

Appendix B

Graving Dock Chemistry Data

Parameter	RDL ¹	Units	CCME Soil Quality Guidelines ²																				Atlantic RBCA Tier 1 RBSL's for Soil ³									
			Commercial/ Industrial										Residential				Commercial / Non-potable	Residential / Non-potable														
			Surface - Course Grained	Sub-Surface Course Grained	Surface - Course Grained	Sub-Surface Course Grained	Course - Grained	Course - Grained																								
BH:A1-SS5	BHA1-SS3	BHA1-SS3 Lab-Dup	BH:A2-SS2	BHA2-SS3	BHA2-SS3 Lab-Dup	BH:A2-SS8	BHA3-SS7	BHA3-SS7 Lab-Dup	BHA4-SS1	BHA4-SS1 Lab-Dup	BH:A4-SS5	BH:A4-SS13	BH:A5-SS9	TP1-BS6	TP2-BS6	TP3-BS6	TP4-BS6	TP5-BS6	TP6-BS6	TP7-BS6	TP7-BS5	TP1-BS5-DUP	Surface - Course Grained	Sub-Surface Course Grained	Surface - Course Grained	Sub-Surface Course Grained	Course - Grained	Course - Grained				
Volatile Organic Compounds																																
1,1,1-Trichloroethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,1,2,2-Tetrachloroethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,1,2-Trichloroethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,1-Dichloroethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,1-Dichloroethylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,2-Dichlorobenzene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	1	-	-
1,2-Dichloroethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,2-Dichloropropane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
1,3-Dichlorobenzene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	1	-	-
1,4-Dichlorobenzene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	1	-	-
Benzene	0.03	mg/kg	-	ND	0.032	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	0.095	-	-
Bromodichloromethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	0.2	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Tetrachloride	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
Chlorobenzene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	1	-	-
Chloroform	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
Chloromethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.082	0.082	-	-
Ethylene Dibromide	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride(Dichloromethane)	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
o-Xylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	11	-	-
p+m-Xylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	11	-	-
Styrene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	-	-
Tetrachloroethylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.2	-	-
Toluene	0.03	mg/kg	-	ND	0.054	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.37	0.37	-	-
trans-1,2-Dichloroethylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01	-	-
Trichlorofluoromethane(FREON 11)	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl Chloride	0.03	mg/kg	-	ND	ND	-	ND	-	-	-	ND	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

¹ RDL = Reportable Detection Limit; Values in parentheses indicate adjusted detection limit due to sample interferences and required dilution.

² Canadian Council of Ministers of the Environment (CCME). Canadian Soil Quality Guidelines, updated 2008.

³ Atlantic RBCA Version 2.1 Reference Document for Petroleum Impacted Sites (2003). RBSL = Risk Based Screening Level.

⁴ Modified TPH values reflect the sum of the individual carbon fractions that resembles Gasoline, Diesel (#2) and Oil (#6).

⁵ - Product resembled gasoline, fuel oil and lube oil fraction, therefore used RBCA guideline for gasoline.

⁶ - Leachable copper result of sample BH-A1-SS3 was 2200 ug/L

ND = Not Detected.

Result above commercial RBCA Guideline
Result above residential RBCA Guideline
Result above CCME Commercial/Industrial Soil Quality Guideline Guideline
Result above CCME Residential Soil Quality Guideline Guideline

Parameter	RDL ¹	Units	BHA1	BHA1 Lab Dup	BHA2	BHA4	BHA4 Lab Dup	BHA5	BHA5 Lab Dup	CCME Marine Water Quality Guidelines ²	Ontario MOE ³	Environmental Control Water and Sewage Regulations	Atlantic RBCA Tier 1 RBSL's for Groundwater					
													Commercial / Non-potable		Residential / Non-potable			
													Course - Grained	Fine - Grained	Course - Grained	Fine - Grained		
Inorganics																		
Total Alkalinity (Total as CaCO3)	25	mg/L	330	-	-	240	240	160	-	-	-	-	-	-	-	-	-	-
Dissolved Chloride (Cl)	1.0	mg/L	78	-	-	3400	3500	260	-	-	2300 ⁴	-	-	-	-	-	-	-
Colour	5.0	TCU	20	-	-	ND	ND	130	-	-	-	-	-	-	-	-	-	-
Nitrate + Nitrite	0.050	mg/L	ND	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Nitrite (N)	0.010	mg/L	0.011	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Nitrogen (Ammonia Nitrogen)	0.050	mg/L	0.35	-	-	2.5	-	0.62	0.59	-	-	2	-	-	-	-	-	-
Total Organic Carbon (C)	5.0	mg/L	13	-	-	ND	-	6.3	-	-	-	-	-	-	-	-	-	-
Orthophosphate (P)	0.010	mg/L	ND	-	-	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
pH	N/A	pH	7.60	-	-	8.01	-	7.40	-	7-8.7	-	5.5-9.0	-	-	-	-	-	-
Reactive Silica (SiO2)	0.50	mg/L	12	-	-	5.4	5.3	11	-	-	-	-	-	-	-	-	-	-
Dissolved Sulphate (SO4)	10	mg/L	57	-	-	370	370	24	-	-	-	-	-	-	-	-	-	-
Turbidity	0.50	NTU	170	-	-	49	-	65	-	8.00	-	-	-	-	-	-	-	-
Conductivity	1.0	uS/cm	930	-	-	11000	-	1200	-	-	-	-	-	-	-	-	-	-
Chlorobenzenes																		
1,2-Dichlorobenzene	0.5	ug/L	ND	-	-	ND	-	ND	-	42	4600	-	-	-	-	-	-	-
1,3-Dichlorobenzene	1	ug/L	ND	-	-	ND	-	ND	-	-	9600	-	-	-	-	-	-	-
1,4-Dichlorobenzene	1	ug/L	ND	-	-	ND	-	ND	-	-	8	-	-	-	-	-	-	-
Chlorobenzene	1	ug/L	ND	-	-	ND	-	ND	-	25	630	-	-	-	-	-	-	-
Volatile Organics																		
1,1,1-Trichloroethane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	640	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	3.2	-	-	-	-	-	-	-
1,1,2-Trichloroethane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	4.7	-	-	-	-	-	-	-
1,1-Dichloroethane	2.0	ug/L	ND	-	-	ND	-	ND	-	-	320	-	-	-	-	-	-	-
1,1-Dichloroethylene	0.5	ug/L	ND	-	-	ND	-	ND	-	-	1.6	-	-	-	-	-	-	-
1,2-Dichloroethane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	1.6	-	-	-	-	-	-	-
1,2-Dichloropropane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	16	-	-	-	-	-	-	-
Benzene	1.0	ug/L	ND	-	-	ND	-	4.6	-	110	44	-	-	-	-	-	-	-
Bromodichloromethane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	85000	-	-	-	-	-	-	-
Bromoform	1.0	ug/L	ND	-	-	ND	-	ND	-	-	380	-	-	-	-	-	-	-
Bromomethane	3.0	ug/L	ND	-	-	ND	-	ND	-	-	5.6	-	-	-	-	-	-	-
Carbon Tetrachloride	1.0	ug/L	ND	-	-	ND	-	ND	-	-	0.79	-	-	-	-	-	-	-
Chloroethane	8.0	ug/L	ND	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-
Chloroform	1.0	ug/L	ND	-	-	ND	-	ND	-	-	2.4	-	-	-	-	-	-	-
Chloromethane	8.0	ug/L	ND	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethylene	2.0	ug/L	ND	-	-	ND	-	ND	-	-	1.6	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	2.0	ug/L	ND	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	1.0	ug/L	ND	-	-	ND	-	ND	-	-	82000	-	-	-	-	-	-	-
Ethylbenzene	1.0	ug/L	ND	-	-	ND	-	ND	-	25	2300	-	-	-	-	-	-	-
Ethylene Dibromide	1.0	ug/L	ND	-	-	ND	-	ND	-	-	0.25	-	-	-	-	-	-	-
Methylene Chloride(Dichloromethan	3.0	ug/L	ND	-	-	ND	-	ND	-	-	610	-	-	-	-	-	-	-
o-Xylene	1.0	ug/L	ND	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-
p+m-Xylene	2.0	ug/L	ND	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-
Styrene	1.0	ug/L	ND	-	-	ND	-	ND	-	-	1300	-	-	-	-	-	-	-
Tetrachloroethylene	1.0	ug/L	ND	-	-	ND	-	ND	-	-	1.6	-	-	-	-	-	-	-
Toluene	1.0	ug/L	ND	-	-	ND	-	ND	-	215	18000	-	-	-	-	-	-	-
trans-1,2-Dichloroethylene	2.0	ug/L	ND	-	-	ND	-	ND	-	-	1.6	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	1.0	ug/L	ND	-	-	ND	-	ND	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	1.0	ug/L	ND	-	-	ND	-	ND	-	-	1.6	-	-	-	-	-	-	-
Trichlorofluoromethane (FREON 11	8.0	ug/L	ND	-	-	ND	-	ND	-	-	2500	-	-	-	-	-	-	-
Vinyl Chloride	0.5	ug/L	ND	-	-	ND	-	ND	-	-	0.5	-	-	-	-	-	-	-

¹ RDL = Reportable Detection Limit; Values in parentheses indicate adjusted detection limit due to sample interferences and required dilution.

² Canadian Environmental Quality Guidelines

³ Ontario Ministry of the Environment (MOE) Soil, Groundwater, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act: Table 3 - Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition for Industrial/Commercial Property Use (April 2011)

⁴ Groundwater in BHA4 is adjacent to the shoreline, therefore TDS and chloride values are expected to be influenced by seawater.

ND = Not Detected.

2.5 Exceeds Environmental Control Water and Sewage Regulations

Appendix C

Graving Dock Environmental Site Assessment Report



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**Phase II Environmental Site
Assessment, Site A, Proposed
GBS Construction Site
Argentina, NL**

Prepared for

Husky Energy
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St. John's, NL

Draft Report

File No. 121613435

Date: April 5, 2012

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1.0 INTRODUCTION

Stantec Consulting Limited (Stantec) was retained by Mr. Gordon Phillips of Husky Energy to conduct a Phase II Environmental Site Assessment (ESA) at the proposed Gravity Base Structure (GBS) Construction Site A on the former United States Naval (USN) Base in Argentia, Newfoundland & Labrador (refer to Drawing No. 121613435-EE-01 in Appendix A). The Phase II ESA involved the excavation of test pits with associated soil sampling and analysis for petroleum hydrocarbon analysis and was completed to further delineate the extent of petroleum hydrocarbon impacted soil identified in borehole BH-A5 during the Stage 2 geotechnical and environmental investigation completed at the site by Stantec from November 2011 to January 2012.

This report was prepared specifically and solely for the above project. The report presents all of the factual findings and laboratory results of the Phase II ESA, and presents our comments on the environmental status of the site.

1.1 Site Description

The former USN Base in Argentia is located along the western coast of the Avalon Peninsula of Newfoundland and Labrador. It is located approximately 130 km west of the City of St. John's and 150 km south of the Town of Clarenville. Access to the property is via Provincial Highway Route 100.

Site A is located in the northeast portion of Northside Peninsula as shown Drawing No. 121613435-EE-01 in Appendix A. Argentia Harbour borders the south-eastern edge of the site. Within the site area the topography is flat with very slight undulations. The elevation of the site is approximately 3 to 5 m above sea level.

1.2 Background and Scope of Work

During the recent Stage 2 investigation of Site A, a concentration of petroleum hydrocarbon (TPH) of 4,200 mg/kg was identified in a soil sample (SS9) collected from borehole BH-A5 at a depth of 6.0 – 6.7 meters below ground surface (mbgs). This concentration of TPH in soil identified in BH-A5-SS9 exceeds the Atlantic PIRI Tier I guideline of 450 mg/kg for gasoline impacts in soil on a commercial site. In addition, this concentration also exceeds the 1,000 mg/kg threshold criteria for disposal at a municipal landfill and therefore any surplus material removed from the impacted area during construction excavation would require disposal at a licenced soil treatment facility.

The source of petroleum hydrocarbon impacts identified in soil in BH-A5 is not known for certain but is likely related to historical storage and usage of hydrocarbon petroleum products at the site during historical naval operations.

Numerous test pits and monitor wells have been completed in the site area as part of previously environmental site investigations. The locations of these with respect to the recent Stage 2 boreholes and test pits completed as part of the current program are shown on Drawing No. 121613435-EE-02 in Appendix A, and a summary of these former environmental programs is provided in Stantec's Stage 1 Report, dated October 11, 2011.

The nearest location is NFSA-515-MW, which is roughly 25 to 30 m north of BHA5. Soil and groundwater analysis completed at the time of installation of this monitoring well by the Argentia Remediation Group in 1995 indicated no detectable concentrations of petroleum hydrocarbons. Similarly, no detectable concentrations of petroleum hydrocarbons were detected at monitor wells NFSA-514-MW and N-MW1B-35, located approximately 50 m and 100 m east and down gradient of BHA5, respectively. No analytical data has been found for test pits N-TP1B-139 & 140 located approximately 30 m to the south of BHA5, but no field evidence of impacts were noted in the logs for these test pits. Based on historical data, impacts identified in BHA5 appear limited in extent.

In addition, the footprint of the large-scale remedial excavation/aeration program completed by Public Works and Government Services Centre (PWGSC) from 2005-2007 in the former Northside Fuel Storage Area (NFSA) Site is located along the northwest boundary of Site A. The remedial footprint is shown on Drawing No. 121613435-EE-02 in Appendix A, and measured approximately 67,000 m² in area and extended to a depth of about -0.5 m below sea level. Based on information provided in the 2010 Northside Fuel Storage Area (NFSA) Closure Report by Dillon Consulting Ltd., with the exception of residual petroleum hydrocarbons in soil at concentrations above the ROs in the area around former tanks T539 (and possibly under former T125), petroleum hydrocarbon impacted soil at the NFSA has been remediated. On-going post-remediation monitoring up to 2009, involving free product measurement and petroleum hydrocarbon groundwater sampling in several sentry monitor and recovery wells in the remediated area, did not identify any issues of concern.

In addition, remediation comprising of overburden removal along the southeast boundary of Site A was completed by PWGSC between 2001-2003. Based on information provided in the 2010 Northside Fuel Storage Area (NFSA) Closure Report by Dillon Consulting Ltd a large excavation of impacted soil encompassing a portion of the tank farm footprint and extending eastward to the harbour was completed. In 2001, PWGSC collected samples from 12 test pits (PWGSC-TP-001 through 012) in the floor of the excavation. TPH concentrations in these samples ranged from less than the laboratory detection limit to 1800 mg/kg.

Based on the results previous investigation Stantec's scope of work for the current investigation consisted of the following:

- 1 Excavate Seven (7) test pits to groundwater seepage;
- 2 Collect soil samples from the test pits for laboratory analysis;
- 3 Select soil samples for chemical analysis of petroleum hydrocarbons;
- 4 Submit selected soil samples for laboratory analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons (TPH); and,

- 5 Document the site investigation scope, methodology and results of the Phase II ESA in a written report. Dependent on the defined extent of any soil impacts, the recommendations may be for additional delineation, site remediation or risk management.

1.3 Regulatory Framework

The Newfoundland and Labrador Department of Environment and Conservation (NLDEC) released soil and groundwater petroleum hydrocarbon remediation guidelines on February 22, 2005 under Department Policy Document PPD05-01 "Guidance Document for the Management of Impacted sites" (December 2004 – Version 1.0). This guidance document is based on a tiered, risk-based approach to site management, and replaces the former Department Policy Document PPD-97-01 "Cleanup of Contaminated sites Criteria" (December 1997), which referenced provincial and Canadian Council of Ministers of the Environment (CCME) numerical guidelines for soil and groundwater quality based on specific land and groundwater uses. Protocols outlined in the new NLDEC Department Policy Document PPD05-01 were fully implemented by the Province of Newfoundland and Labrador on May 16, 2005.

The NLDEC guidance document and the Atlantic RBCA (Risk-Based Corrective Action) Version 2 User Guidance Document (August 2006) contain risk-based screening levels (RBSLs) for evaluating sites impacted with total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene and xylenes (BTEX). These guidelines are contained in "Tier I RBSL Tables" that are based on default conditions for typical sites and exposure pathways. These guidelines are classified by receptor characteristics, groundwater usage and soil type. In addition, the TPH guidelines are dependent on the nature of the hydrocarbon type (i.e., the guidelines vary for gasoline, fuel oil and lube oil).

If site concentrations exceed the Tier I RBSLs, the site may be remediated to the Tier I RBSLs or a Tier II assessment may be completed to determine more appropriate clean-up levels. A Tier II assessment may include comparison of the site concentrations to the Tier II Pathway-Specific Screening Level (PSSL) tables or development of Site-Specific Target Levels (SSTLs). PSSLs are only appropriate for sites where the exposure pathways assumed in the Tier I RBSL tables are not complete (e.g., if a property has no building on-site, there would be no potential for on-site indoor air exposure).

Users of the Tier I RBSLs or Tier II PSSLs are required to ensure that site conditions are compatible with the default site conditions used to generate the screening guidelines. If significant differences exist, the site should be evaluated using a site-specific risk assessment approach. Based on the proposed use of the site for industrial development, the Atlantic PIRI Tier I guidelines for gasoline impacts in soil on a non-potable commercial site are applicable to the subject site.

The soil analytical results for petroleum hydrocarbons were compared to the following provincial guidelines:

The Atlantic RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk Based Screening Levels (RBSLs) for a commercial site with non-potable groundwater and coarse grained soil, fuel oil impacts (March, 2007).

2.0 METHODOLOGY – PHASE II ESA

Phase II ESA consisted of the excavation of seven (7) test pits and the collection of confirmatory soil samples. Clearances for underground services at the site were obtained by Stantec personnel prior to commencing sub-surface investigations.

2.1 Test Pits

The test pit excavation and sampling program was carried out on March 21, 2012. The investigation included the excavation of seven (7) test pits (i.e., TP1 to TP7). The locations of the test pits were selected by Stantec based on the location of the previously installed monitoring well (i.e., BH-A5) where petroleum hydrocarbon impacts were identified.

The test pits were excavated using an excavator supplied Edward Collins Contracting (ECC) of Placentia, NL under the supervision of Stantec personnel. The test pits were all excavated to a depth of approximately 6.0 m below ground surface (mbgs), which generally corresponded to the depth of groundwater and were backfilled with excavated material following completion. Test pit locations are shown on Drawing No. 121613435-EE-02 in Appendix A. The test pits were located radially outward from BH-A5, including TP1–TP3 located 20 m from BH-A5, TP4-TP6 located 10 m from BH-A5 and TP7 which was located 5 m out from BH-A5. Subsurface conditions encountered in the test pits were logged by Stantec personnel at the time of excavation and are presented on the Test Pit Records in Appendix B.

Six (6) soil samples were collected from each test pit at varying depths. The soil samples were examined for any field evidence of petroleum hydrocarbon impacts. Duplicate soil samples were collected at each sample location, where possible. The samples were placed in clean glass jars with aluminum foil under the lids. Head space soil vapour concentrations were measured in the duplicate sample jars using a MiniRAE 2000 photoionization detector (PID). These PID readings are presented on the Test Pit and Monitor Well Records in Appendix B. Based on the PID readings, site observations and site history, selected soil samples were submitted to Maxxam Analytics Inc. in St. John's, NL for laboratory analysis of petroleum hydrocarbons (TPH/BTEX).

3.0 RESULTS – PHASE II ESA

3.1 Laboratory Analyses

The following sections present the results of the Phase II ESA conducted on the subject property, including a description of the subsurface conditions encountered during the investigation.

3.2 Subsurface Conditions

3.2.1 Stratigraphy

Conditions encountered in the test pits are described in detail below and on the Test Pit Records in Appendix B.

Fill materials were encountered at or near the surface at all test pit and monitor well locations and ranged in thickness from 1.0 m in test pit TP2 to 4.0 m in test pit TP6. Fill material generally comprised loose to dense brown sand and gravel (SP) with varying percentages of silt, cobbles and boulders. Also roots and wood debris were encountered at various depths in the test pits. Beneath the fill material, a till layer consisting of a brown to grey brown silty sand and gravel with cobbles and boulders was encountered to the termination of the depths of the test pits. No bedrock was encountered in any of the test pits excavated on the site.

3.2.2 Groundwater

Groundwater seepage was observed on March 21, 2012 in the test pits excavated on the site ranging from approximately 5.5 mbgs in TP2 to TP5 and TP7 to 6.0 mbgs in TP1 and TP6. Test pits are not normally left open long enough for groundwater levels to stabilise in the excavations, therefore groundwater level estimates at these locations have to be considered with caution.

3.2.3 Soil Vapor Concentrations

The soil vapour concentrations measured in each of the soil samples from the test pits are provided on the Test Pit Records in Appendix B. The vapour concentrations measured ranged from 0.0 to 5.9 ppm. Slight petroleum hydrocarbon odours were detected during excavation at test pit locations TP7.

Soil vapour concentrations vary with both fuel type and age, and it should be noted that the readings are intended to provide only a qualitative indication of volatile hydrocarbon levels and are not directly equivalent to soil analytical results. Soil vapor concentrations which exceed 50 ppm may indicate the presence of petroleum hydrocarbon impacts in soil. No soil vapour concentrations above 50 ppm were measured in any of the soil samples collected from test pits and monitor wells at the site.

3.2.4 Liquid Phase Petroleum Hydrocarbons

Free liquid phase petroleum hydrocarbons were not observed in any of the test pits excavated during this investigation.

3.3 Laboratory Analytical Results

Results of the laboratory analysis of soil samples for petroleum hydrocarbons are presented in Table C.1 in Appendix C. The corresponding analytical reports from Maxxam are also presented in Appendix C.

Petroleum hydrocarbons analysis was conducted on soil samples collected from the test pits. Concentrations of TPH were detected in three (3) of the soil samples, with concentrations ranging from 26 mg/kg in soil sample TP7 BS6 to 330 mg/kg in soil sample TP3 BS6. However, the detected concentrations of TPH in the soil samples were below the applicable Atlantic PIRI Tier I guideline of 450 mg/kg for gasoline impacts in soil on a commercial site. The analytical results indicated that the products impacting the soil samples with detected concentrations of TPH resembled petroleum products in the lube oil fraction.

BTEX parameters were not detected in any of the seven (7) soil samples analyzed.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A Phase II ESA was completed at the proposed Gravity Base Structure (GBS) Construction Site A on the former United States Naval (USN) Base in Argentia, NL by Stantec on behalf of the Husky Energy to further delineate the extent of petroleum hydrocarbon impacted soil identified in borehole BH-A5 during the Stage 2 geotechnical and environmental investigation completed at the site by Stantec from November 2011 to January 2012. The conclusions of this assessment are summarised below.

- 1 The stratigraphy observed on the site was generally similar at all test pits and comprised loose to dense brown sand and gravel (SP) with varying percentages of silt, cobbles and boulders fill. Also roots and wood debris were encountered at various depths in the test pits. Beneath the fill material, a till layer consisting of a brown to grey brown silty sand and gravel with cobbles and boulders was encountered to the termination of the depths of the test pits. No bedrock was encountered in any of the test pits excavated on the site.
- 2 Groundwater was encountered at depths ranging from 5.5 m to 6.0 m below the ground surface in the test pits completed at this site. Based on site topography and site observations, the direction of regional groundwater flow at the site is inferred to be east towards Argentia Harbour.
- 3 No free liquid phase petroleum hydrocarbons were observed at the site during the current investigation or the previous Phase II ESA.
- 4 Concentrations of TPH were detected in three (3) of the soil samples, with concentrations ranging from 26 mg/kg in soil sample TP7 BS6 to 330 mg/kg in soil sample TP3 BS6.

However, the detected concentrations of TPH in the soil samples were below the applicable Atlantic PIRI Tier I guideline of 450 mg/kg for gasoline impacts in soil on a commercial site. BTEX parameters were not detected in any of the seven (7) soil samples analyzed. In addition, during a previous investigation of Site A, a concentration of TPH of 4,200 mg/kg was identified in a soil sample (SS9) collected from borehole BH-A5 at a depth of 6.0 – 6.7 mbgs, which exceeds the Atlantic PIRI Tier I guideline of 450 mg/kg for gasoline impacts in soil on a commercial site.

- 5 The estimated extent of TPH in soil exceeding the Atlantic PIRI Tier I guideline for a commercial site in the vicinity of BH-A5 is shown on Drawing No. 121613435-EE-02 in Appendix A. The estimated area with TPH concentrations in soil above 450 mg/kg in this area is approximately 45 m². Based on field evidence of impacts and soil laboratory it is expected that approximately 45 m³ of impacted soil in the vicinity of BH-A5 exceeds the Atlantic PIRI Tier I guideline of 450 mg/kg for gasoline impacts in soil on a commercial site. This volume of impacted material also exceeds the 1,000 mg/kg threshold criteria for disposal at a municipal landfill and therefore any surplus material removed from the impacted area during construction excavation would require disposal at a licenced soil treatment facility.

5.0 CLOSURE

This report has been prepared for the sole benefit of Husky Energy. The report may not be used by any other person or entity without the express written consent of Stantec Consulting Ltd. and Husky Energy. Any use which a third party makes of this report, or any reliance on decisions made based upon it, is the responsibility of such third parties. Stantec Consulting Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any site-specific information provided by other parties and used or referenced by Stantec Consulting Ltd. has been assumed by Stantec Consulting Ltd. to be accurate. Conclusions presented in this report should not be construed as legal advice.

The conclusions presented in this report represent the best technical judgment of Stantec Consulting Ltd. based on the data obtained from the work. The conclusions are based on the site conditions encountered by Stantec Consulting Ltd. at the time the work was performed at the specific testing and/or sampling locations, and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the site reflecting natural, construction and other activities. In addition, analysis has been carried out for a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec Consulting Ltd. cannot warrant against undiscovered environmental liabilities.

If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein. This letter report was prepared by Amy Bradbury, B.Sc. and reviewed by Carolyn Anstey-Moore, M.Sc., M.A.Sc., P.Geo.

Respectfully submitted,

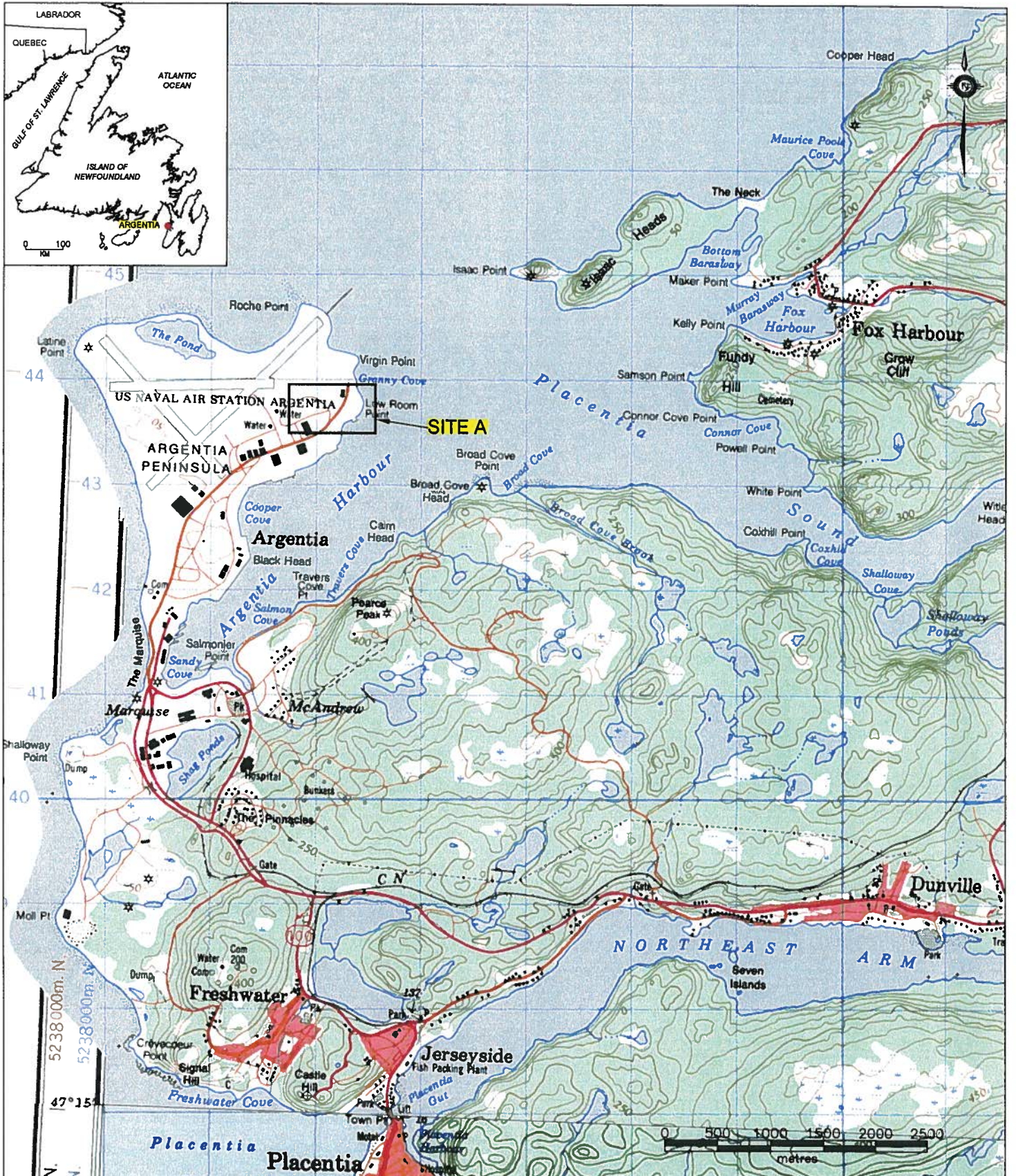
STANTEC CONSULTING LTD.

DRAFT

Carolyn Anstey-Moore, M.Sc., M.A.Sc., P.Geo.
Senior Environmental Geoscientist

APPENDIX A

Drawing









NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

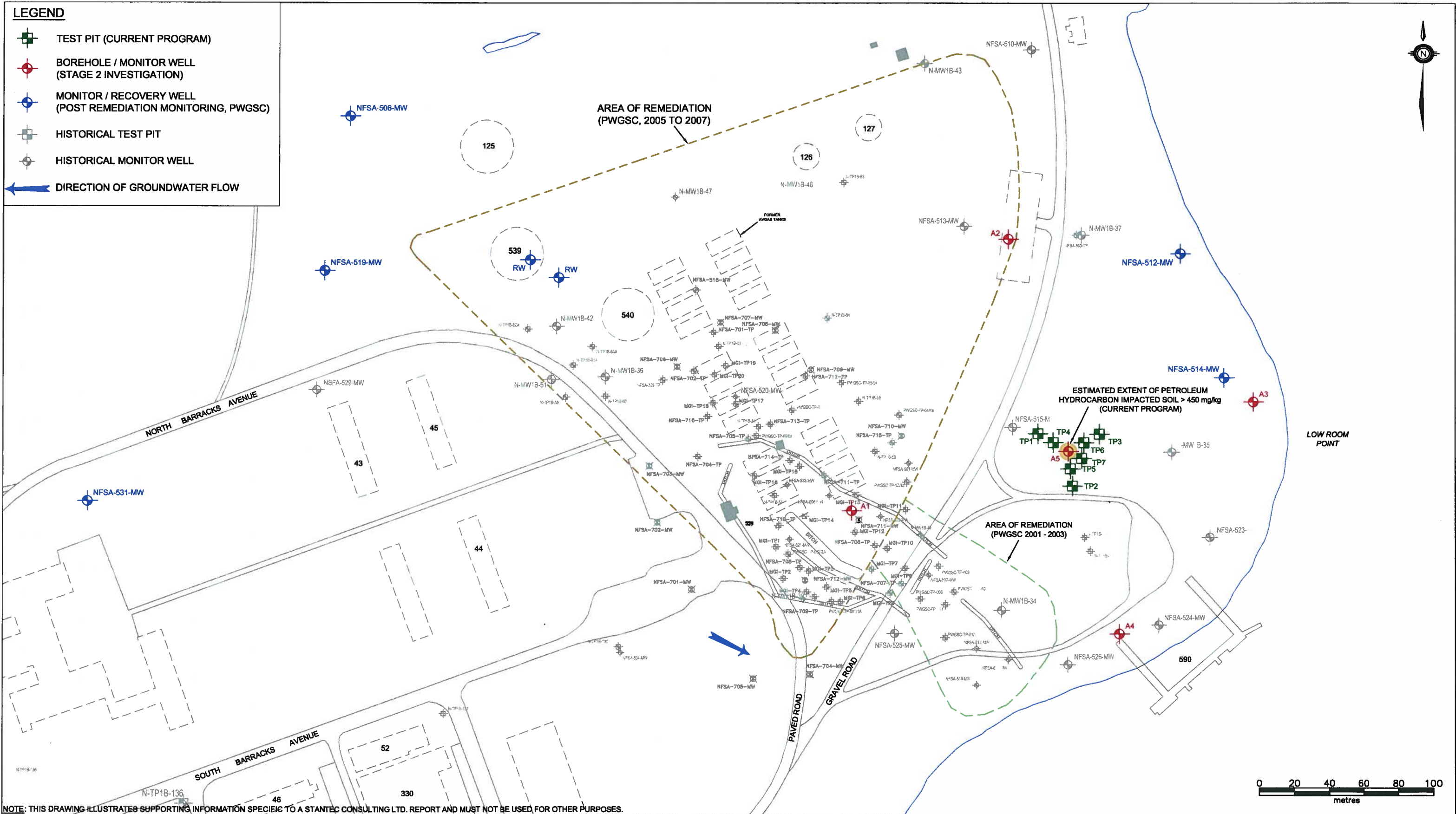
CLIENT:	HUSKY ENERGY		SCALE:	1:50,000	DATE:	APR. 5, 2012
PROJECT TITLE:	PHASE II ENVIRONMENTAL SITE ASSESSMENT, SITE A, PROPOSED GBS CONSTRUCTION SITE, ARGENTIA, NL		DRAWN BY:	N.M.	CHECKED BY:	
DRAWING TITLE:	SITE LOCATION PLAN		EDITED BY:	-	REV. No.	0
			DRAWING No:	121613435-EE-01		
			CAD FILE:	121613435-EE-01.DWG		




Stantec

LEGEND

-  TEST PIT (CURRENT PROGRAM)
-  BOREHOLE / MONITOR WELL (STAGE 2 INVESTIGATION)
-  MONITOR / RECOVERY WELL (POST REMEDIATION MONITORING, PWGSC)
-  HISTORICAL TEST PIT
-  HISTORICAL MONITOR WELL
-  DIRECTION OF GROUNDWATER FLOW



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

<p>CLIENT:</p> <p style="text-align: center;">HUSKY ENERGY</p>	<p>SCALE:</p> <p>1:2000</p>	<p>DATE:</p> <p>APR. 5, 2012</p>	 <p style="font-weight: bold; font-size: 1.2em;">Stantec</p>
<p>PROJECT TITLE:</p> <p style="text-align: center;">PHASE II ENVIRONMENTAL SITE ASSESSMENT, SITE A, PROPOSED GBS CONSTRUCTION SITE, ARGENTIA, NL</p>	<p>DRAWN BY:</p> <p>N.M.</p>	<p>CHECKED BY:</p>	
<p>DRAWING TITLE:</p> <p style="text-align: center;">SITE PLAN</p>	<p>EDITED BY:</p> <p>-</p>	<p>REV. No.</p> <p>0</p>	
<p>DRAWING No.:</p> <p style="text-align: center;">121613435-EE-02</p>		<p>CAD FILE:</p> <p>121613435-EE-02.DWG</p>	
<p>CLIENT:</p> <p style="text-align: center;">HUSKY ENERGY</p>			

APPENDIX B

Symbols & Terms and Test Pit Records

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

<i>Topsoil</i>	- mixture of soil and humus capable of supporting vegetative growth
<i>Peat</i>	- mixture of visible and invisible fragments of decayed organic matter
<i>Till</i>	- unstratified glacial deposit which may range from clay to boulders
<i>Fill</i>	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

<i>Desiccated</i>	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
<i>Fissured</i>	- having cracks, and hence a blocky structure
<i>Varved</i>	- composed of regular alternating layers of silt and clay
<i>Stratified</i>	- composed of alternating successions of different soil types, e.g. silt and sand
<i>Layer</i>	- > 75 mm in thickness
<i>Seam</i>	- 2 mm to 75 mm in thickness
<i>Parting</i>	- < 2 mm in thickness

Terminology describing soil types:

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488). The classification excludes particles larger than 76 mm (3 inches). The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

<i>Trace, or occasional</i>	Less than 10%
<i>Some</i>	10-20%
<i>Frequent</i>	> 20%

Terminology describing compactness of cohesionless soils:

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test N-Value (also known as N-Index). A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
<i>Very Loose</i>	<4
<i>Loose</i>	4-10
<i>Compact</i>	10-30
<i>Dense</i>	30-50
<i>Very Dense</i>	>50

Terminology describing consistency of cohesive soils:

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests.

Consistency	Undrained Shear Strength	
	kips/sq.ft.	kPa
<i>Very Soft</i>	<0.25	<12.5
<i>Soft</i>	0.25 - 0.5	12.5 - 25
<i>Firm</i>	0.5 - 1.0	25 - 50
<i>Stiff</i>	1.0 - 2.0	50 - 100
<i>Very Stiff</i>	2.0 - 4.0	100 - 200
<i>Hard</i>	>4.0	>200



ROCK DESCRIPTION

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	<i>Very Poor Quality - Very Severely Fractured, Crushed</i>
25-50	<i>Poor Quality- Severely Fractured, Shattered or Very Blocky</i>
50-75	<i>Fair Quality - Fractured, Blocky</i>
75-90	<i>Good Quality - Moderately Jointed, Sound</i>
90-100	<i>Excellent Quality - Intact, Very Sound</i>

Rock quality classification is based on a modified core recovery percentage (RQD) in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on N-size core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures. The terminology describing rock mass quality based on RQD is subjective and is underlain by the presumption that sound strong rock is of higher engineering value than fractured weak rock.

Terminology describing rock mass:

Spacing (mm)	Joint Classification	Bedding, Laminations, Bands
> 6000	<i>Extremely Wide</i>	-
2000-6000	<i>Very Wide</i>	<i>Very Thick</i>
600-2000	<i>Wide</i>	<i>Thick</i>
200-600	<i>Moderate</i>	<i>Medium</i>
60-200	<i>Close</i>	<i>Thin</i>
20-60	<i>Very Close</i>	<i>Very Thin</i>
<20	<i>Extremely Close</i>	<i>Laminated</i>
<6	-	<i>Thinly Laminated</i>

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
<i>Extremely Weak</i>	R0	< 1
<i>Very Weak</i>	R1	1 – 5
<i>Weak</i>	R2	5 – 25
<i>Medium Strong</i>	R3	25 – 50
<i>Strong</i>	R4	50 – 100
<i>Very Strong</i>	R5	100 – 250
<i>Extremely Strong</i>	R6	> 250

Terminology describing rock weathering:

Term	Symbol	Description
<i>Fresh</i>	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
<i>Slightly Weathered</i>	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discoloured.
<i>Moderately Weathered</i>	W3	Less than half the rock is decomposed and/or disintegrated into soil.
<i>Highly Weathered</i>	W4	More than half the rock is decomposed and/or disintegrated into soil.
<i>Completely Weathered</i>	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.

Solid Core Recovery (SCR):

Solid core recovery is defined as the cumulative length of all solid (at full diameter) core in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

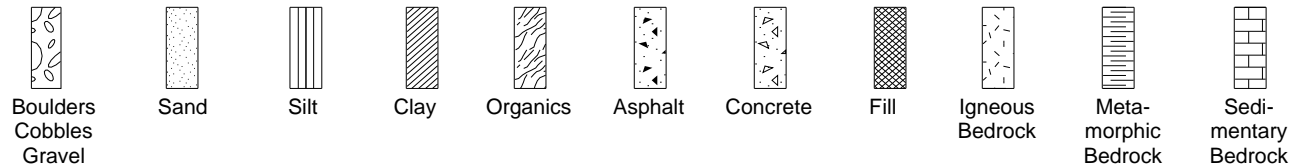
Fracture Index (FI):

Fracture Index is defined as the number of naturally occurring fractures occurring per 0.3 m length of core. The Fracture Index is reported as a simple count of fractures. For > 25 fractures / 0.3 m length, the Fracture Index is reported as >25.



STRATA PLOT

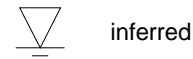
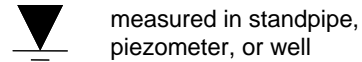
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT



RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery (or total core recovery - TCR) is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE





Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. For split spoon samples where insufficient penetration was achieved and N-values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N value corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to A size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (305 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer





TEST PIT RECORD

CLIENT Huskey Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentia, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 6.00m

TEST PIT No. TP1
 PROJECT No. 121613435
 DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with coarse gravel; roots (SM) and occasional boulders			BS	1	0		0.3	-	-	-	-	-
1	BS				2	0		0.0	-	-	-	-	-	
2	BS				3	0		0.3	-	-	-	-	-	
3		Black SILT; roots (ML)			BS	4	0		0.0	-	-	-	-	-
4		Brown silty SAND with coarse gravel (SM)			BS	5	0		0.0	-	-	-	-	-
5	BS				6	0		0.0	nd	nd	nd	nd	nd	
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 6.0 mbgs.												
9		No debris.												
10		No petroleum hydrocarbon odour.												



TEST PIT RECORD

CLIENT Huskey Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentina, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 5.50m

TEST PIT No. TP2
 PROJECT No. 121613435
 DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown sandy SILT (SM) 12" x 4" piece of asphalt at 0.5 mbgs; small wood chips/debris			BS	1	0		0.0	-	-	-	-	-
1		Brown silty, coarse GRAVEL with cobbles (GP) and occasional boulders		BS	2	0		4.7	-	-	-	-	-	-
2				BS	3	0		0.0	-	-	-	-	-	-
3				BS	4	0		0.0	-	-	-	-	-	-
4				BS	5	0		5.9	-	-	-	-	-	-
5				BS	6	0		0.0	nd	nd	nd	nd	nd	nd
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 5.5 mbgs.												
9		No petroleum hydrocarbon odour.												
10														



TEST PIT RECORD

CLIENT Huskey Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentina, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 5.50m

TEST PIT No. TP3
 PROJECT No. 121613435
 DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Black/brown silty SAND with coarse gravel; roots (SM)			BS	1	0		0.0	-	-	-	-	-
1	BS				2	0		3.6	-	-	-	-	-	
2	BS				3	0		0.0	-	-	-	-	-	
3		Black SILT, roots (ML)			BS	4	0		0.0	-	-	-	-	-
4		Brown silty SAND with coarse gravel (SM) Wood debris (1 m in length) at 5.5 mbgs.			BS	5	0		0.0	-	-	-	-	-
5	BS				6	0		0.0	330	nd	nd	nd	nd	
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 5.5 mbgs.												
9		No petroleum hydrocarbon odour.												
10														



TEST PIT RECORD

CLIENT Huskey Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentia, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 6.00m

TEST PIT No. TP4
 PROJECT No. 121613435
 DATUM _____



DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown sandy GRAVEL with cobbles (GP)			BS	1	0		0.0	-	-	-	-	-
1					BS	2	0		0.0	-	-	-	-	-
2		Black SILT (ML)			BS	3	0		0.0	-	-	-	-	-
3		Brown/black sandy SILT (ML)			BS	4	0		0.0	-	-	-	-	-
4		Brown sandy coarse GRAVEL, occasional boulders (GP)			BS	5	0		0.0	-	-	-	-	-
5					BS	6	0		0.0	40	nd	nd	nd	nd
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 6.0 mbgs.												
9		No debris.												
10		No petroleum hydrocarbon odour.												



TEST PIT RECORD

CLIENT Huskey Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentia, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 5.50m

TEST PIT No. TP5
 PROJECT No. 121613435
 DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown sandy SILT (ML)			BS	1	0		0.0	-	-	-	-	-
1					BS	2	0		0.0	-	-	-	-	-
2		Brown sandy GRAVEL (GP) occasional boulders			BS	3	0		2.2	-	-	-	-	-
3					BS	4	0		0.0	-	-	-	-	-
4					BS	5	0		0.0	-	-	-	-	-
5					BS	6	0		0.0	nd	nd	nd	nd	nd
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 5.5 mbgs.												
9		No debris.												
10		No petroleum hydrocarbon odour.												



TEST PIT RECORD

CLIENT Huskey Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentia, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 5.50m

TEST PIT No. TP6
 PROJECT No. 121613435
 DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty coarse GRAVEL (GP); occasional boulders			BS	1	0		0.0	-	-	-	-	-
1	BS				2	0		0.0	-	-	-	-	-	
2	BS				3	0		0.0	-	-	-	-	-	
3	BS				4	0		0.0	-	-	-	-	-	
4		Brown sandy coarse GRAVEL (GP)			BS	5	0		0.0	-	-	-	-	-
5	BS				6	0		0.0	nd	nd	nd	nd	nd	
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 5.5 mbgs.												
9		No debris.												
10		No petroleum hydrocarbon odour.												



TEST PIT RECORD

CLIENT Husky Energy
 PROJECT Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site
 LOCATION Argentia, NL
 DATES (mm-dd-yy): DUG 3-21-12 WATER LEVEL 5.50m

TEST PIT No. TP7
 PROJECT No. 121613435
 DATUM _____

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				PID READINGS (ppm)	CHEMICAL ANALYSIS (ppm)				
					TYPE	NUMBER	HYDROCARBON ODOUR	OTHER TESTS		TPH	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES
0		Brown silty SAND with coarse gravel (SM)			BS	1	0		0.9	-	-	-	-	-
1				BS	2	1		0.7	-	-	-	-	-	-
2		Grey gravelly SAND (SP)		BS	3	0		0.6	-	-	-	-	-	-
3		Brown sandy coarse GRAVEL (GP)		BS	4	0		1.2	-	-	-	-	-	-
4				BS	5	1		4.7	nd	nd	nd	nd	nd	nd
5				BS	6	0		1.3	26	nd	nd	nd	nd	nd
6		End of Test Pit												
7		Bedrock not encountered.												
8		Groundwater seepage observed at 5.5 mbgs.												
9		No debris.												
10		Slight petroleum hydrocarbon odour at 2.0 mbgs.												
		Slight petroleum hydrocarbon odour at 5.0 mbgs.												

APPENDIX C

Laboratory Analytical Results Summary Tables and Maxxam Analytics Inc.

Laboratory Analytical Reports

Table C.1 Results of Laboratory Analysis of Petroleum Hydrocarbons in Soil

Phase II Environmental Site Assessment, Site A, Proposed GBS Construction Site, Argentia, NL

Stantec Project No. 121613435

Parameters	Sample Depth (m)	Benzene	Toluene	Ethylbenzene	Xylenes	C ₆ -C ₁₀ (Gas Range)	>C ₁₀ -C ₁₆ (Fuel Range)	>C ₁₆ -C ₂₁ (Fuel Range)	>C ₂₁ -C ₃₂ (Lube Range)	Modified TPH - Tier I ³	Resemblance
RDL		0.03	0.03	0.03	0.05	3	10	10	15	20	-
Units		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-
Tier I RBSLs ¹		17	160	430	200	na	na	na	na	450	-
TP1 BS6	6.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	-
TP2 BS6	6.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	-
TP3 BS6	6.0	nd	nd	nd	nd	nd	17	44	270	330	LO
TP4 BS6	6.0	nd	nd	nd	nd	nd	nd	nd	40	40	LO
TP5 BS6	6.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	-
TP6 BS6	6.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	-
TP7 BS5	5.0	nd	nd	nd	nd	nd	nd	nd	nd	nd	-
TP7 BS6	6.0	nd	nd	nd	nd	nd	nd	nd	26	26	LO

Notes:

1 = Atlantic Partners in RBCA (Risk-Based Corrective Action) Implementation (PIRI) Tier I Risk-Based Screening Levels (RBSLs) for a commercial site with non-potable groundwater, coarse grained soil, and gasoline impacts (March 2007)

2 = Modified TPH - Tier I does not include BTEX

Shaded = value exceeds applicable criteria; LO - Lube oil fraction.

Your P.O. #: 16300R-40
 Your Project #: 121613435
 Site Location: ARGENTIA, NL
 Your C.O.C. #: 11267

Attention: Carolyn Anstey-Moore

Stantec Consulting Ltd
 St. John's - Standing Offer
 607 Torbay Rd
 St. John's, NL
 A1A 4Y6

Report Date: 2012/03/29

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B241721

Received: 2012/03/23, 09:48

Sample Matrix: Soil
 # Samples Received: 9

Analyses	Quantity	Date		Laboratory Method	Method Reference
		Extracted	Analyzed		
TEH in Soil (PIRI) (1)	8	2012/03/27	2012/03/27	ATL SOP 00111	Based on Atl. PIRI
TEH in Soil (PIRI) (1)	1	2012/03/27	2012/03/28	ATL SOP 00111	Based on Atl. PIRI
Moisture	9	N/A	2012/03/26	ATL SOP 00001	MOE Handbook 1983
VPH in Soil (PIRI)	2	2012/03/26	2012/03/27	ATL SOP 00119	Based on Atl. PIRI
VPH in Soil (PIRI)	7	2012/03/26	2012/03/28	ATL SOP 00119	Based on Atl. PIRI
ModTPH (T1) Calc. for Soil	9	2012/03/26	2012/03/28		Based on Atl. PIRI

Remarks:

Reporting results to two significant figures at the RDL is to permit statistical evaluation and is not intended to be an indication of analytical precision.

- * RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
- * Results relate only to the items tested.

(1) Soils are reported on a dry weight basis unless otherwise specified.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MICHELLE HILL, Project Manager
 Email: MHill@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.

Total cover pages: 1

Maxxam Job #: B241721
 Report Date: 2012/03/29

Stantec Consulting Ltd
 Client Project #: 121613435
 Site Location: ARGENTIA, NL
 Your P.O. #: 16300R-40
 Sampler Initials: AB

RESULTS OF ANALYSES OF SOIL

Maxxam ID		MX1260	MX1261	MX1262	MX1263	MX1264	MX1265	MX1266	MX1267	MX1268		
Sampling Date		2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22		
	Units	TP1-BS6	TP2-BS6	TP3-BS6	TP4-BS6	TP5-BS6	TP6-BS6	TP7-BS6	TP7-BS5	TP1-BS5-DUP	RDL	QC Batch
Inorganics												
Moisture	%	11	7	32	14	8	7	7	9	11	1	2800992

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch

Maxxam Job #: B241721
 Report Date: 2012/03/29

 Stantec Consulting Ltd
 Client Project #: 121613435
 Site Location: ARGENTIA, NL
 Your P.O. #: 16300R-40
 Sampler Initials: AB

ATLANTIC RBCA HYDROCARBONS (SOIL)

Maxxam ID		MX1260	MX1261	MX1262	MX1263	MX1264	MX1265	MX1266	MX1267	MX1268		
Sampling Date		2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22	2012/03/22		
	Units	TP1-BS6	TP2-BS6	TP3-BS6	TP4-BS6	TP5-BS6	TP6-BS6	TP7-BS6	TP7-BS5	TP1-BS5-DUP	RDL	QC Batch
Petroleum Hydrocarbons												
Benzene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.025	2802603
Toluene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.025	2802603
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.025	2802603
Xylene (Total)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.050	2802603
C6 - C10 (less BTEX)	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	3.6	2.5	2802603
>C10-C16 Hydrocarbons	mg/kg	ND	ND	17	ND	ND	ND	ND	ND	ND	10	2802560
>C16-C21 Hydrocarbons	mg/kg	ND	ND	44	ND	ND	ND	ND	ND	ND	10	2802560
>C21-<C32 Hydrocarbons	mg/kg	ND	ND	270	40	ND	ND	26	ND	ND	15	2802560
Modified TPH (Tier1)	mg/kg	ND	ND	330	40	ND	ND	26	ND	ND	15	2801208
Reached Baseline at C32	mg/kg	NA	NA	YES	YES	NA	NA	YES	NA	NA	N/A	2802560
Hydrocarbon Resemblance	mg/kg	NA	NA	COMMENT ⁽¹⁾	COMMENT ⁽¹⁾	NA	NA	COMMENT ⁽¹⁾	NA	NA	N/A	2802560
Surrogate Recovery (%)												
Isobutylbenzene - Extractable	%	85	85	88	87	83	86	82	83	81		2802560
Isobutylbenzene - Volatile	%	102	98	99	98	101	95	95	101	105		2802603
n-Dotriacontane - Extractable	%	76 ⁽²⁾	76 ⁽²⁾	82	83	73 ⁽²⁾	87 ⁽²⁾	79	70	71		2802560

N/A = Not Applicable

ND = Not detected

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

(1) - Lube oil fraction.

(2) - TEH samples were extracted using a flat-bed shaker instead of the accelerated mechanical shaker due to matrix incompatibility.

Maxxam Job #: B241721
Report Date: 2012/03/29

Stantec Consulting Ltd
Client Project #: 121613435
Site Location: ARGENTIA, NL
Your P.O. #: 16300R-40
Sampler Initials: AB

Package 1	15.0°C
-----------	--------

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

GENERAL COMMENTS

Samples received at an average temperature >10°C and with headspace present.

Maxxam Job #: B241721
 Report Date: 2012/03/29

Stantec Consulting Ltd
 Client Project #: 121613435
 Site Location: ARGENTIA, NL
 Your P.O. #: 16300R-40
 Sampler Initials: AB

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	Units	Value (%)	QC Limits
2802560	Isobutylbenzene - Extractable	2012/03/27	73	30 - 130	89	30 - 130	93	%		
2802560	n-Dotriacontane - Extractable	2012/03/27	80	30 - 130	78	30 - 130	93	%		
2802560	>C10-C16 Hydrocarbons	2012/03/27	NC	30 - 130	79	30 - 130	ND, RDL=10	mg/kg	22.2	50
2802560	>C16-C21 Hydrocarbons	2012/03/27	NC	30 - 130	77	30 - 130	ND, RDL=10	mg/kg	28.6	50
2802560	>C21-<C32 Hydrocarbons	2012/03/27	NC	30 - 130	73	30 - 130	ND, RDL=15	mg/kg	26.1	50
2802603	Isobutylbenzene - Volatile	2012/03/27	52 ^(1,2)	60 - 140	98	60 - 140	99	%		
2802603	Benzene	2012/03/28	83	60 - 140	88	60 - 140	ND, RDL=0.025	mg/kg	NC	50
2802603	Toluene	2012/03/28	109	60 - 140	95	60 - 140	ND, RDL=0.025	mg/kg	NC	50
2802603	Ethylbenzene	2012/03/28	89	60 - 140	91	60 - 140	ND, RDL=0.025	mg/kg	NC	50
2802603	Xylene (Total)	2012/03/28	101	60 - 140	93	60 - 140	ND, RDL=0.050	mg/kg	NC	50
2802603	C6 - C10 (less BTEX)	2012/03/28					ND, RDL=2.5	mg/kg	33.0	50

N/A = Not Applicable

RDL = Reportable Detection Limit

RPD = Relative Percent Difference

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 to which a known amount of the analyte has been added. Used to evaluate analyte recovery.

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 spiked amount was not sufficiently significant to permit a reliable recovery calculation.

NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

(1) - Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) - VPH surrogate not within acceptance limits. Analysis was repeated with similar results.

Validation Signature Page

Maxxam Job #: B241721

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



ROSALYN McDONALD, Scientific Specialist (Organics)

=====
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Appendix D

The Pond Water and Sediment Chemistry Data

Parameter	RDL ¹	Units	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	CCME Marine Sediment PELs ²	CCME Freshwater Sediment PELs ²
Polycyclic Aromatic Hydrocarbon (PAH) Results												
1-Methylnaphthalene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Methylnaphthalene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.201	0.201
Acenaphthene	0.005	mg/kg	ND	ND	0.038	0.026	0.032	ND	ND	ND	0.0889	0.0889
Acenaphthylene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.128	0.128
Anthracene	0.005	mg/kg	ND	0.043	0.059	0.066	0.063	0.026	ND	0.050	0.245	0.245
Benzo(a)anthracene	0.005	mg/kg	0.12	0.23	0.18	0.38	0.24	0.099	ND	0.19	0.693	0.385
Benzo(a)pyrene	0.005	mg/kg	0.12	0.19	0.14	0.28	0.18	0.095	ND	0.21	0.763	0.782
Benzo(b)fluoranthene	0.005	mg/kg	0.20	0.26	0.22	0.45	0.22	0.13	0.031	0.35	-	-
Benzo(g,h,i)perylene	0.15-0.31	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(j)fluoranthene	0.005	mg/kg	0.097	0.13	0.11	0.23	0.12	0.065	ND	0.16	-	-
Benzo(k)fluoranthene	0.005	mg/kg	0.10	0.12	0.11	0.23	0.13	0.068	ND	0.19	-	-
Chrysene	0.005	mg/kg	0.25	0.28	0.26	0.68	0.28	0.13	0.043	0.29	0.846	0.862
Dibenz(a,h)anthracene	0.005	mg/kg	ND	ND	ND	0.038	0.027	ND	ND	ND	0.135	0.135
Fluoranthene	0.005	mg/kg	0.59	1.1	0.81	2.6	0.89	0.38	0.082	0.71	1.494	2.355
Fluorene	0.005	mg/kg	ND	0.035	0.055	0.038	0.038	ND	ND	ND	0.144	0.144
Indeno(1,2,3-cd)pyrene	0.005	mg/kg	0.071	0.086	0.081	0.15	0.084	0.053	ND	0.12	-	-
Naphthalene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.391	0.391
Perylene	0.005	mg/kg	0.31	2.0	0.38	1.1	1.0	0.53	0.96	0.29	-	-
Phenanthrene	0.005	mg/kg	0.093	0.16	0.27	0.26	0.24	0.11	ND	0.12	0.544	0.515
Pyrene	0.005	mg/kg	0.40	0.82	0.62	1.8	0.76	0.31	0.062	0.53	1.398	0.875
Total PAHs ³		mg/kg	2.16	3.57	3.07	7.34	3.41	1.58	0.35	3.04	-	-
Polychlorinated Biphenyl Results												
Total PCBs	0.050	mg/kg	ND	0.38	0.25	0.31	0.32	ND	ND	ND	0.189	0.277
Metal Results												
Available Aluminum (Al)	10	mg/kg	8700	9700	8600	12000	11000	9600	8500	4800	-	-
Available Antimony (Sb)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Available Arsenic (As)	2	mg/kg	11	8.2	8.9	7.2	10	6.3	4.2	7.1	41.6	17
Available Barium (Ba)	5	mg/kg	18	20	19	26	28	18	9.6	14	-	-
Available Beryllium (Be)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Available Bismuth (Bi)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Available Boron (B)	5	mg/kg	140	140	120	91	84	63	96	110	-	-
Available Cadmium (Cd)	0.3	mg/kg	1.4	0.65	0.91	0.73	0.70	0.42	0.41	0.69	4.2	3.5
Available Chromium (Cr)	2	mg/kg	18	19	18	24	23	19	16	9.7	160	90
Available Cobalt (Co)	1	mg/kg	7.3	8.0	7.5	10	9.5	8.4	7.1	4.4	-	-
Available Copper (Cu)	2	mg/kg	130	62	87	75	72	48	36	78	108	197
Available Iron (Fe)	50	mg/kg	18000	22000	20000	25000	26000	22000	16000	15000	-	-
Available Lead (Pb)	0.5	mg/kg	55	44	42	54	48	31	17	39	112	91.3
Available Lithium (Li)	2	mg/kg	11	14	11	16	16	15	14	5.6	-	-
Available Manganese (Mn)	2	mg/kg	360	500	480	570	520	480	380	180	-	-
Available Mercury (Hg)	0.1	mg/kg	0.18	0.13	0.13	0.11	ND	ND	ND	0.11	0.7	0.486
Available Molybdenum (Mo)	2	mg/kg	12	12	6.4	6.7	8.4	5.8	2.6	6.2	-	-
Available Nickel (Ni)	2	mg/kg	15	15	14	18	17	15	13	8.4	-	-
Available Rubidium (Rb)	2	mg/kg	3.0	3.3	2.9	3.9	3.8	2.7	2.0	ND	-	-
Available Selenium (Se)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Available Silver (Ag)	0.5	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Available Strontium (Sr)	5	mg/kg	130	100	150	84	78	140	140	680	-	-
Available Thallium (Tl)	0.1	mg/kg	0.10	ND	ND	ND	ND	ND	ND	ND	-	-
Available Tin (Sn)	2	mg/kg	4.0	3.9	3.3	6.2	4.8	2.4	ND	3.1	-	-
Available Uranium (U)	0.1	mg/kg	5.7	3.2	4.1	2.6	2.9	2.0	2.8	2.3	-	-
Available Vanadium (V)	2	mg/kg	39	45	36	52	49	40	28	25	-	-
Available Zinc (Zn)	5	mg/kg	200	120	130	150	140	100	81	130	271	-

Parameter	RDL ¹	Units	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	CCME Marine Sediment PELs ²	CCME Freshwater Sediment PELs ²
BTEX - TPH Results												
Benzene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Toluene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Ethylbenzene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Xylenes (Total)	0.05	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
C6-C10 (less BTEX)	2.5	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	-	-
>C10-C16 Hydrocarbons	10	mg/kg	ND	ND	ND	ND	ND	ND	ND	130	-	-
>C16-C21 Hydrocarbons	10	mg/kg	ND	ND	ND	ND	ND	ND	ND	54	-	-
>C21-<C32 Hydrocarbons	15	mg/kg	170	330	270	290	290	230	240	310	-	-
Modified TPH ⁶ (Tier 1)	15	mg/kg	170	330	270	290	290	230	240	500	-	-

¹ RDL = Reportable Detection Limit; Values in parentheses indicate adjusted detection limit due to sample interferences and required dilution.

² Canadian Environmental Quality Guidelines.

³ Total PAHs does not include 1-Methylnaphthalene, 2-Methylnaphthalene, or Perylene.

ND = Not Detected.

Result above the marine PEL CCME guideline

Result above both freshwater and marine PEL CCME Guideline

Parameter	RDL ¹	Units	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	CCME Marine Water Quality Guidelines ²	Environmental Control Water and Sewage Regulations
Polycyclic Aromatic Hydrocarbon (PAH) Results												
1-Methylnaphthalene	0.050	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
2-Methylnaphthalene	0.050	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Acenaphthene	0.01 - 0.02	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Acenaphthylene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Anthracene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(a)anthracene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(a)pyrene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(b)fluoranthene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(g,h,i)perylene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(j)fluoranthene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Benzo(k)fluoranthene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Chrysene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Dibenz(a,h)anthracene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Fluoranthene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Fluorene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Indeno(1,2,3-cd)pyrene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Naphthalene	0.20	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	1,400	-
Perylene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Phenanthrene	0.010	ug/L	ND	ND	ND	ND	ND	0.010	ND	ND	-	-
Pyrene	0.010	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Polychlorinated Biphenyl Results												
Total PCBs	0.050	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Metal Results												
Total Aluminum (Al)	5.0	ug/L	10.7	11.4	12.2	10.3	13.1	11.9	12.5	12.2	-	-
Total Antimony (Sb)	1.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Arsenic (As)	1.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	12.5	500
Total Barium (Ba)	1.0	ug/L	16.0	15.4	15.2	14.5	15.1	15.0	15.2	15.0	-	5000
Total Beryllium (Be)	1.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Bismuth (Bi)	2.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Boron (B)	50	ug/L	1950	2000	2000	1960	1940	1970	1880	1920	-	-
Total Cadmium (Cd)	0.017	ug/L	0.029	0.030	0.029	0.024	0.025	0.024	0.041	0.027	0.12	50
Total Calcium (Ca)	100	ug/L	173000	180000	182000	177000	177000	176000	176000	180000	-	-
Total Chromium (Cr)	1.0	ug/L	ND	ND	ND	6.0	ND	ND	ND	28.2	56	1000
Total Cobalt (Co)	0.40	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Copper (Cu)	2.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	300
Total Iron (Fe)	50	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	10000
Total Lead (Pb)	0.50	ug/L	0.56	1.07	ND	ND	ND	ND	ND	ND	-	200
Total Magnesium (Mg)	1000	ug/L	480000	506000	497000	504000	499000	502000	509000	519000	-	-
Total Manganese (Mn)	2.0	ug/L	5.9	6.1	6.2	5.8	5.6	5.6	5.6	5.7	-	-
Total Mercury (Hg) ³	0.013	ug/L	ND	ND	1.2	0.14	ND	ND	ND	ND	0.016	5
Total Mercury (Hg) ⁴	0.013	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	0.016	5
Total Molybdenum (Mo)	2.0	ug/L	3.6	3.8	3.7	3.6	3.7	3.7	3.6	3.7	-	-
Total Nickel (Ni)	2.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	500
Total Potassium (K)	1000	ug/L	138000	141000	143000	143000	142000	141000	145000	149000	-	-
Total Selenium (Se)	1.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	10
Total Silver (Ag)	0.10	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	50
Total Sodium (Na)	1000	ug/L	3910000	4080000	4050000	4070000	4050000	4070000	4080000	4180000	-	-
Total Strontium (Sr)	2.0	ug/L	2960	3030	3090	3010	2990	3030	3080	3100	-	-
Total Thallium (Tl)	0.10	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Tin (Sn)	2.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Titanium (Ti)	2.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Uranium (U)	0.10	ug/L	0.87	0.94	0.94	0.94	0.92	0.91	0.93	0.97	-	-
Total Vanadium (V)	2.0	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Zinc (Zn)	5.0	ug/L	7.4	10.1	8.6	5.0	ND	ND	43.6	ND	-	500

Parameter	RDL ¹	Units	SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	CCME Marine Water Quality Guidelines ²	Environmental Control Water and Sewage Regulations
BTEX - TPH Results												
Benzene	1	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	110	-
Toluene	1	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	215	-
Ethylbenzene	1	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	25	-
Xylenes (Total)	2	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
C6-C10 (less BTEX)	10	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
>C10-C16 Hydrocarbons	50	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
>C16-C21 Hydrocarbons	50	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
>C21-<C32 Hydrocarbons	100	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Modified TPH (Tier 1)	100	ug/L	ND	ND	ND	ND	ND	ND	ND	ND	-	15000
Calculated Parameters												
Anion Sum	N/A	me/L	235	241	238	245	246	243	231	237	-	-
Bicarb. Alkalinity (calc. as CaCO3)	1.0	mg/L	90	86	87	88	86	90	89	85	-	-
Calculated TDS	1.0	mg/L	13300	13700	13600	13800	13800	13700	13300	13700	-	1000 ³
Carb. Alkalinity (calc. as CaCO3)	1.0	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Cation Sum	N/A	me/L	222	232	230	231	230	231	232	237	-	-
Hardness (CaCO3)	1.0	mg/L	2400	2500	2500	2500	2500	2500	2500	2600	-	-
Ion Balance (% Difference)	N/A	%	2.87	1.97	1.81	2.98	3.35	2.60	0.150	0.130	-	-
Langelier Index (@ 20C)		N/A	0.114	0.153	0.163	0.131	0.144	0.163	0.157	0.177	-	-
Langelier Index (@ 4C)		N/A	-0.123	-0.0840	-0.0740	-0.106	-0.0930	-0.0740	-0.0800	-0.0600	-	-
Nitrate (N)	0.050	mg/L	ND	0.074	ND	ND	ND	ND	ND	ND	200	10
Saturation pH (@ 20C)		N/A	7.71	7.71	7.70	7.71	7.72	7.70	7.70	7.71	-	-
Saturation pH (@ 4C)		N/A	7.94	7.94	7.93	7.95	7.95	7.93	7.94	7.95	-	-
Inorganics												
Total Alkalinity (Total as CaCO3)	5.0	mg/L	90	87	88	88	87	91	90	86	-	-
Dissolved Chloride (Cl)	120	mg/L	7600	7800	7700	8000	7900	7800	7400	7600	-	-
Colour	5.0	TCU	6.6	6.5	6.3	6.8	8.7	6.5	6.2	8.6	-	-
Nitrate + Nitrite	0.050	mg/L	ND	0.074	ND	ND	ND	ND	ND	ND	-	-
Nitrite (N)	0.010	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Nitrogen (Ammonia Nitrogen)	0.050	mg/L	ND	ND	ND	ND	ND	ND	ND	0.053	-	2
Total Organic Carbon (C)	0.50	mg/L	1.1	0.99	1.3	1.3	1.3	1.3	1.1	1.2	-	-
Orthophosphate (P)	0.010	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
pH	N/A	pH	7.82	7.86	7.86	7.84	7.86	7.86	7.86	7.89	7-8.7	5.5-9.0
Reactive Silica (SiO2)	0.50	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	-	-
Total Suspended Solids	2.0	mg/L	ND	ND	ND	ND	ND	4.0	ND	2.4	25.0	30
Dissolved Sulphate (SO4)	200	mg/L	920	940	910	930	990	970	920	940	-	-
Turbidity	0.10	NTU	ND	ND	0.26	0.22	0.18	0.11	0.22	ND	8.00	-
Conductivity	1.0	uS/cm	22000	22000	22000	22000	22000	22000	22000	22000	-	-

¹ RDL = Reportable Detection Limit; Values in parentheses indicate adjusted detection limit due to sample interferences and required dilution.

² Canadian Environmental Quality Guidelines

³ Water in "The Pond" is brackish and therefore naturally elevated TDS for which the water and sewage limits do not apply.

⁴ - Sample Date - March 15, 2012

⁵ - Sample Date - June 26, 2012

ND = Not Detected.

Result above the PEL CCME guideline

Appendix E

Nearshore and Tow-out Corridor Dredge Area Sediment

Chemistry Data

Parameter	RDL ¹	Units											CCME Soil Quality Guidelines ²				CCME Marine PELs ³	Atlantic RBCA Tier 1 RBSL's for Soil ⁶			
			1-102	1-103	1-104	1-105	1-106	1-107	1-108	1-109	2-100	2-101	Commercial/ Industrial		Residential			Commercial / Non-potable		Residential / Non-potable	
													Surface - Course Grained	Sub-Surface Course Grained	Surface - Course Grained	Sub-Surface Course Grained		Course - Grained	Fine - grained	Course - Grained	Fine - grained
Polycyclic Aromatic Hydrocarbon (PAH) Results																					
1-Methylnaphthalene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-		
2-Methylnaphthalene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	-	-	0.201	-	-	-	-		
Acenaphthene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.008	0.025	0.28	0.28	0.0889	-	-	-		
Acenaphthylene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	320	320	0.128	-	-	-		
Anthracene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.016	0.049	32	2.5	0.245	-	-	-		
Benzo(a)anthracene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.042	0.077	10	1	0.693	-	-	-		
Benzo(a)pyrene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.034	0.054	72	20	0.763	-	-	-		
Benzo(b)fluoranthene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.026	0.047	10	1	-	-	-	-		
Benzo(g,h,i)perylene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.015	0.027	-	-	-	-	-	-		
Benzo(j)fluoranthene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.017	0.028	-	-	-	-	-	-		
Benzo(k)fluoranthene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.017	0.025	10	1	-	-	-	-		
Chrysene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.042	0.074	-	-	0.846	-	-	-		
Dibenz(a,h)anthracene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.007	10	1	0.135	-	-	-		
Fluoranthene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.082	0.170	180	50	1.494	-	-	-		
Fluorene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.010	0.025	0.25	0.25	0.144	-	-	-		
Indeno(1,2,3-cd)pyrene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.013	0.023	10	1	-	-	-	-		
Naphthalene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.021	0.021	22	0.6	0.391	-	-	-		
Perylene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.012	0.015	-	-	-	-	-	-		
Phenanthrene	0.005	mg/kg	ND	ND	0.013	ND	0.007	ND	0.010	ND	ND	0.082	0.180	50	5	0.544	-	-	-		
Pyrene	0.005	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.068	0.130	100	10	1.398	-	-	-		
Total PAHs ⁴		mg/kg	--	--	0.01	--	0.01	--	0.01	--	0.47	0.96	-	-	-	-	-	-	-		
Polychlorinated Biphenyl Results																					
Total PCBs		mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33	33	0.189	-	-	-	-		
Metal Results																					
Available Aluminum (Al)	10	mg/kg	11000	11000	10000	10000	11000	11000	11000	11000	11000	11000	-	-	-	-	-	-	-		
Available Antimony (Sb)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40	20	-	-	-	-	-		
Available Arsenic (As)	2	mg/kg	4.4	4.2	4.3	3.9	4.4	4.3	4.5	4.2	4.8	4.1	12	12	41.6	-	-	-	-		
Available Barium (Ba)	5	mg/kg	45	34	7.9	53	32	31	46	23	40	48	2000	500	-	-	-	-	-		
Available Beryllium (Be)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8	4	-	-	-	-	-		
Available Bismuth (Bi)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-		
Available Boron (B)	5	mg/kg	5.4	5.5	6.1	6.1	ND	5.4	ND	5.2	13	7.2	-	-	-	-	-	-	-		
Available Cadmium (Cd)	0.3	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22	10	4.2	-	-	-	-		
Available Chromium (Cr)	2	mg/kg	22	21	19	20	23	20	23	21	24	23	87	64	160	-	-	-	-		
Available Cobalt (Co)	1	mg/kg	9.6	9.3	8.6	8.9	9.5	9.0	9.6	9.4	11	10	300	50	-	-	-	-	-		
Available Copper (Cu)	2	mg/kg	5.2	4.8	3.5	5.8	4.7	4.8	5.2	4.5	11	11	91	63	108	-	-	-	-		
Available Iron (Fe)	50	mg/kg	28000	27000	24000	25000	30000	26000	30000	27000	27000	27000	-	-	-	-	-	-	-		
Available Lead (Pb)	0.5	mg/kg	6.8	6.4	5.3	6.6	7.2	6.3	7.4	6.4	10	9.8	260/600	140	112	-	-	-	-		
Available Lithium (Li)	2	mg/kg	25	25	23	24	25	25	24	25	25	24	-	-	-	-	-	-	-		
Available Manganese (Mn)	2	mg/kg	590	570	530	560	590	560	600	580	600	600	-	-	-	-	-	-	-		
Available Mercury (Hg)	0.1	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	24/50	6.6	0.7	-	-	-	-		
Available Molybdenum (Mo)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40	10	-	-	-	-	-		
Available Nickel (Ni)	2	mg/kg	18	17	16	17	18	17	18	17	20	18	50	50	-	-	-	-	-		
Available Rubidium (Rb)	2	mg/kg	2.0	ND	ND	ND	2.0	2.0	ND	ND	ND	ND	-	-	-	-	-	-	-		
Available Selenium (Se)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9	1	-	-	-	-	-		
Available Silver (Ag)	0.5	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40	20	-	-	-	-	-		
Available Strontium (Sr)	5	mg/kg	40	45	95	80	43	42	33	45	120	80	-	-	-	-	-	-	-		
Available Thallium (Tl)	0.1	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1	1	-	-	-	-	-		
Available Tin (Sn)	2	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300	50	-	-	-	-	-		
Available Uranium (U)	0.1	mg/kg	0.41	0.40	0.33	0.36	0.50	0.39	0.44	0.42	0.44	0.45	33/300	23	-	-	-	-	-		
Available Vanadium (V)	2	mg/kg	37	35	31	32	42	33	42	35	39	38	130	130	-	-	-	-	-		
Available Zinc (Zn)	5	mg/kg	56	54	52	52	54	52	57	55	61	68	360	200	271	-	-	-	-		

Parameter	RDL ¹	Units											CCME Soil Quality Guidelines ²				CCME Marine PELs ³	Atlantic RBCA Tier 1 RBSL's for Soil ⁶			
			1-102	1-103	1-104	1-105	1-106	1-107	1-108	1-109	2-100	2-101	Commercial/ Industrial		Residential			Commercial / Non-potable		Residential / Non-potable	
													Surface - Course Grained	Sub-Surface Course Grained	Surface - Course Grained	Sub-Surface Course Grained		Course - Grained	Fine - grained	Course - Grained	Fine - grained
BTEX - TPH Results																					
Benzene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.03	0.03	0.0095	0.011	-	1.8	11	0.16	1.5
Toluene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	0.37	0.37	0.37	-	160	680	14	120
Ethylbenzene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.082	0.082	0.082	0.082	-	430	430	58	430
Xylenes (Total)	0.05	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	11	11	11	-	200	650	17	160
C6-C10 (less BTEX)	2.5	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-
>C10-C16 Hydrocarbons	10	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-
>C16-C21 Hydrocarbons	10	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-
>C21-<C32 Hydrocarbons	15	mg/kg	ND	ND	ND	24	ND	ND	ND	ND	ND	32	19	-	-	-	-	-	-	-	-
Modified TPH ⁵ (Tier 1)	15	mg/kg	ND	ND	ND	24	ND	ND	ND	ND	ND	32	19	-	-	-	-	7400	7400	140	4400

¹ RDL = Reportable Detection Limit; Values in parentheses indicate adjusted detection limit due to sample interferences and required dilution.

² Canadian Council of Ministers of the Environment (CCME). Canadian Soil Quality Guidelines, updated 2008.

³ Canadian Sediment Quality Guidelines, updated 2002.

⁴ Total PAHs does not include 1-Methylnaphthalene, 2-Methylnaphthalene, or Perylene.

⁵ Modified TPH values reflect the sum of the individual carbon fractions that resembles Gasoline, Diesel (#2) and Oil (#6).

⁶ Atlantic RBCA Version 2.1 Reference Document for Petroleum Impacted Sites (2003). RBSL = Risk Based Screening Level. Note that product resemblance was in the diesel and oil range, therefore, used the Diesel/#2 criteria.

ND = Not Detected.

Parameter	RDL ¹	Units																				CCME Soil Quality Guidelines ²				CCME Marine PELs ³	Atlantic RBCA Tier 1 RBSL's for Soil ⁶					
			SA1	SA2	SA3	SA4	SA5	SA6	SA7	SA8	SA9	SA10	A-110	A-111	A-112	A-113	A-114	A-115	A-116	A-117	A-118	A-119	Commercial/ Industrial		Residential		Commercial / Non-potable		Residential / Non-potable			
																							Surface - Course Grained	Sub-Surface Course Grained	Surface - Course Grained		Sub-Surface Course Grained	Course - Grained	Fine - grained	Course - Grained	Fine - grained	
BTEX - TPH Results																																
Benzene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.03	0.03	0.0095	0.011	-	1.8	11	0.16	1.5
Toluene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.37	0.37	0.37	0.37	-	160	680	14	120	
Ethylbenzene	0.025	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.082	0.082	0.082	0.082	-	430	430	58	430	
Xylenes (Total)	0.05	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11	11	11	11	-	200	650	17	160	
C6-C10 (less BTEX)	2.5	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	
>C10-C16 Hydrocarbons	10	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19	ND	ND	ND	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	
>C16-C21 Hydrocarbons	10	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	37	59	61	68	47	28	43	50	31	220	-	-	-	-	-	-	-	-	-	
>C21-<C32 Hydrocarbons	15	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	90	130	130	100	83	66	86	99	66	250	-	-	-	-	-	-	-	-	-	
Modified TPH ⁵ (Tier 1)	15	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	130	<u>190</u>	<u>190</u>	<u>190</u>	130	93	130	<u>150</u>	97	<u>460</u>	-	-	-	-	-	7400	7400	140	4400	

¹ RDL = Reportable Detection Limit; Values in parentheses indicate adjusted detection limit due to sample interferences and required dilution.

² Canadian Council of Ministers of the Environment (CCME). Canadian Soil Quality Guidelines, updated 2008.

³ Canadian Environmental Quality Guidelines, updated 2002.

⁴ Total PAHs does not include 1-Methylnaphthalene, 2-Methylnaphthalene, or Perylene.

⁵ Modified TPH values reflect the sum of the individual carbon fractions that resembles Gasoline, Diesel (#2) and Oil (#6).

⁶ Atlantic RBCA Version 2.1 Reference Document for Petroleum Impacted Sites (2003). RBSL = Risk Based Screening Level. Note that product resemblance was in the diesel and oil range, therefore, used the Diesel/#2 criteria.

ND = Not Detected.

Result above the PEL CCME guideline
<u>underlined</u>
Result above one or more CCME Soil Quality Guideline or RBCA Soil Quality Guideline