of this decision by the Information Access and Privacy Commissioner (formerly the Review Officer). You have 60 days from the date of this letter to exercise this right. If you wish to ask for a review, you may do so on Form 7, a copy of which is attached. Send the completed form to the Information Access and Privacy Commissioner, P.O. Box 181, Halifax, Nova Scotia B3J 2M4.

Please contact Erna Westhaver at 902-424-6726 or by e-mail at: Erna.Westhaver@novascotia.ca if you need further assistance in regards to this application.

Yours truly,

Original Signed

Erna Westhaver
IAP Administrator

Attachment

20(1)

NOVA SCOTIA
Environment

30 Damascus Road, Suite 115
Bedford, N.S.B4A 0C1

Phone: (902) 424-7773
Fax: (902) 424-0597

Process RSN Number: 11347784

INSPECTION REPORT
Document Review

ISSUED TO:	File
INSPECTION DATE:	April 30, 2018
SITE NAME:	SBM Port Wallace - PIDS 00258228 and 00249672
SITE ADDRESS:	DARTMOUTH NS

OVERVIEW OF INSPECTION

Inspection Report Part 1 of 2

In July 2017, the department received a letter from Mr. Bruce MacNeil, P.Eng. regarding the transport of a large amount of slate rock from the proposed Port Wallace Subdivision Lands in Waverly, Nova Scotia on the lands referred to as PIDs 00249672 and 00258228, herein in this report referred to as the 'Site'. The letter indicated the slate material was not considered sulphide bearing material [SBM] based on previous testing.

Based on the letter provided, the slate was exported from the Dartmouth Bridge Terminal Project in 2011:

- Approval 2011-077906-A01: for the Construction and Operation of Sulphide Bearing Material Temporary Storage and Reuse Site and Associated Works, at or near Nantucket Avenue, Dartmouth, Halifax Regional Municipality in the Province of Nova Scotia
- Approval Holder: Halifax Regional Municipality (HRM)
- Approval Location: Dartmouth Bus Terminal at Nantucket Avenue, Dartmouth, NS (PID 00023267)

Based on a complaint and subsequent inspection report by Inspector A. Heggelin (AH) dated August 31, 2012, the slate rock was transferred to the Site between May and June of 2012 (approximately). Bruce MacNeil, P.Eng, representing Conquest Engineering (for HRM) sent an email to AH on June 20, 2012 stating the material that was removed from the site was within the guidelines for sulphide bearing material. He also provided test results which showed the average to be under 0.4% sulphur. Mr MacNeil indicated that Whebby had shipped 1600 cubic yards [1223.288 m3] of material to the Whebby Quarry and they were not shipping any more. Based on a 20 June 2012 letter from 20(1) [redacted] and Bruce MacNeil, Conquest was unaware that the material was moved off-site, but based on their conversations with Whebby say the material moved offsite was the highly weathered, upper portions of the slate material from the northeast corner near Thistle Street. Total Sulphur results were provided from samples collected between November 9 and 18th, 2011.

In October 2017, the department was made aware of samples collected by Englobe Corp. On April 28, 2016 Englobe completed a test pit program in which six test pits were excavated into suspected slate rock stored at the Site. The results were presented to Port Wallace Holdings Limited 20(1) [redacted] 20(1) [redacted] n a May 25, 2016 Englobe Letter Report. Six (6) samples, and one (1) field duplicate were submitted to the Dalhousie University Mineral Engineering Centre in Halifax, NS for analysis of Total Sulphur and Acid Producing Potential. Sample depths ranged from 1.2 metres to 3.0 metres below the surface of the stockpiled material. All samples analyzed were found to be Sulphide Bearing Material as outlined in the Sulphide Bearing Material Disposal Regulations.

For Inspection Report - Part 2 see Process RSN 11445736

Inspector Signature: Original Signed

Date: April 30, 2018

This inspection report was prepared by Stephanie Barkhouse, Inspector with Nova Scotia Environment who may be contacted at:

Nova Scotia Environment
30 Damascus Road, Suite 115
Bedford, N.S. B4A 0C1
Phone:(902) 424-7773
Fax: (902) 424-0597
http://www.gov.ns.ca/nse

NOVA SCOTIA
Environment

30 Damascus Road, Suite 115
Bedford, N.S.B4A 0C1

Phone: (902) 424-7773
Fax: (902) 424-0597

Process RSN Number: 11445736

INSPECTION REPORT
Document Review

ISSUED TO: File

INSPECTION DATE: April 30, 2018

SITE NAME: SBM Port Wallace - PIDS 00258228 and 00249672

SITE ADDRESS: DARTMOUTH NS

OVERVIEW OF INSPECTION

Inspection Report Part 2 of 2

On January 29, 2018, a letter report was received by the department from Bruce MacNeil, P.Eng, summarizing the removal of slate from the site. Based on the letter report, and subsequent information provided:

- Approximately 6,420 cubic metres (11,557 tonnes) of slate material was transported to the Dartmouth Cove facility between December 11 and 15, 2017.
- Eight (8) test pits were completed in the area beneath where the slate was stored, as well as two (2) upgradient background test pits /samples.
- Soil samples were collected and analyzed at an accredited laboratory for metals analysis. Results revealed metal concentrations below EQS or below background levels (based on the 'upgradient background samples').
- Additional information was requested by the department to support the letter report and the information was received by the department within the same day. This included laboratory certificates, a receipt documenting the acceptance of SBM (it has not been confirmed at this time if disposal occurred at a department approved facility), and general questions on methodology.
- Aven Cole, M.Sc.E, P.Eng, of Englobe (representing the purchaser) peer reviewed Mr. McNeil's work (regarding the removal of the slate) and had no issues, in a conversation with Ms. Cole she confirmed that Englobe's position was that nothing further was warranted in regard to the slate.

In summation, based on the information provided, sulphide bearing material was stored on the properties identified as PIDs 00249672 and 00258228 from 2012 to 2017. The SBM was removed in December 2017, and a confirmatory test pit program demonstrated metal concentrations (in soil) below EQS or below background levels (based on the 'upgradient background samples').

Follow up is required regarding the initial approval; the movement and storage of sulphide bearing materials without an approval and the disposal site at which the SBM was disposed of.

For Inspection Report Part 1 see process RSN 11347784

Original Signed

Inspector Signature: ______________________

Date: Apr 30, 2018

This inspection report was prepared by Stephanie Barkhouse, Inspector with Nova Scotia Environment who may be contacted at:

Nova Scotia Environment
30 Damascus Road, Suite 115
Bedford, N.S. B4A 0C1
Phone:(902) 424-7773
Fax: (902) 424-0597
http://www.gov.ns.ca/nse

20(1)

Englobe

englobecorp.com

May 25, 2016

20(1) [redacted]
Port Wallace Holdings Limited
255 Lacewood Dr., Suite 100
Halifax, Nova Scotia, B3M 4G2

Subject: **Slate Rock Stockpile Sampling**
Port Wallace, Dartmouth, NS
Our ref.: 20724

Dear 20(1) [redacted]

Englobe Corp. (Englobe) conducted sampling of a stockpile of suspected slate rock at above-noted site. On April 28, 2016, six test pits were excavated into the stockpile at the locations presented on the attached figure. Englobe personnel collected six rock samples from the test pits for testing.

The samples were submitted to Dalhousie Universities Mineral Engineering Centre in Halifax, Nova Scotia for analysis of Total Sulphur and Acid Producing Potential to assess compliance with the Nova Scotia Environment (NSE) *Sulphide Bearing Material Disposal Regulations*.

Based on the laboratory results, all samples analysed exceed the NSE regulation criteria. Results are summarized in the table below. The laboratory certificate is attached.

Sample ID	Depth (mbGS)	Total Sulphur (Wt.%)	Acid Producing Potential (kg H2SO4/t)
TP1/1	1.2	1.759	53.81
TP1/2	2.4	1.078	32.96
TP4/2	2.4	0.596	18.25
TP5/1	1.5	1.058	32.35
TP5/2	3.0	1.347	41.19
TP6/2	3.0	0.829	25.37
TP6/2-DUP	3.0	0.829	25.35
NSE Regulation		0.4	12.51

[1] 1995 Nova Scotia Environment (NSE) *Sulphide Bearing Material Disposal Regulations*.
Note that NSE Regulation applies to sulphide (a portion of total sulphur) and test results are Total Sulphur.

Englobe Corp.

T 902.468.6486
F 902.468.4919
dartmouth@englobecorp.com

97 Troop Avenue
Dartmouth (Nova Scotia)
Canada B3B 2A7

We trust this satisfies your present requirements. If you require additional information, please do not hesitate to contact the undersigned.

Yours very truly,
Englobe Corp.

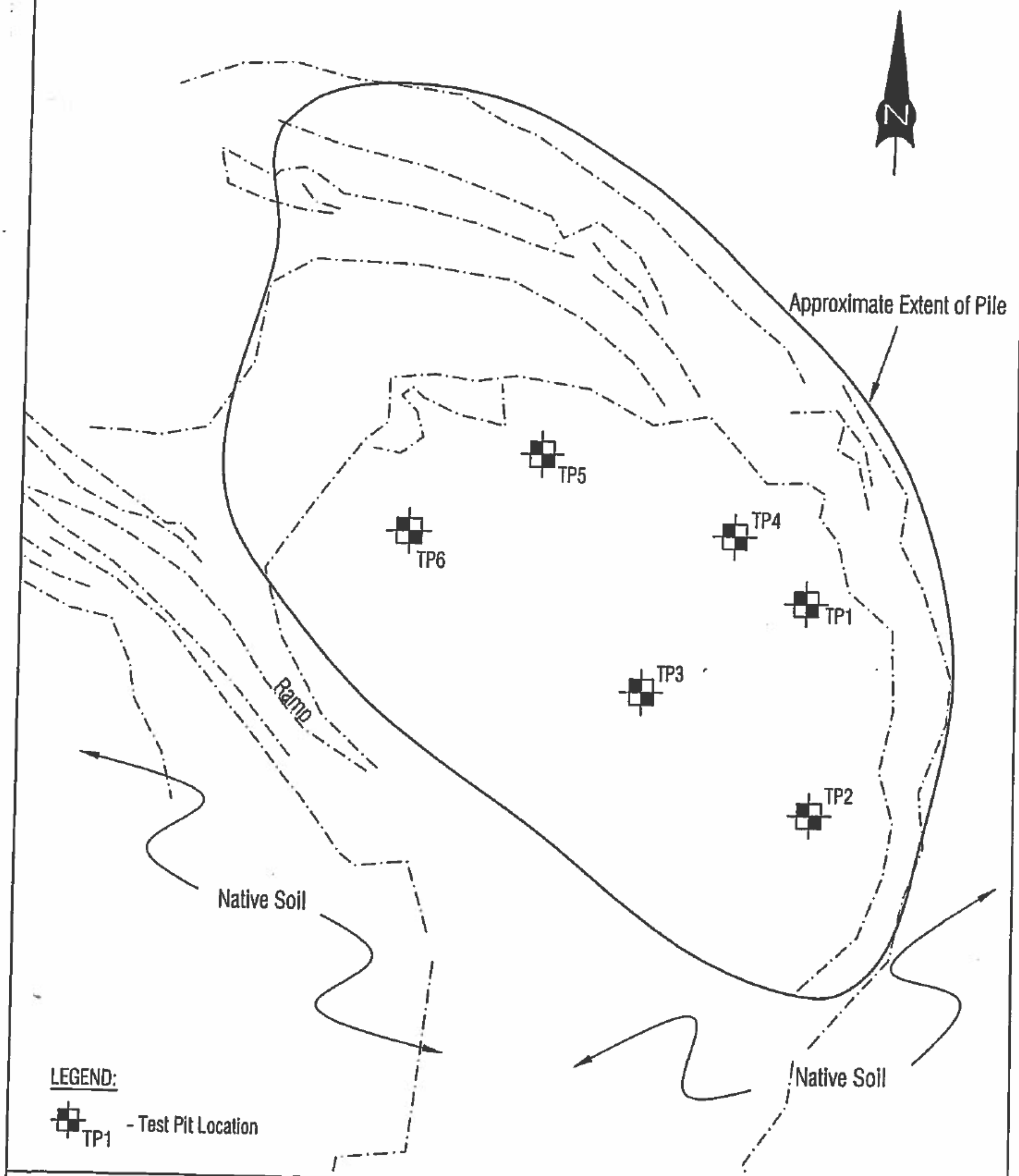
Original Signed

Lisa Ladouceur, CET
Technologist, Environmental Engineering

Original Signed

Aven Cole, M.Sc.E., P.Eng.
Project Manager, Environmental Engineering

Encl.



Englobe

Site Plan Showing Test Pit Location
Port Wallace, Dartmouth, NS

DATE: May 2016	SCALE: 1:400	DRAWN BY: JJ	CKD BY: LL	JOB No. 20724	FIGURE 1

DALHOUSIE UNIVERSITY
Inspiring Minds

20(1)

Minerals Engineering Centre

Dalhousie University
1360 Barrington Street
GH Murray Bldg. Rm. G101
PO Box 15000, Halifax, NS
B3H 4R2

minerals.engineering.dal.ca
Tel: 902.494.3955
Email: mec@dal.ca

May 6, 2016

Englobe Corp.
97 Troop Ave.
Dartmouth, NS
B3B 2A7
Attention: Aven Cole

Re: Results of analysis on submitted samples.

Job #20724

Sample	Wt. % S (Total)	kg H2SO4/t Acid Producing Potential
Englobe TP 1/1	1.759	53.81
Englobe TP 1/2	1.078	32.96
Englobe TP 4/2	0.596	18.25
Englobe TP 5/1	1.058	32.35
Englobe TP 5/2	1.347	41.19
Englobe TP 6/2	0.829	25.37
Englobe TP 6/2-DUP	0.829	25.35

Reference Sample:

Sample	Wt. % S (Total)
NBM-1 (0.28% Sulphur)	0.275

20(1)

Manager, Minerals Engineering Centre

Fisheries and Oceans Canada | Pêches et Océans Canada

1 Challenger Drive
P.O. Box 1006
Dartmouth, Nova Scotia
B2Y 4A2

FEB 12 2016

Your file *Votre référence*

Our file *Notre référence*
15-HMAR-00059

20(1) [redacted]
Smithers Marine Services Limited
1 Canal Street
Dartmouth, NS
B2Y 2W1

Dear 20(1) [redacted]

Subject: ***Fisheries Act* Authorization – Dartmouth Cove**

Pursuant to paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans Canada authorizes the carrying on of your proposed work, undertaking or activity that results in serious harm to fish arising from the infilling up to 10,000 square metres (m^2) of marine habitat by the placement of rock fill on submerged lands at Dartmouth Cove, Halifax Harbour, Nova Scotia. A paragraph 35(2)(b) *Fisheries Act* authorization is attached.

Failure to comply with any of the terms or conditions of the attached Authorization may lead to prosecution under the *Fisheries Act*.

A copy of this Authorization should be kept on site while the work is in progress and upon request be provided to relevant federal or provincial officials. Work crews should be familiar with, and able to adhere to, the conditions.

If you or anyone conducting work on your behalf has any questions please contact Tony Henderson at our Dartmouth office at 902-401-0602, by fax at 902-426-1489, or by email at Tony.Henderson@dfo-mpo.gc.ca.

Yours sincerely,

Original Signed

Morley Knight
Regional Director General
Maritimes Region

Attachment: Authorization

cc: T. Henderson

Canada

PATH No.: 15-HMAR-00059
Authorization No: 15-HMAR-00059

PARAGRAPH 35(2)(*b*) *FISHERIES ACT* AUTHORIZATION

Authorization issued to
Smithers Marine Services Limited *(hereafter referred to as the "Proponent")*
1 Canal Street
Dartmouth, Nova Scotia
B2Y 2W1

Attention to: 20(1) [redacted]

Location of Proposed Project

Nearest community (city, town, village):	Dartmouth
Municipality, district, township, county:	Halifax Regional Municipality
Province:	Nova Scotia
Name of watercourse, waterbody:	Dartmouth Cove, Halifax Harbour
Longitude and latitude, UTM Coordinates:	Map 11D12 44°329'52.44" N, 65°33' 42.28" W

Description of Proposed Project

The proposed project of which the work, undertaking or activity authorized is a part involves:

> Infilling on two waterlots to expand usable land in the project area. This will be accomplished by the placement of rock fill over an area of approximately 9607 square metres (m^2) of soft bottom habitat to a height above the high water-mark in Dartmouth Cove. The rock will be deposited from the landward edge by dump trucks and heavy equipment will be used to spread the material and place boulders to armour the infill slope faces.

Description of Authorized work(s), undertaking(s) or activity(ies) likely to result in serious harm to fish

The work(s), undertaking(s), or activity(ies) associated with the proposed project described above, that are likely to result in serious harm to fish, are:

- Placement of rock fill over an area of approximately 10,000 m^2 of soft bottom habitat. Dumping of rock fill by truck from the landward edge and re-positioned, compacted and graded with an excavator or other machinery. A portion of the fill material is expected to be sulphide-bearing (i.e., pyritic slate). Sulphide-bearing material shall be placed only below low tide level and capped with non-sulphide rock to high tide level.

The serious harm to fish likely to result from the proposed work(s), undertaking(s), or activity(ies), and covered by this authorization includes

Destruction of a total footprint of 9607 m² of marine fish habitat consisting primarily of sand and silt as a result of the placement of rock fill.

Death of non-motile species known to frequent the project area including blue mussel and deep sea scallop.

Conditions of Authorization

The above described work(s), undertaking(s) or activity(ies) likely to result in serious harm to fish must be carried on in accordance with the following conditions.

1. **Conditions that relate to the period during which the works, undertakings or activities that will result in serious harm to fish can be carried on**

   The works, undertakings or activities that result in serious harm to fish is authorized to be carried on during the following period:

   From date signed by Regional Director General to December 31, 2018.

   If the Proponent cannot complete the works, undertakings or activities during this period, Fisheries and Oceans Canada (DFO) must be notified in advance of the expiration of the above time period. DFO may, where appropriate, provide written notice that the period to carry on the works, undertakings or activities have been extended.

   The periods during which other conditions of this authorization must be complied with are provided in their respective sections below. DFO may, where appropriate, provide written notice that these periods have been extended, in order to correspond to the extension of the period to carry on a work, undertaking, or activity.

2. **Conditions that relate to measures and standards to avoid and mitigate serious harm to fish**

2.1 Sediment and erosion control: Sediment and erosion control measures must be in place and shall be upgraded and maintained, such that release of sediment is prevented beyond the location of the authorized work, undertaking, or activity

2.2 List of measures and standards to avoid and mitigate serious harm to fish:

2.2.1 During infilling, a silt curtain will be deployed from the surface to near bottom around the perimeter of the area to be infilled.

2.2.2 Total suspended sediment levels beyond the silt curtain shall not exceed 25 milligrams per litre (mg/l) or 8 nephelometric turbidity units (NTUs) above background levels at 100 m from the nearest edge of the infill site over a 24 hour period. Background levels shall be measured at least 500 m from the project site in a non-disturbed area and upstream from any sediment movement.

2.2.3 All rock material that will be used for fill purposes must be free of excessive fines, clean, non-toxic material (i.e., free of fuel, oil, grease and/or other contaminants) from a non-watercourse source, subject to condition 2.2.4.

2.2.4 The placement of any sulphide-bearing material as fill in the project area shall be done according to accepted best management practices for handling this material. This includes minimizing duration of storage onsite prior to placement, ensuring the material is placed sub-aqueously at least 0.3 to 0.5 metres (m) below low tide levels, the material must be free of contaminants and excessive fines, and capped with non-sulphide-bearing material.

2.2.5 Machinery and equipment must be checked for leakage of lubricants and fuel, and must be in good working order. Refueling must be done as least 100 m from any waterbody, or within a designated containment area.

2.3 Contingency measures:

2.3.1 Rock fill placement shall be suspended if monitoring required in condition 3 below indicates that the measures and standards to avoid and mitigate serious harm to fish are not successful. In particular, if the level of sedimentation resulting from the work should exceed the Canadian Council of Ministers of the Environment (CCME) Water Quality for the Protection of Aquatic Life guidelines for marine parameters at a distance of 100 m beyond the silt curtain, rock dumping and material spreading will be suspended.

2.4 Dates by which these measures and standards shall be implemented: Measures and standards to avoid and mitigate serious harm to fish shall be implemented as necessary prior to and throughout the life of the project.

3. Conditions that relate to monitoring and reporting of measures and standards to avoid and mitigate serious harm to fish

3.1 Monitoring of avoidance and mitigation measures: The Proponent shall monitor the implementation of avoidance and mitigation measures referred to in section 2 of this authorization and report to DFO, within 6 months of completion of the authorized work, and indicate whether the measures and standards to avoid and mitigate serious harm to fish were conducted according to the conditions of this authorization. This shall be done, by:

3.1.1 Demonstration of effective implementation and functioning: Providing dated photographs and inspection and sampling reports to demonstrate effective implementation and functioning of mitigation measures and standards described above to limit the serious harm to fish to what is covered by this authorization.

3.1.2 Contingency measures: Providing details of any contingency measures that were followed, to prevent impacts greater than those covered by this authorization in the event that mitigation measures did not function as described.

3.2 Other monitoring and reporting conditions: Should sediment laden water be released beyond the double silt curtain, sampling for total suspended solids shall be conducted 100 m from edge of infill for comparison with CCME Guidelines for the Protection of Aquatic Life. If these are exceeded, an email should be sent to the Fisheries Protection Biologist responsible for the file with the sediment concentrations and actions taken to resolve the exceedance.

4. Conditions that relate to the offsetting of the serious harm to fish likely to result from the authorized work, undertaking or activity

4.1 Letter of credit: DFO may draw upon funds available to DFO as the beneficiary of the letter of credit provided to DFO as part of the application for this authorization, to cover the costs of implementing the offsetting measures required to be implemented under this authorization, including the associated monitoring and reporting measures included in section 5, in instances where the Proponent fails to implement these required measures.

4.2 Scale and description of offsetting measures: Deployment of nine sets of five reef balls (45 total) shall be undertaken in Halifax Harbour to create approximately 8100 m^2 of marine habitat.

4.2.1 Offsetting plans shall be implemented as per correspondence dated February 25, 2015, from S. MacKnight, OCL Group, identifying the offsetting plan and other information requirements.

4.3 Offsetting criteria to assess the implementation and effectiveness of the offsetting measures: All fish habitat offsetting measures shall be completed and functioning according to the criteria below:

4.3.1 Twice a year for three years following deployment, the reef balls shall be monitored by divers to confirm whether the offsetting was effective through confirmation of macrophyte attachments and biodiversity on the reef ball and surrounding substrate. Dates for submission will be determined after deployment and a schedule provided.

4.4 Contingency measures: If the results of monitoring as required in condition 5 indicate that the offsetting measures are not completed by the date specified and/or are not functioning according to the above criteria in 4.3, the Proponent shall give written notice to DFO and shall implement the contingency measures and associated monitoring measures, as contained within the approved offsetting plan (attached to this authorization or referenced in section 4.2), to ensure the implementation of the offsetting measures is completed and/or functioning as required by this authorization.

4.4.1 Scale and description of contingency measures: Financial security in the form of a Letter of Credit for an amount of *Ninety thousand Canadian dollars ($90,000.00)*, reference # *5783-9000889-01*, has been provided by the proponent in the event that the conditions of Authorization are not met.

4.5 The Proponent shall not carry on any works, undertakings or activities that will adversely disturb or impact the offsetting measures.

5. **Conditions that relate to monitoring and reporting of implementation of offsetting measures (described above in section 4):**

5.1 Schedule(s) and criteria: The Proponent shall conduct monitoring of the implementation of offsetting measures according to the approved timeline and criteria below:

5.1.1 Twice a year, in early summer and fall, for three years following deployment, the reef balls shall be monitored by divers to confirm whether the offsetting was effective. Effectiveness shall be gauged through confirmation of macrophyte attachments and biodiversity on the reef ball and surrounding substrate. A brief written report shall be submitted to provide the results of monitoring.

5.2 List of reports to be provided to DFO: The Proponent shall report to DFO on whether the offsetting measures were conducted according to the conditions of this authorization by providing the following:

5.2.1 Monitoring reports will be provided from the proponent to DFO within 1 month of receipt based on the date of the monitoring and shall include photos and videos collected. Dates for submission will be determined after deployment and a schedule provided.

Authorization Limitations and Application Conditions

The Proponent is solely responsible for plans and specifications relating to this authorization and for all design, safety and workmanship aspects of all the works associated with this authorization.

The holder of this authorization is hereby authorized under the authority of Paragraph 35(2)(*b*) of the *Fisheries Act*. R.S.C., 1985, c.F. 14 to carry on the work(s), undertaking(s) and/or activity(ies) that are likely to result in serious harm to fish as described herein. This authorization does not purport to release the applicant from any obligation to obtain permission from or to comply with the requirements of any other regulatory agencies.

This authorization does not permit the deposit of a deleterious substance in water frequented by fish. Subsection 36(3) of the *Fisheries Act* prohibits the deposit of any deleterious substances into waters frequented by fish unless authorized by regulations made by Governor in Council.

This authorization does not permit the killing, harming, harassment, capture or taking of individuals of any aquatic species listed under the *Species at Risk Act* (SARA) (s. 32 of the SARA), or the damage or destruction of residence of individuals of such species (s. 33 of the SARA) or the destruction of the critical habitat of any such species (s. 58 of the SARA).]

At the date of issuance of this authorization DFO has determined that impacts from the work, undertaking, or activity proposed, to aquatic species listed under the *Species at Risk Act* are not likely.

The failure to comply with any condition of this authorization constitutes an offence under Paragraph 40(3)(*a*) of the *Fisheries Act* and may result in charges being laid under the *Fisheries Act*.
This authorization must be held on site and work crews must be made familiar with the conditions attached.

This authorization cannot be transferred or assigned to another party. If the work(s), undertaking(s) or activity(ies) authorized to be conducted pursuant to this authorization are expected to be sold or transferred, or other circumstances arise that are expected to result in a new Proponent taking over the work(s), undertaking(s) or activity(ies), the Proponent named in this authorization shall advise DFO in advance.

Date of Issuance: FEB 12 2016

Original Signed

Approved by:
Morely Knight
Regional Director General
Maritimes Region
Fisheries and Oceans Canada

Fisheries and Oceans Canada | Pêches et Océans Canada

COMPLETION OF AUTHORIZED WORK(S), UNDERTAKING(S) OR ACTIVITY(IES)

A condition of this Authorization requires that the Authorization Holder notify Fisheries and Oceans Canada within 30 days that the work(s), undertaking(s) or activity(ies) authorized has been completed.

Please enter the information on this sheet and return it to Fisheries and Oceans Canada at the following address:

Fisheries and Oceans Canada, Maritimes Region
Fisheries Protection Program
6th Floor Polaris Building, BIO
PO Box 1006, 1 Challenger Drive
Dartmouth, Nova Scotia, B2Y 4A2

Phone: (902) 401-0602
Fax: (902) 426-1489
Email: ReferralsMaritimes@dfo-mpo.gc.ca
DFO-FPP Contact: Tony Henderson, Marine and Coastal Development

AUTHORIZATION NUMBER: 15-HMAR-00059

NAME OF AUTHORIZATION HOLDER: Smithers Marine Services Limited – 20(1) [redacted]

NAME OF WATERBODY: Dartmouth Cove, Halifax Harbour

WORK(S), UNDERTAKING(S) OR ACTIVITY(IES) AUTHORIZED: Placement of approximately 10,000 m^2 of rock fill material on soft bottom substrate in Dartmouth Cove

NAME OF CONTRACTOR(S): ______________________________
____

DATE AUTHORIZED WORK(S), UNDERTAKING(S) OR ACTIVITY(IES) COMPLETED:______________________

COMMENTS (please attach photos and provide the final footprint area below):
____
____
____
____

By signing below the Authorization Holder verifies the work was done in accordance with the terms and conditions of this Authorization.

SIGNATURE: ____________________ DATE: ____________________

POSITION TITLE: ____________________

OCL GROUP
ENVIRONMENTAL MANAGEMENT CONSULTANTS

SECTION 2:

DARTMOUTH COVE INFILL OFFSETTING PLAN

INTRODUCTION

As noted in Appendix 1 of this document, the Dartmouth Cove Infill Project will result in permanent loss of bottom marine habitat by the placement of rock/fill to cover +/- 9,605 square meters; i.e., permanent harmful destruction of fish habitat. Consequently the project at Dartmouth Cove will require habitat offsetting.

PROPOSED OFFSETTING PLAN

Selecting the Offsetting Measure

The primary objective of offsetting, related to unavoidable serious harm to fish and the loss of fisheries production resulting from any project, is to counterbalance the negative impact the project has on Commercial, Recreational and Aboriginal fisheries. In the selection of the measures to successfully counterbalance serious harm, several guiding principles must be addressed. These are discussed below with respect to our proposal for the deployment of "reef balls" within Halifax Harbour as an effective offsetting measure.

An "out of kind" approach was adopted and agreed upon in principle by regional Fisheries and Oceans representatives and the Proponent. In brief, this offsetting involves the creation of fish habitat by the creation of new benthic marine habitat through the deployment of "reef balls" by *Clean Nova Scotia Foundation (see Figure 6).* The deployment of reef balls is a method for marine habitat offsetting that has been approved by regional Fisheries and Oceans representatives for other projects in Halifax Harbour

Smithers Marine Services Ltd. has signed an agreement with *Clean Nova Scotia Foundation* to have the Foundation and their partners install nine (9) sets of 5 balls, which Dept. of Fisheries and Oceans recognizes as approximating an offset of 8,100 square meters of marine habitat (Appendix 5). The proposed off-set, when combined with an off-set habitat area of 2,218 square meters associated with the rock slope of the proposed infill, will result in a total off-set of approximately 10,300 square meters.

Fisheries Management Objectives

Principle 1:

Offsetting measures must support fisheries management objectives or local priorities.

> A prime fisheries management objective is to sustain commercial, recreational and aboriginal fisheries (C-R-A) and the associated marine habitats required to complete their life cycles. In this respect, the offsetting program satisfies this principle through the establishment of new uncontaminated fish habitat to support primary producers, and secondary and tertiary consumers, as well as enhanced habitat for adult local C-R-A fishery and in addition various aspects of their life cycle.

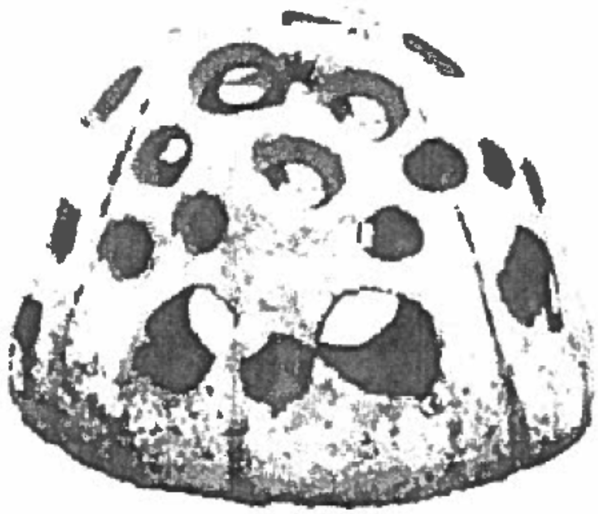
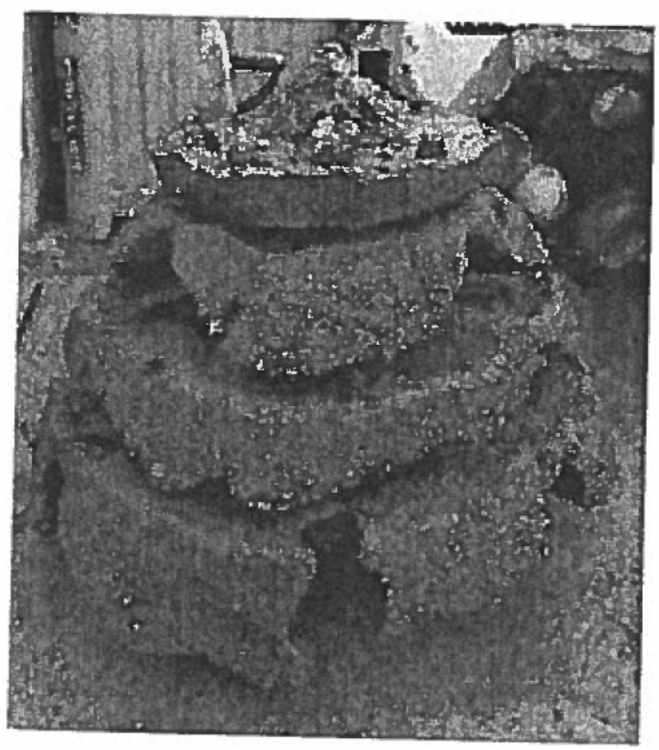


Figure 6: Two examples of reef balls deployed by *Clean Nova Scotia Foundation* within Halifax Harbour.



Principle 2:
Benefits from offsetting measures must balance project impacts.

Providing new fish habitat, in the form of reef balls is an "out of kind" offsetting measure that creates greater productivity gains for the C-R-A fishery. As has been outlined above the proposed infill area will impact +/- 9,607 square meters of severely heavily contaminated sediments. Further, benthic surveys of the proposed infill site provided no evidence of any benthic C-R-A fish species, or aspect of their life cycle that could be compromised within the proposed infill area. The new habitat created through the use of the reef ball complex is about 10% greater than the residual area impacted within Dartmouth Cove.

Principle 3:
Offsetting measures must provide additional benefits to the fishery.

An important management objective is to maintain productive capacity of C-R-A related species. Making available an uncontaminated substrate which offers a series of hard physically-complex surfaces will provide a regionally superior C-R-A fish habitat. This type of habitat within Halifax Harbour has previously been decreasing in overall area for several decades. Further, the proposed habitat provides a viable opportunity to increase the productive capacity of C-R-A fish species (e.g., Alewife, American Eel) as well as other marine invertebrate and vertebrate species for the entire Halifax Harbor ecosystem.

Principle 4:
Offsetting measures must generate self-sustaining benefits over the long term.

Reef balls will create new hard surface, physically-complex uncontaminated substrate and thus increase the productive capacity of the C-R-A and other fish species. The benefits are long-term; the reef ball complex proposed to be created is permanent and provides free access by C-R-A as well as other fish species thereby contributing to the well-being of lifecycle components for all regional marine species. Some algal species that colonize hard substrate can harbor a multitude of other species (Larson 2012).

Equivalency Analysis

Allowing for the off-setting habitat created by the rock slopes of the proposed Dartmouth Cove Infill project, there will be a residual impact of about 7,389 square meters, requiring offsetting. Our offsetting measure of creating fish habitat through the use of reef balls is estimated to provide about 8,100 square meters or about 10% more fish habitat area than the residual impact. These deployed reef balls will initially be colonized by marine algae. Production studies of macrophytic algal assemblages, such as *Fucus sp.* and *Ascophyllum nodosum*, and *Laminaria sp.* associated with hard substrate, exhibit high primary production. Studies have shown that their productivity is on the order of 300 to 600 gC/m^2/yr (Luning 1990; Mann 2000). In addition, studies on the intertidal macrophyte *Ascophyllum nodosum* by Larson (2012) indicated that this species alone can harbour over 70 different invertebrate species and thus contribute to the biodiversity and secondary production. Use of a hard substrate, here in the form of reef ball complexes, would elevate the overall productive capacity of the marine ecosystem. In the shallow waters of Halifax Harbour, where the reef balls would be deployed, kelps, marine algal complexes could produce, on average, 1000 $gC/m^2/yr$ (Mann 1982; 2000) or higher as shown in nearby St. Margaret's Bay where these complexes have been measured to produce in excess of 1700 $gC/m^2/yr$ (Mann 1972). Grant (1986), (see also Billerbeck et al. 2007) determined that the fine sand sediments that dominate Halifax Harbour have a primary productivity of about 22 $gC/m^2/yr$.

Cost estimate of Offsetting

The cost of the offsetting is estimated to be in the order of $90,000.00 CDN.

Monitoring and reporting conditions

All monitoring and reporting is to be done by *Clean Nova Scotia Foundation,* as presented in their Agreement with Smithers Marine Services Ltd. (see the signed contract for monitoring and reporting details in Appendix 5).

Letter of Credit

Financial security in the form of a letter of credit is required and is an agreement by a financial institution promising to pay the Receiver General of Canada, on behalf of the Department of Fisheries and Oceans an agreed upon sum of money if the conditions of the "Authorization" is not fulfilled by the Proponent. Fisheries and Oceans will determine on a case by case basis if financial security is required. An example of such a letter of credit is provided in Appendix 6.

REFERENCES

Billerbeck, M., Hans Røy, Katja Bosselmann, and Markus Huettel 2007. Benthic photosynthesis in submerged Wadden Sea intertidal flats. Estuarine, Coastal and Shelf Science, 71 (2007) 704-716.

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Barkhouse, Stephanie A

From: Matlock, Bernard
Sent: Tuesday, May 01, 2018 3:11 PM
To: 20(1) [redacted]
Cc: MacDonald, Jonathan E; Bennett, Norma J; Garroway, Kevin G; Barkhouse, Stephanie A
Subject: RE: Quick question for you

20(1) [redacted] Until I am informed otherwise, this activity requires an approval in accordance with the *Sulphide Bearing Materials Disposal Regulations*.

You can use the Industrial Approval Application form with the appended link.

https://novascotia.ca/nse/forms/docs/Application-IndustrialApproval.pdf

Regards

Bernie

From: 20(1) [redacted]@mccallumenvironmental.com]
Sent: Tuesday, May 01, 2018 2:36 PM
To: 20(1) [redacted]@mccallumenvironmental.com>; Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: Re: Quick question for you

Hi Bernie,

Just checking in on this email for you Friday. If you have a second to respond, I'd appreciate it.

20(1) [redacted]s.

20(1) [redacted]

McCallum Environmental Ltd.

20(1) [redacted]@mccallumenvironmental.com

(902) 446-8252 (office)

20(1) [redacted](cell)

From: 20(1) [redacted]@mccallumenvironmental.com>
Date: Thursday, April 26, 2018 at 5:02 PM
To: 20(1) [redacted]@mccallumenvironmental.com>, "Matlock, Bernard" <Bernard.Matlock@novascotia.ca>
Subject: Re: Quick question for you

Yup, 20(1) [redacted] right Bernie. A client is asking about process at this point— I don't know the specific location of the water lot, but its in the harbour on the Dartmouth side. They want to infill with slate.

Federal involvement DFO fisheries authorization if necessary triggered by serious harm to fish…

Sulphide Bearing regulations state:
10 (3) No person shall dispose of a sulphide bearing material in marine waters located within the jurisdiction of the Province unless the disposal is approved by the Minister.

I think I just need clarification on what that means perhaps? Where are marine waters located within the jurisdiction of the Province? New nuance for me… I thought all waters below OHWM were federal only…

Thanks a lot Bernie,
20(1) [redacted]

20(1) [redacted]

McCallum Environmental Ltd.

20(1) [redacted]@mccallumenvironmental.com

(902) 446-8252 (office)

20(1) [redacted] (cell)

From: Melanie MacDonald <melanie@mccallumenvironmental.com>
Date: Thursday, April 26, 2018 at 4:55 PM
To: "Matlock, Bernard" <Bernard.Matlock@novascotia.ca>
Cc: Meghan Milloy <meghan@mccallumenvironmental.com>
Subject: RE: Quick question for you

Absolutely. 20(1) [redacted] is the one asking the question.
I think at this point, we're not looking for a real decision, just a feel for the driver of that regulatory process so we can provide the client with a quote. If it's easies to chat on the phone again, I'm happy to chat!

20(1) [redacted]
Melanie

From: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Sent: Thursday, April 26, 2018 4:51 PM
To: Melanie MacDonald <Melanie@mccallumenvironmental.com>
Subject: RE: Quick question for you

Melanie: Thanks

Is there someone we can deal with during your leave?

20(1) [redacted]

Regards

Bernie

From: 20(1) [redacted]@mccallumenvironmental.com]
Sent: Thursday, April 26, 2018 4:47 PM
To: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Quick question for you

Hi there,

Yeah, all I know is that it's beside Kings Wharf in Dartmouth. I assume that's central region?

Thanks
20(1) [redacted]

From: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Sent: Thursday, April 26, 2018 4:44 PM
To: 20(1) [redacted]@mccallumenvironmental.com>
Subject: RE: Quick question for you

20(1) [redacted] Would you be able to tell me if the project is in our Central Region.

I was wanting to take your enquiry to management.

Regards

Bernie

From: 20(1) [redacted]@mccallumenvironmental.com]
Sent: Thursday, April 26, 2018 12:29 PM
To: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Quick question for you

Hi there Bernie,

Thanks for taking the time to run through this question with me yesterday. I have a small follow up question – I'd love if you're able to clarify today or tomorrow. 20(1) [redacted] so I'm trying to tie up any lose ends I can!

My question is that you had mentioned yesterday that if the project was located entirely in federal jurisdiction, that only federal permits would be required, but that projects like Kings Wharf also triggered a provincial IA process. Is it the connectivity to the shoreline that gives the province jurisdiction? What's the trigger for IA in that situation? My understanding is that the Project 20(1) [redacted] was asking about is very similar in nature to infill for Kings wharf, and it's located nearby (maybe even right beside?) Kings Wharf. In reviewing the IA application form, I'm not sure what 'activity' would be checked off in this situation – though I do see the waste disposal section in 5B – is that the driver?

I'm out for a lunch meeting shortly but around this afternoon and tomorrow afternoon. Would love a comment before 20(1) [redacted] tomorrow if possible – sorry to press

Thanks
20(1) [redacted]

Bernie

From 20(1) [redacted] mccallumenvironmental.com]
Sent: Thursday, April 26, 2018 4:47 PM
To: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Quick question for you

Duplicate Email Chain see page 24

[redacted]

From: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Sent: Thursday, April 26, 2018 4:44 PM
To: Melanie MacDonald <Melanie@mccallumenvironmental.com>
Subject: RE: Quick question for you

Duplicate Email Chain See Page 24

[redacted]

From: Melanie MacDonald [mailto:Melanie@mccallumenvironmental.com]
Sent: Thursday, April 26, 2018 12:29 PM
To: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Quick question for you

Duplicate Email Chain See Page 24

[redacted]

From: [redacted]
Sent: Tuesday, April 24, 2018 12:21 PM
To: 'Bernard.Matlock@novascotia.ca' <Bernard.Matlock@novascotia.ca>
Subject: Quick question for you

[redacted]

Hi Bernie,

[redacted] I just left a voicemail, but wanted to follow up with an e-mail. When you have a minute, I'd love the chance to pick your brain about provincial permitting requirements for using acidic slate as infill in the marine environment (beyond the Federal requirements, which we've got our heads wrapped around). F you could give me a call this afternoon or tomorrow morning I'd really appreciate it!

Thanks

[redacted]

[redacted]

Senior Ecologist & Field Coordinator
McCallum Environmental Ltd.
902.817.2444
902.446.8252

3300806 NS Ltd
3600 Prospect Rd
Halifax NS B3T 1Z3
HST# 742730526

Inv # 217

W. Eric Whebby Ltd
Box 38175 Burnside Dartmouth
Nova Scotia, B3B1X2

Date : December 18 ,2017

Acid Shale disposal at Canal St Site 11557 tonnes

HST

Total

[redacted] 21(1)(a)(i)

Paid in Full

[redacted] 20(1)

Environment & Labour

COMMUNICATION FORM

Inspector	S. Barkhouse	File #	HRM SLATE
Topic		Date	3/01/2018
Site		Time	~11:00AM
Contact	E.C. Jane Roma	Phone #	902-426-3649
Address	LD Marine Programs	Cell #	

Re: Disposal @ sea permits

☐ Call Received ☐ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

Jane Roma, Environment Canada

- only active disposal site (for disposal @ sea) is Dredge Material off Halifax / Point Pleasant area - NOT Dartmouth

- Dave McCabe @ 902-426-7559
E.C. Enforcement
- good potential contact

- other avenues
Transport Canada - Navigatable Waters
Habitat Destruction - DFO

Signature Original Signed

Page 1 of 1

☐ Finalized ☐ Ongoing

Environment & Labour

COMMUNICATION FORM

Inspector	S. Barkhouse	File #	Halifax Slate
Topic		Date	03/01/2018
Site	1 Canal St. Dartmouth	Time	
Contact	B. Matlock	Phone #	
Address		Cell #	

☐ Call Received ☐ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

Spoke with B. Matlock (in Person)

- No NSE approval @ that site for Marine disposal of slate

- Federal approvals are required

Original Signed

Signature

Page 1 of 1

☐ Finalized ☐ Ongoing

F:\kary\(... may 2006 and VERSION 2 - APRIL 2004

COMMUNICATION FORM

Inspector	S. Barkhouse	File #	Port Wallace SBM.
Topic	Fares & Co Approval	Date	2/28/2018
Site		Time	1547 - 1550
Contact	[redacted]	Phone #	[redacted]
Address		Cell #	

☒ Call Received ☒ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

Spoke to [redacted] of Fares & Co.
(Approval holder for Marine disposal of SBM @ Kings wharf)

- Smither's Marine is not related to their company/approval
- OCL does not represent them
- Dexter's was @ one point contracted @ their site
- Have not had any marine disposal in the last year or two
- No disposal in December 2017
- May do some disposal this Summer

Signature Original Signed

Page 1 of 1

☒ Finalized ☐ Ongoing

20(1)

Barkhouse, Stephanie A

From: Aven Cole <[redacted]@englobecorp.com>
Sent: Wednesday, February 14, 2018 11:32 AM
To: Barkhouse, Stephanie A
Subject: RE: Slate Removal - Port Wallace, follow-up question

Hi Stephanie, sorry for the delay.

When I went back through my notes for 2016, there wasn't much. This issue was identified during due diligence efforts by Clayton Developments for purchase and sale activities. I'm not exactly sure when it arose during Clayton Developments discussions with the land owner, but it ultimately didn't get resolved until this recent work by Bruce last fall. If you need exact dates of when Whebbys/Bruce were made aware, you are probably best to follow up directly with Bruce and/or his contact for Whebbys.

Regards,
Aven

Aven Cole, M.Sc.E., P.Eng.
Project Manager
Environmental Engineering

Englobe
97 Troop Avenue
Dartmouth (Nova Scotia) B3B 2A7
T 902.468.6486, ext.[redacted] / cell. [redacted]
F 902.468.4919
[redacted]@englobecorp.com
www.englobecorp.com

Working Together for Safety

From: Barkhouse, Stephanie A [mailto:Stephanie.Barkhouse@novascotia.ca]
Sent: Monday, February 12, 2018 2:48 PM
To: Aven Cole <[redacted]@englobecorp.com>
Subject: Slate Removal - Port Wallace, follow-up question

Hi Aven,

As per our phone conversation, I have one follow-up question in regards to the slate removal in Port Wallace and Englobe's role:

At what point did the property owner or consultant for the property owner (Bruce MacNeil of Bruce MacNeil Engineering Ltd.) become aware of the 2016 slate sampling program (and results) completed by Englobe? Please be as specific as possible when outlining with whom you spoke and when.

Thanks in advance,

Stephanie

NOVA SCOTIA
Environment

Stephanie Barkhouse
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
(902) 223-0590
Stephanie.Barkhouse@novascotia.ca

20(1)

COMMUNICATION FORM

Inspector	S. Barkhouse	**File #**	
Topic	Slate Removal	**Date**	2/12/2018
Site	Port Wallace	**Time**	~1440 - 1445
Contact	Aven Cole	**Phone #**	
Address		**Cell #**	[redacted]

☒ Call Received ☒ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

SAB -> AC, left voicemail ~1340
AC -> SAB ~1440
- Englobe was on site the last day to confirm the slate pile had been removed
- She had thought B. MacNeil had really blown the whole thing out of proportion
- the slate was gone and bare soil remained "down to bare soil"
- Not related to SW call previously reported (drains more towards Waverly Rd then towards Barry's Run)
- Englobe did not prepare a report
- Agreed verbally to BM's statement, "Aven at Englobe is not preparing a report, but did conduct peer review of the work. It is understood that Aven has no issues."
- Also Englobe's position nothing further was warranted in regards to the slate.
email provided for additional question:
[redacted]@englobecorp.com

Signature Original Signed

Page 1 of 1

☐ Finalized ☐ Ongoing

Barkhouse, Stephanie A

From: DeGrass, Derek J
Sent: Tuesday, February 06, 2018 9:29 AM
To: Barkhouse, Stephanie A
Subject: RE: Information Request - Compliance Action re 2011-077906

I thought I responded to her, but can't locate my email. Regardless, it appears Donna never followed through her proposed action at the time.

From: Barkhouse, Stephanie A
Sent: Friday, February 02, 2018 2:46 PM
To: DeGrass, Derek J <Derek.DeGrass@novascotia.ca>
Subject: Information Request - Compliance Action re 2011-077906

Hey Derek,

Janet had sent you an email titled Compliance Action - Information Request re 2011-077906, dated December 18, 2017 (with attachments)

Could you forward me a copy of your response if applicable?

Thanks,

Stephanie

NOVA SCOTIA
Environment

Stephanie Barkhouse
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 223-0590
✉ Stephanie.Barkhouse@novascotia.ca

20(1)

Barkhouse, Stephanie A

From:	Bruce MacNeil <[redacted]@MacNeilEng.com>
Sent:	Monday, February 05, 2018 8:26 AM
To:	Barkhouse, Stephanie A
Subject:	RE: Slate Transport, Port Wallace Update

Good. And if you have any further questions, just let me know. I am sure I can answer anything that comes up.

From: Barkhouse, Stephanie A [mailto:Stephanie.Barkhouse@novascotia.ca]
Sent: February 5, 2018 8:20 AM
To: Bruce MacNeil <[redacted]@MacNeilEng.com>
Subject: RE: Slate Transport, Port Wallace Update

Received, thanks Bruce.

- Stephanie

NOVA SCOTIA
Environment

Stephanie Barkhouse
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 223-0590
Stephanie.Barkhouse@novascotia.ca

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From: Bruce MacNeil [mailto[redacted]@MacNeilEng.com]
Sent: Friday, February 02, 2018 4:34 PM
To: Barkhouse, Stephanie A <Stephanie.Barkhouse@novascotia.ca>
Subject: RE: Slate Transport, Port Wallace Update

Hi Stephanie,

See below and attached.

From: Barkhouse, Stephanie A [mailto:Stephanie.Barkhouse@novascotia.ca]
Sent: February 2, 2018 3:54 PM
To: Bruce MacNeil <[redacted]@MacNeilEng.com>
Subject: RE: Slate Transport, Port Wallace Update

Hi Bruce,

My apologies for the delay in my response. In regard to your question on whether there is an open file on this incident, inspection reports will be entered into the system, hopefully next week.

As I mentioned on the phone yesterday, I have a number of questions/follow up items below:

From the January 29, 2018 Slate Removal Summary Report:

- Please provide an official receipt of slate material from the Dartmouth facility (from the 2017 slate removal project);

See attached file, CCF02012018.pdf. This invoice together with the spreadsheets in our report is everything received

- Please provide the laboratory certificates for the analytical work completed (from the 2017 slate removal project);

See attached files provided by Maxxam.

- Given the amount of time the material was on stored at the Port Wallace Site, did your investigation also include a review of down gradient receptors and potential impacts (such as impacts to groundwater)? If so please include your findings, if not please provide your rationale as to why these were not included;

We did not sample groundwater or any down-gradient receptors. We wanted to see the results of the soil samples from below the stockpile first. These results were acceptable. Also, the site is non-potable groundwater use, so that was a factor also. We concluded (as did others) that nothing further was warranted.

- Your report indicates Englobe was on Site representing the potential buyer; did they also compile a report based on and/or including the slate removal program? If so, are you able to provide a copy to the department to verify the findings mirror your own?

The Purchaser, Clayton Developments, is now saying that they didn't intend for EnGlobe to engage in preparation of a formal report. Clayton Developments is happy with the work we completed for the Vendor. And EnGlobe informed Clayton Developments that they are satisfied.

I have additional questions in regards to the original approval, however I will direct those to/through HRM. That is all I have for now. Please confirm receipt of this email, and provide an approximate timeline for your response. I will likely formalize this request for information next week and would like to know how much time you will reasonably need to respond.

Regards,

Stephanie

NOVA SCOTIA
Environment

Stephanie Barkhouse
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 223-0590
Stephanie.Barkhouse@novascotia.ca

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From: Bruce MacNeil [redacted]@MacNeilEng.com]
Sent: Friday, February 02, 2018 3:48 PM
To: Barkhouse, Stephanie A <Stephanie.Barkhouse@novascotia.ca>
Subject: RE: Slate Transport, Port Wallace Update

Hi Stephanie,

Just checking in with you. You were going to email comments on our Port Wallace report.

Aven at EnGlobe is not preparing a report, but did conduct peer review of the work. It is understood that Aven has no issues. Their client, Clayton Developments, is satisfied that the slate issue has been dealt with. I talked to Scott MacCallum at Clayton Development on this today.

Please email me any other comments/questions when possible as the Vendor and Purchaser are closing the large land deal in the coming days.

Thanks.

Bruce MacNeil, P.Eng.
Senior Engineer
Cell: 902 430-2830

BME Bruce MacNeil Engineering Ltd.

81 Terradore Lane · Hammonds Plains, NS B4B 1S7 · Main: 902 430-2830

From: Barkhouse, Stephanie A [mailto:Stephanie.Barkhouse@novascotia.ca]
Sent: January 30, 2018 12:02 PM
To: Bruce MacNeil [redacted]@MacNeilEng.com>
Cc: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Slate Transport, Port Wallace Update

Hi Bruce,

I am currently covering Janet Moore's area and am looking for an update in regards to the report(s) for the removal of sulphide bearing materials stored at Whebby's/Port Wallace Subdivision.

Thanks in advance,

Stephanie

Environment & Labour

COMMUNICATION FORM

Inspector	S. Barkhouse	File #	
Topic	SLATE Removal	Date	Feb 5, 2018
Site	Port Wallace Whebby Lands	Time	0940 AM
Contact	Andrew Bone	Phone #	490-6743
Address	HRM Planning	Cell #	

☒ Call Received ☐ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

- call made message left (Feb 2, 2018 ~1600hrs)
- AB called SAB 02/5/2018 ~ 940 AM
- SAB read book notes from 02/02/2018:
  - material has been removed
  - A summary report has been submitted to the department
  - Additional info was requested / received in regard to the summary report
- Also let him know I had additional questions in regard to the initial slate removal from Approval Site
- SAB asked if HRM engineering would be the appropriate place to send these questions
- AB thought that that they would be best suited to receive those questions
- SAB also noted inspection report would be entered for the PIDs where material was stored

Signature Original Signed

Page 1 of 1

☐ Finalized ☐ Ongoing

20(1)

Barkhouse, Stephanie A

From: Bruce MacNeil [redacted]@MacNeilEng.com>
Sent: Friday, February 02, 2018 4:34 PM
To: Barkhouse, Stephanie A
Subject: RE: Slate Transport, Port Wallace Update
Attachments: CCF02012018.pdf; B7S9509V1-R2018-01-02_09-32-00_R006.pdf; B7T2016V1-R2018-01-04_10-21-05_R006.pdf

Hi Stephanie,

See below and attached.

From: Barkhouse, Stephanie A [mailto:Stephanie.Barkhouse@novascotia.ca]
Sent: February 2, 2018 3:54 PM
To: Bruce MacNeil [redacted]@MacNeilEng.com>
Subject: RE: Slate Transport, Port Wallace Update

Hi Bruce,

My apologies for the delay in my response. In regard to your question on whether there is an open file on this incident, inspection reports will be entered into the system, hopefully next week.

As I mentioned on the phone yesterday, I have a number of questions/follow up items below:

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- Please provide the laboratory certificates for the analytical work completed (from the 2017 slate removal project);

See attached files provided by Maxxam.

- Given the amount of time the material was on stored at the Port Wallace Site, did your investigation also include a review of down gradient receptors and potential impacts (such as impacts to groundwater)? If so please include your findings, if not please provide your rationale as to why these were not included;

We did not sample groundwater or any down-gradient receptors. We wanted to see the results of the soil samples from below the stockpile first. These results were acceptable. Also, the site is non-potable groundwater use, so that was a factor also. We concluded (as did others) that nothing further was warranted.

- Your report indicates Englobe was on Site representing the potential buyer; did they also compile a report based on and/or including the slate removal program? If so, are you able to provide a copy to the department to verify the findings mirror your own?

20(1)

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I have additional questions in regards to the original approval, however I will direct those to/through HRM. That is all I have for now. Please confirm receipt of this email, and provide an approximate timeline for your response. I will likely formalize this request for information next week and would like to know how much time you will reasonably need to respond.

Regards,

Stephanie

NOVA SCOTIA
Environment

Stephanie Barkhouse
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
(902) 223-0590
Stephanie.Barkhouse@novascotia.ca

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From: Bruce MacNeil [redacted]@MacNeilEng.com]
Sent: Friday, February 02, 2018 3:48 PM
To: Barkhouse, Stephanie A <Stephanie.Barkhouse@novascotia.ca>
Subject: RE: Slate Transport, Port Wallace Update

Duplicate Email Chain *See Page 37*

[redacted]

Duplicate Email Chain See Page 37

[redacted]

From: Barkhouse, Stephanie A [mailto:Stephanie.Barkhouse@novascotia.ca]
Sent: January 30, 2018 12:02 PM
To: Bruce MacNeil <bmacneil@MacNeilEng.com>
Cc: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Slate Transport, Port Wallace Update

Duplicate Email Chain See Page 37

[redacted]

NOVA SCOTIA
Environment

Stephanie Barkhouse
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 223-0590
Stephanie.Barkhouse@novascotia.ca

Moore, Janet L

From: Moore, Janet L
Sent: Monday, December 18, 2017 1:46 PM
To: DeGrass, Derek J
Subject: compliance action - information request re: 2011-077906
Attachments: DOC073.pdf; DOC072.pdf

14(1)

Hi Derek

[redacted]

Thanks, Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

Maxxam
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20(1)

Your Project #: WEBBY
Site Location: DARTMOUTH, NS
Your C.O.C. #: D 24895

Attention: Bruce MacNeil

Bruce MacNeil Engineering Ltd. (BME)
81 Terradore Lane
Hammonds Plains, NS
CANADA B4B 1S7

Report Date: 2018/01/04
Report #: R4928238
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7T2016
Received: 2017/12/22, 15:47

Sample Matrix: Soil
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	1	2017/12/28	2017/12/28	ATL SOP 00058	EPA 6020A R1 m
Metals Solids Acid Extr. ICPMS	1	2017/12/28	2017/12/29	ATL SOP 00058	EPA 6020A R1 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key [redacted]

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rachael Mansfield, Customer Service - Bedford
Email [redacted]@maxxam.ca
Phone# (902)420-0203
==

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
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Maxxam Job #: B7T2016
Report Date: 2018/01/04

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Site Location: DARTMOUTH, NS

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FVE146	FVE147		
Sampling Date		2017/12/21 09:30	2017/12/21 09:30		
COC Number		D 24895	D 24895		
	UNITS	B1	B2	RDL	QC Batch
Metals					
Acid Extractable Aluminum (Al)	mg/kg	17000	16000	10	5332949
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	2.0	5332949
Acid Extractable Arsenic (As)	mg/kg	21	8.7	2.0	5332949
Acid Extractable Barium (Ba)	mg/kg	30	16	5.0	5332949
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	2.0	5332949
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	2.0	5332949
Acid Extractable Boron (B)	mg/kg	ND	ND	50	5332949
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	0.30	5332949
Acid Extractable Chromium (Cr)	mg/kg	22	18	2.0	5332949
Acid Extractable Cobalt (Co)	mg/kg	18	8.2	1.0	5332949
Acid Extractable Copper (Cu)	mg/kg	33	17	2.0	5332949
Acid Extractable Iron (Fe)	mg/kg	31000	23000	50	5332949
Acid Extractable Lead (Pb)	mg/kg	20	17	0.50	5332949
Acid Extractable Lithium (Li)	mg/kg	25	23	2.0	5332949
Acid Extractable Manganese (Mn)	mg/kg	980	380	2.0	5332949
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	0.10	5332949
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	2.0	5332949
Acid Extractable Nickel (Ni)	mg/kg	33	23	2.0	5332949
Acid Extractable Rubidium (Rb)	mg/kg	9.5	5.6	2.0	5332949
Acid Extractable Selenium (Se)	mg/kg	ND	ND	1.0	5332949
Acid Extractable Silver (Ag)	mg/kg	ND	ND	0.50	5332949
Acid Extractable Strontium (Sr)	mg/kg	9.3	5.6	5.0	5332949
Acid Extractable Thallium (Tl)	mg/kg	0.12	ND	0.10	5332949
Acid Extractable Tin (Sn)	mg/kg	ND	ND	2.0	5332949
Acid Extractable Uranium (U)	mg/kg	0.64	0.49	0.10	5332949
Acid Extractable Vanadium (V)	mg/kg	15	14	2.0	5332949
Acid Extractable Zinc (Zn)	mg/kg	69	49	5.0	5332949

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7T2016
Report Date: 2018/01/04

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Site Location: DARTMOUTH, NS

GENERAL COMMENTS

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

Package 1	7.3°C

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7T2016
Report Date: 2018/01/04

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Site Location: DARTMOUTH, NS

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5332949	BAN	Matrix Spike (FVE146-01)	Acid Extractable Antimony (Sb)	2017/12/29		98	%	75 - 125
			Acid Extractable Arsenic (As)	2017/12/29		80	%	75 - 125
			Acid Extractable Barium (Ba)	2017/12/29		80	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/12/29		94	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/12/29		96	%	75 - 125
			Acid Extractable Boron (B)	2017/12/29		89	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/12/29		95	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/12/29		92	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/12/29		89	%	75 - 125
			Acid Extractable Copper (Cu)	2017/12/29		95	%	75 - 125
			Acid Extractable Lead (Pb)	2017/12/29		90	%	75 - 125
			Acid Extractable Lithium (Li)	2017/12/29		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/12/29		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/12/29		92	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/12/29		99	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/12/29		95	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/12/29		98	%	75 - 125
			Acid Extractable Selenium (Se)	2017/12/29		94	%	75 - 125
			Acid Extractable Silver (Ag)	2017/12/29		102	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/12/29		101	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/12/29		97	%	75 - 125
			Acid Extractable Tin (Sn)	2017/12/29		98	%	75 - 125
			Acid Extractable Uranium (U)	2017/12/29		95	%	75 - 125
			Acid Extractable Vanadium (V)	2017/12/29		95	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/12/29		NC	%	75 - 125
5332949	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2017/12/28		103	%	75 - 125
			Acid Extractable Arsenic (As)	2017/12/28		97	%	75 - 125
			Acid Extractable Barium (Ba)	2017/12/28		94	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/12/28		92	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/12/28		99	%	75 - 125
			Acid Extractable Boron (B)	2017/12/28		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/12/28		98	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/12/28		94	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/12/28		96	%	75 - 125
			Acid Extractable Copper (Cu)	2017/12/28		97	%	75 - 125
			Acid Extractable Lead (Pb)	2017/12/28		95	%	75 - 125
			Acid Extractable Lithium (Li)	2017/12/28		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/12/28		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/12/28		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/12/28		102	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/12/28		99	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/12/28		98	%	75 - 125
			Acid Extractable Selenium (Se)	2017/12/28		96	%	75 - 125
			Acid Extractable Silver (Ag)	2017/12/28		103	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/12/28		96	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/12/28		99	%	75 - 125
			Acid Extractable Tin (Sn)	2017/12/28		105	%	75 - 125
			Acid Extractable Uranium (U)	2017/12/28		95	%	75 - 125
			Acid Extractable Vanadium (V)	2017/12/28		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/12/28		100	%	75 - 125
5332949	BAN	Method Blank	Acid Extractable Aluminum (Al)	2017/12/28	ND, RDL=10		mg/kg	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-4[illegible] Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B7T2016
Report Date: 2018/01/04

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Site Location: DARTMOUTH, NS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Antimony (Sb)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Arsenic (As)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Barium (Ba)	2017/12/28	ND, RDL=5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Boron (B)	2017/12/28	ND, RDL=50		mg/kg	
			Acid Extractable Cadmium (Cd)	2017/12/28	ND, RDL=0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2017/12/28	ND, RDL=1.0		mg/kg	
			Acid Extractable Copper (Cu)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Iron (Fe)	2017/12/28	ND, RDL=50		mg/kg	
			Acid Extractable Lead (Pb)	2017/12/28	ND, RDL=0.50		mg/kg	
			Acid Extractable Lithium (Li)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2017/12/28	ND, RDL=0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Selenium (Se)	2017/12/28	ND, RDL=1.0		mg/kg	
			Acid Extractable Silver (Ag)	2017/12/28	ND, RDL=0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2017/12/28	ND, RDL=5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2017/12/28	ND, RDL=0.10		mg/kg	
			Acid Extractable Tin (Sn)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Uranium (U)	2017/12/28	ND, RDL=0.10		mg/kg	
			Acid Extractable Vanadium (V)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2017/12/28	ND, RDL=5.0		mg/kg	
5332949	BAN	RPD [FVE146-01]	Acid Extractable Aluminum (Al)	2017/12/28	0.54		%	35

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Maxxam Job #: B7T2016
Report Date: 2018/01/04

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Site Location: DARTMOUTH, NS

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Antimony (Sb)	2017/12/28	NC		%	35
			Acid Extractable Arsenic (As)	2017/12/28	39 (1)		%	35
			Acid Extractable Barium (Ba)	2017/12/28	40 (1)		%	35
			Acid Extractable Beryllium (Be)	2017/12/28	NC		%	35
			Acid Extractable Bismuth (Bi)	2017/12/28	NC		%	35
			Acid Extractable Boron (B)	2017/12/28	NC		%	35
			Acid Extractable Cadmium (Cd)	2017/12/28	NC		%	35
			Acid Extractable Chromium (Cr)	2017/12/28	1.3		%	35
			Acid Extractable Cobalt (Co)	2017/12/28	6.9		%	35
			Acid Extractable Copper (Cu)	2017/12/28	0.73		%	35
			Acid Extractable Iron (Fe)	2017/12/28	0.39		%	35
			Acid Extractable Lead (Pb)	2017/12/28	3.1		%	35
			Acid Extractable Lithium (Li)	2017/12/28	0.31		%	35
			Acid Extractable Manganese (Mn)	2017/12/28	17		%	35
			Acid Extractable Mercury (Hg)	2017/12/28	NC		%	35
			Acid Extractable Molybdenum (Mo)	2017/12/28	NC		%	35
			Acid Extractable Nickel (Ni)	2017/12/28	1.2		%	35
			Acid Extractable Rubidium (Rb)	2017/12/28	1.1		%	35
			Acid Extractable Selenium (Se)	2017/12/28	NC		%	35
			Acid Extractable Silver (Ag)	2017/12/28	NC		%	35
			Acid Extractable Strontium (Sr)	2017/12/28	2.8		%	35
			Acid Extractable Thallium (Tl)	2017/12/28	31		%	35
			Acid Extractable Tin (Sn)	2017/12/28	16		%	35
			Acid Extractable Uranium (U)	2017/12/28	6.3		%	35
			Acid Extractable Vanadium (V)	2017/12/28	4.0		%	35
			Acid Extractable Zinc (Zn)	2017/12/28	0.42		%	35

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

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

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

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

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

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

(1) Poor RPD due to sample inhomogeneity. < 10 % of compounds in multi-component analysis in violation.

VALIDATION SIGNATURE PAGE

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

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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20(1)

Your Project #: WEBBY
Your C.O.C. #: 644045-01-01

Attention: Amanda Hickey

Bruce MacNeil Engineering Ltd. (BME)
81 Terradore Lane
Hammonds Plains, NS
CANADA B4B 1S7

Report Date: 2018/01/02
Report #: R4926058
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B7S9509
Received: 2017/12/20, 11:36

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	8	2017/12/27	2017/12/28	ATL SOP 00058	EPA 6020A R1 m

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key [redacted]

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Rachael Mansfield, Customer Service - Bedford
Email [redacted]@maxxam.ca
Phone# (902)420-0203

==

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Maxxam Job #: B7S9509
Report Date: 2018/01/02

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Sampler Initials: AH

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FUR266	FUR267	FUR268	FUR269	FUR270		
Sampling Date		2017/12/18 14:00	2017/12/18 14:20	2017/12/18 14:40	2017/12/18 12:35	2017/12/18 12:50		
COC Number		644045-01-01	644045-01-01	644045-01-01	644045-01-01	644045-01-01		
	UNITS	TP1	TP2	TP3	TP4	TP5	RDL	QC Batch
Metals								
Acid Extractable Aluminum (Al)	mg/kg	11000	6100	11000	8400	6700	10	5331387
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	ND	2.0	5331387
Acid Extractable Arsenic (As)	mg/kg	18	11	15	16	25	2.0	5331387
Acid Extractable Barium (Ba)	mg/kg	65	36	55	76	31	5.0	5331387
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND	2.0	5331387
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND	2.0	5331387
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	ND	50	5331387
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND	0.30	5331387
Acid Extractable Chromium (Cr)	mg/kg	14	9.4	15	14	12	2.0	5331387
Acid Extractable Cobalt (Co)	mg/kg	15	7.6	8.2	14	7.2	1.0	5331387
Acid Extractable Copper (Cu)	mg/kg	20	13	17	25	18	2.0	5331387
Acid Extractable Iron (Fe)	mg/kg	20000	13000	20000	21000	19000	50	5331387
Acid Extractable Lead (Pb)	mg/kg	12	8.5	14	10	9.5	0.50	5331387
Acid Extractable Lithium (Li)	mg/kg	18	12	18	19	13	2.0	5331387
Acid Extractable Manganese (Mn)	mg/kg	490	400	550	690	450	2.0	5331387
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND	0.10	5331387
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND	2.0	5331387
Acid Extractable Nickel (Ni)	mg/kg	26	14	19	23	13	2.0	5331387
Acid Extractable Rubidium (Rb)	mg/kg	6.6	4.1	6.2	5.8	4.3	2.0	5331387
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	1.0	5331387
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	ND	0.50	5331387
Acid Extractable Strontium (Sr)	mg/kg	7.0	5.0	8.2	6.6	ND	5.0	5331387
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND	0.10	5331387
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	ND	ND	2.0	5331387
Acid Extractable Uranium (U)	mg/kg	0.59	0.46	0.56	1.0	0.47	0.10	5331387
Acid Extractable Vanadium (V)	mg/kg	16	11	18	14	13	2.0	5331387
Acid Extractable Zinc (Zn)	mg/kg	53	32	53	52	35	5.0	5331387

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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Maxxam Job #: B7S9509
Report Date: 2018/01/02

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Sampler Initials: AH

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		FUR271	FUR272	FUR273		
Sampling Date		2017/12/18 13:10	2017/12/18 13:30	2017/12/18 13:50		
COC Number		644045-01-01	644045-01-01	644045-01-01		
	UNITS	TP6	TP7	TP8	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	8600	12000	7200	10	5331387
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	2.0	5331387
Acid Extractable Arsenic (As)	mg/kg	14	8.3	17	2.0	5331387
Acid Extractable Barium (Ba)	mg/kg	62	18	54	5.0	5331387
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	2.0	5331387
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	2.0	5331387
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	50	5331387
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	0.30	5331387
Acid Extractable Chromium (Cr)	mg/kg	12	16	13	2.0	5331387
Acid Extractable Cobalt (Co)	mg/kg	8.9	11	9.4	1.0	5331387
Acid Extractable Copper (Cu)	mg/kg	21	25	21	2.0	5331387
Acid Extractable Iron (Fe)	mg/kg	18000	21000	20000	50	5331387
Acid Extractable Lead (Pb)	mg/kg	10	16	9.3	0.50	5331387
Acid Extractable Lithium (Li)	mg/kg	16	21	15	2.0	5331387
Acid Extractable Manganese (Mn)	mg/kg	630	520	460	2.0	5331387
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	0.10	5331387
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	2.0	5331387
Acid Extractable Nickel (Ni)	mg/kg	17	22	16	2.0	5331387
Acid Extractable Rubidium (Rb)	mg/kg	5.8	6.8	4.5	2.0	5331387
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	1.0	5331387
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	0.50	5331387
Acid Extractable Strontium (Sr)	mg/kg	8.1	6.7	6.1	5.0	5331387
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	0.10	5331387
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	2.0	5331387
Acid Extractable Uranium (U)	mg/kg	0.52	0.59	0.51	0.10	5331387
Acid Extractable Vanadium (V)	mg/kg	14	13	13	2.0	5331387
Acid Extractable Zinc (Zn)	mg/kg	43	48	38	5.0	5331387

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected

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GENERAL COMMENTS

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

Package 1	6.7°C

Results relate only to the items tested.

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Maxxam Job #: B759509
Report Date: 2018/01/02

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Sampler Initials: AH

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
5331387	MLB	Matrix Spike [FUR271-01]	Acid Extractable Antimony (Sb)	2017/12/28		100	%	75 - 125
			Acid Extractable Arsenic (As)	2017/12/28		98	%	75 - 125
			Acid Extractable Barium (Ba)	2017/12/28		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/12/28		104	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/12/28		100	%	75 - 125
			Acid Extractable Boron (B)	2017/12/28		99	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/12/28		101	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/12/28		98	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/12/28		99	%	75 - 125
			Acid Extractable Copper (Cu)	2017/12/28		92	%	75 - 125
			Acid Extractable Lead (Pb)	2017/12/28		102	%	75 - 125
			Acid Extractable Lithium (Li)	2017/12/28		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/12/28		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/12/28		96	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/12/28		97	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/12/28		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/12/28		98	%	75 - 125
			Acid Extractable Selenium (Se)	2017/12/28		94	%	75 - 125
			Acid Extractable Silver (Ag)	2017/12/28		100	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/12/28		108	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/12/28		102	%	75 - 125
			Acid Extractable Tin (Sn)	2017/12/28		99	%	75 - 125
			Acid Extractable Uranium (U)	2017/12/28		106	%	75 - 125
			Acid Extractable Vanadium (V)	2017/12/28		103	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/12/28		99	%	75 - 125
5331387	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2017/12/28		108	%	75 - 125
			Acid Extractable Arsenic (As)	2017/12/28		96	%	75 - 125
			Acid Extractable Barium (Ba)	2017/12/28		98	%	75 - 125
			Acid Extractable Beryllium (Be)	2017/12/28		98	%	75 - 125
			Acid Extractable Bismuth (Bi)	2017/12/28		96	%	75 - 125
			Acid Extractable Boron (B)	2017/12/28		96	%	75 - 125
			Acid Extractable Cadmium (Cd)	2017/12/28		98	%	75 - 125
			Acid Extractable Chromium (Cr)	2017/12/28		96	%	75 - 125
			Acid Extractable Cobalt (Co)	2017/12/28		97	%	75 - 125
			Acid Extractable Copper (Cu)	2017/12/28		94	%	75 - 125
			Acid Extractable Lead (Pb)	2017/12/28		99	%	75 - 125
			Acid Extractable Lithium (Li)	2017/12/28		100	%	75 - 125
			Acid Extractable Manganese (Mn)	2017/12/28		99	%	75 - 125
			Acid Extractable Mercury (Hg)	2017/12/28		100	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2017/12/28		91	%	75 - 125
			Acid Extractable Nickel (Ni)	2017/12/28		97	%	75 - 125
			Acid Extractable Rubidium (Rb)	2017/12/28		95	%	75 - 125
			Acid Extractable Selenium (Se)	2017/12/28		93	%	75 - 125
			Acid Extractable Silver (Ag)	2017/12/28		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2017/12/28		103	%	75 - 125
			Acid Extractable Thallium (Tl)	2017/12/28		101	%	75 - 125
			Acid Extractable Tin (Sn)	2017/12/28		103	%	75 - 125
			Acid Extractable Uranium (U)	2017/12/28		99	%	75 - 125
			Acid Extractable Vanadium (V)	2017/12/28		97	%	75 - 125
			Acid Extractable Zinc (Zn)	2017/12/28		104	%	75 - 125
5331387	MLB	Method Blank	Acid Extractable Aluminum (Al)	2017/12/28	ND, RDL=10		mg/kg	
			Acid Extractable Antimony (Sb)	2017/12/28	ND, RDL=2.0		mg/kg	

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Maxxam Job #: B7S9509
Report Date: 2018/01/02

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Sampler Initials: AH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Arsenic (As)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Barium (Ba)	2017/12/28	ND, RDL=5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Boron (B)	2017/12/28	ND, RDL=50		mg/kg	
			Acid Extractable Cadmium (Cd)	2017/12/28	ND, RDL=0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2017/12/28	ND, RDL=1.0		mg/kg	
			Acid Extractable Copper (Cu)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Iron (Fe)	2017/12/28	ND, RDL=50		mg/kg	
			Acid Extractable Lead (Pb)	2017/12/28	ND, RDL=0.50		mg/kg	
			Acid Extractable Lithium (Li)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2017/12/28	ND, RDL=0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Selenium (Se)	2017/12/28	ND, RDL=1.0		mg/kg	
			Acid Extractable Silver (Ag)	2017/12/28	ND, RDL=0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2017/12/28	ND, RDL=5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2017/12/28	ND, RDL=0.10		mg/kg	
			Acid Extractable Tin (Sn)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Uranium (U)	2017/12/28	ND, RDL=0.10		mg/kg	
			Acid Extractable Vanadium (V)	2017/12/28	ND, RDL=2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2017/12/28	ND, RDL=5.0		mg/kg	
5331387	MLB	RPD [FUR271-01]	Acid Extractable Aluminum (Al)	2017/12/28	3.7		%	35
			Acid Extractable Antimony (Sb)	2017/12/28	NC		%	35
			Acid Extractable Arsenic (As)	2017/12/28	4.2		%	35
			Acid Extractable Barium (Ba)	2017/12/28	3.9		%	35

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Maxxam Job #: B7S9509
Report Date: 2018/01/02

Bruce MacNeil Engineering Ltd. (BME)
Client Project #: WEBBY
Sampler Initials: AH

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Beryllium (Be)	2017/12/28	NC		%	35
			Acid Extractable Bismuth (Bi)	2017/12/28	NC		%	35
			Acid Extractable Boron (B)	2017/12/28	NC		%	35
			Acid Extractable Cadmium (Cd)	2017/12/28	NC		%	35
			Acid Extractable Chromium (Cr)	2017/12/28	1.7		%	35
			Acid Extractable Cobalt (Co)	2017/12/28	3.9		%	35
			Acid Extractable Copper (Cu)	2017/12/28	7.2		%	35
			Acid Extractable Iron (Fe)	2017/12/28	1.1		%	35
			Acid Extractable Lead (Pb)	2017/12/28	4.1		%	35
			Acid Extractable Lithium (Li)	2017/12/28	3.9		%	35
			Acid Extractable Manganese (Mn)	2017/12/28	1.2		%	35
			Acid Extractable Mercury (Hg)	2017/12/28	NC		%	35
			Acid Extractable Molybdenum (Mo)	2017/12/28	NC		%	35
			Acid Extractable Nickel (Ni)	2017/12/28	2.4		%	35
			Acid Extractable Rubidium (Rb)	2017/12/28	5.4		%	35
			Acid Extractable Selenium (Se)	2017/12/28	NC		%	35
			Acid Extractable Silver (Ag)	2017/12/28	NC		%	35
			Acid Extractable Strontium (Sr)	2017/12/28	5.2		%	35
			Acid Extractable Thallium (Tl)	2017/12/28	NC		%	35
			Acid Extractable Tin (Sn)	2017/12/28	NC		%	35
			Acid Extractable Uranium (U)	2017/12/28	3.6		%	35
			Acid Extractable Vanadium (V)	2017/12/28	4.5		%	35
			Acid Extractable Zinc (Zn)	2017/12/28	3.6		%	35

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

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

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

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

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

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

VALIDATION SIGNATURE PAGE

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

Original Signed

Kevin MacDonald, Inorganics Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

3300806 NS Ltd
3600 Prospect Rd
Halifax NS B3T 1Z3
HST# 742730526

Inv # 217

W. Eric Whebby Ltd
Box 38175 Burnside Dartmouth
Nova Scotia, B3B1X2

Date : December 18 ,2017

Acid Shale disposal at Canal St Site 11557 tonnes
HST
Total

[redacted] 21(1)(a)(i)

Paid in Full

[redacted] 20(1)

• NS Limited company status - revoked for non payment.

COMMUNICATION FORM

Inspector	S Barkhouse		
Topic	Port Wallace Slate Removal	**File #**	
Site	Port Wallace Whebby lands	**Date**	02/01/2018 (Feb1)
Contact	Bruce MacNeil	**Time**	~14:00 hrs
Address		**Phone #**	
		Cell #	

☒ Call Received ☐ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

- Bruce MacNeil called SAB to confirm receipt of Slate Removal Summary Report
- SAB confirmed yes, and let him know I was currently reviewing the file and hoped to follow up with him shortly
- Re: ↔ an official receipt of material (for slate removed in 2017 from Whebby lands)
  ↔ receipt of original material (slate from bus terminal) to Kings Wharf
  ↔ lab certificates for analytical data from 2017 summary report
  ↔ also enquired as to Englobes 2017 slate report (that his report indicated may exist)
- MacNeil said he didn't think they (Englobe) had written a report, but had sent staff to occasionally supervise the work
- Aven Cole was listed in Englobe 2016 slate testing report, SAB asked if she would be the contact

Signature Original Signed

Page 1 of 2

☐ Finalized ☐ Ongoing

Environment & Labour

COMMUNICATION FORM

Inspector	S.A.B		
Topic		File #	
Site		Date	02/01/2018 (Feb 1)
Contact		Time	~1400hrs
Address		Phone #	
		Cell #	

☐ Call Received ☐ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

- MacNeil confirmed yes

Signature Original Signed

Page 2 of 2

☐ Finalized ☐ Ongoing

F:\kerry\Communicationform may 2006 and VERSION 2 - APRIL 2004

20(1)

Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS B4B 1S7
902-430-2830

January 29, 2018

[redacted]
W. Eric Whebby Limited
Via email

Dear [redacted]

Re: Summary Report – Slate Removal
Port Wallace Subdivision Lands, Waverley, NS

This is the summary report on the slate removal from the Port Wallace Subdivision Lands in Waverley prepared by Bruce MacNeil Engineering Ltd (BME). The work was conducted in accordance with the Joint Protocol which is part of the Amending Agreement between W. Eric Whebby Limited, Frank Whebby Limited, and Blue Chip Development Limited ("Vendor") and Port Wallace Holdings Limited ("Purchaser").

MAIN FINDINGS AND RECOMMENDATIONS

The main findings and results of the Slate Removal Program are as follows:

- The Slate Removal Work is now complete.
- The slate has been removed entirely from the Port Wallace Subdivision Lands and disposed at Dartmouth Cove, which is a licenced facility.
- Test pits and environmental sampling were conducted to evaluate the soils below the slate stockpile. The results meet the regulations.
- There are no further issues related to the slate stockpile.

BACKGROUND

Bridge Terminal Project

The slate material was originally exported from the Dartmouth Bridge Terminal project in 2011 and taken to lands that are now part of the proposed Port Wallace Subdivision Lands in Waverley. The Dartmouth Bridge Terminal site was former parkland, so there was no source for environmental contamination from the site.

For the Dartmouth Bridge Terminal project in 2011, the slate was testing extensively. The upper weathered portion of the slate bedrock was below the provincial regulation of 0.4% sulphide sulphur. In 2011, the results were documented and submitted to Nova Scotia Environment. Deeper portions of the slate at the Dartmouth Bridge Terminal site were taken to a licensed facility (King's Wharf), as approved by Nova Scotia Environment. The deeper portions were tested for Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH) prior to disposal in 2011, and showed non-detectable levels, which further shows that the environmental conditions at the Dartmouth Bridge Terminal were very good.

During the Dartmouth Bridge Terminal project in 2011, because the upper portion of the slate was below the Nova Scotia Environment regulations, the contractor (Whebby) exported the upper slate to their lands in Waverley, which are now part of the Port Wallace Subdivision Lands.

EnGlobe Testing in 2016

In 2016, EnGlobe conducted sampling and testing for Total Sulphur on the slate stockpile on the Port Wallace Subdivision Lands (the same slate that was exported from the Dartmouth Bridge Terminal project in 2011). Despite the previous test results in 2011 showing concentrations within the regulations, the EnGlobe results showed concentrations above the regulations. It is unknown why there is a discrepancy in the two sets of results.

Discussion in 2017

The slate stockpile was identified as a potential issue in 2017. The decision was made between the Vendor and the Purchaser to address the slate as a sulphide bearing material and handle it as a regulated material.

Testing for Acceptance at a Licensed Facility

In late 2017, testing of the slate at the Port Wallace Subdivision Lands was conducted for Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH) for evaluation for disposal at a licensed facility. The results of 18 samples of the slate showed non-detectable levels of TPH and PAH. With these results, OCL Environmental Limited on behalf of the Dartmouth Cove facility accepted the material for export from the Port Wallace Subdivision Lands to the Dartmouth Cove facility. Attached in Appendix A is the acceptance letter from OCL. Subsequently, a contract was signed with the Dartmouth Cove facility.

Consultation/Notification with Nova Scotia Environment

Nova Scotia Environmental is the regulatory agency for sulphide bearing material (material that exceeds a 0.4% Sulphide Sulphur concentration). The inspector for the area of the Port Wallace Subdivision Lands was notified and updated on the discussions and slate removal work. Attached in Appendix B is the notification letter sent to Nova Scotia Environment stating that the slate stockpile will be moved to a licensed facility. Also attached in Appendix B is a map showing the location of Port Wallace Subdivision Lands and the Dartmouth Cove Facility.

SLATE REMOVAL PROGRAM

Joint Protocol

An amending agreement was established between the Vendor and the Purchaser and a Joint Protocol was prepared for procedures on how to handle the slate. Bruce MacNeil Engineering Ltd (BME) was the consultant for the Vendor and EnGlobe was the consultant for the Purchaser. The required work and inspection and testing procedures were agreed to by both consultants. Attached in Appendix C is the Joint Protocol to be followed to confirm acceptance of the work for the Vendor and the Purchaser.

Slate Removal Work

The removal of the slate was conducted by W. Eric Whebby Limited between December 11 and 15, 2017. The work was periodically inspected by BME and EnGlobe.

All of the slate material was transported to the Dartmouth Cove facility. The volume of material was 6,420 cubic metres (or 11,557 tonnes), which compared very well with the estimated quantity (11,000 to 12,000 tonnes, with an approved amount up to 13,500 tonnes or 7,500 cubic metres). The Dartmouth Cove facility accepted all of the material and there are no outstanding issues with the receiving of the material. Attached in Appendix D are the Dartmouth Cove spreadsheets with the quantities.

Attached are representative photographs of the site before, during, and after the work. In particular, we took photographs showing the edge of the stockpiled slate and the detailed removal work throughout.

Inspection and Testing

On the final day of slate removal, we had a site inspection meeting with EnGlobe to reviewed the program. BME and EnGlobe agreed that the slate was removed entirely and that there are no further issues.

On the same day (December 15, 2017), [redacted] of Port Wallace Holdings Limited made a site visit and requested test pits and environmental samples for metals testing. The requested field program consisted of 8 test pits in the area where the slate stockpile was situation. We added 2 test pits upgradient of the site to allow for testing to determine background concentrations. A detailed photolog is attached at the end of this report. The test pit locations are shown on Drawing 1 at the end of this report.

The results of the soil testing for metals revealed levels below the guidelines or below background levels. The iron concentration was above the guideline but below background levels. The results are provided in Appendix E. Based on the laboratory results, there are no further issues related to the slate stockpile.

20(1)

CONCLUSION

The main findings and results of the Slate Removal Program are that the slate has been removed entirely and that there are no further issues related to the slate stockpile.

Please contact us if you have any questions.

Regards,

[redacted]

R. Bruce MacNeil, P.Eng.
Senior Engineer
[redacted]@MacNeilEng.com

APPENDIX A

OCL GROUP
ENVIRONMENTAL MANAGEMENT CONSULTANTS

20(1)

5339-L4
24 October 2017

Mr. Bruce MacNeil, P.Eng.
Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS
B4B 1S7

RE: BEDROCK STORED ON PID 00249672 AND PID 00258228, WAVERLEY ROAD, DARTMOUTH, HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA

To Whom It May Concern:

On behalf of *Smithers Marine Services Ltd.*, we reviewed the set of laboratory analyses of pyritic bedrock samples from the above-named source properties and which you provided to us on 18 October. It is understood the bedrock was originally excavated from what is now the Halifax Transit – Bridge Terminal facility at civic address 110 Wyse Road.

Sampling from 9 test pits provided 18 rock samples which were tested for petroleum hydrocarbons and for polycyclic aromatic hydrocarbons. Analyses were conducted by *Maxxam Analytics* (Bedford). The laboratory certificates indicated concentrations of test analytes were less than respective minimum reportable detection limits for all samples.

We confirm the rock materials are suitable for receipt and placement at the 1 Canal Street, Dartmouth marine sequestration facility. Based on the results for the 18 samples, 13,500 tonnes or approximately 7,500 cu m of material can be deposited at the Canal Street facility.

You and your trucking company will need to co-ordinate with [redacted] or [redacted]@hotmail.com) with respect to timing of deliveries and placement of the materials. You will need to co-ordinate with [redacted] with respect to payment for the disposal.

Please contact us if you require additional information or clarification.

Yours truly,

OCL SERVICES LTD.

[redacted]

S. MacKnight, Ph.D., EP(CEA)
President

cc. [redacted]

41 Alben Lane, Wellington, Nova Scotia, Canada B2T 1A2

Tel: 1-902-463-0114 • Fax: 1-902-466-5743
Email: info@oclgroup.com • www.oclgroup.com

APPENDIX B

20(1)

Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS B4B 1S7
902-430-2830

October 31, 2017

Ms. Janet Moore, MSc
Nova Scotia Environment
Via email

Dear Ms. Moore,

Re: Transport of Slate Fill – Port Wallace Lands to Dartmouth Cove
Waverley, NS

On behalf of W. Eric Whebby Ltd, this letter provides notification to the Nova Scotia Environment, as per the Sulphide Bearing Material Disposal Regulation, of the slate fill transport from the Port Wallace Lands to 1 Canal Street ("Dartmouth Cove"). 1 Canal Street is a licensed facility.

All of the slate fill will be removed from the Port Wallace Lands and taken to the Dartmouth Cove facility for disposal. The quantity of slate fill is estimated to be in the range of 11,000 tonnes to 12,000 tonnes. We submitted sufficient samples for 13,500 tonnes, which is approximately 7,500 cubic metres. Attached is the acceptance of the material from the Dartmouth Cove facility.

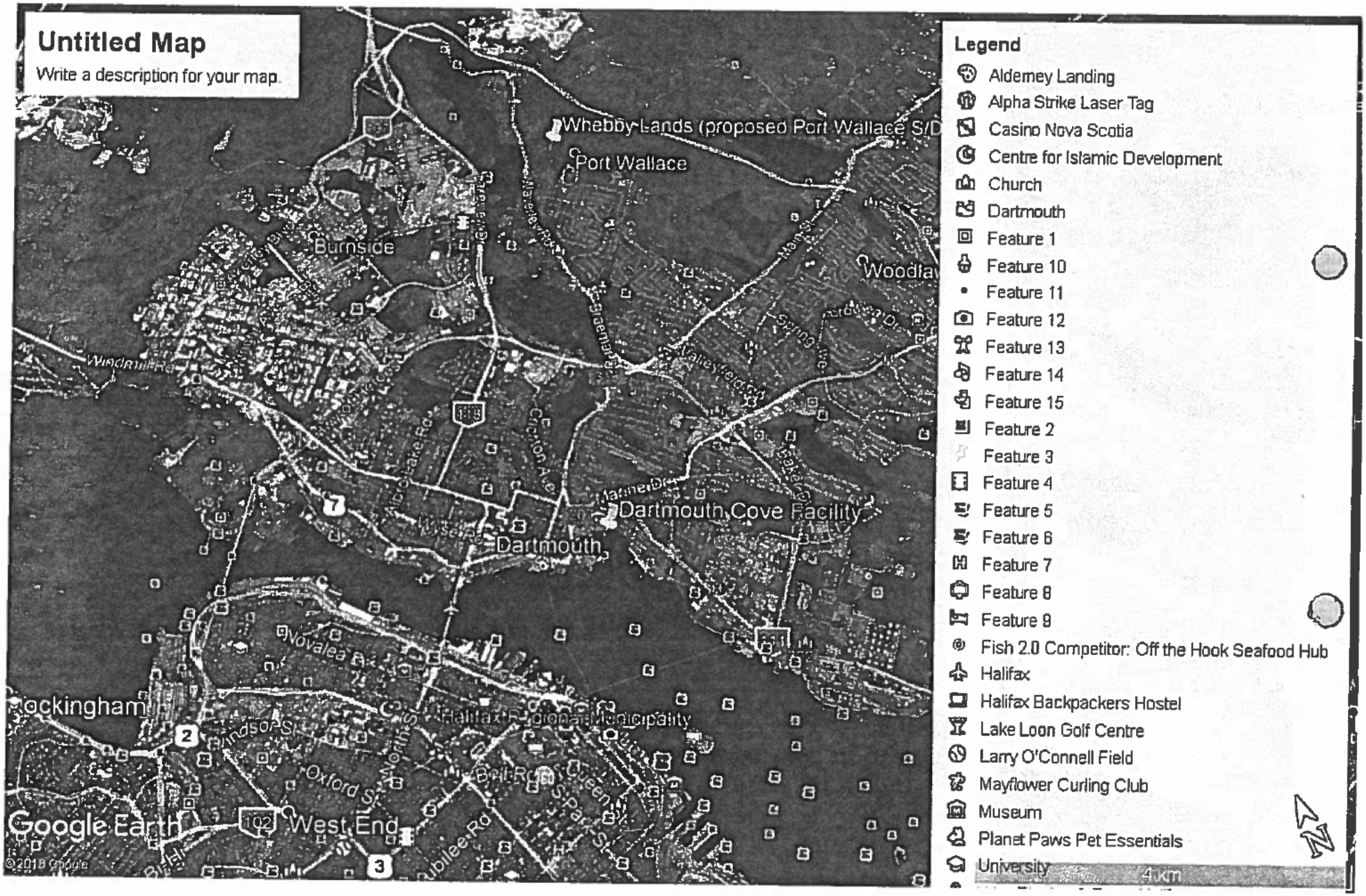
The existing slate stockpile covers two properties. PID 00249672 is owned by W.Eric Whebby Ltd and Frank Whebby Ltd and PID 00258228 is owned by Clayton Developments Ltd. This notification applies to both properties. The schedule for transporting the material from the Port Wallace Lands is Thursday, November 2, 2017, and will continue until complete, which is expected to be prior to the end of November 2017.

Please contact me if you have any questions.

Regards,

[redacted]

R. Bruce MacNeil, P.Eng.
Senior Engineer
[redacted]MacNeilEng.com



Untitled Map
Write a description for your map.
Whebby Lands (proposed Port Wallace S/D
Port Wallace
Burnside
Woodlaw
Windmill Rd
Dartmouth Cove Facility
Dartmouth
Rockingham
Halifax Regional Municipality
Windsor St
Oxford St
West End
Jubilee Rd
Google Earth
©2018 Google
Legend
Alderney Landing
Alpha Strike Laser Tag
Casino Nova Scotia
Centre for Islamic Development
Church
Dartmouth
Feature 1
Feature 10
Feature 11
Feature 12
Feature 13
Feature 14
Feature 15
Feature 2
Feature 3
Feature 4
Feature 5
Feature 6
Feature 7
Feature 8
Feature 9
Fish 2.0 Competitor: Off the Hook Seafood Hub
Halifax
Halifax Backpackers Hostel
Lake Loon Golf Centre
Larry O'Connell Field
Mayflower Curling Club
Museum
Planet Paws Pet Essentials
University
4 km

APPENDIX C

Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS B4B 1S7
902-430-2830

November 29, 2017

Re: Joint Protocol - Removal of Slate Fill
Port Wallace Lands, Waverley, NS

As noted in the Amending Agreement between the Vendor and the Purchaser, this is the Joint Protocol for confirmatory inspection required for the removal of all of the slate rockfill from the Port Wallace Lands (specifically PIDs 00249672 and 00258228). This Joint Protocol will conclude with a Summary Report documenting that the slate rockfill was removed entirely, and thus there will be no future issues related to the slate rockfill.

Background

The slate rockfill originated from the Dartmouth Bridge Terminal project. The land use prior to that project was park land. The material taken to the Port Wallace Lands had a low sulphide sulphur concentration, but recent testing results showed a higher concentration. Thus, the decision was made to take the material to a licensed disposal facility.

Dartmouth Cove was selected as the disposal facility. A total of 18 representative samples were collected for TPH and PAH testing. The results of the testing were non-detectable. As such, Dartmouth Cove accepted transport of up to 13,500 tonnes (approximately 7,500 cubic metres) of slate rockfill, which is estimated to be all of the slate rockfill on the Port Wallace Lands.

Nova Scotia Department of Environment (NSE) were notified that the material will be transported. NSE acknowledge the notification. Bruce MacNeil Engineering Ltd (BME) will continue to communicate with NSE on the slate removal to ensure that everyone is well-informed.

Inspection Procedures

During the slate rockfill removal, EnGlobe (the consultant for the Purchaser) and BME will make periodic site visits as deemed necessary to observe the work. Any questions or concerns can be addressed through BME, who will coordinate with the contractor.

As the slate removal advances, areas completed will be reviewed and approved by both EnGlobe and BME.

Upon complete removal of the slate, EnGlobe and BME will inspect the area. They will jointly conduct post removal testing of the insitu soils below and immediate surrounding areas for sulfide bearing levels to ensure there are no slate impacts.

If after testing the sulfide levels exceed the regulations, additional removals shall be done by W. Eric Whebby Limited and additional testing under this Joint Protocol, until confirmation is obtained that sulphide levels do not exceed the regulations. If any additional removals are necessary, this will be indicated by EnGlobe and BME at that time.

Upon approval by both consultants that the slate rockfill has been transported in its entirety to Dartmouth Cove, and no further work is necessary, BME and Englobe will each prepare a Joint Summary Report. The Summary Reports will document the work completed and that the original in situ material does not have any sulfide levels above the NSDOE sulphide bearing rock disposal regulations. Both consultants may send individual letters to their respective clients based on the Joint Protocol, with copies to the other party.

BME will notify NSE that the slate has been completely removed.

Please contact me if you have any questions.

Regards,

[redacted]

R. Bruce MacNeil, P.Eng.
BME Ltd, Senior Engineer
[redacted]MacNeilEng.com

APPENDIX D

CANAL STREET SHALE DUMPING SPREADSHEET

DATE: Dec 11,2017

	1	2	3	4	5	6	7	8
Vehicle plate number	47-865D dump truck	35-035D dump truck	44-228D dump truck	37-347D dump truck	47-241D dump truck	27-150D dump trailer	40-726D dump truck	44-553D dump truck
1	7:41	7:42	7:44	7:49	7:56	8:22	8:25	8:48
2	8:08	8:18	8:19	8:26	8:33	8:58	9:01	9:19
3	8:38	8:51	8:54	9:03	9:10	9:34	9:32	10:01
4	9:06	9:23	9:25	9:37	9:44	10:15	10:11	10:32
5	9:42	10:07	10:08	10:14	10:22	10:39	11:10	11:01
6	10:21	10:52	10:36	10:59	10:59	10:49	11:42	11:31
7	10:56	11:27	11:03	11:29	11:41	11:23	12:14	12:06
8	11:28	12:02	11:32	12:05	12:13	11:59	12:49	12:41
9	12:03	12:32	12:07	12:38	12:53	12:45	1:23	1:20
10	12:37	1:05	12:49	1:11	1:29	1:19	1:53	1:49
11	1:10	1:36	1:23	2:07	2:02	1:59	2:23	2:20
12	1:43	2:08	1:56	2:39	2:36	2:36	2:57	2:54
13	2:13	2:42	2:24	3:12	3:03	3:16	3:34	3:26
14	2:52	3:32	2:57	3:41	3:42	3:53	4:06	4:00
15		4:04	3:35	4:12	4:17	4:30	4:40	4:33
16		4:38	4:08	4:47	4:53	5:11	5:24	5:20
17		5:20	4:41		5:37			6:25
TOTALS	14	17	17	16	17	16	16	17

Daily total	Tandem dump truck	232
	Tandem dump Trailer	16

Total daily tonnage received:	trucks	3248
	trailers	336
	total	3584

tonnage paid to date	4000	
prepaid tonnage remaining		416

9	10	11	12	13	14	15	16	17
40-754D	37-998D	31-767D	43-617D	38-204D	39-630D	43-812D	36-893D	48-235D
dump truck	dump Truck	dump truck	dump truck	dump truck	dump truck	dump truck	dump truck	dump truck
8:50	9:05	9:20	9:27	9:41	10:48	12:35	12:37	1:42
9:21	9:39	10:03	10:10	10:20	11:16	1:05	1:05	2:12
10:04	10:19	10:34	10:38	10:55	11:49	1:37	1:37	2:47
10:36	10:55	11:13	11:08	11:27	12:12	2:10	2:10	3:19
11:06	11:34	11:43	11:39	12:04	12:55	2:43	2:45	3:57
11:39	12:07	12:16	12:11	12:45	1:27	3:19	3:19	4:31
12:10	12:46	12:53	12:48	1:15	2:01	3:52	3:56	5:08
12:48	1:17	1:26	1:21	1:49	2:33	4:23	4:24	6:07
1:25	1:50	1:57	1:52	2:21	3:05	5:00	5:02	
2:05	2:27	2:30	2:22	2:56	3:38	5:34	6:00	
2:38	3:00	3:03	2:56	3:20	4:18			
3:13	3:37	3:40	3:30	4:00	4:51			
3:44	4:12	4:14	4:02	4:34	5:35			
4:20	4:45	4:50	4:35	5:15				
4:57	5:37	5:35	5:21	6:20				
5:37			6:39					
16	15	15	16	15	13	10	10	8

CANAL STREET SHALE DUMPING SPREADSHEET

DATE: Dec 12,2017

	1	2	3	4	5	6	7	8
Vehicle plate number	47-865D dump truck	35-035D dump truck	44-228D dump truck	37-347D dump truck	47-241D dump truck	27-150D dump trailer	40-726D dump truck	44-553D dump truck
1	1:55	8:18		8:27	8:27		9:15	9:22
2	2:33	8:52		9:00	8:59		9:49	9:53
3	3:06	9:25		9:36	9:31		10:19	10:24
4	3:59	9:57		10:17	10:01		10:52	11:43
5	4:31	10:30		10:51	10:43		11:25	12:13
6	5:09	11:01		11:22	11:15		11:59	12:20
7		11:32		11:57	11:49		12:42	12:59
8		12:07		12:41	12:39		1:18	1:38
9		12:48		1:37	1:12		1:51	2:38
10		1:33		2:08	1:48		2:28	3:14
11		2:21		2:41	2:27		3:54	4:08
12		2:55		3:16	3:12		4:27	4:41
13		3:34		4:09	4:00		5:06	5:27
14		4:26		4:44	4:33			
15		5:04		5:28	5:14			
16								
17								
TOTALS	6	15	0	15	15	0	13	13

Daily total	Tandem dump truck	239
	Tandem dump Trailer	0

Total daily tonnage received:	trucks	3346
	trailers	0
	total	**3346**

tonnage paid to date	8000
tonnage received to date	6930
prepaid tonnage remaining	**1070**

9	10	11	12	13	14	15	16	17
40-754D dump truck	37-998D dump Truck	31-767D dump truck	43-617D dump truck	38-204D dump truck	39-630D dump truck	43-812D dump truck	36-893D dump truck	48-235D dump truck
8:21		8:08	8:08	8:15	8:11	8:30	8:32	8:30
8:58		8:41	8:42	8:49	8:45	9:02	9:02	9:02
9:29		9:10	9:10	9:22	9:17	9:37	9:40	9:44
10:03		9:44	9:45	9:55	12:26	10:07	10:10	10:13
10:34		10:15	10:17	10:26	1:02	10:36	10:45	10:49
11:05		10:50	10:50	10:58	1:40	11:05	11:28	11:20
11:46		11:22	11:22	11:31	2:16	11:38	11:58	11:53
12:18		12:03	11:56	12:05	2:47	12:11	12:39	12:30
12:52		12:44	12:36	12:48	3:26	12:49	1:14	1:06
1:35		1:20	1:09	1:26	4:13	1:33	1:50	2:32
2:10		1:54	2:17	1:59	4:52	2:04	2:27	3:05
2:43		2:30	2:52	2:37		2:38	3:00	3:56
3:19		3:04	3:27	3:13		3:14	3:35	4:28
4:11		3:56	4:19	4:03		4:04	4:56	5:05
4:46		4:30	4:52	4:38		4:41		
5:27		5:07		5:12		5:26		
16	0	16	15	16	11	16	14	14

18	19	20
46-590 dump truck	37-339D dump truck	44-228D dump truck
8:20	8:27	8:12
8:56	9:00	8:46
9:27	9:36	9:18
9:59	10:06	10:11
10:30	10:45	10:47
11:01	11:15	11:16
11:34	11:51	11:51
12:07	12:38	12:29
12:51	1:11	1:05
1:34	1:48	1:40
2:05	2:22	2:15
2:39	2:56	2:50
3:15	3:39	3:26
4:08	4:23	4:15
4:41	4:56	
15	15	14

CANAL STREET SHALE DUMPING SPREADSHEET

DATE: Dec 13,2017

	1	2	3	4	5	6	7	8
Vehicle plate number	47-865D dump truck	35-035D dump truck	44-228D dump truck	37-347D dump truck	47-241D dump truck	35-917D dump truck	46-590D dump truck	44-553D dump truck
1	8:11	8:25	8:34	8:27	8:24	8:17	8:18	8:38
2	8:47	9:03	9:05	9:03	8:58	8:53	8:55	9:10
3	9:17	9:35	9:40	9:36	9:30	9:27	9:31	9:45
4	9:53	10:08	10:15	10:09	10:05	10:02	10:07	10:30
5	10:46	10:57	11:02	11:10	10:37	10:52	10:57	11:13
6	11:24	11:41	11:38	11:45	11:10	11:30	11:36	11:47
7	11:58	12:32	12:24	12:35	11:44	12:07	12:27	12:35
8	12:45	1:07	12:57	1:11	12:34	12:52	1:01	1:11
9	1:22	1:41	1:33	1:44	1:07	1:32	1:35	1:43
10	1:56	2:13	2:06	2:16	1:40	2:04	2:09	2:16
11	2:30	2:51	2:43	2:53	2:12	2:40	2:46	2:51
12	3:01				2:48	3:38		
13								
14								
15								
16								
17								
TOTALS	12	11	11	11	12	12	11	11

Daily total	Tandem dump truck	196
	Tandem dump Trailer	0

Total daily tonnage received:	trucks	2744
	trailers	0
	total	**2744**

tonnage paid to date	12000
tonnage received to date	9674
prepaid tonnage remaining	**2326**

9	10	11	12	13	14	15	16	17
40-754D dump truck	37-339D dump Truck	31-767D dump truck	43-617D dump truck	38-204D dump truck	39-630D dump truck	43-812D dump truck	36-893D dump truck	48-235D dump truck
8:39	8:30	8:05	8:08	8:15	8:10		8:35	8:25
9:05	9:08	8:38	8:40	8:52	8:43		9:10	8:58
9:38	9:56	9:14	9:16	9:24	9:17		9:41	9:29
10:11	10:49	9:47	9:48	9:58	9:51		10:28	10:03
11:00	11:28	10:35	10:36	10:43	10:45		11:09	10:58
11:36	12:02	11:20	11:14	11:29	11:24		11:52	11:34
12:25	12:46	11:54	11:48	12:06	11:56		12:38	12:23
1:07	1:26	12:41	12:37	12:49	12:43		1:16	12:56
1:46	2:01	1:21	1:15	1:30	1:23		1:52	1:32
2:18	2:37	1:54	1:48	2:03	1:57		2:34	2:05
2:58	3:38	2:31	2:19	2:39	2:33		3:14	2:40
		3:14	2:56	3:38	3:18			3:38
11	11	12	12	12	12		11	12

18
40-726D
dump
truck
8:10
8:43
9:17
9:51
10:40
11:15
11:49
12:38
1:16
1:48
2:23
2:58

12

CANAL STREET SHALE DUMPING SPREADSHEET

DATE: Dec 14,2017

	1	2	3	4	5	6	7	8	9
Vehicle plate number	47-865D dump truck	35-035D dump truck	44-228D dump truck	37-347D dump truck	47-241D dump truck	35-917D dump truck	46-590D dump truck	44-553D dump truck	40-754D dump truck
1		8:28	8:13	8:19	9:33	8:22	9:02	8:29	8:29
2		9:07	8:52	8:59	10:12		9:44	9:06	9:08
3		9:52	9:26	9:33	10:49		12:21	9:59	9:57
4		10:28	10:01	10:27	11:30		11:05	10:57	10:29
5		11:11	10:46	11:09	12:14		11:34	12:22	11:12
6		11:51	11:25	12:01			12:19		11:48
7			12:06						
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
TOTALS		6	7	6	5	1	6	5	6

Daily total	Tandem dump truck	110
	Tandem dump Trailer	0

Total daily tonnage received:	trucks	1540
	trailers	0
	total	**1540**

tonnage paid to date 12000

tonnage received to date 11214

prepaid tonnage remaining **786**

10	11	12	13	14	15	16	17	18	
37-339D dump Truck	31-767D dump truck	43-617D dump truck	38-204D dump truck	39-630D dump truck	43-812D dump truck	36-893D dump truck	48-235D dump truck	40-726D dump truck	47-865D dump truck
8:18	8:51	8:14	8:15	8:12	8:21	8:30	8:20	8:16	8:16
8:59	9:30	8:45	8:55	8:49	9:04	9:09	9:00	8:55	8:55
9:42	10:02	9:15	9:39	9:22	9:45	9:49	9:40	9:30	9:29
10:16	10:44	9:59	10:15	10:00	10:22	10:22	10:15	10:22	10:05
10:59	11:23	10:34	10:56	10:38	11:03	11:06	10:52	10:38	10:49
11:32	12:01	11:17	11:31	11:22	11:33	11:57	11:28	11:19	11:27
12:16		11:53	12:15	12:01	12:19		12:08	11:54	12:07
7	6	7	7	7	7	6	7	7	7

CANAL STREET SHALE DUMPING SPREADSHEET

DATE: Dec 15,2017

	1	2	3
Vehicle plate number	27-150D dump trailer	36-893D dump truck	48-235D dump truck
1	8:15	8:25	8:16
2	9:00	9:00	9:00
3	9:43	9:32	9:34
4	10:31	10:00	10:04
5	11:21	10:33	10:36
6	11:51	11:03	11:13
7	1:00	11:54	11:46
TOTALS	7	7	7

Daily load totals	Tandem Dump truck	14
	Tanden Dump trailer	7

Total daily tonnage received:	Trucks	196
	Trailers	147
	Total	343

tonnage paid to date	12000
tonnage received to date	11557
prepaid tonnage remaining	443

APPENDIX E

Bruce MacNeil Engineering Ltd (BME)

Table 1, Site Test Pits, Soil Metals Results

Maxxam ID		FUR266	FUR267	FUR268	FUR269	FUR270
Sampling Date		18-Dec-17	18-Dec-17	18-Dec-17	18-Dec-17	18-Dec-17
COC Number		644045-01-01	644045-01-01	644045-01-01	644045-01-01	644045-01-01
	UNITS	TP1	TP2	TP3	TP4	TP5
Metals						
Acid Extractable Aluminum (Al)	mg/kg	11000	6100	11000	8400	6700
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Arsenic (As)	mg/kg	18	11	15	16	25
Acid Extractable Barium (Ba)	mg/kg	65	36	55	76	31
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Boron (B)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Chromium (Cr)	mg/kg	14	9.4	15	14	12
Acid Extractable Cobalt (Co)	mg/kg	15	7.6	8.2	14	7.2
Acid Extractable Copper (Cu)	mg/kg	20	13	17	25	18
Acid Extractable Iron (Fe)	mg/kg	20000	**13000**	**20000**	**21000**	**19000**
Acid Extractable Lead (Pb)	mg/kg	12	8.5	14	10	9.5
Acid Extractable Lithium (Li)	mg/kg	18	12	18	19	13
Acid Extractable Manganese (Mn)	mg/kg	490	400	550	690	450
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Nickel (Ni)	mg/kg	26	14	19	23	13
Acid Extractable Rubidium (Rb)	mg/kg	6.6	4.1	6.2	5.8	4.3
Acid Extractable Selenium (Se)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Silver (Ag)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Strontium (Sr)	mg/kg	7.0	5.0	8.2	6.6	ND
Acid Extractable Thallium (Tl)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Tin (Sn)	mg/kg	ND	ND	ND	ND	ND
Acid Extractable Uranium (U)	mg/kg	0.59	0.46	0.56	1.0	0.47
Acid Extractable Vanadium (V)	mg/kg	16	11	18	14	13
Acid Extractable Zinc (Zn)	mg/kg	53	32	53	52	35

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
ND = Not detected
Bold results show exceedence

Bruce MacNeil Engineering Ltd (BME)

Table 1, Site Test Pits, Soil Metals R

Maxxam ID	FUR271	FUR272	FUR273			
Sampling Date	18-Dec-17	18-Dec-17	18-Dec-17			
COC Number	644045-01-01	644045-01-01	644045-01-01	Guideline		
	TP6	TP7	TP8		RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	8600	12000	7200	15400	10	5331387
Acid Extractable Antimony (Sb)	ND	ND	ND	7.5	2.0	5331387
Acid Extractable Arsenic (As)	14	8.3	17	31	2.0	5331387
Acid Extractable Barium (Ba)	62	18	54	10000	5.0	5331387
Acid Extractable Beryllium (Be)	ND	ND	ND	38	2.0	5331387
Acid Extractable Bismuth (Bi)	ND	ND	ND	-	2.0	5331387
Acid Extractable Boron (B)	ND	ND	ND	4300	50	5331387
Acid Extractable Cadmium (Cd)	ND	ND	ND	14	0.30	5331387
Acid Extractable Chromium (Cr)	12	16	13	220	2.0	5331387
Acid Extractable Cobalt (Co)	8.9	11	9.4	22	1.0	5331387
Acid Extractable Copper (Cu)	21	25	21	1100	2.0	5331387
Acid Extractable Iron (Fe)	**18000**	**21000**	**20000**	11000	50	5331387
Acid Extractable Lead (Pb)	10	16	9.3	140	0.50	5331387
Acid Extractable Lithium (Li)	16	21	15	-	2.0	5331387
Acid Extractable Manganese (Mn)	630	520	460		2.0	5331387
Acid Extractable Mercury (Hg)	ND	ND	ND	6.6	0.10	5331387
Acid Extractable Molybdenum (Mo)	ND	ND	ND	110	2.0	5331387
Acid Extractable Nickel (Ni)	17	22	16	330	2.0	5331387
Acid Extractable Rubidium (Rb)	5.8	6.8	4.5	-	2.0	5331387
Acid Extractable Selenium (Se)	ND	ND	ND	80	1.0	5331387
Acid Extractable Silver (Ag)	ND	ND	ND	77	0.50	5331387
Acid Extractable Strontium (Sr)	8.1	6.7	6.1	9400	5.0	5331387
Acid Extractable Thallium (Tl)	ND	ND	ND	1	0.10	5331387
Acid Extractable Tin (Sn)	ND	ND	ND	9400	2.0	5331387
Acid Extractable Uranium (U)	0.52	0.59	0.51	23	0.10	5331387
Acid Extractable Vanadium (V)	14	13	13	39	2.0	5331387
Acid Extractable Zinc (Zn)	43	48	38	5600	5.0	5331387

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

ND = Not detected

Bold results show exceedence

Bruce MacNeil Engineering Ltd (BME)

Tier 1 EQS

Table 2, Upgradient/Background Test Pits, Soil Metals Results

Maxxam ID		FVE146	FVE147			
Sampling Date		21-Dec-17	21-Dec-17	mg/Kg		
COC Number		D 24895	D 24895	Guideline		
	UNITS	B1	B2		RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	17000	16000	15400	10	5332949
Acid Extractable Antimony (Sb)	mg/kg	ND	ND	7.5	2.0	5332949
Acid Extractable Arsenic (As)	mg/kg	21	8.7	31	2.0	5332949
Acid Extractable Barium (Ba)	mg/kg	30	16	10000	5.0	5332949
Acid Extractable Beryllium (Be)	mg/kg	ND	ND	38	2.0	5332949
Acid Extractable Bismuth (Bi)	mg/kg	ND	ND	-	2.0	5332949
Acid Extractable Boron (B)	mg/kg	ND	ND	4300	50	5332949
Acid Extractable Cadmium (Cd)	mg/kg	ND	ND	14	0.30	5332949
Acid Extractable Chromium (Cr)	mg/kg	22	18	220	2.0	5332949
Acid Extractable Cobalt (Co)	mg/kg	18	8.2	22	1.0	5332949
Acid Extractable Copper (Cu)	mg/kg	33	17	1100	2.0	5332949
Acid Extractable Iron (Fe)	mg/kg	31000	23000	11000	50	5332949
Acid Extractable Lead (Pb)	mg/kg	20	17	140	0.50	5332949
Acid Extractable Lithium (Li)	mg/kg	25	23	-	2.0	5332949
Acid Extractable Manganese (Mn)	mg/kg	980	380		2.0	5332949
Acid Extractable Mercury (Hg)	mg/kg	ND	ND	6.6	0.10	5332949
Acid Extractable Molybdenum (Mo)	mg/kg	ND	ND	110	2.0	5332949
Acid Extractable Nickel (Ni)	mg/kg	33	23	330	2.0	5332949
Acid Extractable Rubidium (Rb)	mg/kg	9.5	5.6	-	2.0	5332949
Acid Extractable Selenium (Se)	mg/kg	ND	ND	80	1.0	5332949
Acid Extractable Silver (Ag)	mg/kg	ND	ND	77	0.50	5332949
Acid Extractable Strontium (Sr)	mg/kg	9.3	5.6	9400	5.0	5332949
Acid Extractable Thallium (Tl)	mg/kg	0.12	ND	1	0.10	5332949
Acid Extractable Tin (Sn)	mg/kg	ND	ND	9400	2.0	5332949
Acid Extractable Uranium (U)	mg/kg	0.64	0.49	23	0.10	5332949
Acid Extractable Vanadium (V)	mg/kg	15	14	39	2.0	5332949
Acid Extractable Zinc (Zn)	mg/kg	69	49	5600	5.0	5332949

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

ND = Not detected

Bold results show exceedence

Photograph 1: View of the top of the slate fill embankment. December 5, 2017.

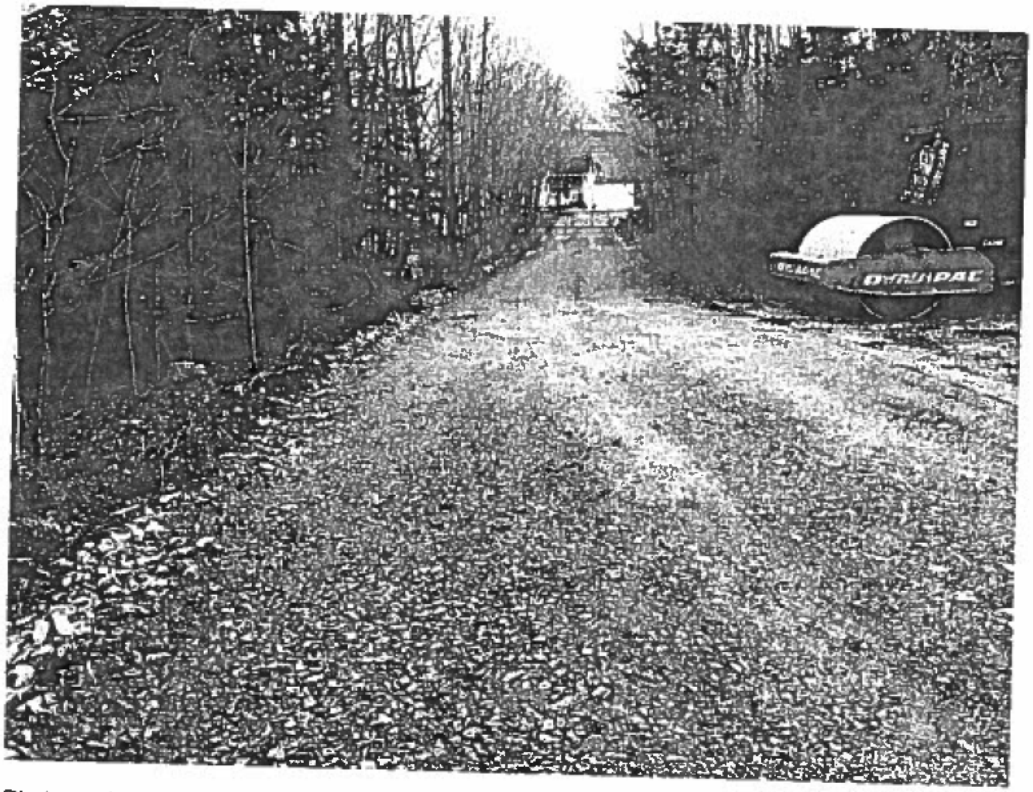
Photograph 2: View of the top of the slate fill embankment. December 5, 2017.

Photograph 3: View of the edge of the slate fill embankment (well-defined limit). December 5, 2017.

Photograph 4: View of the edge of the slate fill embankment (well-defined limit). December 5, 2017.

Photograph 5: View of the gravel turning circle for truck loading in preparation for the slate removal work. December 5, 2017.

Photograph 6: View of the gravel access road from Waverley Road for truck access in preparation for the slate removal work. December 5, 2017.



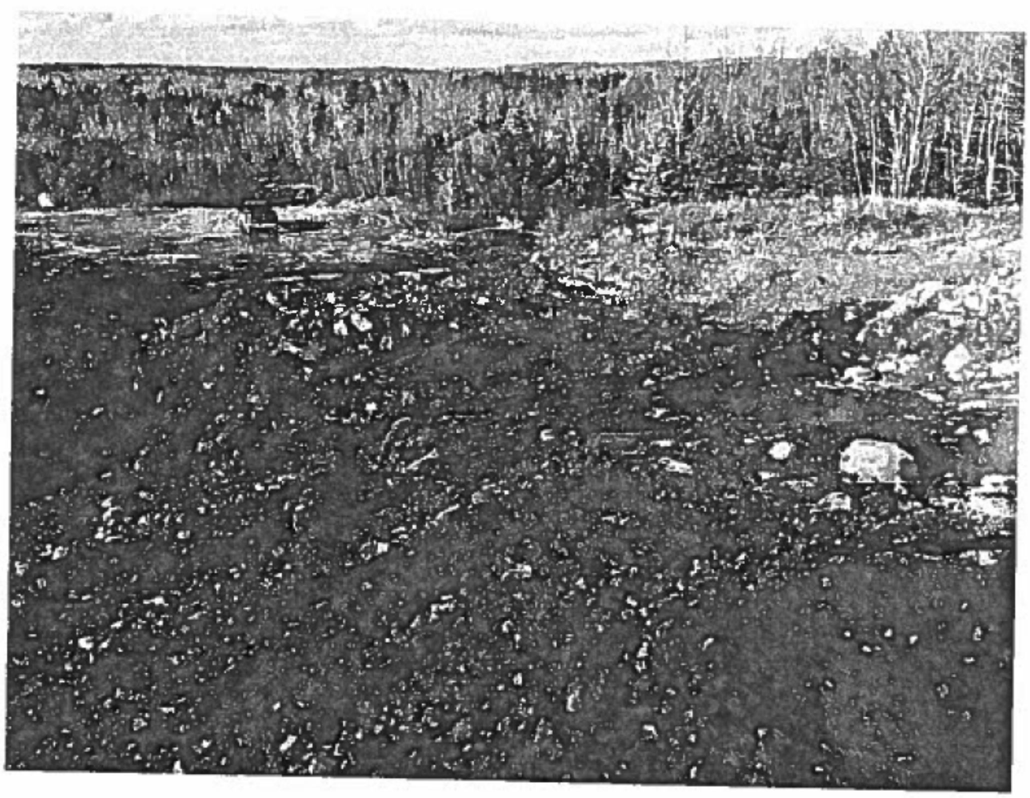
Photograph 7: View of the gravel access road from Waverley Road for truck access in preparation for the slate removal work. December 5, 2017.

Photograph 8: View of the slate removal work well-underway. December 12, 2017.

Photograph 9: View of the slate removal work. A second excavator and also a dozer being used to removal the slate entirely. December 12, 2017.

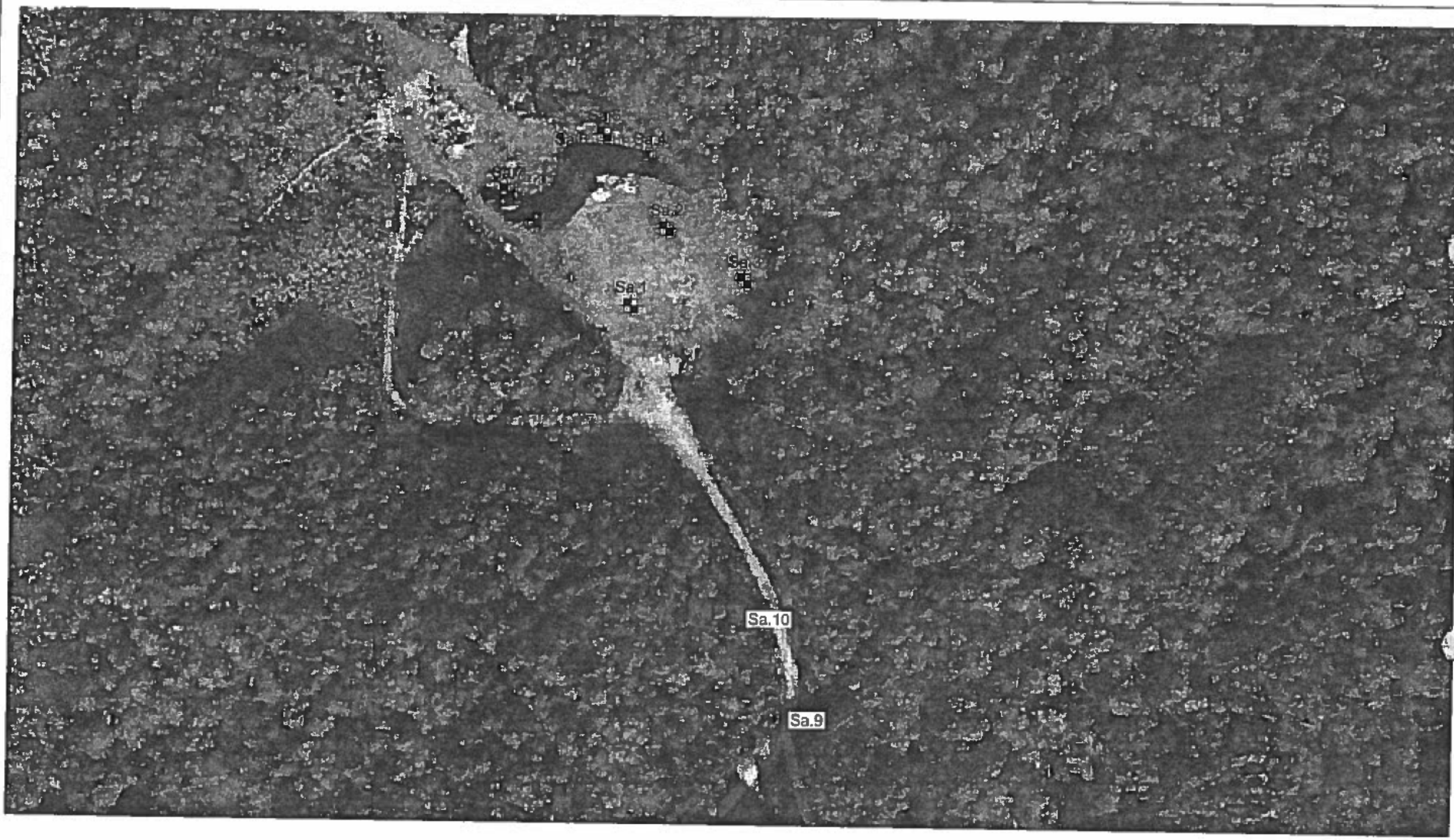
Photograph 10: View of the slate removal work. The slate is pushed to the edge of the area to allow for removal. December 12, 2017.

Photograph 11: View of the second excavator moving the slate at the edge of the stockpile/embankment area. December 12, 2017.



Photograph 12: View of the slate removal work. The slate was mostly removed except for the small stockpile in the background. December 14, 2017.

Photograph 13: View of the second excavator removing small quantities of slate to allow for completion of the program. December 14, 2017.



BME Bruce MacNeil Engineering Ltd.	**Metals Testing** Soil Sample Locations 406 Waverley Road Dartmouth, NS	NTS 4-JAN-2017 AH RBM	101 0

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20(1)

Barkhouse, Stephanie A

From:	Bruce MacNeil [redacted]@MacNeilEng.com>
Sent:	Tuesday, January 30, 2018 12:31 PM
To:	Barkhouse, Stephanie A
Subject:	FW: Slate Transport, Update
Attachments:	Summary Report, Slate Removal, Port Wallace.pdf

Stephanie,

I got your email. Attached is our report. Please review and comment.

But would you let me know if NSE has an open file on this or not? The Purchaser is asking.

Thanks.

Bruce MacNeil, P.Eng.
Senior Engineer
Cell: 902 430-2830

BME Bruce MacNeil Engineering Ltd.

81 Terradore Lane Hammonds Plains, NS B4B 1S7 Main: 902 430-2830

From: Bruce MacNeil
Sent: January 29, 2018 10:27 AM
To: 'Moore, Janet L' <Janet.Moore@novascotia.ca>
Subject: RE: Slate Transport, Update

Hi Janet,

On the slate removal at the Port Wallace lands in Waverley from December, I will be sending you a copy of the final summary report soon.

One question the Purchaser had was whether or not NSE had opened a file on this matter. They are wondering if a future Phase I ESA would identify on open file and there for a concern in someone's mind. Can you let me know on this?

Thanks!

Bruce MacNeil, P.Eng.
Senior Engineer
Cell: 902 430-2830

BME Bruce MacNeil Engineering Ltd.

20(1)

81 Terradore Lane Hammonds Plains, NS B4B 1S7 Main: 902 430-2830

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: December 18, 2017 2:19 PM
To: Bruce MacNeil [redacted]@MacNeilEng.com>
Subject: RE: Slate Transport, Update

Thank you for the update. Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
(902) 219-2532
Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]@MacNeilEng.com]
Sent: Monday, December 18, 2017 2:14 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Re: Slate Transport, Update

Sounds good. No problem.

The last of the material was trucked out on Friday afternoon. We are taking samples this afternoon of the base of the stockpile area. I don't think we need any, but we are taking them anyway. We plan to test for metals (the purchaser mentioned this in passing, so we were going to do that). Was there anything else you can think of? The visual evidence is clear that the slate has entirely been removed.

We will have photos, drawings, documents from Dartmouth Cove, volumes, and information from The Dartmouth Bridge Terminal project.

We are wrapping up our field work today (hopefully).

Thanks.

Bruce MacNeil
Bruce MacNeil Engineering Ltd.
81 Terradore Lane, Hammonds Plains, NS B4B 1S7
902-430-2830

On Dec 18, 2017, at 2:05 PM, Moore, Janet L <Janet.Moore@novascotia.ca> wrote:

Bruce,

Please confirm all sulphide bearing materials stored at Webby's/Port Wallace subdivision have now been removed and taken to an approved facility; that boundary sampling has been undertaken etc.

Also, when you prepare the full summary report on the slate removal operation, ensure quantities removed (in cubic meters) from the bus terminal are included along with citing the specific location(s) of where these materials went and all receipts for any disposals (e.g. at an approved facility) are included. Earlier reports provided by Conquest Engineering do not include receipts for disposal or evidence materials were taken elsewhere, such as Webby's.

If you have any questions, please contact me.
Regards,
Janet
<image001.jpg>

From: Bruce MacNeil [redacted]@MacNeilEng.com] 20(1)
Sent: Tuesday, December 12, 2017 4:14 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: FW: Slate Transport, Update

Hi again Janet.

They moved a lot of material yesterday. And likely as much will be moved today. At this rate they will easily be finished by the end of the week.

I was at the site today and had a good review of everything. No issues.

There is a separate consultant working for the land purchaser. I was in touch with them (EnGlobe) today. They are going to review the site, in addition to us, to ensure that there are no remaining issues.

That is the latest. Let me know if you have any questions.

Bruce MacNeil, P.Eng.
Senior Engineer
Cell: 902 430-2830
<image002.jpg>

81

<image003.jpg>
Terradore Lane Hammonds Plains, NS B4B 1S7 Main: 902 430-2830 <image003.jpg>

From: Bruce MacNeil
Sent: December 11, 2017 3:25 PM
To: 'Moore, Janet L' <Janet.Moore@novascotia.ca>
Subject: FW: Slate Transport, Update

Hi Janet,

The slate is being moved. It started this morning and will be on-going until done.

I understand some residents were complaining about the number of trucks working early in the day. Although it wasn't necessary, the contractor is planning to push the start time back to 8 am to keep people a little happier.

I will continue to send you updates.

Bruce MacNeil, P.Eng.
Senior Engineer
Cell: 902 430-2830
<image002.jpg>

81

<image003.jpg>
Terradore Lane Hammonds Plains, NS B4B 1S7 Main: 902 430-2830 <image003.jpg>

From: Bruce MacNeil
Sent: December 8, 2017 5:20 PM
To: Janet.Moore@novascotia.ca
Subject: Fwd: Slate Transport, Update

Janet,

Well finally I have the chequered in hand to provide the Dartmouth Cove tomorrow. With this, trucks will start hauling on Monday. They will continue daily Monday to Friday for a couple of weeks until completely done.

20(1)

We will prepare a report on the work and that the slate was completely removed. The land purchaser also engaged an engineering firm, so there will be lots of inspection.

Please contact me at any time if you have questions.

Bruce MacNeil
Bruce MacNeil Engineering Ltd.
81 Terradore Lane, Hammonds Plains, NS B4B 1S7
902-430-2830

Begin forwarded message:

> **From:** Bruce MacNeil <[redacted]@MacNeilEng.com>
> **Date:** December 5, 2017 at 9:22:44 AM AST
> **To:** "Moore, Janet L" <Janet.Moore@novascotia.ca>
> **Subject: Slate Transport, Update**
>
> Hi Janet,
>
> The two land owner have settled a cost sharing arrangement and the contractor, Whebby, is planning to start the transportation within a day or two. They have prepared the access road into the site and placed gravel to allow for a clean operation.
>
> Dartmouth Cove are also ready to accept the material and place it in the water as per their approval.
>
> I will email you again when the trucks actually start haul. I am told if it is not tomorrow it will be Thursday.
>
> Please contact me if you have any questions. Note that the Purchaser have engage an engineering consultant, so we will end up having two consultants overseeing the end result of the work. We will prepare a full summary report on the slate removal operation, and we will provide a copy to you.
>
> Thanks.
>
> **Bruce MacNeil, P.Eng.**
> *Senior Engineer*
> *Cell: 902 430-2830*
> <image004.jpg>
>
> <image011.jpg> <image011.jpg> 81 Terradore Lane Hammonds Plains, NS B4B 1S7 Main: 902 430-2830

Environment & Labour

COMMUNICATION FORM

Inspector	S. Barkhouse	File #	2011-077906
Topic	update	Date	1/17/2018
Site		Time	Before 12pm
Contact	Andrew Bone, HRM	Phone #	490-6743
Address		Cell #	

☑ Call Received ☑ Call Made ☐ Meeting ☐ Complaint ☐ Enquiry ☐ Other

- Andrew Bone (HRM Planning) called, left voicemail re 1/17/2018 update on Webbie Ponds/Port Wallace.
- SAB Returned call, asked for additional info
- Mr. Bone said looking for an update before February 5th
- Re materials put on Whebbie lands
  - ↳ was it cleaned up?
  - ↳ waiting for file update

Signature Original Signed

Page 1 of 1

☐ Finalized ☐ Ongoing

NOVA SCOTIA

Environment
Compliance Division

NOTE-TO-FILE

RECORDED BY: Janet Moore Date: 5 Dec 2017

SITE/CLIENT NAME: Port Wallace Slate

APPROVAL/FILE NUMBER:

SUBJECT: Conversation w Bernie Matlock.

- Limited disposal options
- To arrange meeting to review any issues of compliance related to original Approval issued for work at Dartmouth bus terminal and why/how slate in such large quantities were not disposed but rather stored on Webber property

20(1)

Moore, Janet L

From:	Bruce MacNeil [redacted]@MacNeilEng.com>
Sent:	Monday, November 20, 2017 2:46 PM
To:	Moore, Janet L
Subject:	RE: Slate Transport from Port Wallace Lands

Hi Janet,

Sorry, obviously I need to keep you better informed. Here is an update.

- Because the slate rockfill covers two properties, there is a joint effort to remove all of the slate. This is a good thing, but it has taken a little longer than expected.

- I know that there is a target date of tomorrow, Nov.21, between the land owners to finalize an agreement on payment for the work. The land owners want to move quickly. They expect that the work will take approximately 10 days. They expected that the work would be completed by the end of November, but some extra days will be needed.

- The contractor for removal of the material will be W. Eric Whebby Ltd. They have already organized an excavator and trucks, and can start on short notice.

- The Dartmouth Cove facility (1 Canal Street) has already started to prepare for the arrive of the material. They are ready now to receive the material.

- We will over-see the work and collect boundary samples upon completion.

I will let you know the start date for transport of the material to Dartmouth Cove.

Thanks.

Bruce MacNeil
902-430-2830

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: November 20, 2017 2:12 PM
To: Bruce MacNeil [redacted]@MacNeilEng.com>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate Transport from Port Wallace Lands

Hello Bruce
I conducted a follow up inspection Friday (17th Nov. 2017) and noted slate material remains. Please provide rationale for the delay and update on when all of this slate bearing material will have been removed.
Regards,
Janet

20(1)

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

From: Moore, Janet L
Sent: Wednesday, November 01, 2017 8:57 AM
To: 'Bruce MacNeil' [redacted]@MacNeilEng.com>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate Transport from Port Wallace Lands

Thanks Bruce. Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]MacNeilEng.com]
Sent: Tuesday, October 31, 2017 3:47 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: Slate Transport from Port Wallace Lands

Janet, Bernie,

Attached is notification that slate fill is being transported from the Port Wallace Lands to 1 Canal Street, which is a licensed slate disposal facility.

Janet, the land owner is trying to mobilize to start the work on Thursday when you and I will meet on the site. I suspect it will take them some time on Thursday to get organized. This will be a good opportunity to have a look around and see what is planned for the exporting of material.

Bruce MacNeil, P.Eng.
Senior Engineer
Cell: 902 430-2830

BME Bruce MacNeil Engineering Ltd.

81 Terradore Lane Hammonds Plains, NS B4B 1S7 Main: 902 430-2830

20(1)

Moore, Janet L

From:	Moore, Janet L
Sent:	Monday, November 20, 2017 2:12 PM
To:	'Bruce MacNeil'
Cc:	Matlock, Bernard
Subject:	RE: Slate Transport from Port Wallace Lands

Duplicate Email Chain See Page 105

[redacted]

From: Moore, Janet L
Sent: Wednesday, November 01, 2017 8:57 AM
To: 'Bruce MacNeil' [redacted] MacNeilEng.com>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate Transport from Port Wallace Lands

Duplicate Email Chain See Page 106

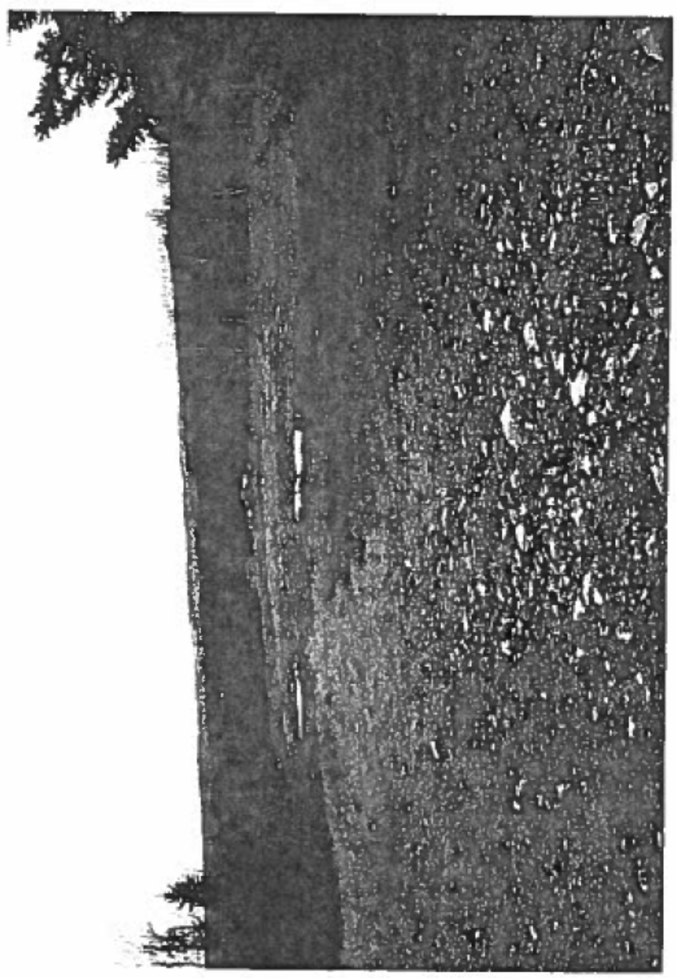
[redacted]

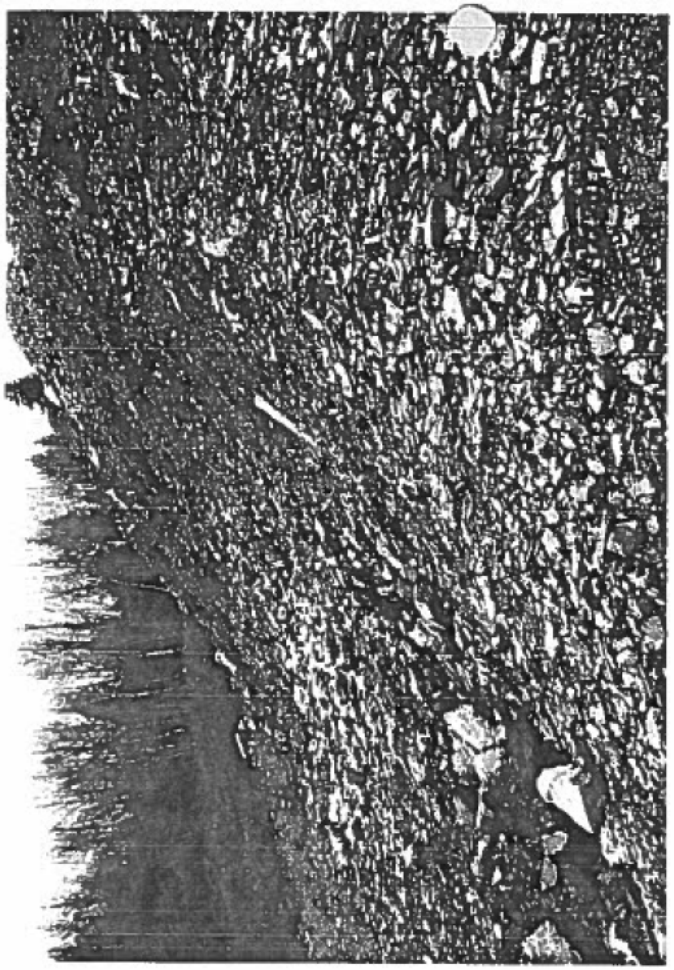
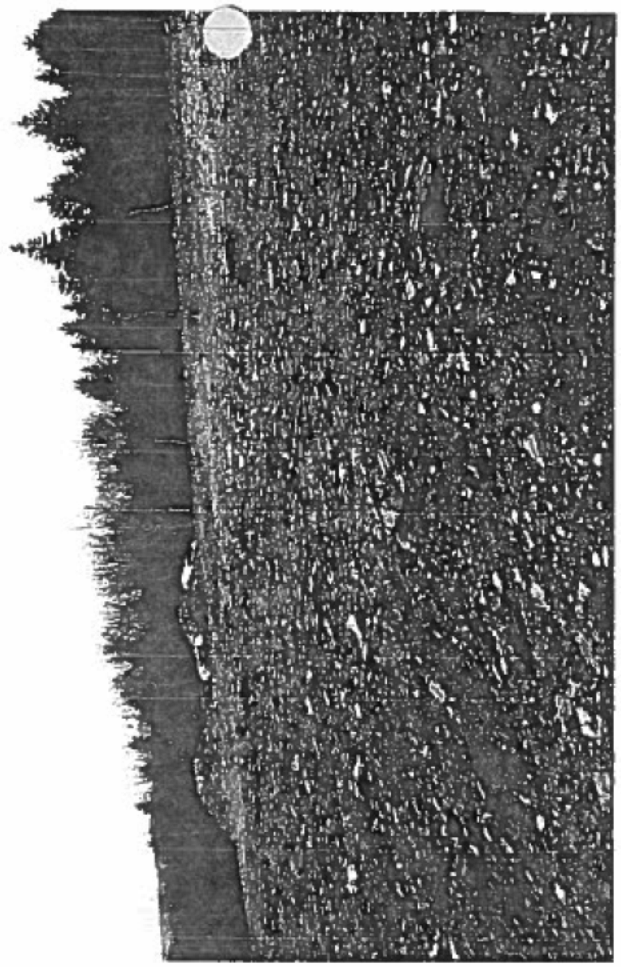
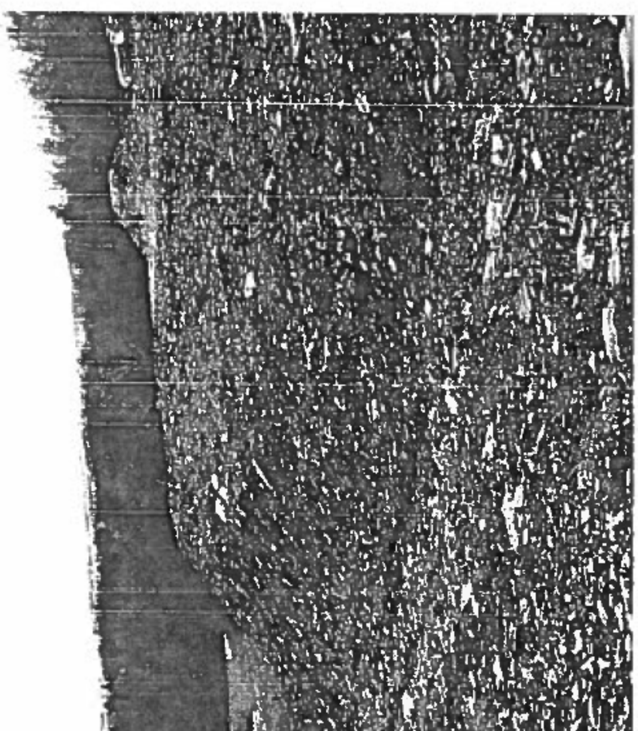
From: Bruce MacNei [redacted] MacNeilEng.com]
Sent: Tuesday, October 31, 2017 3:47 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: Slate Transport from Port Wallace Lands

[redacted] Duplicate Email Chain

Duplicate Email Chain See Page 106

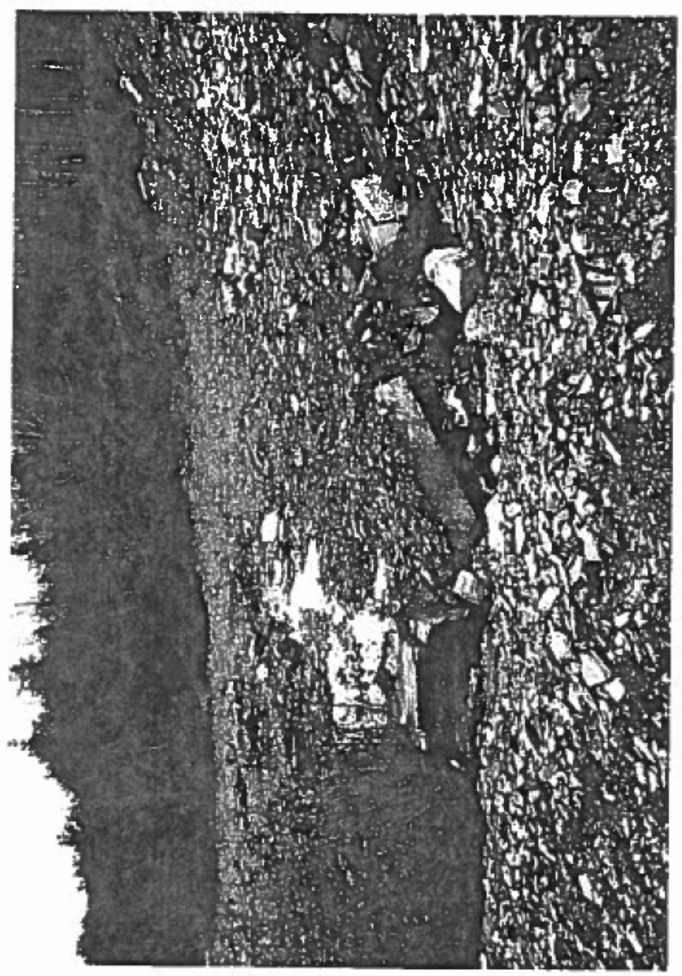








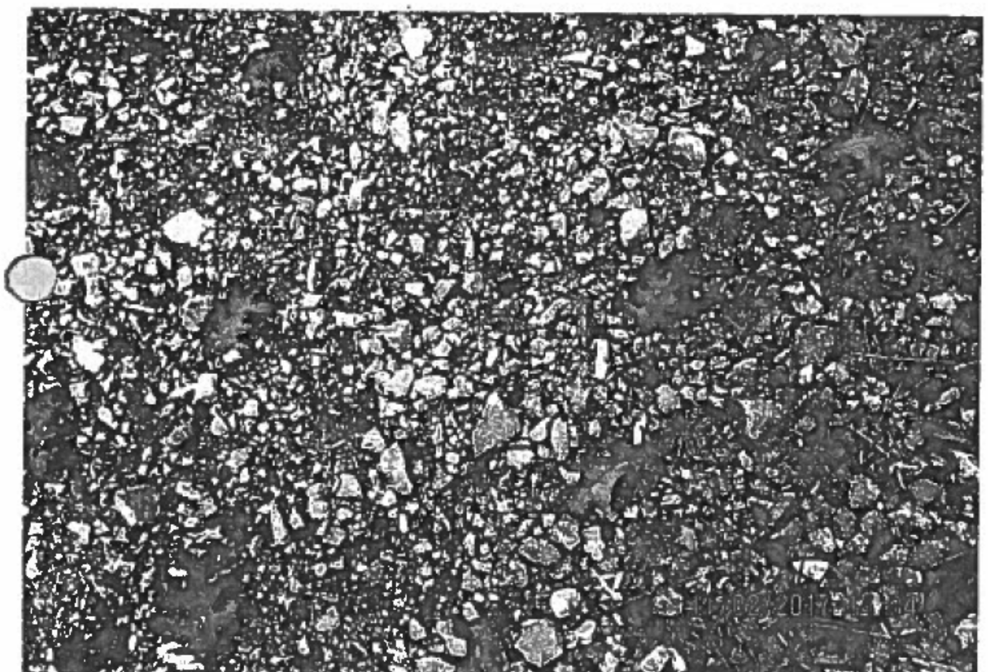
68

17 Nov 2017 330pm
Pile of slide material
Webster/Port Wallace
remaining - Still need
to move/remove for
disposal. No evidence
material has been removed.
See photos.

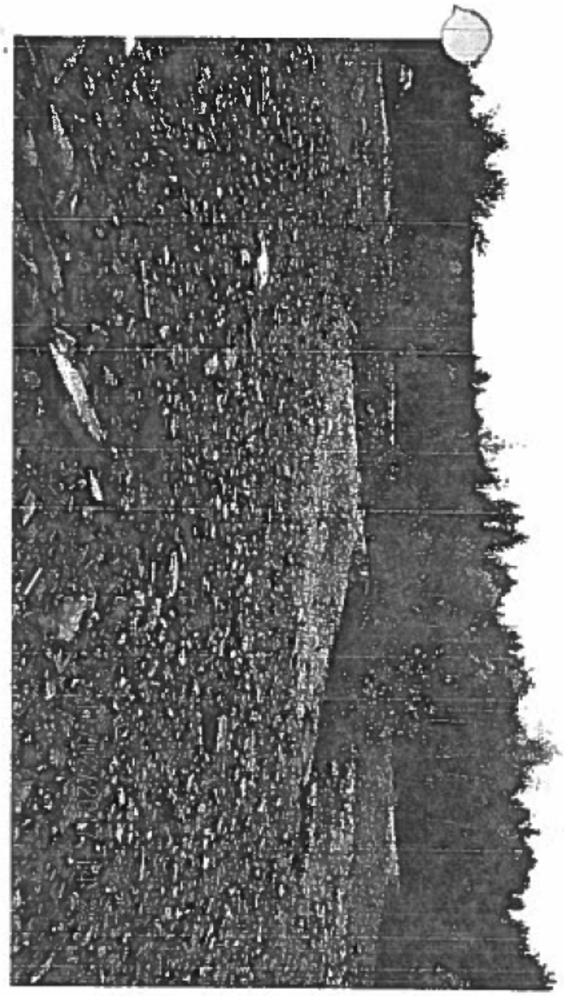
2 Nov 2017
Port Wallan Subdivision
Inspection off White Rd.
Met with Bruce Macdonald
of Surveying / P. Eng Co
hired for Clayton Development
20(1) He deals w [redacted]
of Clayton Development
Photos taken. Area of
slide large – about 6200m3
according to Bruce – they
used Autocad + elevation
data to calculate. Lands
owned by Webber + Clayton
Development. We discussed
how samples show slide

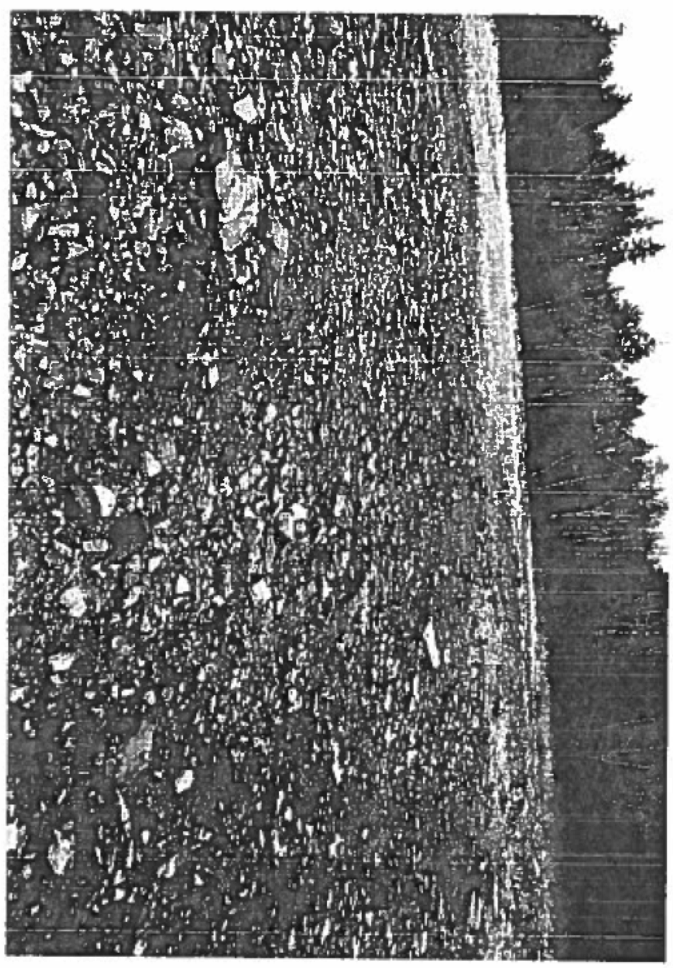
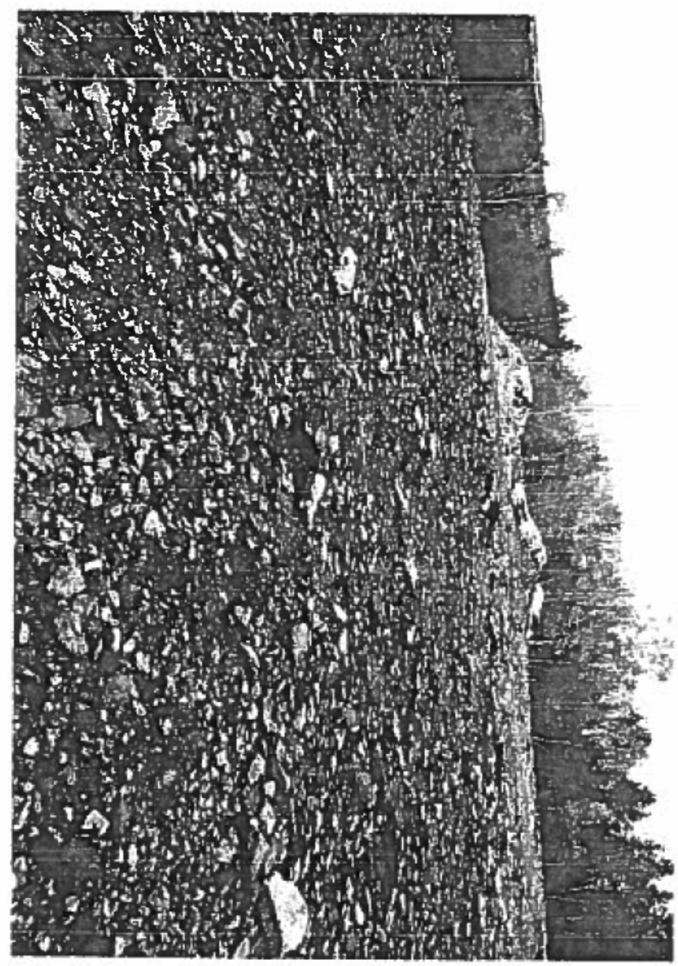
Material to be removed
following week

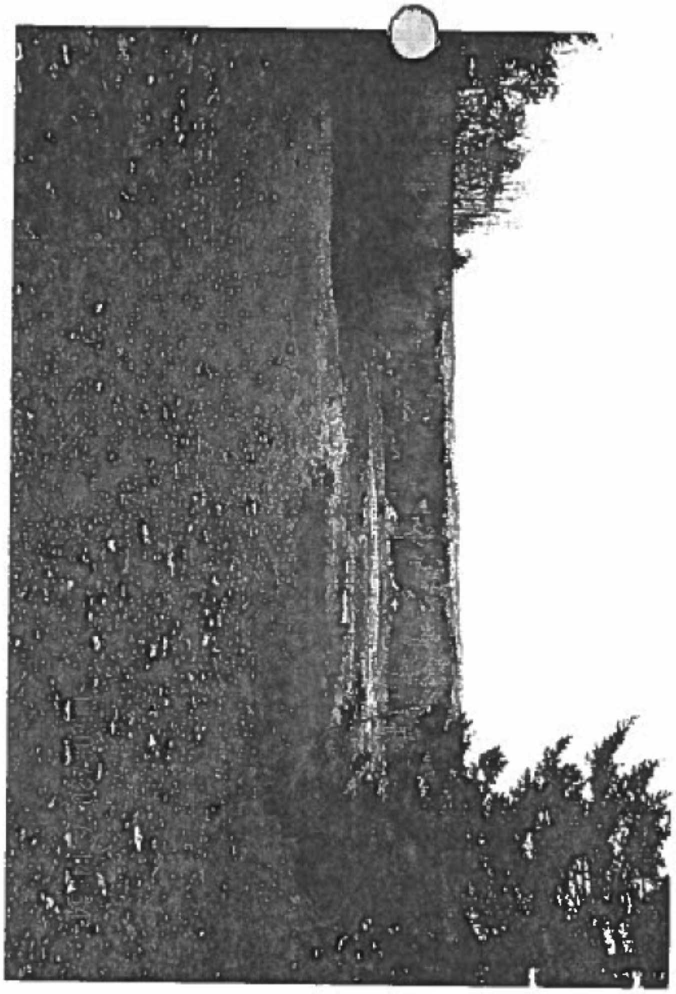
when they had none in
past. I advised in future
either more samples collected
at source, the movement of
material is better overseen
+ samples collected of the
material at the disposal
site. Bruce noted Englobe
collected more samples but
did not report results - 2
Samples at each test pit.
Clayton Dev. were aware
of results from Englobe in
2016, but didn't provide
results to Bruce prior to
recently / 2017.

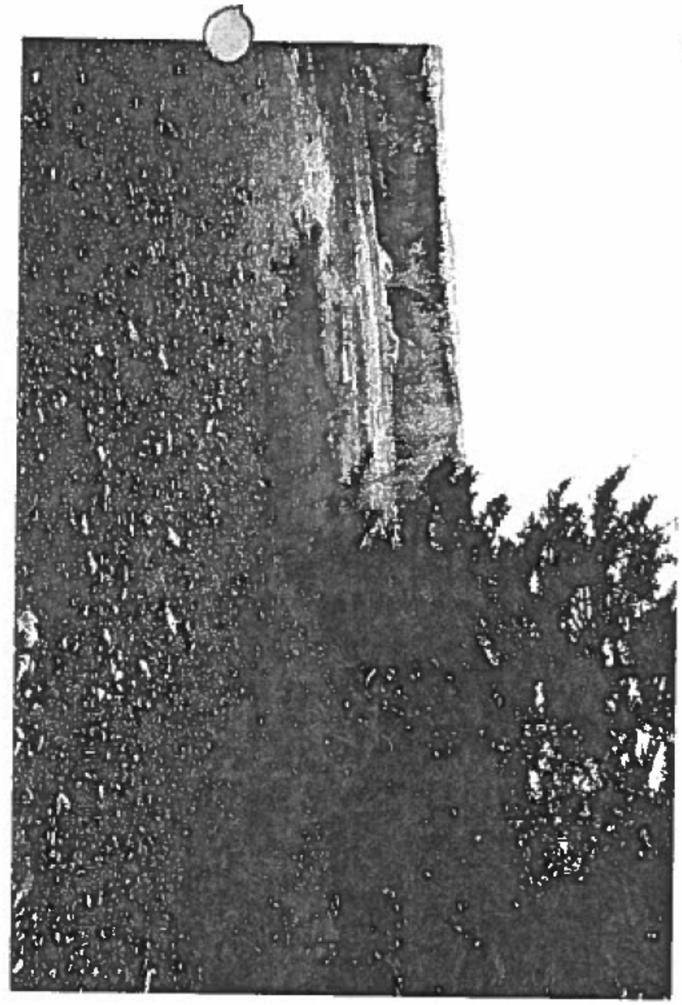



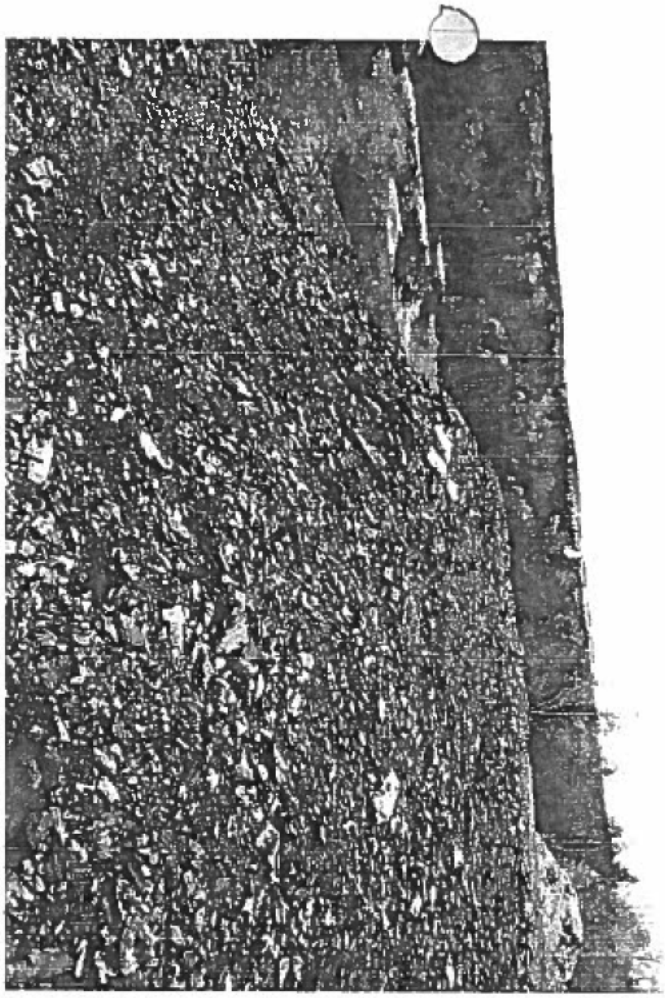
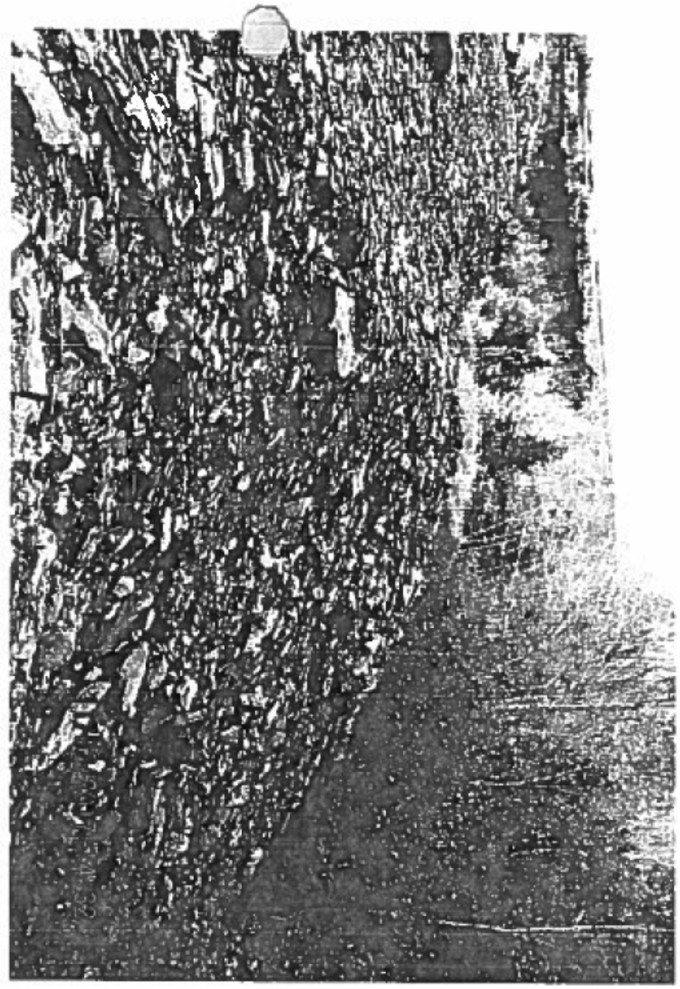
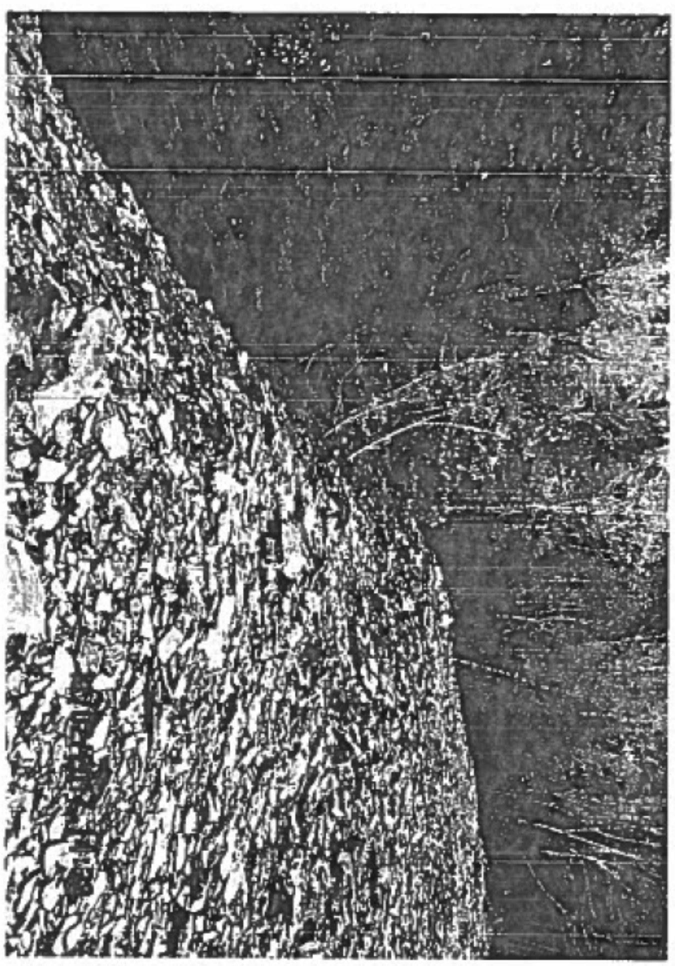
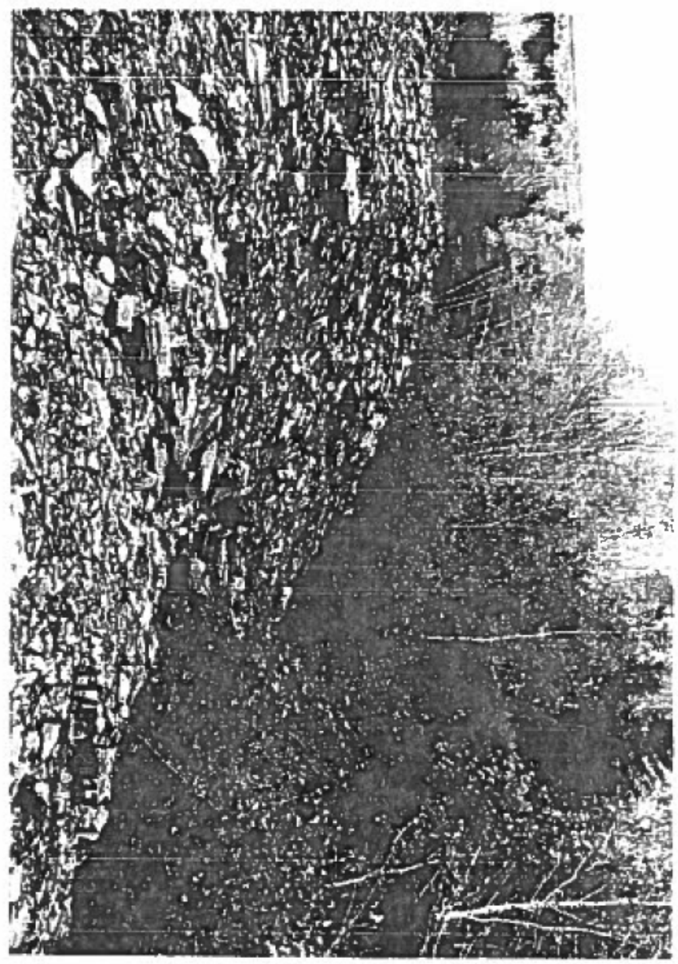

Inspector Janet Moore

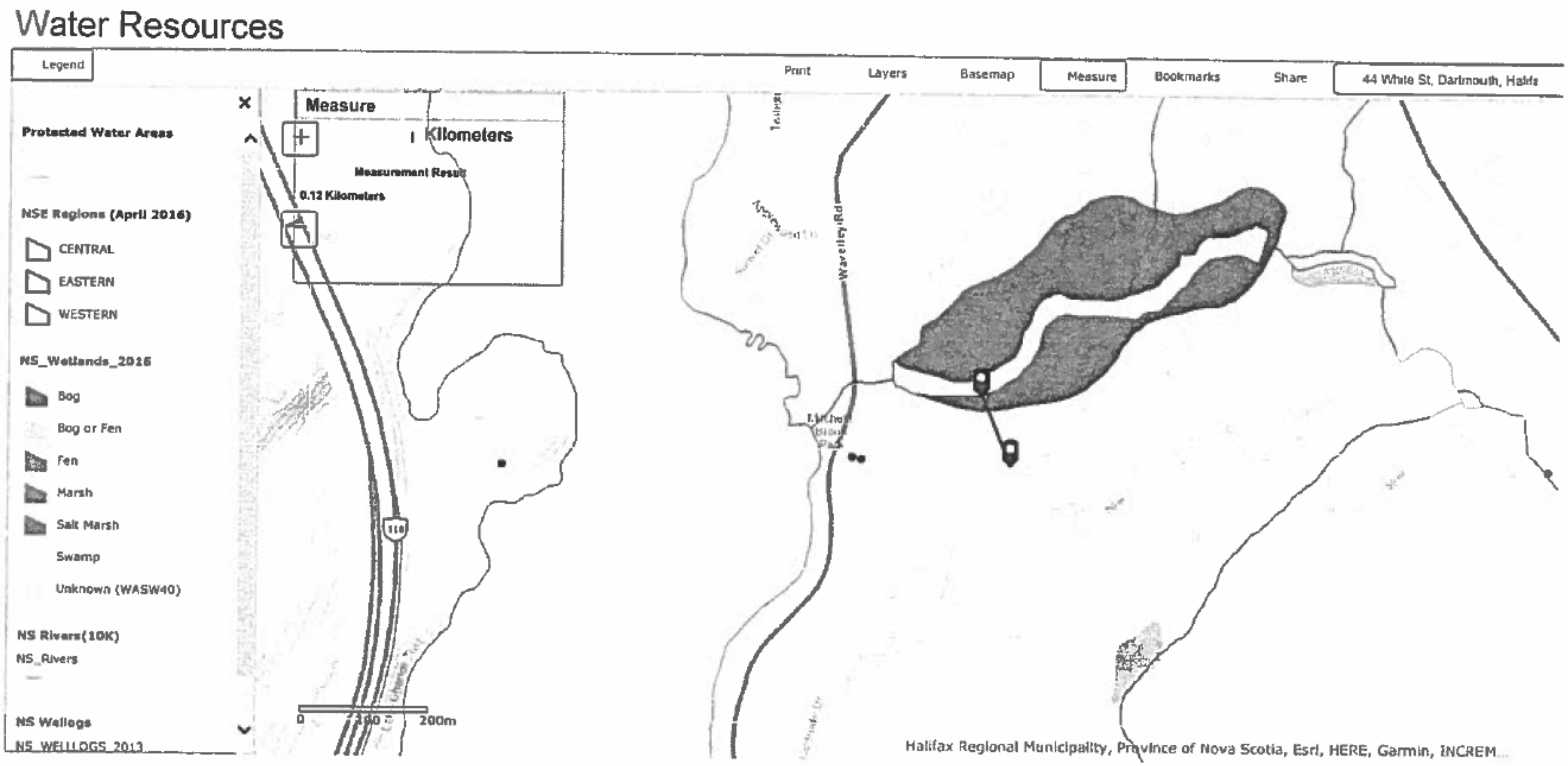




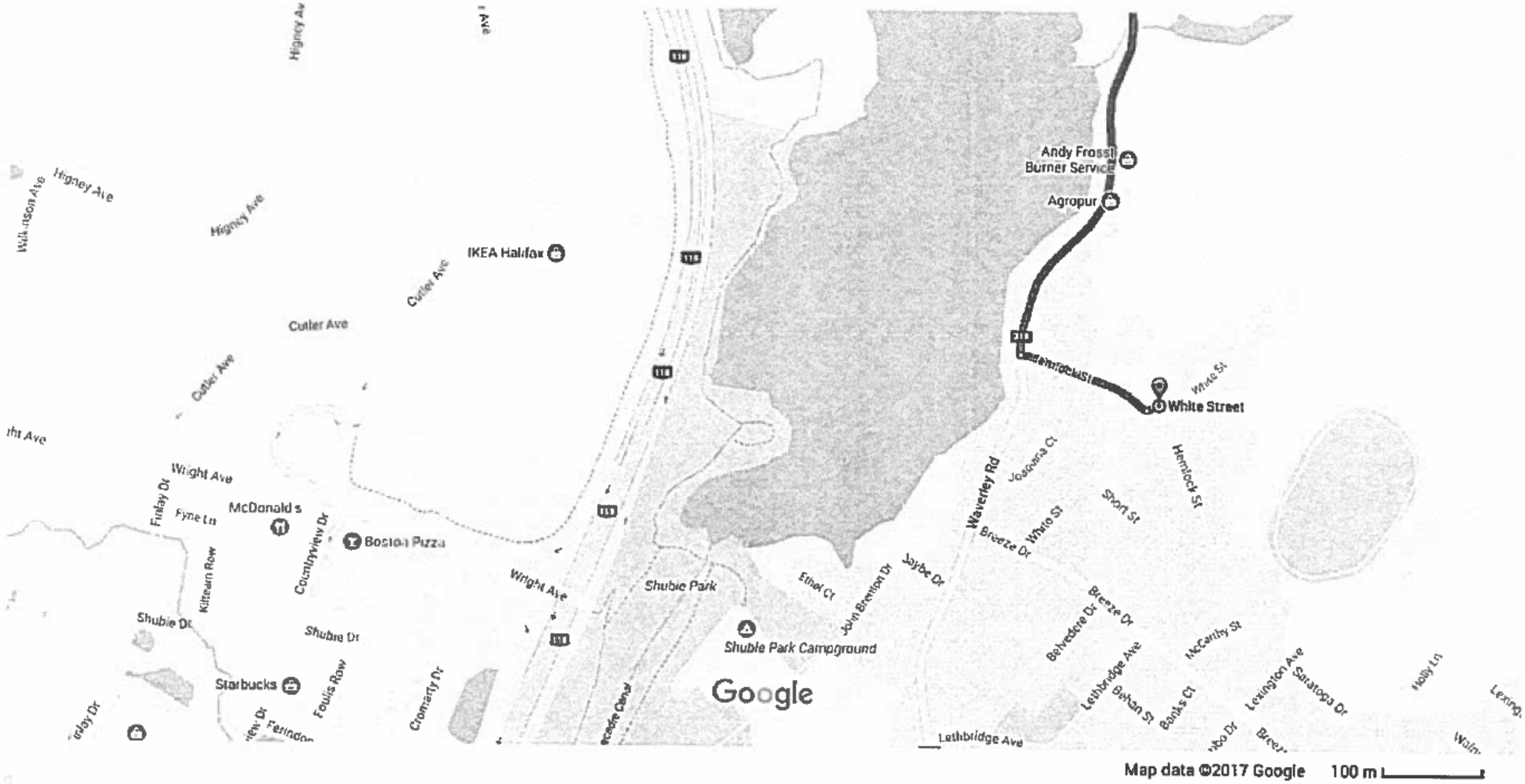



Water Resources
Legend
Print
Layers
Basemap
Measure
Bookmarks
Share
44 White St, Dartmouth, Halifa
Protected Water Areas
NSE Regions (April 2016)
CENTRAL
EASTERN
WESTERN
NS_Wetlands_2016
Bog
Bog or Fen
Fen
Marsh
Salt Marsh
Swamp
Unknown (WASW40)
NS Rivers(10K)
NS_Rivers
NS Wellogs
NS_WELLLOGS_2013
Measure
Kilometers
Measurement Result
0.12 Kilometers
Waverley Rd
0
200m
Halifax Regional Municipality, Province of Nova Scotia, Esri, HERE, Garmin, INCREM...

Google Maps 30 Damascus Road, Bedford, NS to White St, Dartmouth, NS

Drive 23.2 km, 20 min



via NS-102 and NS-118

19 min without traffic

20 min

23.2 km

OCL GROUP
ENVIRONMENTAL MANAGEMENT CONSULTANTS

20(1)

Attachment
email Oct 31/2017
B.MacNeil -> JMoore
cc B.Matlock

5339-L4
24 October 2017

Mr. Bruce MacNeil, P.Eng.
Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS
B4B 1S7

RE: BEDROCK STORED ON PID 00249672 AND PID 00258228, WAVERLEY ROAD, DARTMOUTH, HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA

To Whom It May Concern:

On behalf of *Smithers Marine Services Ltd.*, we reviewed the set of laboratory analyses of pyritic bedrock samples from the above-named source properties and which you provided to us on 18 October. It is understood the bedrock was originally excavated from what is now the Halifax Transit – Bridge Terminal facility at civic address 110 Wyse Road.

Sampling from 9 test pits provided 18 rock samples which were tested for petroleum hydrocarbons and for polycyclic aromatic hydrocarbons. Analyses were conducted by *Maxxam Analytics* (Bedford). The laboratory certificates indicated concentrations of test analytes were less than respective minimum reportable detection limits for all samples.

We confirm the rock materials are suitable for receipt and placement at the 1 Canal Street, Dartmouth marine sequestration facility. Based on the results for the 18 samples, 13,500 tonnes or approximately 7,500 cu m of material can be deposited at the Canal Street facility.

You and your trucking company will need to co-ordinate with [redacted] or [redacted]@hotmail.com) with respect to timing of deliveries and placement of the materials. You will need to co-ordinate with [redacted] with respect to payment for the disposal.

Please contact us if you require additional information or clarification.

Yours truly,

OCL SERVICES LTD.

Original Signed

S. MacKnight, Ph.D./EP(CEA)
President

cc. [redacted]

20(1)

Moore, Janet L

From:	Bruce MacNeil [redacted]@conquest-eng.com>
Sent:	Friday, October 27, 2017 10:34 AM
To:	Moore, Janet L
Subject:	Re: Slate and Port Wallace Subdivision

Okay. Go to the end of White Street off Breeze Drive and I will meet you at the gate there. I will be driving a [redacted]

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Moore, Janet L
Sent: Friday, October 27, 2017 10:30 AM
To: Bruce MacNeil
Subject: RE: Slate and Port Wallace Subdivision

Bruce,
I'd like to meet at the site at 2. Thank you.
Janet

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Friday, October 27, 2017 9:50 AM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Re: Slate and Port Wallace Subdivision

Thanks Janet. Next Thursday, Nov. 2 is good. We can meet at your office or at the site, whichever you like.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Moore, Janet L
Sent: Friday, October 27, 2017 9:29 AM
To: Bruce MacNeil
Subject: RE: Slate and Port Wallace Subdivision

Hello Bruce
I would like to suggest a site meeting so I can familiarize myself with quantities and risks at the actual location where the rock/material is being stored. Could you meet at 2 next Thursday 2 Nov.? Please provide coordinates of where I should meet you too. Thank you.
Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Tuesday, October 24, 2017 8:56 AM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Re: Slate and Port Wallace Subdivision

Okay. Thanks for the update.

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Moore, Janet L
Sent: Tuesday, October 24, 2017 8:45 AM
To: Bruce MacNeil
Subject: RE: Slate and Port Wallace Subdivision

I'm still unable to meet and will be in touch at the earliest opportunity to arrange for this meeting Bruce.
Janet

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Monday, October 23, 2017 3:51 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Hi Janet,

[redacted]

Let me know if you can meet. I am available anytime.

Thanks.

Bruce MacNeil
902-430-2830

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 19, 2017 9:00 AM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Hi Bruce,
[redacted] I am happy to meet next week. Please suggest a time that works for you.
Regards,
Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

20(1)

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Wednesday, October 18, 2017 4:34 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Hi Janet,

I think it would be best to meet on this item. The exporting of slate from the Bridge Terminal site was already addressed in 2011 and 2012, which is why I was calling you originally – to let you know that.

We have been working with various parties to arrive at a suitable solution to the exporting of the material to a licenced facility. We hope to have arrangements in place on exporting material this week. I assume that NSE would have no objection to moving the material to a licenced facility, and that there would be little point in trying to glean information from a project from 6 years ago, but that is why I would like to meet with you.

Thanks.

Bruce MacNeil
902-430-2830

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 12, 2017 3:55 PM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Thanks Bruce, but the information you provided does not show the location of where your samples were collected from (site map). A site map showing relationship between sample collection locations and where excavations/disturbances occurred at the terminal and where these respective excavated materials were deposited at is also required. Explanation as to why this sulphide bearing material was not disposed of at an approved facility or otherwise managed/stored as per Approval 2011-077906-A01 is required (and the above might point provide evidence of causality).

To reiterate, the material stored is considered sulphide bearing and all of this material shall therefore only be disposed at an approved facility. Considering it is sulphide bearing, NSE is also looking for details about its storage over the past years to determine risk and any sensitivities. Therefore, please provide a map showing location of storage in relationship to sensitive receptors etc. and details about if the material was covered etc.

What is the quantity of material at the Port Wallace subdivision? Did the owner permit other materials to be deposited here too etc.

Regards,
Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
(902) 219-2532
Janet.Moore@novascotia.ca

20(1)

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Thursday, October 12, 2017 2:53 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Hi Janet,

I sent the 2011/2012 letters to you previously. I have attached them here again. Everything was done correctly in 2011 and 2012. Another firm took some samples recently and found higher concentrations. We don't know anything about their sampling methodology, but generally we stand behind the original results. Despite all of this, we have a favourable solution.

It appears that this material will be moved in its entirety to a licenced facility (eg; Fairview Cove, etc.), pending environmental review of sample results of course. I will keep you up to speed on this item as information becomes available. I will know more next week.

Bruce

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 12, 2017 2:30 PM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Bruce,
An explanation is required for why sulphide bearing material was transported and deposited at the Port Wallace Subdivision from the Dartmouth bus terminal excavation works of 2011.

How did sampling methodologies differ and how did sampling fail to identify this sulphide bearing material in the first place etc.

Please include details about the quantities removed from the terminal and deposited elsewhere (at Port Wallace/Clayton Development and any other locations). Include detail about where this sulphide bearing material has been stored (PIDs and proximity to sensitive receptors such as watercourses and wells etc.) of unauthorized disposal sites.

Following our last conversation, I understood any sulphide bearing material at the Port Wallace site would be deposited at an Approved facility: describe the quantity removed and day and location of disposal.

It is requested that the above information is provided at your earliest opportunity or within 14 days of this email.

If you have any questions, feel free to call.

Regards,
Janet

20(1)

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
(902) 219-2532
Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Wednesday, October 04, 2017 3:09 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Thanks Janet. Understood.

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 4, 2017 3:01 PM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Bruce,
As the professional engineer overseeing this project you, and the 'owner' of the material (or otherwise persons responsible for its handling, storage etc.) are responsible (as per the Environment Act) for the appropriate disposal given it is considered as sulphide bearing material as per the applicable Regulation. Likewise, it is up to any Approval holder to ensure the materials they accept, that they are lawfully able to accept as per the conditions of their Approval.
Regards,
Janet

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Wednesday, October 04, 2017 2:13 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: FW: Slate and Port Wallace Subdivision

Hi Janet,

I just thought I would check in with you in case you have any thoughts on moving the slate fill to the Leiblin Drive site.

Just thought I would check just in case.

Bruce MacNeil, P.Eng.
902-430-2830

From: Bruce MacNeil
Sent: October 2, 2017 9:19 AM
To: 'Moore, Janet L' <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

20(1)

Thanks for the reply Janet. I was just about to email you

This slate fill item at the proposed Port Wallace Subdivision lands has gotten a little more complicated. Clayton Developments is the company that is proposing to develop this 10 year project. They informed us of some slate testing they had completed some time ago that show different results from those in 2011. We are not entirely sure why the results are different. Personally, I think we should stick to the original plan of taking the slate fill to the Leiblin Drive site where it will be safely buried below the road in a non-sensitive area. However, that option is only available for a couple of days because it is an active construction site in a roadway that needs to continue. So, if you have any thoughts on how to make this happen, that would be great.

I wanted to make you aware of these results before you wrote anything. I am available to meet briefly with you if you have time. Attached are the results provided from Clayton Developments. I am working for the current land owner, W. Eric Whebby Construction.

Thanks.

R. Bruce MacNeil, P. Eng.
Senior Geotechnical Engineer

Conquest Engineering
Experience commitment

Saint John
Moncton
Fredericton
Bedford

Geotechnical and Materials Engineers

348 Bluewater Road | Bedford, NS B4B 1J6 | Office: 902 835-7313 | Cell: 902 789-6047 | Fax: 902 835-1260 | www.conquest-eng.com

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 2, 2017 9:14 AM
To: Bruce MacNeil <[redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Hello Bruce,
If the results of recent sampling and testing show the material meets the definition of sulphide bearing (means aggregate having a sulphide sulphur content equal to or greater than 0.4% (12.51 kg H_2SO_4/tonne) then the material shall be disposed of at an approved facility.
Yes, please forward the results and sample method and also provide an estimate of the amount of material which requires disposal.
Thank you.
Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Thursday, September 28, 2017 3:57 PM

20(1)

To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Re: Slate and Port Wallace Subdivision

Sorry Janet, but would you be able to send me a letter or something that the results don't exceed the guidelines and based on this the material is not a sulphide bearing material.

What do you think?

Sent from my BlackBerry 10 smartphone on the Bell network.

From: Moore, Janet L
Sent: Thursday, September 28, 2017 2:05 PM
To: Bruce MacNeil
Subject: RE: Slate and Port Wallace Subdivision

Thank you Bruce, received.
Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Thursday, September 28, 2017 12:17 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Hi Janet,

As discussed, attached is information on the material that will be moved from Waverley to Leiblin Drive in Halifax. Halifax Water and Halifax Regional Municipality have already agreed that the material is acceptable to them.

The material may be moved as early as Monday, October 2 and will be on-going for approximately one week.

Note that this material is not a regulated material, but we are taking this step with NSE because of public perception. Attached are test results from 2011.

Also attached is a Google Earth file – hopefully that works.

If you could kindly acknowledge receipt of this email, that would be appreciated.

Bruce MacNeil, P.Eng.
902-430-2830

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: September 12, 2017 8:56 AM

20(1)

To: Bruce MacNeil [redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Hi Bruce,
Yes, disposal of sulfide bearing material (as defined/identified by the Regulation) does require disposal at an approved facility. Please refer to the Sulphide Bearing Material Disposal Regulation for further detail regarding potential requirements to screen materials and have these samples analyzed along with excavation requirements etc. particularly if there is any uncertainly regarding existing sulphide concentrations in the materials/slate earlier deposited at the Port Wallace subdivision lands and which originated from an area as having high sulphide concentrations.

http://novascotia.ca/just/regulations/regs/env5795.htm

Thank you for your inquiry.

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ **(902) 219-2532**
✉ Janet.Moore@novascotia.ca

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Friday, September 08, 2017 2:51 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Janet,

I left you a voice mail. I have a question, and hopefully you know the answer. I am sure that if a property owner are taking sulphide bearing material from a property and taking it to a licenced facility then a permit from NSE is not required. Is that the case? I am sure it is, but need to confirm it for my client. In this scenario, no sulphide bearing material would be managed on site.

Thanks!

R. Bruce MacNeil, P. Eng.
Senior Geotechnical Engineer

Conquest Engineering
Experience commitment.

Saint John
Moncton
Fredericton
Bedford

Geotechnical and Materials Engineers
348 Bluewater Road | Bedford, NS B4B 1J6 | Office: 902 835-7313 | Cell: 902 789-6047 | Fax: 902 835-1260 | www.conquest-eng.com

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: July 27, 2017 1:51 PM

20(1)

To: Bruce MacNeil [redacted]@co[illegible]dest-eng.com>
Subject: Slate and Port Wallace Subdivision

Bruce,
Further to our conversation below are my coordinates.

Concerned residents can contact me/the Department. When complaints are made, this prompts further inspections/inquiries and the result is a more formal response and/or request for more information (sample results etc.) from the developer.

I understood that you are not seeking a response at present, but if the situation changes, please feel free to contact me.

Thank you for bringing this to our attention.

Regards,
Janet

NOVA SCOTIA
Environment

Janet Moore
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

20(1)

Moore, Janet L

From: Bruce MacNeil [redacted]@conquest-eng.com>
Sent: Wednesday, October 25, 2017 4:39 PM
To: Moore, Janet L
Subject: RE: Slate and Port Wallace Subdivision
Attachments: Rev. Letter of acceptance of materials from Waverley Road properties.pdf

Hi Janet,

Just trying to keep you up to date on Port Wallace until such time as you and I are able to meet. We have approval from the Dartmouth Cove facility to transfer all of the slate there. We are just trying to get all parties in agreement on the details (eg; payment, etc.). I expect that I will be sending you a notification soon that the material will be moved to a licenced facility. I think that this will address this matter, but we can discuss this whenever you are available.

Attached is the letter from the Dartmouth Cove facility. My expectation is the material will be moved in the near future.

That is the latest information. I am just trying to ensure that you are updated on this item.

Bruce

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 24, 2017 8:45 AM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain

[redacted]

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Monday, October 23, 2017 3:51 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain

[redacted]

20(1)

Moore, Janet L

From:	Moore, Janet L
Sent:	Thursday, October 12, 2017 4:14 PM
To:	Matlock, Bernard
Subject:	FW: Slate and Port Wallace Subdivision

Bernie
FYI only - I am following up with the sulphide material stored at this site which may be contrary to Approval 2011-077906-A01 issued in 2011 and related to the Dartmouth bus terminal development and Webbe.
J

From: Bruce MacNeil [redacted]conquest-eng.com]
Sent: Thursday, October 12, 2017 4:10 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Hi Janet,

Yes, I will follow-up in the coming days with the information required.

Bruce

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 12, 2017 3:55 PM
To: Bruce MacNeil <bmacneil@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain *See Page 124*

[redacted]

20(1)

Moore, Janet L

From:	Bruce MacNeil [redacted]@conquest-eng.com>
Sent:	Thursday, October 12, 2017 2:53 PM
To:	Moore, Janet L
Cc:	Matlock, Bernard
Subject:	RE: Slate and Port Wallace Subdivision
Attachments:	Whebby, Bridge Terminal Project.pdf

Duplicate Email Chain See Page 125

[redacted]

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 12, 2017 2:30 PM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Cc: Matlock, Bernard <Bernard.Matlock@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain See Page 125

[redacted]

20(1)

CONQUEST ENGINEERING LTD.

Geotechnical and Materials Engineers
Concrete Technology, Blasting Consultants
Construction Quality Assurance / Quality Control

348 Bluewater Road, Bedford, NS B4B 1J6 • Phone (902)835-7313 • Fax (902)835-1260

December 14, 2011

[redacted]
W. Eric Whebby Limited
Box 38175 Burnside RPO
Dartmouth, NS B3B 1X2

Dear [redacted]

Re: Slate Sampling and Testing
Dartmouth Bridge Terminal, Dartmouth, Nova Scotia

This provides the results of our slate sampling and testing services for the proposed Dartmouth Bridge Terminal site in Dartmouth, NS.

Our main findings are as follows:

- The upper slate bedrock tested to date is not considered to be sulphide bearing material.
- The lower slate bedrock tested to date is considered to be sulphide bearing material and will require special disposal.

Seven samples of the slate bedrock were taken between November 9 and 18, 2011 and were tested for sulphur sulphide content. The sulphur content ranged between 0.10% and 0.39% for samples taken at the bedrock surface and 1.25% to 1.38% for two samples taken at approximate depths of 3 m. Also, four samples of the near surface slate bedrock were also tested for sulphur sulphide content as part of the Geotechnical Investigation and ESA. These results showed sulphur contents ranging between 0.04% and 0.16%. The exception was at the southwest corner where the near-surface slate was tested at 0.85% sulphide sulphur. This material will be kept on-site or taken to Kings Wharf (only).

Since the average sulphur content (0.15%) of the bedrock surface samples tested to date was less than the specified 0.4% in the NSE regulations, the upper portions of the weathered slate tested to date are not considered to be sulphide bearing material. Therefore, starting November 8, the upper portions of the slate bedrock were being transported off-site to a subdivision (Voyageur) for use as road construction fill. The lower portions of the slate bedrock will need to be disposed at Kings Wharf, pending approval from NSE.

Please contact us if you require additional information.

Thank you,

[redacted]

Geotechnical Engineer
[redacted]@conquest-eng.com
Project #437-002

[redacted]

R. Bruce MacNeil, P.Eng
Senior Geotechnical Engineer
[redacted]@conquest-eng.com

CONQUEST
ENGINEERING
LTD.

Geotechnical and Materials Engineers
Concrete Technology, Blasting Consultants
Construction Quality Assurance / Quality Control

348 Bluewater Road, Bedford, NS B4B 1J6 • Phone (902)835-7313 • Fax (902)835-1260

June 20, 2012

Mr. Bernard Matlock, P.Eng.
Regional Engineer
Nova Scotia Environment
30 Damascus Road
Suite 115
Bedford, NS B4A 0C1

Dear Mr. Matlock,

Re: Slate Testing Results – Removal Offsite
Dartmouth Bridge Terminal, Dartmouth, Nova Scotia

It is understood from discussions with you late last week that slate bedrock has been moved from the Dartmouth Terminal site to a site in Waverley. We were unaware that this material was being moved off-site, however, we made a site visit on June 19, 2012 to speak with the contractor (Whebby).

Based on our discussions with Whebby, the material that was moved off-site was the highly weathered, upper portions of the slate material from the northeast corner near Thistle Street. The following are our findings based on our initial testing conducted in November 2011:

- The upper slate bedrock tested to date is not considered to be sulphide bearing material.
- The lower slate bedrock tested to date is considered to be sulphide bearing material and will require special disposal.

These findings were based on seven samples of the slate bedrock taken between November 9 and 18, 2011 that were tested for total sulphur content. The sulphur content ranged between 0.10% and 0.39% for samples taken at the bedrock surface and 1.25% to 1.38% for two samples taken at approximate depths of 3 m. The results from the upper portion samples are provided in Table A below.

Also, four samples of the near surface slate bedrock were tested for sulphur sulphide content as part of the earlier Geotechnical Investigation. These results showed sulphur contents ranging between 0.04% and 0.16%. The exception was at the southeast corner where the near-surface slate was tested at 0.85% sulphide sulphur (Sample 9). This material will be kept on-site or taken to Kings Wharf (only).

Table A: Upper Portion of Bedrock Sulphur Results

Sample ID	Date (dd/mm/yy)	Total Sulphur* (% S)	Sulphide (% S)
Slate Sample 1	28/10/2011	0.390	<0.390*
Slate Sample 2	28/10/2011	0.160	<0.160*
Slate Sample 9	18/11/2011	**0.852**	<0.852*
Slate Sample 10	18/11/2011	0.100	<0.100*
Slate Sample 11	18/11/2011	0.201	<0.201*
TP104-S1	03/12/2009	0.058	<0.058*

TP106-S1	03/12/2009	0.036	<0.036*
TP108-S1	03/12/2009	0.119	<0.119*
BH5-S4	04/03/2009	0.164	0.138

*Total sulphur results are below 0.4%, so sulphide sulphur results will also be below 0.4%.

Since the average sulphur content (0.15%) of the bedrock surface samples was less than the specified 0.4% in the NSE regulations, the upper portions of the weathered slate was not considered to be sulphide bearing material.

It is also our understanding, based on recent discussions with Whebby, that the lower portions of the slate bedrock are currently being disposed at Kings Wharf.

Please contact us if you require additional information.

Thank you,

[redacted]

Geotechnical Engineer
[redacted]@conquest-eng.com

[redacted]

R. Bruce MacNeil, P.Eng
Senior Geotechnical Engineer
[redacted]@conquest-eng.com

NOVA SCOTIA
Environment

Suite 115,
30Damascus Road
Bedford, NS B4A 0C1

Tel: (902) 424-7773
Fax: (902) 424-0597

Our File Number:92100-30-BED-2011-077906

AUG 1 7 2011

Bruce Mac Neil, P.Eng.
Conquest Engineering Limited
348 Bluewater Road,
Bedford, N.S.
B4B 1J6

Dear Mr. Mac Neil:

RE: Approval to Disturb and Reuse Sulphide Bearing Materials
HRM, Dartmouth Bus Terminal Expansion,
PID # 0023267

Enclosed please find Approval # 2011-077906-A01 authorizing the disturbance and reuse of sulphide bearing materials for the proposed expansion of the Dartmouth Bus Terminal situated at Nantucket Ave., Dartmouth, HRM, Nova Scotia.

Strict adherence to the attached terms and conditions is imperative in order to validate this approval.

Despite the issuance of the Approval, the Approval Holder is still responsible for obtaining any other authorization which may be required to carry out the activity, including those which may be necessary under provincial, federal or municipal law.

Please arrange to forward the original approval to the Halifax Regional Municipality.

This Approval corrects the site location on the approval certificate. There are no other changes to the approval.

This Approval will superscede Approval # 2011-077906 which is now null and void.

Should you have any questions, please contact Bernie J Matlock, Central Region, Bedford Office at (902) 424-3631.

Yours truly,
Original Signed

S. Westhaver, P. Eng.
Administrator/ District Manager

cc B. Matlock, P. Eng.

NOVA SCOTIA

Environment

APPROVAL

Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1**

APPROVAL HOLDER: **Halifax Regional Municipality**

APPROVAL NO: **2011-077906-A01**

EXPIRY DATE: **August 7, 2021**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Construction and operation of Sulphide Bearing Material Temporary Storage and Reuse Site, and associated works, at or near Nantucket Avenue, Dartmouth, Halifax Regional Municipality in the Province of Nova Scotia.

Original Signed

Administrator ____________________

Effective Date August 17, 2011

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Project: Sulphide Bearing Material Disturbance and Reuse
Halifax Regional Municipality
Nantucket Ave.,
Dartmouth,
Halifax Regional Municipality

File No: 92100-30-BED-2011-077906

PID #s : 0023267

Reference Documents:

- Application for Industrial Approval dated July 11, 2011
- E-mail from Conquest Engineering Ltd dated August 4, 2011 and attached drawing numbers 1 and 2.

1. Definitions

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1 and includes all regulations made pursuant to the Act.

b) "Activity" refers to the proposed temporary storage and reuse of sulphide bearing materials.

c) "Administrator" means the Administrator designated by the Minister of the Nova Scotia Environment.

d) " Approval Holder" refers to Halifax Regional Municipality.

e) "Department" means the Central Region, Bedford Office, of the Nova Scotia Environment located at the following address:

Nova Scotia Environment
Environmental Monitoring and Compliance Division
Central Region, Bedford Office,
Suite 115, 30 Damascus Road,
Bedford, Nova Scotia, B4A 0C1.

Phone: (902) 424-7773
Fax: (902) 424-0597

f) " Site" refers to the lots with PID#' 0023267 on which the proposed Activity occurs.

2. Scope of Approval

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above to conduct the Activity, situated at or near the proposed Site.

b) The Activity shall be completed as outlined in the application for approval and Reference Documents. Take measurement

c) The Approval Holder shall limit the on Site reuse of sulphide bearing materials to 10,500 m^3 cubic metres. The Approval Holder shall be required to verify the amount of extraction at the request of the Department. ?

d) Reuse or temporary storage of sulphide bearing materials in excess of the volume referenced in condition 2 (c) shall require written authorization of the Department. Should not sulphide bearing

e) The Approval Holder shall obtain written permission from the Department to remove excess aggregate from the Site.

f) Should the work authorized by this Approval not be commenced within a year, this Approval shall automatically be null and void, unless extended in writing by an Administrator.

g) This Approval is restricted to the Activity only. No other alteration or infill of a watercourse or water resource is permitted by this Approval. Works associated with the alteration or infill of a watercourse or water resource will require separate approval from Nova Scotia Environment.

h) This Approval does not apply to the electrical, roadways, and structural components of the project.

i) This Approval supercedes previous Approval Number 2011-077906 which is now null and void.

3. General Terms and Conditions

a) The Approval Holder shall construct, operate and reclaim its Facility in accordance with provisions of the:

i) *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time;
ii) Regulations, as amended from time to time, pursuant to the above Act;

b) The Approval Holder is responsible for ensuring that they operate the Facility on lands which they own or have a lease or written agreement with the landowner or occupier. The Approval Holder shall be responsible for ensuring that the Department has, at all times, a copy of the most recent lease or written agreement with the landowner or occupier. Breach of this condition may result in cancellation or suspension of the Approval.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister or Administrator may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

e) This Approval is not transferable without the consent of the Minister or Administrator.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(2)(b) and 58(4) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change. Extensions or modifications to the Facility may be subject to the Environmental Assessment Regulations.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) Unless written approval is received otherwise from the Administrator, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, All monitoring results shall be submitted within 30 days following the month of monitoring.

o) Upon request of the Department the Approval Holder may be required to post security in those amounts specified in section 12(2) of the *Sulphide Bearing Material Disposal Regulations* at an amount of $25.00 per cubic metre of material disposed.

p) If terms and conditions of the Approval are not demonstrated to be complied with during completion of the Activty, the Department may require all work on the property to cease and order immediate remedial measures.

4. Sulphide Bearing Material Disturbance

a) (i) Written certification by a professional engineer is required stating that all construction and/or installation relating to the Activity has been conducted in accordance with the terms and conditions of this Approval and has met the minimum requirements of the drawings and specifications. received?

(ii) This certification must be provided to the Department, within 6 weeks of project completion.

(iii) The certification must confirm that all as-built drawings and any other relevant documentation have been turned over to the Approval Holder by the engineer.

b) The excavated/blasted sulphide bearing material shall be moved <u>daily</u> from the excavation or blast site and placed within the areas identified for reuse of sulphide bearing materials unless otherwise stated in the Approval. non-compliance

c) The disturbance of sulphide bearing material on the Site shall incorporate the following measures:

i) Limiting the removal of surface vegetation covering sulphide bearing bedrock during construction to that required for staged excavation, drilling and blasting activities.

ii) Limiting excavation, drilling and blasting activities to generate rock volumes necessary for controlled and staged cut and fills.

X d) Records of the building/infill location, amounts of material transferred, lot number(s), date of initial rock placement and date of final mitigation or encapsulation shall be maintained on the Site and be available for inspection upon request by the Department.

e) The clay soil used for encapsulation/cover areas shall be a minimum 750 mm thick with a maximum hydraulic conductivity of 1 X 10^{-6} cm/sec (or equivalent) and compacted to 95% Standard Proctor.

f) Test results confirming the hydraulic conductivity of the imported clay material to meet the required specification of a maximum 1 X 10^{-6} cm/sec must be provided to the Department from the borrow source of this material. This is required prior to placement of the capping material.

X → g) Disturbed sulphide bearing materials shall not remain exposed to elements of weather in excess of 30 days. If necessary, exposed stockpile materials shall be covered with tarps or capped with clay.

X → h) Temporary clay caps used on Site and placed over the sulphide bearing materials shall meet the specifications identified in condition 4(e). This cap shall be stabilized to prevent erosion.

to be updated → i) A report detailing the total quantities of sulphide bearing material re-used on the site and removed from the Site for disposal shall be submitted to the Department within 30 days of completion of the Activity.

5. Surface Water

a) The Approval Holder shall ensure the Site is situated to maintain a separation distance of 60 metres from a watercourse or water resource.

b) All water leaving the Site during the construction phase shall be directed to a central location for monitoring and control, and then to the municipal sewer system. Surface water collection ditches and retention pond(s) must be inspected by the consultant to ensure surface water is being collected effectively as construction proceeds. Records of such inspections shall be maintained by the on-site consultant and be available for inspection by the Department.

c) No authority is granted by this Approval to enable the Approval Holder to discharge surface water beyond the property boundary and onto adjoining lands or the storm water collection system without the authorization of the affected owner(s). It is the responsibility of the Approval Holder to ensure that the authorization of said owner(s) is current and valid.

d) The Approval Holder shall establish one (1) surface water monitoring station SW-1 prior to the final outfall to the municipal sewer system.

e) The Approval Holder shall monitor SW-1 on a weekly basis for one month prior to the commencement of construction and during construction and on a monthly basis following construction. The parameters of pH, field temperature, conductivity and total aluminum shall be analysed.

f) Results of monitoring shall be submitted to the Department on a monthly basis.

g) The Approval Holder shall conduct additional surface water monitoring as requested by the Department.

h) Based on sample results, the Department may alter the frequencies, location and parameters for analyses required for this Approval or require remedial action, including treatment.

i) Records of all surface water quality taken on the Site must be held by the Approval Holder and be available for inspection by the Department upon request.

j) Drainage swales, ditches and/or retention pond(s) shall be lined with adequate limestone or neutralizing materials to maintain discharge water quality if so directed by the Department.

Regards,
Janet

NOVA SCOTIA
Environment

Janet Moore
Environment Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
(902) 219-2532
Janet.Moore@novascotia.ca

NOVA SCOTIA

Environment
Compliance Division

NOTE-TO-FILE

RECORDED BY: Jack Moore Date: 2 Oct 2017

SITE/CLIENT NAME:

APPROVAL/FILE NUMBER:

SUBJECT: Message from Bruce MacNeil

- Clayton Development buying portion of land + results above 0.4% for their recent supply
- Bruce MacNeil
[redacted]

attachment:
From: Oct 02, 2017
email from BH to JMoore
& JMoore to BMatlock

Englobe

20(1)

englobecorp.com

May 25, 2016

[redacted]
Port Wallace Holdings Limited
255 Lacewood Dr., Suite 100
Halifax, Nova Scotia, B3M 4G2

Subject: **Slate Rock Stockpile Sampling**
Port Wallace, Dartmouth, NS
Our ref.: 20724

Dear [redacted]

Englobe Corp. (Englobe) conducted sampling of a stockpile of suspected slate rock at above-noted site. On April 28, 2016, six test pits were excavated into the stockpile at the locations presented on the attached figure. Englobe personnel collected six rock samples from the test pits for testing.

The samples were submitted to Dalhousie Universities Mineral Engineering Centre in Halifax, Nova Scotia for analysis of Total Sulphur and Acid Producing Potential to assess compliance with the Nova Scotia Environment (NSE) *Sulphide Bearing Material Disposal Regulations.*

Based on the laboratory results, all samples analysed exceed the NSE regulation criteria. Results are summarized in the table below. The laboratory certificate is attached.

Sample ID	Depth (mbGS)	Total Sulphur (Wt.%)	Acid Producing Potential (kg H_2SO_4/t)
TP1/1	1.2	1.759	53.81
TP1/2	2.4	1.078	32.96
TP4/2	2.4	0.596	18.25
TP5/1	1.5	1.058	32.35
TP5/2	3.0	1.347	41.19
TP6/2	3.0	0.829	25.37
TP6/2-DUP	3.0	0.829	25.35
NSE Regulation		0.4	12.51

[1] 1995 Nova Scotia Environment (NSE) *Sulphide Bearing Material Disposal Regulations.*
Note that NSE Regulation applies to sulphide (a portion of total sulphur) and test results are Total Sulphur.

T 902.468.6486
F 902.468.4919
dartmouth@englobecorp.com
97 Troop Avenue
Dartmouth (Nova Scotia)
Canada B3B 2A7

We trust this satisfies your present requirements. If you require additional information, please do not hesitate to contact the undersigned.

Yours very truly,
Englobe Corp.

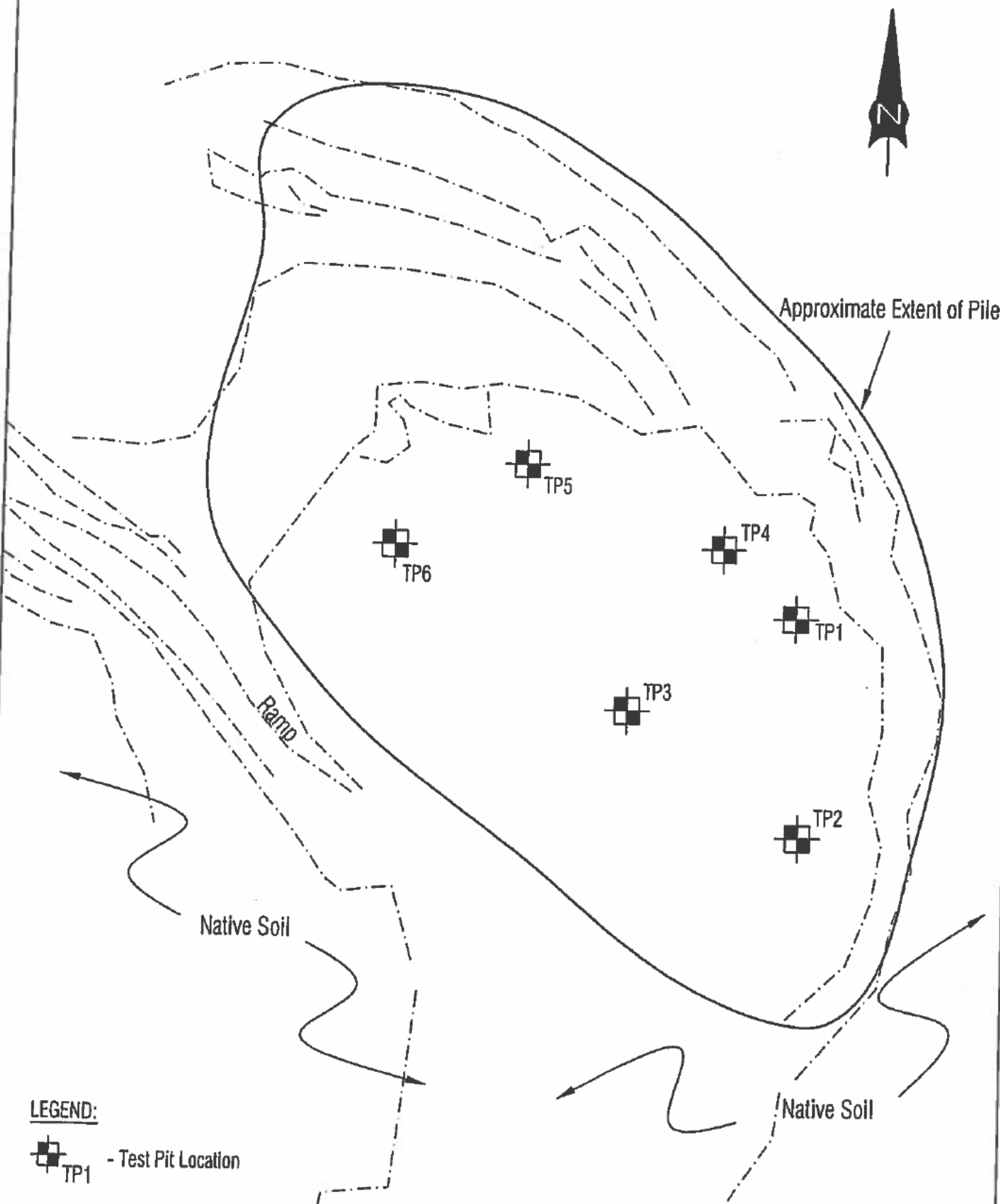
[redacted]

Original Signed

Lisa Ladouceur, CET
Technologist, Environmental Engineering

Aven Cole, M.Sc.E., P.Eng.
Project Manager, Environmental Engineering

Encl.



Englobe	Site Plan Showing Test Pit Location Port Wallace, Dartmouth, NS

DATE: May 2016	SCALE: 1:400	DRAWN BY: JJ	CKD BY: LL	JOB No. 20724	FIGURE 1

DALHOUSIE UNIVERSITY
Inspiring Minds

20(1)

Minerals Engineering Centre

Dalhousie University
1360 Barrington Street
GH Murray Bldg. Rm. G101
PO Box 15000, Halifax, NS
B3H 4R2

minerals.engineering.dal.ca
Tel: 902.494.3956
Email: mec@dal.ca

May 6, 2016

Englobe Corp.
97 Troop Ave.
Dartmouth, NS
B3B 2A7
Attention: Aven Cole

Re: Results of analysis on submitted samples.

Job #20724

Sample	Wt. % S (Total)	kg H2SO4/t Acid Producing Potential
Englobe TP 1/1	1.759	53.81
Englobe TP 1/2	1.078	32.96
Englobe TP 4/2	0.596	18.25
Englobe TP 5/1	1.058	32.35
Englobe TP 5/2	1.347	41.19
Englobe TP 6/2	0.829	25.37
Englobe TP 6/2-DUP	0.829	25.35

Reference Sample:

Sample	Wt. % S (Total)
NBM-1 (0.28% Sulphur)	0.275

[redacted] 20(1)

Manager, Minerals Engineering Centre

20(1)

Moore, Janet L

From: Moore, Janet L
Sent: Monday, October 02, 2017 2:01 PM
To: Matlock, Bernard
Subject: FW: Slate and Port Wallace Subdivision
Attachments: EnGlobe Slate Results, Whebby Lands.pdf

Bernie – it would appear then that this is sulphide bearing materials. I wrote Bruce back, again, indicating it shall be disposed of at an approved facility. I'm assuming I may now also need to ensure that it has been stored appropriately prior to disposal and in turn may have implications on why it was permitted to be stored off site in the first place.
Cheers, Janet

From: Bruce MacNeil [redacted]@conquest-eng.com]
Sent: Monday, October 02, 2017 9:19 AM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain

See Page 126 & 127

[redacted]

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 2, 2017 9:14 AM
To: Bruce MacNei[redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

20(1)

Moore, Janet L

From:	Bruce MacNeil <[redacted]@conquest-eng.com>
Sent:	Monday, October 02, 2017 9:19 AM
To:	Moore, Janet L
Subject:	RE: Slate and Port Wallace Subdivision
Attachments:	EnGlobe Slate Results, Whebby Lands.pdf

Duplicate Email Chain *See Page 126 & 127*

[redacted]

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: October 2, 2017 9:14 AM
To: Bruce MacNeil [redacted]conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain *See Page 127*

[redacted]

20(1)

Englobe

englobecorp.com

May 25, 2016

[redacted]
Port Wallace Holdings Limited
255 Lacewood Dr., Suite 100
Halifax, Nova Scotia, B3M 4G2

Subject: **Slate Rock Stockpile Sampling**
Port Wallace, Dartmouth, NS
Our ref.: 20724

Dear [redacted]

Englobe Corp. (Englobe) conducted sampling of a stockpile of suspected slate rock at above-noted site. On April 28, 2016, six test pits were excavated into the stockpile at the locations presented on the attached figure. Englobe personnel collected six rock samples from the test pits for testing.

The samples were submitted to Dalhousie Universities Mineral Engineering Centre in Halifax, Nova Scotia for analysis of Total Sulphur and Acid Producing Potential to assess compliance with the Nova Scotia Environment (NSE) *Sulphide Bearing Material Disposal Regulations.*

Based on the laboratory results, all samples analysed exceed the NSE regulation criteria. Results are summarized in the table below. The laboratory certificate is attached.

Sample ID	Depth (mbGS)	Total Sulphur (Wt.%)	Acid Producing Potential (kg H_2SO_4/t)
TP1/1	1.2	1.759	53.81
TP1/2	2.4	1.078	32.96
TP4/2	2.4	0.596	18.25
TP5/1	1.5	1.058	32.35
TP5/2	3.0	1.347	41.19
TP6/2	3.0	0.829	25.37
TP6/2-DUP	3.0	0.829	25.35
NSE Regulation		0.4	12.51

[1] 1995 Nova Scotia Environment (NSE) *Sulphide Bearing Material Disposal Regulations.*
Note that NSE Regulation applies to sulphide (a portion of total sulphur) and test results are Total Sulphur.

Englobe Corp.

T 902.468.8486
F 902.468.4919
dartmouth@englobecorp.com

97 Troop Avenue
Dartmouth (Nova Scotia)
Canada B3B 2A7

20(1)

May 25, 2016

We trust this satisfies your present requirements. If you require additional information, please do not hesitate to contact the undersigned.

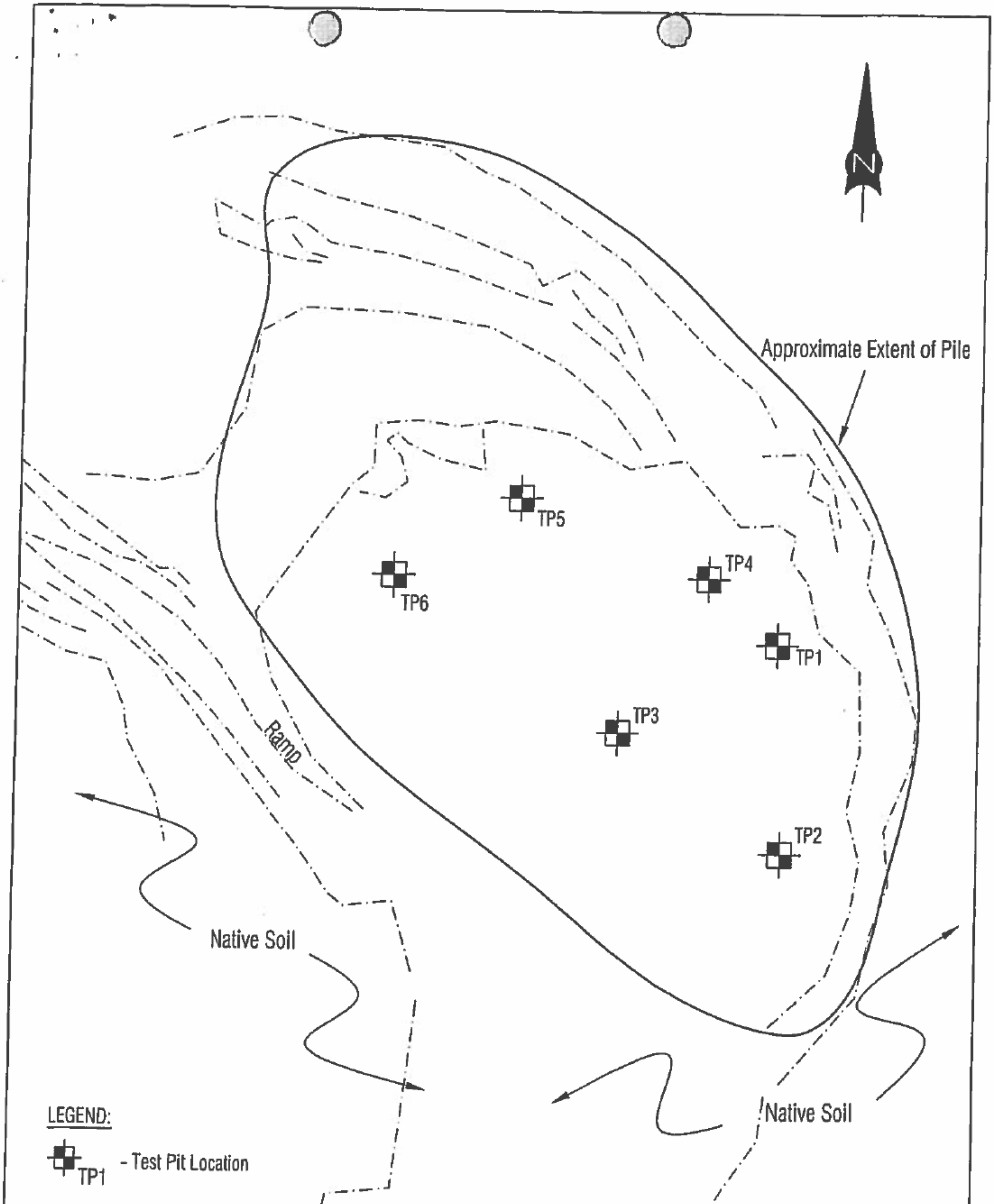
Yours very truly,
Englobe Corp.

Original Signed

Lisa Ladouceur, CET
Technologist, Environmental Engineering

Aven Cole, M.Sc.E., P.Eng.
Project Manager, Environmental Engineering

Encl.



Englobe			Site Plan Showing Test Pit Location Port Wallace, Dartmouth, NS		
DATE: May 2016	SCALE: 1:400	DRAWN BY: JJ	CKD BY: LL	JOB No. 20724	FIGURE 1

DALHOUSIE UNIVERSITY
Inspiring Minds

20(1)

Minerals Engineering Centre

Dalhousie University
1360 Barrington Street
GH Murray Bldg. Rm. G101
PO Box 15000, Halifax, NS
B3H 4R2

minerals.engineering.dal.ca
Tel: 902.494.3955
Email: mec@dal.ca

May 6, 2016

Englobe Corp.
97 Troop Ave.
Dartmouth, NS
B3B 2A7
Attention: Aven Cole

Re: Results of analysis on submitted samples.

Job #20724

Sample	Wt. % S (Total)	kg H2SO4/t Acid Producing Potential
Englobe TP 1/1	1.759	53.81
Englobe TP 1/2	1.078	32.96
Englobe TP 4/2	0.596	18.25
Englobe TP 5/1	1.058	32.35
Englobe TP 5/2	1.347	41.19
Englobe TP 6/2	0.829	25.37
Englobe TP 6/2-DUP	0.829	25.35

Reference Sample:

Sample	Wt. % S (Total)
NBM-1 (0.28% Sulphur)	0.275

Manager, Minerals Engineering Centre

Moore, Janet L

From: Moore, Janet L
Sent: Friday, September 29, 2017 11:28 AM
To: 'Bruce MacNeil'
Subject: RE: Slate and Port Wallace Subdivision

Hi Bruce,
I am working in the field and out of the office until later this afternoon so I may not be able to review and correspond regarding this matter until next week. Otherwise, as I noted, if the material does not meet the lawfully described definition of sulphide bearing material (i.e., in the respective Regulation), then disposal at an approved facility is not required. And according to the information you provided (your letter), the material does not meet the definition.
Regards,
Janet

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
Janet.Moore@novascotia.ca

From: Bruce MacNei[redacted]@conquest-eng.com]
Sent: Thursday, September 28, 2017 3:57 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: Re: Slate and Port Wallace Subdivision

Duplicate Email Chain

See Page 128

[redacted]

From: Moore, Janet L
Sent: Thursday, September 28, 2017 2:05 PM
To: Bruce MacNeil
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain *See Page 128*

[redacted]

Moore, Janet L

From:	Bruce MacNeil [redacted]conquest-eng.com>
Sent:	Thursday, September 28, 2017 12:17 PM
To:	Moore, Janet L
Subject:	RE: Slate and Port Wallace Subdivision
Attachments:	Bruce MacNeil, Slate Fill Review Sep20, Port Wallace.pdf; Whebby Lands (proposed Port Wallace SD).kmz; Whebby, Bridge Terminal Project.pdf

Duplicate Email Chain See Page 128

[redacted]

From: Moore, Janet L [mailto:Janet.Moore@novascotia.ca]
Sent: September 12, 2017 8:56 AM
To: Bruce MacNeil [redacted]@conquest-eng.com>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain See Page 128 & 129

[redacted]

Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS B4B 1S7
902-430-2830

September 28, 2017

Ms. Janet Moore, MSc
Nova Scotia Environment
Via email:

Dear Ms. Moore,

Re: Trucking of Slate Fill (Non-Sulphide Bearing Material)
Proposed Port Wallace Subdivision, Waverley, NS

Further to my letter to Mr. Jamie Burns, P.Eng. on July 20, 2017 (summarizing my conversation on June 6, 2017), and further to several conversations with you, we wish to notify Nova Scotia Environment that W. Eric Whebby Construction Limited will be trucking slate fill from their own lands in Waverley to an active municipal services project within the Leiblin Drive right-of-way in Halifax. The slate fill has already been determined to be as non-sulphide bearing material (see attached documentation). A Google Earth file will be send separately with the location of the fill and the new destination for the material.

The material was originally exported from the Dartmouth Bridge Terminal project in 2011 and taken to lands that are now part of the proposed Port Wallace Subdivision lands in Waverley. The slate was tested extensively in 2011. The upper weathered portion of the slate bedrock was below 0.4% sulphide sulphur. The results were documented and submitted to NSE in 2011. Deeper portions of the slate from the Bridge Terminal site were taken to a licenced facility, as approved by NS Environment.

As discussed, the previous test results on the slate fill taken to the proposed Port Wallace Subdivision lands in Waverley would still be valid, and therefore, the material would not be a regulated material under the Environment Act. Based on the previous test results, exporting material from the current location to another property, with both property owner's permission, would not require an approval under the Sulphide Bearing Material Regulations under the Environment Act.

As discussed, because of possible public perception associated with exporting slate fill, our client will use extra procedures with placing this material. These extra procedures will include: placement in a non-sensitive area, use of impermeable cover, etc. As discussed, such practices are not required in this situation, but our client will do this anyway to avoid possible public perception that all slate is a sulphide bearing material.

As discussed, it is generally understood by geotechnical/environmental engineers and NS Environment that the test results on slate can vary. The results for a selected piece of slate can be elevated, but some variation is normal, and average results are typically used. As such, reliance on the previous testing program, which was very thorough, would be the best approach with this material.

Please contact me if you have any questions.

Regards,

Original Signed

R. Bruce MacNeil, P.Eng.
Senior Geotechnical Engineer
macneilengineering@gmail.com

20(1)

CONQUEST ENGINEERING LTD.

Geotechnical and Materials Engineers
Concrete Technology, Blasting Consultants
Construction Quality Assurance / Quality Control

348 Bluewater Road, Bedford, NS B4B 1J6 • Phone (902)835-7313 • Fax (902)835-1260

December 14, 2011

[redacted]
W. Eric Whebby Limited
Box 38175 Burnside RPO
Dartmouth, NS B3B 1X2

Dear [redacted]

Re: Slate Sampling and Testing
Dartmouth Bridge Terminal, Dartmouth, Nova Scotia

This provides the results of our slate sampling and testing services for the proposed Dartmouth Bridge Terminal site in Dartmouth, NS.

Our main findings are as follows:

- The upper slate bedrock tested to date is not considered to be sulphide bearing material.
- The lower slate bedrock tested to date is considered to be sulphide bearing material and will require special disposal.

Seven samples of the slate bedrock were taken between November 9 and 18, 2011 and were tested for sulphur sulphide content. The sulphur content ranged between 0.10% and 0.39% for samples taken at the bedrock surface and 1.25% to 1.38% for two samples taken at approximate depths of 3 m. Also, four samples of the near surface slate bedrock were also tested for sulphur sulphide content as part of the Geotechnical Investigation and ESA. These results showed sulphur contents ranging between 0.04% and 0.16%. The exception was at the southwest corner where the near-surface slate was tested at 0.85% sulphide sulphur. This material will be kept on-site or taken to Kings Wharf (only).

Since the average sulphur content (0.15%) of the bedrock surface samples tested to date was less than the specified 0.4% in the NSE regulations, the upper portions of the weathered slate tested to date are not considered to be sulphide bearing material. Therefore, starting November 8, the upper portions of the slate bedrock were being transported off-site to a subdivision (Voyageur) for use as road construction fill. The lower portions of the slate bedrock will need to be disposed at Kings Wharf, pending approval from NSE.

Please contact us if you require additional information.

Thank you

[redacted]
Geotechnical Engineer
[redacted]@conquest-eng.com

[redacted]
R. Bruce MacNeil, P.Eng
Senior Geotechnical Engineer
[redacted]@conquest-eng.com

Project #437-002

CONQUEST ENGINEERING LTD.

Geotechnical and Materials Engineers
Concrete Technology, Blasting Consultants
Construction Quality Assurance / Quality Control

348 Bluewater Road, Bedford, NS B4B 1J6 • Phone (902)835-7313 • Fax (902)835-1260

June 20, 2012

Mr. Bernard Matlock, P.Eng.
Regional Engineer
Nova Scotia Environment
30 Damascus Road
Suite 115
Bedford, NS B4A 0C1

Dear Mr. Matlock,

Re: Slate Testing Results – Removal Offsite
Dartmouth Bridge Terminal, Dartmouth, Nova Scotia

It is understood from discussions with you late last week that slate bedrock has been moved from the Dartmouth Terminal site to a site in Waverley. We were unaware that this material was being moved off-site, however, we made a site visit on June 19, 2012 to speak with the contractor (Whebby).

Based on our discussions with Whebby, the material that was moved off-site was the highly weathered, upper portions of the slate material from the northeast corner near Thistle Street. The following are our findings based on our initial testing conducted in November 2011:

- The upper slate bedrock tested to date is not considered to be sulphide bearing material.
- The lower slate bedrock tested to date is considered to be sulphide bearing material and will require special disposal.

These findings were based on seven samples of the slate bedrock taken between November 9 and 18, 2011 that were tested for total sulphur content. The sulphur content ranged between 0.10% and 0.39% for samples taken at the bedrock surface and 1.25% to 1.38% for two samples taken at approximate depths of 3 m. The results from the upper portion samples are provided in Table A below.

Also, four samples of the near surface slate bedrock were tested for sulphur sulphide content as part of the earlier Geotechnical Investigation. These results showed sulphur contents ranging between 0.04% and 0.16%. The exception was at the southeast corner where the near-surface slate was tested at 0.85% sulphide sulphur (Sample 9). This material will be kept on-site or taken to Kings Wharf (only).

Table A: Upper Portion of Bedrock Sulphur Results

Sample ID	Date (dd/mm/yy)	Total Sulphur* (% S)	Sulphide (% S)
Slate Sample 1	28/10/2011	0.390	<0.390*
Slate Sample 2	28/10/2011	0.160	<0.160*
Slate Sample 9	18/11/2011	0.852	<0.852*
Slate Sample 10	18/11/2011	0.100	<0.100*
Slate Sample 11	18/11/2011	0.201	<0.201*
TP104-S1	03/12/2009	0.058	<0.058*

TP106-S1	03/12/2009	0.036	<0.036*
TP108-S1	03/12/2009	0.119	<0.119*
BH5-S4	04/03/2009	0.164	0.138

*Total sulphur results are below 0.4%, so sulphide sulphur results will also be below 0.4%.

Since the average sulphur content (0.15%) of the bedrock surface samples was less than the specified 0.4% in the NSE regulations, the upper portions of the weathered slate was not considered to be sulphide bearing material.

It is also our understanding, based on recent discussions with Whebby, that the lower portions of the slate bedrock are currently being disposed at Kings Wharf.

Please contact us if you require additional information.

Thank you,

[redacted]

Geotechnical Engineer
[redacted]@conquest-eng.com

[redacted]

R. Bruce MacNeil, P.Eng
Senior Geotechnical Engineer
[redacted]conquest-eng.com

NOVA SCOTIA
Environment

Suite 115,
30Damascus Road
Bedford, NS B4A 0C1

Tel: (902) 424-7773
Fax: (902) 424-0597

AUG 1 7 2011

Our File Number:92100-30-BED-2011-077906

Bruce Mac Neil, P.Eng.
Conquest Engineering Limited
348 Bluewater Road,
Bedford, N.S.
B4B 1J6

Dear Mr. Mac Neil:

RE: Approval to Disturb and Reuse Sulphide Bearing Materials
HRM, Dartmouth Bus Terminal Expansion,
PID # 0023267

Enclosed please find Approval # 2011-077906-A01 authorizing the disturbance and reuse of sulphide bearing materials for the proposed expansion of the Dartmouth Bus Terminal situated at Nantucket Ave., Dartmouth, HRM, Nova Scotia.

Strict adherence to the attached terms and conditions is imperative in order to validate this approval.

Despite the issuance of the Approval, the Approval Holder is still responsible for obtaining any other authorization which may be required to carry out the activity, including those which may be necessary under provincial, federal or municipal law.

Please arrange to forward the original approval to the Halifax Regional Municipality.

This Approval corrects the site location on the approval certificate. There are no other changes to the approval.

This Approval will superscede Approval # 2011-077906 which is now null and void.

Should you have any questions, please contact Bernie J Matlock, Central Region, Bedford Office at (902) 424-3631.

Yours truly,
Original Signed

S. Westhaver, P. Eng.
Administrator/ District Manager

cc B. Matlock, P. Eng.

NOVA SCOTIA

Environment

APPROVAL

Province of Nova Scotia
***Environment Act*, S.N.S. 1994-95, c.1**

APPROVAL HOLDER: **Halifax Regional Municipality**

APPROVAL NO: **2011-077906-A01**

EXPIRY DATE: **August 7, 2021**

Pursuant to Part V of the *Environment Act*, S.N.S. 1994-95, c.1 as amended from time to time, approval is granted to the Approval Holder subject to the Terms and Conditions attached to and forming part of this Approval, for the following activity:

Construction and operation of Sulphide Bearing Material Temporary Storage and Reuse Site, and associated works, at or near Nantucket Avenue, Dartmouth, Halifax Regional Municipality in the Province of Nova Scotia.

Administrator Original Signed

Effective Date August 17, 2011

TERMS AND CONDITIONS OF APPROVAL

Nova Scotia Environment

Project: Sulphide Bearing Material Disturbance and Reuse
Halifax Regional Municipality
Nantucket Ave.,
Dartmouth,
Halifax Regional Municipality

File No: 92100-30-BED-2011-077906

PID #s : 0023267

Reference Documents:

- Application for Industrial Approval dated July 11, 2011
- E-mail from Conquest Engineering Ltd dated August 4, 2011 and attached drawing numbers 1 and 2.

1. Definitions

a) "Act" means the *Environment Act* S.N.S. 1994-1995, c.1 and includes all regulations made pursuant to the Act.

b) "Activity" refers to the proposed temporary storage and reuse of sulphide bearing materials.

c) "Administrator" means the Administrator designated by the Minister of the Nova Scotia Environment.

d) " Approval Holder" refers to Halifax Regional Municipality.

e) "Department" means the Central Region, Bedford Office, of the Nova Scotia Environment located at the following address:

Nova Scotia Environment
Environmental Monitoring and Compliance Division
Central Region, Bedford Office,
Suite 115, 30 Damascus Road,
Bedford, Nova Scotia, B4A 0C1.

Phone: (902) 424-7773
Fax: (902) 424-0597

f) " Site" refers to the lots with PID#' 0023267 on which the proposed Activity occurs.

2. **Scope of Approval**

a) This Approval (the "Approval") relates to the Approval Holder and their application and supporting documentation, as listed in the reference documents above to conduct the Activity, situated at or near the proposed Site.

b) The Activity shall be completed as outlined in the application for approval and Reference Documents.

c) The Approval Holder shall limit the on Site reuse of sulphide bearing materials to 10,500 m^3 cubic metres. The Approval Holder shall be required to verify the amount of extraction at the request of the Department.

d) Reuse or temporary storage of sulphide bearing materials in excess of the volume referenced in condition 2 (c) shall require written authorization of the Department.

e) The Approval Holder shall obtain written permission from the Department to remove excess aggregate from the Site.

f) Should the work authorized by this Approval not be commenced within a year, this Approval shall automatically be null and void, unless extended in writing by an Administrator.

g) This Approval is restricted to the Activity only. No other alteration or infill of a watercourse or water resource is permitted by this Approval. Works associated with the alteration or infill of a watercourse or water resource will require separate approval from Nova Scotia Environment.

h) This Approval does not apply to the electrical, roadways, and structural components of the project.

i) *This Approval supercedes previous Approval Number 2011-077906 which is* now null and void.

3. **General Terms and Conditions**

a) The Approval Holder shall construct, operate and reclaim its Facility in accordance with provisions of the:

i) *Environment Act* S.N.S. 1994-1995, c.1, as amended from time to time;
ii) Regulations, as amended from time to time, pursuant to the above Act;

b) The Approval Holder is responsible for ensuring that they operate the Facility on lands which they own or have a lease or written agreement with the landowner or occupier. The Approval Holder shall be responsible for ensuring that the Department has, at all times, a copy of the most recent lease or written agreement with the landowner or occupier. Breach of this condition may result in cancellation or suspension of the Approval.

c) If there is a discrepancy between the reference documents and the terms and conditions of this Approval, the terms and conditions of this Approval shall apply.

d) The Minister or Administrator may modify, amend or add conditions to this Approval at anytime pursuant to Section 58 of the Act.

e) This Approval is not transferable without the consent of the Minister or Administrator.

f) (i) If the Minister or Administrator determines that there has been non-compliance with any or all of the terms and conditions contained in this Approval, the Minister or Administrator may cancel or suspend the Approval pursuant to subsections 58(2)(b) and 58(4) of the Act, until such time as the Minister or Administrator is satisfied that all terms and conditions have been met.

(ii) Despite a cancellation or suspension of this Approval, the Approval Holder remains subject to the penalty provisions of the Act and regulations.

g) The Approval Holder shall notify the Department prior to any proposed extensions or modifications of the Facility, including the active area, process changes or waste disposal practices which are not granted under this Approval. An amendment to this Approval will be required before implementing any change. Extensions or modifications to the Facility may be subject to the Environmental Assessment Regulations.

h) Pursuant to Section 60 of the *Act*, the Approval Holder shall submit to the Administrator any new and relevant information respecting any adverse effect that actually results, or may potentially result, from any activity to which the Approval relates and that comes to the attention of the Approval Holder after the issuance of the Approval.

i) The Approval Holder shall immediately notify the Department of any incidents of non-compliance with this Approval.

j) The Approval Holder shall bear all expenses incurred in carrying out the environmental monitoring required under the terms and conditions of this Approval.

k) Unless specified otherwise in this Approval, all samples required to be collected by this Approval shall be collected, preserved and analysed, by qualified personnel, in accordance with recognized industry standards and procedures.

l) Unless written approval is received otherwise from the Administrator, all samples required by this Approval shall be analysed by a laboratory that meets the requirements of the Department's "Policy on Acceptable Certification of Laboratories" as amended from time to time.

m) The Approval Holder shall submit any monitoring results or reports required by this Approval to the Department. Unless specified otherwise in this Approval, All monitoring results shall be submitted within 30 days following the month of monitoring.

o) Upon request of the Department the Approval Holder may be required to post security in those amounts specified in section 12(2) of the *Sulphide Bearing Material Disposal Regulations* at an amount of $25.00 per cubic metre of material disposed.

p) If terms and conditions of the Approval are not demonstrated to be complied with during completion of the Activty, the Department may require all work on the property to cease and order immediate remedial measures.

4. **Sulphide Bearing Material Disturbance**

a) (i) Written certification by a professional engineer is required stating that all construction and/or installation relating to the Activity has been conducted in accordance with the terms and conditions of this Approval and has met the minimum requirements of the drawings and specifications.

(ii) This certification must be provided to the Department, within 6 weeks of project completion.

(iii) The certification must confirm that all as-built drawings and any other relevant documentation have been turned over to the Approval Holder by the engineer.

b) The excavated/blasted sulphide bearing material shall be moved <u>daily</u> from the excavation or blast site and placed within the areas identified for reuse of sulphide bearing materials unless otherwise stated in the Approval.

c) The disturbance of sulphide bearing material on the Site shall incorporate the following measures:

   i) Limiting the removal of surface vegetation covering sulphide bearing bedrock during construction to that required for staged excavation, drilling and blasting activities.

   ii) Limiting excavation, drilling and blasting activities to generate rock volumes necessary for controlled and staged cut and fills.

d) Records of the building/infill location, amounts of material transferred, lot number(s), date of initial rock placement and date of final mitigation or encapsulation shall be maintained on the Site and be available for inspection upon request by the Department.

e) The clay soil used for encapsulation/cover areas shall be a minimum 750 mm thick with a maximum hydraulic conductivity of 1×10^{-6} cm/sec (or equivalent) and compacted to 95% Standard Proctor.

f) Test results confirming the hydraulic conductivity of the imported clay material to meet the required specification of a maximum 1×10^{-6} cm/sec must be provided to the Department from the borrow source of this material. This is required prior to placement of the capping material.

g) Disturbed sulphide bearing materials shall not remain exposed to elements of weather in excess of 30 days. If necessary, exposed stockpile materials shall be covered with tarps or capped with clay.

h) Temporary clay caps used on Site and placed over the sulphide bearing materials shall meet the specifications identified in condition 4(e). This cap shall be stabilized to prevent erosion.

i) A report detailing the total quantities of sulphide bearing material re-used on the site and removed from the Site for disposal shall be submitted to the Department within 30 days of completion of the Activity.

5. **Surface Water**

a) The Approval Holder shall ensure the Site is situated to maintain a separation distance of 60 metres from a watercourse or water resource.

b) All water leaving the Site during the construction phase shall be directed to a central location for monitoring and control, and then to the municipal sewer system. Surface water collection ditches and retention pond(s) must be inspected by the consultant to ensure surface water is being collected effectively as construction proceeds. Records of such inspections shall be maintained by the on-site consultant and be available for inspection by the Department.

c) No authority is granted by this Approval to enable the Approval Holder to discharge surface water beyond the property boundary and onto adjoining lands or the storm water collection system without the authorization of the affected owner(s). It is the responsibility of the Approval Holder to ensure that the authorization of said owner(s) is current and valid.

d) The Approval Holder shall establish one (1) surface water monitoring station SW-1 prior to the final outfall to the municipal sewer system.

e) The Approval Holder shall monitor SW-1 on a weekly basis for one month prior to the commencement of construction and during construction and on a monthly basis following construction. The parameters of pH, field temperature, conductivity and total aluminum shall be analysed.

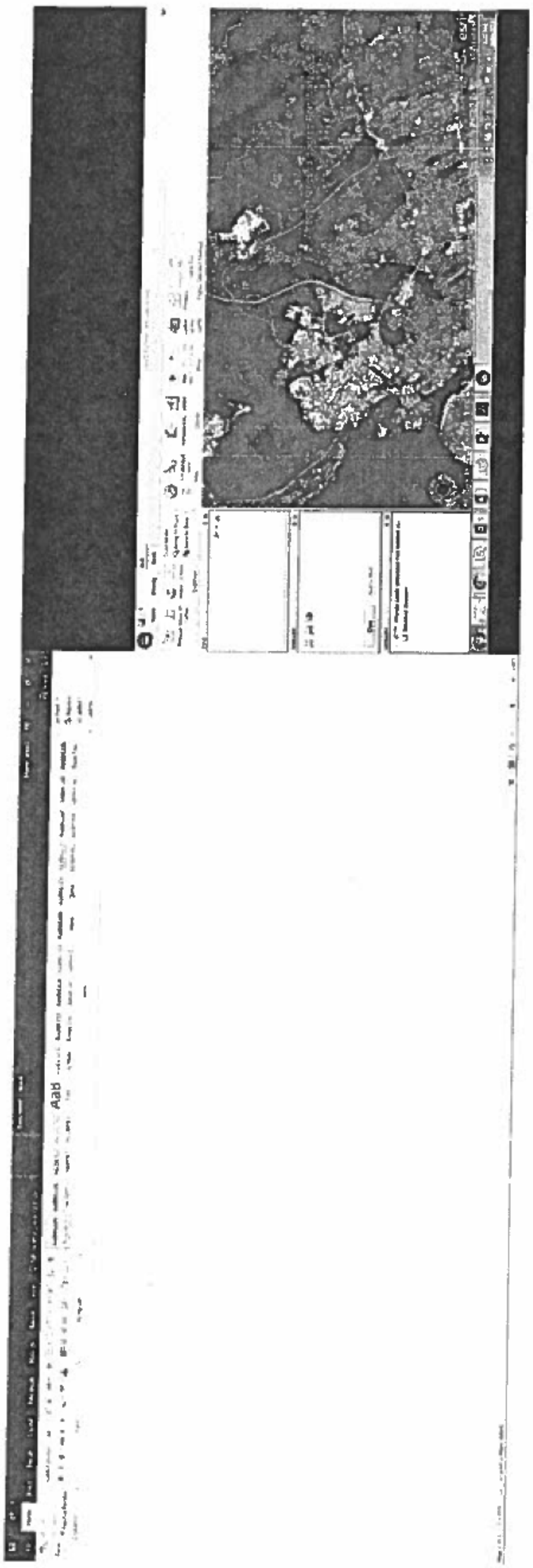
f) Results of monitoring shall be submitted to the Department on a monthly basis.

g) The Approval Holder shall conduct additional surface water monitoring as requested by the Department.

h) Based on sample results, the Department may alter the frequencies, location and parameters for analyses required for this Approval or require remedial action, including treatment.

i) Records of all surface water quality taken on the Site must be held by the Approval Holder and be available for inspection by the Department upon request.

j) Drainage swales, ditches and/or retention pond(s) shall be lined with adequate limestone or neutralizing materials to maintain discharge water quality if so directed by the Department.



NOVA SCOTIA

Environment
Compliance Division

NOTE-TO-FILE

RECORDED BY: Janet Moore   Date: 28 Sept 2017

SITE/CLIENT NAME: Webbe Development off Waverley Rd

APPROVAL/FILE NUMBER: Port Wallace Subdivision

Brian cell 430 2830

SUBJECT:

Brian MacNeil

-> Webbe Construction Moving as early as Monday the material
-> Below guidelines for sulphide bearing regs to slate
-> Sample results + letter - he will send apply
-> Can simply say received.

Confirmed "non-sulphide bearing material" several occasions on phone

Going to HRM road right of way

Moore, Janet L

From: Moore, Janet L
Sent: Tuesday, September 12, 2017 8:56 AM
To: 'Bruce MacNeil'
Subject: RE: Slate and Port Wallace Subdivision

Hi Bruce,
Yes, disposal of sulfide bearing material (as defined/identified by the Regulation) does require disposal at an approved facility. Please refer to the Sulphide Bearing Material Disposal Regulation for further detail regarding potential requirements to screen materials and have these samples analyzed along with excavation requirements etc. particularly if there is any uncertainly regarding existing sulphide concentrations in the materials/slate earlier deposited at the Port Wallace subdivision lands and which originated from an area as having high sulphide concentrations.

http://novascotia.ca/just/regulations/regs/env5795.htm

Thank you for your inquiry.

12 Sept 2017 - Bruce called
May require approval for
on-site disposal or
removed + deposited at
approved site - Harbour site -
may be chosen - still uncertain
+ described local concern is
exists.

NOVA SCOTIA
Environment

Janet Moore, MSc
Environmental Inspector
Inspection Compliance & Enforcement Division

30 Damascus Road, Suite 115
Bedford, NS B4A 0C1
☎ (902) 219-2532
✉ Janet.Moore@novascotia.ca

From: Bruce MacNeil [mailto:[redacted]@conquest-eng.com]
Sent: Friday, September 08, 2017 2:51 PM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Subject: RE: Slate and Port Wallace Subdivision

Duplicate Email Chain

See Page 129

NOVA SCOTIA

Environment
Compliance Division

NOTE-TO-FILE

RECORDED BY: Janet Moore Date: 23 Aug 2017

SITE/CLIENT NAME:

APPROVAL/FILE NUMBER:

SUBJECT:

acting on behalf of
- Bruce McNeil Webby placed upper portion on their land. =
- Clayton now want

- Clayton put it in writing
- NSE to comment re: storage of materials

NOVA SCOTIA

Environment
Compliance Division

NOTE-TO-FILE

RECORDED BY: Janet Moore Date: 27 July 2017

SITE/CLIENT NAME: Port Wallace Subdivision - Clayton Developer

APPROVAL/FILE NUMBER: Bruce MacNeil Inquiry

SUBJECT:

- Bruce spoke to James already
- Trying to deal with public perception
- Needs to be above 0.4%
- If able to count.

Got permit to develop in Slate - weathered portion below but below portion >0.4%.

- Kings Wharf accepted Sulphide bearing material

- Clayton Development buying lands + people concerned.
- Best thing for Waverley is to move material they own

- Not necessary that we had to respond.
- Explained NSE wouldn't write letter about the material

cont'd

Moore, Janet L

From: Moore, Janet L
Sent: Thursday, July 27, 2017 2:14 PM
To: Horne, Sara; Randell, Terry B
Cc: Bennett, Norma J
Subject: RE: Slate Fill, Port Wallace Lands, Waverley

I spoke with Bruce MacNeil today and subsequently wrote the following email (below). No further action required at present. Please forward to Jamie as appropriate.

Bruce,
Further to our conversation below are my coordinates.

Concerned residents can contact me/the Department. When complaints are made, this prompts further inspections/inquiries and the result is a more formal response and/or request for more information (sample results etc.) from the developer.

I understood that you are not seeking a response at present, but if the situation changes, please feel free to contact me.

Thank you for bringing this to our attention.

Regards,
Janet

From: Horne, Sara
Sent: Thursday, July 27, 2017 9:11 AM
To: Randell, Terry B <Terry.Randell@novascotia.ca>; Moore, Janet L <Janet.Moore@novascotia.ca>
Cc: Bennett, Norma J <Norma.Bennett@novascotia.ca>
Subject: RE: Slate Fill, Port Wallace Lands, Waverley

Recorded as ITS 3270, please have back to Jamie by August 2 2017

Sara

From: Randell, Terry B
Sent: Thursday, July 27, 2017 9:07 AM
To: Moore, Janet L <Janet.Moore@novascotia.ca>
Cc: Bennett, Norma J <Norma.Bennett@novascotia.ca>; Horne, Sara <Sara.Horne@novascotia.ca>
Subject: FW: Slate Fill, Port Wallace Lands, Waverley

Hi Janet,

Please prepare a response to the ITS action.
Sara, can you please provide a due date?

Thanks,
Terry

From: Burns, Jamie R
Sent: July 27, 2017 9:02 AM
To: Randell, Terry B <Terry.Randell@novascotia.ca>
Cc: Horne, Sara <Sara.Horne@novascotia.ca>
Subject: FW: Slate Fill, Port Wallace Lands, Waverley

Hi Terry,
Can you have Janet (I think) prepare a response to this letter?

Sara for ITS.
Thanks
Jamie

From: Bruce MacNeil [mailto:[redacted]@gmail.com]
Sent: Thursday, July 27, 2017 8:49 AM
To: Burns, Jamie R <Jamie.Burns@novascotia.ca>
Subject: Slate Fill, Port Wallace Lands, Waverley

Hi Jamie,

We talked about some slate fill that was previously determined to be a non-sulphide bearing material. My client wanted me to document my conversation with you. So, attached is a letter.

Someone at a public meeting for the proposed development asked about the slate fill. We are trying to avoid false information. Although not necessary, my client is willing to take extra measures associated with moving the fill, just so that everyone is satisfied that we are doing the right thing. This is all a non-issue, but seems to be necessary to move forward with this large development.

Note that I am on a long-term contract with Conquest Engineering, but also conduct some residential type projects through my own firm, Bruce MacNeil Engineering Ltd.

Thanks! If you have time to read this and call or email me, that would be great.

Moore, Janet L

From:	Randell, Terry B
Sent:	Thursday, July 27, 2017 9:07 AM
To:	Moore, Janet L
Cc:	Bennett, Norma J; Horne, Sara
Subject:	FW: Slate Fill, Port Wallace Lands, Waverley
Attachments:	Bruce MacNeil, Slate Fill Review, Port Wallace.pdf

Hi Janet,

Please prepare a response to the ITS action.
Sara, can you please provide a due date?

Thanks,
Terry

From: Burns, Jamie R
Sent: July 27, 2017 9:02 AM
To: Randell, Terry B <Terry.Randell@novascotia.ca>
Cc: Horne, Sara <Sara.Horne@novascotia.ca>
Subject: FW: Slate Fill, Port Wallace Lands, Waverley

Duplicate Email Chain *See Page 178*

[redacted]

From: Bruce MacNeil [redacted]@gmail.com]
Sent: Thursday, July 27, 2017 8:49 AM
To: Burns, Jamie R <Jamie.Burns@novascotia.ca>
Subject: Slate Fill, Port Wallace Lands, Waverley

Duplicate Email Chain *See Page 178*

[redacted]

Bruce MacNeil Engineering Ltd.
81 Terradore Lane
Hammonds Plains, NS B4B 1S7
902-430-2830

July 20, 2017

Mr. Jamie Burns, P.Eng.
Nova Scotia Environment
Via email:

Dear Mr. Burns,

Re: Environmental Review of Slate Fill Exported from Previous Project
Proposed Port Wallace Subdivision, Waverley, NS

This summarizes our conversation on June 6, 2017, about slate bedrock that has previously been classified as a non-sulphide bearing material. The material was exported from the Dartmouth Bridge Terminal project in 2011 and taken to lands that are now part of the proposed Port Wallace Subdivision lands in Waverley. The slate was tested extensively in 2011. The upper weathered portion of the slate bedrock was below 0.4% sulphide sulphur. The results were documented and submitted to NSE in 2011. Deeper portions of the slate from the Bridge Terminal site were taken to a licenced facility, as approved by NS Environment.

As discussed, the previous test results on the slate fill taken to the proposed Port Wallace Subdivision lands in Waverley would still be valid, and therefore, the material would not be a regulated material under the Environment Act. Based on the previous test results, exporting material from the current location to another property, with both property owner's permission, would not require an approval under the Sulphide Bearing Material Regulations under the Environment Act.

As discussed, because of possible public perception associated with exporting slate fill, our client will use extra procedures with placing this material. These extra procedures will include: placement in one, non-sensitive area, use of impermeable cover, etc. As discussed, such practices are not required in this situation, but our client will do this anyway to avoid possible public perception that all slate is a sulphide bearing material.

As discussed, it is generally understood by geotechnical/environmental engineers and NS Environment that the test results on slate can vary. The results for a selected piece of slate can be elevated, but some variation is normal, and average results are typically used. As such, reliance on the previous testing program, which was very thorough, would be the best approach with this material.

Please contact me if you have any questions.

Regards,

[redacted]

R. Bruce MacNeil, P.Eng.
Senior Geotechnical Engineer
macneilengineering@gmail.com

NOVA SCOTIA

Environment
Compliance Division

20(1)

- innovation centre
- residence board.

NOTE-TO-FILE

RECORDED BY: ______________________ Date: ______________

SITE/CLIENT NAME: ______________________

APPROVAL/FILE NUMBER: ______________________

SUBJECT:

Bruce MacNeil - proposed P. Willow subdivision
- property transaction - sulphide bearing
- may come back in application
- if took material + disposed @ approved facility

- [redacted] asap oil leaking. 3 weeks
[redacted]

[redacted] - burning pallets inside home
[redacted] - painted ones. little trailer loads

- [redacted] Stewart Harris Dr. Dartmouth

[redacted] [redacted]

- Plot plan - storage - commercial jobs

[redacted] west ~~Cherrybrook~~ Rd Greyhound rd
Petpeswick Atlantic

C - 1 [redacted]

[redacted]

Muskodoboit Harbour

[redacted] Coalies Lane Muskodoboit Harbour

Complaint -

Appendix E

Laboratory Analytical Results Tables and Sediment Stratigraphy Logs

DILLON CONSULTING

Table E1: Sediment Stratigraphy Logs

Sample ID	Core Depth (mbgs)	Sampling Method	Sample Location	Sampling depth (mbgs)	Sample Stratigraphy
SED01	0.25	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED02	0.25	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED03	0.23	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED04	0.28	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED05	0.2	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED06	0.18	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED07	0.29	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED08	0.29	Glew Gravity Corer	channel	0 - 0.1	brown, hydric soil with high-organic matter and decomposed peat
SED09	0.1	Shelby Tube	channel	0 - 0.1	grey, fine grained minerogenic soil
SED10	0.23	Shelby Tube	channel	0 - 0.1	grey, fine grained minerogenic material believed to be tailings
SED11	0.1	Shelby Tube	channel	0 - 0.1	grey, fine grained minerogenic material believed to be tailings
SED12	0.61	Shelby Tube	channel	0 - 0.1	grey, fine grained minerogenic material believed to be tailings
SED13	1.8	Shelby Tube	channel	0 - 0.1	grey, fine grained minerogenic material believed to be tailings with trace brown, hydric soil with high organic content
SED14	0.61	Shelby Tube	channel	0 - 0.1	grey, fine grained minerogenic material believed to be tailings with trace brown, hydric soil with high organic content
PW01	0.25	Glew Gravity Corer	channel	0 - 0.25	brown, hydric soil with high-organic matter and decomposed peat
PW02	0.25	Glew Gravity Corer	channel	0 - 0.25	brown, hydric soil with high-organic matter and decomposed peat
PW03	0.25	Glew Gravity Corer	channel	0 - 0.25	brown, hydric soil with high-organic matter and decomposed peat
PW04	0.25	Glew Gravity Corer	channel	0 - 0.25	brown, hydric soil with high-organic matter and decomposed peat
PW05	0.25	Grab Sample	channel	0 - 0.25	grey, fine grained minerogenic material believed to be tailings
SS01	0.46	Split Spoon	area adjacent to Mitchell's Brook channel	0 - 0.1	dark brown, hydric soil with high-organic matter and decomposed peat
SS02	0.61	Split Spoon	area adjacent to Mitchell's Brook channel	0 - 0.1	dark brown, hydric soil with high-organic matter and decomposed peat
SS03	1.83	Split Spoon	area adjacent to Mitchell's Brook channel	1.2-1.4	dark brown, hydric soil with high-organic matter and decomposed peat
SS04	0.6	Split Spoon	area adjacent to Mitchell's Brook channel	0.3 - 0.6	dark brown, hydric soil with high-organic matter and decomposed peat
SS05	2.71	Split Spoon	fen	No sample submitted	grey, fine grained minerogenic soil with trace brown, hydric soil with high organic content
SS06	1.22	Split Spoon	fen	No sample submitted	grey, fine grained minerogenic soil with trace brown, hydric soil with high organic content
SS07	3.8	Split Spoon	fen	3.66 - 3.80	grey, fine grained minerogenic soil
SS08	5.08	Split Spoon	fen	5.03 - 5.08	grey, fine grained minerogenic soil
SS09	5.18	Split Spoon	fen	5.03 - 5.18	grey, fine grained minerogenic soil
SS10	3.56	Split Spoon	fen	3.36 - 3.56	grey, fine grained minerogenic soil
SS11	3.6	Split Spoon	fen	3.49 - 3.60	grey, fine grained minerogenic soil
SS12	3.71	Split Spoon	fen	3.51 - 3.71	grey, fine grained minerogenic soil
SS13	4.93	Split Spoon	fen	4.65 - 4.93	grey, fine grained minerogenic soil
SS14	4.14	Split Spoon	fen	4.06 - 4.14	grey, fine grained minerogenic soil

Table E2. General Chemistry and Metals in Pore Water (PW) and Surface Water (SW)

Parameter	Units	EQL	NS Tier 1 EQS Freshwater Surface Water	US EPA National Recommended Water Quality Criteria - Aquatic Life (CCC)	PW01	PW02	PW03	PW04	PW05
				Sample ID	PW01	PW02	PW03	PW04	PW05
				Date	2019-04-16	2019-04-16	2019-04-16	2019-04-29	2018-04-25
Calculated Parameters									
Total Dissolved Solids (TDS) - Calculated	mg/L	1	-	-	-	-	-	-	-
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	-	-	-	-	-	-	-
Alkalinity (Carbonate as CaCO3)	mg/L	1	-	-	-	-	-	-	-
Anions Total	meq/L		-	-	-	-	-	-	-
Cations Total	meq/L		-	-	-	-	-	-	-
Ionic Balance	%		-	-	-	-	-	-	-
Hardness as CaCO3	mg/L	1	-	-	-	-	-	-	-
Hardness as CaCO3 (Dissolved)	mg/L	0.5	-	-	82.3	129	105	75.6	24.4
General Chemistry									
Alkalinity (total) as CaCO3	mg/L	5	-	20	-	-	-	-	-
Ammonia (as N)	µg/L	50	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	0.05	-	-	-	-	-	-	-
Nitrate + Nitrite (as N)	mg/L	0.05	-	-	-	-	-	-	-
Nitrite (as N)	mg/L	0.01	-	-	-	-	-	-	-
Phosphate	mg/L	0.01	-	-	-	-	-	-	-
Phosphorus	mg/L	0.1	-	-	-	-	-	-	-
Electrical conductivity (lab)	µS/cm	1	-	-	472	650	614	483	262
Chloride (Dissolved)	mg/L	1	-	230	-	-	-	-	-
Cyanide Anion	mg/L	0.005	0.005	0.0052	-	-	-	-	-
Total Organic Carbon (TOC)	mg/L	0.5	-	-	-	-	-	-	-
pH (Lab)	pH Unit		-	6.5-9	7.56	7.51	6.78	6.87	6.65
Silica as SiO2	mg/L	0.5	-	-	-	-	-	-	-
Sulphate (SO4) (Dissolved)	mg/L	2	-	-	-	-	-	-	-
Turbidity	NTU	0.1	-	-	-	-	-	-	-
Metals									
Aluminium	mg/L	0.005	0.005	-	-	-	-	-	-
Aluminium (Dissolved)	mg/L	0.003	0.005	-	0.094	0.034	0.045	0.053	1.07
Antimony	mg/L	0.001	0.02	-	-	-	-	-	-
Antimony (Dissolved)	mg/L	0.0005	0.02	-	<0.0025	<0.005	<0.005	<0.0025	0.0108
Arsenic	mg/L	0.001	0.005	-	-	-	-	-	-
Arsenic (Dissolved)	mg/L	0.0001	-	0.15	0.137	0.203	0.146	0.298	0.129
Barium	mg/L	0.001	1	-	-	-	-	-	-
Barium (Dissolved)	mg/L	0.001	1	-	0.135	0.307	0.292	0.202	0.0306
Beryllium	mg/L	0.001	0.0053	-	-	-	-	-	-
Beryllium (Dissolved)	mg/L	0.0001	0.0053	-	<0.0005	<0.001	<0.001	<0.0005	<0.0001
Bismuth	mg/L	0.002	-	-	-	-	-	-	-
Bismuth (Dissolved)	mg/L	0.001	-	-	<0.005	<0.01	<0.01	<0.005	<0.001
Boron	mg/L	0.05	1.2	-	-	-	-	-	-
Boron (Dissolved)	mg/L	0.05	1.2	-	<0.25	<0.5	<0.5	<0.25	<0.05
Cadmium	mg/L	0.00001	0.00001	-	-	-	-	-	-
Cadmium (Dissolved)	mg/L	0.00001	-	0.00072[1]	<0.00005	<0.0001	<0.0001	<0.00005	0.000041
Calcium	mg/L	0.1	-	-	-	-	-	-	-
Calcium (Dissolved)	mg/L	0.05	-	-	26.9	41.4	34.2	24.7	7.27
Chromium Total (III+VI)	mg/L	0.001	-	-	-	-	-	-	-
Chromium Total (III+VI) (Dissolved)	mg/L	0.001	-	0.011*	<0.005	<0.01	<0.01	<0.005	<0.001
Cobalt	mg/L	0.0004	0.01	-	-	-	-	-	-
Cobalt (Dissolved)	mg/L	0.0002	0.01	-	0.016	0.0151	0.0388	0.0403	0.00379
Copper	mg/L	0.0005	0.002	-	-	-	-	-	-
Copper (Dissolved)	mg/L	0.0002	0.002	-	<0.001	<0.002	<0.002	<0.001	0.00531
Iron	mg/L	0.05	0.3	-	-	-	-	-	-
Iron (Dissolved)	mg/L	0.005	-	1	7.72	7.55	14.5	20.5	0.757
Lead	mg/L	0.0005	0.001	-	-	-	-	-	-
Lead (Dissolved)	mg/L	0.0002	-	0.0032 [2]	<0.001	<0.002	<0.002	<0.001	0.00592
Lithium (Dissolved)	mg/L	0.002	-	-	<0.01	<0.02	<0.02	<0.01	<0.002
Magnesium	mg/L	0.1	-	-	-	-	-	-	-
Magnesium (Dissolved)	mg/L	0.05	-	-	3.71	6.16	4.86	3.36	1.51
Manganese	mg/L	0.002	0.82	-	-	-	-	-	-
Manganese (Dissolved)	mg/L	0.001	0.82	-	29.5	51.6	49.5	30.2	1.96
Mercury	mg/L	0.000002	0.000026	-	-	-	-	-	-
Mercury (Dissolved)	mg/L	0.000002	-	0.00077	0.0000099	0.000012	0.0000074	0.0000048	0.00098
Molybdenum	mg/L	0.002	0.073	-	-	-	-	-	-
Molybdenum (Dissolved)	mg/L	0.001	0.073	-	<0.005	<0.01	<0.01	<0.005	<0.001
Nickel	mg/L	0.002	0.025	-	-	-	-	-	-
Nickel (Dissolved)	mg/L	0.001	-	0.052 [3]	<0.005	<0.01	<0.01	0.0078	0.0031
Potassium	mg/L	0.1	-	-	-	-	-	-	-
Potassium (Dissolved)	mg/L	0.05	-	-	1.83	2.51	1.97	1.67	2.17
Selenium	mg/L	0.001	0.001	-	-	-	-	-	-
Selenium (Dissolved)	mg/L	0.0001	0.001	-	<0.0005	<0.001	<0.001	<0.0005	0.00013
Silicon (Dissolved)	mg/L	0.1	-	-	2.46	1.91	2.95	4.1	7.31
Silver	mg/L	0.0001	0.0001	-	-	-	-	-	-
Silver (Dissolved)	mg/L	0.00002	0.0001	-	<0.0001	<0.0002	<0.0002	<0.0001	0.000056
Sodium	mg/L	0.1	-	-	-	-	-	-	-
Sodium (Dissolved)	mg/L	0.05	-	-	31.7	37.2	34.9	27.3	33.5
Strontium	mg/L	0.002	21	-	-	-	-	-	-
Strontium (Dissolved)	mg/L	0.001	21	-	0.11	0.153	0.134	0.0922	0.0317
Sulphur (as S) (Dissolved)	mg/L	3	-	-	31	69	75	44	10.9
Thallium	mg/L	0.0001	0.0008	-	-	-	-	-	-
Thallium (Dissolved)	mg/L	0.00001	0.0008	-	<0.00005	<0.0001	<0.0001	<0.00005	0.00006
Tin	mg/L	0.002	-	-	-	-	-	-	-
Tin (Dissolved)	mg/L	0.002	-	-	<0.025	<0.05	<0.05	<0.025	<0.005
Titanium	mg/L	0.002	-	-	-	-	-	-	-
Titanium (Dissolved)	mg/L	0.002	-	-	<0.025	<0.05	<0.05	<0.025	0.0182
Uranium	mg/L	0.0001	0.3	-	-	-	-	-	-
Uranium (Dissolved)	mg/L	0.0001	0.3	-	<0.0005	<0.001	<0.001	<0.0005	0.00014
Vanadium	mg/L	0.002	0.006	-	-	-	-	-	-
Vanadium (Dissolved)	mg/L	0.002	0.006	-	<0.025	<0.05	<0.05	<0.025	<0.005
Zinc	mg/L	0.005	0.03	-	-	-	-	-	-
Zinc (Dissolved)	mg/L	0.005	-	0.12 [4]	<0.025	<0.05	<0.05	<0.025	<0.005
Zirconium (Dissolved)	mg/L	0.0001	-	-	<0.0005	<0.001	<0.001	<0.0005	0.00235

Notes:
CCC: Criterion Continuous Concentration
The NS Tier 1 EQS for metals are for total metals; therefore, dissolved metals were compared to the US EPA National Recommended Water Quality Criteria for Aquatic Life.
In the absence of a dissolved metals guideline in the US EPA National Recommended Water Quality Criteria for Aquatic Life, the NS Tier 1 EQS were used for comparison
The pore water samples were filtered and preserved at the laboratory for dissolved metals analysis
Total mercury results were reported from a ntric preserved aliquot. The nitric prserved aliquot was not refrigerated between 1-6 degrees celcius as recommended. Mercury results may be b
*The more stringent chromium(VI) guideline was used for comparison
[1] Cadmium is hardness dependant according to the following equation: exp{0.7977[In(hardness)]-3.909}(1.101672-[(Inhardness)(0.041838)]), which is applied to guideline comparisons for
[2] Lead is hardness dependant according to the following equation: exp{1.273[In(hardness)]-4.705}(1.46203-[(Inhardness)(0.145712)]), which is applied to guideline comparisons for each sa
[3] Nickel is hardness dependant according to the following equation: exp{0.8460[In(hardness)]+0.0584}(0.997), which is applied to guideline comparisons for each sample
[4] Zinc is hardness dependant according to the following equation: exp{0.8473[In(hardness)]+0.884}(0.986), which is applied to guideline comparisons for each sample

Table E2. General Chemistry and Metals in Pore Water (PW) and Surface Water (SW)

Parameter	Units	EQL	NS Tier 1 EQS Freshwater Surface Water	US EPA National Recommended Water Quality Criteria - Aquatic Life (CCC)	SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW10	SW11
				Date	2019-04-29	2019-04-29	2019-04-29	2019-04-29	2019-04-29	2019-04-29	2019-04-29	2019-04-29	2019-04-29
Calculated Parameters													
Total Dissolved Solids (TDS) - Calculated	mg/L	1	-	-	100	100	110	110	100	110	100	110	100
Alkalinity (Bicarbonate as CaCO3)	mg/L	1	-	-	11	11	11	11	11	11	11	11	10
Alkalinity (Carbonate as CaCO3)	mg/L	1	-	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Anions Total	meq/L		-	-	1.76	1.81	1.87	1.84	1.75	1.9	1.78	1.96	1.74
Cations Total	meq/L		-	-	1.69	1.69	1.74	1.71	1.64	1.83	1.68	1.89	1.64
Ionic Balance	%		-	-	2.03	3.43	3.6	3.66	3.24	1.88	2.89	1.82	2.96
Hardness as CaCO3	mg/L	1	-	-	19	19	19	19	19	20	19	20	19
Hardness as CaCO3 (Dissolved)	mg/L	0.5	-	-	-	-	-	-	-	-	-	-	-
General Chemistry													
Alkalinity (total) as CaCO3	mg/L	5	-	20	11	11	11	11	11	11	11	11	11
Ammonia (as N)	µg/L	50	-	-	<50	<50	<50	<50	<50	<50	<50	<50	<50
Nitrate (as N)	mg/L	0.05	-	-	0.092	0.092	0.066	0.27	0.084	<0.05	0.076	<0.05	0.076
Nitrate + Nitrite (as N)	mg/L	0.05	-	-	0.092	0.092	0.066	0.27	0.084	<0.05	0.076	<0.05	0.076
Nitrite (as N)	mg/L	0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phosphate	mg/L	0.01	-	-	0.013	0.013	0.014	0.013	0.013	0.015	0.012	0.02	0.012
Phosphorus	mg/L	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Electrical conductivity (lab)	µS/cm	1	-	-	200	200	210	210	200	220	200	230	200
Chloride (Dissolved)	mg/L	1	-	230	48	50	52	50	48	54	49	56	48
Cyanide Anion	mg/L	0.005	0.005	0.0052	-	-	-	-	-	-	-	<0.005	<0.005
Total Organic Carbon (TOC)	mg/L	0.5	-	-	5.3	5.2	4.9	4.9	5.4	4.8	5.3	4.4	5.3
pH (Lab)	pH Unit		-	6.5-9	7.1	6.93	7.02	7.01	7.06	7.04	6.94	7.11	6.95
Silica as SiO2	mg/L	0.5	-	-	1.6	1.5	1.3	1.5	1.6	1.2	1.6	1.1	1.6
Sulphate (SO4) (Dissolved)	mg/L	2	-	-	8.4	8.5	8.4	9	8.3	8.4	8.4	8.5	8.9
Turbidity	NTU	0.1	-	-	0.25	0.26	0.31	0.27	0.24	0.33	0.47	<0.1	0.41
Metals													
Aluminium	mg/L	0.005	0.005	-	0.081	0.071	0.063	0.07	0.079	0.057	0.08	0.046	0.086
Aluminium (Dissolved)	mg/L	0.003	0.005	-	0.081	0.077	0.066	0.068	0.08	0.055	0.091	0.048	0.088
Antimony	mg/L	0.001	0.02	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Antimony (Dissolved)	mg/L	0.0005	0.02	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	mg/L	0.001	0.005	-	0.045	0.047	0.054	0.05	0.046	0.059	0.046	0.086	0.045
Arsenic (Dissolved)	mg/L	0.0001	-	0.15	0.045	0.044	0.054	0.047	0.044	0.058	0.045	0.083	0.044
Barium	mg/L	0.001	1	-	0.0045	0.0041	0.0041	0.0055	0.0045	0.0044	0.0046	0.0045	0.0045
Barium (Dissolved)	mg/L	0.001	1	-	0.0044	0.0043	0.0044	0.0044	0.0044	0.0044	0.0046	0.0046	0.0047
Beryllium	mg/L	0.001	0.0053	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Beryllium (Dissolved)	mg/L	0.0001	0.0053	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Bismuth (Dissolved)	mg/L	0.001	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Boron	mg/L	0.05	1.2	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Boron (Dissolved)	mg/L	0.05	1.2	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	mg/L	0.00001	0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Cadmium (Dissolved)	mg/L	0.00001	-	0.00072[1]	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Calcium	mg/L	0.1	-	-	5.7	5.7	5.7	5.9	5.6	5.9	5.7	6.2	5.7
Calcium (Dissolved)	mg/L	0.05	-	-	5.8	5.8	5.8	5.6	5.7	6	5.7	6.2	5.7
Chromium Total (III+VI)	mg/L	0.001	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium Total (III+VI) (Dissolved)	mg/L	0.001	-	0.011*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	0.0004	0.01	-	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Cobalt (Dissolved)	mg/L	0.0002	0.01	-	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Copper	mg/L	0.0005	0.002	-	0.00089	0.00087	0.0013	0.0008	0.00092	0.00097	0.00097	0.00098	0.00092
Copper (Dissolved)	mg/L	0.0002	0.002	-	0.00076	0.00076	0.00082	0.00076	0.00076	0.00086	0.00088	0.00081	0.0008
Iron	mg/L	0.05	0.3	-	0.073	0.055	<0.05	0.052	0.067	0.06	0.075	<0.05	0.07
Iron (Dissolved)	mg/L	0.005	-	1	0.059	0.053	<0.05	<0.05	0.059	<0.05	0.056	<0.05	0.17
Lead	mg/L	0.0005	0.001	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lead (Dissolved)	mg/L	0.0002	-	0.0032 [2]	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium (Dissolved)	mg/L	0.002	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	0.1	-	-	1.1	1.1	1	1.1	1	1.1	1.1	1.1	1.1
Magnesium (Dissolved)	mg/L	0.05	-	-	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1
Manganese	mg/L	0.002	0.82	-	0.027	0.02	0.019	0.019	0.026	0.018	0.028	0.018	0.026
Manganese (Dissolved)	mg/L	0.001	0.82	-	0.024	0.02	0.017	0.018	0.023	0.015	0.022	0.018	0.025
Mercury	mg/L	0.000002	0.000026	-	<0.000013	-	-	-	<0.000013	<0.000013	-	-	<0.000013
Mercury (Dissolved)	mg/L	0.000002	-	0.00077	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013	<0.000013
Molybdenum	mg/L	0.002	0.073	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Molybdenum (Dissolved)	mg/L	0.001	0.073	-	<0.002	<0.002	<0.002	0.0036	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel	mg/L	0.002	0.025	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Nickel (Dissolved)	mg/L	0.001	-	0.052 [3]	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Potassium	mg/L	0.1	-	-	0.93	0.9	0.94	0.95	0.95	0.95	0.96	1	0.93
Potassium (Dissolved)	mg/L	0.05	-	-	0.97	1	0.98	0.98	0.98	0.99	0.97	1.1	0.98
Selenium	mg/L	0.001	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Dissolved)	mg/L	0.0001	0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silicon (Dissolved)	mg/L	0.1	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	0.0001	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silver (Dissolved)	mg/L	0.00002	0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium	mg/L	0.1	-	-	28	28	30	30	28	31	28	32	28
Sodium (Dissolved)	mg/L	0.05	-	-	29	30	31	30	29	32	29	34	28
Strontium	mg/L	0.002	21	-	0.019	0.019	0.02	0.021	0.02	0.021	0.019	0.022	0.02
Strontium (Dissolved)	mg/L	0.001	21	-	0.02	0.021	0.02	0.021	0.02	0.022	0.02	0.022	0.019
Sulphur (as S) (Dissolved)	mg/L	3	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	0.0001	0.0008	-	0.00011	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thallium (Dissolved)	mg/L	0.00001	0.0008	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Tin (Dissolved)	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Titanium (Dissolved)	mg/L	0.002	-	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Uranium	mg/L	0.0001	0.3	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium (Dissolved)	mg/L	0.0001	0.3	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Vanadium	mg/L	0.002	0.006	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Vanadium (Dissolved)	mg/L	0.002	0.006	-	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	0.005	0.03	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc (Dissolved)	mg/L	0.005	-	0.12 [4]	0.0054	<0.005	<0.005	0.0065	<0.005	<0.005	<0.005	0.0074	<0.005
Zirconium (Dissolved)	mg/L	0.0001	-	-	-	-	-	-	-	-	-	-	-

Notes:
CCC: Criterion Continuous Concentration
The NS Tier 1 EQS for metals are for total metals; therefore, dissolved metals were compared to the US EPA National Recommended Water Quality Criteria for Aquatic Life.
In the absence of a dissolved metals guideline in the US EPA National Recommended Water Quality Criteria for Aquatic Life, the NS Tier 1 EQS were used for comparison
The pore water samples were filtered and preserved at the laboratory for dissolved metals analysis
Total mercury results were reported from a ntric preserved aliquot. The nitric prserved aliquot was not refrigerated between 1-6 degrees celcius as recommended. Mercury results may be b
*The more stringent chromium(VI) guideline was used for comparison
[1] Cadmium is hardness dependant according to the following equation: exp{0.7977[In(hardness)]-3.909}(1.101672-[(Inhardness)(0.041838)]), which is applied to guideline comparisons for
[2] Lead is hardness dependant according to the following equation: exp{1.273[In(hardness)]-4.705}(1.46203-[(Inhardness)(0.145712)]), which is applied to guideline comparisons for each sa
[3] Nickel is hardness dependant according to the following equation: exp{0.8460[In(hardness)]+0.0584}(0.997), which is applied to guideline comparisons for each sample
[4] Zinc is hardness dependant according to the following equation: exp{0.8473[In(hardness)]+0.884}(0.986), which is applied to guideline comparisons for each sample

Halifax Regional Municipality
Port Wallace
Dartmouth, NS
19-9183

Table E3. Petroleum Hydrocarbons in Surface Water

Parameter	Units	EQL	NS Tier 1 EQS Freshwater Surface Water	SW10	SW11
			Sample ID	SW10	SW11
			Date	2019-04-29	2019-04-29
BTEX			-		
Benzene	mg/L	0.001	2.1	<0.001	<0.001
Toluene	mg/L	0.001	0.77	<0.001	<0.001
Ethylbenzene	mg/L	0.001	0.32	<0.001	<0.001
Xylenes	mg/L	0.002	0.33	<0.002	<0.002
Petroleum Hydrocarbons (PHCs)					
C6-C10 - BTEX	mg/L	0.01	-	<0.01	<0.01
>C10-C16	mg/L	0.05	-	<0.05	<0.05
>C16-C21	mg/L	0.05	-	<0.05	<0.05
>C21-C32	mg/L	0.1	-	<0.1	<0.1
Modified TPH	mg/L	0.1	0.1|0.1|1.5	<0.1	<0.1

Table E4. General Chemistry and Metals in Sediment

Parameter	Units	EQL	NS Tier 1 EQS Freshwater Sediment	NS Tier 1 EQS Soil Residential Non-Potable Coarse	SED01	SED02	SED03	SED04	SED05	SED06	SED07	SED07B (Dup of SED07)	SED08	SED09	SED10	SED10 (Lab Dup - Maxxam Burnaby)	SED11	SED12	SED13	SED14
Date					2019-04-16	2019-04-16	2019-04-16	2019-04-16	2019-04-16	2019-04-16	2019-04-16	2019-04-16	2019-04-16	2019-04-25	2019-04-25	2019-04-25	2019-04-25	2019-04-25	2019-04-26	2019-04-26
Sample Depth (mbgs)					0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1	0-0.1
General Chemistry																				
Phosphorus	mg/kg	10	-	-	-	-	-	-	-	-	-	-	-	-	-	731	-	694	-	-
Cyanide Anion	mg/kg	0.2	-	29	-	-	-	-	-	-	-	-	-	-	-	0.36	-	<0.4	-	-
Total Organic Carbon (TOC)	mg/kg	0.0005	-	-	170000	-	-	-	-	-	130000	-	-	-	1300	1300	-	8800	-	-
pH (aqueous extract)	pH Unit		-	-	-	-	-	-	-	-	-	-	-	-	-	5.81	-	6.19	-	-
Sulphate (SO4)	mg/kg	10	-	-	1500	-	-	-	-	-	2300	-	-	-	59	585	-	170	-	-
Sulphide	mg/kg	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	0.45	-	32.7	-	-
Metals			-	-																
Aluminium	mg/kg	10	-	15400	17,000	18,000	20,000	18,000	27,000	22,000	25,000	22,000	23,000	12,000	14,000	13,500	12,000	13,900	11,000	12,000
Antimony	mg/kg	0.1	25	7.5	<2	<2	<2	<2	<2	<2	2.4	2.3	2.3	<2	9.5	9.36	8.1	7.38	3.3	4.6
Arsenic	mg/kg	0.5	17	31	2000	1900	2000	1900	960	1600	1900	1900	2400	170	6200	6480	5100	4830	1900	2900
Barium	mg/kg	0.1	-	10000	150	250	230	250	160	150	230	240	260	84	58	54.5	70	64.4	74	91
Beryllium	mg/kg	0.2	-	38	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.37	<2	0.42	<2	<2
Bismuth	mg/kg	0.1	-	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	0.89	<2	0.85	<2	<2
Boron	mg/kg	50	-	4300	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	<50	-	<50	<50
Cadmium	mg/kg	0.05	3.5	14	2.6	2.6	2.1	1.9	1.7	1.4	2.5	2.4	2.6	<0.3	<0.3	0.176	<0.3	0.268	<0.3	<0.3
Calcium	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	4810	-	3980	-	-
Chromium Total (III+VI)	mg/kg	1	90	220	12	14	15	14	21	19	17	16	17	13	15	15.9	14	15.9	12	13
Cobalt	mg/kg	0.3	-	22	100	120	130	110	84	87	160	150	160	4.1	16	18.5	17	17.9	8.1	15
Copper	mg/kg	0.5	197	1100	32	35	36	33	34	35	43	39	40	30	53	50.5	47	52.1	34	38
Iron	mg/kg	50	43766	11000	40,000	40,000	54,000	44,000	41,000	36,000	45,000	42,000	54,000	17,000	31,000	33,600	27,000	32,100	18,000	23,000
Lead	mg/kg	0.1	91.3	140	63	72	73	62	96	74	78	72	74	35	73	57.3	62	54	40	45
Lithium	mg/kg	2	-	-	12	16	16	15	25	22	21	19	20	24	25	-	24	-	22	23
Magnesium	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	9780	-	9090	-	-
Manganese	mg/kg	0.2	1100	-	4900	15,000	14,000	17,000	4800	7700	14,000	14,000	13,000	250	660	703	890	1210	280	930
Mercury	mg/kg	0.05	0.486	6.6	1.9	2.2	2.2	2.1	0.82	2.4	2.9	2.7	2.7	4.4	6.8	4.55	6.3	5.35	5.2	5.2
Molybdenum	mg/kg	0.1	-	110	<2	<2	<2	<2	2.2	<2	<2	<2	<2	<2	<2	0.23	<2	0.28	<2	<2
Nickel	mg/kg	0.8	75	330	86	76	53	48	38	41	75	65	67	12	34	38.5	29	35.6	17	25
Potassium	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	4520	-	4370	-	-
Rubidium	mg/kg	2	-	-	8.5	11	11	9.8	11	15	12	12	12	20	32	-	29	-	19	25
Selenium	mg/kg	0.5	2	80	1.7	1.9	2	1.8	2.7	2.5	2	2	2.2	<1	<1	<0.5	<1	<0.5	<1	<1
Silver	mg/kg	0.05	1	77	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.157	<0.5	0.164	<0.5	<0.5
Sodium	mg/kg	100	-	-	-	-	-	-	-	-	-	-	-	-	-	<100	-	<100	-	-
Strontium	mg/kg	0.1	-	9400	23	24	24	29	40	27	29	26	31	12	17	20.5	14	18.6	13	14
Sulphur (as S)	mg/kg	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2950	-	-
Thallium	mg/kg	0.05	-	1	0.29	0.34	0.37	0.32	0.34	0.36	0.43	0.4	0.48	0.16	0.28	0.304	0.26	0.327	0.2	0.26
Tin	mg/kg	0.1	-	9400	1.2	1.3	1.3	1.3	1.3	1.4	1.5	1.3	1.3	<1	<1	0.28	<1	0.36	<1	<1
Titanium	mg/kg	1	-	-	-	-	-	-	-	-	-	-	-	-	-	610	-	582	-	-
Uranium	mg/kg	0.1	-	23	0.85	1.2	1.1	1	2.5	1.4	1.3	1.2	1.2	1.1	1.1	-	1.1	-	1.1	1.1
Vanadium	mg/kg	2	-	39	60	63	69	56	58	56	66	61	75	16	15	16.4	14	16.8	12	15
Zinc	mg/kg	1	315	5600	260	270	250	230	200	180	330	290	320	58	120	119	100	135	64	94
Zirconium	mg/kg	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	29.3	-	22.8	-	-

Table E4. General Chemistry and Metals in Sediment

Parameter	Units	EQL	NS Tier 1 EQS Freshwater Sediment	NS Tier 1 EQS Soil Residential Non-Potable Coarse	SS01	SS02	SS03	SS04	SS07	SS08	SS09	SS10	SS11	SS12	SS13	SS13B (Dup of SS13)	SS14
Date					2019-04-25	2019-04-25	2019-04-25	2019-04-25	2019-04-25	2019-04-25	2019-04-25	2018-04-25	2019-04-25	2019-04-25	2019-04-29	2019-04-29	2019-04-29
Sample Depth (mbgs)					0-0.1	0-0.1	1.2-1.4	0.3-0.6	3.66-3.8	5.03-5.08	5.03-5.18	3.36-3.56	3.49-3.6	3.51-3.71	4.65-4.93	4.65-4.93	4.06-4.14
General Chemistry																	
Phosphorus	mg/kg	10	-	-	-	-	-	-	-	-	-	665	-	-	-	-	-
Cyanide Anion	mg/kg	0.2	-	29	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon (TOC)	mg/kg	0.0005	-	-	-	-	-	-	-	6800	-	2900	-	-	<500	-	-
pH (aqueous extract)	pH Unit		-	-	-	-	-	-	-	-	-	5.46	-	-	-	-	-
Sulphate (SO4)	mg/kg	10	-	-	-	-	-	-	-	11	-	<100	-	-	20	-	-
Sulphide	mg/kg	0.3	-	-	-	-	-	-	-	-	-	<0.3	-	-	-	-	-
Metals			-	-													
Aluminium	mg/kg	10	-	15400	-	-	-	-	8300	6000	6800	10,600	12,000	12,000	5600	5500	13,000
Antimony	mg/kg	0.1	25	7.5	-	-	-	-	<2	<2	<2	0.24	<2	<2	<2	<2	<2
Arsenic	mg/kg	0.5	17	31	1400	56	33	490	130	17	15	16.4	29	45	8.8	8.1	13
Barium	mg/kg	0.1	-	10000	-	-	-	-	23	20	20	25	32	30	11	9.5	35
Beryllium	mg/kg	0.2	-	38	-	-	-	-	<2	<2	<2	0.27	<2	<2	<2	<2	<2
Bismuth	mg/kg	0.1	-	-	-	-	-	-	<2	<2	<2	0.14	<2	<2	<2	<2	<2
Boron	mg/kg	50	-	4300	-	-	-	-	<50	<50	<50	-	<50	<50	<50	<50	<50
Cadmium	mg/kg	0.05	3.5	14	-	-	-	-	<0.3	<0.3	<0.3	0.075	<0.3	<0.3	<0.3	<0.3	<0.3
Calcium	mg/kg	100	-	-	-	-	-	-	-	-	-	2120	-	-	-	-	-
Chromium Total (III+VI)	mg/kg	1	90	220	-	-	-	-	14	9.7	11	17.1	19	19	8.7	8.8	21
Cobalt	mg/kg	0.3	-	22	-	-	-	-	9.3	5.8	6.4	10.4	12	13	5.5	5.9	12
Copper	mg/kg	0.5	197	1100	-	-	-	-	18	16	16	18	20	22	12	12	21
Iron	mg/kg	50	43766	11000	-	-	-	-	15,000	10,000	13,000	20,500	23,000	25,000	11,000	11,000	23,000
Lead	mg/kg	0.1	91.3	140	-	-	-	-	11	8.2	8.4	9.66	13	11	6.7	4.3	14
Lithium	mg/kg	2	-	-	-	-	-	-	18	11	13	-	23	23	11	12	25
Magnesium	mg/kg	100	-	-	-	-	-	-	-	-	-	6240	-	-	-	-	-
Manganese	mg/kg	0.2	1100	-	-	-	-	-	260	190	250	390	410	420	200	200	430
Mercury	mg/kg	0.05	0.486	6.6	1.1	3.3	0.13	0.73	0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum	mg/kg	0.1	-	110	-	-	-	-	<2	<2	<2	0.45	<2	3.8	<2	<2	<2
Nickel	mg/kg	0.8	75	330	-	-	-	-	19	16	15	24.4	26	34	12	11	29
Potassium	mg/kg	100	-	-	-	-	-	-	-	-	-	700	-	-	-	-	-
Rubidium	mg/kg	2	-	-	-	-	-	-	5.9	4.4	4.4	-	7	6.6	2.6	2.6	7.3
Selenium	mg/kg	0.5	2	80	-	-	-	-	<1	<1	<1	<0.5	<1	<1	<1	<1	<1
Silver	mg/kg	0.05	1	77	-	-	-	-	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Sodium	mg/kg	100	-	-	-	-	-	-	-	-	-	<100	-	-	-	-	-
Strontium	mg/kg	0.1	-	9400	-	-	-	-	8.1	7.5	8.7	14.9	13	15	7.2	6.9	16
Sulphur (as S)	mg/kg	500	-	-	-	-	-	-	-	-	-	<500	-	-	-	-	-
Thallium	mg/kg	0.05	-	1	-	-	-	-	<0.1	<0.1	<0.1	0.055	<0.1	<0.1	<0.1	<0.1	<0.1
Tin	mg/kg	0.1	-	9400	-	-	-	-	<1	<1	<1	0.23	<1	<1	<1	<1	<1
Titanium	mg/kg	1	-	-	-	-	-	-	-	-	-	498	-	-	-	-	-
Uranium	mg/kg	0.1	-	23	-	-	-	-	1.3	1	0.82	-	1.2	2.1	0.52	0.52	3
Vanadium	mg/kg	2	-	39	-	-	-	-	13	8.2	9.3	14	16	14	8	8.3	17
Zinc	mg/kg	1	315	5600	-	-	-	-	48	37	41	51.8	61	67	26	26	66
Zirconium	mg/kg	0.5	-	-	-	-	-	-	-	-	-	6.06	-	-	-	-	-

Table E5: Petroleum Hydrocarbons in Sediment

Parameter	Units	EQL	NS Tier 1 EQS Freshwater Sediment	NS Tier 1 EQS Soil Residential Non-Potable Coarse	SED10	SED10[1]	SED12	SED12[1]
				Date	2019-04-25	2019-04-25	2019-04-25	2019-04-25
				Sample Depth (mbgs)	0-0.1	0-0.1	0-0.1	0-0.1
BTEX			-	-				
Benzene	mg/kg	0.025	1.2	0.099	<0.025	-	<0.025	-
Toluene	mg/kg	0.05	1.4	77	<0.05	-	<0.05	-
Ethylbenzene	mg/kg	0.025	1.2	30	<0.025	-	<0.025	-
Xylenes Total	mg/kg	0.05	1.3	8.8	<0.05	-	<0.05	-
Petroleum Hydrocarbons (PHCs)								
C6-C10 - BTEX	mg/kg	2.5	-	-	<2.5	-	<2.5	-
>C10-C16	mg/kg	10	-	-	<10	<10	<10	<10
>C16-C21	mg/kg	10	-	-	18	15	23	20
>C21-C32	mg/kg	15	-	-	100	100	100	95
Modified TPH	mg/kg	15	15*|25**|43***	74*|270**|1100***	120***	120***	130***	110***
Resemblance					G	G	K,L, Possible G	K,L, Possible G

Note: Applicable Criteria Based on resemblance as indicated
[1]Silica Gel Treatment performed prior to analysis
Resemblance:

A - Gasoline Fraction
B - Weathered Gasoline Fraction
C - One Product in Gas Range
D - Fuel Oil Fraction
E - Weathered Fuel Oil Fraction
F - One Product in Fuel Range
G - Lube Oil Fraction
H -One Product In Lube Oil Range
I - No Resemblance
J - Unidentified Peaks in the C6-C10 Range
K - Unidentified Peaks in the C10-C21 Range
L - Unidentified Peaks in the C21-C32 Range

Appendix F

Laboratory Analytical Certificates

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II
Your C.O.C. #: D 29796

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Report Date: 2019/05/17
Report #: R5715602
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9C8161
Received: 2019/05/14, 13:06

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	4	2019/05/15	2019/05/16	ATL SOP 00058	EPA 6020B R2 m

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II
Your C.O.C. #: D 29796

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Report Date: 2019/05/17
Report #: R5715602
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9C8161
Received: 2019/05/14, 13:06

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Senior Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
==
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B9C8161
Report Date: 2019/05/17

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II
Sampler Initials: JAM

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JSA204		JSA205	JSA206	JSA207		
Sampling Date		2019/04/25		2019/04/25	2019/04/25	2019/04/25		
COC Number		D 29796		D 29796	D 29796	D 29796		
	UNITS	**2019SS1 (0-0.1M)**	**RDL**	**2019SS2 (0-0.1M)**	**2019SS3 (1.2-1.4M)**	**2019SS4 (0.3-0.6M)**	**RDL**	**QC Batch**
Metals								
Acid Extractable Arsenic (As)	mg/kg	1400	20	56	33	490	2.0	6122421
Acid Extractable Mercury (Hg)	mg/kg	1.1	0.10	3.3	0.13	0.73	0.10	6122421

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9C8161
Report Date: 2019/05/17

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II
Sampler Initials: JAM

GENERAL COMMENTS

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

Package 1	7.3°C

Results relate only to the items tested.

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Maxxam Job #: B9C8161
Report Date: 2019/05/17

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II
Sampler Initials: JAM

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6122421	BAN	Matrix Spike	Acid Extractable Arsenic (As)	2019/05/16		48 (1)	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/16		94	%	75 - 125
6122421	BAN	Spiked Blank	Acid Extractable Arsenic (As)	2019/05/16		99	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/16		104	%	75 - 125
6122421	BAN	Method Blank	Acid Extractable Arsenic (As)	2019/05/16	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/16	<0.10		mg/kg	
6122421	BAN	RPD	Acid Extractable Arsenic (As)	2019/05/16	84 (2)		%	35
			Acid Extractable Mercury (Hg)	2019/05/16	4.0		%	35

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

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

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

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

(1) Spike exceeds acceptance limits, sample inhomogeneity suspected.

(2) Poor RPD due to sample inhomogeneity verified by repeat digestion and analysis.

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VALIDATION SIGNATURE PAGE

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

Eric Dearman, Scientific Specialist

Maxxam
A Bureau Veritas Group Company

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/10
Report #: R5705925
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Soil
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	2	2019/05/03	2019/05/04	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	4	2019/05/07	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	2	2019/05/07	2019/05/08	ATL SOP 00058	EPA 6020B R2 m
Sulphate in Soil by Auto Colourimetry	2	2019/05/07	2019/05/08	ATL SOP 00023	ASTM D516-16 m
Total Organic Carbon in Soil	2	2019/05/07	2019/05/09	ATL SOP 00044	LECO203601224 1991 m

Sample Matrix: Sediment
Samples Received: 15

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1)	1	2019/05/06	2019/05/06	ATL SOP 00111	Atl. RBCA v3.1 m
TEH in Soil (PIRI) (1)	1	2019/05/07	2019/05/07	ATL SOP 00111	Atl. RBCA v3.1 m
Metals Solids Acid Extr. ICPMS	3	2019/05/03	2019/05/06	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2019/05/07	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	9	2019/05/07	2019/05/08	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2019/05/07	2019/05/09	ATL SOP 00058	EPA 6020B R2 m
Moisture	1	N/A	2019/05/03	ATL SOP 00001	OMOE Handbook 1983 m
Moisture	1	N/A	2019/05/06	ATL SOP 00001	OMOE Handbook 1983 m
Sulphate in Soil by Auto Colourimetry	3	2019/05/07	2019/05/08	ATL SOP 00023	ASTM D516-16 m
Total Organic Carbon in Soil	3	2019/05/07	2019/05/09	ATL SOP 00044	LECO203601224 1991 m
ModTPH (T1) Calc. for Soil	1	N/A	2019/05/07	N/A	Atl. RBCA v3.1 m
ModTPH (T1) Calc. for Soil	1	N/A	2019/05/08	N/A	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (2)	1	N/A	2019/05/03	ATL SOP 00119	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (2)	1	N/A	2019/05/06	ATL SOP 00119	Atl. RBCA v3.1 m

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	9	N/A	2019/05/05	N/A	SM 23 4500-CO2 D

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/10
Report #: R5705925
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Alkalinity	9	N/A	2019/05/06	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	9	N/A	2019/05/06	ATL SOP 00014	SM 23 4500-Cl- E m
Colour	9	N/A	2019/05/06	ATL SOP 00020	SM 23 2120C m
Total Cyanide (3)	2	2019/05/06	2019/05/07	CAM SOP-00457	OMOE E3015 5 m
Conductance - water	9	N/A	2019/05/04	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	2	2019/05/03	2019/05/03	ATL SOP 00113	Atl. RBCA v3.1 m
Hardness (calculated as CaCO3)	9	N/A	2019/05/06	ATL SOP 00048	Auto Calc
Mercury - Dissolved (CVAA,LL)	9	2019/05/06	2019/05/06	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Diss. MS (as rec'd)	9	N/A	2019/05/03	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS	9	2019/05/06	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	9	N/A	2019/05/08	N/A	Auto Calc.
Anion and Cation Sum	9	N/A	2019/05/08	N/A	Auto Calc.
Nitrogen Ammonia - water	9	N/A	2019/05/07	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	9	N/A	2019/05/06	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	9	N/A	2019/05/06	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	9	N/A	2019/05/06	ATL SOP 00018	ASTM D3867-16
pH (4)	9	N/A	2019/05/04	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	9	N/A	2019/05/07	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	2	N/A	2019/05/03	ATL SOP 00118	Atl. RBCA v3.1 m
Sat. pH and Langelier Index (@ 20C)	9	N/A	2019/05/08	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	9	N/A	2019/05/08	ATL SOP 00049	Auto Calc.
Reactive Silica	9	N/A	2019/05/06	ATL SOP 00022	EPA 366.0 m
Sulphate	9	N/A	2019/05/06	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc)	9	N/A	2019/05/08	N/A	Auto Calc.
Organic carbon - Total (TOC) (5)	9	N/A	2019/05/03	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	2	N/A	2019/05/06	N/A	Atl. RBCA v3 m
Turbidity	9	N/A	2019/05/07	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/10
Report #: R5705925
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Soils are reported on a dry weight basis unless otherwise specified.
(2) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(3) This test was performed by Maxxam Analytics Mississauga
(4) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(5) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/10
Report #: R5705925
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Senior Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JPE938	JPE943		
Sampling Date		2019/04/25	2019/04/29		
COC Number		D 29794	D 29794		
	UNITS	**2019SS8 (5.03-5.08M)**	**2019SS13 (4.65-4.93M)**	**RDL**	**QC Batch**
Inorganics					
Organic Carbon (TOC)	g/kg	6.8	<0.50	0.50	6106759
Sulphate (SO4)	mg/kg	11	20	10	6109397

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE937		JPE938		
Sampling Date		2019/04/25		2019/04/25		
COC Number		D 29794		D 29794		
	UNITS	2019SS7 (3.66-3.80M)	QC Batch	2019SS8 (5.03-5.08M)	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	8300	6106758	6000	10	6102070
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Arsenic (As)	mg/kg	130	6106758	17	2.0	6102070
Acid Extractable Barium (Ba)	mg/kg	23	6106758	20	5.0	6102070
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Boron (B)	mg/kg	<50	6106758	<50	50	6102070
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	6106758	<0.30	0.30	6102070
Acid Extractable Chromium (Cr)	mg/kg	14	6106758	9.7	2.0	6102070
Acid Extractable Cobalt (Co)	mg/kg	9.3	6106758	5.8	1.0	6102070
Acid Extractable Copper (Cu)	mg/kg	18	6106758	16	2.0	6102070
Acid Extractable Iron (Fe)	mg/kg	15000	6106758	10000	50	6102070
Acid Extractable Lead (Pb)	mg/kg	11	6106758	8.2	0.50	6102070
Acid Extractable Lithium (Li)	mg/kg	18	6106758	11	2.0	6102070
Acid Extractable Manganese (Mn)	mg/kg	260	6106758	190	2.0	6102070
Acid Extractable Mercury (Hg)	mg/kg	0.10	6106758	<0.10	0.10	6102070
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Nickel (Ni)	mg/kg	19	6106758	16	2.0	6102070
Acid Extractable Rubidium (Rb)	mg/kg	5.9	6106758	4.4	2.0	6102070
Acid Extractable Selenium (Se)	mg/kg	<1.0	6106758	<1.0	1.0	6102070
Acid Extractable Silver (Ag)	mg/kg	<0.50	6106758	<0.50	0.50	6102070
Acid Extractable Strontium (Sr)	mg/kg	8.1	6106758	7.5	5.0	6102070
Acid Extractable Thallium (Tl)	mg/kg	<0.10	6106758	<0.10	0.10	6102070
Acid Extractable Tin (Sn)	mg/kg	<1.0	6106758	<1.0	1.0	6102070
Acid Extractable Uranium (U)	mg/kg	1.3	6106758	1.0	0.10	6102070
Acid Extractable Vanadium (V)	mg/kg	13	6106758	8.2	2.0	6102070
Acid Extractable Zinc (Zn)	mg/kg	48	6106758	37	5.0	6102070

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE939	JPE941	JPE942		
Sampling Date		2019/04/25	2019/04/25	2019/04/25		
COC Number		D 29794	D 29794	D 29794		
	UNITS	2019SS9 (5.03-5.18M)	2019SS11 (3.49-3.60M)	2019SS12 (3.51-3.71M)	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	6800	12000	12000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	15	29	45	2.0	6106758
Acid Extractable Barium (Ba)	mg/kg	20	32	30	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	11	19	19	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	6.4	12	13	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	16	20	22	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	13000	23000	25000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	8.4	13	11	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	13	23	23	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	250	410	420	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	3.8	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	15	26	34	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	4.4	7.0	6.6	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	8.7	13	15	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.82	1.2	2.1	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	9.3	16	14	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	41	61	67	5.0	6106758

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE943		JPE944	JPE945		
Sampling Date		2019/04/29		2019/04/29	2019/04/29		
COC Number		D 29794		D 29794	D 29794		
	UNITS	2019SS13 (4.65-4.93M)	QC Batch	2019SS14 (4.06-4.14M)	2019SS13 B	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	5600	6102070	13000	5500	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	8.8	6102070	13	8.1	2.0	6106758
Acid Extractable Barium (Ba)	mg/kg	11	6102070	35	9.5	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	6102070	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	6102070	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	8.7	6102070	21	8.8	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	5.5	6102070	12	5.9	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	12	6102070	21	12	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	11000	6102070	23000	11000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	6.7	6102070	14	4.3	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	11	6102070	25	12	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	200	6102070	430	200	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	<0.10	6102070	<0.10	<0.10	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	12	6102070	29	11	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	2.6	6102070	7.3	2.6	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	6102070	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	6102070	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	7.2	6102070	16	6.9	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	<0.10	6102070	<0.10	<0.10	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	6102070	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.52	6102070	3.0	0.52	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	8.0	6102070	17	8.3	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	26	6102070	66	26	5.0	6106758

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF SEDIMENT

Maxxam ID		JPE917	JPE923			JPE927			JPE927		
Sampling Date		2019/04/16	2019/04/16			2019/04/25			2019/04/25		
COC Number		D 29791	D 29791			D 29793			D 29793		
	UNITS	2019SED1A	2019SED7A	RDL	QC Batch	2019SED10A	RDL	QC Batch	2019SED10A Lab-Dup	RDL	QC Batch
Inorganics											
Moisture	%					28	1.0	6104961	28	1.0	6104961
Organic Carbon (TOC)	g/kg	170	130	0.50	6106759	1.3	0.50	6106759			
Sulphate (SO4)	mg/kg	1500	2300	50	6109397	59	10	6109397	63	10	6109397

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		JPE929		
Sampling Date		2019/04/25		
COC Number		D 29793		
	UNITS	2019SED12A	RDL	QC Batch
Inorganics				
Moisture	%	44	1.0	6100446

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE917		JPE918	JPE919		JPE920	JPE920		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/16	2019/04/16		
COC Number		D 29791		D 29791	D 29791		D 29791	D 29791		
	UNITS	**2019SED1A**	**QC Batch**	**2019SED2A**	**2019SED3A**	**QC Batch**	**2019SED4A**	**2019SED4A Lab-Dup**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	17000	6102070	18000	20000	6106756	18000	17000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	2000	6102070	1900	2000	6106756	1900	1800	20	6106758
Acid Extractable Barium (Ba)	mg/kg	150	6102070	250	230	6106756	250	230	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	6102070	<50	<50	6106756	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	2.6	6102070	2.6	2.1	6106756	1.9	1.9	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	12	6102070	14	15	6106756	14	13	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	100	6102070	120	130	6106756	110	110	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	32	6102070	35	36	6106756	33	33	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	40000	6102070	40000	54000	6106756	44000	44000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	63	6102070	72	73	6106756	62	60	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	12	6102070	16	16	6106756	15	15	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	4900	6102070	15000	14000	6106756	17000	17000	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	1.9	6102070	2.2	2.2	6106756	2.1	2.1	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	86	6102070	76	53	6106756	48	49	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	8.5	6102070	11	11	6106756	9.8	9.2	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	1.7	6102070	1.9	2.0	6106756	1.8	1.9	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	6102070	<0.50	<0.50	6106756	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	23	6102070	24	24	6106756	29	29	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	0.29	6102070	0.34	0.37	6106756	0.32	0.30	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	1.2	6102070	1.3	1.3	6106756	1.3	1.1	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.85	6102070	1.2	1.1	6106756	1.0	1.0	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	60	6102070	63	69	6106756	56	55	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	260	6102070	270	250	6106756	230	220	5.0	6106758

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

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE921	JPE922		JPE923		JPE924		
Sampling Date		2019/04/16	2019/04/16		2019/04/16		2019/04/16		
COC Number		D 29791	D 29791		D 29791		D 29791		
	UNITS	2019SED5A	2019SED6A	QC Batch	2019SED7A	QC Batch	2019SED8A	RDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	27000	22000	6106756	25000	6102070	23000	10	6106756
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	6106756	2.4	6102070	2.3	2.0	6106756
Acid Extractable Arsenic (As)	mg/kg	960	1600	6106756	1900	6102070	2400	20	6106756
Acid Extractable Barium (Ba)	mg/kg	160	150	6106756	230	6102070	260	5.0	6106756
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Boron (B)	mg/kg	<50	<50	6106756	<50	6102070	<50	50	6106756
Acid Extractable Cadmium (Cd)	mg/kg	1.7	1.4	6106756	2.5	6102070	2.6	0.30	6106756
Acid Extractable Chromium (Cr)	mg/kg	21	19	6106756	17	6102070	17	2.0	6106756
Acid Extractable Cobalt (Co)	mg/kg	84	87	6106756	160	6102070	160	1.0	6106756
Acid Extractable Copper (Cu)	mg/kg	34	35	6106756	43	6102070	40	2.0	6106756
Acid Extractable Iron (Fe)	mg/kg	41000	36000	6106756	45000	6102070	54000	50	6106756
Acid Extractable Lead (Pb)	mg/kg	96	74	6106756	78	6102070	74	0.50	6106756
Acid Extractable Lithium (Li)	mg/kg	25	22	6106756	21	6102070	20	2.0	6106756
Acid Extractable Manganese (Mn)	mg/kg	4800	7700	6106756	14000	6102070	13000	2.0	6106756
Acid Extractable Mercury (Hg)	mg/kg	0.82	2.4	6106756	2.9	6102070	2.7	0.10	6106756
Acid Extractable Molybdenum (Mo)	mg/kg	2.2	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Nickel (Ni)	mg/kg	38	41	6106756	75	6102070	67	2.0	6106756
Acid Extractable Rubidium (Rb)	mg/kg	11	15	6106756	12	6102070	12	2.0	6106756
Acid Extractable Selenium (Se)	mg/kg	2.7	2.5	6106756	2.0	6102070	2.2	1.0	6106756
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	6106756	<0.50	6102070	<0.50	0.50	6106756
Acid Extractable Strontium (Sr)	mg/kg	40	27	6106756	29	6102070	31	5.0	6106756
Acid Extractable Thallium (Tl)	mg/kg	0.34	0.36	6106756	0.43	6102070	0.48	0.10	6106756
Acid Extractable Tin (Sn)	mg/kg	1.3	1.4	6106756	1.5	6102070	1.3	1.0	6106756
Acid Extractable Uranium (U)	mg/kg	2.5	1.4	6106756	1.3	6102070	1.2	0.10	6106756
Acid Extractable Vanadium (V)	mg/kg	58	56	6106756	66	6102070	75	2.0	6106756
Acid Extractable Zinc (Zn)	mg/kg	200	180	6106756	330	6102070	320	5.0	6106756

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE925		JPE926			JPE927	JPE927		
Sampling Date		2019/04/16		2019/04/25			2019/04/25	2019/04/25		
COC Number		D 29791		D 29791			D 29793	D 29793		
	UNITS	**2019SED7B**	**RDL**	**2019SED9A**	**RDL**	**QC Batch**	**2019SED10A**	**2019SED10A Lab-Dup**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	22000	10	12000	10	6106758	14000	13000	10	6102070
Acid Extractable Antimony (Sb)	mg/kg	2.3	2.0	<2.0	2.0	6106758	9.5	9.1	2.0	6102070
Acid Extractable Arsenic (As)	mg/kg	1900	20	170	2.0	6106758	6200	6000	200	6102070
Acid Extractable Barium (Ba)	mg/kg	240	5.0	84	5.0	6106758	58	55	5.0	6102070
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	6106758	<50	<50	50	6102070
Acid Extractable Cadmium (Cd)	mg/kg	2.4	0.30	<0.30	0.30	6106758	<0.30	<0.30	0.30	6102070
Acid Extractable Chromium (Cr)	mg/kg	16	2.0	13	2.0	6106758	15	14	2.0	6102070
Acid Extractable Cobalt (Co)	mg/kg	150	1.0	4.1	1.0	6106758	16	16	1.0	6102070
Acid Extractable Copper (Cu)	mg/kg	39	2.0	30	2.0	6106758	53	51	2.0	6102070
Acid Extractable Iron (Fe)	mg/kg	42000	50	17000	50	6106758	31000	30000	50	6102070
Acid Extractable Lead (Pb)	mg/kg	72	0.50	35	0.50	6106758	73	70	0.50	6102070
Acid Extractable Lithium (Li)	mg/kg	19	2.0	24	2.0	6106758	25	24	2.0	6102070
Acid Extractable Manganese (Mn)	mg/kg	14000	2.0	250	2.0	6106758	660	630	2.0	6102070
Acid Extractable Mercury (Hg)	mg/kg	2.7	0.10	4.4	0.10	6106758	6.8	6.5	0.10	6102070
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Nickel (Ni)	mg/kg	65	2.0	12	2.0	6106758	34	33	2.0	6102070
Acid Extractable Rubidium (Rb)	mg/kg	12	2.0	20	2.0	6106758	32	30	2.0	6102070
Acid Extractable Selenium (Se)	mg/kg	2.0	1.0	<1.0	1.0	6106758	<1.0	<1.0	1.0	6102070
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	0.50	6106758	<0.50	<0.50	0.50	6102070
Acid Extractable Strontium (Sr)	mg/kg	26	5.0	12	5.0	6106758	17	16	5.0	6102070
Acid Extractable Thallium (Tl)	mg/kg	0.40	0.10	0.16	0.10	6106758	0.28	0.27	0.10	6102070
Acid Extractable Tin (Sn)	mg/kg	1.3	1.0	<1.0	1.0	6106758	<1.0	<1.0	1.0	6102070
Acid Extractable Uranium (U)	mg/kg	1.2	0.10	1.1	0.10	6106758	1.1	1.0	0.10	6102070
Acid Extractable Vanadium (V)	mg/kg	61	2.0	16	2.0	6106758	15	14	2.0	6102070
Acid Extractable Zinc (Zn)	mg/kg	290	5.0	58	5.0	6106758	120	110	5.0	6102070

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE928		JPE930	JPE931		
Sampling Date		2019/04/25		2019/04/26	2019/04/26		
COC Number		D 29793		D 29793	D 29793		
	UNITS	2019SED11A	RDL	2019SED13A	2019SED14A	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	12000	10	11000	12000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	8.1	2.0	3.3	4.6	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	5100	200	1900	2900	20	6106758
Acid Extractable Barium (Ba)	mg/kg	70	5.0	74	91	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	14	2.0	12	13	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	17	1.0	8.1	15	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	47	2.0	34	38	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	27000	50	18000	23000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	62	0.50	40	45	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	24	2.0	22	23	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	890	2.0	280	930	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	6.3	0.10	5.2	5.2	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	29	2.0	17	25	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	29	2.0	19	25	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	14	5.0	13	14	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	0.26	0.10	0.20	0.26	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	1.1	0.10	1.1	1.1	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	14	2.0	12	15	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	100	5.0	64	94	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ATLANTIC RBCA HYDROCARBONS (SEDIMENT)

Maxxam ID		JPE927			JPE927			JPE929		
Sampling Date		2019/04/25			2019/04/25			2019/04/25		
COC Number		D 29793			D 29793			D 29793		
	UNITS	2019SED10A	RDL	QC Batch	2019SED10A Lab-Dup	RDL	QC Batch	2019SED12A	RDL	QC Batch
Petroleum Hydrocarbons										
Benzene	mg/kg	<0.025	0.025	6105340				<0.025	0.025	6101927
Toluene	mg/kg	<0.050	0.050	6105340				<0.050	0.050	6101927
Ethylbenzene	mg/kg	<0.025	0.025	6105340				<0.025	0.025	6101927
Total Xylenes	mg/kg	<0.050	0.050	6105340				<0.050	0.050	6101927
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	6105340				<2.5	2.5	6101927
>C10-C16 Hydrocarbons	mg/kg	<10	10	6106793	<10	10	6106793	<10	10	6104752
>C16-C21 Hydrocarbons	mg/kg	18	10	6106793	19	10	6106793	23	10	6104752
>C21-<C32 Hydrocarbons	mg/kg	100	15	6106793	100	15	6106793	100	15	6104752
Modified TPH (Tier1)	mg/kg	120	15	6104987				130	15	6099603
Reached Baseline at C32	mg/kg	Yes	N/A	6106793				Yes	N/A	6104752
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	6106793				COMMENT (2)	N/A	6104752
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	87		6106793	87		6106793	82		6104752
n-Dotriacontane - Extractable	%	95		6106793	93		6106793	97		6104752
Isobutylbenzene - Volatile	%	132 (3)		6105340				116		6101927

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Lube oil fraction.
(2) Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.
(3) VPH surrogate not within acceptance limits. Analysis was repeated with similar results. VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE946		JPE947			JPE947		
Sampling Date		2019/04/29		2019/04/29			2019/04/29		
COC Number		D 39276		D 39276			D 39276		
	UNITS	**2019SW1**	**QC Batch**	**2019SW2**	**RDL**	**QC Batch**	**2019SW2 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	me/L	1.76	6099911	1.81	N/A	6099911			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	6099909	11	1.0	6099909			
Calculated TDS	mg/L	100	6099914	100	1.0	6099914			
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6099909	<1.0	1.0	6099909			
Cation Sum	me/L	1.69	6099911	1.69	N/A	6099911			
Hardness (CaCO3)	mg/L	19	6099822	19	1.0	6099822			
Ion Balance (% Difference)	%	2.03	6099910	3.43	N/A	6099910			
Langelier Index (@ 20C)	N/A	-2.44	6099912	-2.61		6099912			
Langelier Index (@ 4C)	N/A	-2.69	6099913	-2.86		6099913			
Nitrate (N)	mg/L	0.092	6099787	0.092	0.050	6099787			
Saturation pH (@ 20C)	N/A	9.54	6099912	9.54		6099912			
Saturation pH (@ 4C)	N/A	9.79	6099913	9.79		6099913			
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	6104792	11	5.0	6104792			
Dissolved Chloride (Cl-)	mg/L	48	6104797	50	1.0	6104797			
Colour	TCU	33	6104804	28	5.0	6104804			
Nitrate + Nitrite (N)	mg/L	0.092	6104810	0.092	0.050	6104810			
Nitrite (N)	mg/L	<0.010	6104813	<0.010	0.010	6104813			
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	6106993	<0.050	0.050	6106998	<0.050	0.050	6106998
Total Organic Carbon (C)	mg/L	5.3	6102025	5.2	0.50	6102025			
Orthophosphate (P)	mg/L	0.013	6104806	0.013	0.010	6104806			
pH	pH	7.10	6103907	6.93	N/A	6103904	6.97	N/A	6103904
Reactive Silica (SiO2)	mg/L	1.6	6104802	1.5	0.50	6104802			
Dissolved Sulphate (SO4)	mg/L	8.4	6104799	8.5	2.0	6104799			
Turbidity	NTU	0.25	6107949	0.26	0.10	6107949			
Conductivity	uS/cm	200	6103910	200	1.0	6103906	200	1.0	6103906

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

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RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE948	JPE949		JPE950		JPE951		
Sampling Date		2019/04/29	2019/04/29		2019/04/29		2019/04/29		
COC Number		D 39276	D 39276		D 39276		D 39276		
	UNITS	2019SW3	2019SW4	QC Batch	2019SW5	QC Batch	2019SW6	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	1.87	1.84	6099911	1.75	6099911	1.90	N/A	6099911
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	11	6099909	11	6099909	11	1.0	6099909
Calculated TDS	mg/L	110	110	6099914	100	6099914	110	1.0	6099914
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	<1.0	6099909	<1.0	6099909	<1.0	1.0	6099909
Cation Sum	me/L	1.74	1.71	6099911	1.64	6099911	1.83	N/A	6099911
Hardness (CaCO3)	mg/L	19	19	6099822	19	6099822	20	1.0	6099822
Ion Balance (% Difference)	%	3.60	3.66	6099910	3.24	6099910	1.88	N/A	6099910
Langelier Index (@ 20C)	N/A	-2.54	-2.56	6099912	-2.48	6099912	-2.50		6099912
Langelier Index (@ 4C)	N/A	-2.79	-2.81	6099913	-2.73	6099913	-2.75		6099913
Nitrate (N)	mg/L	0.066	0.27	6099787	0.084	6099787	<0.050	0.050	6099787
Saturation pH (@ 20C)	N/A	9.55	9.57	6099912	9.54	6099912	9.54		6099912
Saturation pH (@ 4C)	N/A	9.81	9.82	6099913	9.79	6099913	9.79		6099913
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	11	6104792	11	6104816	11	5.0	6104816
Dissolved Chloride (Cl-)	mg/L	52	50	6104797	48	6104818	54	1.0	6104818
Colour	TCU	28	27	6104804	32	6104823	25	5.0	6104823
Nitrate + Nitrite (N)	mg/L	0.066	0.27	6104810	0.084	6104827	<0.050	0.050	6104827
Nitrite (N)	mg/L	<0.010	<0.010	6104813	<0.010	6104828	<0.010	0.010	6104828
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	<0.050	6106993	<0.050	6106998	<0.050	0.050	6106993
Total Organic Carbon (C)	mg/L	4.9	4.9	6102025	5.4	6102025	4.8	0.50	6102025
Orthophosphate (P)	mg/L	0.014	0.013	6104806	0.013	6104825	0.015	0.010	6104825
pH	pH	7.02	7.01	6103904	7.06	6103907	7.04	N/A	6103904
Reactive Silica (SiO2)	mg/L	1.3	1.5	6104802	1.6	6104822	1.2	0.50	6104822
Dissolved Sulphate (SO4)	mg/L	8.4	9.0	6104799	8.3	6104820	8.4	2.0	6104820
Turbidity	NTU	0.31	0.27	6107943	0.24	6107943	0.33	0.10	6107949
Conductivity	uS/cm	210	210	6103906	200	6103910	220	1.0	6103906

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE952		JPE953			JPE954		
Sampling Date		2019/04/29		2019/04/29			2019/04/29		
COC Number		D 39276		D 39276			D 39276		
	UNITS	2019SW10	QC Batch	2019SW11	RDL	QC Batch	2019SW7	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	1.96	6099911	1.74	N/A	6099911	1.78	N/A	6099911
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	6099909	10	1.0	6099909	11	1.0	6099909
Calculated TDS	mg/L	110	6099914	100	1.0	6099914	100	1.0	6099914
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6099909	<1.0	1.0	6099909	<1.0	1.0	6099909
Cation Sum	me/L	1.89	6099911	1.64	N/A	6099911	1.68	N/A	6099911
Hardness (CaCO3)	mg/L	20	6099822	19	1.0	6099822	19	1.0	6099822
Ion Balance (% Difference)	%	1.82	6099910	2.96	N/A	6099910	2.89	N/A	6099910
Langelier Index (@ 20C)	N/A	-2.42	6099912	-2.62		6099912	-2.60		6099912
Langelier Index (@ 4C)	N/A	-2.67	6099913	-2.87		6099913	-2.85		6099913
Nitrate (N)	mg/L	<0.050	6099787	0.076	0.050	6099787	0.076	0.050	6099787
Saturation pH (@ 20C)	N/A	9.53	6099912	9.57		6099912	9.54		6099912
Saturation pH (@ 4C)	N/A	9.78	6099913	9.82		6099913	9.79		6099913
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	6104816	11	5.0	6104816	11	5.0	6104816
Dissolved Chloride (Cl-)	mg/L	56	6104818	48	1.0	6104818	49	1.0	6104818
Colour	TCU	24	6104823	31	5.0	6104823	31	5.0	6104823
Nitrate + Nitrite (N)	mg/L	<0.050	6104827	0.076	0.050	6104827	0.076	0.050	6104827
Nitrite (N)	mg/L	<0.010	6104828	<0.010	0.010	6104828	<0.010	0.010	6104828
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	6106993	<0.050	0.050	6106993	<0.050	0.050	6106993
Total Organic Carbon (C)	mg/L	4.4	6102025	5.3	0.50	6102025	5.3	0.50	6102025
Orthophosphate (P)	mg/L	0.020	6104825	0.012	0.010	6104825	0.012	0.010	6104825
pH	pH	7.11	6103904	6.95	N/A	6103907	6.94	N/A	6103907
Reactive Silica (SiO2)	mg/L	1.1	6104822	1.6	0.50	6104822	1.6	0.50	6104822
Dissolved Sulphate (SO4)	mg/L	8.5	6104820	8.9	2.0	6104820	8.4	2.0	6104820
Total Cyanide (CN)	mg/L	<0.0050	6105437	<0.0050	0.0050	6105432			
Turbidity	NTU	<0.10	6107949	0.41	0.10	6107949	0.47	0.10	6107943
Conductivity	uS/cm	230	6103906	200	1.0	6103910	200	1.0	6103910

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE954		
Sampling Date		2019/04/29		
COC Number		D 39276		
	UNITS	**2019SW7 Lab-Dup**	**RDL**	**QC Batch**
Inorganics				
pH	pH	6.98	N/A	6103907
Conductivity	uS/cm	200	1.0	6103910

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

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		JPE946	JPE947	JPE948	JPE949	JPE950	JPE951	JPE952		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	**2019SW1**	**2019SW2**	**2019SW3**	**2019SW4**	**2019SW5**	**2019SW6**	**2019SW10**	**RDL**	**QC Batch**
Metals										
Dissolved Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	6101730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29		
COC Number		D 39276	D 39276		
	UNITS	**2019SW11**	**2019SW7**	**RDL**	**QC Batch**
Metals					
Dissolved Mercury (Hg)	ug/L	<0.013	<0.013	0.013	6101730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE946	JPE947			JPE947			JPE948		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	2019SW1	2019SW2	RDL	QC Batch	2019SW2 Lab-Dup	RDL	QC Batch	2019SW3	RDL	QC Batch
Metals											
Dissolved Aluminum (Al)	ug/L	81	77	5.0	6102447				66	5.0	6102447
Total Aluminum (Al)	ug/L	81	71	5.0	6104716	73	5.0	6104716	63	5.0	6104716
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Antimony (Sb)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Arsenic (As)	ug/L	45	44	1.0	6102447				54	1.0	6102447
Total Arsenic (As)	ug/L	45	47	1.0	6104716	48	1.0	6104716	54	1.0	6104716
Dissolved Barium (Ba)	ug/L	4.4	4.3	1.0	6102447				4.4	1.0	6102447
Total Barium (Ba)	ug/L	4.5	4.1	1.0	6104716	4.4	1.0	6104716	4.1	1.0	6104716
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Beryllium (Be)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Boron (B)	ug/L	<50	<50	50	6102447				<50	50	6102447
Total Boron (B)	ug/L	<50	<50	50	6104716	<50	50	6104716	<50	50	6104716
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6102447				<0.010	0.010	6102447
Total Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6104716	<0.010	0.010	6104716	<0.010	0.010	6104716
Dissolved Calcium (Ca)	ug/L	5800	5800	100	6102447				5800	100	6102447
Total Calcium (Ca)	ug/L	5700	5700	100	6104716	5700	100	6104716	5700	100	6104716
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Cobalt (Co)	ug/L	<0.40	<0.40	0.40	6102447				<0.40	0.40	6102447
Total Cobalt (Co)	ug/L	<0.40	<0.40	0.40	6104716	<0.40	0.40	6104716	<0.40	0.40	6104716
Dissolved Copper (Cu)	ug/L	0.76	0.76	0.50	6102447				0.82	0.50	6102447
Total Copper (Cu)	ug/L	0.89	0.87	0.50	6104716	0.95	0.50	6104716	1.3	0.50	6104716
Dissolved Iron (Fe)	ug/L	59	53	50	6102447				<50	50	6102447
Total Iron (Fe)	ug/L	73	55	50	6104716	57	50	6104716	<50	50	6104716
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6102447				<0.50	0.50	6102447
Total Lead (Pb)	ug/L	<0.50	<0.50	0.50	6104716	<0.50	0.50	6104716	<0.50	0.50	6104716
Dissolved Magnesium (Mg)	ug/L	1100	1100	100	6102447				1100	100	6102447
Total Magnesium (Mg)	ug/L	1100	1100	100	6104716	1100	100	6104716	1000	100	6104716
Dissolved Manganese (Mn)	ug/L	24	20	2.0	6102447				17	2.0	6102447
Total Manganese (Mn)	ug/L	27	20	2.0	6104716	21	2.0	6104716	19	2.0	6104716
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE946	JPE947			JPE947			JPE948		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	2019SW1	2019SW2	RDL	QC Batch	2019SW2 Lab-Dup	RDL	QC Batch	2019SW3	RDL	QC Batch
Total Nickel (Ni)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Phosphorus (P)	ug/L	<100	<100	100	6102447				<100	100	6102447
Total Phosphorus (P)	ug/L	<100	<100	100	6104716	<100	100	6104716	<100	100	6104716
Dissolved Potassium (K)	ug/L	970	1000	100	6102447				980	100	6102447
Total Potassium (K)	ug/L	930	900	100	6104716	910	100	6104716	940	100	6104716
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Selenium (Se)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Silver (Ag)	ug/L	<0.10	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Sodium (Na)	ug/L	29000	30000	100	6102447				31000	100	6102447
Total Sodium (Na)	ug/L	28000	28000	100	6104716	29000	100	6104716	30000	100	6104716
Dissolved Strontium (Sr)	ug/L	20	21	2.0	6102447				20	2.0	6102447
Total Strontium (Sr)	ug/L	19	19	2.0	6104716	20	2.0	6104716	20	2.0	6104716
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Thallium (Tl)	ug/L	0.11	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Tin (Sn)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Titanium (Ti)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Uranium (U)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Uranium (U)	ug/L	<0.10	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Vanadium (V)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Zinc (Zn)	ug/L	5.4	<5.0	5.0	6102447				<5.0	5.0	6102447
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6104716	<5.0	5.0	6104716	<5.0	5.0	6104716

RDL = Reportable Detection Limit
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A Bureau Veritas Group Company

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE949	JPE950	JPE951	JPE952	JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	**2019SW4**	**2019SW5**	**2019SW6**	**2019SW10**	**2019SW11**	**2019SW7**	**RDL**	**QC Batch**
Metals									
Dissolved Aluminum (Al)	ug/L	68	80	55	48	88	91	5.0	6102447
Total Aluminum (Al)	ug/L	70	79	57	46	86	80	5.0	6104716
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Arsenic (As)	ug/L	47	44	58	83	44	45	1.0	6102447
Total Arsenic (As)	ug/L	50	46	59	86	45	46	1.0	6104716
Dissolved Barium (Ba)	ug/L	4.4	4.4	4.4	4.6	4.7	4.6	1.0	6102447
Total Barium (Ba)	ug/L	5.5	4.5	4.4	4.5	4.5	4.6	1.0	6104716
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	6102447
Total Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	6104716
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6102447
Total Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6104716
Dissolved Calcium (Ca)	ug/L	5600	5700	6000	6200	5700	5700	100	6102447
Total Calcium (Ca)	ug/L	5900	5600	5900	6200	5700	5700	100	6104716
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6102447
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6104716
Dissolved Copper (Cu)	ug/L	0.76	0.76	0.86	0.81	0.80	0.88	0.50	6102447
Total Copper (Cu)	ug/L	0.80	0.92	0.97	0.98	0.92	0.97	0.50	6104716
Dissolved Iron (Fe)	ug/L	<50	59	<50	<50	170	56	50	6102447
Total Iron (Fe)	ug/L	52	67	60	<50	70	75	50	6104716
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6102447
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6104716
Dissolved Magnesium (Mg)	ug/L	1100	1100	1100	1200	1100	1100	100	6102447
Total Magnesium (Mg)	ug/L	1100	1000	1100	1100	1100	1100	100	6104716
Dissolved Manganese (Mn)	ug/L	18	23	15	18	25	22	2.0	6102447
Total Manganese (Mn)	ug/L	19	26	18	18	26	28	2.0	6104716
Dissolved Molybdenum (Mo)	ug/L	3.6	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE949	JPE950	JPE951	JPE952	JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	**2019SW4**	**2019SW5**	**2019SW6**	**2019SW10**	**2019SW11**	**2019SW7**	**RDL**	**QC Batch**
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	100	6102447
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	100	6104716
Dissolved Potassium (K)	ug/L	980	980	990	1100	980	970	100	6102447
Total Potassium (K)	ug/L	950	950	950	1000	930	960	100	6104716
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Sodium (Na)	ug/L	30000	29000	32000	34000	28000	29000	100	6102447
Total Sodium (Na)	ug/L	30000	28000	31000	32000	28000	28000	100	6104716
Dissolved Strontium (Sr)	ug/L	21	20	22	22	19	20	2.0	6102447
Total Strontium (Sr)	ug/L	21	20	21	22	20	19	2.0	6104716
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Thallium (Tl)	ug/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Zinc (Zn)	ug/L	6.5	<5.0	<5.0	7.4	<5.0	<5.0	5.0	6102447
Total Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6104716

RDL = Reportable Detection Limit
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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		JPE952			JPE952			JPE953		
Sampling Date		2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276			D 39276			D 39276		
	UNITS	**2019SW10**	**RDL**	**QC Batch**	**2019SW10 Lab-Dup**	**RDL**	**QC Batch**	**2019SW11**	**RDL**	**QC Batch**
Petroleum Hydrocarbons										
Benzene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Toluene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Ethylbenzene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Total Xylenes	mg/L	<0.0020	0.0020	6101727	<0.0020	0.0020	6101727	<0.0020	0.0020	6101727
C6 - C10 (less BTEX)	mg/L	<0.010	0.010	6101727	<0.010	0.010	6101727	<0.010	0.010	6101727
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	6102045				<0.050	0.050	6102045
>C16-C21 Hydrocarbons	mg/L	<0.050	0.050	6102045				<0.050	0.050	6102045
>C21-<C32 Hydrocarbons	mg/L	<0.10	0.10	6102045				<0.10	0.10	6102045
Modified TPH (Tier1)	mg/L	<0.10	0.10	6099525				<0.10	0.10	6099525
Reached Baseline at C32	mg/L	NA	N/A	6102045				NA	N/A	6102045
Hydrocarbon Resemblance	mg/L	NA	N/A	6102045				NA	N/A	6102045
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	83		6102045				91		6102045
n-Dotriacontane - Extractable	%	92		6102045				99		6102045
Isobutylbenzene - Volatile	%	102		6101727	102		6101727	102		6101727

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

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GENERAL COMMENTS

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

Package 1	3.7°C
Package 2	0.7°C

Total Water Analysis - Sample decanted from a non-preserved aliquot – metals results may be biased low.

Results relate only to the items tested.

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6100446	SDN	RPD	Moisture	2019/05/03	12		%	25
6101727	THL	Matrix Spike [JPE953-09]	Isobutylbenzene - Volatile	2019/05/03		104	%	70 - 130
			Benzene	2019/05/03		112	%	70 - 130
			Toluene	2019/05/03		117	%	70 - 130
			Ethylbenzene	2019/05/03		120	%	70 - 130
			Total Xylenes	2019/05/03		117	%	70 - 130
6101727	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	70 - 130
			Benzene	2019/05/03		102	%	70 - 130
			Toluene	2019/05/03		104	%	70 - 130
			Ethylbenzene	2019/05/03		106	%	70 - 130
			Total Xylenes	2019/05/03		104	%	70 - 130
6101727	THL	Method Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	70 - 130
			Benzene	2019/05/03	<0.0010		mg/L	
			Toluene	2019/05/03	<0.0010		mg/L	
			Ethylbenzene	2019/05/03	<0.0010		mg/L	
			Total Xylenes	2019/05/03	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/05/03	<0.010		mg/L	
6101727	THL	RPD [JPE952-09]	Benzene	2019/05/03	NC		%	40
			Toluene	2019/05/03	NC		%	40
			Ethylbenzene	2019/05/03	NC		%	40
			Total Xylenes	2019/05/03	NC		%	40
			C6 - C10 (less BTEX)	2019/05/03	NC		%	40
6101730	CCR	Matrix Spike	Dissolved Mercury (Hg)	2019/05/06		93	%	80 - 120
6101730	CCR	Spiked Blank	Dissolved Mercury (Hg)	2019/05/06		100	%	80 - 120
6101730	CCR	Method Blank	Dissolved Mercury (Hg)	2019/05/06	<0.013		ug/L	
6101730	CCR	RPD	Dissolved Mercury (Hg)	2019/05/06	NC		%	20
6101927	YXU	Matrix Spike	Isobutylbenzene - Volatile	2019/05/03		108	%	60 - 130
			Benzene	2019/05/03		95	%	60 - 130
			Toluene	2019/05/03		95	%	60 - 130
			Ethylbenzene	2019/05/03		103	%	60 - 130
			Total Xylenes	2019/05/03		100	%	60 - 130
6101927	YXU	Spiked Blank	Isobutylbenzene - Volatile	2019/05/03		97	%	60 - 130
			Benzene	2019/05/03		90	%	60 - 140
			Toluene	2019/05/03		92	%	60 - 140
			Ethylbenzene	2019/05/03		94	%	60 - 140
			Total Xylenes	2019/05/03		94	%	60 - 140
6101927	YXU	Method Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	60 - 130
			Benzene	2019/05/03	<0.025		mg/kg	
			Toluene	2019/05/03	<0.050		mg/kg	
			Ethylbenzene	2019/05/03	<0.025		mg/kg	
			Total Xylenes	2019/05/03	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2019/05/03	<2.5		mg/kg	
6101927	YXU	RPD	Benzene	2019/05/03	NC		%	50
			Toluene	2019/05/03	NC		%	50
			Ethylbenzene	2019/05/03	NC		%	50
			Total Xylenes	2019/05/03	11		%	50
			C6 - C10 (less BTEX)	2019/05/03	NC		%	50
6102025	SSI	Matrix Spike	Total Organic Carbon (C)	2019/05/03		98	%	85 - 115
6102025	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/03		103	%	80 - 120
6102025	SSI	Method Blank	Total Organic Carbon (C)	2019/05/03	<0.50		mg/L	
6102025	SSI	RPD	Total Organic Carbon (C)	2019/05/03	NC		%	15
6102045	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/03		104	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		111	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03		98	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2019/05/03		93	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/03		107	%	70 - 130
6102045	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/03		102	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		104	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/03		89	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/03		102	%	70 - 130
6102045	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/03		102	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		100	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/03	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/03	<0.10		mg/L	
6102045	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/03	0.31		%	40
			>C16-C21 Hydrocarbons	2019/05/03	3.0		%	40
			>C21-<C32 Hydrocarbons	2019/05/03	5.0		%	40
6102070	MLB	Matrix Spike [JPE927-01]	Acid Extractable Antimony (Sb)	2019/05/06		NC	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/06		NC	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/06		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/06		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/06		104	%	75 - 125
			Acid Extractable Boron (B)	2019/05/06		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/06		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/06		96	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/06		95	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/06		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/06		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/06		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/06		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/06		94	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/06		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/06		96	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/06		98	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/06		94	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/06		99	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/06		106	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/06		103	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/06		111	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/06		103	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/06		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/06		NC	%	75 - 125
6102070	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/04		104	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/04		97	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/04		101	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/04		94	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/04		103	%	75 - 125
			Acid Extractable Boron (B)	2019/05/04		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/04		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/04		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/04		97	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/04		95	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/04		100	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/04		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/04		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/04		103	%	75 - 125

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2019/05/04		106	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/04		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/04		99	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/04		96	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/04		97	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/04		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/04		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/04		102	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/04		100	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/04		95	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/04		99	%	75 - 125
6102070	MLB	Method Blank	Acid Extractable Aluminum (Al)	2019/05/04	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/04	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/04	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/04	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/04	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/04	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/04	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/04	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/04	<5.0		mg/kg	
6102070	MLB	RPD [JPE927-01]	Acid Extractable Aluminum (Al)	2019/05/06	7.6		%	35
			Acid Extractable Antimony (Sb)	2019/05/06	4.3		%	35
			Acid Extractable Arsenic (As)	2019/05/06	3.8		%	35
			Acid Extractable Barium (Ba)	2019/05/06	6.4		%	35
			Acid Extractable Beryllium (Be)	2019/05/06	NC		%	35
			Acid Extractable Bismuth (Bi)	2019/05/06	NC		%	35
			Acid Extractable Boron (B)	2019/05/06	NC		%	35
			Acid Extractable Cadmium (Cd)	2019/05/06	NC		%	35
			Acid Extractable Chromium (Cr)	2019/05/06	7.4		%	35
			Acid Extractable Cobalt (Co)	2019/05/06	1.3		%	35
			Acid Extractable Copper (Cu)	2019/05/06	3.5		%	35
			Acid Extractable Iron (Fe)	2019/05/06	4.1		%	35
			Acid Extractable Lead (Pb)	2019/05/06	4.0		%	35
			Acid Extractable Lithium (Li)	2019/05/06	3.4		%	35
			Acid Extractable Manganese (Mn)	2019/05/06	4.6		%	35
			Acid Extractable Mercury (Hg)	2019/05/06	4.6		%	35

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2019/05/06	NC		%	35
			Acid Extractable Nickel (Ni)	2019/05/06	2.6		%	35
			Acid Extractable Rubidium (Rb)	2019/05/06	7.2		%	35
			Acid Extractable Selenium (Se)	2019/05/06	NC		%	35
			Acid Extractable Silver (Ag)	2019/05/06	NC		%	35
			Acid Extractable Strontium (Sr)	2019/05/06	1.9		%	35
			Acid Extractable Thallium (Tl)	2019/05/06	1.8		%	35
			Acid Extractable Tin (Sn)	2019/05/06	NC		%	35
			Acid Extractable Uranium (U)	2019/05/06	8.6		%	35
			Acid Extractable Vanadium (V)	2019/05/06	5.6		%	35
			Acid Extractable Zinc (Zn)	2019/05/06	2.3		%	35
6102447	MLB	Matrix Spike	Dissolved Aluminum (Al)	2019/05/03		103	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/05/03		93	%	80 - 120
			Dissolved Barium (Ba)	2019/05/03		99	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/03		96	%	80 - 120
			Dissolved Bismuth (Bi)	2019/05/03		97	%	80 - 120
			Dissolved Boron (B)	2019/05/03		95	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/03		98	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/03		99	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/03		95	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/03		94	%	80 - 120
			Dissolved Copper (Cu)	2019/05/03		90	%	80 - 120
			Dissolved Iron (Fe)	2019/05/03		98	%	80 - 120
			Dissolved Lead (Pb)	2019/05/03		98	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/03		101	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/03		92	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/03		NC	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/03		92	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/03		105	%	80 - 120
			Dissolved Potassium (K)	2019/05/03		102	%	80 - 120
			Dissolved Selenium (Se)	2019/05/03		91	%	80 - 120
			Dissolved Silver (Ag)	2019/05/03		94	%	80 - 120
			Dissolved Sodium (Na)	2019/05/03		NC	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/03		NC	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/03		99	%	80 - 120
			Dissolved Tin (Sn)	2019/05/03		104	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/03		99	%	80 - 120
			Dissolved Uranium (U)	2019/05/03		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/03		95	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/03		95	%	80 - 120
6102447	MLB	Spiked Blank	Dissolved Aluminum (Al)	2019/05/03		106	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/05/03		94	%	80 - 120
			Dissolved Barium (Ba)	2019/05/03		100	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/03		98	%	80 - 120
			Dissolved Bismuth (Bi)	2019/05/03		101	%	80 - 120
			Dissolved Boron (B)	2019/05/03		95	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/03		97	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/03		100	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/03		97	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/03		96	%	80 - 120
			Dissolved Copper (Cu)	2019/05/03		95	%	80 - 120
			Dissolved Iron (Fe)	2019/05/03		99	%	80 - 120

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Lead (Pb)	2019/05/03		99	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/03		105	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/03		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/03		100	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/03		96	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/03		104	%	80 - 120
			Dissolved Potassium (K)	2019/05/03		99	%	80 - 120
			Dissolved Selenium (Se)	2019/05/03		91	%	80 - 120
			Dissolved Silver (Ag)	2019/05/03		95	%	80 - 120
			Dissolved Sodium (Na)	2019/05/03		99	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/03		100	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/03		100	%	80 - 120
			Dissolved Tin (Sn)	2019/05/03		102	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/03		102	%	80 - 120
			Dissolved Uranium (U)	2019/05/03		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/03		97	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/03		98	%	80 - 120
6102447	MLB	Method Blank	Dissolved Aluminum (Al)	2019/05/03	<5.0		ug/L	
			Dissolved Antimony (Sb)	2019/05/03	<1.0		ug/L	
			Dissolved Arsenic (As)	2019/05/03	<1.0		ug/L	
			Dissolved Barium (Ba)	2019/05/03	<1.0		ug/L	
			Dissolved Beryllium (Be)	2019/05/03	<1.0		ug/L	
			Dissolved Bismuth (Bi)	2019/05/03	<2.0		ug/L	
			Dissolved Boron (B)	2019/05/03	<50		ug/L	
			Dissolved Cadmium (Cd)	2019/05/03	<0.010		ug/L	
			Dissolved Calcium (Ca)	2019/05/03	<100		ug/L	
			Dissolved Chromium (Cr)	2019/05/03	<1.0		ug/L	
			Dissolved Cobalt (Co)	2019/05/03	<0.40		ug/L	
			Dissolved Copper (Cu)	2019/05/03	<0.50		ug/L	
			Dissolved Iron (Fe)	2019/05/03	<50		ug/L	
			Dissolved Lead (Pb)	2019/05/03	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2019/05/03	<100		ug/L	
			Dissolved Manganese (Mn)	2019/05/03	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2019/05/03	<2.0		ug/L	
			Dissolved Nickel (Ni)	2019/05/03	<2.0		ug/L	
			Dissolved Phosphorus (P)	2019/05/03	<100		ug/L	
			Dissolved Potassium (K)	2019/05/03	<100		ug/L	
			Dissolved Selenium (Se)	2019/05/03	<1.0		ug/L	
			Dissolved Silver (Ag)	2019/05/03	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/05/03	<100		ug/L	
			Dissolved Strontium (Sr)	2019/05/03	<2.0		ug/L	
			Dissolved Thallium (Tl)	2019/05/03	<0.10		ug/L	
			Dissolved Tin (Sn)	2019/05/03	<2.0		ug/L	
			Dissolved Titanium (Ti)	2019/05/03	<2.0		ug/L	
			Dissolved Uranium (U)	2019/05/03	<0.10		ug/L	
			Dissolved Vanadium (V)	2019/05/03	<2.0		ug/L	
			Dissolved Zinc (Zn)	2019/05/03	<5.0		ug/L	
6102447	MLB	RPD	Dissolved Aluminum (Al)	2019/05/03	0.34		%	20
			Dissolved Antimony (Sb)	2019/05/03	NC		%	20
			Dissolved Arsenic (As)	2019/05/03	0.15		%	20
			Dissolved Barium (Ba)	2019/05/03	1.9		%	20
			Dissolved Beryllium (Be)	2019/05/03	NC		%	20
			Dissolved Bismuth (Bi)	2019/05/03	NC		%	20
			Dissolved Boron (B)	2019/05/03	3.6		%	20

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cadmium (Cd)	2019/05/03	NC		%	20
			Dissolved Calcium (Ca)	2019/05/03	0.045		%	20
			Dissolved Chromium (Cr)	2019/05/03	3.0		%	20
			Dissolved Cobalt (Co)	2019/05/03	NC		%	20
			Dissolved Copper (Cu)	2019/05/03	NC		%	20
			Dissolved Iron (Fe)	2019/05/03	NC		%	20
			Dissolved Lead (Pb)	2019/05/03	NC		%	20
			Dissolved Magnesium (Mg)	2019/05/03	2.8		%	20
			Dissolved Manganese (Mn)	2019/05/03	0.085		%	20
			Dissolved Molybdenum (Mo)	2019/05/03	0.89		%	20
			Dissolved Nickel (Ni)	2019/05/03	NC		%	20
			Dissolved Phosphorus (P)	2019/05/03	NC		%	20
			Dissolved Potassium (K)	2019/05/03	1.5		%	20
			Dissolved Selenium (Se)	2019/05/03	NC		%	20
			Dissolved Silver (Ag)	2019/05/03	NC		%	20
			Dissolved Sodium (Na)	2019/05/03	0.21		%	20
			Dissolved Strontium (Sr)	2019/05/03	0.45		%	20
			Dissolved Thallium (Tl)	2019/05/03	NC		%	20
			Dissolved Tin (Sn)	2019/05/03	NC		%	20
			Dissolved Titanium (Ti)	2019/05/03	NC		%	20
			Dissolved Uranium (U)	2019/05/03	NC		%	20
			Dissolved Vanadium (V)	2019/05/03	5.7		%	20
			Dissolved Zinc (Zn)	2019/05/03	NC		%	20
6103904	KMC	QC Standard	pH	2019/05/04		100	%	97 - 103
6103904	KMC	RPD [JPE947-01]	pH	2019/05/04	0.52		%	N/A
6103906	KMC	Spiked Blank	Conductivity	2019/05/04		101	%	80 - 120
6103906	KMC	Method Blank	Conductivity	2019/05/04	1.1, RDL=1.0		uS/cm	
6103906	KMC	RPD [JPE947-01]	Conductivity	2019/05/04	0.49		%	10
6103907	KMC	QC Standard	pH	2019/05/04		101	%	97 - 103
6103907	KMC	RPD [JPE954-01]	pH	2019/05/04	0.64		%	N/A
6103910	KMC	Spiked Blank	Conductivity	2019/05/04		102	%	80 - 120
6103910	KMC	Method Blank	Conductivity	2019/05/04	<1.0		uS/cm	
6103910	KMC	RPD [JPE954-01]	Conductivity	2019/05/04	0.00015		%	10
6104716	BAN	Matrix Spike [JPE948-01]	Total Aluminum (Al)	2019/05/07		98	%	80 - 120
			Total Antimony (Sb)	2019/05/07		100	%	80 - 120
			Total Arsenic (As)	2019/05/07		95	%	80 - 120
			Total Barium (Ba)	2019/05/07		97	%	80 - 120
			Total Beryllium (Be)	2019/05/07		95	%	80 - 120
			Total Bismuth (Bi)	2019/05/07		99	%	80 - 120
			Total Boron (B)	2019/05/07		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/07		97	%	80 - 120
			Total Calcium (Ca)	2019/05/07		101	%	80 - 120
			Total Chromium (Cr)	2019/05/07		95	%	80 - 120
			Total Cobalt (Co)	2019/05/07		96	%	80 - 120
			Total Copper (Cu)	2019/05/07		93	%	80 - 120
			Total Iron (Fe)	2019/05/07		98	%	80 - 120
			Total Lead (Pb)	2019/05/07		97	%	80 - 120
			Total Magnesium (Mg)	2019/05/07		101	%	80 - 120
			Total Manganese (Mn)	2019/05/07		95	%	80 - 120
			Total Molybdenum (Mo)	2019/05/07		102	%	80 - 120
			Total Nickel (Ni)	2019/05/07		93	%	80 - 120
			Total Phosphorus (P)	2019/05/07		105	%	80 - 120
			Total Potassium (K)	2019/05/07		98	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2019/05/07		95	%	80 - 120
			Total Silver (Ag)	2019/05/07		95	%	80 - 120
			Total Sodium (Na)	2019/05/07		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/07		97	%	80 - 120
			Total Thallium (Tl)	2019/05/07		98	%	80 - 120
			Total Tin (Sn)	2019/05/07		101	%	80 - 120
			Total Titanium (Ti)	2019/05/07		101	%	80 - 120
			Total Uranium (U)	2019/05/07		103	%	80 - 120
			Total Vanadium (V)	2019/05/07		97	%	80 - 120
			Total Zinc (Zn)	2019/05/07		94	%	80 - 120
6104716	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/07		104	%	80 - 120
			Total Antimony (Sb)	2019/05/07		102	%	80 - 120
			Total Arsenic (As)	2019/05/07		98	%	80 - 120
			Total Barium (Ba)	2019/05/07		100	%	80 - 120
			Total Beryllium (Be)	2019/05/07		97	%	80 - 120
			Total Bismuth (Bi)	2019/05/07		101	%	80 - 120
			Total Boron (B)	2019/05/07		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/07		99	%	80 - 120
			Total Calcium (Ca)	2019/05/07		104	%	80 - 120
			Total Chromium (Cr)	2019/05/07		97	%	80 - 120
			Total Cobalt (Co)	2019/05/07		98	%	80 - 120
			Total Copper (Cu)	2019/05/07		96	%	80 - 120
			Total Iron (Fe)	2019/05/07		100	%	80 - 120
			Total Lead (Pb)	2019/05/07		100	%	80 - 120
			Total Magnesium (Mg)	2019/05/07		103	%	80 - 120
			Total Manganese (Mn)	2019/05/07		97	%	80 - 120
			Total Molybdenum (Mo)	2019/05/07		103	%	80 - 120
			Total Nickel (Ni)	2019/05/07		96	%	80 - 120
			Total Phosphorus (P)	2019/05/07		106	%	80 - 120
			Total Potassium (K)	2019/05/07		100	%	80 - 120
			Total Selenium (Se)	2019/05/07		96	%	80 - 120
			Total Silver (Ag)	2019/05/07		97	%	80 - 120
			Total Sodium (Na)	2019/05/07		99	%	80 - 120
			Total Strontium (Sr)	2019/05/07		100	%	80 - 120
			Total Thallium (Tl)	2019/05/07		100	%	80 - 120
			Total Tin (Sn)	2019/05/07		102	%	80 - 120
			Total Titanium (Ti)	2019/05/07		100	%	80 - 120
			Total Uranium (U)	2019/05/07		105	%	80 - 120
			Total Vanadium (V)	2019/05/07		100	%	80 - 120
			Total Zinc (Zn)	2019/05/07		97	%	80 - 120
6104716	BAN	Method Blank	Total Aluminum (Al)	2019/05/07	<5.0		ug/L	
			Total Antimony (Sb)	2019/05/07	<1.0		ug/L	
			Total Arsenic (As)	2019/05/07	<1.0		ug/L	
			Total Barium (Ba)	2019/05/07	<1.0		ug/L	
			Total Beryllium (Be)	2019/05/07	<1.0		ug/L	
			Total Bismuth (Bi)	2019/05/07	<2.0		ug/L	
			Total Boron (B)	2019/05/07	<50		ug/L	
			Total Cadmium (Cd)	2019/05/07	<0.010		ug/L	
			Total Calcium (Ca)	2019/05/07	<100		ug/L	
			Total Chromium (Cr)	2019/05/07	<1.0		ug/L	
			Total Cobalt (Co)	2019/05/07	<0.40		ug/L	
			Total Copper (Cu)	2019/05/07	<0.50		ug/L	
			Total Iron (Fe)	2019/05/07	<50		ug/L	
			Total Lead (Pb)	2019/05/07	<0.50		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Magnesium (Mg)	2019/05/07	<100		ug/L	
			Total Manganese (Mn)	2019/05/07	<2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/07	<2.0		ug/L	
			Total Nickel (Ni)	2019/05/07	<2.0		ug/L	
			Total Phosphorus (P)	2019/05/07	<100		ug/L	
			Total Potassium (K)	2019/05/07	<100		ug/L	
			Total Selenium (Se)	2019/05/07	<1.0		ug/L	
			Total Silver (Ag)	2019/05/07	<0.10		ug/L	
			Total Sodium (Na)	2019/05/07	<100		ug/L	
			Total Strontium (Sr)	2019/05/07	<2.0		ug/L	
			Total Thallium (Tl)	2019/05/07	<0.10		ug/L	
			Total Tin (Sn)	2019/05/07	<2.0		ug/L	
			Total Titanium (Ti)	2019/05/07	<2.0		ug/L	
			Total Uranium (U)	2019/05/07	<0.10		ug/L	
			Total Vanadium (V)	2019/05/07	<2.0		ug/L	
			Total Zinc (Zn)	2019/05/07	<5.0		ug/L	
6104716	BAN	RPD [JPE947-01]	Total Aluminum (Al)	2019/05/07	2.8		%	20
			Total Antimony (Sb)	2019/05/07	NC		%	20
			Total Arsenic (As)	2019/05/07	1.3		%	20
			Total Barium (Ba)	2019/05/07	7.0		%	20
			Total Beryllium (Be)	2019/05/07	NC		%	20
			Total Bismuth (Bi)	2019/05/07	NC		%	20
			Total Boron (B)	2019/05/07	NC		%	20
			Total Cadmium (Cd)	2019/05/07	NC		%	20
			Total Calcium (Ca)	2019/05/07	1.2		%	20
			Total Chromium (Cr)	2019/05/07	NC		%	20
			Total Cobalt (Co)	2019/05/07	NC		%	20
			Total Copper (Cu)	2019/05/07	9.3		%	20
			Total Iron (Fe)	2019/05/07	3.0		%	20
			Total Lead (Pb)	2019/05/07	NC		%	20
			Total Magnesium (Mg)	2019/05/07	0.29		%	20
			Total Manganese (Mn)	2019/05/07	7.4		%	20
			Total Molybdenum (Mo)	2019/05/07	NC		%	20
			Total Nickel (Ni)	2019/05/07	NC		%	20
			Total Phosphorus (P)	2019/05/07	NC		%	20
			Total Potassium (K)	2019/05/07	1.1		%	20
			Total Selenium (Se)	2019/05/07	NC		%	20
			Total Silver (Ag)	2019/05/07	NC		%	20
			Total Sodium (Na)	2019/05/07	1.7		%	20
			Total Strontium (Sr)	2019/05/07	3.4		%	20
			Total Thallium (Tl)	2019/05/07	NC		%	20
			Total Tin (Sn)	2019/05/07	NC		%	20
			Total Titanium (Ti)	2019/05/07	NC		%	20
			Total Uranium (U)	2019/05/07	NC		%	20
			Total Vanadium (V)	2019/05/07	NC		%	20
			Total Zinc (Zn)	2019/05/07	NC		%	20
6104752	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/06		86	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/06		109	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/06		97	%	30 - 130
			>C16-C21 Hydrocarbons	2019/05/06		92	%	30 - 130
			>C21-<C32 Hydrocarbons	2019/05/06		NC	%	30 - 130
6104752	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/06		84	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/06		84	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/06		93	%	60 - 130

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2019/05/06		88	%	60 - 130
			>C21-<C32 Hydrocarbons	2019/05/06		100	%	60 - 130
6104752	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/06		86	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/06		89	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/06	<10		mg/kg	
			>C16-C21 Hydrocarbons	2019/05/06	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2019/05/06	<15		mg/kg	
6104752	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/06	6.1		%	50
			>C16-C21 Hydrocarbons	2019/05/06	0.12		%	50
			>C21-<C32 Hydrocarbons	2019/05/06	7.0		%	50
6104792	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/06		100	%	80 - 120
6104792	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/06		104	%	80 - 120
6104792	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/06	<5.0		mg/L	
6104792	NRG	RPD	Total Alkalinity (Total as CaCO3)	2019/05/06	0.52		%	25
6104797	NRG	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/06		NC	%	80 - 120
6104797	NRG	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/06		98	%	80 - 120
6104797	NRG	Method Blank	Dissolved Chloride (Cl-)	2019/05/06	<1.0		mg/L	
6104797	NRG	RPD	Dissolved Chloride (Cl-)	2019/05/06	0.32		%	25
6104799	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/06		99	%	80 - 120
6104799	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/06		99	%	80 - 120
6104799	NRG	Method Blank	Dissolved Sulphate (SO4)	2019/05/06	<2.0		mg/L	
6104799	NRG	RPD	Dissolved Sulphate (SO4)	2019/05/06	1.6		%	25
6104802	NRG	Matrix Spike	Reactive Silica (SiO2)	2019/05/06		96	%	80 - 120
6104802	NRG	Spiked Blank	Reactive Silica (SiO2)	2019/05/06		101	%	80 - 120
6104802	NRG	Method Blank	Reactive Silica (SiO2)	2019/05/06	<0.50		mg/L	
6104802	NRG	RPD	Reactive Silica (SiO2)	2019/05/06	0.14		%	25
6104804	NRG	Spiked Blank	Colour	2019/05/06		98	%	80 - 120
6104804	NRG	Method Blank	Colour	2019/05/06	<5.0		TCU	
6104804	NRG	RPD	Colour	2019/05/06	15		%	20
6104806	NRG	Matrix Spike	Orthophosphate (P)	2019/05/07		92	%	80 - 120
6104806	NRG	Spiked Blank	Orthophosphate (P)	2019/05/07		97	%	80 - 120
6104806	NRG	Method Blank	Orthophosphate (P)	2019/05/07	<0.010		mg/L	
6104806	NRG	RPD	Orthophosphate (P)	2019/05/07	NC		%	25
6104810	NRG	Matrix Spike	Nitrate + Nitrite (N)	2019/05/06		94	%	80 - 120
6104810	NRG	Spiked Blank	Nitrate + Nitrite (N)	2019/05/06		94	%	80 - 120
6104810	NRG	Method Blank	Nitrate + Nitrite (N)	2019/05/06	<0.050		mg/L	
6104810	NRG	RPD	Nitrate + Nitrite (N)	2019/05/06	2.1		%	25
6104813	NRG	Matrix Spike	Nitrite (N)	2019/05/06		98	%	80 - 120
6104813	NRG	Spiked Blank	Nitrite (N)	2019/05/06		103	%	80 - 120
6104813	NRG	Method Blank	Nitrite (N)	2019/05/06	<0.010		mg/L	
6104813	NRG	RPD	Nitrite (N)	2019/05/06	NC		%	20
6104816	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/06		NC	%	80 - 120
6104816	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/06		106	%	80 - 120
6104816	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/06	<5.0		mg/L	
6104816	NRG	RPD	Total Alkalinity (Total as CaCO3)	2019/05/06	1.1		%	25
6104818	NRG	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/06		NC	%	80 - 120
6104818	NRG	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/06		98	%	80 - 120
6104818	NRG	Method Blank	Dissolved Chloride (Cl-)	2019/05/06	<1.0		mg/L	
6104818	NRG	RPD	Dissolved Chloride (Cl-)	2019/05/06	0.15		%	25
6104820	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/06		97	%	80 - 120
6104820	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/06		101	%	80 - 120
6104820	NRG	Method Blank	Dissolved Sulphate (SO4)	2019/05/06	<2.0		mg/L	
6104820	NRG	RPD	Dissolved Sulphate (SO4)	2019/05/06	0.28		%	25
6104822	NRG	Matrix Spike	Reactive Silica (SiO2)	2019/05/06		NC	%	80 - 120

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6104822	NRG	Spiked Blank	Reactive Silica (SiO2)	2019/05/06		105	%	80 - 120
6104822	NRG	Method Blank	Reactive Silica (SiO2)	2019/05/06	<0.50		mg/L	
6104822	NRG	RPD	Reactive Silica (SiO2)	2019/05/06	0.0089		%	25
6104823	NRG	Spiked Blank	Colour	2019/05/06		97	%	80 - 120
6104823	NRG	Method Blank	Colour	2019/05/06	<5.0		TCU	
6104823	NRG	RPD	Colour	2019/05/06	11		%	20
6104825	NRG	Matrix Spike	Orthophosphate (P)	2019/05/07		87	%	80 - 120
6104825	NRG	Spiked Blank	Orthophosphate (P)	2019/05/07		92	%	80 - 120
6104825	NRG	Method Blank	Orthophosphate (P)	2019/05/07	<0.010		mg/L	
6104825	NRG	RPD	Orthophosphate (P)	2019/05/07	0.11		%	25
6104827	NRG	Matrix Spike	Nitrate + Nitrite (N)	2019/05/06		93	%	80 - 120
6104827	NRG	Spiked Blank	Nitrate + Nitrite (N)	2019/05/06		95	%	80 - 120
6104827	NRG	Method Blank	Nitrate + Nitrite (N)	2019/05/06	<0.050		mg/L	
6104827	NRG	RPD	Nitrate + Nitrite (N)	2019/05/06	NC		%	25
6104828	NRG	Matrix Spike	Nitrite (N)	2019/05/06		101	%	80 - 120
6104828	NRG	Spiked Blank	Nitrite (N)	2019/05/06		101	%	80 - 120
6104828	NRG	Method Blank	Nitrite (N)	2019/05/06	<0.010		mg/L	
6104828	NRG	RPD	Nitrite (N)	2019/05/06	NC		%	20
6104961	SDN	RPD [JPE927-01]	Moisture	2019/05/06	1.8		%	25
6105340	YXU	Matrix Spike	Isobutylbenzene - Volatile	2019/05/06		124 (1)	%	60 - 130
			Benzene	2019/05/06		99	%	60 - 130
			Toluene	2019/05/06		99	%	60 - 130
			Ethylbenzene	2019/05/06		106	%	60 - 130
			Total Xylenes	2019/05/06		102	%	60 - 130
6105340	YXU	Spiked Blank	Isobutylbenzene - Volatile	2019/05/06		97	%	60 - 130
			Benzene	2019/05/06		97	%	60 - 140
			Toluene	2019/05/06		99	%	60 - 140
			Ethylbenzene	2019/05/06		100	%	60 - 140
			Total Xylenes	2019/05/06		100	%	60 - 140
6105340	YXU	Method Blank	Isobutylbenzene - Volatile	2019/05/06		106	%	60 - 130
			Benzene	2019/05/06	<0.025		mg/kg	
			Toluene	2019/05/06	<0.050		mg/kg	
			Ethylbenzene	2019/05/06	<0.025		mg/kg	
			Total Xylenes	2019/05/06	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2019/05/06	<2.5		mg/kg	
6105340	YXU	RPD	Benzene	2019/05/06	NC		%	50
			Toluene	2019/05/06	NC		%	50
			Ethylbenzene	2019/05/06	NC		%	50
			Total Xylenes	2019/05/06	NC		%	50
			C6 - C10 (less BTEX)	2019/05/06	2.7		%	50
6105432	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/07		96	%	80 - 120
6105432	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/07		103	%	80 - 120
6105432	BKE	Method Blank	Total Cyanide (CN)	2019/05/07	<0.0050		mg/L	
6105432	BKE	RPD	Total Cyanide (CN)	2019/05/07	NC		%	20
6105437	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/07		99	%	80 - 120
6105437	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/07		101	%	80 - 120
6105437	BKE	Method Blank	Total Cyanide (CN)	2019/05/07	<0.0050		mg/L	
6105437	BKE	RPD	Total Cyanide (CN)	2019/05/07	4.6		%	20
6106756	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2019/05/07		96	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		100	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		102	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		102	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		98	%	75 - 125

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Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Cadmium (Cd)	2019/05/07		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		104	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		102	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		106	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		93	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		102	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		100	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		94	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		NC	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		102	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		98	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		NC	%	75 - 125
6106756	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/07		101	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		100	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		100	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		103	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		99	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		101	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		98	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		99	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		101	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		99	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		95	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		101	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		102	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		98	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		104	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		100	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		97	%	75 - 125
6106756	BAN	Method Blank	Acid Extractable Aluminum (Al)	2019/05/07	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/07	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/07	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/07	<1.0		mg/kg	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Copper (Cu)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/07	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/07	<5.0		mg/kg	
6106756	BAN	RPD	Acid Extractable Lead (Pb)	2019/05/07	10		%	35
6106758	BAN	Matrix Spike [JPE920-01]	Acid Extractable Antimony (Sb)	2019/05/08		84	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/08		NC	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/08		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/08		93	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/08		99	%	75 - 125
			Acid Extractable Boron (B)	2019/05/08		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/08		92	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/08		88	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/08		NC	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/08		88	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/08		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/08		94	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/08		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/08		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/08		91	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/08		90	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/08		94	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/08		92	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/08		90	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/08		97	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/08		98	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/08		96	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/08		93	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/08		NC	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/08		NC	%	75 - 125
6106758	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/07		101	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		98	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		101	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		102	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		97	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		95	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		99	%	75 - 125

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Lithium (Li)	2019/05/07		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		98	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		96	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		100	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		98	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		96	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		100	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		103	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		99	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		98	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		94	%	75 - 125
6106758	BAN	Method Blank	Acid Extractable Aluminum (Al)	2019/05/07	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/07	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/07	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/07	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/07	<5.0		mg/kg	
6106758	BAN	RPD [JPE920-01]	Acid Extractable Aluminum (Al)	2019/05/08	3.6		%	35
			Acid Extractable Antimony (Sb)	2019/05/08	NC		%	35
			Acid Extractable Arsenic (As)	2019/05/08	3.5		%	35
			Acid Extractable Barium (Ba)	2019/05/08	5.4		%	35
			Acid Extractable Beryllium (Be)	2019/05/08	NC		%	35
			Acid Extractable Bismuth (Bi)	2019/05/08	NC		%	35
			Acid Extractable Boron (B)	2019/05/08	NC		%	35
			Acid Extractable Cadmium (Cd)	2019/05/08	3.1		%	35
			Acid Extractable Chromium (Cr)	2019/05/08	2.0		%	35
			Acid Extractable Cobalt (Co)	2019/05/08	1.4		%	35
			Acid Extractable Copper (Cu)	2019/05/08	1.2		%	35
			Acid Extractable Iron (Fe)	2019/05/08	1.6		%	35
			Acid Extractable Lead (Pb)	2019/05/08	3.0		%	35

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Lithium (Li)	2019/05/08	2.2		%	35
			Acid Extractable Manganese (Mn)	2019/05/08	3.2		%	35
			Acid Extractable Mercury (Hg)	2019/05/08	2.6		%	35
			Acid Extractable Molybdenum (Mo)	2019/05/08	NC		%	35
			Acid Extractable Nickel (Ni)	2019/05/08	2.2		%	35
			Acid Extractable Rubidium (Rb)	2019/05/08	5.8		%	35
			Acid Extractable Selenium (Se)	2019/05/08	4.8		%	35
			Acid Extractable Silver (Ag)	2019/05/08	NC		%	35
			Acid Extractable Strontium (Sr)	2019/05/08	0.44		%	35
			Acid Extractable Thallium (Tl)	2019/05/08	7.7		%	35
			Acid Extractable Tin (Sn)	2019/05/08	14		%	35
			Acid Extractable Uranium (U)	2019/05/08	0.43		%	35
			Acid Extractable Vanadium (V)	2019/05/08	2.4		%	35
			Acid Extractable Zinc (Zn)	2019/05/08	1.8		%	35
6106759	BBD	QC Standard	Organic Carbon (TOC)	2019/05/09		90	%	75 - 125
6106759	BBD	Method Blank	Organic Carbon (TOC)	2019/05/09	<0.50		g/kg	
6106759	BBD	RPD	Organic Carbon (TOC)	2019/05/09	4.9		%	35
6106793	BCD	Matrix Spike [JPE927-01]	Isobutylbenzene - Extractable	2019/05/07		87	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/07		98	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/07		101	%	30 - 130
			>C16-C21 Hydrocarbons	2019/05/07		93	%	30 - 130
			>C21-<C32 Hydrocarbons	2019/05/07		97	%	30 - 130
6106793	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/07		86	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/07		85	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/07		98	%	60 - 130
			>C16-C21 Hydrocarbons	2019/05/07		91	%	60 - 130
			>C21-<C32 Hydrocarbons	2019/05/07		100	%	60 - 130
6106793	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/07		84	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/07		82	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/07	<10		mg/kg	
			>C16-C21 Hydrocarbons	2019/05/07	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2019/05/07	<15		mg/kg	
6106793	BCD	RPD [JPE927-01]	>C10-C16 Hydrocarbons	2019/05/07	NC		%	50
			>C16-C21 Hydrocarbons	2019/05/07	6.0		%	50
			>C21-<C32 Hydrocarbons	2019/05/07	0.79		%	50
6106993	SRM	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/05/07		91	%	80 - 120
6106993	SRM	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07		99	%	80 - 120
6106993	SRM	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07	<0.050		mg/L	
6106993	SRM	RPD	Nitrogen (Ammonia Nitrogen)	2019/05/07	2.0		%	20
6106998	SRM	Matrix Spike [JPE947-06]	Nitrogen (Ammonia Nitrogen)	2019/05/07		83	%	80 - 120
6106998	SRM	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07		102	%	80 - 120
6106998	SRM	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07	<0.050		mg/L	
6106998	SRM	RPD [JPE947-06]	Nitrogen (Ammonia Nitrogen)	2019/05/07	NC		%	20
6107943	KMC	QC Standard	Turbidity	2019/05/07		102	%	80 - 120
6107943	KMC	Spiked Blank	Turbidity	2019/05/07		102	%	80 - 120
6107943	KMC	Method Blank	Turbidity	2019/05/07	<0.10		NTU	
6107943	KMC	RPD	Turbidity	2019/05/07	6.5		%	20
6107949	KMC	QC Standard	Turbidity	2019/05/07		102	%	80 - 120
6107949	KMC	Spiked Blank	Turbidity	2019/05/07		102	%	80 - 120
6107949	KMC	Method Blank	Turbidity	2019/05/07	<0.10		NTU	
6107949	KMC	RPD	Turbidity	2019/05/07	NC		%	20
6109397	NRG	Matrix Spike [JPE927-01]	Sulphate (SO4)	2019/05/08		98	%	80 - 120
6109397	NRG	Spiked Blank	Sulphate (SO4)	2019/05/08		99	%	80 - 120
6109397	NRG	Method Blank	Sulphate (SO4)	2019/05/08	<10		mg/kg	

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Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6109397	NRG	RPD [JPE927-01]	Sulphate (SO4)	2019/05/08	6.7		%	25

N/A = Not Applicable

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

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

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

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

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

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

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

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

(1) VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

Maxxam Job #: B9B5460
Report Date: 2019/05/10

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

VALIDATION SIGNATURE PAGE

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

Original Signed

Anastassia Hamanov, Scientific Specialist

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

Original Signed

Rosemarie MacDonald, Scientific Specialist (Organics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/22
Report #: R5720264
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	2	2019/05/03	2019/05/04	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	4	2019/05/07	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	2	2019/05/07	2019/05/08	ATL SOP 00058	EPA 6020B R2 m
Sulfur (1)	2	N/A	2019/05/09	STL SOP-00028	MA. 310-CS 1.0 R3 m
Sulphate in Soil by Auto Colourimetry	2	2019/05/07	2019/05/08	ATL SOP 00023	ASTM D516-16 m
Sulphide in Soil (2)	1	2019/05/06	2019/05/14		
Sublet (Inorganics) (2, 4)	1	N/A	2019/05/14		
Total Organic Carbon in Soil	2	2019/05/07	2019/05/09	ATL SOP 00044	LECO203601224 1991 m

Sample Matrix: Sediment
Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	3	2019/05/03	2019/05/06	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2019/05/07	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	9	2019/05/07	2019/05/08	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2019/05/07	2019/05/09	ATL SOP 00058	EPA 6020B R2 m
Total Cyanide (1)	3	2019/05/08	2019/05/10	STL SOP-00035	MA300-CN 1.2 R4 m
Water Content (Subcontracted) (1, 3)	3	N/A	2019/05/15	STL SOP-00021	MA.100-S.T. 1.1 R4 m
Sulfur (1)	3	N/A	2019/05/09	STL SOP-00028	MA. 310-CS 1.0 R3 m
Moisture	1	N/A	2019/05/03	ATL SOP 00001	OMOE Handbook 1983 m
Moisture	1	N/A	2019/05/06	ATL SOP 00001	OMOE Handbook 1983 m
Sulphate in Soil by Auto Colourimetry	3	2019/05/07	2019/05/08	ATL SOP 00023	ASTM D516-16 m
Sulphide in Soil (2)	2	2019/05/06	2019/05/14		
Sublet (Inorganics) (2, 4)	6	N/A	2019/05/14		
Total Organic Carbon in Soil	3	2019/05/07	2019/05/09	ATL SOP 00044	LECO203601224 1991 m
VPH in Soil (PIRI) - Field Preserved (5)	1	N/A	2019/05/03	ATL SOP 00119	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (5)	1	N/A	2019/05/06	ATL SOP 00119	Atl. RBCA v3.1 m

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/22
Report #: R5720264
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	9	N/A	2019/05/05	N/A	SM 23 4500-CO2 D
Alkalinity	9	N/A	2019/05/06	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	9	N/A	2019/05/06	ATL SOP 00014	SM 23 4500-Cl- E m
Colour	9	N/A	2019/05/06	ATL SOP 00020	SM 23 2120C m
Total Cyanide (6)	2	2019/05/06	2019/05/07	CAM SOP-00457	OMOE E3015 5 m
Conductance - water	9	N/A	2019/05/04	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	2	2019/05/03	2019/05/03	ATL SOP 00113	Atl. RBCA v3.1 m
Hardness (calculated as CaCO3)	9	N/A	2019/05/06	ATL SOP 00048	Auto Calc
Mercury - Dissolved (CVAA,LL)	9	2019/05/06	2019/05/06	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Diss. MS (as rec'd)	9	N/A	2019/05/03	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS	9	2019/05/06	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	9	N/A	2019/05/08	N/A	Auto Calc.
Anion and Cation Sum	9	N/A	2019/05/08	N/A	Auto Calc.
Nitrogen Ammonia - water	9	N/A	2019/05/07	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	9	N/A	2019/05/06	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	9	N/A	2019/05/06	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	9	N/A	2019/05/06	ATL SOP 00018	ASTM D3867-16
pH (7)	9	N/A	2019/05/04	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	9	N/A	2019/05/07	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	2	N/A	2019/05/03	ATL SOP 00118	Atl. RBCA v3.1 m
Sat. pH and Langelier Index (@ 20C)	9	N/A	2019/05/08	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	9	N/A	2019/05/08	ATL SOP 00049	Auto Calc.
Reactive Silica	9	N/A	2019/05/06	ATL SOP 00022	EPA 366.0 m
Sulphate	9	N/A	2019/05/06	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc)	9	N/A	2019/05/08	N/A	Auto Calc.
Organic carbon - Total (TOC) (8)	9	N/A	2019/05/03	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	2	N/A	2019/05/06	N/A	Atl. RBCA v3 m
Turbidity	9	N/A	2019/05/07	ATL SOP 00011	EPA 180.1 R2 m

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/22
Report #: R5720264
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bedford To Montreal Offsite
(2) This test was performed by Bedford to Burnaby Env
(3) Offsite analysis requires that subcontracted moisture be reported.
(4) Please refer to enclosed subcontract report.
(5) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(6) This test was performed by Maxxam Analytics Mississauga
(7) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(8) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/22
Report #: R5720264
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Senior Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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RESULTS OF ANALYSES OF SOIL

Maxxam ID		JPE938			JPE940	
Sampling Date		2019/04/25			2019/04/25	
COC Number		D 29794			D 29794	
	UNITS	**2019SS8 (5.03-5.08M)**	**RDL**	**QC Batch**	**2019SS10 (3.36-3.56M)**	**QC Batch**
Inorganics						
Organic Carbon (TOC)	g/kg	6.8	0.50	6106759		
Sulphate (SO4)	mg/kg	11	10	6109397		
Total Sulphur (S)	% g/g	0.076	0.010	6127324		
Subcontracted Analysis						
Subcontract Parameter	N/A				ATTACHED	6105515

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		JPE943		
Sampling Date		2019/04/29		
COC Number		D 29794		
	UNITS	**2019SS13 (4.65-4.93M)**	**RDL**	**QC Batch**
Inorganics				
Organic Carbon (TOC)	g/kg	<0.50	0.50	6106759
Sulphate (SO4)	mg/kg	20	10	6109397
Total Sulphur (S)	% g/g	0.071	0.010	6127324

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE937		JPE938		
Sampling Date		2019/04/25		2019/04/25		
COC Number		D 29794		D 29794		
	UNITS	2019SS7 (3.66-3.80M)	QC Batch	2019SS8 (5.03-5.08M)	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	8300	6106758	6000	10	6102070
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Arsenic (As)	mg/kg	130	6106758	17	2.0	6102070
Acid Extractable Barium (Ba)	mg/kg	23	6106758	20	5.0	6102070
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Boron (B)	mg/kg	<50	6106758	<50	50	6102070
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	6106758	<0.30	0.30	6102070
Acid Extractable Chromium (Cr)	mg/kg	14	6106758	9.7	2.0	6102070
Acid Extractable Cobalt (Co)	mg/kg	9.3	6106758	5.8	1.0	6102070
Acid Extractable Copper (Cu)	mg/kg	18	6106758	16	2.0	6102070
Acid Extractable Iron (Fe)	mg/kg	15000	6106758	10000	50	6102070
Acid Extractable Lead (Pb)	mg/kg	11	6106758	8.2	0.50	6102070
Acid Extractable Lithium (Li)	mg/kg	18	6106758	11	2.0	6102070
Acid Extractable Manganese (Mn)	mg/kg	260	6106758	190	2.0	6102070
Acid Extractable Mercury (Hg)	mg/kg	0.10	6106758	<0.10	0.10	6102070
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Nickel (Ni)	mg/kg	19	6106758	16	2.0	6102070
Acid Extractable Rubidium (Rb)	mg/kg	5.9	6106758	4.4	2.0	6102070
Acid Extractable Selenium (Se)	mg/kg	<1.0	6106758	<1.0	1.0	6102070
Acid Extractable Silver (Ag)	mg/kg	<0.50	6106758	<0.50	0.50	6102070
Acid Extractable Strontium (Sr)	mg/kg	8.1	6106758	7.5	5.0	6102070
Acid Extractable Thallium (Tl)	mg/kg	<0.10	6106758	<0.10	0.10	6102070
Acid Extractable Tin (Sn)	mg/kg	<1.0	6106758	<1.0	1.0	6102070
Acid Extractable Uranium (U)	mg/kg	1.3	6106758	1.0	0.10	6102070
Acid Extractable Vanadium (V)	mg/kg	13	6106758	8.2	2.0	6102070
Acid Extractable Zinc (Zn)	mg/kg	48	6106758	37	5.0	6102070

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE939	JPE941	JPE942		
Sampling Date		2019/04/25	2019/04/25	2019/04/25		
COC Number		D 29794	D 29794	D 29794		
	UNITS	2019SS9 (5.03-5.18M)	2019SS11 (3.49-3.60M)	2019SS12 (3.51-3.71M)	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	6800	12000	12000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	15	29	45	2.0	6106758
Acid Extractable Barium (Ba)	mg/kg	20	32	30	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	11	19	19	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	6.4	12	13	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	16	20	22	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	13000	23000	25000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	8.4	13	11	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	13	23	23	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	250	410	420	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	3.8	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	15	26	34	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	4.4	7.0	6.6	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	8.7	13	15	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.82	1.2	2.1	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	9.3	16	14	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	41	61	67	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE943		JPE944	JPE945		
Sampling Date		2019/04/29		2019/04/29	2019/04/29		
COC Number		D 29794		D 29794	D 29794		
	UNITS	2019SS13 (4.65-4.93M)	QC Batch	2019SS14 (4.06-4.14M)	2019SS13 B	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	5600	6102070	13000	5500	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	8.8	6102070	13	8.1	2.0	6106758
Acid Extractable Barium (Ba)	mg/kg	11	6102070	35	9.5	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	6102070	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	6102070	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	8.7	6102070	21	8.8	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	5.5	6102070	12	5.9	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	12	6102070	21	12	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	11000	6102070	23000	11000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	6.7	6102070	14	4.3	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	11	6102070	25	12	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	200	6102070	430	200	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	<0.10	6102070	<0.10	<0.10	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	12	6102070	29	11	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	2.6	6102070	7.3	2.6	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	6102070	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	6102070	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	7.2	6102070	16	6.9	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	<0.10	6102070	<0.10	<0.10	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	6102070	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.52	6102070	3.0	0.52	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	8.0	6102070	17	8.3	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	26	6102070	66	26	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF SEDIMENT

Maxxam ID		JPE917			JPE917			JPE923		
Sampling Date		2019/04/16			2019/04/16			2019/04/16		
COC Number		D 29791			D 29791			D 29791		
	UNITS	2019SED1A	RDL	QC Batch	2019SED1A Lab-Dup	RDL	QC Batch	2019SED7A	RDL	QC Batch
Inorganics										
Organic Carbon (TOC)	g/kg	170	0.50	6106759				130	0.50	6106759
Sulphate (SO4)	mg/kg	1500	50	6109397				2300	50	6109397
Total Sulphur (S)	% g/g	0.59	0.010	6127324	0.58	0.010	6127324	0.59	0.010	6127324
Total Cyanide (CN)	mg/kg	1.5	1.0	6118321				1.2	1.0	6118321
Physical Testing										
Moisture-Subcontracted	%w/w	92	0.50	6127323				88	0.50	6127323

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		JPE927			JPE927			JPE929		
Sampling Date		2019/04/25			2019/04/25			2019/04/25		
COC Number		D 29793			D 29793			D 29793		
	UNITS	2019SED10A	RDL	QC Batch	2019SED10A Lab-Dup	RDL	QC Batch	2019SED12A	RDL	QC Batch
Inorganics										
Moisture	%	28	1.0	6104961	28	1.0	6104961	44	1.0	6100446
Organic Carbon (TOC)	g/kg	1.3	0.50	6106759						
Sulphate (SO4)	mg/kg	59	10	6109397	63	10	6109397			
Total Sulphur (S)	% g/g	0.39	0.010	6127324						
Total Cyanide (CN)	mg/kg	<1.0	1.0	6118321						
Physical Testing										
Moisture-Subcontracted	%w/w	27	0.50	6127323						
Subcontracted Analysis										
Subcontract Parameter	N/A	ATTACHED	N/A	6105515				ATTACHED	N/A	6105515

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

RESULTS OF ANALYSES OF SEDIMENT

Maxxam ID		JPE932	JPE933	JPE934	JPE935	JPE936	
Sampling Date		2019/04/16	2019/04/16	2019/04/16	2019/04/16	2019/04/29	
COC Number		D 29792	D 29792	D 29792	D 29792	D 29792	
	UNITS	**2019PW1**	**2019PW2**	**2019PW3**	**2019PW4**	**2019PW5**	**QC Batch**
Subcontracted Analysis							
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	6105517
QC Batch = Quality Control Batch							

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE917		JPE918	JPE919		JPE920	JPE920		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/16	2019/04/16		
COC Number		D 29791		D 29791	D 29791		D 29791	D 29791		
	UNITS	**2019SED1A**	**QC Batch**	**2019SED2A**	**2019SED3A**	**QC Batch**	**2019SED4A**	**2019SED4A Lab-Dup**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	17000	6102070	18000	20000	6106756	18000	17000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	2000	6102070	1900	2000	6106756	1900	1800	20	6106758
Acid Extractable Barium (Ba)	mg/kg	150	6102070	250	230	6106756	250	230	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	6102070	<50	<50	6106756	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	2.6	6102070	2.6	2.1	6106756	1.9	1.9	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	12	6102070	14	15	6106756	14	13	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	100	6102070	120	130	6106756	110	110	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	32	6102070	35	36	6106756	33	33	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	40000	6102070	40000	54000	6106756	44000	44000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	63	6102070	72	73	6106756	62	60	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	12	6102070	16	16	6106756	15	15	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	4900	6102070	15000	14000	6106756	17000	17000	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	1.9	6102070	2.2	2.2	6106756	2.1	2.1	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	86	6102070	76	53	6106756	48	49	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	8.5	6102070	11	11	6106756	9.8	9.2	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	1.7	6102070	1.9	2.0	6106756	1.8	1.9	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	6102070	<0.50	<0.50	6106756	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	23	6102070	24	24	6106756	29	29	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	0.29	6102070	0.34	0.37	6106756	0.32	0.30	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	1.2	6102070	1.3	1.3	6106756	1.3	1.1	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.85	6102070	1.2	1.1	6106756	1.0	1.0	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	60	6102070	63	69	6106756	56	55	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	260	6102070	270	250	6106756	230	220	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE921	JPE922		JPE923		JPE924		
Sampling Date		2019/04/16	2019/04/16		2019/04/16		2019/04/16		
COC Number		D 29791	D 29791		D 29791		D 29791		
	UNITS	**2019SED5A**	**2019SED6A**	**QC Batch**	**2019SED7A**	**QC Batch**	**2019SED8A**	**RDL**	**QC Batch**
Metals									
Acid Extractable Aluminum (Al)	mg/kg	27000	22000	6106756	25000	6102070	23000	10	6106756
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	6106756	2.4	6102070	2.3	2.0	6106756
Acid Extractable Arsenic (As)	mg/kg	960	1600	6106756	1900	6102070	2400	20	6106756
Acid Extractable Barium (Ba)	mg/kg	160	150	6106756	230	6102070	260	5.0	6106756
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Boron (B)	mg/kg	<50	<50	6106756	<50	6102070	<50	50	6106756
Acid Extractable Cadmium (Cd)	mg/kg	1.7	1.4	6106756	2.5	6102070	2.6	0.30	6106756
Acid Extractable Chromium (Cr)	mg/kg	21	19	6106756	17	6102070	17	2.0	6106756
Acid Extractable Cobalt (Co)	mg/kg	84	87	6106756	160	6102070	160	1.0	6106756
Acid Extractable Copper (Cu)	mg/kg	34	35	6106756	43	6102070	40	2.0	6106756
Acid Extractable Iron (Fe)	mg/kg	41000	36000	6106756	45000	6102070	54000	50	6106756
Acid Extractable Lead (Pb)	mg/kg	96	74	6106756	78	6102070	74	0.50	6106756
Acid Extractable Lithium (Li)	mg/kg	25	22	6106756	21	6102070	20	2.0	6106756
Acid Extractable Manganese (Mn)	mg/kg	4800	7700	6106756	14000	6102070	13000	2.0	6106756
Acid Extractable Mercury (Hg)	mg/kg	0.82	2.4	6106756	2.9	6102070	2.7	0.10	6106756
Acid Extractable Molybdenum (Mo)	mg/kg	2.2	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Nickel (Ni)	mg/kg	38	41	6106756	75	6102070	67	2.0	6106756
Acid Extractable Rubidium (Rb)	mg/kg	11	15	6106756	12	6102070	12	2.0	6106756
Acid Extractable Selenium (Se)	mg/kg	2.7	2.5	6106756	2.0	6102070	2.2	1.0	6106756
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	6106756	<0.50	6102070	<0.50	0.50	6106756
Acid Extractable Strontium (Sr)	mg/kg	40	27	6106756	29	6102070	31	5.0	6106756
Acid Extractable Thallium (Tl)	mg/kg	0.34	0.36	6106756	0.43	6102070	0.48	0.10	6106756
Acid Extractable Tin (Sn)	mg/kg	1.3	1.4	6106756	1.5	6102070	1.3	1.0	6106756
Acid Extractable Uranium (U)	mg/kg	2.5	1.4	6106756	1.3	6102070	1.2	0.10	6106756
Acid Extractable Vanadium (V)	mg/kg	58	56	6106756	66	6102070	75	2.0	6106756
Acid Extractable Zinc (Zn)	mg/kg	200	180	6106756	330	6102070	320	5.0	6106756

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ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE925		JPE926			JPE927	JPE927		
Sampling Date		2019/04/16		2019/04/25			2019/04/25	2019/04/25		
COC Number		D 29791		D 29791			D 29793	D 29793		
	UNITS	2019SED7B	RDL	2019SED9A	RDL	QC Batch	2019SED10A	2019SED10A Lab-Dup	RDL	QC Batch
Metals										
Acid Extractable Aluminum (Al)	mg/kg	22000	10	12000	10	6106758	14000	13000	10	6102070
Acid Extractable Antimony (Sb)	mg/kg	2.3	2.0	<2.0	2.0	6106758	9.5	9.1	2.0	6102070
Acid Extractable Arsenic (As)	mg/kg	1900	20	170	2.0	6106758	6200	6000	200	6102070
Acid Extractable Barium (Ba)	mg/kg	240	5.0	84	5.0	6106758	58	55	5.0	6102070
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	6106758	<50	<50	50	6102070
Acid Extractable Cadmium (Cd)	mg/kg	2.4	0.30	<0.30	0.30	6106758	<0.30	<0.30	0.30	6102070
Acid Extractable Chromium (Cr)	mg/kg	16	2.0	13	2.0	6106758	15	14	2.0	6102070
Acid Extractable Cobalt (Co)	mg/kg	150	1.0	4.1	1.0	6106758	16	16	1.0	6102070
Acid Extractable Copper (Cu)	mg/kg	39	2.0	30	2.0	6106758	53	51	2.0	6102070
Acid Extractable Iron (Fe)	mg/kg	42000	50	17000	50	6106758	31000	30000	50	6102070
Acid Extractable Lead (Pb)	mg/kg	72	0.50	35	0.50	6106758	73	70	0.50	6102070
Acid Extractable Lithium (Li)	mg/kg	19	2.0	24	2.0	6106758	25	24	2.0	6102070
Acid Extractable Manganese (Mn)	mg/kg	14000	2.0	250	2.0	6106758	660	630	2.0	6102070
Acid Extractable Mercury (Hg)	mg/kg	2.7	0.10	4.4	0.10	6106758	6.8	6.5	0.10	6102070
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Nickel (Ni)	mg/kg	65	2.0	12	2.0	6106758	34	33	2.0	6102070
Acid Extractable Rubidium (Rb)	mg/kg	12	2.0	20	2.0	6106758	32	30	2.0	6102070
Acid Extractable Selenium (Se)	mg/kg	2.0	1.0	<1.0	1.0	6106758	<1.0	<1.0	1.0	6102070
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	0.50	6106758	<0.50	<0.50	0.50	6102070
Acid Extractable Strontium (Sr)	mg/kg	26	5.0	12	5.0	6106758	17	16	5.0	6102070
Acid Extractable Thallium (Tl)	mg/kg	0.40	0.10	0.16	0.10	6106758	0.28	0.27	0.10	6102070
Acid Extractable Tin (Sn)	mg/kg	1.3	1.0	<1.0	1.0	6106758	<1.0	<1.0	1.0	6102070
Acid Extractable Uranium (U)	mg/kg	1.2	0.10	1.1	0.10	6106758	1.1	1.0	0.10	6102070
Acid Extractable Vanadium (V)	mg/kg	61	2.0	16	2.0	6106758	15	14	2.0	6102070
Acid Extractable Zinc (Zn)	mg/kg	290	5.0	58	5.0	6106758	120	110	5.0	6102070

RDL = Reportable Detection Limit
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ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE928		JPE930	JPE931		
Sampling Date		2019/04/25		2019/04/26	2019/04/26		
COC Number		D 29793		D 29793	D 29793		
	UNITS	2019SED11A	RDL	2019SED13A	2019SED14A	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	12000	10	11000	12000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	8.1	2.0	3.3	4.6	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	5100	200	1900	2900	20	6106758
Acid Extractable Barium (Ba)	mg/kg	70	5.0	74	91	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	14	2.0	12	13	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	17	1.0	8.1	15	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	47	2.0	34	38	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	27000	50	18000	23000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	62	0.50	40	45	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	24	2.0	22	23	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	890	2.0	280	930	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	6.3	0.10	5.2	5.2	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	29	2.0	17	25	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	29	2.0	19	25	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	14	5.0	13	14	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	0.26	0.10	0.20	0.26	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	1.1	0.10	1.1	1.1	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	14	2.0	12	15	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	100	5.0	64	94	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ATLANTIC RBCA HYDROCARBONS (SEDIMENT)

Maxxam ID		JPE927		JPE929		
Sampling Date		2019/04/25		2019/04/25		
COC Number		D 29793		D 29793		
	UNITS	2019SED10A	QC Batch	2019SED12A	RDL	QC Batch
Petroleum Hydrocarbons						
Benzene	mg/kg	<0.025	6105340	<0.025	0.025	6101927
Toluene	mg/kg	<0.050	6105340	<0.050	0.050	6101927
Ethylbenzene	mg/kg	<0.025	6105340	<0.025	0.025	6101927
Total Xylenes	mg/kg	<0.050	6105340	<0.050	0.050	6101927
C6 - C10 (less BTEX)	mg/kg	<2.5	6105340	<2.5	2.5	6101927
Surrogate Recovery (%)						
Isobutylbenzene - Volatile	%	132 (1)	6105340	116		6101927

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) VPH surrogate not within acceptance limits. Analysis was repeated with similar results. VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE946		JPE947			JPE947		
Sampling Date		2019/04/29		2019/04/29			2019/04/29		
COC Number		D 39276		D 39276			D 39276		
	UNITS	2019SW1	QC Batch	2019SW2	RDL	QC Batch	2019SW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	1.76	6099911	1.81	N/A	6099911			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	6099909	11	1.0	6099909			
Calculated TDS	mg/L	100	6099914	100	1.0	6099914			
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6099909	<1.0	1.0	6099909			
Cation Sum	me/L	1.69	6099911	1.69	N/A	6099911			
Hardness (CaCO3)	mg/L	19	6099822	19	1.0	6099822			
Ion Balance (% Difference)	%	2.03	6099910	3.43	N/A	6099910			
Langelier Index (@ 20C)	N/A	-2.44	6099912	-2.61		6099912			
Langelier Index (@ 4C)	N/A	-2.69	6099913	-2.86		6099913			
Nitrate (N)	mg/L	0.092	6099787	0.092	0.050	6099787			
Saturation pH (@ 20C)	N/A	9.54	6099912	9.54		6099912			
Saturation pH (@ 4C)	N/A	9.79	6099913	9.79		6099913			
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	6104792	11	5.0	6104792			
Dissolved Chloride (Cl-)	mg/L	48	6104797	50	1.0	6104797			
Colour	TCU	33	6104804	28	5.0	6104804			
Nitrate + Nitrite (N)	mg/L	0.092	6104810	0.092	0.050	6104810			
Nitrite (N)	mg/L	<0.010	6104813	<0.010	0.010	6104813			
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	6106993	<0.050	0.050	6106998	<0.050	0.050	6106998
Total Organic Carbon (C)	mg/L	5.3	6102025	5.2	0.50	6102025			
Orthophosphate (P)	mg/L	0.013	6104806	0.013	0.010	6104806			
pH	pH	7.10	6103907	6.93	N/A	6103904	6.97	N/A	6103904
Reactive Silica (SiO2)	mg/L	1.6	6104802	1.5	0.50	6104802			
Dissolved Sulphate (SO4)	mg/L	8.4	6104799	8.5	2.0	6104799			
Turbidity	NTU	0.25	6107949	0.26	0.10	6107949			
Conductivity	uS/cm	200	6103910	200	1.0	6103906	200	1.0	6103906

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

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE948	JPE949		JPE950		JPE951		
Sampling Date		2019/04/29	2019/04/29		2019/04/29		2019/04/29		
COC Number		D 39276	D 39276		D 39276		D 39276		
	UNITS	2019SW3	2019SW4	QC Batch	2019SW5	QC Batch	2019SW6	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	1.87	1.84	6099911	1.75	6099911	1.90	N/A	6099911
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	11	6099909	11	6099909	11	1.0	6099909
Calculated TDS	mg/L	110	110	6099914	100	6099914	110	1.0	6099914
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	<1.0	6099909	<1.0	6099909	<1.0	1.0	6099909
Cation Sum	me/L	1.74	1.71	6099911	1.64	6099911	1.83	N/A	6099911
Hardness (CaCO3)	mg/L	19	19	6099822	19	6099822	20	1.0	6099822
Ion Balance (% Difference)	%	3.60	3.66	6099910	3.24	6099910	1.88	N/A	6099910
Langelier Index (@ 20C)	N/A	-2.54	-2.56	6099912	-2.48	6099912	-2.50		6099912
Langelier Index (@ 4C)	N/A	-2.79	-2.81	6099913	-2.73	6099913	-2.75		6099913
Nitrate (N)	mg/L	0.066	0.27	6099787	0.084	6099787	<0.050	0.050	6099787
Saturation pH (@ 20C)	N/A	9.55	9.57	6099912	9.54	6099912	9.54		6099912
Saturation pH (@ 4C)	N/A	9.81	9.82	6099913	9.79	6099913	9.79		6099913
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	11	6104792	11	6104816	11	5.0	6104816
Dissolved Chloride (Cl-)	mg/L	52	50	6104797	48	6104818	54	1.0	6104818
Colour	TCU	28	27	6104804	32	6104823	25	5.0	6104823
Nitrate + Nitrite (N)	mg/L	0.066	0.27	6104810	0.084	6104827	<0.050	0.050	6104827
Nitrite (N)	mg/L	<0.010	<0.010	6104813	<0.010	6104828	<0.010	0.010	6104828
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	<0.050	6106993	<0.050	6106998	<0.050	0.050	6106993
Total Organic Carbon (C)	mg/L	4.9	4.9	6102025	5.4	6102025	4.8	0.50	6102025
Orthophosphate (P)	mg/L	0.014	0.013	6104806	0.013	6104825	0.015	0.010	6104825
pH	pH	7.02	7.01	6103904	7.06	6103907	7.04	N/A	6103904
Reactive Silica (SiO2)	mg/L	1.3	1.5	6104802	1.6	6104822	1.2	0.50	6104822
Dissolved Sulphate (SO4)	mg/L	8.4	9.0	6104799	8.3	6104820	8.4	2.0	6104820
Turbidity	NTU	0.31	0.27	6107943	0.24	6107943	0.33	0.10	6107949
Conductivity	uS/cm	210	210	6103906	200	6103910	220	1.0	6103906

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N/A = Not Applicable

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE952		JPE953			JPE954		
Sampling Date		2019/04/29		2019/04/29			2019/04/29		
COC Number		D 39276		D 39276			D 39276		
	UNITS	2019SW10	QC Batch	2019SW11	RDL	QC Batch	2019SW7	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	1.96	6099911	1.74	N/A	6099911	1.78	N/A	6099911
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	6099909	10	1.0	6099909	11	1.0	6099909
Calculated TDS	mg/L	110	6099914	100	1.0	6099914	100	1.0	6099914
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6099909	<1.0	1.0	6099909	<1.0	1.0	6099909
Cation Sum	me/L	1.89	6099911	1.64	N/A	6099911	1.68	N/A	6099911
Hardness (CaCO3)	mg/L	20	6099822	19	1.0	6099822	19	1.0	6099822
Ion Balance (% Difference)	%	1.82	6099910	2.96	N/A	6099910	2.89	N/A	6099910
Langelier Index (@ 20C)	N/A	-2.42	6099912	-2.62		6099912	-2.60		6099912
Langelier Index (@ 4C)	N/A	-2.67	6099913	-2.87		6099913	-2.85		6099913
Nitrate (N)	mg/L	<0.050	6099787	0.076	0.050	6099787	0.076	0.050	6099787
Saturation pH (@ 20C)	N/A	9.53	6099912	9.57		6099912	9.54		6099912
Saturation pH (@ 4C)	N/A	9.78	6099913	9.82		6099913	9.79		6099913
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	6104816	11	5.0	6104816	11	5.0	6104816
Dissolved Chloride (Cl-)	mg/L	56	6104818	48	1.0	6104818	49	1.0	6104818
Colour	TCU	24	6104823	31	5.0	6104823	31	5.0	6104823
Nitrate + Nitrite (N)	mg/L	<0.050	6104827	0.076	0.050	6104827	0.076	0.050	6104827
Nitrite (N)	mg/L	<0.010	6104828	<0.010	0.010	6104828	<0.010	0.010	6104828
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	6106993	<0.050	0.050	6106993	<0.050	0.050	6106993
Total Organic Carbon (C)	mg/L	4.4	6102025	5.3	0.50	6102025	5.3	0.50	6102025
Orthophosphate (P)	mg/L	0.020	6104825	0.012	0.010	6104825	0.012	0.010	6104825
pH	pH	7.11	6103904	6.95	N/A	6103907	6.94	N/A	6103907
Reactive Silica (SiO2)	mg/L	1.1	6104822	1.6	0.50	6104822	1.6	0.50	6104822
Dissolved Sulphate (SO4)	mg/L	8.5	6104820	8.9	2.0	6104820	8.4	2.0	6104820
Total Cyanide (CN)	mg/L	<0.0050	6105437	<0.0050	0.0050	6105432			
Turbidity	NTU	<0.10	6107949	0.41	0.10	6107949	0.47	0.10	6107943
Conductivity	uS/cm	230	6103906	200	1.0	6103910	200	1.0	6103910

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE954		
Sampling Date		2019/04/29		
COC Number		D 39276		
	UNITS	**2019SW7 Lab-Dup**	**RDL**	**QC Batch**
Inorganics				
pH	pH	6.98	N/A	6103907
Conductivity	uS/cm	200	1.0	6103910

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

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		JPE946	JPE947	JPE948	JPE949	JPE950	JPE951	JPE952		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	2019SW1	2019SW2	2019SW3	2019SW4	2019SW5	2019SW6	2019SW10	RDL	QC Batch
Metals										
Dissolved Mercury (Hg)	ug/L	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.013	6101730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29		
COC Number		D 39276	D 39276		
	UNITS	2019SW11	2019SW7	RDL	QC Batch
Metals					
Dissolved Mercury (Hg)	ug/L	<0.013	<0.013	0.013	6101730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE946	JPE947			JPE947			JPE948		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	**2019SW1**	**2019SW2**	**RDL**	**QC Batch**	**2019SW2 Lab-Dup**	**RDL**	**QC Batch**	**2019SW3**	**RDL**	**QC Batch**
Metals											
Dissolved Aluminum (Al)	ug/L	81	77	5.0	6102447				66	5.0	6102447
Total Aluminum (Al)	ug/L	81	71	5.0	6104716	73	5.0	6104716	63	5.0	6104716
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Antimony (Sb)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Arsenic (As)	ug/L	45	44	1.0	6102447				54	1.0	6102447
Total Arsenic (As)	ug/L	45	47	1.0	6104716	48	1.0	6104716	54	1.0	6104716
Dissolved Barium (Ba)	ug/L	4.4	4.3	1.0	6102447				4.4	1.0	6102447
Total Barium (Ba)	ug/L	4.5	4.1	1.0	6104716	4.4	1.0	6104716	4.1	1.0	6104716
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Beryllium (Be)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Boron (B)	ug/L	<50	<50	50	6102447				<50	50	6102447
Total Boron (B)	ug/L	<50	<50	50	6104716	<50	50	6104716	<50	50	6104716
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6102447				<0.010	0.010	6102447
Total Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6104716	<0.010	0.010	6104716	<0.010	0.010	6104716
Dissolved Calcium (Ca)	ug/L	5800	5800	100	6102447				5800	100	6102447
Total Calcium (Ca)	ug/L	5700	5700	100	6104716	5700	100	6104716	5700	100	6104716
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Cobalt (Co)	ug/L	<0.40	<0.40	0.40	6102447				<0.40	0.40	6102447
Total Cobalt (Co)	ug/L	<0.40	<0.40	0.40	6104716	<0.40	0.40	6104716	<0.40	0.40	6104716
Dissolved Copper (Cu)	ug/L	0.76	0.76	0.50	6102447				0.82	0.50	6102447
Total Copper (Cu)	ug/L	0.89	0.87	0.50	6104716	0.95	0.50	6104716	1.3	0.50	6104716
Dissolved Iron (Fe)	ug/L	59	53	50	6102447				<50	50	6102447
Total Iron (Fe)	ug/L	73	55	50	6104716	57	50	6104716	<50	50	6104716
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6102447				<0.50	0.50	6102447
Total Lead (Pb)	ug/L	<0.50	<0.50	0.50	6104716	<0.50	0.50	6104716	<0.50	0.50	6104716
Dissolved Magnesium (Mg)	ug/L	1100	1100	100	6102447				1100	100	6102447
Total Magnesium (Mg)	ug/L	1100	1100	100	6104716	1100	100	6104716	1000	100	6104716
Dissolved Manganese (Mn)	ug/L	24	20	2.0	6102447				17	2.0	6102447
Total Manganese (Mn)	ug/L	27	20	2.0	6104716	21	2.0	6104716	19	2.0	6104716
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE946	JPE947			JPE947			JPE948		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	2019SW1	2019SW2	RDL	QC Batch	2019SW2 Lab-Dup	RDL	QC Batch	2019SW3	RDL	QC Batch
Total Nickel (Ni)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Phosphorus (P)	ug/L	<100	<100	100	6102447				<100	100	6102447
Total Phosphorus (P)	ug/L	<100	<100	100	6104716	<100	100	6104716	<100	100	6104716
Dissolved Potassium (K)	ug/L	970	1000	100	6102447				980	100	6102447
Total Potassium (K)	ug/L	930	900	100	6104716	910	100	6104716	940	100	6104716
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Selenium (Se)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Silver (Ag)	ug/L	<0.10	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Sodium (Na)	ug/L	29000	30000	100	6102447				31000	100	6102447
Total Sodium (Na)	ug/L	28000	28000	100	6104716	29000	100	6104716	30000	100	6104716
Dissolved Strontium (Sr)	ug/L	20	21	2.0	6102447				20	2.0	6102447
Total Strontium (Sr)	ug/L	19	19	2.0	6104716	20	2.0	6104716	20	2.0	6104716
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Thallium (Tl)	ug/L	0.11	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Tin (Sn)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Titanium (Ti)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Uranium (U)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Uranium (U)	ug/L	<0.10	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Vanadium (V)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Zinc (Zn)	ug/L	5.4	<5.0	5.0	6102447				<5.0	5.0	6102447
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6104716	<5.0	5.0	6104716	<5.0	5.0	6104716

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE949	JPE950	JPE951	JPE952	JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	2019SW4	2019SW5	2019SW6	2019SW10	2019SW11	2019SW7	RDL	QC Batch
Metals									
Dissolved Aluminum (Al)	ug/L	68	80	55	48	88	91	5.0	6102447
Total Aluminum (Al)	ug/L	70	79	57	46	86	80	5.0	6104716
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Arsenic (As)	ug/L	47	44	58	83	44	45	1.0	6102447
Total Arsenic (As)	ug/L	50	46	59	86	45	46	1.0	6104716
Dissolved Barium (Ba)	ug/L	4.4	4.4	4.4	4.6	4.7	4.6	1.0	6102447
Total Barium (Ba)	ug/L	5.5	4.5	4.4	4.5	4.5	4.6	1.0	6104716
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	6102447
Total Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	6104716
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6102447
Total Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6104716
Dissolved Calcium (Ca)	ug/L	5600	5700	6000	6200	5700	5700	100	6102447
Total Calcium (Ca)	ug/L	5900	5600	5900	6200	5700	5700	100	6104716
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6102447
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6104716
Dissolved Copper (Cu)	ug/L	0.76	0.76	0.86	0.81	0.80	0.88	0.50	6102447
Total Copper (Cu)	ug/L	0.80	0.92	0.97	0.98	0.92	0.97	0.50	6104716
Dissolved Iron (Fe)	ug/L	<50	59	<50	<50	170	56	50	6102447
Total Iron (Fe)	ug/L	52	67	60	<50	70	75	50	6104716
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6102447
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6104716
Dissolved Magnesium (Mg)	ug/L	1100	1100	1100	1200	1100	1100	100	6102447
Total Magnesium (Mg)	ug/L	1100	1000	1100	1100	1100	1100	100	6104716
Dissolved Manganese (Mn)	ug/L	18	23	15	18	25	22	2.0	6102447
Total Manganese (Mn)	ug/L	19	26	18	18	26	28	2.0	6104716
Dissolved Molybdenum (Mo)	ug/L	3.6	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE949	JPE950	JPE951	JPE952	JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	**2019SW4**	**2019SW5**	**2019SW6**	**2019SW10**	**2019SW11**	**2019SW7**	**RDL**	**QC Batch**
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	100	6102447
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	100	6104716
Dissolved Potassium (K)	ug/L	980	980	990	1100	980	970	100	6102447
Total Potassium (K)	ug/L	950	950	950	1000	930	960	100	6104716
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Sodium (Na)	ug/L	30000	29000	32000	34000	28000	29000	100	6102447
Total Sodium (Na)	ug/L	30000	28000	31000	32000	28000	28000	100	6104716
Dissolved Strontium (Sr)	ug/L	21	20	22	22	19	20	2.0	6102447
Total Strontium (Sr)	ug/L	21	20	21	22	20	19	2.0	6104716
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Thallium (Tl)	ug/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Zinc (Zn)	ug/L	6.5	<5.0	<5.0	7.4	<5.0	<5.0	5.0	6102447
Total Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6104716

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		JPE952			JPE952			JPE953		
Sampling Date		2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276			D 39276			D 39276		
	UNITS	2019SW10	RDL	QC Batch	2019SW10 Lab-Dup	RDL	QC Batch	2019SW11	RDL	QC Batch
Petroleum Hydrocarbons										
Benzene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Toluene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Ethylbenzene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Total Xylenes	mg/L	<0.0020	0.0020	6101727	<0.0020	0.0020	6101727	<0.0020	0.0020	6101727
C6 - C10 (less BTEX)	mg/L	<0.010	0.010	6101727	<0.010	0.010	6101727	<0.010	0.010	6101727
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	6102045				<0.050	0.050	6102045
>C16-C21 Hydrocarbons	mg/L	<0.050	0.050	6102045				<0.050	0.050	6102045
>C21-<C32 Hydrocarbons	mg/L	<0.10	0.10	6102045				<0.10	0.10	6102045
Modified TPH (Tier1)	mg/L	<0.10	0.10	6099525				<0.10	0.10	6099525
Reached Baseline at C32	mg/L	NA	N/A	6102045				NA	N/A	6102045
Hydrocarbon Resemblance	mg/L	NA	N/A	6102045				NA	N/A	6102045
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	83		6102045				91		6102045
n-Dotriacontane - Extractable	%	92		6102045				99		6102045
Isobutylbenzene - Volatile	%	102		6101727	102		6101727	102		6101727

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

GENERAL COMMENTS

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

Package 1	3.7°C
Package 2	0.7°C

Total Water Analysis - Sample decanted from a non-preserved aliquot – metals results may be biased low.

Total Cyanide: Due to a high percent humidity, the detection limits for samples JPE917 & JPE923 were adjusted.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6100446	SDN	RPD	Moisture	2019/05/03	12		%	25
6101727	THL	Matrix Spike [JPE953-09]	Isobutylbenzene - Volatile	2019/05/03		104	%	70 - 130
			Benzene	2019/05/03		112	%	70 - 130
			Toluene	2019/05/03		117	%	70 - 130
			Ethylbenzene	2019/05/03		120	%	70 - 130
			Total Xylenes	2019/05/03		117	%	70 - 130
6101727	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	70 - 130
			Benzene	2019/05/03		102	%	70 - 130
			Toluene	2019/05/03		104	%	70 - 130
			Ethylbenzene	2019/05/03		106	%	70 - 130
			Total Xylenes	2019/05/03		104	%	70 - 130
6101727	THL	Method Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	70 - 130
			Benzene	2019/05/03	<0.0010		mg/L	
			Toluene	2019/05/03	<0.0010		mg/L	
			Ethylbenzene	2019/05/03	<0.0010		mg/L	
			Total Xylenes	2019/05/03	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/05/03	<0.010		mg/L	
6101727	THL	RPD [JPE952-09]	Benzene	2019/05/03	NC		%	40
			Toluene	2019/05/03	NC		%	40
			Ethylbenzene	2019/05/03	NC		%	40
			Total Xylenes	2019/05/03	NC		%	40
			C6 - C10 (less BTEX)	2019/05/03	NC		%	40
6101730	CCR	Matrix Spike	Dissolved Mercury (Hg)	2019/05/06		93	%	80 - 120
6101730	CCR	Spiked Blank	Dissolved Mercury (Hg)	2019/05/06		100	%	80 - 120
6101730	CCR	Method Blank	Dissolved Mercury (Hg)	2019/05/06	<0.013		ug/L	
6101730	CCR	RPD	Dissolved Mercury (Hg)	2019/05/06	NC		%	20
6101927	YXU	Matrix Spike	Isobutylbenzene - Volatile	2019/05/03		108	%	60 - 130
			Benzene	2019/05/03		95	%	60 - 130
			Toluene	2019/05/03		95	%	60 - 130
			Ethylbenzene	2019/05/03		103	%	60 - 130
			Total Xylenes	2019/05/03		100	%	60 - 130
6101927	YXU	Spiked Blank	Isobutylbenzene - Volatile	2019/05/03		97	%	60 - 130
			Benzene	2019/05/03		90	%	60 - 140
			Toluene	2019/05/03		92	%	60 - 140
			Ethylbenzene	2019/05/03		94	%	60 - 140
			Total Xylenes	2019/05/03		94	%	60 - 140
6101927	YXU	Method Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	60 - 130
			Benzene	2019/05/03	<0.025		mg/kg	
			Toluene	2019/05/03	<0.050		mg/kg	
			Ethylbenzene	2019/05/03	<0.025		mg/kg	
			Total Xylenes	2019/05/03	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2019/05/03	<2.5		mg/kg	
6101927	YXU	RPD	Benzene	2019/05/03	NC		%	50
			Toluene	2019/05/03	NC		%	50
			Ethylbenzene	2019/05/03	NC		%	50
			Total Xylenes	2019/05/03	11		%	50
			C6 - C10 (less BTEX)	2019/05/03	NC		%	50
6102025	SSI	Matrix Spike	Total Organic Carbon (C)	2019/05/03		98	%	85 - 115
6102025	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/03		103	%	80 - 120
6102025	SSI	Method Blank	Total Organic Carbon (C)	2019/05/03	<0.50		mg/L	
6102025	SSI	RPD	Total Organic Carbon (C)	2019/05/03	NC		%	15
6102045	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/03		104	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		111	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03		98	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2019/05/03		93	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/03		107	%	70 - 130
6102045	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/03		102	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		104	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/03		89	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/03		102	%	70 - 130
6102045	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/03		102	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		100	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/03	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/03	<0.10		mg/L	
6102045	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/03	0.31		%	40
			>C16-C21 Hydrocarbons	2019/05/03	3.0		%	40
			>C21-<C32 Hydrocarbons	2019/05/03	5.0		%	40
6102070	MLB	Matrix Spike [JPE927-01]	Acid Extractable Antimony (Sb)	2019/05/06		NC	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/06		NC	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/06		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/06		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/06		104	%	75 - 125
			Acid Extractable Boron (B)	2019/05/06		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/06		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/06		96	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/06		95	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/06		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/06		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/06		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/06		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/06		94	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/06		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/06		96	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/06		98	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/06		94	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/06		99	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/06		106	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/06		103	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/06		111	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/06		103	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/06		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/06		NC	%	75 - 125
6102070	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/04		104	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/04		97	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/04		101	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/04		94	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/04		103	%	75 - 125
			Acid Extractable Boron (B)	2019/05/04		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/04		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/04		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/04		97	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/04		95	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/04		100	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/04		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/04		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/04		103	%	75 - 125

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2019/05/04		106	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/04		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/04		99	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/04		96	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/04		97	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/04		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/04		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/04		102	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/04		100	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/04		95	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/04		99	%	75 - 125
6102070	MLB	Method Blank	Acid Extractable Aluminum (Al)	2019/05/04	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/04	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/04	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/04	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/04	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/04	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/04	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/04	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/04	<5.0		mg/kg	
6102070	MLB	RPD [JPE927-01]	Acid Extractable Aluminum (Al)	2019/05/06	7.6		%	35
			Acid Extractable Antimony (Sb)	2019/05/06	4.3		%	35
			Acid Extractable Arsenic (As)	2019/05/06	3.8		%	35
			Acid Extractable Barium (Ba)	2019/05/06	6.4		%	35
			Acid Extractable Beryllium (Be)	2019/05/06	NC		%	35
			Acid Extractable Bismuth (Bi)	2019/05/06	NC		%	35
			Acid Extractable Boron (B)	2019/05/06	NC		%	35
			Acid Extractable Cadmium (Cd)	2019/05/06	NC		%	35
			Acid Extractable Chromium (Cr)	2019/05/06	7.4		%	35
			Acid Extractable Cobalt (Co)	2019/05/06	1.3		%	35
			Acid Extractable Copper (Cu)	2019/05/06	3.5		%	35
			Acid Extractable Iron (Fe)	2019/05/06	4.1		%	35
			Acid Extractable Lead (Pb)	2019/05/06	4.0		%	35
			Acid Extractable Lithium (Li)	2019/05/06	3.4		%	35
			Acid Extractable Manganese (Mn)	2019/05/06	4.6		%	35
			Acid Extractable Mercury (Hg)	2019/05/06	4.6		%	35

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2019/05/06	NC		%	35
			Acid Extractable Nickel (Ni)	2019/05/06	2.6		%	35
			Acid Extractable Rubidium (Rb)	2019/05/06	7.2		%	35
			Acid Extractable Selenium (Se)	2019/05/06	NC		%	35
			Acid Extractable Silver (Ag)	2019/05/06	NC		%	35
			Acid Extractable Strontium (Sr)	2019/05/06	1.9		%	35
			Acid Extractable Thallium (Tl)	2019/05/06	1.8		%	35
			Acid Extractable Tin (Sn)	2019/05/06	NC		%	35
			Acid Extractable Uranium (U)	2019/05/06	8.6		%	35
			Acid Extractable Vanadium (V)	2019/05/06	5.6		%	35
			Acid Extractable Zinc (Zn)	2019/05/06	2.3		%	35
6102447	MLB	Matrix Spike	Dissolved Aluminum (Al)	2019/05/03		103	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/05/03		93	%	80 - 120
			Dissolved Barium (Ba)	2019/05/03		99	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/03		96	%	80 - 120
			Dissolved Bismuth (Bi)	2019/05/03		97	%	80 - 120
			Dissolved Boron (B)	2019/05/03		95	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/03		98	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/03		99	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/03		95	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/03		94	%	80 - 120
			Dissolved Copper (Cu)	2019/05/03		90	%	80 - 120
			Dissolved Iron (Fe)	2019/05/03		98	%	80 - 120
			Dissolved Lead (Pb)	2019/05/03		98	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/03		101	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/03		92	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/03		NC	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/03		92	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/03		105	%	80 - 120
			Dissolved Potassium (K)	2019/05/03		102	%	80 - 120
			Dissolved Selenium (Se)	2019/05/03		91	%	80 - 120
			Dissolved Silver (Ag)	2019/05/03		94	%	80 - 120
			Dissolved Sodium (Na)	2019/05/03		NC	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/03		NC	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/03		99	%	80 - 120
			Dissolved Tin (Sn)	2019/05/03		104	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/03		99	%	80 - 120
			Dissolved Uranium (U)	2019/05/03		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/03		95	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/03		95	%	80 - 120
6102447	MLB	Spiked Blank	Dissolved Aluminum (Al)	2019/05/03		106	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/05/03		94	%	80 - 120
			Dissolved Barium (Ba)	2019/05/03		100	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/03		98	%	80 - 120
			Dissolved Bismuth (Bi)	2019/05/03		101	%	80 - 120
			Dissolved Boron (B)	2019/05/03		95	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/03		97	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/03		100	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/03		97	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/03		96	%	80 - 120
			Dissolved Copper (Cu)	2019/05/03		95	%	80 - 120
			Dissolved Iron (Fe)	2019/05/03		99	%	80 - 120

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Lead (Pb)	2019/05/03		99	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/03		105	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/03		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/03		100	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/03		96	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/03		104	%	80 - 120
			Dissolved Potassium (K)	2019/05/03		99	%	80 - 120
			Dissolved Selenium (Se)	2019/05/03		91	%	80 - 120
			Dissolved Silver (Ag)	2019/05/03		95	%	80 - 120
			Dissolved Sodium (Na)	2019/05/03		99	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/03		100	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/03		100	%	80 - 120
			Dissolved Tin (Sn)	2019/05/03		102	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/03		102	%	80 - 120
			Dissolved Uranium (U)	2019/05/03		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/03		97	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/03		98	%	80 - 120
6102447	MLB	Method Blank	Dissolved Aluminum (Al)	2019/05/03	<5.0		ug/L	
			Dissolved Antimony (Sb)	2019/05/03	<1.0		ug/L	
			Dissolved Arsenic (As)	2019/05/03	<1.0		ug/L	
			Dissolved Barium (Ba)	2019/05/03	<1.0		ug/L	
			Dissolved Beryllium (Be)	2019/05/03	<1.0		ug/L	
			Dissolved Bismuth (Bi)	2019/05/03	<2.0		ug/L	
			Dissolved Boron (B)	2019/05/03	<50		ug/L	
			Dissolved Cadmium (Cd)	2019/05/03	<0.010		ug/L	
			Dissolved Calcium (Ca)	2019/05/03	<100		ug/L	
			Dissolved Chromium (Cr)	2019/05/03	<1.0		ug/L	
			Dissolved Cobalt (Co)	2019/05/03	<0.40		ug/L	
			Dissolved Copper (Cu)	2019/05/03	<0.50		ug/L	
			Dissolved Iron (Fe)	2019/05/03	<50		ug/L	
			Dissolved Lead (Pb)	2019/05/03	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2019/05/03	<100		ug/L	
			Dissolved Manganese (Mn)	2019/05/03	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2019/05/03	<2.0		ug/L	
			Dissolved Nickel (Ni)	2019/05/03	<2.0		ug/L	
			Dissolved Phosphorus (P)	2019/05/03	<100		ug/L	
			Dissolved Potassium (K)	2019/05/03	<100		ug/L	
			Dissolved Selenium (Se)	2019/05/03	<1.0		ug/L	
			Dissolved Silver (Ag)	2019/05/03	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/05/03	<100		ug/L	
			Dissolved Strontium (Sr)	2019/05/03	<2.0		ug/L	
			Dissolved Thallium (Tl)	2019/05/03	<0.10		ug/L	
			Dissolved Tin (Sn)	2019/05/03	<2.0		ug/L	
			Dissolved Titanium (Ti)	2019/05/03	<2.0		ug/L	
			Dissolved Uranium (U)	2019/05/03	<0.10		ug/L	
			Dissolved Vanadium (V)	2019/05/03	<2.0		ug/L	
			Dissolved Zinc (Zn)	2019/05/03	<5.0		ug/L	
6102447	MLB	RPD	Dissolved Aluminum (Al)	2019/05/03	0.34		%	20
			Dissolved Antimony (Sb)	2019/05/03	NC		%	20
			Dissolved Arsenic (As)	2019/05/03	0.15		%	20
			Dissolved Barium (Ba)	2019/05/03	1.9		%	20
			Dissolved Beryllium (Be)	2019/05/03	NC		%	20
			Dissolved Bismuth (Bi)	2019/05/03	NC		%	20
			Dissolved Boron (B)	2019/05/03	3.6		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cadmium (Cd)	2019/05/03	NC		%	20
			Dissolved Calcium (Ca)	2019/05/03	0.045		%	20
			Dissolved Chromium (Cr)	2019/05/03	3.0		%	20
			Dissolved Cobalt (Co)	2019/05/03	NC		%	20
			Dissolved Copper (Cu)	2019/05/03	NC		%	20
			Dissolved Iron (Fe)	2019/05/03	NC		%	20
			Dissolved Lead (Pb)	2019/05/03	NC		%	20
			Dissolved Magnesium (Mg)	2019/05/03	2.8		%	20
			Dissolved Manganese (Mn)	2019/05/03	0.085		%	20
			Dissolved Molybdenum (Mo)	2019/05/03	0.89		%	20
			Dissolved Nickel (Ni)	2019/05/03	NC		%	20
			Dissolved Phosphorus (P)	2019/05/03	NC		%	20
			Dissolved Potassium (K)	2019/05/03	1.5		%	20
			Dissolved Selenium (Se)	2019/05/03	NC		%	20
			Dissolved Silver (Ag)	2019/05/03	NC		%	20
			Dissolved Sodium (Na)	2019/05/03	0.21		%	20
			Dissolved Strontium (Sr)	2019/05/03	0.45		%	20
			Dissolved Thallium (Tl)	2019/05/03	NC		%	20
			Dissolved Tin (Sn)	2019/05/03	NC		%	20
			Dissolved Titanium (Ti)	2019/05/03	NC		%	20
			Dissolved Uranium (U)	2019/05/03	NC		%	20
			Dissolved Vanadium (V)	2019/05/03	5.7		%	20
			Dissolved Zinc (Zn)	2019/05/03	NC		%	20
6103904	KMC	QC Standard	pH	2019/05/04		100	%	97 - 103
6103904	KMC	RPD [JPE947-01]	pH	2019/05/04	0.52		%	N/A
6103906	KMC	Spiked Blank	Conductivity	2019/05/04		101	%	80 - 120
6103906	KMC	Method Blank	Conductivity	2019/05/04	1.1, RDL=1.0		uS/cm	
6103906	KMC	RPD [JPE947-01]	Conductivity	2019/05/04	0.49		%	10
6103907	KMC	QC Standard	pH	2019/05/04		101	%	97 - 103
6103907	KMC	RPD [JPE954-01]	pH	2019/05/04	0.64		%	N/A
6103910	KMC	Spiked Blank	Conductivity	2019/05/04		102	%	80 - 120
6103910	KMC	Method Blank	Conductivity	2019/05/04	<1.0		uS/cm	
6103910	KMC	RPD [JPE954-01]	Conductivity	2019/05/04	0.00015		%	10
6104716	BAN	Matrix Spike [JPE948-01]	Total Aluminum (Al)	2019/05/07		98	%	80 - 120
			Total Antimony (Sb)	2019/05/07		100	%	80 - 120
			Total Arsenic (As)	2019/05/07		95	%	80 - 120
			Total Barium (Ba)	2019/05/07		97	%	80 - 120
			Total Beryllium (Be)	2019/05/07		95	%	80 - 120
			Total Bismuth (Bi)	2019/05/07		99	%	80 - 120
			Total Boron (B)	2019/05/07		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/07		97	%	80 - 120
			Total Calcium (Ca)	2019/05/07		101	%	80 - 120
			Total Chromium (Cr)	2019/05/07		95	%	80 - 120
			Total Cobalt (Co)	2019/05/07		96	%	80 - 120
			Total Copper (Cu)	2019/05/07		93	%	80 - 120
			Total Iron (Fe)	2019/05/07		98	%	80 - 120
			Total Lead (Pb)	2019/05/07		97	%	80 - 120
			Total Magnesium (Mg)	2019/05/07		101	%	80 - 120
			Total Manganese (Mn)	2019/05/07		95	%	80 - 120
			Total Molybdenum (Mo)	2019/05/07		102	%	80 - 120
			Total Nickel (Ni)	2019/05/07		93	%	80 - 120
			Total Phosphorus (P)	2019/05/07		105	%	80 - 120
			Total Potassium (K)	2019/05/07		98	%	80 - 120

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2019/05/07		95	%	80 - 120
			Total Silver (Ag)	2019/05/07		95	%	80 - 120
			Total Sodium (Na)	2019/05/07		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/07		97	%	80 - 120
			Total Thallium (Tl)	2019/05/07		98	%	80 - 120
			Total Tin (Sn)	2019/05/07		101	%	80 - 120
			Total Titanium (Ti)	2019/05/07		101	%	80 - 120
			Total Uranium (U)	2019/05/07		103	%	80 - 120
			Total Vanadium (V)	2019/05/07		97	%	80 - 120
			Total Zinc (Zn)	2019/05/07		94	%	80 - 120
6104716	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/07		104	%	80 - 120
			Total Antimony (Sb)	2019/05/07		102	%	80 - 120
			Total Arsenic (As)	2019/05/07		98	%	80 - 120
			Total Barium (Ba)	2019/05/07		100	%	80 - 120
			Total Beryllium (Be)	2019/05/07		97	%	80 - 120
			Total Bismuth (Bi)	2019/05/07		101	%	80 - 120
			Total Boron (B)	2019/05/07		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/07		99	%	80 - 120
			Total Calcium (Ca)	2019/05/07		104	%	80 - 120
			Total Chromium (Cr)	2019/05/07		97	%	80 - 120
			Total Cobalt (Co)	2019/05/07		98	%	80 - 120
			Total Copper (Cu)	2019/05/07		96	%	80 - 120
			Total Iron (Fe)	2019/05/07		100	%	80 - 120
			Total Lead (Pb)	2019/05/07		100	%	80 - 120
			Total Magnesium (Mg)	2019/05/07		103	%	80 - 120
			Total Manganese (Mn)	2019/05/07		97	%	80 - 120
			Total Molybdenum (Mo)	2019/05/07		103	%	80 - 120
			Total Nickel (Ni)	2019/05/07		96	%	80 - 120
			Total Phosphorus (P)	2019/05/07		106	%	80 - 120
			Total Potassium (K)	2019/05/07		100	%	80 - 120
			Total Selenium (Se)	2019/05/07		96	%	80 - 120
			Total Silver (Ag)	2019/05/07		97	%	80 - 120
			Total Sodium (Na)	2019/05/07		99	%	80 - 120
			Total Strontium (Sr)	2019/05/07		100	%	80 - 120
			Total Thallium (Tl)	2019/05/07		100	%	80 - 120
			Total Tin (Sn)	2019/05/07		102	%	80 - 120
			Total Titanium (Ti)	2019/05/07		100	%	80 - 120
			Total Uranium (U)	2019/05/07		105	%	80 - 120
			Total Vanadium (V)	2019/05/07		100	%	80 - 120
			Total Zinc (Zn)	2019/05/07		97	%	80 - 120
6104716	BAN	Method Blank	Total Aluminum (Al)	2019/05/07	<5.0		ug/L	
			Total Antimony (Sb)	2019/05/07	<1.0		ug/L	
			Total Arsenic (As)	2019/05/07	<1.0		ug/L	
			Total Barium (Ba)	2019/05/07	<1.0		ug/L	
			Total Beryllium (Be)	2019/05/07	<1.0		ug/L	
			Total Bismuth (Bi)	2019/05/07	<2.0		ug/L	
			Total Boron (B)	2019/05/07	<50		ug/L	
			Total Cadmium (Cd)	2019/05/07	<0.010		ug/L	
			Total Calcium (Ca)	2019/05/07	<100		ug/L	
			Total Chromium (Cr)	2019/05/07	<1.0		ug/L	
			Total Cobalt (Co)	2019/05/07	<0.40		ug/L	
			Total Copper (Cu)	2019/05/07	<0.50		ug/L	
			Total Iron (Fe)	2019/05/07	<50		ug/L	
			Total Lead (Pb)	2019/05/07	<0.50		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Magnesium (Mg)	2019/05/07	<100		ug/L	
			Total Manganese (Mn)	2019/05/07	<2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/07	<2.0		ug/L	
			Total Nickel (Ni)	2019/05/07	<2.0		ug/L	
			Total Phosphorus (P)	2019/05/07	<100		ug/L	
			Total Potassium (K)	2019/05/07	<100		ug/L	
			Total Selenium (Se)	2019/05/07	<1.0		ug/L	
			Total Silver (Ag)	2019/05/07	<0.10		ug/L	
			Total Sodium (Na)	2019/05/07	<100		ug/L	
			Total Strontium (Sr)	2019/05/07	<2.0		ug/L	
			Total Thallium (Tl)	2019/05/07	<0.10		ug/L	
			Total Tin (Sn)	2019/05/07	<2.0		ug/L	
			Total Titanium (Ti)	2019/05/07	<2.0		ug/L	
			Total Uranium (U)	2019/05/07	<0.10		ug/L	
			Total Vanadium (V)	2019/05/07	<2.0		ug/L	
			Total Zinc (Zn)	2019/05/07	<5.0		ug/L	
6104716	BAN	RPD [JPE947-01]	Total Aluminum (Al)	2019/05/07	2.8		%	20
			Total Antimony (Sb)	2019/05/07	NC		%	20
			Total Arsenic (As)	2019/05/07	1.3		%	20
			Total Barium (Ba)	2019/05/07	7.0		%	20
			Total Beryllium (Be)	2019/05/07	NC		%	20
			Total Bismuth (Bi)	2019/05/07	NC		%	20
			Total Boron (B)	2019/05/07	NC		%	20
			Total Cadmium (Cd)	2019/05/07	NC		%	20
			Total Calcium (Ca)	2019/05/07	1.2		%	20
			Total Chromium (Cr)	2019/05/07	NC		%	20
			Total Cobalt (Co)	2019/05/07	NC		%	20
			Total Copper (Cu)	2019/05/07	9.3		%	20
			Total Iron (Fe)	2019/05/07	3.0		%	20
			Total Lead (Pb)	2019/05/07	NC		%	20
			Total Magnesium (Mg)	2019/05/07	0.29		%	20
			Total Manganese (Mn)	2019/05/07	7.4		%	20
			Total Molybdenum (Mo)	2019/05/07	NC		%	20
			Total Nickel (Ni)	2019/05/07	NC		%	20
			Total Phosphorus (P)	2019/05/07	NC		%	20
			Total Potassium (K)	2019/05/07	1.1		%	20
			Total Selenium (Se)	2019/05/07	NC		%	20
			Total Silver (Ag)	2019/05/07	NC		%	20
			Total Sodium (Na)	2019/05/07	1.7		%	20
			Total Strontium (Sr)	2019/05/07	3.4		%	20
			Total Thallium (Tl)	2019/05/07	NC		%	20
			Total Tin (Sn)	2019/05/07	NC		%	20
			Total Titanium (Ti)	2019/05/07	NC		%	20
			Total Uranium (U)	2019/05/07	NC		%	20
			Total Vanadium (V)	2019/05/07	NC		%	20
			Total Zinc (Zn)	2019/05/07	NC		%	20
6104792	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/06		100	%	80 - 120
6104792	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/06		104	%	80 - 120
6104792	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/06	<5.0		mg/L	
6104792	NRG	RPD	Total Alkalinity (Total as CaCO3)	2019/05/06	0.52		%	25
6104797	NRG	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/06		NC	%	80 - 120
6104797	NRG	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/06		98	%	80 - 120
6104797	NRG	Method Blank	Dissolved Chloride (Cl-)	2019/05/06	<1.0		mg/L	
6104797	NRG	RPD	Dissolved Chloride (Cl-)	2019/05/06	0.32		%	25

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6104799	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/06		99	%	80 - 120
6104799	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/06		99	%	80 - 120
6104799	NRG	Method Blank	Dissolved Sulphate (SO4)	2019/05/06	<2.0		mg/L	
6104799	NRG	RPD	Dissolved Sulphate (SO4)	2019/05/06	1.6		%	25
6104802	NRG	Matrix Spike	Reactive Silica (SiO2)	2019/05/06		96	%	80 - 120
6104802	NRG	Spiked Blank	Reactive Silica (SiO2)	2019/05/06		101	%	80 - 120
6104802	NRG	Method Blank	Reactive Silica (SiO2)	2019/05/06	<0.50		mg/L	
6104802	NRG	RPD	Reactive Silica (SiO2)	2019/05/06	0.14		%	25
6104804	NRG	Spiked Blank	Colour	2019/05/06		98	%	80 - 120
6104804	NRG	Method Blank	Colour	2019/05/06	<5.0		TCU	
6104804	NRG	RPD	Colour	2019/05/06	15		%	20
6104806	NRG	Matrix Spike	Orthophosphate (P)	2019/05/07		92	%	80 - 120
6104806	NRG	Spiked Blank	Orthophosphate (P)	2019/05/07		97	%	80 - 120
6104806	NRG	Method Blank	Orthophosphate (P)	2019/05/07	<0.010		mg/L	
6104806	NRG	RPD	Orthophosphate (P)	2019/05/07	NC		%	25
6104810	NRG	Matrix Spike	Nitrate + Nitrite (N)	2019/05/06		94	%	80 - 120
6104810	NRG	Spiked Blank	Nitrate + Nitrite (N)	2019/05/06		94	%	80 - 120
6104810	NRG	Method Blank	Nitrate + Nitrite (N)	2019/05/06	<0.050		mg/L	
6104810	NRG	RPD	Nitrate + Nitrite (N)	2019/05/06	2.1		%	25
6104813	NRG	Matrix Spike	Nitrite (N)	2019/05/06		98	%	80 - 120
6104813	NRG	Spiked Blank	Nitrite (N)	2019/05/06		103	%	80 - 120
6104813	NRG	Method Blank	Nitrite (N)	2019/05/06	<0.010		mg/L	
6104813	NRG	RPD	Nitrite (N)	2019/05/06	NC		%	20
6104816	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/06		NC	%	80 - 120
6104816	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/06		106	%	80 - 120
6104816	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/06	<5.0		mg/L	
6104816	NRG	RPD	Total Alkalinity (Total as CaCO3)	2019/05/06	1.1		%	25
6104818	NRG	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/06		NC	%	80 - 120
6104818	NRG	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/06		98	%	80 - 120
6104818	NRG	Method Blank	Dissolved Chloride (Cl-)	2019/05/06	<1.0		mg/L	
6104818	NRG	RPD	Dissolved Chloride (Cl-)	2019/05/06	0.15		%	25
6104820	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/06		97	%	80 - 120
6104820	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/06		101	%	80 - 120
6104820	NRG	Method Blank	Dissolved Sulphate (SO4)	2019/05/06	<2.0		mg/L	
6104820	NRG	RPD	Dissolved Sulphate (SO4)	2019/05/06	0.28		%	25
6104822	NRG	Matrix Spike	Reactive Silica (SiO2)	2019/05/06		NC	%	80 - 120
6104822	NRG	Spiked Blank	Reactive Silica (SiO2)	2019/05/06		105	%	80 - 120
6104822	NRG	Method Blank	Reactive Silica (SiO2)	2019/05/06	<0.50		mg/L	
6104822	NRG	RPD	Reactive Silica (SiO2)	2019/05/06	0.0089		%	25
6104823	NRG	Spiked Blank	Colour	2019/05/06		97	%	80 - 120
6104823	NRG	Method Blank	Colour	2019/05/06	<5.0		TCU	
6104823	NRG	RPD	Colour	2019/05/06	11		%	20
6104825	NRG	Matrix Spike	Orthophosphate (P)	2019/05/07		87	%	80 - 120
6104825	NRG	Spiked Blank	Orthophosphate (P)	2019/05/07		92	%	80 - 120
6104825	NRG	Method Blank	Orthophosphate (P)	2019/05/07	<0.010		mg/L	
6104825	NRG	RPD	Orthophosphate (P)	2019/05/07	0.11		%	25
6104827	NRG	Matrix Spike	Nitrate + Nitrite (N)	2019/05/06		93	%	80 - 120
6104827	NRG	Spiked Blank	Nitrate + Nitrite (N)	2019/05/06		95	%	80 - 120
6104827	NRG	Method Blank	Nitrate + Nitrite (N)	2019/05/06	<0.050		mg/L	
6104827	NRG	RPD	Nitrate + Nitrite (N)	2019/05/06	NC		%	25
6104828	NRG	Matrix Spike	Nitrite (N)	2019/05/06		101	%	80 - 120
6104828	NRG	Spiked Blank	Nitrite (N)	2019/05/06		101	%	80 - 120
6104828	NRG	Method Blank	Nitrite (N)	2019/05/06	<0.010		mg/L	
6104828	NRG	RPD	Nitrite (N)	2019/05/06	NC		%	20

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam A Bureau Veritas Group Company

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6104961	SDN	RPD [JPE927-01]	Moisture	2019/05/06	1.8		%	25
6105340	YXU	Matrix Spike	Isobutylbenzene - Volatile	2019/05/06		124 (1)	%	60 - 130
			Benzene	2019/05/06		99	%	60 - 130
			Toluene	2019/05/06		99	%	60 - 130
			Ethylbenzene	2019/05/06		106	%	60 - 130
			Total Xylenes	2019/05/06		102	%	60 - 130
6105340	YXU	Spiked Blank	Isobutylbenzene - Volatile	2019/05/06		97	%	60 - 130
			Benzene	2019/05/06		97	%	60 - 140
			Toluene	2019/05/06		99	%	60 - 140
			Ethylbenzene	2019/05/06		100	%	60 - 140
			Total Xylenes	2019/05/06		100	%	60 - 140
6105340	YXU	Method Blank	Isobutylbenzene - Volatile	2019/05/06		106	%	60 - 130
			Benzene	2019/05/06	<0.025		mg/kg	
			Toluene	2019/05/06	<0.050		mg/kg	
			Ethylbenzene	2019/05/06	<0.025		mg/kg	
			Total Xylenes	2019/05/06	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2019/05/06	<2.5		mg/kg	
6105340	YXU	RPD	Benzene	2019/05/06	NC		%	50
			Toluene	2019/05/06	NC		%	50
			Ethylbenzene	2019/05/06	NC		%	50
			Total Xylenes	2019/05/06	NC		%	50
			C6 - C10 (less BTEX)	2019/05/06	2.7		%	50
6105432	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/07		96	%	80 - 120
6105432	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/07		103	%	80 - 120
6105432	BKE	Method Blank	Total Cyanide (CN)	2019/05/07	<0.0050		mg/L	
6105432	BKE	RPD	Total Cyanide (CN)	2019/05/07	NC		%	20
6105437	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/07		99	%	80 - 120
6105437	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/07		101	%	80 - 120
6105437	BKE	Method Blank	Total Cyanide (CN)	2019/05/07	<0.0050		mg/L	
6105437	BKE	RPD	Total Cyanide (CN)	2019/05/07	4.6		%	20
6106756	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2019/05/07		96	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		100	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		102	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		102	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		98	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		104	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		102	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		106	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		93	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		102	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		100	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		94	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		NC	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		102	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		98	%	75 - 125

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Zinc (Zn)	2019/05/07		NC	%	75 - 125
6106756	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/07		101	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		100	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		100	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		103	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		99	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		101	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		98	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		99	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		101	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		99	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		95	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		101	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		102	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		98	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		104	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		100	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		97	%	75 - 125
6106756	BAN	Method Blank	Acid Extractable Aluminum (Al)	2019/05/07	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/07	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/07	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/07	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/07	<5.0		mg/kg	
6106756	BAN	RPD	Acid Extractable Lead (Pb)	2019/05/07	10		%	35

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6106758	BAN	Matrix Spike [JPE920-01]	Acid Extractable Antimony (Sb)	2019/05/08		84	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/08		NC	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/08		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/08		93	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/08		99	%	75 - 125
			Acid Extractable Boron (B)	2019/05/08		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/08		92	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/08		88	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/08		NC	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/08		88	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/08		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/08		94	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/08		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/08		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/08		91	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/08		90	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/08		94	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/08		92	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/08		90	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/08		97	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/08		98	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/08		96	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/08		93	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/08		NC	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/08		NC	%	75 - 125
6106758	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/07		101	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		98	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		101	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		102	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		97	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		95	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		99	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		98	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		96	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		100	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		98	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		96	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		100	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		103	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		99	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		98	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		94	%	75 - 125
6106758	BAN	Method Blank	Acid Extractable Aluminum (Al)	2019/05/07	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/07	<5.0		mg/kg	

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Beryllium (Be)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/07	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/07	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/07	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/07	<5.0		mg/kg	
6106758	BAN	RPD [JPE920-01]	Acid Extractable Aluminum (Al)	2019/05/08	3.6		%	35
			Acid Extractable Antimony (Sb)	2019/05/08	NC		%	35
			Acid Extractable Arsenic (As)	2019/05/08	3.5		%	35
			Acid Extractable Barium (Ba)	2019/05/08	5.4		%	35
			Acid Extractable Beryllium (Be)	2019/05/08	NC		%	35
			Acid Extractable Bismuth (Bi)	2019/05/08	NC		%	35
			Acid Extractable Boron (B)	2019/05/08	NC		%	35
			Acid Extractable Cadmium (Cd)	2019/05/08	3.1		%	35
			Acid Extractable Chromium (Cr)	2019/05/08	2.0		%	35
			Acid Extractable Cobalt (Co)	2019/05/08	1.4		%	35
			Acid Extractable Copper (Cu)	2019/05/08	1.2		%	35
			Acid Extractable Iron (Fe)	2019/05/08	1.6		%	35
			Acid Extractable Lead (Pb)	2019/05/08	3.0		%	35
			Acid Extractable Lithium (Li)	2019/05/08	2.2		%	35
			Acid Extractable Manganese (Mn)	2019/05/08	3.2		%	35
			Acid Extractable Mercury (Hg)	2019/05/08	2.6		%	35
			Acid Extractable Molybdenum (Mo)	2019/05/08	NC		%	35
			Acid Extractable Nickel (Ni)	2019/05/08	2.2		%	35
			Acid Extractable Rubidium (Rb)	2019/05/08	5.8		%	35
			Acid Extractable Selenium (Se)	2019/05/08	4.8		%	35
			Acid Extractable Silver (Ag)	2019/05/08	NC		%	35
			Acid Extractable Strontium (Sr)	2019/05/08	0.44		%	35
			Acid Extractable Thallium (Tl)	2019/05/08	7.7		%	35
			Acid Extractable Tin (Sn)	2019/05/08	14		%	35
			Acid Extractable Uranium (U)	2019/05/08	0.43		%	35
			Acid Extractable Vanadium (V)	2019/05/08	2.4		%	35
			Acid Extractable Zinc (Zn)	2019/05/08	1.8		%	35
6106759	BBD	QC Standard	Organic Carbon (TOC)	2019/05/09		90	%	75 - 125
6106759	BBD	Method Blank	Organic Carbon (TOC)	2019/05/09	<0.50		g/kg	
6106759	BBD	RPD	Organic Carbon (TOC)	2019/05/09	4.9		%	35
6106993	SRM	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/05/07		91	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6106993	SRM	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07		99	%	80 - 120
6106993	SRM	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07	<0.050		mg/L	
6106993	SRM	RPD	Nitrogen (Ammonia Nitrogen)	2019/05/07	2.0		%	20
6106998	SRM	Matrix Spike [JPE947-06]	Nitrogen (Ammonia Nitrogen)	2019/05/07		83	%	80 - 120
6106998	SRM	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07		102	%	80 - 120
6106998	SRM	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07	<0.050		mg/L	
6106998	SRM	RPD [JPE947-06]	Nitrogen (Ammonia Nitrogen)	2019/05/07	NC		%	20
6107943	KMC	QC Standard	Turbidity	2019/05/07		102	%	80 - 120
6107943	KMC	Spiked Blank	Turbidity	2019/05/07		102	%	80 - 120
6107943	KMC	Method Blank	Turbidity	2019/05/07	<0.10		NTU	
6107943	KMC	RPD	Turbidity	2019/05/07	6.5		%	20
6107949	KMC	QC Standard	Turbidity	2019/05/07		102	%	80 - 120
6107949	KMC	Spiked Blank	Turbidity	2019/05/07		102	%	80 - 120
6107949	KMC	Method Blank	Turbidity	2019/05/07	<0.10		NTU	
6107949	KMC	RPD	Turbidity	2019/05/07	NC		%	20
6109397	NRG	Matrix Spike [JPE927-01]	Sulphate (SO4)	2019/05/08		98	%	80 - 120
6109397	NRG	Spiked Blank	Sulphate (SO4)	2019/05/08		99	%	80 - 120
6109397	NRG	Method Blank	Sulphate (SO4)	2019/05/08	<10		mg/kg	
6109397	NRG	RPD [JPE927-01]	Sulphate (SO4)	2019/05/08	6.7		%	25
6118321	GGC	Spiked Blank	Total Cyanide (CN)	2019/05/10		87	%	75 - 125
6118321	GGC	Method Blank	Total Cyanide (CN)	2019/05/10	<0.50		mg/kg	
6127324	éBA	QC Standard	Total Sulphur (S)	2019/05/09		95	%	77 - 128
6127324	éBA	Method Blank	Total Sulphur (S)	2019/05/09	<0.010		% g/g	
6127324	éBA	RPD [JPE917-01]	Total Sulphur (S)	2019/05/09	0.50		%	30

N/A = Not Applicable

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

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

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

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

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

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

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

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

(1) VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

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Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

VALIDATION SIGNATURE PAGE

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

Original Signed

Anastassia Hamanov, Scientific Specialist

Original Signed

Caroline Bougie, B.Sc. Chemist

Original Signed

Eric Dearman, Scientific Specialist

Original Signed

Mike MacGillivray, Scientific Specialist (Inorganics)

Original Signed

Noureddine Chafiaai, B.Sc., Chemist

Original Signed

Rosemarie MacDonald, Scientific Specialist (Organics)

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Your Project #: B9B5460
Your C.O.C. #: b9b5460

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2019/05/17
Report #: R2724453
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B933641
Received: 2019/05/04, 10:56

Sample Matrix: Sediment
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cyanide (Total) (1, 2)	2	2019/05/15	2019/05/16	CAL SOP-00270	SM 23 4500-CN m
Elements by ICPMS (total)	3	2019/05/14	2019/05/14	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture	3	2019/05/13	2019/05/14	BBY8SOP-00017	BCMOE BCLM Dec2000 m
pH (2:1 DI Water Extract)	3	2019/05/14	2019/05/14	BBY6SOP-00028	BCMOE BCLM Mar2005 m
Sulphate in Soil (5:1 DI Water Extract)	3	2019/05/14	2019/05/15	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphide in Soil	3	2019/05/13	2019/05/15	BBY6SOP-00052,	EPA-821-R-91-100 m
Total Organic Carbon LECO Method (1)	2	N/A	2019/05/15	CAL SOP-00243	LECO 203-821-498 m
Total Organic Carbon LECO Method (1)	1	N/A	2019/05/17	CAL SOP-00243	LECO 203-821-498 m

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Conductance - water	5	N/A	2019/05/14	BBY6SOP-00026	SM 22 2510 B m
Hardness (calculated as CaCO3)	5	N/A	2019/05/14	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV	5	N/A	2019/05/14	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2019/05/14	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved)	5	N/A	2019/05/14	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO3 Preserve for Metals	5	N/A	2019/05/13	BBY7 WI-00004	SM 23 3030B m
pH Water (3)	5	N/A	2019/05/14	BBY6SOP-00026	SM 22 4500-H+ B m

Remarks:

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

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

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

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Your Project #: B9B5460
Your C.O.C. #: b9b5460

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2019/05/17
Report #: R2724453
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B933641
Received: 2019/05/04, 10:56

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Calgary Environmental
(2) Free cyanide will complex with soil iron, producing anomalously low recoveries. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(3) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Eva Sénéchal, Key Account Specialist
Email: esenechal@maxxam.ca
Phone# (604) 734 7276
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF CHEMICAL ANALYSES OF SEDIMENT

Maxxam ID		VQ0693		VQ0694	VQ0694	VQ0700		
Sampling Date		2019/04/25		2019/04/25	2019/04/25	2018/04/25		
COC Number		b9b5460		b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**RDL**	**2019SED12A(JPE929)**	**2019SED12A(JPE929) Lab-Dup**	**2019SS10(3.36-3.56m) (JPE940)**	**RDL**	**QC Batch**
Misc. Inorganics								
Soluble (5:1) Sulphate (SO4)	mg/kg	585	100	170	N/A	<100	100	9417535
Total Cyanide (CN)	mg/kg	0.36	0.20	<0.40	0.42	N/A	0.40	9418529
MISCELLANEOUS								
Sulphide	ug/g	0.45	0.30	32.7	N/A	<0.30	0.30	9415117

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

Maxxam ID		VQ0700		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics				
Soluble (5:1) Sulphate (SO4)	mg/kg	<100	100	9417535

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

PHYSICAL TESTING (SEDIMENT)

Maxxam ID		VQ0693		VQ0694	VQ0700		
Sampling Date		2019/04/25		2019/04/25	2018/04/25		
COC Number		b9b5460		b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**QC Batch**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	26	9415518	34	21	0.30	9415903
RDL = Reportable Detection Limit							

MISCELLANEOUS (SEDIMENT)

Maxxam ID		VQ0693	VQ0693	VQ0694		
Sampling Date		2019/04/25	2019/04/25	2019/04/25		
COC Number		b9b5460	b9b5460	b9b5460		
	UNITS	2019SED10A(JPE927)	2019SED10A(JPE927) Lab-Dup	2019SED12A(JPE929)	RDL	QC Batch
Misc. Inorganics						
Total Organic Carbon (C)	%	0.13	0.12	0.88	0.050	9418647

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

Maxxam ID		VQ0700	VQ0700		
Sampling Date		2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460		
	UNITS	2019SS10(3.36-3.56m) (JPE940)	2019SS10(3.36-3.56m) (JPE940) Lab-Dup	RDL	QC Batch
Misc. Inorganics					
Total Organic Carbon (C)	%	0.29	0.26	0.050	9422751

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

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RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VQ0695	VQ0696	VQ0697	VQ0698		
Sampling Date		2019/04/16	2019/04/16	2019/04/16	2019/04/29		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	2019PW1(JPE932)	2019PW2(JPE933)	2019PW3(JPE934)	2019PW4(JPE935)	RDL	QC Batch
Calculated Parameters							
Filter and HNO3 Preservation	N/A	LAB	LAB	LAB	LAB	N/A	9415419
Physical Properties							
Conductivity	uS/cm	472	650	614	483	2.0	9418322
pH	pH	7.56	7.51	6.78	6.87	N/A	9418321

RDL = Reportable Detection Limit
N/A = Not Applicable

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	2019PW5(JPE936)	RDL	QC Batch
Calculated Parameters				
Filter and HNO3 Preservation	N/A	LAB	N/A	9415419
Physical Properties				
Conductivity	uS/cm	262	2.0	9418322
pH	pH	6.65	N/A	9418321

RDL = Reportable Detection Limit
N/A = Not Applicable

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CSR/CCME METALS IN SOIL WITH HG (SEDIMENT)

Maxxam ID		VQ0693	VQ0694	VQ0700	VQ0700		
Sampling Date		2019/04/25	2019/04/25	2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Physical Properties							
Soluble (2:1) pH	pH	5.81	6.19	5.46	5.48	N/A	9416453
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	13500	13900	10600	10700	100	9416441
Total Antimony (Sb)	mg/kg	9.36	7.38	0.24	0.24	0.10	9416441
Total Arsenic (As)	mg/kg	6480	4830	16.4	17.0	0.50	9416441
Total Barium (Ba)	mg/kg	54.5	64.4	25.0	25.3	0.10	9416441
Total Beryllium (Be)	mg/kg	0.37	0.42	0.27	0.27	0.20	9416441
Total Bismuth (Bi)	mg/kg	0.89	0.85	0.14	0.14	0.10	9416441
Total Cadmium (Cd)	mg/kg	0.176	0.268	0.075	0.065	0.050	9416441
Total Calcium (Ca)	mg/kg	4810	3980	2120	2090	100	9416441
Total Chromium (Cr)	mg/kg	15.9	15.9	17.1	17.0	1.0	9416441
Total Cobalt (Co)	mg/kg	18.5	17.9	10.4	10.3	0.30	9416441
Total Copper (Cu)	mg/kg	50.5	52.1	18.0	17.8	0.50	9416441
Total Iron (Fe)	mg/kg	33600	32100	20500	20700	100	9416441
Total Lead (Pb)	mg/kg	57.3	54.0	9.66	10.1	0.10	9416441
Total Magnesium (Mg)	mg/kg	9780	9090	6240	6270	100	9416441
Total Manganese (Mn)	mg/kg	703	1210	390	392	0.20	9416441
Total Mercury (Hg)	mg/kg	4.55	5.35	<0.050	<0.050	0.050	9416441
Total Molybdenum (Mo)	mg/kg	0.23	0.28	0.45	0.44	0.10	9416441
Total Nickel (Ni)	mg/kg	38.5	35.6	24.4	23.9	0.80	9416441
Total Phosphorus (P)	mg/kg	731	694	665	655	10	9416441
Total Potassium (K)	mg/kg	4520	4370	700	715	100	9416441
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.50	9416441
Total Silver (Ag)	mg/kg	0.157	0.164	<0.050	<0.050	0.050	9416441
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	100	9416441
Total Strontium (Sr)	mg/kg	20.5	18.6	14.9	15.1	0.10	9416441
Total Sulphur (S)	mg/kg	N/A	2950	<500	<500	500	9416441
Total Thallium (Tl)	mg/kg	0.304	0.327	0.055	0.055	0.050	9416441
Total Tin (Sn)	mg/kg	0.28	0.36	0.23	0.26	0.10	9416441
Total Titanium (Ti)	mg/kg	610	582	498	511	1.0	9416441
Total Vanadium (V)	mg/kg	16.4	16.8	14.0	14.1	2.0	9416441
Total Zinc (Zn)	mg/kg	119	135	51.8	52.1	1.0	9416441

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

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CSR/CCME METALS IN SOIL WITH HG (SEDIMENT)

Maxxam ID		VQ0693	VQ0694	VQ0700	VQ0700		
Sampling Date		2019/04/25	2019/04/25	2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Total Zirconium (Zr)	mg/kg	29.3	22.8	6.06	6.29	0.50	9416441

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

Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0695		VQ0696	VQ0697		VQ0698		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/29		
COC Number		b9b5460		b9b5460	b9b5460		b9b5460		
	UNITS	**2019PW1(JPE932)**	**RDL**	**2019PW2(JPE933)**	**2019PW3(JPE934)**	**RDL**	**2019PW4(JPE935)**	**RDL**	**QC Batch**
Calculated Parameters									
Dissolved Hardness (CaCO3)	mg/L	82.3	0.50	129	105	0.50	75.6	0.50	9407523
Elements									
Dissolved Mercury (Hg)	ug/L	0.0099	0.0020	0.0120	0.0074	0.0020	0.0048	0.0020	9416652
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	94	15	34	45	30	53	15	9415624
Dissolved Antimony (Sb)	ug/L	<2.5	2.5	<5.0	<5.0	5.0	<2.5	2.5	9415624
Dissolved Arsenic (As)	ug/L	137	0.50	203	146	1.0	298	0.50	9415624
Dissolved Barium (Ba)	ug/L	135	5.0	307	292	10	202	5.0	9415624
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Bismuth (Bi)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Boron (B)	ug/L	<250	250	<500	<500	500	<250	250	9415624
Dissolved Cadmium (Cd)	ug/L	<0.050	0.050	<0.10	<0.10	0.10	<0.050	0.050	9415624
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Cobalt (Co)	ug/L	16.0	1.0	15.1	38.8	2.0	40.3	1.0	9415624
Dissolved Copper (Cu)	ug/L	<1.0	1.0	<2.0	<2.0	2.0	<1.0	1.0	9415624
Dissolved Iron (Fe)	ug/L	7720	25	7550	14500	50	20500	25	9415624
Dissolved Lead (Pb)	ug/L	<1.0	1.0	<2.0	<2.0	2.0	<1.0	1.0	9415624
Dissolved Lithium (Li)	ug/L	<10	10	<20	<20	20	<10	10	9415624
Dissolved Manganese (Mn)	ug/L	29500	5.0	51600	49500	10	30200	5.0	9415624
Dissolved Molybdenum (Mo)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Nickel (Ni)	ug/L	<5.0	5.0	<10	<10	10	7.8	5.0	9415624
Dissolved Selenium (Se)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Silicon (Si)	ug/L	2460	500	1910	2950	1000	4100	500	9415624
Dissolved Silver (Ag)	ug/L	<0.10	0.10	<0.20	<0.20	0.20	<0.10	0.10	9415624
Dissolved Strontium (Sr)	ug/L	110	5.0	153	134	10	92.2	5.0	9415624
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	<0.10	<0.10	0.10	<0.050	0.050	9415624
Dissolved Tin (Sn)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Titanium (Ti)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Uranium (U)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Vanadium (V)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Zinc (Zn)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Zirconium (Zr)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Calcium (Ca)	mg/L	26.9	0.25	41.4	34.2	0.50	24.7	0.25	9407531
Dissolved Magnesium (Mg)	mg/L	3.71	0.25	6.16	4.86	0.50	3.36	0.25	9407531

RDL = Reportable Detection Limit

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CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0695		VQ0696	VQ0697		VQ0698		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/29		
COC Number		b9b5460		b9b5460	b9b5460		b9b5460		
	UNITS	**2019PW1(JPE932)**	**RDL**	**2019PW2(JPE933)**	**2019PW3(JPE934)**	**RDL**	**2019PW4(JPE935)**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	1.83	0.25	2.51	1.97	0.50	1.67	0.25	9407531
Dissolved Sodium (Na)	mg/L	31.7	0.25	37.2	34.9	0.50	27.3	0.25	9407531
Dissolved Sulphur (S)	mg/L	31	15	69	75	30	44	15	9407531
RDL = Reportable Detection Limit									

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Calculated Parameters				
Dissolved Hardness (CaCO3)	mg/L	24.4	0.50	9407523
Elements				
Dissolved Mercury (Hg)	ug/L	0.98 (1)	0.10	9416652
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	1070	3.0	9415624
Dissolved Antimony (Sb)	ug/L	10.8	0.50	9415624
Dissolved Arsenic (As)	ug/L	129	0.10	9415624
Dissolved Barium (Ba)	ug/L	30.6	1.0	9415624
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	9415624
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	9415624
Dissolved Boron (B)	ug/L	<50	50	9415624
Dissolved Cadmium (Cd)	ug/L	0.041	0.010	9415624
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	9415624
Dissolved Cobalt (Co)	ug/L	3.79	0.20	9415624
Dissolved Copper (Cu)	ug/L	5.31	0.20	9415624
Dissolved Iron (Fe)	ug/L	757	5.0	9415624
Dissolved Lead (Pb)	ug/L	5.92	0.20	9415624
Dissolved Lithium (Li)	ug/L	<2.0	2.0	9415624
Dissolved Manganese (Mn)	ug/L	1960	1.0	9415624
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	9415624
Dissolved Nickel (Ni)	ug/L	3.1	1.0	9415624
Dissolved Selenium (Se)	ug/L	0.13	0.10	9415624
Dissolved Silicon (Si)	ug/L	7310	100	9415624
Dissolved Silver (Ag)	ug/L	0.056	0.020	9415624
Dissolved Strontium (Sr)	ug/L	31.7	1.0	9415624
Dissolved Thallium (Tl)	ug/L	0.060	0.010	9415624
Dissolved Tin (Sn)	ug/L	<5.0	5.0	9415624
Dissolved Titanium (Ti)	ug/L	18.2	5.0	9415624
Dissolved Uranium (U)	ug/L	0.14	0.10	9415624
Dissolved Vanadium (V)	ug/L	<5.0	5.0	9415624
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	9415624
Dissolved Zirconium (Zr)	ug/L	2.35	0.10	9415624
Dissolved Calcium (Ca)	mg/L	7.27	0.050	9407531

RDL = Reportable Detection Limit
(1) Detection limit raised due to interferent.

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CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	1.51	0.050	9407531
Dissolved Potassium (K)	mg/L	2.17	0.050	9407531
Dissolved Sodium (Na)	mg/L	33.5	0.050	9407531
Dissolved Sulphur (S)	mg/L	10.9	3.0	9407531
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

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

Package 1	5.0°C

Sample VQ0693 [2019SED10A(JPE927)] : Sample analyzed past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample was analyzed past method specified hold time for Total Sulphide.

Sample VQ0694 [2019SED12A(JPE929)] : Sample analyzed past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample was analyzed past method specified hold time for Total Sulphide.

Sample VQ0695 [2019PW1(JPE932)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0696 [2019PW2(JPE933)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0697 [2019PW3(JPE934)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0698 [2019PW4(JPE935)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0699 [2019PW5(JPE936)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling. Sample was analyzed past method specified hold time for Conductance - water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Conductance - water.

Sample VQ0700 [2019SS10(3.36-3.56m)(JPE940)] : Sample analyzed past method specified hold time for Moisture. Sample received past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample analyzed past method specified hold time for pH (2:1 DI Water Extract). Sample received past method specified hold time for pH (2:1 DI Water Extract). Sample analyzed past method specified hold time for Sulphate in Soil (5:1 DI Water Extract). Sample received past method specified hold time for Sulphate in Soil (5:1 DI Water Extract). Sample was analyzed past method specified hold time for Total Sulphide.

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER) Comments

Sample VQ0695 [2019PW1(JPE932)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0696 [2019PW2(JPE933)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0697 [2019PW3(JPE934)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0698 [2019PW4(JPE935)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Maxxam Job #: B933641
Report Date: 2019/05/17

QUALITY ASSURANCE REPORT

MAXXAM ANALYTICS
Client Project #: B9B5460

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9415117	Sulphide	2019/05/15	NC	75 - 125	84	75 - 125	<0.50	ug/g	NC	30		
9415518	Moisture	2019/05/14					<0.30	%	4.0	20		
9415624	Dissolved Aluminum (Al)	2019/05/14	93	80 - 120	103	80 - 120	<3.0	ug/L	NC	20		
9415624	Dissolved Antimony (Sb)	2019/05/14	97	80 - 120	102	80 - 120	<0.50	ug/L	NC	20		
9415624	Dissolved Arsenic (As)	2019/05/14	105	80 - 120	101	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Barium (Ba)	2019/05/14	100	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Beryllium (Be)	2019/05/14	83	80 - 120	92	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Bismuth (Bi)	2019/05/14	95	80 - 120	109	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Boron (B)	2019/05/14	95	80 - 120	103	80 - 120	<50	ug/L	NC	20		
9415624	Dissolved Cadmium (Cd)	2019/05/14	93	80 - 120	103	80 - 120	<0.010	ug/L	NC	20		
9415624	Dissolved Chromium (Cr)	2019/05/14	92	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Cobalt (Co)	2019/05/14	89	80 - 120	97	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Copper (Cu)	2019/05/14	83	80 - 120	96	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Iron (Fe)	2019/05/14	96	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Lead (Pb)	2019/05/14	99	80 - 120	108	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Lithium (Li)	2019/05/14	NC	80 - 120	93	80 - 120	<2.0	ug/L	NC	20		
9415624	Dissolved Manganese (Mn)	2019/05/14	98	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Molybdenum (Mo)	2019/05/14	NC	80 - 120	102	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Nickel (Ni)	2019/05/14	85	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Selenium (Se)	2019/05/14	100	80 - 120	99	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Silicon (Si)	2019/05/14	94	80 - 120	105	80 - 120	<100	ug/L	NC	20		
9415624	Dissolved Silver (Ag)	2019/05/14	88	80 - 120	104	80 - 120	<0.020	ug/L	NC	20		
9415624	Dissolved Strontium (Sr)	2019/05/14	NC	80 - 120	112	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Thallium (Tl)	2019/05/14	100	80 - 120	108	80 - 120	<0.010	ug/L	NC	20		
9415624	Dissolved Tin (Sn)	2019/05/14	98	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Titanium (Ti)	2019/05/14	101	80 - 120	103	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Uranium (U)	2019/05/14	117	80 - 120	116	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Vanadium (V)	2019/05/14	97	80 - 120	99	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Zinc (Zn)	2019/05/14	91	80 - 120	102	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Zirconium (Zr)	2019/05/14	105	80 - 120	106	80 - 120	<0.10	ug/L	NC	20		
9415903	Moisture	2019/05/14					<0.30	%	4.8	20		
9416441	Total Aluminum (Al)	2019/05/14					<100	mg/kg	0.72	40	94	70 - 130
9416441	Total Antimony (Sb)	2019/05/14	100	75 - 125	104	75 - 125	<0.10	mg/kg	2.2	30	116	70 - 130

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9416441	Total Arsenic (As)	2019/05/14	103	75 - 125	101	75 - 125	<0.50	mg/kg	3.3	30	95	70 - 130
9416441	Total Barium (Ba)	2019/05/14	103	75 - 125	106	75 - 125	<0.10	mg/kg	1.0	40	101	70 - 130
9416441	Total Beryllium (Be)	2019/05/14	102	75 - 125	101	75 - 125	<0.20	mg/kg	0.099	30	102	70 - 130
9416441	Total Bismuth (Bi)	2019/05/14					<0.10	mg/kg	0.10	30		
9416441	Total Cadmium (Cd)	2019/05/14	101	75 - 125	104	75 - 125	<0.050	mg/kg	14	30	107	70 - 130
9416441	Total Calcium (Ca)	2019/05/14					<100	mg/kg	1.4	30	97	70 - 130
9416441	Total Chromium (Cr)	2019/05/14	101	75 - 125	103	75 - 125	<1.0	mg/kg	0.16	30	101	70 - 130
9416441	Total Cobalt (Co)	2019/05/14	100	75 - 125	101	75 - 125	<0.30	mg/kg	1.2	30	98	70 - 130
9416441	Total Copper (Cu)	2019/05/14	100	75 - 125	102	75 - 125	<0.50	mg/kg	1.3	30	100	70 - 130
9416441	Total Iron (Fe)	2019/05/14					<100	mg/kg	0.88	30	104	70 - 130
9416441	Total Lead (Pb)	2019/05/14	99	75 - 125	101	75 - 125	<0.10	mg/kg	4.9	40	107	70 - 130
9416441	Total Magnesium (Mg)	2019/05/14					<100	mg/kg	0.43	30	100	70 - 130
9416441	Total Manganese (Mn)	2019/05/14	NC	75 - 125	102	75 - 125	<0.20	mg/kg	0.64	30	105	70 - 130
9416441	Total Mercury (Hg)	2019/05/14	97	75 - 125	108	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
9416441	Total Molybdenum (Mo)	2019/05/14	104	75 - 125	102	75 - 125	<0.10	mg/kg	3.3	40	104	70 - 130
9416441	Total Nickel (Ni)	2019/05/14	99	75 - 125	102	75 - 125	<0.80	mg/kg	1.9	30	106	70 - 130
9416441	Total Phosphorus (P)	2019/05/14					<10	mg/kg	1.5	30	99	70 - 130
9416441	Total Potassium (K)	2019/05/14					<100	mg/kg	2.1	40	89	70 - 130
9416441	Total Selenium (Se)	2019/05/14	103	75 - 125	104	75 - 125	<0.50	mg/kg	NC	30		
9416441	Total Silver (Ag)	2019/05/14	95	75 - 125	96	75 - 125	<0.050	mg/kg	NC	40	89	70 - 130
9416441	Total Sodium (Na)	2019/05/14					<100	mg/kg	NC	40	96	70 - 130
9416441	Total Strontium (Sr)	2019/05/14	107	75 - 125	100	75 - 125	<0.10	mg/kg	1.5	40	107	70 - 130
9416441	Total Sulphur (S)	2019/05/14					<500	mg/kg	NC	30		
9416441	Total Thallium (Tl)	2019/05/14	99	75 - 125	102	75 - 125	<0.050	mg/kg	0.091	30	94	70 - 130
9416441	Total Tin (Sn)	2019/05/14	102	75 - 125	100	75 - 125	<0.10	mg/kg	12	40	99	70 - 130
9416441	Total Titanium (Ti)	2019/05/14	NC	75 - 125	101	75 - 125	<1.0	mg/kg	2.6	40		
9416441	Total Vanadium (V)	2019/05/14	101	75 - 125	102	75 - 125	<2.0	mg/kg	0.81	30	104	70 - 130
9416441	Total Zinc (Zn)	2019/05/14	NC	75 - 125	101	75 - 125	<1.0	mg/kg	0.47	30	102	70 - 130
9416441	Total Zirconium (Zr)	2019/05/14					<0.50	mg/kg	3.7	40		
9416453	Soluble (2:1) pH	2019/05/14			99	97 - 103			0.37	20		
9416652	Dissolved Mercury (Hg)	2019/05/14	94	80 - 120	98	80 - 120	<0.0020	ug/L	NC	20		
9417535	Soluble (5:1) Sulphate (SO4)	2019/05/15	101	75 - 125	101	80 - 120	<100	mg/kg	NC	30		
9418321	pH	2019/05/14			101	97 - 103						

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9418322	Conductivity	2019/05/14			100	80 - 120	<2.0	uS/cm				
9418529	Total Cyanide (CN)	2019/05/16	104	N/A	110	N/A	<0.20	mg/kg	5.3	35		
9418647	Total Organic Carbon (C)	2019/05/15			100	80 - 120	<0.050	%	12	35	98	75 - 125
9422751	Total Organic Carbon (C)	2019/05/17			96	80 - 120	<0.050	%	10	35	100	75 - 125

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

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

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

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

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

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

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

Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

VALIDATION SIGNATURE PAGE

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

Original Signed

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Original Signed

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Original Signed

Harry (Peng) Liang, Senior Analyst

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Maxxam Analytics International Corporation o/a Maxxam Analytics Burnaby: 4606 Canada Way V5G 1K5 Telephone(604) 734-7276 Fax(604) 731-2386

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/22
Report #: R5720831
Version: 3 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Sediment
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (1)	2	2019/05/21	2019/05/21	ATL SOP 00111	Atl. RBCA v3.1 m
ModTPH (T1) Calc. for Soil	2	N/A	2019/05/22	N/A	Atl. RBCA v3.1 m

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Soils are reported on a dry weight basis unless otherwise specified.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/22
Report #: R5720831
Version: 3 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Senior Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
==
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Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ATLANTIC RBCA HYDROCARBONS (SEDIMENT)

Maxxam ID		JPE927			JPE927			JPE929		
Sampling Date		2019/04/25			2019/04/25			2019/04/25		
COC Number		D 29793			D 29793			D 29793		
	UNITS	**2019SED10A**	**RDL**	**QC Batch**	**2019SED10A Lab-Dup**	**RDL**	**QC Batch**	**2019SED12A**	**RDL**	**QC Batch**
Petroleum Hydrocarbons										
>C10-C16 Hydrocarbons	mg/kg	<10	10	6130723	<10	10	6130723	<10	10	6130723
>C16-C21 Hydrocarbons	mg/kg	15	10	6130723	17	10	6130723	20	10	6130723
>C21-<C32 Hydrocarbons	mg/kg	100	15	6130723	100	15	6130723	95	15	6130723
Modified TPH (Tier1)	mg/kg	120	15	6128357				110	15	6128357
Reached Baseline at C32	mg/kg	Yes	N/A	6130723				Yes	N/A	6130723
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	6130723				COMMENT (2)	N/A	6130723
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	100		6130723	103		6130723	103		6130723
n-Dotriacontane - Extractable	%	115 (3)		6130723	117 (3)		6130723	108 (3)		6130723

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Lube oil fraction.
(2) Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.
(3) Silica gel clean-up performed prior to analysis as per client request.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

GENERAL COMMENTS

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

Package 1	3.7°C
Package 2	0.7°C

Total Water Analysis - Sample decanted from a non-preserved aliquot – metals results may be biased low.

Total Cyanide: Due to a high percent humidity, the detection limits for samples JPE917 & JPE923 were adjusted.

Results relate only to the items tested.

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6130723	BCD	Matrix Spike [JPE927-01]	Isobutylbenzene - Extractable	2019/05/21		107	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/21		116 (1)	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/21		90	%	30 - 130
			>C16-C21 Hydrocarbons	2019/05/21		83	%	30 - 130
			>C21-<C32 Hydrocarbons	2019/05/21		97	%	30 - 130
6130723	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/21		102	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/21		109	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/21		94	%	60 - 130
			>C16-C21 Hydrocarbons	2019/05/21		92	%	60 - 130
			>C21-<C32 Hydrocarbons	2019/05/21		109	%	60 - 130
6130723	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/21		99	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/21		109	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/21	<10		mg/kg	
			>C16-C21 Hydrocarbons	2019/05/21	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2019/05/21	<15		mg/kg	
6130723	BCD	RPD [JPE927-01]	>C10-C16 Hydrocarbons	2019/05/21	NC		%	50
			>C16-C21 Hydrocarbons	2019/05/21	9.6		%	50
			>C21-<C32 Hydrocarbons	2019/05/21	2.9		%	50

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

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

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

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

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

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

(1) Silica gel clean-up performed prior to analysis as per client request.

Maxxam Job #: B9B5460
Report Date: 2019/05/22

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

VALIDATION SIGNATURE PAGE

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

Original Signed

Rosemarie MacDonald, Scientific Specialist (Organics)

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Your Project #: B9B5460
Your C.O.C. #: b9b5460

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2019/05/17
Report #: R2724453
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B933641
Received: 2019/05/04, 10:56

Sample Matrix: Sediment
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cyanide (Total) (1, 2)	2	2019/05/15	2019/05/16	CAL SOP-00270	SM 23 4500-CN m
Elements by ICPMS (total)	3	2019/05/14	2019/05/14	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture	3	2019/05/13	2019/05/14	BBY8SOP-00017	BCMOE BCLM Dec2000 m
pH (2:1 DI Water Extract)	3	2019/05/14	2019/05/14	BBY6SOP-00028	BCMOE BCLM Mar2005 m
Sulphate in Soil (5:1 DI Water Extract)	3	2019/05/14	2019/05/15	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphide in Soil	3	2019/05/13	2019/05/15	BBY6SOP-00052,	EPA-821-R-91-100 m
Total Organic Carbon LECO Method (1)	2	N/A	2019/05/15	CAL SOP-00243	LECO 203-821-498 m
Total Organic Carbon LECO Method (1)	1	N/A	2019/05/17	CAL SOP-00243	LECO 203-821-498 m

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Conductance - water	5	N/A	2019/05/14	BBY6SOP-00026	SM 22 2510 B m
Hardness (calculated as CaCO3)	5	N/A	2019/05/14	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV	5	N/A	2019/05/14	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2019/05/14	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved)	5	N/A	2019/05/14	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO3 Preserve for Metals	5	N/A	2019/05/13	BBY7 WI-00004	SM 23 3030B m
pH Water (3)	5	N/A	2019/05/14	BBY6SOP-00026	SM 22 4500-H+ B m

Remarks:

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

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

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Your Project #: B9B5460
Your C.O.C. #: b9b5460

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2019/05/17
Report #: R2724453
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B933641
Received: 2019/05/04, 10:56

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Calgary Environmental
(2) Free cyanide will complex with soil iron, producing anomalously low recoveries. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(3) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Eva Sénéchal, Key Account Specialist
Email: esenechal@maxxam.ca
Phone# (604) 734 7276
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam
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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

RESULTS OF CHEMICAL ANALYSES OF SEDIMENT

Maxxam ID		VQ0693		VQ0694	VQ0694	VQ0700		
Sampling Date		2019/04/25		2019/04/25	2019/04/25	2018/04/25		
COC Number		b9b5460		b9b5460	b9b5460	b9b5460		
	UNITS	2019SED10A(JPE927)	RDL	2019SED12A(JPE929)	2019SED12A(JPE929) Lab-Dup	2019SS10(3.36-3.56m) (JPE940)	RDL	QC Batch
Misc. Inorganics								
Soluble (5:1) Sulphate (SO4)	mg/kg	585	100	170	N/A	<100	100	9417535
Total Cyanide (CN)	mg/kg	0.36	0.20	<0.40	0.42	N/A	0.40	9418529
MISCELLANEOUS								
Sulphide	ug/g	0.45	0.30	32.7	N/A	<0.30	0.30	9415117

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

Maxxam ID		VQ0700		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	2019SS10(3.36-3.56m) (JPE940) Lab-Dup	RDL	QC Batch
Misc. Inorganics				
Soluble (5:1) Sulphate (SO4)	mg/kg	<100	100	9417535

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

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

PHYSICAL TESTING (SEDIMENT)

Maxxam ID		VQ0693		VQ0694	VQ0700		
Sampling Date		2019/04/25		2019/04/25	2018/04/25		
COC Number		b9b5460		b9b5460	b9b5460		
	UNITS	2019SED10A(JPE927)	QC Batch	2019SED12A(JPE929)	2019SS10(3.36-3.56m) (JPE940)	RDL	QC Batch
Physical Properties							
Moisture	%	26	9415518	34	21	0.30	9415903
RDL = Reportable Detection Limit							

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MISCELLANEOUS (SEDIMENT)

Maxxam ID		VQ0693	VQ0693	VQ0694		
Sampling Date		2019/04/25	2019/04/25	2019/04/25		
COC Number		b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED10A(JPE927) Lab-Dup**	**2019SED12A(JPE929)**	**RDL**	**QC Batch**
Misc. Inorganics						
Total Organic Carbon (C)	%	0.13	0.12	0.88	0.050	9418647

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

Maxxam ID		VQ0700	VQ0700		
Sampling Date		2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460		
	UNITS	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics					
Total Organic Carbon (C)	%	0.29	0.26	0.050	9422751

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

Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VQ0695	VQ0696	VQ0697	VQ0698		
Sampling Date		2019/04/16	2019/04/16	2019/04/16	2019/04/29		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019PW1(JPE932)**	**2019PW2(JPE933)**	**2019PW3(JPE934)**	**2019PW4(JPE935)**	**RDL**	**QC Batch**
Calculated Parameters							
Filter and HNO3 Preservation	N/A	LAB	LAB	LAB	LAB	N/A	9415419
Physical Properties							
Conductivity	uS/cm	472	650	614	483	2.0	9418322
pH	pH	7.56	7.51	6.78	6.87	N/A	9418321

RDL = Reportable Detection Limit
N/A = Not Applicable

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Calculated Parameters				
Filter and HNO3 Preservation	N/A	LAB	N/A	9415419
Physical Properties				
Conductivity	uS/cm	262	2.0	9418322
pH	pH	6.65	N/A	9418321

RDL = Reportable Detection Limit
N/A = Not Applicable

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR/CCME METALS IN SOIL WITH HG (SEDIMENT)

Maxxam ID		VQ0693	VQ0694	VQ0700	VQ0700		
Sampling Date		2019/04/25	2019/04/25	2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Physical Properties							
Soluble (2:1) pH	pH	5.81	6.19	5.46	5.48	N/A	9416453
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	13500	13900	10600	10700	100	9416441
Total Antimony (Sb)	mg/kg	9.36	7.38	0.24	0.24	0.10	9416441
Total Arsenic (As)	mg/kg	6480	4830	16.4	17.0	0.50	9416441
Total Barium (Ba)	mg/kg	54.5	64.4	25.0	25.3	0.10	9416441
Total Beryllium (Be)	mg/kg	0.37	0.42	0.27	0.27	0.20	9416441
Total Bismuth (Bi)	mg/kg	0.89	0.85	0.14	0.14	0.10	9416441
Total Cadmium (Cd)	mg/kg	0.176	0.268	0.075	0.065	0.050	9416441
Total Calcium (Ca)	mg/kg	4810	3980	2120	2090	100	9416441
Total Chromium (Cr)	mg/kg	15.9	15.9	17.1	17.0	1.0	9416441
Total Cobalt (Co)	mg/kg	18.5	17.9	10.4	10.3	0.30	9416441
Total Copper (Cu)	mg/kg	50.5	52.1	18.0	17.8	0.50	9416441
Total Iron (Fe)	mg/kg	33600	32100	20500	20700	100	9416441
Total Lead (Pb)	mg/kg	57.3	54.0	9.66	10.1	0.10	9416441
Total Magnesium (Mg)	mg/kg	9780	9090	6240	6270	100	9416441
Total Manganese (Mn)	mg/kg	703	1210	390	392	0.20	9416441
Total Mercury (Hg)	mg/kg	4.55	5.35	<0.050	<0.050	0.050	9416441
Total Molybdenum (Mo)	mg/kg	0.23	0.28	0.45	0.44	0.10	9416441
Total Nickel (Ni)	mg/kg	38.5	35.6	24.4	23.9	0.80	9416441
Total Phosphorus (P)	mg/kg	731	694	665	655	10	9416441
Total Potassium (K)	mg/kg	4520	4370	700	715	100	9416441
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.50	9416441
Total Silver (Ag)	mg/kg	0.157	0.164	<0.050	<0.050	0.050	9416441
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	100	9416441
Total Strontium (Sr)	mg/kg	20.5	18.6	14.9	15.1	0.10	9416441
Total Sulphur (S)	mg/kg	N/A	2950	<500	<500	500	9416441
Total Thallium (Tl)	mg/kg	0.304	0.327	0.055	0.055	0.050	9416441
Total Tin (Sn)	mg/kg	0.28	0.36	0.23	0.26	0.10	9416441
Total Titanium (Ti)	mg/kg	610	582	498	511	1.0	9416441
Total Vanadium (V)	mg/kg	16.4	16.8	14.0	14.1	2.0	9416441
Total Zinc (Zn)	mg/kg	119	135	51.8	52.1	1.0	9416441

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

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CSR/CCME METALS IN SOIL WITH HG (SEDIMENT)

Maxxam ID		VQ0693	VQ0694	VQ0700	VQ0700		
Sampling Date		2019/04/25	2019/04/25	2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Total Zirconium (Zr)	mg/kg	29.3	22.8	6.06	6.29	0.50	9416441

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

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0695		VQ0696	VQ0697		VQ0698		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/29		
COC Number		b9b5460		b9b5460	b9b5460		b9b5460		
	UNITS	**2019PW1(JPE932)**	**RDL**	**2019PW2(JPE933)**	**2019PW3(JPE934)**	**RDL**	**2019PW4(JPE935)**	**RDL**	**QC Batch**
Calculated Parameters									
Dissolved Hardness (CaCO3)	mg/L	82.3	0.50	129	105	0.50	75.6	0.50	9407523
Elements									
Dissolved Mercury (Hg)	ug/L	0.0099	0.0020	0.0120	0.0074	0.0020	0.0048	0.0020	9416652
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	94	15	34	45	30	53	15	9415624
Dissolved Antimony (Sb)	ug/L	<2.5	2.5	<5.0	<5.0	5.0	<2.5	2.5	9415624
Dissolved Arsenic (As)	ug/L	137	0.50	203	146	1.0	298	0.50	9415624
Dissolved Barium (Ba)	ug/L	135	5.0	307	292	10	202	5.0	9415624
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Bismuth (Bi)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Boron (B)	ug/L	<250	250	<500	<500	500	<250	250	9415624
Dissolved Cadmium (Cd)	ug/L	<0.050	0.050	<0.10	<0.10	0.10	<0.050	0.050	9415624
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Cobalt (Co)	ug/L	16.0	1.0	15.1	38.8	2.0	40.3	1.0	9415624
Dissolved Copper (Cu)	ug/L	<1.0	1.0	<2.0	<2.0	2.0	<1.0	1.0	9415624
Dissolved Iron (Fe)	ug/L	7720	25	7550	14500	50	20500	25	9415624
Dissolved Lead (Pb)	ug/L	<1.0	1.0	<2.0	<2.0	2.0	<1.0	1.0	9415624
Dissolved Lithium (Li)	ug/L	<10	10	<20	<20	20	<10	10	9415624
Dissolved Manganese (Mn)	ug/L	29500	5.0	51600	49500	10	30200	5.0	9415624
Dissolved Molybdenum (Mo)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Nickel (Ni)	ug/L	<5.0	5.0	<10	<10	10	7.8	5.0	9415624
Dissolved Selenium (Se)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Silicon (Si)	ug/L	2460	500	1910	2950	1000	4100	500	9415624
Dissolved Silver (Ag)	ug/L	<0.10	0.10	<0.20	<0.20	0.20	<0.10	0.10	9415624
Dissolved Strontium (Sr)	ug/L	110	5.0	153	134	10	92.2	5.0	9415624
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	<0.10	<0.10	0.10	<0.050	0.050	9415624
Dissolved Tin (Sn)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Titanium (Ti)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Uranium (U)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Vanadium (V)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Zinc (Zn)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Zirconium (Zr)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Calcium (Ca)	mg/L	26.9	0.25	41.4	34.2	0.50	24.7	0.25	9407531
Dissolved Magnesium (Mg)	mg/L	3.71	0.25	6.16	4.86	0.50	3.36	0.25	9407531

RDL = Reportable Detection Limit

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0695		VQ0696	VQ0697		VQ0698		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/29		
COC Number		b9b5460		b9b5460	b9b5460		b9b5460		
	UNITS	2019PW1(JPE932)	RDL	2019PW2(JPE933)	2019PW3(JPE934)	RDL	2019PW4(JPE935)	RDL	QC Batch
Dissolved Potassium (K)	mg/L	1.83	0.25	2.51	1.97	0.50	1.67	0.25	9407531
Dissolved Sodium (Na)	mg/L	31.7	0.25	37.2	34.9	0.50	27.3	0.25	9407531
Dissolved Sulphur (S)	mg/L	31	15	69	75	30	44	15	9407531
RDL = Reportable Detection Limit									

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Calculated Parameters				
Dissolved Hardness (CaCO3)	mg/L	24.4	0.50	9407523
Elements				
Dissolved Mercury (Hg)	ug/L	0.98 (1)	0.10	9416652
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	1070	3.0	9415624
Dissolved Antimony (Sb)	ug/L	10.8	0.50	9415624
Dissolved Arsenic (As)	ug/L	129	0.10	9415624
Dissolved Barium (Ba)	ug/L	30.6	1.0	9415624
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	9415624
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	9415624
Dissolved Boron (B)	ug/L	<50	50	9415624
Dissolved Cadmium (Cd)	ug/L	0.041	0.010	9415624
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	9415624
Dissolved Cobalt (Co)	ug/L	3.79	0.20	9415624
Dissolved Copper (Cu)	ug/L	5.31	0.20	9415624
Dissolved Iron (Fe)	ug/L	757	5.0	9415624
Dissolved Lead (Pb)	ug/L	5.92	0.20	9415624
Dissolved Lithium (Li)	ug/L	<2.0	2.0	9415624
Dissolved Manganese (Mn)	ug/L	1960	1.0	9415624
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	9415624
Dissolved Nickel (Ni)	ug/L	3.1	1.0	9415624
Dissolved Selenium (Se)	ug/L	0.13	0.10	9415624
Dissolved Silicon (Si)	ug/L	7310	100	9415624
Dissolved Silver (Ag)	ug/L	0.056	0.020	9415624
Dissolved Strontium (Sr)	ug/L	31.7	1.0	9415624
Dissolved Thallium (Tl)	ug/L	0.060	0.010	9415624
Dissolved Tin (Sn)	ug/L	<5.0	5.0	9415624
Dissolved Titanium (Ti)	ug/L	18.2	5.0	9415624
Dissolved Uranium (U)	ug/L	0.14	0.10	9415624
Dissolved Vanadium (V)	ug/L	<5.0	5.0	9415624
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	9415624
Dissolved Zirconium (Zr)	ug/L	2.35	0.10	9415624
Dissolved Calcium (Ca)	mg/L	7.27	0.050	9407531

RDL = Reportable Detection Limit
(1) Detection limit raised due to interferent.

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CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	1.51	0.050	9407531
Dissolved Potassium (K)	mg/L	2.17	0.050	9407531
Dissolved Sodium (Na)	mg/L	33.5	0.050	9407531
Dissolved Sulphur (S)	mg/L	10.9	3.0	9407531
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

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

Package 1	5.0°C

Sample VQ0693 [2019SED10A(JPE927)] : Sample analyzed past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample was analyzed past method specified hold time for Total Sulphide.

Sample VQ0694 [2019SED12A(JPE929)] : Sample analyzed past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample was analyzed past method specified hold time for Total Sulphide.

Sample VQ0695 [2019PW1(JPE932)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0696 [2019PW2(JPE933)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0697 [2019PW3(JPE934)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0698 [2019PW4(JPE935)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0699 [2019PW5(JPE936)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling. Sample was analyzed past method specified hold time for Conductance - water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Conductance - water.

Sample VQ0700 [2019SS10(3.36-3.56m)(JPE940)] : Sample analyzed past method specified hold time for Moisture. Sample received past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample analyzed past method specified hold time for pH (2:1 DI Water Extract). Sample received past method specified hold time for pH (2:1 DI Water Extract). Sample analyzed past method specified hold time for Sulphate in Soil (5:1 DI Water Extract). Sample received past method specified hold time for Sulphate in Soil (5:1 DI Water Extract). Sample was analyzed past method specified hold time for Total Sulphide.

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER) Comments

Sample VQ0695 [2019PW1(JPE932)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0696 [2019PW2(JPE933)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0697 [2019PW3(JPE934)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0698 [2019PW4(JPE935)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.

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Maxxam Job #: B933641
Report Date: 2019/05/17

QUALITY ASSURANCE REPORT

MAXXAM ANALYTICS
Client Project #: B9B5460

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9415117	Sulphide	2019/05/15	NC	75 - 125	84	75 - 125	<0.50	ug/g	NC	30		
9415518	Moisture	2019/05/14					<0.30	%	4.0	20		
9415624	Dissolved Aluminum (Al)	2019/05/14	93	80 - 120	103	80 - 120	<3.0	ug/L	NC	20		
9415624	Dissolved Antimony (Sb)	2019/05/14	97	80 - 120	102	80 - 120	<0.50	ug/L	NC	20		
9415624	Dissolved Arsenic (As)	2019/05/14	105	80 - 120	101	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Barium (Ba)	2019/05/14	100	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Beryllium (Be)	2019/05/14	83	80 - 120	92	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Bismuth (Bi)	2019/05/14	95	80 - 120	109	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Boron (B)	2019/05/14	95	80 - 120	103	80 - 120	<50	ug/L	NC	20		
9415624	Dissolved Cadmium (Cd)	2019/05/14	93	80 - 120	103	80 - 120	<0.010	ug/L	NC	20		
9415624	Dissolved Chromium (Cr)	2019/05/14	92	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Cobalt (Co)	2019/05/14	89	80 - 120	97	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Copper (Cu)	2019/05/14	83	80 - 120	96	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Iron (Fe)	2019/05/14	96	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Lead (Pb)	2019/05/14	99	80 - 120	108	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Lithium (Li)	2019/05/14	NC	80 - 120	93	80 - 120	<2.0	ug/L	NC	20		
9415624	Dissolved Manganese (Mn)	2019/05/14	98	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Molybdenum (Mo)	2019/05/14	NC	80 - 120	102	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Nickel (Ni)	2019/05/14	85	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Selenium (Se)	2019/05/14	100	80 - 120	99	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Silicon (Si)	2019/05/14	94	80 - 120	105	80 - 120	<100	ug/L	NC	20		
9415624	Dissolved Silver (Ag)	2019/05/14	88	80 - 120	104	80 - 120	<0.020	ug/L	NC	20		
9415624	Dissolved Strontium (Sr)	2019/05/14	NC	80 - 120	112	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Thallium (Tl)	2019/05/14	100	80 - 120	108	80 - 120	<0.010	ug/L	NC	20		
9415624	Dissolved Tin (Sn)	2019/05/14	98	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Titanium (Ti)	2019/05/14	101	80 - 120	103	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Uranium (U)	2019/05/14	117	80 - 120	116	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Vanadium (V)	2019/05/14	97	80 - 120	99	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Zinc (Zn)	2019/05/14	91	80 - 120	102	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Zirconium (Zr)	2019/05/14	105	80 - 120	106	80 - 120	<0.10	ug/L	NC	20		
9415903	Moisture	2019/05/14					<0.30	%	4.8	20		
9416441	Total Aluminum (Al)	2019/05/14					<100	mg/kg	0.72	40	94	70 - 130
9416441	Total Antimony (Sb)	2019/05/14	100	75 - 125	104	75 - 125	<0.10	mg/kg	2.2	30	116	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9416441	Total Arsenic (As)	2019/05/14	103	75 - 125	101	75 - 125	<0.50	mg/kg	3.3	30	95	70 - 130
9416441	Total Barium (Ba)	2019/05/14	103	75 - 125	106	75 - 125	<0.10	mg/kg	1.0	40	101	70 - 130
9416441	Total Beryllium (Be)	2019/05/14	102	75 - 125	101	75 - 125	<0.20	mg/kg	0.099	30	102	70 - 130
9416441	Total Bismuth (Bi)	2019/05/14					<0.10	mg/kg	0.10	30		
9416441	Total Cadmium (Cd)	2019/05/14	101	75 - 125	104	75 - 125	<0.050	mg/kg	14	30	107	70 - 130
9416441	Total Calcium (Ca)	2019/05/14					<100	mg/kg	1.4	30	97	70 - 130
9416441	Total Chromium (Cr)	2019/05/14	101	75 - 125	103	75 - 125	<1.0	mg/kg	0.16	30	101	70 - 130
9416441	Total Cobalt (Co)	2019/05/14	100	75 - 125	101	75 - 125	<0.30	mg/kg	1.2	30	98	70 - 130
9416441	Total Copper (Cu)	2019/05/14	100	75 - 125	102	75 - 125	<0.50	mg/kg	1.3	30	100	70 - 130
9416441	Total Iron (Fe)	2019/05/14					<100	mg/kg	0.88	30	104	70 - 130
9416441	Total Lead (Pb)	2019/05/14	99	75 - 125	101	75 - 125	<0.10	mg/kg	4.9	40	107	70 - 130
9416441	Total Magnesium (Mg)	2019/05/14					<100	mg/kg	0.43	30	100	70 - 130
9416441	Total Manganese (Mn)	2019/05/14	NC	75 - 125	102	75 - 125	<0.20	mg/kg	0.64	30	105	70 - 130
9416441	Total Mercury (Hg)	2019/05/14	97	75 - 125	108	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
9416441	Total Molybdenum (Mo)	2019/05/14	104	75 - 125	102	75 - 125	<0.10	mg/kg	3.3	40	104	70 - 130
9416441	Total Nickel (Ni)	2019/05/14	99	75 - 125	102	75 - 125	<0.80	mg/kg	1.9	30	106	70 - 130
9416441	Total Phosphorus (P)	2019/05/14					<10	mg/kg	1.5	30	99	70 - 130
9416441	Total Potassium (K)	2019/05/14					<100	mg/kg	2.1	40	89	70 - 130
9416441	Total Selenium (Se)	2019/05/14	103	75 - 125	104	75 - 125	<0.50	mg/kg	NC	30		
9416441	Total Silver (Ag)	2019/05/14	95	75 - 125	96	75 - 125	<0.050	mg/kg	NC	40	89	70 - 130
9416441	Total Sodium (Na)	2019/05/14					<100	mg/kg	NC	40	96	70 - 130
9416441	Total Strontium (Sr)	2019/05/14	107	75 - 125	100	75 - 125	<0.10	mg/kg	1.5	40	107	70 - 130
9416441	Total Sulphur (S)	2019/05/14					<500	mg/kg	NC	30		
9416441	Total Thallium (Tl)	2019/05/14	99	75 - 125	102	75 - 125	<0.050	mg/kg	0.091	30	94	70 - 130
9416441	Total Tin (Sn)	2019/05/14	102	75 - 125	100	75 - 125	<0.10	mg/kg	12	40	99	70 - 130
9416441	Total Titanium (Ti)	2019/05/14	NC	75 - 125	101	75 - 125	<1.0	mg/kg	2.6	40		
9416441	Total Vanadium (V)	2019/05/14	101	75 - 125	102	75 - 125	<2.0	mg/kg	0.81	30	104	70 - 130
9416441	Total Zinc (Zn)	2019/05/14	NC	75 - 125	101	75 - 125	<1.0	mg/kg	0.47	30	102	70 - 130
9416441	Total Zirconium (Zr)	2019/05/14					<0.50	mg/kg	3.7	40		
9416453	Soluble (2:1) pH	2019/05/14			99	97 - 103			0.37	20		
9416652	Dissolved Mercury (Hg)	2019/05/14	94	80 - 120	98	80 - 120	<0.0020	ug/L	NC	20		
9417535	Soluble (5:1) Sulphate (SO4)	2019/05/15	101	75 - 125	101	80 - 120	<100	mg/kg	NC	30		
9418321	pH	2019/05/14			101	97 - 103						

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9418322	Conductivity	2019/05/14			100	80 - 120	<2.0	uS/cm				
9418529	Total Cyanide (CN)	2019/05/16	104	N/A	110	N/A	<0.20	mg/kg	5.3	35		
9418647	Total Organic Carbon (C)	2019/05/15			100	80 - 120	<0.050	%	12	35	98	75 - 125
9422751	Total Organic Carbon (C)	2019/05/17			96	80 - 120	<0.050	%	10	35	100	75 - 125

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

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

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

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

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

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

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

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VALIDATION SIGNATURE PAGE

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

Original Signed

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Original Signed

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Original Signed

Harry (Peng) Liang, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/23
Report #: R5722441
Version: 4 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Soil
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Metals Solids Acid Extr. ICPMS	2	2019/05/03	2019/05/04	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	4	2019/05/07	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	2	2019/05/07	2019/05/08	ATL SOP 00058	EPA 6020B R2 m
Sulfur (1)	2	N/A	2019/05/09	STL SOP-00028	MA. 310-CS 1.0 R3 m
Sulphate in Soil by Auto Colourimetry	2	2019/05/07	2019/05/08	ATL SOP 00023	ASTM D516-16 m
Sulphide in Soil (2)	1	2019/05/06	2019/05/14		
Sublet (Inorganics) (2, 5)	1	N/A	2019/05/14		
Total Organic Carbon in Soil	2	2019/05/07	2019/05/09	ATL SOP 00044	LECO203601224 1991 m

Sample Matrix: Sediment
Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
TEH in Soil (PIRI) (3)	2	2019/05/21	2019/05/21	ATL SOP 00111	Atl. RBCA v3.1 m
Metals Solids Acid Extr. ICPMS	3	2019/05/03	2019/05/06	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2019/05/07	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	9	2019/05/07	2019/05/08	ATL SOP 00058	EPA 6020B R2 m
Metals Solids Acid Extr. ICPMS	1	2019/05/07	2019/05/09	ATL SOP 00058	EPA 6020B R2 m
Total Cyanide (1)	3	2019/05/08	2019/05/10	STL SOP-00035	MA300-CN 1.2 R4 m
Water Content (Subcontracted) (1, 4)	3	N/A	2019/05/15	STL SOP-00021	MA.100-S.T. 1.1 R4 m
Sulfur (1)	3	N/A	2019/05/09	STL SOP-00028	MA. 310-CS 1.0 R3 m
Moisture	1	N/A	2019/05/03	ATL SOP 00001	OMOE Handbook 1983 m
Moisture	1	N/A	2019/05/06	ATL SOP 00001	OMOE Handbook 1983 m
Sulphate in Soil by Auto Colourimetry	3	2019/05/07	2019/05/08	ATL SOP 00023	ASTM D516-16 m
Sulphide in Soil (2)	2	2019/05/06	2019/05/14		
Sublet (Inorganics) (2, 5)	6	N/A	2019/05/14		
Total Organic Carbon in Soil	3	2019/05/07	2019/05/09	ATL SOP 00044	LECO203601224 1991 m
ModTPH (T1) Calc. for Soil	2	N/A	2019/05/22	N/A	Atl. RBCA v3.1 m
VPH in Soil (PIRI) - Field Preserved (6)	1	N/A	2019/05/03	ATL SOP 00119	Atl. RBCA v3.1 m

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CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/23
Report #: R5722441
Version: 4 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Sediment
Samples Received: 20

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
VPH in Soil (PIRI) - Field Preserved (6)	1	N/A	2019/05/06	ATL SOP 00119	Atl. RBCA v3.1 m

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Carbonate, Bicarbonate and Hydroxide	9	N/A	2019/05/05	N/A	SM 23 4500-CO2 D
Alkalinity	9	N/A	2019/05/06	ATL SOP 00013	EPA 310.2 R1974 m
Chloride	9	N/A	2019/05/06	ATL SOP 00014	SM 23 4500-Cl- E m
Colour	9	N/A	2019/05/06	ATL SOP 00020	SM 23 2120C m
Total Cyanide (7)	2	2019/05/06	2019/05/07	CAM SOP-00457	OMOE E3015 5 m
Conductance - water	9	N/A	2019/05/04	ATL SOP 00004	SM 23 2510B m
TEH in Water (PIRI)	2	2019/05/03	2019/05/03	ATL SOP 00113	Atl. RBCA v3.1 m
Hardness (calculated as CaCO3)	9	N/A	2019/05/06	ATL SOP 00048	Auto Calc
Mercury - Dissolved (CVAA,LL)	9	2019/05/06	2019/05/06	ATL SOP 00026	EPA 245.1 R3 m
Mercury - Total (CVAA,LL)	5	2019/05/23	2019/05/23	ATL SOP 00026	EPA 245.1 R3 m
Metals Water Diss. MS (as rec'd)	9	N/A	2019/05/03	ATL SOP 00058	EPA 6020B R2 m
Metals Water Total MS	9	2019/05/06	2019/05/07	ATL SOP 00058	EPA 6020B R2 m
Ion Balance (% Difference)	9	N/A	2019/05/08	N/A	Auto Calc.
Anion and Cation Sum	9	N/A	2019/05/08	N/A	Auto Calc.
Nitrogen Ammonia - water	9	N/A	2019/05/07	ATL SOP 00015	EPA 350.1 R2 m
Nitrogen - Nitrate + Nitrite	9	N/A	2019/05/06	ATL SOP 00016	USGS I-2547-11m
Nitrogen - Nitrite	9	N/A	2019/05/06	ATL SOP 00017	SM 23 4500-NO2- B m
Nitrogen - Nitrate (as N)	9	N/A	2019/05/06	ATL SOP 00018	ASTM D3867-16
pH (8)	9	N/A	2019/05/04	ATL SOP 00003	SM 23 4500-H+ B m
Phosphorus - ortho	9	N/A	2019/05/07	ATL SOP 00021	SM 23 4500-P E m
VPH in Water (PIRI)	2	N/A	2019/05/03	ATL SOP 00118	Atl. RBCA v3.1 m
Sat. pH and Langelier Index (@ 20C)	9	N/A	2019/05/08	ATL SOP 00049	Auto Calc.
Sat. pH and Langelier Index (@ 4C)	9	N/A	2019/05/08	ATL SOP 00049	Auto Calc.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/23
Report #: R5722441
Version: 4 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9B5460
Received: 2019/04/30, 17:05

Sample Matrix: Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Reference
Reactive Silica	9	N/A	2019/05/06	ATL SOP 00022	EPA 366.0 m
Sulphate	9	N/A	2019/05/06	ATL SOP 00023	ASTM D516-16 m
Total Dissolved Solids (TDS calc)	9	N/A	2019/05/08	N/A	Auto Calc.
Organic carbon - Total (TOC) (9)	9	N/A	2019/05/03	ATL SOP 00203	SM 23 5310B m
ModTPH (T1) Calc. for Water	2	N/A	2019/05/06	N/A	Atl. RBCA v3 m
Turbidity	9	N/A	2019/05/07	ATL SOP 00011	EPA 180.1 R2 m

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bedford To Montreal Offsite
(2) This test was performed by Bedford to Burnaby Env

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Your Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

Attention: Rebecca Appleton

Dillon Consulting Limited
137 Chain Lake Dr
Suite 100
Halifax , NS
CANADA B3S 1B3

Your C.O.C. #: D 29791, D 29793, D 29792, D 29794, D 39276

Report Date: 2019/05/23
Report #: R5722441
Version: 4 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B9B5460

Received: 2019/04/30, 17:05

(3) Soils are reported on a dry weight basis unless otherwise specified.
(4) Offsite analysis requires that subcontracted moisture be reported.
(5) Please refer to enclosed subcontract report.
(6) No lab extraction date is given for C6-C10/BTEX and VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
(7) This test was performed by Maxxam Analytics Mississauga
(8) The APHA Standard Method require pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.
(9) TOC / DOC present in the sample should be considered as non-purgeable TOC / DOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Heather Macumber, Senior Project Manager
Email: HMacumber@maxxam.ca
Phone# (902)420-0203 Ext:226
==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF SOIL

Maxxam ID		JPE938			JPE940	
Sampling Date		2019/04/25			2019/04/25	
COC Number		D 29794			D 29794	
	UNITS	**2019SS8 (5.03-5.08M)**	**RDL**	**QC Batch**	**2019SS10 (3.36-3.56M)**	**QC Batch**
Inorganics						
Organic Carbon (TOC)	g/kg	6.8	0.50	6106759		
Sulphate (SO4)	mg/kg	11	10	6109397		
Total Sulphur (S)	% g/g	0.076	0.010	6127324		
Subcontracted Analysis						
Subcontract Parameter	N/A				ATTACHED	6105515

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		JPE943		
Sampling Date		2019/04/29		
COC Number		D 29794		
	UNITS	**2019SS13 (4.65-4.93M)**	**RDL**	**QC Batch**
Inorganics				
Organic Carbon (TOC)	g/kg	<0.50	0.50	6106759
Sulphate (SO4)	mg/kg	20	10	6109397
Total Sulphur (S)	% g/g	0.071	0.010	6127324

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE937		JPE938		
Sampling Date		2019/04/25		2019/04/25		
COC Number		D 29794		D 29794		
	UNITS	2019SS7 (3.66-3.80M)	QC Batch	2019SS8 (5.03-5.08M)	RDL	QC Batch
Metals						
Acid Extractable Aluminum (Al)	mg/kg	8300	6106758	6000	10	6102070
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Arsenic (As)	mg/kg	130	6106758	17	2.0	6102070
Acid Extractable Barium (Ba)	mg/kg	23	6106758	20	5.0	6102070
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Boron (B)	mg/kg	<50	6106758	<50	50	6102070
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	6106758	<0.30	0.30	6102070
Acid Extractable Chromium (Cr)	mg/kg	14	6106758	9.7	2.0	6102070
Acid Extractable Cobalt (Co)	mg/kg	9.3	6106758	5.8	1.0	6102070
Acid Extractable Copper (Cu)	mg/kg	18	6106758	16	2.0	6102070
Acid Extractable Iron (Fe)	mg/kg	15000	6106758	10000	50	6102070
Acid Extractable Lead (Pb)	mg/kg	11	6106758	8.2	0.50	6102070
Acid Extractable Lithium (Li)	mg/kg	18	6106758	11	2.0	6102070
Acid Extractable Manganese (Mn)	mg/kg	260	6106758	190	2.0	6102070
Acid Extractable Mercury (Hg)	mg/kg	0.10	6106758	<0.10	0.10	6102070
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6106758	<2.0	2.0	6102070
Acid Extractable Nickel (Ni)	mg/kg	19	6106758	16	2.0	6102070
Acid Extractable Rubidium (Rb)	mg/kg	5.9	6106758	4.4	2.0	6102070
Acid Extractable Selenium (Se)	mg/kg	<1.0	6106758	<1.0	1.0	6102070
Acid Extractable Silver (Ag)	mg/kg	<0.50	6106758	<0.50	0.50	6102070
Acid Extractable Strontium (Sr)	mg/kg	8.1	6106758	7.5	5.0	6102070
Acid Extractable Thallium (Tl)	mg/kg	<0.10	6106758	<0.10	0.10	6102070
Acid Extractable Tin (Sn)	mg/kg	<1.0	6106758	<1.0	1.0	6102070
Acid Extractable Uranium (U)	mg/kg	1.3	6106758	1.0	0.10	6102070
Acid Extractable Vanadium (V)	mg/kg	13	6106758	8.2	2.0	6102070
Acid Extractable Zinc (Zn)	mg/kg	48	6106758	37	5.0	6102070

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE939	JPE941	JPE942		
Sampling Date		2019/04/25	2019/04/25	2019/04/25		
COC Number		D 29794	D 29794	D 29794		
	UNITS	**2019SS9 (5.03-5.18M)**	**2019SS11 (3.49-3.60M)**	**2019SS12 (3.51-3.71M)**	**RDL**	**QC Batch**
Metals						
Acid Extractable Aluminum (Al)	mg/kg	6800	12000	12000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	15	29	45	2.0	6106758
Acid Extractable Barium (Ba)	mg/kg	20	32	30	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	11	19	19	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	6.4	12	13	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	16	20	22	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	13000	23000	25000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	8.4	13	11	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	13	23	23	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	250	410	420	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	<0.10	<0.10	<0.10	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	<2.0	3.8	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	15	26	34	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	4.4	7.0	6.6	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	8.7	13	15	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	<0.10	<0.10	<0.10	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.82	1.2	2.1	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	9.3	16	14	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	41	61	67	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		JPE943		JPE944	JPE945		
Sampling Date		2019/04/29		2019/04/29	2019/04/29		
COC Number		D 29794		D 29794	D 29794		
	UNITS	2019SS13 (4.65-4.93M)	QC Batch	2019SS14 (4.06-4.14M)	2019SS13 B	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	5600	6102070	13000	5500	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	8.8	6102070	13	8.1	2.0	6106758
Acid Extractable Barium (Ba)	mg/kg	11	6102070	35	9.5	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	6102070	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	6102070	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	8.7	6102070	21	8.8	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	5.5	6102070	12	5.9	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	12	6102070	21	12	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	11000	6102070	23000	11000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	6.7	6102070	14	4.3	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	11	6102070	25	12	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	200	6102070	430	200	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	<0.10	6102070	<0.10	<0.10	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6102070	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	12	6102070	29	11	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	2.6	6102070	7.3	2.6	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	6102070	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	6102070	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	7.2	6102070	16	6.9	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	<0.10	6102070	<0.10	<0.10	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	6102070	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.52	6102070	3.0	0.52	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	8.0	6102070	17	8.3	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	26	6102070	66	26	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF SEDIMENT

Maxxam ID		JPE917			JPE917			JPE923		
Sampling Date		2019/04/16			2019/04/16			2019/04/16		
COC Number		D 29791			D 29791			D 29791		
	UNITS	**2019SED1A**	**RDL**	**QC Batch**	**2019SED1A Lab-Dup**	**RDL**	**QC Batch**	**2019SED7A**	**RDL**	**QC Batch**
Inorganics										
Organic Carbon (TOC)	g/kg	170	0.50	6106759				130	0.50	6106759
Sulphate (SO4)	mg/kg	1500	50	6109397				2300	50	6109397
Total Sulphur (S)	% g/g	0.59	0.010	6127324	0.58	0.010	6127324	0.59	0.010	6127324
Total Cyanide (CN)	mg/kg	1.5	1.0	6118321				1.2	1.0	6118321
Physical Testing										
Moisture-Subcontracted	%w/w	92	0.50	6127323				88	0.50	6127323

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Maxxam ID		JPE927			JPE927			JPE929		
Sampling Date		2019/04/25			2019/04/25			2019/04/25		
COC Number		D 29793			D 29793			D 29793		
	UNITS	**2019SED10A**	**RDL**	**QC Batch**	**2019SED10A Lab-Dup**	**RDL**	**QC Batch**	**2019SED12A**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	28	1.0	6104961	28	1.0	6104961	44	1.0	6100446
Organic Carbon (TOC)	g/kg	1.3	0.50	6106759						
Sulphate (SO4)	mg/kg	59	10	6109397	63	10	6109397			
Total Sulphur (S)	% g/g	0.39	0.010	6127324						
Total Cyanide (CN)	mg/kg	<1.0	1.0	6118321						
Physical Testing										
Moisture-Subcontracted	%w/w	27	0.50	6127323						
Subcontracted Analysis										
Subcontract Parameter	N/A	ATTACHED	N/A	6105515				ATTACHED	N/A	6105515

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

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF SEDIMENT

Maxxam ID		JPE932	JPE933	JPE934	JPE935	JPE936	
Sampling Date		2019/04/16	2019/04/16	2019/04/16	2019/04/16	2019/04/29	
COC Number		D 29792	D 29792	D 29792	D 29792	D 29792	
	UNITS	**2019PW1**	**2019PW2**	**2019PW3**	**2019PW4**	**2019PW5**	**QC Batch**
Subcontracted Analysis							
Subcontract Parameter	N/A	ATTACHED	ATTACHED	ATTACHED	ATTACHED	ATTACHED	6105517
QC Batch = Quality Control Batch							

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ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE917		JPE918	JPE919		JPE920	JPE920		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/16	2019/04/16		
COC Number		D 29791		D 29791	D 29791		D 29791	D 29791		
	UNITS	2019SED1A	QC Batch	2019SED2A	2019SED3A	QC Batch	2019SED4A	2019SED4A Lab-Dup	RDL	QC Batch
Metals										
Acid Extractable Aluminum (Al)	mg/kg	17000	6102070	18000	20000	6106756	18000	17000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	2000	6102070	1900	2000	6106756	1900	1800	20	6106758
Acid Extractable Barium (Ba)	mg/kg	150	6102070	250	230	6106756	250	230	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	6102070	<50	<50	6106756	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	2.6	6102070	2.6	2.1	6106756	1.9	1.9	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	12	6102070	14	15	6106756	14	13	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	100	6102070	120	130	6106756	110	110	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	32	6102070	35	36	6106756	33	33	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	40000	6102070	40000	54000	6106756	44000	44000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	63	6102070	72	73	6106756	62	60	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	12	6102070	16	16	6106756	15	15	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	4900	6102070	15000	14000	6106756	17000	17000	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	1.9	6102070	2.2	2.2	6106756	2.1	2.1	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	6102070	<2.0	<2.0	6106756	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	86	6102070	76	53	6106756	48	49	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	8.5	6102070	11	11	6106756	9.8	9.2	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	1.7	6102070	1.9	2.0	6106756	1.8	1.9	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	6102070	<0.50	<0.50	6106756	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	23	6102070	24	24	6106756	29	29	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	0.29	6102070	0.34	0.37	6106756	0.32	0.30	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	1.2	6102070	1.3	1.3	6106756	1.3	1.1	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	0.85	6102070	1.2	1.1	6106756	1.0	1.0	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	60	6102070	63	69	6106756	56	55	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	260	6102070	270	250	6106756	230	220	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam
A Bureau Veritas Group Company

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE921	JPE922		JPE923		JPE924		
Sampling Date		2019/04/16	2019/04/16		2019/04/16		2019/04/16		
COC Number		D 29791	D 29791		D 29791		D 29791		
	UNITS	2019SED5A	2019SED6A	QC Batch	2019SED7A	QC Batch	2019SED8A	RDL	QC Batch
Metals									
Acid Extractable Aluminum (Al)	mg/kg	27000	22000	6106756	25000	6102070	23000	10	6106756
Acid Extractable Antimony (Sb)	mg/kg	<2.0	<2.0	6106756	2.4	6102070	2.3	2.0	6106756
Acid Extractable Arsenic (As)	mg/kg	960	1600	6106756	1900	6102070	2400	20	6106756
Acid Extractable Barium (Ba)	mg/kg	160	150	6106756	230	6102070	260	5.0	6106756
Acid Extractable Beryllium (Be)	mg/kg	<2.0	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Boron (B)	mg/kg	<50	<50	6106756	<50	6102070	<50	50	6106756
Acid Extractable Cadmium (Cd)	mg/kg	1.7	1.4	6106756	2.5	6102070	2.6	0.30	6106756
Acid Extractable Chromium (Cr)	mg/kg	21	19	6106756	17	6102070	17	2.0	6106756
Acid Extractable Cobalt (Co)	mg/kg	84	87	6106756	160	6102070	160	1.0	6106756
Acid Extractable Copper (Cu)	mg/kg	34	35	6106756	43	6102070	40	2.0	6106756
Acid Extractable Iron (Fe)	mg/kg	41000	36000	6106756	45000	6102070	54000	50	6106756
Acid Extractable Lead (Pb)	mg/kg	96	74	6106756	78	6102070	74	0.50	6106756
Acid Extractable Lithium (Li)	mg/kg	25	22	6106756	21	6102070	20	2.0	6106756
Acid Extractable Manganese (Mn)	mg/kg	4800	7700	6106756	14000	6102070	13000	2.0	6106756
Acid Extractable Mercury (Hg)	mg/kg	0.82	2.4	6106756	2.9	6102070	2.7	0.10	6106756
Acid Extractable Molybdenum (Mo)	mg/kg	2.2	<2.0	6106756	<2.0	6102070	<2.0	2.0	6106756
Acid Extractable Nickel (Ni)	mg/kg	38	41	6106756	75	6102070	67	2.0	6106756
Acid Extractable Rubidium (Rb)	mg/kg	11	15	6106756	12	6102070	12	2.0	6106756
Acid Extractable Selenium (Se)	mg/kg	2.7	2.5	6106756	2.0	6102070	2.2	1.0	6106756
Acid Extractable Silver (Ag)	mg/kg	<0.50	<0.50	6106756	<0.50	6102070	<0.50	0.50	6106756
Acid Extractable Strontium (Sr)	mg/kg	40	27	6106756	29	6102070	31	5.0	6106756
Acid Extractable Thallium (Tl)	mg/kg	0.34	0.36	6106756	0.43	6102070	0.48	0.10	6106756
Acid Extractable Tin (Sn)	mg/kg	1.3	1.4	6106756	1.5	6102070	1.3	1.0	6106756
Acid Extractable Uranium (U)	mg/kg	2.5	1.4	6106756	1.3	6102070	1.2	0.10	6106756
Acid Extractable Vanadium (V)	mg/kg	58	56	6106756	66	6102070	75	2.0	6106756
Acid Extractable Zinc (Zn)	mg/kg	200	180	6106756	330	6102070	320	5.0	6106756

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE925		JPE926			JPE927	JPE927		
Sampling Date		2019/04/16		2019/04/25			2019/04/25	2019/04/25		
COC Number		D 29791		D 29791			D 29793	D 29793		
	UNITS	**2019SED7B**	**RDL**	**2019SED9A**	**RDL**	**QC Batch**	**2019SED10A**	**2019SED10A Lab-Dup**	**RDL**	**QC Batch**
Metals										
Acid Extractable Aluminum (Al)	mg/kg	22000	10	12000	10	6106758	14000	13000	10	6102070
Acid Extractable Antimony (Sb)	mg/kg	2.3	2.0	<2.0	2.0	6106758	9.5	9.1	2.0	6102070
Acid Extractable Arsenic (As)	mg/kg	1900	20	170	2.0	6106758	6200	6000	200	6102070
Acid Extractable Barium (Ba)	mg/kg	240	5.0	84	5.0	6106758	58	55	5.0	6102070
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Boron (B)	mg/kg	<50	50	<50	50	6106758	<50	<50	50	6102070
Acid Extractable Cadmium (Cd)	mg/kg	2.4	0.30	<0.30	0.30	6106758	<0.30	<0.30	0.30	6102070
Acid Extractable Chromium (Cr)	mg/kg	16	2.0	13	2.0	6106758	15	14	2.0	6102070
Acid Extractable Cobalt (Co)	mg/kg	150	1.0	4.1	1.0	6106758	16	16	1.0	6102070
Acid Extractable Copper (Cu)	mg/kg	39	2.0	30	2.0	6106758	53	51	2.0	6102070
Acid Extractable Iron (Fe)	mg/kg	42000	50	17000	50	6106758	31000	30000	50	6102070
Acid Extractable Lead (Pb)	mg/kg	72	0.50	35	0.50	6106758	73	70	0.50	6102070
Acid Extractable Lithium (Li)	mg/kg	19	2.0	24	2.0	6106758	25	24	2.0	6102070
Acid Extractable Manganese (Mn)	mg/kg	14000	2.0	250	2.0	6106758	660	630	2.0	6102070
Acid Extractable Mercury (Hg)	mg/kg	2.7	0.10	4.4	0.10	6106758	6.8	6.5	0.10	6102070
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	2.0	6106758	<2.0	<2.0	2.0	6102070
Acid Extractable Nickel (Ni)	mg/kg	65	2.0	12	2.0	6106758	34	33	2.0	6102070
Acid Extractable Rubidium (Rb)	mg/kg	12	2.0	20	2.0	6106758	32	30	2.0	6102070
Acid Extractable Selenium (Se)	mg/kg	2.0	1.0	<1.0	1.0	6106758	<1.0	<1.0	1.0	6102070
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	0.50	6106758	<0.50	<0.50	0.50	6102070
Acid Extractable Strontium (Sr)	mg/kg	26	5.0	12	5.0	6106758	17	16	5.0	6102070
Acid Extractable Thallium (Tl)	mg/kg	0.40	0.10	0.16	0.10	6106758	0.28	0.27	0.10	6102070
Acid Extractable Tin (Sn)	mg/kg	1.3	1.0	<1.0	1.0	6106758	<1.0	<1.0	1.0	6102070
Acid Extractable Uranium (U)	mg/kg	1.2	0.10	1.1	0.10	6106758	1.1	1.0	0.10	6102070
Acid Extractable Vanadium (V)	mg/kg	61	2.0	16	2.0	6106758	15	14	2.0	6102070
Acid Extractable Zinc (Zn)	mg/kg	290	5.0	58	5.0	6106758	120	110	5.0	6102070

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Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ATOMIC SPECTROSCOPY (SEDIMENT)

Maxxam ID		JPE928		JPE930	JPE931		
Sampling Date		2019/04/25		2019/04/26	2019/04/26		
COC Number		D 29793		D 29793	D 29793		
	UNITS	2019SED11A	RDL	2019SED13A	2019SED14A	RDL	QC Batch
Metals							
Acid Extractable Aluminum (Al)	mg/kg	12000	10	11000	12000	10	6106758
Acid Extractable Antimony (Sb)	mg/kg	8.1	2.0	3.3	4.6	2.0	6106758
Acid Extractable Arsenic (As)	mg/kg	5100	200	1900	2900	20	6106758
Acid Extractable Barium (Ba)	mg/kg	70	5.0	74	91	5.0	6106758
Acid Extractable Beryllium (Be)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Bismuth (Bi)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Boron (B)	mg/kg	<50	50	<50	<50	50	6106758
Acid Extractable Cadmium (Cd)	mg/kg	<0.30	0.30	<0.30	<0.30	0.30	6106758
Acid Extractable Chromium (Cr)	mg/kg	14	2.0	12	13	2.0	6106758
Acid Extractable Cobalt (Co)	mg/kg	17	1.0	8.1	15	1.0	6106758
Acid Extractable Copper (Cu)	mg/kg	47	2.0	34	38	2.0	6106758
Acid Extractable Iron (Fe)	mg/kg	27000	50	18000	23000	50	6106758
Acid Extractable Lead (Pb)	mg/kg	62	0.50	40	45	0.50	6106758
Acid Extractable Lithium (Li)	mg/kg	24	2.0	22	23	2.0	6106758
Acid Extractable Manganese (Mn)	mg/kg	890	2.0	280	930	2.0	6106758
Acid Extractable Mercury (Hg)	mg/kg	6.3	0.10	5.2	5.2	0.10	6106758
Acid Extractable Molybdenum (Mo)	mg/kg	<2.0	2.0	<2.0	<2.0	2.0	6106758
Acid Extractable Nickel (Ni)	mg/kg	29	2.0	17	25	2.0	6106758
Acid Extractable Rubidium (Rb)	mg/kg	29	2.0	19	25	2.0	6106758
Acid Extractable Selenium (Se)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Silver (Ag)	mg/kg	<0.50	0.50	<0.50	<0.50	0.50	6106758
Acid Extractable Strontium (Sr)	mg/kg	14	5.0	13	14	5.0	6106758
Acid Extractable Thallium (Tl)	mg/kg	0.26	0.10	0.20	0.26	0.10	6106758
Acid Extractable Tin (Sn)	mg/kg	<1.0	1.0	<1.0	<1.0	1.0	6106758
Acid Extractable Uranium (U)	mg/kg	1.1	0.10	1.1	1.1	0.10	6106758
Acid Extractable Vanadium (V)	mg/kg	14	2.0	12	15	2.0	6106758
Acid Extractable Zinc (Zn)	mg/kg	100	5.0	64	94	5.0	6106758

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ATLANTIC RBCA HYDROCARBONS (SEDIMENT)

Maxxam ID		JPE927			JPE927			JPE929		
Sampling Date		2019/04/25			2019/04/25			2019/04/25		
COC Number		D 29793			D 29793			D 29793		
	UNITS	2019SED10A	RDL	QC Batch	2019SED10A Lab-Dup	RDL	QC Batch	2019SED12A	RDL	QC Batch
Petroleum Hydrocarbons										
Benzene	mg/kg	<0.025	0.025	6105340				<0.025	0.025	6101927
Toluene	mg/kg	<0.050	0.050	6105340				<0.050	0.050	6101927
Ethylbenzene	mg/kg	<0.025	0.025	6105340				<0.025	0.025	6101927
Total Xylenes	mg/kg	<0.050	0.050	6105340				<0.050	0.050	6101927
C6 - C10 (less BTEX)	mg/kg	<2.5	2.5	6105340				<2.5	2.5	6101927
>C10-C16 Hydrocarbons	mg/kg	<10	10	6130723	<10	10	6130723	<10	10	6130723
>C16-C21 Hydrocarbons	mg/kg	15	10	6130723	17	10	6130723	20	10	6130723
>C21-<C32 Hydrocarbons	mg/kg	100	15	6130723	100	15	6130723	95	15	6130723
Modified TPH (Tier1)	mg/kg	120	15	6128357				110	15	6128357
Reached Baseline at C32	mg/kg	Yes	N/A	6130723				Yes	N/A	6130723
Hydrocarbon Resemblance	mg/kg	COMMENT (1)	N/A	6130723				COMMENT (2)	N/A	6130723
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	100		6130723	103		6130723	103		6130723
n-Dotriacontane - Extractable	%	115 (3)		6130723	117 (3)		6130723	108 (3)		6130723
Isobutylbenzene - Volatile	%	132 (4)		6105340				116		6101927

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable
(1) Lube oil fraction.
(2) Unidentified compound(s) in fuel / lube range. Possible lube oil fraction.
(3) Silica gel clean-up performed prior to analysis as per client request.
(4) VPH surrogate not within acceptance limits. Analysis was repeated with similar results. VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE946		JPE947			JPE947		
Sampling Date		2019/04/29		2019/04/29			2019/04/29		
COC Number		D 39276		D 39276			D 39276		
	UNITS	**2019SW1**	**QC Batch**	**2019SW2**	**RDL**	**QC Batch**	**2019SW2 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	me/L	1.76	6099911	1.81	N/A	6099911			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	6099909	11	1.0	6099909			
Calculated TDS	mg/L	100	6099914	100	1.0	6099914			
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6099909	<1.0	1.0	6099909			
Cation Sum	me/L	1.69	6099911	1.69	N/A	6099911			
Hardness (CaCO3)	mg/L	19	6099822	19	1.0	6099822			
Ion Balance (% Difference)	%	2.03	6099910	3.43	N/A	6099910			
Langelier Index (@ 20C)	N/A	-2.44	6099912	-2.61		6099912			
Langelier Index (@ 4C)	N/A	-2.69	6099913	-2.86		6099913			
Nitrate (N)	mg/L	0.092	6099787	0.092	0.050	6099787			
Saturation pH (@ 20C)	N/A	9.54	6099912	9.54		6099912			
Saturation pH (@ 4C)	N/A	9.79	6099913	9.79		6099913			
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	6104792	11	5.0	6104792			
Dissolved Chloride (Cl-)	mg/L	48	6104797	50	1.0	6104797			
Colour	TCU	33	6104804	28	5.0	6104804			
Nitrate + Nitrite (N)	mg/L	0.092	6104810	0.092	0.050	6104810			
Nitrite (N)	mg/L	<0.010	6104813	<0.010	0.010	6104813			
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	6106993	<0.050	0.050	6106998	<0.050	0.050	6106998
Total Organic Carbon (C)	mg/L	5.3	6102025	5.2	0.50	6102025			
Orthophosphate (P)	mg/L	0.013	6104806	0.013	0.010	6104806			
pH	pH	7.10	6103907	6.93	N/A	6103904	6.97	N/A	6103904
Reactive Silica (SiO2)	mg/L	1.6	6104802	1.5	0.50	6104802			
Dissolved Sulphate (SO4)	mg/L	8.4	6104799	8.5	2.0	6104799			
Turbidity	NTU	0.25	6107949	0.26	0.10	6107949			
Conductivity	uS/cm	200	6103910	200	1.0	6103906	200	1.0	6103906

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

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE948	JPE949		JPE950		JPE951		
Sampling Date		2019/04/29	2019/04/29		2019/04/29		2019/04/29		
COC Number		D 39276	D 39276		D 39276		D 39276		
	UNITS	**2019SW3**	**2019SW4**	**QC Batch**	**2019SW5**	**QC Batch**	**2019SW6**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	me/L	1.87	1.84	6099911	1.75	6099911	1.90	N/A	6099911
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	11	6099909	11	6099909	11	1.0	6099909
Calculated TDS	mg/L	110	110	6099914	100	6099914	110	1.0	6099914
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	<1.0	6099909	<1.0	6099909	<1.0	1.0	6099909
Cation Sum	me/L	1.74	1.71	6099911	1.64	6099911	1.83	N/A	6099911
Hardness (CaCO3)	mg/L	19	19	6099822	19	6099822	20	1.0	6099822
Ion Balance (% Difference)	%	3.60	3.66	6099910	3.24	6099910	1.88	N/A	6099910
Langelier Index (@ 20C)	N/A	-2.54	-2.56	6099912	-2.48	6099912	-2.50		6099912
Langelier Index (@ 4C)	N/A	-2.79	-2.81	6099913	-2.73	6099913	-2.75		6099913
Nitrate (N)	mg/L	0.066	0.27	6099787	0.084	6099787	<0.050	0.050	6099787
Saturation pH (@ 20C)	N/A	9.55	9.57	6099912	9.54	6099912	9.54		6099912
Saturation pH (@ 4C)	N/A	9.81	9.82	6099913	9.79	6099913	9.79		6099913
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	11	6104792	11	6104816	11	5.0	6104816
Dissolved Chloride (Cl-)	mg/L	52	50	6104797	48	6104818	54	1.0	6104818
Colour	TCU	28	27	6104804	32	6104823	25	5.0	6104823
Nitrate + Nitrite (N)	mg/L	0.066	0.27	6104810	0.084	6104827	<0.050	0.050	6104827
Nitrite (N)	mg/L	<0.010	<0.010	6104813	<0.010	6104828	<0.010	0.010	6104828
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	<0.050	6106993	<0.050	6106998	<0.050	0.050	6106993
Total Organic Carbon (C)	mg/L	4.9	4.9	6102025	5.4	6102025	4.8	0.50	6102025
Orthophosphate (P)	mg/L	0.014	0.013	6104806	0.013	6104825	0.015	0.010	6104825
pH	pH	7.02	7.01	6103904	7.06	6103907	7.04	N/A	6103904
Reactive Silica (SiO2)	mg/L	1.3	1.5	6104802	1.6	6104822	1.2	0.50	6104822
Dissolved Sulphate (SO4)	mg/L	8.4	9.0	6104799	8.3	6104820	8.4	2.0	6104820
Turbidity	NTU	0.31	0.27	6107943	0.24	6107943	0.33	0.10	6107949
Conductivity	uS/cm	210	210	6103906	200	6103910	220	1.0	6103906

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N/A = Not Applicable

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE952		JPE953			JPE954		
Sampling Date		2019/04/29		2019/04/29			2019/04/29		
COC Number		D 39276		D 39276			D 39276		
	UNITS	**2019SW10**	**QC Batch**	**2019SW11**	**RDL**	**QC Batch**	**2019SW7**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	me/L	1.96	6099911	1.74	N/A	6099911	1.78	N/A	6099911
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	11	6099909	10	1.0	6099909	11	1.0	6099909
Calculated TDS	mg/L	110	6099914	100	1.0	6099914	100	1.0	6099914
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1.0	6099909	<1.0	1.0	6099909	<1.0	1.0	6099909
Cation Sum	me/L	1.89	6099911	1.64	N/A	6099911	1.68	N/A	6099911
Hardness (CaCO3)	mg/L	20	6099822	19	1.0	6099822	19	1.0	6099822
Ion Balance (% Difference)	%	1.82	6099910	2.96	N/A	6099910	2.89	N/A	6099910
Langelier Index (@ 20C)	N/A	-2.42	6099912	-2.62		6099912	-2.60		6099912
Langelier Index (@ 4C)	N/A	-2.67	6099913	-2.87		6099913	-2.85		6099913
Nitrate (N)	mg/L	<0.050	6099787	0.076	0.050	6099787	0.076	0.050	6099787
Saturation pH (@ 20C)	N/A	9.53	6099912	9.57		6099912	9.54		6099912
Saturation pH (@ 4C)	N/A	9.78	6099913	9.82		6099913	9.79		6099913
Inorganics									
Total Alkalinity (Total as CaCO3)	mg/L	11	6104816	11	5.0	6104816	11	5.0	6104816
Dissolved Chloride (Cl-)	mg/L	56	6104818	48	1.0	6104818	49	1.0	6104818
Colour	TCU	24	6104823	31	5.0	6104823	31	5.0	6104823
Nitrate + Nitrite (N)	mg/L	<0.050	6104827	0.076	0.050	6104827	0.076	0.050	6104827
Nitrite (N)	mg/L	<0.010	6104828	<0.010	0.010	6104828	<0.010	0.010	6104828
Nitrogen (Ammonia Nitrogen)	mg/L	<0.050	6106993	<0.050	0.050	6106993	<0.050	0.050	6106993
Total Organic Carbon (C)	mg/L	4.4	6102025	5.3	0.50	6102025	5.3	0.50	6102025
Orthophosphate (P)	mg/L	0.020	6104825	0.012	0.010	6104825	0.012	0.010	6104825
pH	pH	7.11	6103904	6.95	N/A	6103907	6.94	N/A	6103907
Reactive Silica (SiO2)	mg/L	1.1	6104822	1.6	0.50	6104822	1.6	0.50	6104822
Dissolved Sulphate (SO4)	mg/L	8.5	6104820	8.9	2.0	6104820	8.4	2.0	6104820
Total Cyanide (CN)	mg/L	<0.0050	6105437	<0.0050	0.0050	6105432			
Turbidity	NTU	<0.10	6107949	0.41	0.10	6107949	0.47	0.10	6107943
Conductivity	uS/cm	230	6103906	200	1.0	6103910	200	1.0	6103910

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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RESULTS OF ANALYSES OF WATER

Maxxam ID		JPE954		
Sampling Date		2019/04/29		
COC Number		D 39276		
	UNITS	2019SW7 Lab-Dup	RDL	QC Batch
Inorganics				
pH	pH	6.98	N/A	6103907
Conductivity	uS/cm	200	1.0	6103910

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

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

MERCURY BY COLD VAPOUR AA (WATER)

Maxxam ID		JPE946			JPE947	JPE948	JPE949		
Sampling Date		2019/04/29			2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276			D 39276	D 39276	D 39276		
	UNITS	**2019SW1**	**RDL**	**QC Batch**	**2019SW2**	**2019SW3**	**2019SW4**	**RDL**	**QC Batch**
Metals									
Dissolved Mercury (Hg)	ug/L	<0.013	0.013	6101730	<0.013	<0.013	<0.013	0.013	6101730
Total Mercury (Hg)	ug/L	<0.013 (1)	0.013	6131192					

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) A mercury bottle was not received for Total Mercury analysis. Mercury results are reported from a nitric preserved aliquot. The nitric preserved aliquot was not refrigerated between 1-6°C as recommended. Mercury results may be bias low.

Maxxam ID		JPE950	JPE951			JPE952			JPE953		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	**2019SW5**	**2019SW6**	**RDL**	**QC Batch**	**2019SW10**	**RDL**	**QC Batch**	**2019SW11**	**RDL**	**QC Batch**
Metals											
Dissolved Mercury (Hg)	ug/L	<0.013	<0.013	0.013	6101730	<0.013	0.013	6101730	<0.013	0.013	6101730
Total Mercury (Hg)	ug/L	<0.013 (1)	<0.013 (1)	0.013	6131192				<0.013 (1)	0.013	6131192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) A mercury bottle was not received for Total Mercury analysis. Mercury results are reported from a nitric preserved aliquot. The nitric preserved aliquot was not refrigerated between 1-6°C as recommended. Mercury results may be bias low.

Maxxam ID		JPE954		
Sampling Date		2019/04/29		
COC Number		D 39276		
	UNITS	**2019SW7**	**RDL**	**QC Batch**
Metals				
Dissolved Mercury (Hg)	ug/L	<0.013	0.013	6101730
Total Mercury (Hg)	ug/L	<0.013 (1)	0.013	6131192

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) A mercury bottle was not received for Total Mercury analysis. Mercury results are reported from a nitric preserved aliquot. The nitric preserved aliquot was not refrigerated between 1-6°C as recommended. Mercury results may be bias low.

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE946	JPE947			JPE947			JPE948		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	2019SW1	2019SW2	RDL	QC Batch	2019SW2 Lab-Dup	RDL	QC Batch	2019SW3	RDL	QC Batch
Metals											
Dissolved Aluminum (Al)	ug/L	81	77	5.0	6102447				66	5.0	6102447
Total Aluminum (Al)	ug/L	81	71	5.0	6104716	73	5.0	6104716	63	5.0	6104716
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Antimony (Sb)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Arsenic (As)	ug/L	45	44	1.0	6102447				54	1.0	6102447
Total Arsenic (As)	ug/L	45	47	1.0	6104716	48	1.0	6104716	54	1.0	6104716
Dissolved Barium (Ba)	ug/L	4.4	4.3	1.0	6102447				4.4	1.0	6102447
Total Barium (Ba)	ug/L	4.5	4.1	1.0	6104716	4.4	1.0	6104716	4.1	1.0	6104716
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Beryllium (Be)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Bismuth (Bi)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Boron (B)	ug/L	<50	<50	50	6102447				<50	50	6102447
Total Boron (B)	ug/L	<50	<50	50	6104716	<50	50	6104716	<50	50	6104716
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6102447				<0.010	0.010	6102447
Total Cadmium (Cd)	ug/L	<0.010	<0.010	0.010	6104716	<0.010	0.010	6104716	<0.010	0.010	6104716
Dissolved Calcium (Ca)	ug/L	5800	5800	100	6102447				5800	100	6102447
Total Calcium (Ca)	ug/L	5700	5700	100	6104716	5700	100	6104716	5700	100	6104716
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Chromium (Cr)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Cobalt (Co)	ug/L	<0.40	<0.40	0.40	6102447				<0.40	0.40	6102447
Total Cobalt (Co)	ug/L	<0.40	<0.40	0.40	6104716	<0.40	0.40	6104716	<0.40	0.40	6104716
Dissolved Copper (Cu)	ug/L	0.76	0.76	0.50	6102447				0.82	0.50	6102447
Total Copper (Cu)	ug/L	0.89	0.87	0.50	6104716	0.95	0.50	6104716	1.3	0.50	6104716
Dissolved Iron (Fe)	ug/L	59	53	50	6102447				<50	50	6102447
Total Iron (Fe)	ug/L	73	55	50	6104716	57	50	6104716	<50	50	6104716
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	6102447				<0.50	0.50	6102447
Total Lead (Pb)	ug/L	<0.50	<0.50	0.50	6104716	<0.50	0.50	6104716	<0.50	0.50	6104716
Dissolved Magnesium (Mg)	ug/L	1100	1100	100	6102447				1100	100	6102447
Total Magnesium (Mg)	ug/L	1100	1100	100	6104716	1100	100	6104716	1000	100	6104716
Dissolved Manganese (Mn)	ug/L	24	20	2.0	6102447				17	2.0	6102447
Total Manganese (Mn)	ug/L	27	20	2.0	6104716	21	2.0	6104716	19	2.0	6104716
Dissolved Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE946	JPE947			JPE947			JPE948		
Sampling Date		2019/04/29	2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276	D 39276			D 39276			D 39276		
	UNITS	**2019SW1**	**2019SW2**	**RDL**	**QC Batch**	**2019SW2 Lab-Dup**	**RDL**	**QC Batch**	**2019SW3**	**RDL**	**QC Batch**
Total Nickel (Ni)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Phosphorus (P)	ug/L	<100	<100	100	6102447				<100	100	6102447
Total Phosphorus (P)	ug/L	<100	<100	100	6104716	<100	100	6104716	<100	100	6104716
Dissolved Potassium (K)	ug/L	970	1000	100	6102447				980	100	6102447
Total Potassium (K)	ug/L	930	900	100	6104716	910	100	6104716	940	100	6104716
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	1.0	6102447				<1.0	1.0	6102447
Total Selenium (Se)	ug/L	<1.0	<1.0	1.0	6104716	<1.0	1.0	6104716	<1.0	1.0	6104716
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Silver (Ag)	ug/L	<0.10	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Sodium (Na)	ug/L	29000	30000	100	6102447				31000	100	6102447
Total Sodium (Na)	ug/L	28000	28000	100	6104716	29000	100	6104716	30000	100	6104716
Dissolved Strontium (Sr)	ug/L	20	21	2.0	6102447				20	2.0	6102447
Total Strontium (Sr)	ug/L	19	19	2.0	6104716	20	2.0	6104716	20	2.0	6104716
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Thallium (Tl)	ug/L	0.11	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Tin (Sn)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Titanium (Ti)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Uranium (U)	ug/L	<0.10	<0.10	0.10	6102447				<0.10	0.10	6102447
Total Uranium (U)	ug/L	<0.10	<0.10	0.10	6104716	<0.10	0.10	6104716	<0.10	0.10	6104716
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	2.0	6102447				<2.0	2.0	6102447
Total Vanadium (V)	ug/L	<2.0	<2.0	2.0	6104716	<2.0	2.0	6104716	<2.0	2.0	6104716
Dissolved Zinc (Zn)	ug/L	5.4	<5.0	5.0	6102447				<5.0	5.0	6102447
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	6104716	<5.0	5.0	6104716	<5.0	5.0	6104716

RDL = Reportable Detection Limit
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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE949	JPE950	JPE951	JPE952	JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	**2019SW4**	**2019SW5**	**2019SW6**	**2019SW10**	**2019SW11**	**2019SW7**	**RDL**	**QC Batch**
Metals									
Dissolved Aluminum (Al)	ug/L	68	80	55	48	88	91	5.0	6102447
Total Aluminum (Al)	ug/L	70	79	57	46	86	80	5.0	6104716
Dissolved Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Arsenic (As)	ug/L	47	44	58	83	44	45	1.0	6102447
Total Arsenic (As)	ug/L	50	46	59	86	45	46	1.0	6104716
Dissolved Barium (Ba)	ug/L	4.4	4.4	4.4	4.6	4.7	4.6	1.0	6102447
Total Barium (Ba)	ug/L	5.5	4.5	4.4	4.5	4.5	4.6	1.0	6104716
Dissolved Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Beryllium (Be)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Bismuth (Bi)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	6102447
Total Boron (B)	ug/L	<50	<50	<50	<50	<50	<50	50	6104716
Dissolved Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6102447
Total Cadmium (Cd)	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	6104716
Dissolved Calcium (Ca)	ug/L	5600	5700	6000	6200	5700	5700	100	6102447
Total Calcium (Ca)	ug/L	5900	5600	5900	6200	5700	5700	100	6104716
Dissolved Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Chromium (Cr)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6102447
Total Cobalt (Co)	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	6104716
Dissolved Copper (Cu)	ug/L	0.76	0.76	0.86	0.81	0.80	0.88	0.50	6102447
Total Copper (Cu)	ug/L	0.80	0.92	0.97	0.98	0.92	0.97	0.50	6104716
Dissolved Iron (Fe)	ug/L	<50	59	<50	<50	170	56	50	6102447
Total Iron (Fe)	ug/L	52	67	60	<50	70	75	50	6104716
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6102447
Total Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	6104716
Dissolved Magnesium (Mg)	ug/L	1100	1100	1100	1200	1100	1100	100	6102447
Total Magnesium (Mg)	ug/L	1100	1000	1100	1100	1100	1100	100	6104716
Dissolved Manganese (Mn)	ug/L	18	23	15	18	25	22	2.0	6102447
Total Manganese (Mn)	ug/L	19	26	18	18	26	28	2.0	6104716
Dissolved Molybdenum (Mo)	ug/L	3.6	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Molybdenum (Mo)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ELEMENTS BY ICP/MS (WATER)

Maxxam ID		JPE949	JPE950	JPE951	JPE952	JPE953	JPE954		
Sampling Date		2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29	2019/04/29		
COC Number		D 39276	D 39276	D 39276	D 39276	D 39276	D 39276		
	UNITS	**2019SW4**	**2019SW5**	**2019SW6**	**2019SW10**	**2019SW11**	**2019SW7**	**RDL**	**QC Batch**
Total Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	100	6102447
Total Phosphorus (P)	ug/L	<100	<100	<100	<100	<100	<100	100	6104716
Dissolved Potassium (K)	ug/L	980	980	990	1100	980	970	100	6102447
Total Potassium (K)	ug/L	950	950	950	1000	930	960	100	6104716
Dissolved Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6102447
Total Selenium (Se)	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	6104716
Dissolved Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Silver (Ag)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Sodium (Na)	ug/L	30000	29000	32000	34000	28000	29000	100	6102447
Total Sodium (Na)	ug/L	30000	28000	31000	32000	28000	28000	100	6104716
Dissolved Strontium (Sr)	ug/L	21	20	22	22	19	20	2.0	6102447
Total Strontium (Sr)	ug/L	21	20	21	22	20	19	2.0	6104716
Dissolved Thallium (Tl)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Thallium (Tl)	ug/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Titanium (Ti)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6102447
Total Uranium (U)	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	6104716
Dissolved Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6102447
Total Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	6104716
Dissolved Zinc (Zn)	ug/L	6.5	<5.0	<5.0	7.4	<5.0	<5.0	5.0	6102447
Total Zinc (Zn)	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	6104716

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

ATLANTIC RBCA HYDROCARBONS (WATER)

Maxxam ID		JPE952			JPE952			JPE953		
Sampling Date		2019/04/29			2019/04/29			2019/04/29		
COC Number		D 39276			D 39276			D 39276		
	UNITS	**2019SW10**	**RDL**	**QC Batch**	**2019SW10 Lab-Dup**	**RDL**	**QC Batch**	**2019SW11**	**RDL**	**QC Batch**
Petroleum Hydrocarbons										
Benzene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Toluene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Ethylbenzene	mg/L	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727	<0.0010	0.0010	6101727
Total Xylenes	mg/L	<0.0020	0.0020	6101727	<0.0020	0.0020	6101727	<0.0020	0.0020	6101727
C6 - C10 (less BTEX)	mg/L	<0.010	0.010	6101727	<0.010	0.010	6101727	<0.010	0.010	6101727
>C10-C16 Hydrocarbons	mg/L	<0.050	0.050	6102045				<0.050	0.050	6102045
>C16-C21 Hydrocarbons	mg/L	<0.050	0.050	6102045				<0.050	0.050	6102045
>C21-<C32 Hydrocarbons	mg/L	<0.10	0.10	6102045				<0.10	0.10	6102045
Modified TPH (Tier1)	mg/L	<0.10	0.10	6099525				<0.10	0.10	6099525
Reached Baseline at C32	mg/L	NA	N/A	6102045				NA	N/A	6102045
Hydrocarbon Resemblance	mg/L	NA	N/A	6102045				NA	N/A	6102045
Surrogate Recovery (%)										
Isobutylbenzene - Extractable	%	83		6102045				91		6102045
n-Dotriacontane - Extractable	%	92		6102045				99		6102045
Isobutylbenzene - Volatile	%	102		6101727	102		6101727	102		6101727

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

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

GENERAL COMMENTS

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

Package 1	3.7°C
Package 2	0.7°C

Total Water Analysis - Sample decanted from a non-preserved aliquot – metals results may be biased low.

Total Cyanide: Due to a high percent humidity, the detection limits for samples JPE917 & JPE923 were adjusted.

Results relate only to the items tested.

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6100446	SDN	RPD	Moisture	2019/05/03	12		%	25
6101727	THL	Matrix Spike [JPE953-09]	Isobutylbenzene - Volatile	2019/05/03		104	%	70 - 130
			Benzene	2019/05/03		112	%	70 - 130
			Toluene	2019/05/03		117	%	70 - 130
			Ethylbenzene	2019/05/03		120	%	70 - 130
			Total Xylenes	2019/05/03		117	%	70 - 130
6101727	THL	Spiked Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	70 - 130
			Benzene	2019/05/03		102	%	70 - 130
			Toluene	2019/05/03		104	%	70 - 130
			Ethylbenzene	2019/05/03		106	%	70 - 130
			Total Xylenes	2019/05/03		104	%	70 - 130
6101727	THL	Method Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	70 - 130
			Benzene	2019/05/03	<0.0010		mg/L	
			Toluene	2019/05/03	<0.0010		mg/L	
			Ethylbenzene	2019/05/03	<0.0010		mg/L	
			Total Xylenes	2019/05/03	<0.0020		mg/L	
			C6 - C10 (less BTEX)	2019/05/03	<0.010		mg/L	
6101727	THL	RPD [JPE952-09]	Benzene	2019/05/03	NC		%	40
			Toluene	2019/05/03	NC		%	40
			Ethylbenzene	2019/05/03	NC		%	40
			Total Xylenes	2019/05/03	NC		%	40
			C6 - C10 (less BTEX)	2019/05/03	NC		%	40
6101730	CCR	Matrix Spike	Dissolved Mercury (Hg)	2019/05/06		93	%	80 - 120
6101730	CCR	Spiked Blank	Dissolved Mercury (Hg)	2019/05/06		100	%	80 - 120
6101730	CCR	Method Blank	Dissolved Mercury (Hg)	2019/05/06	<0.013		ug/L	
6101730	CCR	RPD	Dissolved Mercury (Hg)	2019/05/06	NC		%	20
6101927	YXU	Matrix Spike	Isobutylbenzene - Volatile	2019/05/03		108	%	60 - 130
			Benzene	2019/05/03		95	%	60 - 130
			Toluene	2019/05/03		95	%	60 - 130
			Ethylbenzene	2019/05/03		103	%	60 - 130
			Total Xylenes	2019/05/03		100	%	60 - 130
6101927	YXU	Spiked Blank	Isobutylbenzene - Volatile	2019/05/03		97	%	60 - 130
			Benzene	2019/05/03		90	%	60 - 140
			Toluene	2019/05/03		92	%	60 - 140
			Ethylbenzene	2019/05/03		94	%	60 - 140
			Total Xylenes	2019/05/03		94	%	60 - 140
6101927	YXU	Method Blank	Isobutylbenzene - Volatile	2019/05/03		100	%	60 - 130
			Benzene	2019/05/03	<0.025		mg/kg	
			Toluene	2019/05/03	<0.050		mg/kg	
			Ethylbenzene	2019/05/03	<0.025		mg/kg	
			Total Xylenes	2019/05/03	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2019/05/03	<2.5		mg/kg	
6101927	YXU	RPD	Benzene	2019/05/03	NC		%	50
			Toluene	2019/05/03	NC		%	50
			Ethylbenzene	2019/05/03	NC		%	50
			Total Xylenes	2019/05/03	11		%	50
			C6 - C10 (less BTEX)	2019/05/03	NC		%	50
6102025	SSI	Matrix Spike	Total Organic Carbon (C)	2019/05/03		98	%	85 - 115
6102025	SSI	Spiked Blank	Total Organic Carbon (C)	2019/05/03		103	%	80 - 120
6102025	SSI	Method Blank	Total Organic Carbon (C)	2019/05/03	<0.50		mg/L	
6102025	SSI	RPD	Total Organic Carbon (C)	2019/05/03	NC		%	15
6102045	BCD	Matrix Spike	Isobutylbenzene - Extractable	2019/05/03		104	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		111	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03		98	%	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			>C16-C21 Hydrocarbons	2019/05/03		93	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/03		107	%	70 - 130
6102045	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/03		102	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		104	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03		96	%	70 - 130
			>C16-C21 Hydrocarbons	2019/05/03		89	%	70 - 130
			>C21-<C32 Hydrocarbons	2019/05/03		102	%	70 - 130
6102045	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/03		102	%	70 - 130
			n-Dotriacontane - Extractable	2019/05/03		100	%	70 - 130
			>C10-C16 Hydrocarbons	2019/05/03	<0.050		mg/L	
			>C16-C21 Hydrocarbons	2019/05/03	<0.050		mg/L	
			>C21-<C32 Hydrocarbons	2019/05/03	<0.10		mg/L	
6102045	BCD	RPD	>C10-C16 Hydrocarbons	2019/05/03	0.31		%	40
			>C16-C21 Hydrocarbons	2019/05/03	3.0		%	40
			>C21-<C32 Hydrocarbons	2019/05/03	5.0		%	40
6102070	MLB	Matrix Spike [JPE927-01]	Acid Extractable Antimony (Sb)	2019/05/06		NC	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/06		NC	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/06		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/06		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/06		104	%	75 - 125
			Acid Extractable Boron (B)	2019/05/06		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/06		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/06		96	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/06		95	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/06		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/06		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/06		104	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/06		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/06		94	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/06		103	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/06		96	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/06		98	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/06		94	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/06		99	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/06		106	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/06		103	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/06		111	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/06		103	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/06		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/06		NC	%	75 - 125
6102070	MLB	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/04		104	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/04		97	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/04		101	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/04		94	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/04		103	%	75 - 125
			Acid Extractable Boron (B)	2019/05/04		94	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/04		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/04		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/04		97	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/04		95	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/04		100	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/04		95	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/04		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/04		103	%	75 - 125

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2019/05/04		106	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/04		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/04		99	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/04		96	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/04		97	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/04		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/04		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/04		102	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/04		100	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/04		95	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/04		99	%	75 - 125
6102070	MLB	Method Blank	Acid Extractable Aluminum (Al)	2019/05/04	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/04	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/04	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/04	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/04	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/04	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/04	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/04	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/04	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/04	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/04	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/04	<5.0		mg/kg	
6102070	MLB	RPD [JPE927-01]	Acid Extractable Aluminum (Al)	2019/05/06	7.6		%	35
			Acid Extractable Antimony (Sb)	2019/05/06	4.3		%	35
			Acid Extractable Arsenic (As)	2019/05/06	3.8		%	35
			Acid Extractable Barium (Ba)	2019/05/06	6.4		%	35
			Acid Extractable Beryllium (Be)	2019/05/06	NC		%	35
			Acid Extractable Bismuth (Bi)	2019/05/06	NC		%	35
			Acid Extractable Boron (B)	2019/05/06	NC		%	35
			Acid Extractable Cadmium (Cd)	2019/05/06	NC		%	35
			Acid Extractable Chromium (Cr)	2019/05/06	7.4		%	35
			Acid Extractable Cobalt (Co)	2019/05/06	1.3		%	35
			Acid Extractable Copper (Cu)	2019/05/06	3.5		%	35
			Acid Extractable Iron (Fe)	2019/05/06	4.1		%	35
			Acid Extractable Lead (Pb)	2019/05/06	4.0		%	35
			Acid Extractable Lithium (Li)	2019/05/06	3.4		%	35
			Acid Extractable Manganese (Mn)	2019/05/06	4.6		%	35
			Acid Extractable Mercury (Hg)	2019/05/06	4.6		%	35

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Molybdenum (Mo)	2019/05/06	NC		%	35
			Acid Extractable Nickel (Ni)	2019/05/06	2.6		%	35
			Acid Extractable Rubidium (Rb)	2019/05/06	7.2		%	35
			Acid Extractable Selenium (Se)	2019/05/06	NC		%	35
			Acid Extractable Silver (Ag)	2019/05/06	NC		%	35
			Acid Extractable Strontium (Sr)	2019/05/06	1.9		%	35
			Acid Extractable Thallium (Tl)	2019/05/06	1.8		%	35
			Acid Extractable Tin (Sn)	2019/05/06	NC		%	35
			Acid Extractable Uranium (U)	2019/05/06	8.6		%	35
			Acid Extractable Vanadium (V)	2019/05/06	5.6		%	35
			Acid Extractable Zinc (Zn)	2019/05/06	2.3		%	35
6102447	MLB	Matrix Spike	Dissolved Aluminum (Al)	2019/05/03		103	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/05/03		93	%	80 - 120
			Dissolved Barium (Ba)	2019/05/03		99	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/03		96	%	80 - 120
			Dissolved Bismuth (Bi)	2019/05/03		97	%	80 - 120
			Dissolved Boron (B)	2019/05/03		95	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/03		98	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/03		99	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/03		95	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/03		94	%	80 - 120
			Dissolved Copper (Cu)	2019/05/03		90	%	80 - 120
			Dissolved Iron (Fe)	2019/05/03		98	%	80 - 120
			Dissolved Lead (Pb)	2019/05/03		98	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/03		101	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/03		92	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/03		NC	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/03		92	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/03		105	%	80 - 120
			Dissolved Potassium (K)	2019/05/03		102	%	80 - 120
			Dissolved Selenium (Se)	2019/05/03		91	%	80 - 120
			Dissolved Silver (Ag)	2019/05/03		94	%	80 - 120
			Dissolved Sodium (Na)	2019/05/03		NC	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/03		NC	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/03		99	%	80 - 120
			Dissolved Tin (Sn)	2019/05/03		104	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/03		99	%	80 - 120
			Dissolved Uranium (U)	2019/05/03		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/03		95	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/03		95	%	80 - 120
6102447	MLB	Spiked Blank	Dissolved Aluminum (Al)	2019/05/03		106	%	80 - 120
			Dissolved Antimony (Sb)	2019/05/03		102	%	80 - 120
			Dissolved Arsenic (As)	2019/05/03		94	%	80 - 120
			Dissolved Barium (Ba)	2019/05/03		100	%	80 - 120
			Dissolved Beryllium (Be)	2019/05/03		98	%	80 - 120
			Dissolved Bismuth (Bi)	2019/05/03		101	%	80 - 120
			Dissolved Boron (B)	2019/05/03		95	%	80 - 120
			Dissolved Cadmium (Cd)	2019/05/03		97	%	80 - 120
			Dissolved Calcium (Ca)	2019/05/03		100	%	80 - 120
			Dissolved Chromium (Cr)	2019/05/03		97	%	80 - 120
			Dissolved Cobalt (Co)	2019/05/03		96	%	80 - 120
			Dissolved Copper (Cu)	2019/05/03		95	%	80 - 120
			Dissolved Iron (Fe)	2019/05/03		99	%	80 - 120

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Lead (Pb)	2019/05/03		99	%	80 - 120
			Dissolved Magnesium (Mg)	2019/05/03		105	%	80 - 120
			Dissolved Manganese (Mn)	2019/05/03		99	%	80 - 120
			Dissolved Molybdenum (Mo)	2019/05/03		100	%	80 - 120
			Dissolved Nickel (Ni)	2019/05/03		96	%	80 - 120
			Dissolved Phosphorus (P)	2019/05/03		104	%	80 - 120
			Dissolved Potassium (K)	2019/05/03		99	%	80 - 120
			Dissolved Selenium (Se)	2019/05/03		91	%	80 - 120
			Dissolved Silver (Ag)	2019/05/03		95	%	80 - 120
			Dissolved Sodium (Na)	2019/05/03		99	%	80 - 120
			Dissolved Strontium (Sr)	2019/05/03		100	%	80 - 120
			Dissolved Thallium (Tl)	2019/05/03		100	%	80 - 120
			Dissolved Tin (Sn)	2019/05/03		102	%	80 - 120
			Dissolved Titanium (Ti)	2019/05/03		102	%	80 - 120
			Dissolved Uranium (U)	2019/05/03		103	%	80 - 120
			Dissolved Vanadium (V)	2019/05/03		97	%	80 - 120
			Dissolved Zinc (Zn)	2019/05/03		98	%	80 - 120
6102447	MLB	Method Blank	Dissolved Aluminum (Al)	2019/05/03	<5.0		ug/L	
			Dissolved Antimony (Sb)	2019/05/03	<1.0		ug/L	
			Dissolved Arsenic (As)	2019/05/03	<1.0		ug/L	
			Dissolved Barium (Ba)	2019/05/03	<1.0		ug/L	
			Dissolved Beryllium (Be)	2019/05/03	<1.0		ug/L	
			Dissolved Bismuth (Bi)	2019/05/03	<2.0		ug/L	
			Dissolved Boron (B)	2019/05/03	<50		ug/L	
			Dissolved Cadmium (Cd)	2019/05/03	<0.010		ug/L	
			Dissolved Calcium (Ca)	2019/05/03	<100		ug/L	
			Dissolved Chromium (Cr)	2019/05/03	<1.0		ug/L	
			Dissolved Cobalt (Co)	2019/05/03	<0.40		ug/L	
			Dissolved Copper (Cu)	2019/05/03	<0.50		ug/L	
			Dissolved Iron (Fe)	2019/05/03	<50		ug/L	
			Dissolved Lead (Pb)	2019/05/03	<0.50		ug/L	
			Dissolved Magnesium (Mg)	2019/05/03	<100		ug/L	
			Dissolved Manganese (Mn)	2019/05/03	<2.0		ug/L	
			Dissolved Molybdenum (Mo)	2019/05/03	<2.0		ug/L	
			Dissolved Nickel (Ni)	2019/05/03	<2.0		ug/L	
			Dissolved Phosphorus (P)	2019/05/03	<100		ug/L	
			Dissolved Potassium (K)	2019/05/03	<100		ug/L	
			Dissolved Selenium (Se)	2019/05/03	<1.0		ug/L	
			Dissolved Silver (Ag)	2019/05/03	<0.10		ug/L	
			Dissolved Sodium (Na)	2019/05/03	<100		ug/L	
			Dissolved Strontium (Sr)	2019/05/03	<2.0		ug/L	
			Dissolved Thallium (Tl)	2019/05/03	<0.10		ug/L	
			Dissolved Tin (Sn)	2019/05/03	<2.0		ug/L	
			Dissolved Titanium (Ti)	2019/05/03	<2.0		ug/L	
			Dissolved Uranium (U)	2019/05/03	<0.10		ug/L	
			Dissolved Vanadium (V)	2019/05/03	<2.0		ug/L	
			Dissolved Zinc (Zn)	2019/05/03	<5.0		ug/L	
6102447	MLB	RPD	Dissolved Aluminum (Al)	2019/05/03	0.34		%	20
			Dissolved Antimony (Sb)	2019/05/03	NC		%	20
			Dissolved Arsenic (As)	2019/05/03	0.15		%	20
			Dissolved Barium (Ba)	2019/05/03	1.9		%	20
			Dissolved Beryllium (Be)	2019/05/03	NC		%	20
			Dissolved Bismuth (Bi)	2019/05/03	NC		%	20
			Dissolved Boron (B)	2019/05/03	3.6		%	20

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Cadmium (Cd)	2019/05/03	NC		%	20
			Dissolved Calcium (Ca)	2019/05/03	0.045		%	20
			Dissolved Chromium (Cr)	2019/05/03	3.0		%	20
			Dissolved Cobalt (Co)	2019/05/03	NC		%	20
			Dissolved Copper (Cu)	2019/05/03	NC		%	20
			Dissolved Iron (Fe)	2019/05/03	NC		%	20
			Dissolved Lead (Pb)	2019/05/03	NC		%	20
			Dissolved Magnesium (Mg)	2019/05/03	2.8		%	20
			Dissolved Manganese (Mn)	2019/05/03	0.085		%	20
			Dissolved Molybdenum (Mo)	2019/05/03	0.89		%	20
			Dissolved Nickel (Ni)	2019/05/03	NC		%	20
			Dissolved Phosphorus (P)	2019/05/03	NC		%	20
			Dissolved Potassium (K)	2019/05/03	1.5		%	20
			Dissolved Selenium (Se)	2019/05/03	NC		%	20
			Dissolved Silver (Ag)	2019/05/03	NC		%	20
			Dissolved Sodium (Na)	2019/05/03	0.21		%	20
			Dissolved Strontium (Sr)	2019/05/03	0.45		%	20
			Dissolved Thallium (Tl)	2019/05/03	NC		%	20
			Dissolved Tin (Sn)	2019/05/03	NC		%	20
			Dissolved Titanium (Ti)	2019/05/03	NC		%	20
			Dissolved Uranium (U)	2019/05/03	NC		%	20
			Dissolved Vanadium (V)	2019/05/03	5.7		%	20
			Dissolved Zinc (Zn)	2019/05/03	NC		%	20
6103904	KMC	QC Standard	pH	2019/05/04		100	%	97 - 103
6103904	KMC	RPD [JPE947-01]	pH	2019/05/04	0.52		%	N/A
6103906	KMC	Spiked Blank	Conductivity	2019/05/04		101	%	80 - 120
6103906	KMC	Method Blank	Conductivity	2019/05/04	1.1, RDL=1.0		uS/cm	
6103906	KMC	RPD [JPE947-01]	Conductivity	2019/05/04	0.49		%	10
6103907	KMC	QC Standard	pH	2019/05/04		101	%	97 - 103
6103907	KMC	RPD [JPE954-01]	pH	2019/05/04	0.64		%	N/A
6103910	KMC	Spiked Blank	Conductivity	2019/05/04		102	%	80 - 120
6103910	KMC	Method Blank	Conductivity	2019/05/04	<1.0		uS/cm	
6103910	KMC	RPD [JPE954-01]	Conductivity	2019/05/04	0.00015		%	10
6104716	BAN	Matrix Spike [JPE948-01]	Total Aluminum (Al)	2019/05/07		98	%	80 - 120
			Total Antimony (Sb)	2019/05/07		100	%	80 - 120
			Total Arsenic (As)	2019/05/07		95	%	80 - 120
			Total Barium (Ba)	2019/05/07		97	%	80 - 120
			Total Beryllium (Be)	2019/05/07		95	%	80 - 120
			Total Bismuth (Bi)	2019/05/07		99	%	80 - 120
			Total Boron (B)	2019/05/07		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/07		97	%	80 - 120
			Total Calcium (Ca)	2019/05/07		101	%	80 - 120
			Total Chromium (Cr)	2019/05/07		95	%	80 - 120
			Total Cobalt (Co)	2019/05/07		96	%	80 - 120
			Total Copper (Cu)	2019/05/07		93	%	80 - 120
			Total Iron (Fe)	2019/05/07		98	%	80 - 120
			Total Lead (Pb)	2019/05/07		97	%	80 - 120
			Total Magnesium (Mg)	2019/05/07		101	%	80 - 120
			Total Manganese (Mn)	2019/05/07		95	%	80 - 120
			Total Molybdenum (Mo)	2019/05/07		102	%	80 - 120
			Total Nickel (Ni)	2019/05/07		93	%	80 - 120
			Total Phosphorus (P)	2019/05/07		105	%	80 - 120
			Total Potassium (K)	2019/05/07		98	%	80 - 120

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Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Selenium (Se)	2019/05/07		95	%	80 - 120
			Total Silver (Ag)	2019/05/07		95	%	80 - 120
			Total Sodium (Na)	2019/05/07		NC	%	80 - 120
			Total Strontium (Sr)	2019/05/07		97	%	80 - 120
			Total Thallium (Tl)	2019/05/07		98	%	80 - 120
			Total Tin (Sn)	2019/05/07		101	%	80 - 120
			Total Titanium (Ti)	2019/05/07		101	%	80 - 120
			Total Uranium (U)	2019/05/07		103	%	80 - 120
			Total Vanadium (V)	2019/05/07		97	%	80 - 120
			Total Zinc (Zn)	2019/05/07		94	%	80 - 120
6104716	BAN	Spiked Blank	Total Aluminum (Al)	2019/05/07		104	%	80 - 120
			Total Antimony (Sb)	2019/05/07		102	%	80 - 120
			Total Arsenic (As)	2019/05/07		98	%	80 - 120
			Total Barium (Ba)	2019/05/07		100	%	80 - 120
			Total Beryllium (Be)	2019/05/07		97	%	80 - 120
			Total Bismuth (Bi)	2019/05/07		101	%	80 - 120
			Total Boron (B)	2019/05/07		99	%	80 - 120
			Total Cadmium (Cd)	2019/05/07		99	%	80 - 120
			Total Calcium (Ca)	2019/05/07		104	%	80 - 120
			Total Chromium (Cr)	2019/05/07		97	%	80 - 120
			Total Cobalt (Co)	2019/05/07		98	%	80 - 120
			Total Copper (Cu)	2019/05/07		96	%	80 - 120
			Total Iron (Fe)	2019/05/07		100	%	80 - 120
			Total Lead (Pb)	2019/05/07		100	%	80 - 120
			Total Magnesium (Mg)	2019/05/07		103	%	80 - 120
			Total Manganese (Mn)	2019/05/07		97	%	80 - 120
			Total Molybdenum (Mo)	2019/05/07		103	%	80 - 120
			Total Nickel (Ni)	2019/05/07		96	%	80 - 120
			Total Phosphorus (P)	2019/05/07		106	%	80 - 120
			Total Potassium (K)	2019/05/07		100	%	80 - 120
			Total Selenium (Se)	2019/05/07		96	%	80 - 120
			Total Silver (Ag)	2019/05/07		97	%	80 - 120
			Total Sodium (Na)	2019/05/07		99	%	80 - 120
			Total Strontium (Sr)	2019/05/07		100	%	80 - 120
			Total Thallium (Tl)	2019/05/07		100	%	80 - 120
			Total Tin (Sn)	2019/05/07		102	%	80 - 120
			Total Titanium (Ti)	2019/05/07		100	%	80 - 120
			Total Uranium (U)	2019/05/07		105	%	80 - 120
			Total Vanadium (V)	2019/05/07		100	%	80 - 120
			Total Zinc (Zn)	2019/05/07		97	%	80 - 120
6104716	BAN	Method Blank	Total Aluminum (Al)	2019/05/07	<5.0		ug/L	
			Total Antimony (Sb)	2019/05/07	<1.0		ug/L	
			Total Arsenic (As)	2019/05/07	<1.0		ug/L	
			Total Barium (Ba)	2019/05/07	<1.0		ug/L	
			Total Beryllium (Be)	2019/05/07	<1.0		ug/L	
			Total Bismuth (Bi)	2019/05/07	<2.0		ug/L	
			Total Boron (B)	2019/05/07	<50		ug/L	
			Total Cadmium (Cd)	2019/05/07	<0.010		ug/L	
			Total Calcium (Ca)	2019/05/07	<100		ug/L	
			Total Chromium (Cr)	2019/05/07	<1.0		ug/L	
			Total Cobalt (Co)	2019/05/07	<0.40		ug/L	
			Total Copper (Cu)	2019/05/07	<0.50		ug/L	
			Total Iron (Fe)	2019/05/07	<50		ug/L	
			Total Lead (Pb)	2019/05/07	<0.50		ug/L	

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Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Magnesium (Mg)	2019/05/07	<100		ug/L	
			Total Manganese (Mn)	2019/05/07	<2.0		ug/L	
			Total Molybdenum (Mo)	2019/05/07	<2.0		ug/L	
			Total Nickel (Ni)	2019/05/07	<2.0		ug/L	
			Total Phosphorus (P)	2019/05/07	<100		ug/L	
			Total Potassium (K)	2019/05/07	<100		ug/L	
			Total Selenium (Se)	2019/05/07	<1.0		ug/L	
			Total Silver (Ag)	2019/05/07	<0.10		ug/L	
			Total Sodium (Na)	2019/05/07	<100		ug/L	
			Total Strontium (Sr)	2019/05/07	<2.0		ug/L	
			Total Thallium (Tl)	2019/05/07	<0.10		ug/L	
			Total Tin (Sn)	2019/05/07	<2.0		ug/L	
			Total Titanium (Ti)	2019/05/07	<2.0		ug/L	
			Total Uranium (U)	2019/05/07	<0.10		ug/L	
			Total Vanadium (V)	2019/05/07	<2.0		ug/L	
			Total Zinc (Zn)	2019/05/07	<5.0		ug/L	
6104716	BAN	RPD [JPE947-01]	Total Aluminum (Al)	2019/05/07	2.8		%	20
			Total Antimony (Sb)	2019/05/07	NC		%	20
			Total Arsenic (As)	2019/05/07	1.3		%	20
			Total Barium (Ba)	2019/05/07	7.0		%	20
			Total Beryllium (Be)	2019/05/07	NC		%	20
			Total Bismuth (Bi)	2019/05/07	NC		%	20
			Total Boron (B)	2019/05/07	NC		%	20
			Total Cadmium (Cd)	2019/05/07	NC		%	20
			Total Calcium (Ca)	2019/05/07	1.2		%	20
			Total Chromium (Cr)	2019/05/07	NC		%	20
			Total Cobalt (Co)	2019/05/07	NC		%	20
			Total Copper (Cu)	2019/05/07	9.3		%	20
			Total Iron (Fe)	2019/05/07	3.0		%	20
			Total Lead (Pb)	2019/05/07	NC		%	20
			Total Magnesium (Mg)	2019/05/07	0.29		%	20
			Total Manganese (Mn)	2019/05/07	7.4		%	20
			Total Molybdenum (Mo)	2019/05/07	NC		%	20
			Total Nickel (Ni)	2019/05/07	NC		%	20
			Total Phosphorus (P)	2019/05/07	NC		%	20
			Total Potassium (K)	2019/05/07	1.1		%	20
			Total Selenium (Se)	2019/05/07	NC		%	20
			Total Silver (Ag)	2019/05/07	NC		%	20
			Total Sodium (Na)	2019/05/07	1.7		%	20
			Total Strontium (Sr)	2019/05/07	3.4		%	20
			Total Thallium (Tl)	2019/05/07	NC		%	20
			Total Tin (Sn)	2019/05/07	NC		%	20
			Total Titanium (Ti)	2019/05/07	NC		%	20
			Total Uranium (U)	2019/05/07	NC		%	20
			Total Vanadium (V)	2019/05/07	NC		%	20
			Total Zinc (Zn)	2019/05/07	NC		%	20
6104792	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/06		100	%	80 - 120
6104792	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/06		104	%	80 - 120
6104792	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/06	<5.0		mg/L	
6104792	NRG	RPD	Total Alkalinity (Total as CaCO3)	2019/05/06	0.52		%	25
6104797	NRG	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/06		NC	%	80 - 120
6104797	NRG	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/06		98	%	80 - 120
6104797	NRG	Method Blank	Dissolved Chloride (Cl-)	2019/05/06	<1.0		mg/L	
6104797	NRG	RPD	Dissolved Chloride (Cl-)	2019/05/06	0.32		%	25

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Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6104799	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/06		99	%	80 - 120
6104799	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/06		99	%	80 - 120
6104799	NRG	Method Blank	Dissolved Sulphate (SO4)	2019/05/06	<2.0		mg/L	
6104799	NRG	RPD	Dissolved Sulphate (SO4)	2019/05/06	1.6		%	25
6104802	NRG	Matrix Spike	Reactive Silica (SiO2)	2019/05/06		96	%	80 - 120
6104802	NRG	Spiked Blank	Reactive Silica (SiO2)	2019/05/06		101	%	80 - 120
6104802	NRG	Method Blank	Reactive Silica (SiO2)	2019/05/06	<0.50		mg/L	
6104802	NRG	RPD	Reactive Silica (SiO2)	2019/05/06	0.14		%	25
6104804	NRG	Spiked Blank	Colour	2019/05/06		98	%	80 - 120
6104804	NRG	Method Blank	Colour	2019/05/06	<5.0		TCU	
6104804	NRG	RPD	Colour	2019/05/06	15		%	20
6104806	NRG	Matrix Spike	Orthophosphate (P)	2019/05/07		92	%	80 - 120
6104806	NRG	Spiked Blank	Orthophosphate (P)	2019/05/07		97	%	80 - 120
6104806	NRG	Method Blank	Orthophosphate (P)	2019/05/07	<0.010		mg/L	
6104806	NRG	RPD	Orthophosphate (P)	2019/05/07	NC		%	25
6104810	NRG	Matrix Spike	Nitrate + Nitrite (N)	2019/05/06		94	%	80 - 120
6104810	NRG	Spiked Blank	Nitrate + Nitrite (N)	2019/05/06		94	%	80 - 120
6104810	NRG	Method Blank	Nitrate + Nitrite (N)	2019/05/06	<0.050		mg/L	
6104810	NRG	RPD	Nitrate + Nitrite (N)	2019/05/06	2.1		%	25
6104813	NRG	Matrix Spike	Nitrite (N)	2019/05/06		98	%	80 - 120
6104813	NRG	Spiked Blank	Nitrite (N)	2019/05/06		103	%	80 - 120
6104813	NRG	Method Blank	Nitrite (N)	2019/05/06	<0.010		mg/L	
6104813	NRG	RPD	Nitrite (N)	2019/05/06	NC		%	20
6104816	NRG	Matrix Spike	Total Alkalinity (Total as CaCO3)	2019/05/06		NC	%	80 - 120
6104816	NRG	Spiked Blank	Total Alkalinity (Total as CaCO3)	2019/05/06		106	%	80 - 120
6104816	NRG	Method Blank	Total Alkalinity (Total as CaCO3)	2019/05/06	<5.0		mg/L	
6104816	NRG	RPD	Total Alkalinity (Total as CaCO3)	2019/05/06	1.1		%	25
6104818	NRG	Matrix Spike	Dissolved Chloride (Cl-)	2019/05/06		NC	%	80 - 120
6104818	NRG	Spiked Blank	Dissolved Chloride (Cl-)	2019/05/06		98	%	80 - 120
6104818	NRG	Method Blank	Dissolved Chloride (Cl-)	2019/05/06	<1.0		mg/L	
6104818	NRG	RPD	Dissolved Chloride (Cl-)	2019/05/06	0.15		%	25
6104820	NRG	Matrix Spike	Dissolved Sulphate (SO4)	2019/05/06		97	%	80 - 120
6104820	NRG	Spiked Blank	Dissolved Sulphate (SO4)	2019/05/06		101	%	80 - 120
6104820	NRG	Method Blank	Dissolved Sulphate (SO4)	2019/05/06	<2.0		mg/L	
6104820	NRG	RPD	Dissolved Sulphate (SO4)	2019/05/06	0.28		%	25
6104822	NRG	Matrix Spike	Reactive Silica (SiO2)	2019/05/06		NC	%	80 - 120
6104822	NRG	Spiked Blank	Reactive Silica (SiO2)	2019/05/06		105	%	80 - 120
6104822	NRG	Method Blank	Reactive Silica (SiO2)	2019/05/06	<0.50		mg/L	
6104822	NRG	RPD	Reactive Silica (SiO2)	2019/05/06	0.0089		%	25
6104823	NRG	Spiked Blank	Colour	2019/05/06		97	%	80 - 120
6104823	NRG	Method Blank	Colour	2019/05/06	<5.0		TCU	
6104823	NRG	RPD	Colour	2019/05/06	11		%	20
6104825	NRG	Matrix Spike	Orthophosphate (P)	2019/05/07		87	%	80 - 120
6104825	NRG	Spiked Blank	Orthophosphate (P)	2019/05/07		92	%	80 - 120
6104825	NRG	Method Blank	Orthophosphate (P)	2019/05/07	<0.010		mg/L	
6104825	NRG	RPD	Orthophosphate (P)	2019/05/07	0.11		%	25
6104827	NRG	Matrix Spike	Nitrate + Nitrite (N)	2019/05/06		93	%	80 - 120
6104827	NRG	Spiked Blank	Nitrate + Nitrite (N)	2019/05/06		95	%	80 - 120
6104827	NRG	Method Blank	Nitrate + Nitrite (N)	2019/05/06	<0.050		mg/L	
6104827	NRG	RPD	Nitrate + Nitrite (N)	2019/05/06	NC		%	25
6104828	NRG	Matrix Spike	Nitrite (N)	2019/05/06		101	%	80 - 120
6104828	NRG	Spiked Blank	Nitrite (N)	2019/05/06		101	%	80 - 120
6104828	NRG	Method Blank	Nitrite (N)	2019/05/06	<0.010		mg/L	
6104828	NRG	RPD	Nitrite (N)	2019/05/06	NC		%	20

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6104961	SDN	RPD [JPE927-01]	Moisture	2019/05/06	1.8		%	25
6105340	YXU	Matrix Spike	Isobutylbenzene - Volatile	2019/05/06		124 (1)	%	60 - 130
			Benzene	2019/05/06		99	%	60 - 130
			Toluene	2019/05/06		99	%	60 - 130
			Ethylbenzene	2019/05/06		106	%	60 - 130
			Total Xylenes	2019/05/06		102	%	60 - 130
6105340	YXU	Spiked Blank	Isobutylbenzene - Volatile	2019/05/06		97	%	60 - 130
			Benzene	2019/05/06		97	%	60 - 140
			Toluene	2019/05/06		99	%	60 - 140
			Ethylbenzene	2019/05/06		100	%	60 - 140
			Total Xylenes	2019/05/06		100	%	60 - 140
6105340	YXU	Method Blank	Isobutylbenzene - Volatile	2019/05/06		106	%	60 - 130
			Benzene	2019/05/06	<0.025		mg/kg	
			Toluene	2019/05/06	<0.050		mg/kg	
			Ethylbenzene	2019/05/06	<0.025		mg/kg	
			Total Xylenes	2019/05/06	<0.050		mg/kg	
			C6 - C10 (less BTEX)	2019/05/06	<2.5		mg/kg	
6105340	YXU	RPD	Benzene	2019/05/06	NC		%	50
			Toluene	2019/05/06	NC		%	50
			Ethylbenzene	2019/05/06	NC		%	50
			Total Xylenes	2019/05/06	NC		%	50
			C6 - C10 (less BTEX)	2019/05/06	2.7		%	50
6105432	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/07		96	%	80 - 120
6105432	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/07		103	%	80 - 120
6105432	BKE	Method Blank	Total Cyanide (CN)	2019/05/07	<0.0050		mg/L	
6105432	BKE	RPD	Total Cyanide (CN)	2019/05/07	NC		%	20
6105437	BKE	Matrix Spike	Total Cyanide (CN)	2019/05/07		99	%	80 - 120
6105437	BKE	Spiked Blank	Total Cyanide (CN)	2019/05/07		101	%	80 - 120
6105437	BKE	Method Blank	Total Cyanide (CN)	2019/05/07	<0.0050		mg/L	
6105437	BKE	RPD	Total Cyanide (CN)	2019/05/07	4.6		%	20
6106756	BAN	Matrix Spike	Acid Extractable Antimony (Sb)	2019/05/07		96	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		100	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		102	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		102	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		98	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		100	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		104	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		102	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		NC	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		106	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		93	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		100	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		102	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		100	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		94	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		NC	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		102	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		98	%	75 - 125

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Zinc (Zn)	2019/05/07		NC	%	75 - 125
6106756	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/07		101	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		100	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		100	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		103	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		99	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		101	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		98	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		99	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		101	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		99	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		95	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		98	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		101	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		102	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		98	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		98	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		101	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		104	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		100	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		99	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		97	%	75 - 125
6106756	BAN	Method Blank	Acid Extractable Aluminum (Al)	2019/05/07	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Beryllium (Be)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/07	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/07	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/07	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/07	<5.0		mg/kg	
6106756	BAN	RPD	Acid Extractable Lead (Pb)	2019/05/07	10		%	35

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Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6106758	BAN	Matrix Spike [JPE920-01]	Acid Extractable Antimony (Sb)	2019/05/08		84	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/08		NC	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/08		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/08		93	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/08		99	%	75 - 125
			Acid Extractable Boron (B)	2019/05/08		87	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/08		92	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/08		88	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/08		NC	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/08		88	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/08		NC	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/08		94	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/08		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/08		93	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/08		91	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/08		90	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/08		94	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/08		92	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/08		90	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/08		97	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/08		98	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/08		96	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/08		93	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/08		NC	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/08		NC	%	75 - 125
6106758	BAN	Spiked Blank	Acid Extractable Antimony (Sb)	2019/05/07		101	%	75 - 125
			Acid Extractable Arsenic (As)	2019/05/07		98	%	75 - 125
			Acid Extractable Barium (Ba)	2019/05/07		99	%	75 - 125
			Acid Extractable Beryllium (Be)	2019/05/07		97	%	75 - 125
			Acid Extractable Bismuth (Bi)	2019/05/07		101	%	75 - 125
			Acid Extractable Boron (B)	2019/05/07		102	%	75 - 125
			Acid Extractable Cadmium (Cd)	2019/05/07		97	%	75 - 125
			Acid Extractable Chromium (Cr)	2019/05/07		97	%	75 - 125
			Acid Extractable Cobalt (Co)	2019/05/07		97	%	75 - 125
			Acid Extractable Copper (Cu)	2019/05/07		95	%	75 - 125
			Acid Extractable Lead (Pb)	2019/05/07		99	%	75 - 125
			Acid Extractable Lithium (Li)	2019/05/07		103	%	75 - 125
			Acid Extractable Manganese (Mn)	2019/05/07		98	%	75 - 125
			Acid Extractable Mercury (Hg)	2019/05/07		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2019/05/07		98	%	75 - 125
			Acid Extractable Nickel (Ni)	2019/05/07		96	%	75 - 125
			Acid Extractable Rubidium (Rb)	2019/05/07		100	%	75 - 125
			Acid Extractable Selenium (Se)	2019/05/07		98	%	75 - 125
			Acid Extractable Silver (Ag)	2019/05/07		96	%	75 - 125
			Acid Extractable Strontium (Sr)	2019/05/07		100	%	75 - 125
			Acid Extractable Thallium (Tl)	2019/05/07		100	%	75 - 125
			Acid Extractable Tin (Sn)	2019/05/07		103	%	75 - 125
			Acid Extractable Uranium (U)	2019/05/07		99	%	75 - 125
			Acid Extractable Vanadium (V)	2019/05/07		98	%	75 - 125
			Acid Extractable Zinc (Zn)	2019/05/07		94	%	75 - 125
6106758	BAN	Method Blank	Acid Extractable Aluminum (Al)	2019/05/07	<10		mg/kg	
			Acid Extractable Antimony (Sb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Arsenic (As)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Barium (Ba)	2019/05/07	<5.0		mg/kg	

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Beryllium (Be)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Bismuth (Bi)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Boron (B)	2019/05/07	<50		mg/kg	
			Acid Extractable Cadmium (Cd)	2019/05/07	<0.30		mg/kg	
			Acid Extractable Chromium (Cr)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Cobalt (Co)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Copper (Cu)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Iron (Fe)	2019/05/07	<50		mg/kg	
			Acid Extractable Lead (Pb)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Lithium (Li)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Manganese (Mn)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Mercury (Hg)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Molybdenum (Mo)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Nickel (Ni)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Rubidium (Rb)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Selenium (Se)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Silver (Ag)	2019/05/07	<0.50		mg/kg	
			Acid Extractable Strontium (Sr)	2019/05/07	<5.0		mg/kg	
			Acid Extractable Thallium (Tl)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Tin (Sn)	2019/05/07	<1.0		mg/kg	
			Acid Extractable Uranium (U)	2019/05/07	<0.10		mg/kg	
			Acid Extractable Vanadium (V)	2019/05/07	<2.0		mg/kg	
			Acid Extractable Zinc (Zn)	2019/05/07	<5.0		mg/kg	
6106758	BAN	RPD [JPE920-01]	Acid Extractable Aluminum (Al)	2019/05/08	3.6		%	35
			Acid Extractable Antimony (Sb)	2019/05/08	NC		%	35
			Acid Extractable Arsenic (As)	2019/05/08	3.5		%	35
			Acid Extractable Barium (Ba)	2019/05/08	5.4		%	35
			Acid Extractable Beryllium (Be)	2019/05/08	NC		%	35
			Acid Extractable Bismuth (Bi)	2019/05/08	NC		%	35
			Acid Extractable Boron (B)	2019/05/08	NC		%	35
			Acid Extractable Cadmium (Cd)	2019/05/08	3.1		%	35
			Acid Extractable Chromium (Cr)	2019/05/08	2.0		%	35
			Acid Extractable Cobalt (Co)	2019/05/08	1.4		%	35
			Acid Extractable Copper (Cu)	2019/05/08	1.2		%	35
			Acid Extractable Iron (Fe)	2019/05/08	1.6		%	35
			Acid Extractable Lead (Pb)	2019/05/08	3.0		%	35
			Acid Extractable Lithium (Li)	2019/05/08	2.2		%	35
			Acid Extractable Manganese (Mn)	2019/05/08	3.2		%	35
			Acid Extractable Mercury (Hg)	2019/05/08	2.6		%	35
			Acid Extractable Molybdenum (Mo)	2019/05/08	NC		%	35
			Acid Extractable Nickel (Ni)	2019/05/08	2.2		%	35
			Acid Extractable Rubidium (Rb)	2019/05/08	5.8		%	35
			Acid Extractable Selenium (Se)	2019/05/08	4.8		%	35
			Acid Extractable Silver (Ag)	2019/05/08	NC		%	35
			Acid Extractable Strontium (Sr)	2019/05/08	0.44		%	35
			Acid Extractable Thallium (Tl)	2019/05/08	7.7		%	35
			Acid Extractable Tin (Sn)	2019/05/08	14		%	35
			Acid Extractable Uranium (U)	2019/05/08	0.43		%	35
			Acid Extractable Vanadium (V)	2019/05/08	2.4		%	35
			Acid Extractable Zinc (Zn)	2019/05/08	1.8		%	35
6106759	BBD	QC Standard	Organic Carbon (TOC)	2019/05/09		90	%	75 - 125
6106759	BBD	Method Blank	Organic Carbon (TOC)	2019/05/09	<0.50		g/kg	
6106759	BBD	RPD	Organic Carbon (TOC)	2019/05/09	4.9		%	35
6106993	SRM	Matrix Spike	Nitrogen (Ammonia Nitrogen)	2019/05/07		91	%	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6106993	SRM	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07		99	%	80 - 120
6106993	SRM	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07	<0.050		mg/L	
6106993	SRM	RPD	Nitrogen (Ammonia Nitrogen)	2019/05/07	2.0		%	20
6106998	SRM	Matrix Spike [JPE947-06]	Nitrogen (Ammonia Nitrogen)	2019/05/07		83	%	80 - 120
6106998	SRM	Spiked Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07		102	%	80 - 120
6106998	SRM	Method Blank	Nitrogen (Ammonia Nitrogen)	2019/05/07	<0.050		mg/L	
6106998	SRM	RPD [JPE947-06]	Nitrogen (Ammonia Nitrogen)	2019/05/07	NC		%	20
6107943	KMC	QC Standard	Turbidity	2019/05/07		102	%	80 - 120
6107943	KMC	Spiked Blank	Turbidity	2019/05/07		102	%	80 - 120
6107943	KMC	Method Blank	Turbidity	2019/05/07	<0.10		NTU	
6107943	KMC	RPD	Turbidity	2019/05/07	6.5		%	20
6107949	KMC	QC Standard	Turbidity	2019/05/07		102	%	80 - 120
6107949	KMC	Spiked Blank	Turbidity	2019/05/07		102	%	80 - 120
6107949	KMC	Method Blank	Turbidity	2019/05/07	<0.10		NTU	
6107949	KMC	RPD	Turbidity	2019/05/07	NC		%	20
6109397	NRG	Matrix Spike [JPE927-01]	Sulphate (SO4)	2019/05/08		98	%	80 - 120
6109397	NRG	Spiked Blank	Sulphate (SO4)	2019/05/08		99	%	80 - 120
6109397	NRG	Method Blank	Sulphate (SO4)	2019/05/08	<10		mg/kg	
6109397	NRG	RPD [JPE927-01]	Sulphate (SO4)	2019/05/08	6.7		%	25
6118321	GGC	Spiked Blank	Total Cyanide (CN)	2019/05/10		87	%	75 - 125
6118321	GGC	Method Blank	Total Cyanide (CN)	2019/05/10	<0.50		mg/kg	
6127324	éBA	QC Standard	Total Sulphur (S)	2019/05/09		95	%	77 - 128
6127324	éBA	Method Blank	Total Sulphur (S)	2019/05/09	<0.010		% g/g	
6127324	éBA	RPD [JPE917-01]	Total Sulphur (S)	2019/05/09	0.50		%	30
6130723	BCD	Matrix Spike [JPE927-01]	Isobutylbenzene - Extractable	2019/05/21		107	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/21		116 (2)	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/21		90	%	30 - 130
			>C16-C21 Hydrocarbons	2019/05/21		83	%	30 - 130
			>C21-<C32 Hydrocarbons	2019/05/21		97	%	30 - 130
6130723	BCD	Spiked Blank	Isobutylbenzene - Extractable	2019/05/21		102	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/21		109	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/21		94	%	60 - 130
			>C16-C21 Hydrocarbons	2019/05/21		92	%	60 - 130
			>C21-<C32 Hydrocarbons	2019/05/21		109	%	60 - 130
6130723	BCD	Method Blank	Isobutylbenzene - Extractable	2019/05/21		99	%	60 - 130
			n-Dotriacontane - Extractable	2019/05/21		109	%	60 - 130
			>C10-C16 Hydrocarbons	2019/05/21	<10		mg/kg	
			>C16-C21 Hydrocarbons	2019/05/21	<10		mg/kg	
			>C21-<C32 Hydrocarbons	2019/05/21	<15		mg/kg	
6130723	BCD	RPD [JPE927-01]	>C10-C16 Hydrocarbons	2019/05/21	NC		%	50
			>C16-C21 Hydrocarbons	2019/05/21	9.6		%	50
			>C21-<C32 Hydrocarbons	2019/05/21	2.9		%	50
6131192	CCR	Matrix Spike	Total Mercury (Hg)	2019/05/23		101	%	80 - 120
6131192	CCR	Spiked Blank	Total Mercury (Hg)	2019/05/23		99	%	80 - 120
6131192	CCR	Method Blank	Total Mercury (Hg)	2019/05/23	<0.013		ug/L	

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
6131192	CCR	RPD	Total Mercury (Hg)	2019/05/23	NC		%	20

N/A = Not Applicable

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

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

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

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

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

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

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

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

(1) VPH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

(2) Silica gel clean-up performed prior to analysis as per client request.

Maxxam Analytics International Corporation o/a Maxxam Analytics 200 Bluewater Rd, Suite 105, Bedford, Nova Scotia Canada B4B 1G9 Tel: 902-420-0203 Toll-free: 800-565-7227 Fax: 902-420-8612 www.maxxamanalytics.com

Maxxam Job #: B9B5460
Report Date: 2019/05/23

Dillon Consulting Limited
Client Project #: 19-9183-3000
Site Location: PORT WALLACE PHASE II

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific Specialist

Caroline Bougie, B.Sc. Chemist

Eric Dearman, Scientific Specialist

Mike MacGillivray, Scientific Specialist (Inorganics)

Noureddine Chafiaai, B.Sc., Chemist

Rosemarie MacDonald, Scientific Specialist (Organics)

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Your Project #: B9B5460
Your C.O.C. #: b9b5460

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2019/05/17
Report #: R2724453
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B933641
Received: 2019/05/04, 10:56

Sample Matrix: Sediment
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Cyanide (Total) (1, 2)	2	2019/05/15	2019/05/16	CAL SOP-00270	SM 23 4500-CN m
Elements by ICPMS (total)	3	2019/05/14	2019/05/14	BBY7SOP-00004 / BBY7SOP-00001	EPA 6020b R2 m
Moisture	3	2019/05/13	2019/05/14	BBY8SOP-00017	BCMOE BCLM Dec2000 m
pH (2:1 DI Water Extract)	3	2019/05/14	2019/05/14	BBY6SOP-00028	BCMOE BCLM Mar2005 m
Sulphate in Soil (5:1 DI Water Extract)	3	2019/05/14	2019/05/15	BBY6SOP-00017	SM 22 4500-SO42- E m
Sulphide in Soil	3	2019/05/13	2019/05/15	BBY6SOP-00052,	EPA-821-R-91-100 m
Total Organic Carbon LECO Method (1)	2	N/A	2019/05/15	CAL SOP-00243	LECO 203-821-498 m
Total Organic Carbon LECO Method (1)	1	N/A	2019/05/17	CAL SOP-00243	LECO 203-821-498 m

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Conductance - water	5	N/A	2019/05/14	BBY6SOP-00026	SM 22 2510 B m
Hardness (calculated as CaCO3)	5	N/A	2019/05/14	BBY WI-00033	Auto Calc
Mercury (Dissolved) by CV	5	N/A	2019/05/14	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (diss.)	5	N/A	2019/05/14	BBY WI-00033	Auto Calc
Elements by CRC ICPMS (dissolved)	5	N/A	2019/05/14	BBY7SOP-00002	EPA 6020b R2 m
Filter and HNO3 Preserve for Metals	5	N/A	2019/05/13	BBY7 WI-00004	SM 23 3030B m
pH Water (3)	5	N/A	2019/05/14	BBY6SOP-00026	SM 22 4500-H+ B m

Remarks:

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

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

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Maxxam
A Bureau Veritas Group Company

Your Project #: B9B5460
Your C.O.C. #: b9b5460

Attention: BEDFORD CLIENT SERVICE

MAXXAM ANALYTICS
200 BLUEWATER ROAD, SUITE 105
BEDFORD, NS
CANADA B4B 1G9

Report Date: 2019/05/17
Report #: R2724453
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B933641
Received: 2019/05/04, 10:56

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing. Maxxam is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Maxxam, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Maxxam Calgary Environmental
(2) Free cyanide will complex with soil iron, producing anomalously low recoveries. Thus a failed spike recovery does not invalidate a negative result on the native sample.
(3) The BC-MOE and APHA Standard Method require pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the BC-MOE/APHA Standard Method holding time.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Eva Sénéchal, Key Account Specialist
Email: esenechal@maxxam.ca
Phone# (604) 734 7276
==
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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

RESULTS OF CHEMICAL ANALYSES OF SEDIMENT

Maxxam ID		VQ0693		VQ0694	VQ0694	VQ0700		
Sampling Date		2019/04/25		2019/04/25	2019/04/25	2018/04/25		
COC Number		b9b5460		b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**RDL**	**2019SED12A(JPE929)**	**2019SED12A(JPE929) Lab-Dup**	**2019SS10(3.36-3.56m) (JPE940)**	**RDL**	**QC Batch**
Misc. Inorganics								
Soluble (5:1) Sulphate (SO4)	mg/kg	585	100	170	N/A	<100	100	9417535
Total Cyanide (CN)	mg/kg	0.36	0.20	<0.40	0.42	N/A	0.40	9418529
MISCELLANEOUS								
Sulphide	ug/g	0.45	0.30	32.7	N/A	<0.30	0.30	9415117

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

Maxxam ID		VQ0700		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics				
Soluble (5:1) Sulphate (SO4)	mg/kg	<100	100	9417535

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

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PHYSICAL TESTING (SEDIMENT)

Maxxam ID		VQ0693		VQ0694	VQ0700		
Sampling Date		2019/04/25		2019/04/25	2018/04/25		
COC Number		b9b5460		b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**QC Batch**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**RDL**	**QC Batch**
Physical Properties							
Moisture	%	26	9415518	34	21	0.30	9415903
RDL = Reportable Detection Limit							

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MISCELLANEOUS (SEDIMENT)

Maxxam ID		VQ0693	VQ0693	VQ0694		
Sampling Date		2019/04/25	2019/04/25	2019/04/25		
COC Number		b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED10A(JPE927) Lab-Dup**	**2019SED12A(JPE929)**	**RDL**	**QC Batch**
Misc. Inorganics						
Total Organic Carbon (C)	%	0.13	0.12	0.88	0.050	9418647

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

Maxxam ID		VQ0700	VQ0700		
Sampling Date		2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460		
	UNITS	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Misc. Inorganics					
Total Organic Carbon (C)	%	0.29	0.26	0.050	9422751

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

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		VQ0695	VQ0696	VQ0697	VQ0698		
Sampling Date		2019/04/16	2019/04/16	2019/04/16	2019/04/29		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019PW1(JPE932)**	**2019PW2(JPE933)**	**2019PW3(JPE934)**	**2019PW4(JPE935)**	**RDL**	**QC Batch**
Calculated Parameters							
Filter and HNO3 Preservation	N/A	LAB	LAB	LAB	LAB	N/A	9415419
Physical Properties							
Conductivity	uS/cm	472	650	614	483	2.0	9418322
pH	pH	7.56	7.51	6.78	6.87	N/A	9418321
RDL = Reportable Detection Limit							
N/A = Not Applicable							

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Calculated Parameters				
Filter and HNO3 Preservation	N/A	LAB	N/A	9415419
Physical Properties				
Conductivity	uS/cm	262	2.0	9418322
pH	pH	6.65	N/A	9418321
RDL = Reportable Detection Limit				
N/A = Not Applicable				

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR/CCME METALS IN SOIL WITH HG (SEDIMENT)

Maxxam ID		VQ0693	VQ0694	VQ0700	VQ0700		
Sampling Date		2019/04/25	2019/04/25	2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Physical Properties							
Soluble (2:1) pH	pH	5.81	6.19	5.46	5.48	N/A	9416453
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	13500	13900	10600	10700	100	9416441
Total Antimony (Sb)	mg/kg	9.36	7.38	0.24	0.24	0.10	9416441
Total Arsenic (As)	mg/kg	6480	4830	16.4	17.0	0.50	9416441
Total Barium (Ba)	mg/kg	54.5	64.4	25.0	25.3	0.10	9416441
Total Beryllium (Be)	mg/kg	0.37	0.42	0.27	0.27	0.20	9416441
Total Bismuth (Bi)	mg/kg	0.89	0.85	0.14	0.14	0.10	9416441
Total Cadmium (Cd)	mg/kg	0.176	0.268	0.075	0.065	0.050	9416441
Total Calcium (Ca)	mg/kg	4810	3980	2120	2090	100	9416441
Total Chromium (Cr)	mg/kg	15.9	15.9	17.1	17.0	1.0	9416441
Total Cobalt (Co)	mg/kg	18.5	17.9	10.4	10.3	0.30	9416441
Total Copper (Cu)	mg/kg	50.5	52.1	18.0	17.8	0.50	9416441
Total Iron (Fe)	mg/kg	33600	32100	20500	20700	100	9416441
Total Lead (Pb)	mg/kg	57.3	54.0	9.66	10.1	0.10	9416441
Total Magnesium (Mg)	mg/kg	9780	9090	6240	6270	100	9416441
Total Manganese (Mn)	mg/kg	703	1210	390	392	0.20	9416441
Total Mercury (Hg)	mg/kg	4.55	5.35	<0.050	<0.050	0.050	9416441
Total Molybdenum (Mo)	mg/kg	0.23	0.28	0.45	0.44	0.10	9416441
Total Nickel (Ni)	mg/kg	38.5	35.6	24.4	23.9	0.80	9416441
Total Phosphorus (P)	mg/kg	731	694	665	655	10	9416441
Total Potassium (K)	mg/kg	4520	4370	700	715	100	9416441
Total Selenium (Se)	mg/kg	<0.50	<0.50	<0.50	<0.50	0.50	9416441
Total Silver (Ag)	mg/kg	0.157	0.164	<0.050	<0.050	0.050	9416441
Total Sodium (Na)	mg/kg	<100	<100	<100	<100	100	9416441
Total Strontium (Sr)	mg/kg	20.5	18.6	14.9	15.1	0.10	9416441
Total Sulphur (S)	mg/kg	N/A	2950	<500	<500	500	9416441
Total Thallium (Tl)	mg/kg	0.304	0.327	0.055	0.055	0.050	9416441
Total Tin (Sn)	mg/kg	0.28	0.36	0.23	0.26	0.10	9416441
Total Titanium (Ti)	mg/kg	610	582	498	511	1.0	9416441
Total Vanadium (V)	mg/kg	16.4	16.8	14.0	14.1	2.0	9416441
Total Zinc (Zn)	mg/kg	119	135	51.8	52.1	1.0	9416441

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

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CSR/CCME METALS IN SOIL WITH HG (SEDIMENT)

Maxxam ID		VQ0693	VQ0694	VQ0700	VQ0700		
Sampling Date		2019/04/25	2019/04/25	2018/04/25	2018/04/25		
COC Number		b9b5460	b9b5460	b9b5460	b9b5460		
	UNITS	**2019SED10A(JPE927)**	**2019SED12A(JPE929)**	**2019SS10(3.36-3.56m) (JPE940)**	**2019SS10(3.36-3.56m) (JPE940) Lab-Dup**	**RDL**	**QC Batch**
Total Zirconium (Zr)	mg/kg	29.3	22.8	6.06	6.29	0.50	9416441

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

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CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0695		VQ0696	VQ0697		VQ0698		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/29		
COC Number		b9b5460		b9b5460	b9b5460		b9b5460		
	UNITS	2019PW1(JPE932)	RDL	2019PW2(JPE933)	2019PW3(JPE934)	RDL	2019PW4(JPE935)	RDL	QC Batch
Calculated Parameters									
Dissolved Hardness (CaCO3)	mg/L	82.3	0.50	129	105	0.50	75.6	0.50	9407523
Elements									
Dissolved Mercury (Hg)	ug/L	0.0099	0.0020	0.0120	0.0074	0.0020	0.0048	0.0020	9416652
Dissolved Metals by ICPMS									
Dissolved Aluminum (Al)	ug/L	94	15	34	45	30	53	15	9415624
Dissolved Antimony (Sb)	ug/L	<2.5	2.5	<5.0	<5.0	5.0	<2.5	2.5	9415624
Dissolved Arsenic (As)	ug/L	137	0.50	203	146	1.0	298	0.50	9415624
Dissolved Barium (Ba)	ug/L	135	5.0	307	292	10	202	5.0	9415624
Dissolved Beryllium (Be)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Bismuth (Bi)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Boron (B)	ug/L	<250	250	<500	<500	500	<250	250	9415624
Dissolved Cadmium (Cd)	ug/L	<0.050	0.050	<0.10	<0.10	0.10	<0.050	0.050	9415624
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Cobalt (Co)	ug/L	16.0	1.0	15.1	38.8	2.0	40.3	1.0	9415624
Dissolved Copper (Cu)	ug/L	<1.0	1.0	<2.0	<2.0	2.0	<1.0	1.0	9415624
Dissolved Iron (Fe)	ug/L	7720	25	7550	14500	50	20500	25	9415624
Dissolved Lead (Pb)	ug/L	<1.0	1.0	<2.0	<2.0	2.0	<1.0	1.0	9415624
Dissolved Lithium (Li)	ug/L	<10	10	<20	<20	20	<10	10	9415624
Dissolved Manganese (Mn)	ug/L	29500	5.0	51600	49500	10	30200	5.0	9415624
Dissolved Molybdenum (Mo)	ug/L	<5.0	5.0	<10	<10	10	<5.0	5.0	9415624
Dissolved Nickel (Ni)	ug/L	<5.0	5.0	<10	<10	10	7.8	5.0	9415624
Dissolved Selenium (Se)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Silicon (Si)	ug/L	2460	500	1910	2950	1000	4100	500	9415624
Dissolved Silver (Ag)	ug/L	<0.10	0.10	<0.20	<0.20	0.20	<0.10	0.10	9415624
Dissolved Strontium (Sr)	ug/L	110	5.0	153	134	10	92.2	5.0	9415624
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	<0.10	<0.10	0.10	<0.050	0.050	9415624
Dissolved Tin (Sn)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Titanium (Ti)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Uranium (U)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Vanadium (V)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Zinc (Zn)	ug/L	<25	25	<50	<50	50	<25	25	9415624
Dissolved Zirconium (Zr)	ug/L	<0.50	0.50	<1.0	<1.0	1.0	<0.50	0.50	9415624
Dissolved Calcium (Ca)	mg/L	26.9	0.25	41.4	34.2	0.50	24.7	0.25	9407531
Dissolved Magnesium (Mg)	mg/L	3.71	0.25	6.16	4.86	0.50	3.36	0.25	9407531

RDL = Reportable Detection Limit

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CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0695		VQ0696	VQ0697		VQ0698		
Sampling Date		2019/04/16		2019/04/16	2019/04/16		2019/04/29		
COC Number		b9b5460		b9b5460	b9b5460		b9b5460		
	UNITS	**2019PW1(JPE932)**	**RDL**	**2019PW2(JPE933)**	**2019PW3(JPE934)**	**RDL**	**2019PW4(JPE935)**	**RDL**	**QC Batch**
Dissolved Potassium (K)	mg/L	1.83	0.25	2.51	1.97	0.50	1.67	0.25	9407531
Dissolved Sodium (Na)	mg/L	31.7	0.25	37.2	34.9	0.50	27.3	0.25	9407531
Dissolved Sulphur (S)	mg/L	31	15	69	75	30	44	15	9407531
RDL = Reportable Detection Limit									

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Maxxam Job #: B933641
Report Date: 2019/05/17

MAXXAM ANALYTICS
Client Project #: B9B5460

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Calculated Parameters				
Dissolved Hardness (CaCO3)	mg/L	24.4	0.50	9407523
Elements				
Dissolved Mercury (Hg)	ug/L	0.98 (1)	0.10	9416652
Dissolved Metals by ICPMS				
Dissolved Aluminum (Al)	ug/L	1070	3.0	9415624
Dissolved Antimony (Sb)	ug/L	10.8	0.50	9415624
Dissolved Arsenic (As)	ug/L	129	0.10	9415624
Dissolved Barium (Ba)	ug/L	30.6	1.0	9415624
Dissolved Beryllium (Be)	ug/L	<0.10	0.10	9415624
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	9415624
Dissolved Boron (B)	ug/L	<50	50	9415624
Dissolved Cadmium (Cd)	ug/L	0.041	0.010	9415624
Dissolved Chromium (Cr)	ug/L	<1.0	1.0	9415624
Dissolved Cobalt (Co)	ug/L	3.79	0.20	9415624
Dissolved Copper (Cu)	ug/L	5.31	0.20	9415624
Dissolved Iron (Fe)	ug/L	757	5.0	9415624
Dissolved Lead (Pb)	ug/L	5.92	0.20	9415624
Dissolved Lithium (Li)	ug/L	<2.0	2.0	9415624
Dissolved Manganese (Mn)	ug/L	1960	1.0	9415624
Dissolved Molybdenum (Mo)	ug/L	<1.0	1.0	9415624
Dissolved Nickel (Ni)	ug/L	3.1	1.0	9415624
Dissolved Selenium (Se)	ug/L	0.13	0.10	9415624
Dissolved Silicon (Si)	ug/L	7310	100	9415624
Dissolved Silver (Ag)	ug/L	0.056	0.020	9415624
Dissolved Strontium (Sr)	ug/L	31.7	1.0	9415624
Dissolved Thallium (Tl)	ug/L	0.060	0.010	9415624
Dissolved Tin (Sn)	ug/L	<5.0	5.0	9415624
Dissolved Titanium (Ti)	ug/L	18.2	5.0	9415624
Dissolved Uranium (U)	ug/L	0.14	0.10	9415624
Dissolved Vanadium (V)	ug/L	<5.0	5.0	9415624
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	9415624
Dissolved Zirconium (Zr)	ug/L	2.35	0.10	9415624
Dissolved Calcium (Ca)	mg/L	7.27	0.050	9407531

RDL = Reportable Detection Limit
(1) Detection limit raised due to interferent.

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CSR DISSOLVED METALS IN WATER WITH CV HG (WATER)

Maxxam ID		VQ0699		
Sampling Date		2018/04/25		
COC Number		b9b5460		
	UNITS	**2019PW5(JPE936)**	**RDL**	**QC Batch**
Dissolved Magnesium (Mg)	mg/L	1.51	0.050	9407531
Dissolved Potassium (K)	mg/L	2.17	0.050	9407531
Dissolved Sodium (Na)	mg/L	33.5	0.050	9407531
Dissolved Sulphur (S)	mg/L	10.9	3.0	9407531
RDL = Reportable Detection Limit				

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GENERAL COMMENTS

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

Package 1	5.0°C

Sample VQ0693 [2019SED10A(JPE927)] : Sample analyzed past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample was analyzed past method specified hold time for Total Sulphide.

Sample VQ0694 [2019SED12A(JPE929)] : Sample analyzed past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample was analyzed past method specified hold time for Total Sulphide.

Sample VQ0695 [2019PW1(JPE932)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0696 [2019PW2(JPE933)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0697 [2019PW3(JPE934)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0698 [2019PW4(JPE935)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling.

Sample VQ0699 [2019PW5(JPE936)] : The sample for dissolved metals was filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling. Sample was analyzed past method specified hold time for Conductance - water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Conductance - water.

Sample VQ0700 [2019SS10(3.36-3.56m)(JPE940)] : Sample analyzed past method specified hold time for Moisture. Sample received past method specified hold time for Moisture. Sample analyzed past method specified hold time for Sulphide in Soil. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised. Sample received past method specified hold time for Sulphide in Soil. Sample analyzed past method specified hold time for pH (2:1 DI Water Extract). Sample received past method specified hold time for pH (2:1 DI Water Extract). Sample analyzed past method specified hold time for Sulphate in Soil (5:1 DI Water Extract). Sample received past method specified hold time for Sulphate in Soil (5:1 DI Water Extract). Sample was analyzed past method specified hold time for Total Sulphide.

CSR DISSOLVED METALS IN WATER WITH CV HG (WATER) Comments

Sample VQ0695 [2019PW1(JPE932)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0696 [2019PW2(JPE933)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0697 [2019PW3(JPE934)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.
Sample VQ0698 [2019PW4(JPE935)] Elements by CRC ICPMS (dissolved): RDL raised due to concentration over linear range, sample dilution required.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9415117	Sulphide	2019/05/15	NC	75 - 125	84	75 - 125	<0.50	ug/g	NC	30		
9415518	Moisture	2019/05/14					<0.30	%	4.0	20		
9415624	Dissolved Aluminum (Al)	2019/05/14	93	80 - 120	103	80 - 120	<3.0	ug/L	NC	20		
9415624	Dissolved Antimony (Sb)	2019/05/14	97	80 - 120	102	80 - 120	<0.50	ug/L	NC	20		
9415624	Dissolved Arsenic (As)	2019/05/14	105	80 - 120	101	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Barium (Ba)	2019/05/14	100	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Beryllium (Be)	2019/05/14	83	80 - 120	92	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Bismuth (Bi)	2019/05/14	95	80 - 120	109	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Boron (B)	2019/05/14	95	80 - 120	103	80 - 120	<50	ug/L	NC	20		
9415624	Dissolved Cadmium (Cd)	2019/05/14	93	80 - 120	103	80 - 120	<0.010	ug/L	NC	20		
9415624	Dissolved Chromium (Cr)	2019/05/14	92	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Cobalt (Co)	2019/05/14	89	80 - 120	97	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Copper (Cu)	2019/05/14	83	80 - 120	96	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Iron (Fe)	2019/05/14	96	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Lead (Pb)	2019/05/14	99	80 - 120	108	80 - 120	<0.20	ug/L	NC	20		
9415624	Dissolved Lithium (Li)	2019/05/14	NC	80 - 120	93	80 - 120	<2.0	ug/L	NC	20		
9415624	Dissolved Manganese (Mn)	2019/05/14	98	80 - 120	105	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Molybdenum (Mo)	2019/05/14	NC	80 - 120	102	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Nickel (Ni)	2019/05/14	85	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Selenium (Se)	2019/05/14	100	80 - 120	99	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Silicon (Si)	2019/05/14	94	80 - 120	105	80 - 120	<100	ug/L	NC	20		
9415624	Dissolved Silver (Ag)	2019/05/14	88	80 - 120	104	80 - 120	<0.020	ug/L	NC	20		
9415624	Dissolved Strontium (Sr)	2019/05/14	NC	80 - 120	112	80 - 120	<1.0	ug/L	NC	20		
9415624	Dissolved Thallium (Tl)	2019/05/14	100	80 - 120	108	80 - 120	<0.010	ug/L	NC	20		
9415624	Dissolved Tin (Sn)	2019/05/14	98	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Titanium (Ti)	2019/05/14	101	80 - 120	103	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Uranium (U)	2019/05/14	117	80 - 120	116	80 - 120	<0.10	ug/L	NC	20		
9415624	Dissolved Vanadium (V)	2019/05/14	97	80 - 120	99	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Zinc (Zn)	2019/05/14	91	80 - 120	102	80 - 120	<5.0	ug/L	NC	20		
9415624	Dissolved Zirconium (Zr)	2019/05/14	105	80 - 120	106	80 - 120	<0.10	ug/L	NC	20		
9415903	Moisture	2019/05/14					<0.30	%	4.8	20		
9416441	Total Aluminum (Al)	2019/05/14					<100	mg/kg	0.72	40	94	70 - 130
9416441	Total Antimony (Sb)	2019/05/14	100	75 - 125	104	75 - 125	<0.10	mg/kg	2.2	30	116	70 - 130

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9416441	Total Arsenic (As)	2019/05/14	103	75 - 125	101	75 - 125	<0.50	mg/kg	3.3	30	95	70 - 130
9416441	Total Barium (Ba)	2019/05/14	103	75 - 125	106	75 - 125	<0.10	mg/kg	1.0	40	101	70 - 130
9416441	Total Beryllium (Be)	2019/05/14	102	75 - 125	101	75 - 125	<0.20	mg/kg	0.099	30	102	70 - 130
9416441	Total Bismuth (Bi)	2019/05/14					<0.10	mg/kg	0.10	30		
9416441	Total Cadmium (Cd)	2019/05/14	101	75 - 125	104	75 - 125	<0.050	mg/kg	14	30	107	70 - 130
9416441	Total Calcium (Ca)	2019/05/14					<100	mg/kg	1.4	30	97	70 - 130
9416441	Total Chromium (Cr)	2019/05/14	101	75 - 125	103	75 - 125	<1.0	mg/kg	0.16	30	101	70 - 130
9416441	Total Cobalt (Co)	2019/05/14	100	75 - 125	101	75 - 125	<0.30	mg/kg	1.2	30	98	70 - 130
9416441	Total Copper (Cu)	2019/05/14	100	75 - 125	102	75 - 125	<0.50	mg/kg	1.3	30	100	70 - 130
9416441	Total Iron (Fe)	2019/05/14					<100	mg/kg	0.88	30	104	70 - 130
9416441	Total Lead (Pb)	2019/05/14	99	75 - 125	101	75 - 125	<0.10	mg/kg	4.9	40	107	70 - 130
9416441	Total Magnesium (Mg)	2019/05/14					<100	mg/kg	0.43	30	100	70 - 130
9416441	Total Manganese (Mn)	2019/05/14	NC	75 - 125	102	75 - 125	<0.20	mg/kg	0.64	30	105	70 - 130
9416441	Total Mercury (Hg)	2019/05/14	97	75 - 125	108	75 - 125	<0.050	mg/kg	NC	40	101	70 - 130
9416441	Total Molybdenum (Mo)	2019/05/14	104	75 - 125	102	75 - 125	<0.10	mg/kg	3.3	40	104	70 - 130
9416441	Total Nickel (Ni)	2019/05/14	99	75 - 125	102	75 - 125	<0.80	mg/kg	1.9	30	106	70 - 130
9416441	Total Phosphorus (P)	2019/05/14					<10	mg/kg	1.5	30	99	70 - 130
9416441	Total Potassium (K)	2019/05/14					<100	mg/kg	2.1	40	89	70 - 130
9416441	Total Selenium (Se)	2019/05/14	103	75 - 125	104	75 - 125	<0.50	mg/kg	NC	30		
9416441	Total Silver (Ag)	2019/05/14	95	75 - 125	96	75 - 125	<0.050	mg/kg	NC	40	89	70 - 130
9416441	Total Sodium (Na)	2019/05/14					<100	mg/kg	NC	40	96	70 - 130
9416441	Total Strontium (Sr)	2019/05/14	107	75 - 125	100	75 - 125	<0.10	mg/kg	1.5	40	107	70 - 130
9416441	Total Sulphur (S)	2019/05/14					<500	mg/kg	NC	30		
9416441	Total Thallium (Tl)	2019/05/14	99	75 - 125	102	75 - 125	<0.050	mg/kg	0.091	30	94	70 - 130
9416441	Total Tin (Sn)	2019/05/14	102	75 - 125	100	75 - 125	<0.10	mg/kg	12	40	99	70 - 130
9416441	Total Titanium (Ti)	2019/05/14	NC	75 - 125	101	75 - 125	<1.0	mg/kg	2.6	40		
9416441	Total Vanadium (V)	2019/05/14	101	75 - 125	102	75 - 125	<2.0	mg/kg	0.81	30	104	70 - 130
9416441	Total Zinc (Zn)	2019/05/14	NC	75 - 125	101	75 - 125	<1.0	mg/kg	0.47	30	102	70 - 130
9416441	Total Zirconium (Zr)	2019/05/14					<0.50	mg/kg	3.7	40		
9416453	Soluble (2:1) pH	2019/05/14			99	97 - 103			0.37	20		
9416652	Dissolved Mercury (Hg)	2019/05/14	94	80 - 120	98	80 - 120	<0.0020	ug/L	NC	20		
9417535	Soluble (5:1) Sulphate (SO4)	2019/05/15	101	75 - 125	101	80 - 120	<100	mg/kg	NC	30		
9418321	pH	2019/05/14			101	97 - 103						

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		Spiked Blank		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9418322	Conductivity	2019/05/14			100	80 - 120	<2.0	uS/cm				
9418529	Total Cyanide (CN)	2019/05/16	104	N/A	110	N/A	<0.20	mg/kg	5.3	35		
9418647	Total Organic Carbon (C)	2019/05/15			100	80 - 120	<0.050	%	12	35	98	75 - 125
9422751	Total Organic Carbon (C)	2019/05/17			96	80 - 120	<0.050	%	10	35	100	75 - 125

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

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

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

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

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

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

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

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VALIDATION SIGNATURE PAGE

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

Original Signed

Andy Lu, Ph.D., P.Chem., Scientific Specialist

Original Signed

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Original Signed

Harry (Peng) Liang, Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Appendix G

Notification of Contamination Form (FRM-100)

NSE File #:

NOVA SCOTIA

Notification of Free Product or Contamination

For all sites with either contamination, or free product in soil or groundwater requiring written notification.

Instructions

- All relevant Sections of this form are to be completed.
- Signatures on this form are required from the following: the Site Owner or their Recognized Agent; the managing Site Professional or any other Person providing the Notice (if different than the preceding).
- All regulatory protocols must be followed and all forms/checklists must be completed separately for each property. This means that a source property and an impacted third party property must have all documents filed separately. Once the source property or impacted third party property is identified by the check box below, all subsequent reference on this form/checklist are to that site owner.
- If cleanup is being completed following the 30-Day Verification Exemption, this form will not be required.
- Forms/checklists must be complete prior to filing with the Minister.

1 - Site Location and Contact Information

Details provided on this form are applicable to ☐ Source Property OR ☑ Impacted Third Party Property

Site Location Mandatory must be completed.
Site Address *Port Wallace* City *Dartmouth, NS*
Parcel Identification Number (PID) *41376898* Postal Code *B2X 2G1*
Additional Information, Lot No., GPS, location relative to landmark, etc.

Affected Property Owner Mandatory must be completed.
Name Shannon Miedema c/o HRM Phone 902 490 3665
Email miedems@halifax.ca Fax
Company Name (if applicable) *Halifax Regional Municipality* City *Halifax, NS*
Mailing Address *P.O. Box 1749* Postal Code *B3J 3A5*

Recognized Agent This section is Optional.
Name Phone
Email Fax
Company Name City
Mailing Address Postal Code

Contact for correspondence if different than above. This section is Optional.
Name *Jim Hunter, P.Geo.* Phone *(902) 292-3111*
Email *hunterj@halifax.ca* Fax *(902) 490-5950*
Company Name (if applicable) *Halifax Regional Municipality* City *Halifax, NS*
Mailing Address *P.O. Box 1749* Postal Code *B3J 3A5*

Person providing notice (if different than above)

Contact Information
Name Phone
Email Fax
Company Name (if applicable) City
Mailing Address Postal Code

Site Professional

Contact Information
Name *Rebecca Appleton, P.Eng.* Phone *(902) 450-4000*
Email *RAppleton@dillon.ca* Fax *(902) 450-2008*
Company Name *Dillon Consulting Limited* City *Halifax, NS*
Mailing Address *137 Chain Lake Drive, Suite 100* Postal Code *B3S 1B3*

Impacted Third-Party Property Owner(s)
Applicable to Source Property Notifications only

Property Location
Property Address City
Parcel Identification Number (PID) Postal Code
☐ Written notice has been provided to owner of Impacted Third Party Property.
Additional Information, Lot No., GPS, location relative to landmark, etc.

NOVA SCOTIA

Notification of Free Product or Contamination

2 - Notification of Free Product in Soil or Groundwater Section 2 is not applicable if no Free Product has been identified as defined in PRO-100, *Notification of Contamination Protocol.*

		Observed in Soil	Measured in Groundwater
Type of free product. *Check all applicable.*	Gasoline	☐	☐
	Fuel Oil (No. 2)	☐	☐
	Lube Oil	☐	☐
	Hydrocarbon mixture	☐	☐
	Mineral oil	☐	☐
	Glycols	☐	☐
	DNAPL and Chlorinated Solvent	☐	☐
	Other (describe)	☐	☐

Confirmation that verbal notifications have been made in accordance with Section 8 (1) of the *Contaminated Sites Regulations. Check all applicable.*

☐ Site Owner listed above (if person reporting is not the owner) ☐ All known Impacted Third-Party Property Owners listed above

3 - Notification of Contamination in Soil, Sediment, Surface Water or Groundwater

		Soil	Sediment	Surface Water	Groundwater
Type of Contamination *Check all applicable.*	Inorganic Parameters (metals)	☐	☑	☑	☐
	Petroleum Hydrocarbon Parameters	☐	☐	☐	☐
	Polycyclic Aromatic Hydrocarbon (PAH) Parameters	☐	☐	☐	☐
	Volatile Organic Compound (VOC) Parameters	☐	☐	☐	☐
	Pesticides	☐	☐	☐	☐
	PCBs	☐	☐	☐	☐
	Dioxins and Furans	☐	☐	☐	☐
	Pentachlorophenol	☐	☐	☐	☐
	Organotins	☐	☐	☐	☐
	Glycols	☐	☐	☐	☐
	Phenol	☐	☐	☐	☐

Current land use

☐ Agricultural ☐ Commercial

☑ Residential/Parkland ☐ Industrial

Groundwater potability of site (potable or non-potable according to Appendix 1, Figure 3 of Notification Protocol)

☐ Potable ☑ Non-potable

Check all that apply.

☑ Yes ☐ No Is contamination known or suspected to directly impact surface water or sediment?

☐ Yes ☑ No Is contamination known or suspected to directly impact a drinking water supply on or off the site?

☐ Yes ☑ No Are volatile contaminants known or suspected to affect indoor building spaces requiring immediate or short term actions for the protection of health or safety on or off the site?

☐ Yes ☑ No Is contaminated soil at ground surface in an area where receptors could be exposed?

☐ Yes ☐ No Are immediate actions necessary to protect people or the environment from known contamination at the site? If yes, are maintenance of any exposure management controls required. ☐ Yes ☐ No

If yes, conditions associated with the maintenance of any exposure management controls and monitoring have been documented, provided and explained to the applicable site owner, and are attached to this form. ☐ Yes ☐ No

4 - Signatures

Name of Site Professional (*print*) *Rebecca Appleton*

Professional Registration Number/Stamp 9988

Signature Original Signed

Date August 6, 2014

Original Signed

PROFESSIONAL ENG... PROVINCE OF NOVA SC...

NOVA SCOTIA

Notification of Free Product or Contamination

Name of Person Providing Notice (*print*) Shannon Miedema for HRM

Signature Original Signed

Date July 23/17

Name of Property Owner (*if different then above*) ~~Jim Hunter~~

Signature

Date

Return completed form and associated documents to the Department of Environment Regional Office.
To find your Regional Office go online at *novascotia.ca/nse/dept/division emc.asp#central* or call 1-877-936-8476

Appendix H

Disclaimer

DILLON
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Appendix I

Arsenic Study, Acadia University

Evaluating Arsenic concentrations from Montague Gold Mine tailings using sediment chemistry at Barry's Run and Lake Charles, Port Wallace, Nova Scotia, Canada

Prepared by:

Ian S. Spooner (P.Geo), Chelsea J. Renaud and Brette Pettet
Department of Earth and Environmental Science,
Acadia University, 12 University Ave.,
Wolfville, NS B4P 2R5, Canada

Prepared for:

Dillon Consulting Ltd
137 Chain Lake Dr.,
Halifax, NS B3S 1B3, Canada

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Summary

An applied paleolimnological assessment of arsenic in aquatic sediments at Barry's Run and Lake Charles, Dartmouth, NS was carried out collaboratively between I. Spooner (Acadia), his research students C. Renaud (Acadia), assistant Brette Pettet and Dillon Consulting Ltd. The goal of this project was to provide insight into stratigraphic variability in arsenic (As) concentrations in sediment in Barry's Run, Dartmouth, NS, a tributary stream and stillwater that empties into Lake Charles (Fig. 1). Arsenic is a metal of concern at Barry's Run because much of the watershed encompasses a landscape disturbed by gold extraction associated with the Montague Gold Mining district in which a variety of mines operated intermittently from 1863-1940 (Rousell et al., 2018). Lake sediment samples were obtained by gravity coring from three different locations within Barry's Run and two locations within Lake Charles, located downstream from Barry's Run. The Lake Charles samples were obtained to provide regional As concentration context for the Barry's Run analyses.

Metal concentrations were evaluated at 1 cm resolution down core using a Panalytical Epsilon 1 X-ray Fluorescence (XRF) diffractometer at Acadia University; one sample was also analyzed using ICP-MS. This stratigraphic sampling technique provides insight into variations in As with depth as well as the impact of watershed development and sediment composition on As concentration.

Data obtained indicate that the Barry's Run aquatic sediment samples contain arsenic concentrations that are very significantly elevated above regional geogenic background and are an order of magnitude higher than concentrations in nearby Lake Charles. The rapid increase within the top 5 cm of every core from Barry's Run collected either represents increased total arsenic concentrations related to upstream watershed disturbance and/or a change in redox state

near the water-sediment interface resulting in As mobility within the sediment. The oxidative state of the As in Barry's Run (As^{3+} or As^{5+}) is unknown but has very significant implications for the toxicity of the sediment, the bioavailability of arsenic and its mobility if this sediment is disturbed.

Introduction

Arsenic is recognized as the most significant water-borne contaminant in Maritime Canada (Bottomley 1984). Arsenic concentrations exceeding the Canadian Sediment Quality Guidelines (SQG's) have been identified in aquatic sediments of lakes in Nova Scotia that serve as water supply reservoirs for over 500,000 people (Gibbons and Gagnon 2010). Elevated arsenic has also been identified in wetlands throughout Nova Scotia and New Brunswick and has the potential to impact many species at risk (Drysdale et al. 2008; Loder et al. 2016). The factors influencing arsenic fate processes in aquatic systems are complex and include Eh, pH, iron concentrations, temperature, salinity and the nature and concentration of minerogenic and organic matter (Farago 1997; Redman et al. 2002). High arsenic in NS groundwater has been attributed mainly to the oxidation of arsenopyrite that occurs when new wells are drilled, and, less commonly, the local presence of mine tailings. However, recent NSERC Engage-funded paleolimnological research by Dunnington and Spooner (2016, 2017) suggests that past landscape disturbance (mining, logging, agriculture, development) has enhanced arsenic delivery to surface water and groundwater systems and that lake sediment records contain high resolution archives of arsenic flux (Liard et al. 2014).

Figure 1. Location of cores included in this study. The MGM samples are taken from within Barry's Run, a still water that drains into Lake Charles.

Background and Literature Review

Halifax Regional Municipality (HRM, pop. 405,000, 10 reservoirs) relies largely on managed lakes for potable water as they are plentiful and groundwater sources can be chemically complex with high metal contents (Méranger and Subramanian 1984). The high density of lakes and still waters within HRM also leads to pervasive development both around and within these systems. Surface water has been significantly impacted by mining, logging, and industrial and urban growth (Dunnington et al. 2018, Ginn et al. 2015). Municipal water systems have been affected by arsenic contamination, and treatment for As removal has become more complex and expensive with higher concentrations (Gibbons and Gagnon 2010). There has recently been significant paleolimnological research on arsenic toxicity (e.g. Thienpont et al. 2016), arsenic speciation in freshwater environments (e.g. Bowell et al. 2014), influence of mining on arsenic flux (Liard et al., 2014) and arsenic sources and mineralogy in Nova SCotia (e.g. Meunier et al.

2010), but little is known about the effect of watershed-scale disturbance (particularly urban development) on arsenic flux and toxicity in surface water, groundwater and in organic aquatic sediments (Spooner and Dunnington 2017). Research on the bulk geochemistry of aquatic sediment in Halifax Regional Municipality by Dunnington and Spooner (2016, 2017) was triggered by the concern of HRM water utility managers over how changes in identified environmental stressors (e.g. increased nutrient flux; Ginn et al. 2015) and proposed watershed development (watershed erosion; Dunnington et al. 2018) may affect the chemical character, environmental stability and treatability of water in supply lakes. This research identified arsenic as pervasive and often present in concentrations above Interim Sediment Quality Guidelines (ISQG's). Ongoing watershed modeling and contaminant transport research in southwestern Nova Scotia by M. Parsons (GSC-Atlantic) and R. Jamieson (Center for Water Resource Studies, Dalhousie) and G. Gagnon (Center for Water Resource Studies, Dalhousie) has indicated that geogenic arsenic groundwater is pervasive. A significant challenge of interpreting arsenic trends in lake sediment archives is decoupling the impact of changing human influenced environmental stressors (e.g. acidification, nutrients-especially phosphorous, climate change), atmospheric deposition, and the effects of watershed disturbance from natural variability and regional geogenic and anthropogenic trends (Liard et al. 2014; Blais et al. 2015). Accurately dated, high resolution pre- and post-disturbance lake sediment records of metal concentrations offer an effective method to approach this challenge. Baseline conditions can be established from the prehistorical portion of the lake sediment record and from reference lakes. A detailed understanding of the Nova Scotia arsenic sources (e.g. Walker et al. 2009), minerogenic speciation (e.g. Gong et al. 2002) and the association of arsenic (and other metals) with various fractions of organic matter (e.g. Kent et al. 2014) is also be required.

Arsenic in Nova Scotia is most commonly found as arsenopyrite which, when oxidized, releases dissolved arsenic and iron in surface waters. In our study arsenic is also be related to local mining activity in which arsenic bearing minerals were exposed and arseniferous gold tailings were produced. The resulting landscape disturbance and mine tailings accumulations were primarily associated with the Montague Gold Mining district in which a variety of mines operated intermittently from 1863-1940 (Rousell et al. 2018). Arsenic has a strong affinity for Fe and Mn oxyhydroxides, sulfides, organic matter, and clay minerals. Consequently, arsenic readily accumulates in aquatic sediments where authigenesis may result in post-depositional mobility, complicating the interpretation of the arsenic archive in freshwater sediments (Korosi et al. 2017, Kuzyk et al. 2015). Thus, an independent understanding of sediment composition and redox changes through time is required to effectively interpret the archive of arsenic flux using paleolimnological records.

Materials and Methods

A previous (May 2019) field excursion to Barry's Run in which sediment gravity cores were obtained determined that the basic aquatic sediment stratigraphy at the site can broadly be described as grey mine tailings overlain by dominantly fine-grained organic sediment. Pre-mining organic aquatic sediment is thought to underlie the grey mine tailings however, its presence was not verified, a task that would require percussion coring or vibracoring. The mine tailings are compact and fine sand-silt-clay sized. The organic sediment is dark brown to black and is in very sharp contact with the underlying tailings. In many locations, where water flow may be more vigorous, the organic sediment is absent, and the "stream" bed is composed of cobbles and boulders with the interstices filled in by grey sediment (presumably largely tailings).

Sampling locations within Barry's Run were chosen between bends as these straight runs appear to have accumulated the greatest thickness of organic sediment. Samples from Lake Charles were collected by gravity core in a deep basin near the outlet of Barry's Run and at a somewhat further distance (Table 1).

Gravity cores were collected from Barry's Run and Lake Charles on 29 May 2019 and 20 June 2019 (respectively) using a NLA (National Lake Assessment) gravity corer. These cores were transported to the lab at Acadia where they were extruded at 1 cm intervals using a Glew portable extruder (Glew 1988, Glew et al. 2001). Samples were dried at 60ºC for 48 hours and ground using a mortar and pestle to homogenize the sediment and reduce the possibility of the analyses reflecting the "nugget effect". Samples were stored in SnapCap vials until analysis.

Table 1. Cores collected in this study.

Lake Name	Core ID	Collected (yyyy-mm-dd)	Longitude	Latitude
Barry's Run	MGM0	2019-06-10	-63.538919	44.717831
Barry's Run	MGM1	2019-05-29	-63.540431	44.717589
Barry's Run	MGM2	2019-05-29	-63.541587	44.716899
Lake Charles	LC1	2019-06-20	-63.547739	44.714638
Lake Charles	LC2	2019-06-20	-63.550029	44.711197

Elemental geochemistry was measured in the laboratory using portable X-Ray Fluorescence spectrometer (pXRF). Recently, advances in X-Ray Fluorescence (XRF) technology have led to the availability of high-resolution, high-quality bulk geochemical data for aquatic sediments, particularly for typically minerogenic elements such as titanium (Ti), potassium (K), and rubidium (Rb) (Dunnington et al. 2016). XRF allows for rapid, non-destructive measurement of many elements at relatively low cost, allowing a large volume of data to be obtained without compromising time, future analyses, or cost (Boyle 2000, Rouillon and Taylor 2016). Minerogenic elements are commonly used to reconstruct land use change or anthropogenic disturbance (Dixit et al. 2000, Brunschön et al. 2010, Simonneau et al. 2013). 5 elements have been reported for this study (Figure 2). Arsenic from XRF analyses (and a single ICM-MS analysis) was used to determine contamination levels. Copper (Cu) can be used as a relative indicator of terrestrial organic content as Cu is regulated by many terrestrial plants. Pb can be used for temporal control as historical increases and decreases in hydrocarbon combustion may be well resolved in some lake sediment records. Zinc (Zn) can be used as an indicator of watershed development. Concentrations of titanium (Ti) and rubidium (Rb), which are both conserved minerogenic elements can be used to help identify periods of landscape disturbance. Ti and Rb are commonly used as a proxy for watershed disturbance, particularly erosion (Rouillon and Taylor 2016).

Recently, investigators have reported replicable results from bench top XRF models for use in aquatic sediments measuring elemental geochemistry of contaminated aquatic soils (Rouillon and Taylor 2016), wetland sediments (Loder et al. 2017), and in paleolimnological studies (Dunnington et al. 2016, Dunnington et al. 2017). Elemental concentrations reported by the Panalytical Epsilon 1 XRF instrument were in parts per million (ppm) according to a factory calibration. Replicate analysis indicated that our data were precise for all elements, but that accuracy was variable, as can be seen in Figure 1. To better understand the accuracy of our analyses one sample from Lake Charles (collected by Spooner) and a number of bulk samples from Barry's Run (collected by Dillon Consulting) were analyzed for metals using ICP-MS.

Preliminary Results and Discussion

Lake Charles

The Lake Charles data (LC1, LC2, Figure 2) was obtained to provide a perspective on distal arsenic concentrations downstream of Barry's Run. The lead data appear to indicate background (predominantly atmospheric) lead levels (approximately 1900 AD) at 12 cm for LC 1 and at 7 cm for LC2. These data, if accurate, indicate relatively low sedimentation rates (as expected for larger lakes) and indicate that the sediment record in both cores may span 200 years. The cooper and zinc data likely reflect gradually changing sediment compositions from more clastic dominated sediment at the base of the core progressing to more organic-rich sediment up the core. For both cores arsenic concentrations are relatively stable at bottom of the core and increase abruptly at around 1900 AD. The lower, consistent arsenic levels likely indicate regional background concentrations associated with largely natural geogenic conditions. The observed concentrations are consistent with other lakes in the region that are underlain by arseniferous slate. This trend is broadly consistent with mining activity in the Montague Gold Mining camp. The highest levels detected in the Lake Charles cores (784 ppm) were detected closest to the outlet of Barry's Run. A bulk sample from core LC 1 sent to AGAT laboratory (Dartmouth) for ICP-MS analyses of metals indicated 840 ppm arsenic. This data indicates that the LC 1 and LC 2 arsenic data are reasonably accurate. Titanium (Ti) and rubidium (Rb) data are indicators of watershed-scale disturbance/erosion and correlate well with watershed development that has taken place at Lake Charles from the 1900's onwards.

Barry's Run

Data from the Barry's Run sampling sites MGM0 and MGM1 indicate significantly higher maximum arsenic concentrations than Lake Charles and trends that likely reflect the different sediment compositions that are a characteristic of Barry's Run. MGM2 was obtained nearest to the outlet of Barry's Run where water current may be accentuated. It is the shortest core and likely contains a truncated sediment record associated with erosion.

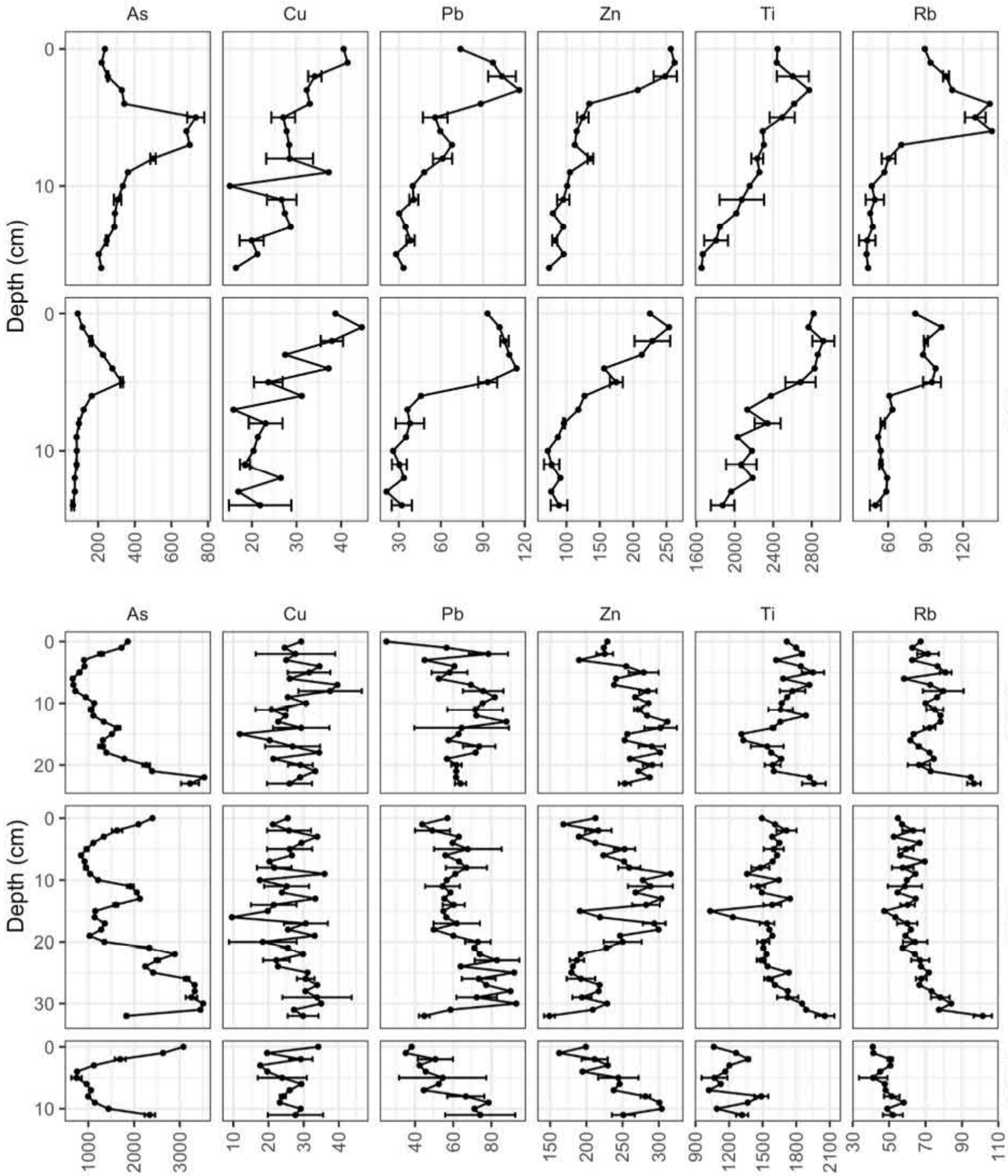

Figure 2. Bulk Geochemical data for Lake Charles cores (LC1, LC2, Figure 1) and Barry's Run cores (MGM1, MGM2, MGM3). MGM3 likely represents a partial core and is not discussed in detail in this report.

Pb data is not particularly accurate as baseline cannot be identified however the total concentrations and trends in MGM0 and MGM1 when compared to data form Lake Charles suggest that the cores obtained represent about 100 years of sedimentation. The copper data does not reveal a distinct trend and, along with the Pb data may indicate that a mixture of organic and clastic (tailings?) sediment may be present throughout the core. Titanium (Ti) is a conserved element that is commonly associated with erosion of clastic sediment and/or rock. The elevated Ti concentrations (mirrored by rubidium) at the base of cores MGM0 and MGM1 likely represent the clastic contribution of landscape disturbance directly related to mining and tailings to the sediment at Barry's Run. The persistent high levels throughout the organic portion of the cores may be a consequence of post-mining disturbance.

Arsenic trends in the three cores are similar. The elevated concentrations at the base of each core (~3500 ppm) likely reflect the direct influence of arseniferous tailings. The very rapid increase in the top 5 cm's of each core may reflect an actual increase in arsenic associated with upstream disturbance of tailings. However, mobilization of arsenic in underlying organic sediment due to a change from a reducing state lower in the core (due to low oxygen content associated with organic sediment decay) to an oxidative state at the sediment water interface may also be occurring. This redox trend is very common in organic-rich sediments with a significant arsenic burden where there is a ready and consistent supply of oxygen at the sediment-water interface. At Barry's Run, the shallow depth along with the pervasive current serve to keep oxygen levels high at this interface year around. It is likely that under these highly oxidative conditions the most pervasive species of As is As^{5+} which is thought to be less harmful to humans. Of great interest is whether arsenic at shallow depth (3-5 cm) at Barry's Run is in a reduced state (trivalent arsenic; As^{+3}, or arsenite). Trivalent arsenic is generally more harmful and more difficult to remove from water.

Toxicity

Our data indicate that for all samples at both locations' concentrations of arsenic exceeded interim sediment quality guidelines (ISQGs 5.9 ppm) and probable effect levels (PELs 17 ppm) for freshwater sediments by orders of magnitude. We speculate that the species of inorganic arsenic that is prevalent at the sediment-water interface is As^{5+}, which is generally thought to be less harmful to humans than As^{3+}. However, the results of this study are preliminary. Arsenic tends to be geochemically unstable within organic lake sediments in shallow lakes and wetlands and its bioavailability is strongly associated with the form of As, lake sediment composition, redox potential and pore water chemistry, concepts that all require further study (Skjelkvåle et al. 2006). In aquatic systems, arsenic may undergo a variety of reactions, including oxidation-reduction reactions, ligand exchange, precipitation, and biotransformation (Couture et al. 2010). In surface waters, inorganic arsenic can be absorbed by algae that then convert the arsenic to arsenosugars, arsinolipids and arsenobetaine (Andrewes et al. 2004). Fish and other forms of marine life feed on these algae and concentrate the arsenic compounds. However, the toxicity of organic arsenicals is generally relatively low. The fate of arsenic in freshwater systems is influenced by Eh, pH, metal sulfide and sulfide ion concentrations and distribution and composition of the biota (O'Day et al. 2004).

An investigation of conditions at the sediment water interface in Barry's Run and how these conditions may impact arsenic speciation and consequently the concentration, availability and toxicity of arsenic is recommended. As well, a longer core (percussion core or vibracore) that penetrates the underlying tailings in Barry's Run and recovers "pre-mining" organic sediment may provide greater insight into the thickness of tailings in Barry's Run and background levels of arsenic that might be expected in the aquatic sediments at the site. Finally, a investigation of arsenic bioaccumulation is warranted.

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