

Channel Re-dredging

Dingwall

Victoria County, N.S.

Project No. R.076886.001

Appendix "B"

Page 1

Appendix "B" - Marine Sediment Sampling Results



**PWGSC PROJECT #R.076318.003
MARINE SEDIMENT SAMPLING PROGRAM
Dingwall DFO-SCH
Dingwall, Nova Scotia

DRAFT REPORT**

Submitted to:
Public Works and Government Services Canada
Halifax, Nova Scotia

Submitted by:
**Amec Foster Wheeler Environment & Infrastructure,
a Division of Amec Foster Wheeler Americas Limited**
Dartmouth, Nova Scotia

June 2015

TV151207



09 June 2015

TV151207

Mr. Troy Young, B.Sc.
Environmental Specialist
Environmental Services
Public Works and Government Services Canada
1713 Bedford Row
Halifax, Nova Scotia
B3J 3C9

Dear Mr. Young:

Re: Marine Sediment Sampling Program at the Dingwall Fisheries and Oceans Small Craft Harbour, Dingwall, Nova Scotia - Draft Report

Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), is pleased to provide Public Works and Government Services Canada with the findings of a Marine Sediment Sampling Program undertaken at the Dingwall Fisheries and Oceans Canada - Small Craft Harbour in Nova Scotia.

Amec Foster Wheeler appreciates the opportunity to provide services to your organization. Please do not hesitate to call if you have any questions regarding this, or any other matter.

Respectfully submitted,
Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

Maureen Cameron-MacMillan, M.Sc.
Intermediate Environmental Scientist
Direct Tel.: 902.564.1110 ext. 226
Direct Fax: 902.564.6318
E-mail: maureen.cameron@amecfw.com

MCM/BM/kk

EXECUTIVE SUMMARY

Six (6) sediment samples were collected within the Dingwall Fisheries and Oceans Canada (DFO) - Small Craft Harbour (SCH) in Nova Scotia on 11 May 2015. The samples were submitted to AGAT Laboratories for detailed analyses. Results were compared to the *Canadian Environmental Protection Act* (CEPA) Disposal at Sea Lower Level Screening Criteria; Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines (SQGs) for the Protection of Environment and Human Health (1999a); Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Version 3.0 Risk-Based Screening Levels (RBSLs) and Sediment Ecological Screening Levels (SESLs) for the Protection of Freshwater and Marine Aquatic Life (2012); Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992); and Nova Scotia Tier 1 Environmental Quality Standards (EQS) (2013). As summarized below in Table ES1, the sediment analyses for the field program found no guideline exceedances. Figure ES1 (below) depicts the summarized substrate composition for the samples collected from the Dingwall DFO-SCH.

Table ES1 Sediment Analysis Guideline Exceedance Table

Guideline / Parameter	Sample ID					
	DW-6	DW-15	DW-24	DW-30	DW-65	DW-71
CEPA Disposal at Sea – Lower Level Screening Criteria						
PAHs ¹	-	-	-	-	-	-
Metals	-	-	-	-	-	-
PCBs ²	-	-	-	-	-	-
CCME SQGs						
PAHs	-	-	-	-	-	-
Metals	-	-	-	-	-	-
BTEX ³	-	-	-	-	-	-
PCBs	-	-	-	-	-	-
DDT ⁴	-	-	-	-	-	-
Atlantic RBCA Tier 1 Version 3.0 RBSLs and SESLs						
BTEX	-	-	-	-	-	-
TPH ⁵	-	-	-	-	-	-
Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills						
PAHs	-	-	-	-	-	-
Metals	-	-	-	-	-	-
BTEX	-	-	-	-	-	-
PCBs	-	-	-	-	-	-
Nova Scotia Tier 1 EQS						
PAHs	-	-	-	-	-	-
Metals	-	-	-	-	-	-
BTEX	-	-	-	-	-	-
TPH	-	-	-	-	-	-
PCBs	-	-	-	-	-	-

Notes:

“-” indicates no exceedance

“•” indicates exceedance

1 – PAH - polycyclic aromatic hydrocarbon

2 – PCB - polychlorinated biphenyl

3 – BTEX - benzene, toluene, ethylbenzene, and xylene

4 – DDT - dichloro-diphenyl-trichloroethane

5 – TPH - total petroleum hydrocarbons

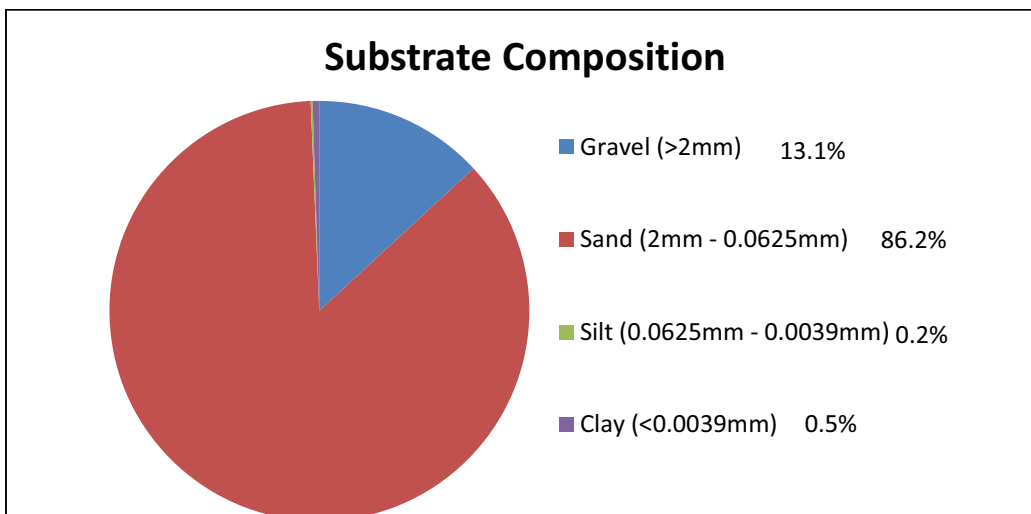


Figure ES1 Substrate Composition Averaged from Six Sampling Locations at the Dingwall DFO-SCH, Nova Scotia

Based on the results of the sediment analysis, no samples were submitted for Synthetic Precipitation Leaching Procedure (SPLP) leachate analysis.

TABLE OF CONTENTS

	PAGE
1.0 INTRODUCTION.....	1
2.0 SCOPE AND METHODOLOGY	1
2.1 SITE PLAN	1
2.2 SAMPLE COLLECTION AND ANALYSIS.....	1
3.0 ANALYTICAL RESULTS	3
3.1 PAH CONCENTRATIONS	4
3.2 METAL CONCENTRATIONS.....	4
3.3 PETROLEUM HYDROCARBON CONCENTRATIONS.....	5
3.4 PCBS CONCENTRATIONS.....	5
3.5 DDT CONCENTRATIONS	5
3.6 CARBON CONTENT	5
3.7 GRAIN SIZE DISTRIBUTION.....	6
4.0 BENTHIC PHOTOGRAPH DESCRIPTION	6
5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC).....	7
6.0 CONCLUSION	8
7.0 CLOSING.....	8
8.0 REFERENCES.....	9

TABLE OF CONTENTS (cont)

PAGE

LIST OF TABLES

Table ES1	Sediment Analysis Guideline Exceedance Table.....	i
Table 3.1	Dominant Sediment Types at Each Sample Location	6

LIST OF FIGURES

Figure ES1	Substrate Composition Averaged from Sampling Locations at the Dingwall DFO-SCH, Nova Scotia	ii
Figure 2.1	Sampling Locations at the Dingwall DFO-SCH (11 May 2015)	2
Figure 3.1	Substrate Composition Averaged from Sampling Locations at the Dingwall DFO-SCH, Nova Scotia	6

LIST OF APPENDICES

Appendix A	Photo Log
Appendix B	Analytical Summary Tables
Appendix C	Quality Assurance/Quality Control (QA/QC), Chain of Custody (COC), and Laboratory Certificates of Analyses
Appendix D	Limitations

1.0 INTRODUCTION

At the request of Public Works and Government Services Canada (PWGSC), six (6) stations were sampled within the footprint of the proposed dredging area at the Dingwall Fisheries and Oceans (DFO) - Small Craft Harbour (SCH) on 11 May 2015.

2.0 SCOPE AND METHODOLOGY

2.1 Site Plan

The selection of sample stations followed guidance provided in the Environmental Protection Series *Users' Guide to the Application Form for Ocean Disposal* (Environment Canada, 1995), whereby a random approach was implemented to determine the location of sampling stations in the proposed dredging area of the SCH. The unstratified area was divided into a number of square blocks totalling at least five times the number of stations required (minimum of 30 blocks). A random number generator software program was then used to select the sampling locations within this dredge area (Figure 2.1).

A detailed program design was prepared by Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler), and submitted to PWGSC on 29 April 2015 for review and approval prior to field program implementation. The field program was scheduled upon acceptance of the design.

Sample collection, preparation, and analyses were conducted in accordance with Environment Canada's publication *Guidance Document on Collection and Preparation of Sediments for Physicochemical Characterization and Biological Testing* (1994). Scuba Tech Commercial Diving & Marine was retained to collect the sediment samples. The sample collection field program was completed in accordance with guidelines defined by provincial Occupational Health and Safety Standards.

2.2 Sample Collection and Analysis

The marine sediment samples were collected by divers at the selected sampling stations. A handheld Garmin Global Positioning System (GPS) was used to locate the sampling location coordinates that were determined prior to field program initiation. Sample station coordinates are listed in Figure 2.1. Appendix A contains photos of the sample locations taken during the field program.

Duplicate samples were collected from all stations to safeguard against loss or damage during transport. All samples were then stored in the laboratory-supplied jars and kept in a cooler on ice until the field program was completed. Upon completion of the field program, the samples were chilled and hand-delivered to the Amec Foster Wheeler office in Sydney, NS. From there, the samples were sent to the laboratory for select chemical analyses. The duplicate sediment samples were refrigerated and stored at the Amec Foster Wheeler office.

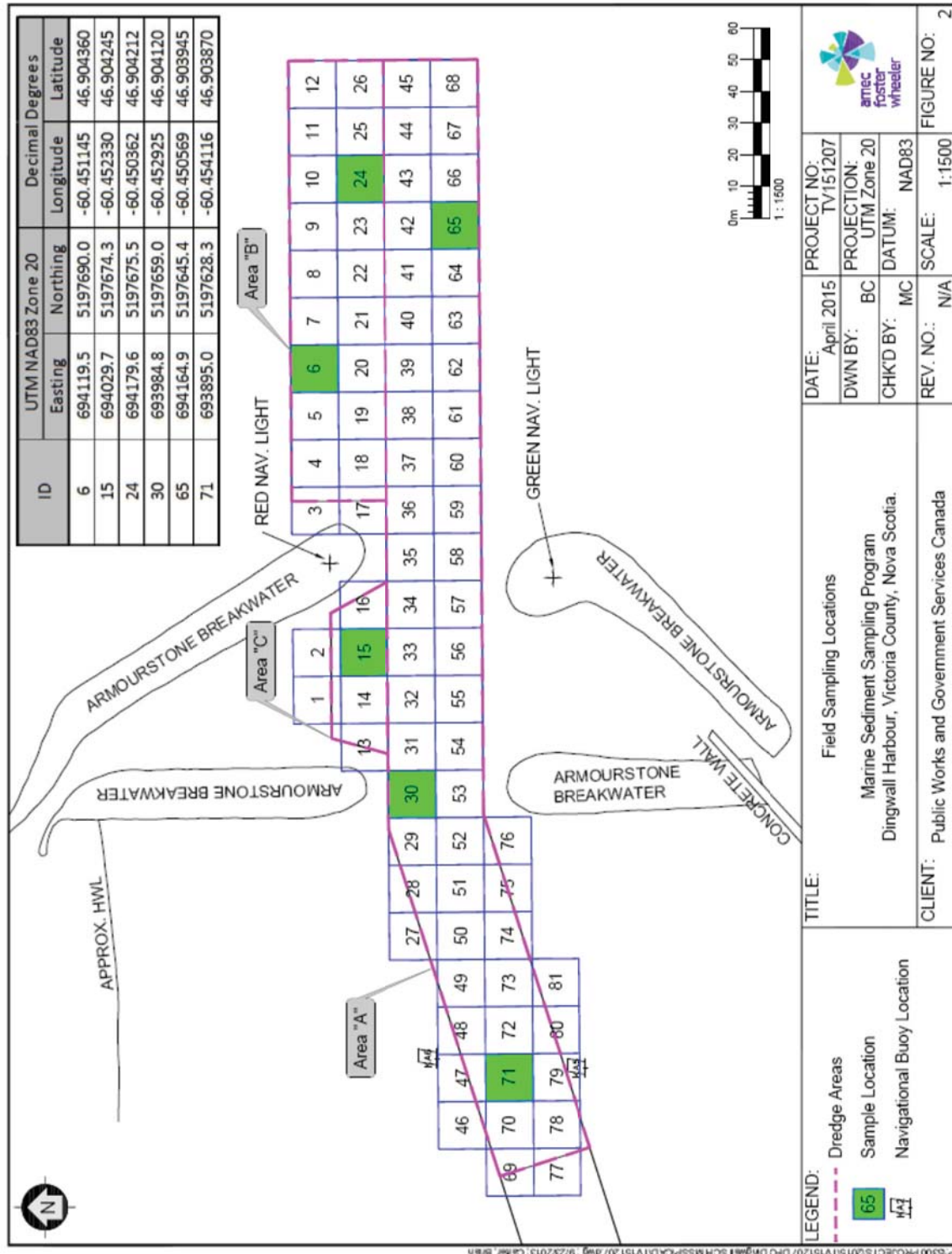


Figure 2.1 Sampling Locations at the Dingwall DFO-SCH (11 May 2015)

AGAT Laboratories (AGAT) in Dartmouth, Nova Scotia, an accredited laboratory with the Canadian Association for Laboratory Accreditation (CALA) and ISO/IEC 17025 certified for all of the analyses required for this Project, was engaged to conduct the laboratory analyses. At the request of PWGSC, the samples were submitted for the typical ocean and land disposal suite of parameters which includes ICP 23 metals scan plus mercury, hexavalent chromium, tin, and low-level selenium; low-level polycyclic aromatic hydrocarbons (PAHs); total inorganic and total organic carbon (TIC/TOC); total polychlorinated biphenyls (PCBs); total dichloro-diphenyl-trichloroethane (DDT); low-level benzene, toluene, ethylbenzene, and xylene (BTEX); total petroleum hydrocarbons (TPHs), including a qualitative assessment for presence/absence of creosote; and grain size. Silica gel cleanup was completed for all samples analyzed for petroleum hydrocarbons, and a return to baseline at C32 was verified.

Based on the results of the sediment analysis, no samples were submitted for select Synthetic Precipitation Leaching Procedure (SPLP) leachate analysis.

3.0 ANALYTICAL RESULTS

The analytical results of the marine sediment samples collected and analyzed from the Dingwall DFO-SCH are summarized in Tables B.1 to B.9 (Appendix B) and discussed below. The complete set of analytical results, including laboratory Quality Assurance/Quality Control (QA/QC) and Certificates of Analyses for all parameters tested, is provided in Appendix C.

In order to facilitate the determination of all disposal options, the tabulated analytical sample results were compared to the following, where applicable:

- *Canadian Environmental Protection Act (CEPA) Disposal at Sea Regulations (formerly the Ocean Dumping Control Act)* – Lower Level Screening Criteria.
- Canadian Council of Ministers of the Environment (CCME) Sediment Quality Guidelines - Interim Sediment Quality Guidelines (ISQGs) and Marine and Estuarine Probable Effects Levels (PELs) (1999b).
- CCME Soil Quality Guidelines (SQGs) for the Protection of Environment and Human Health in agricultural, residential/parkland, and commercial/industrial applications (1999a).
- Atlantic Risk-Based Corrective Action (RBCA) Tier 1 Version 3.0 Risk-Based Screening Levels (RBSLs) and Sediment Ecological Screening Levels (SESLs) for the Protection of Freshwater and Marine Aquatic Life (2012).
- Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992).
- Nova Scotia Tier 1 Environmental Quality Standards (EQS) (2013).
- CCME Water Quality Guidelines (WQGs) (1999c).
- Health Canada's Canadian Guidelines for Drinking Water Quality (CGDWQ) (2014).

Results as compared to the afore-noted guidelines, with the exception of the CCME Sediment Quality Guidelines (ISQGs and PELs), are discussed further in this report.

3.1 PAH Concentrations

PAHs were not detected in any of the six samples collected.

CEPA Disposal at Sea Screening Criteria - Lower Level

There were no exceedances to the CEPA Disposal at Sea Lower Level Screening Criteria for any of the six samples collected (Table B.1).

CCME SQGs - Human Health (Potable Water) and (Direct Contact)

None of the six samples collected exceeded the CCME SQGs for the Protection of Human Health (Potable Water) for all land use scenarios (Table B.1).

Guidance provided in the CCME SQGs for the Protection of Environmental and Human Health (2008) indicates that for soil contaminated by coal tar or creosote mixtures, the calculated Benzo(a)pyrene total potency equivalent (TPE) concentration for soil samples should be multiplied by an uncertainty factor (UF) of 3 prior to comparison with the SQGs for the protection of human health (direct contact) to account for carcinogenic potential of alkylated and other PAHs present for which Potency Equivalency Factors (PEF) does not currently exist, but which are likely to contribute to mixture carcinogenic potential.

Analytical review of the results by laboratory staff revealed that the presence of creosote was not observed in any of the six samples analyzed. No exceedances of the CCME SQGs for the Protection of Human Health (Direct Contact) for all land use applications were noted in the six samples collected (Table B.1).

CCME SQGs - Environmental Health (Soil Contact), (Soil and Food Ingestion), and (Freshwater Life)

None of the six samples collected showed exceedances of the CCME SQGs for the Protection of Environmental Health (Soil Contact), (Soil and Food Ingestion) or (Freshwater Life) for any land use scenarios (Table B.1).

Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992)

None of the six samples collected exceeded the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (Table B.2).

Nova Scotia Tier 1 EQS

None of the six samples collected exceeded the Nova Scotia Tier 1 EQS for Sediment Environments (Freshwater and Marine) or the Nova Scotia Tier 1 EQS for any land use applications (potable or non-potable sites with fine- or coarse-grained soils) (Table B.2).

3.2 Metal Concentrations

CEPA Disposal at Sea Screening Criteria - Lower Level

No exceedances of the CEPA Disposal at Sea Lower Level Screening Criteria were noted in the six samples collected (Table B.3).

CCME SQGs

No exceedances of the CCME SQGs for agricultural and residential/parkland land use applications were noted (Table B.3)

Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992)

No exceedances of the Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills were noted (Table B.4).

Nova Scotia Tier 1 EQS

No exceedances of the Nova Scotia Tier 1 EQS for agricultural, residential/parkland, commercial or industrial land use applications were noted (Table B.4).

3.3 Petroleum Hydrocarbon Concentrations

Modified TPH values reflect the sum of the individual carbon fractions that resemble gasoline, diesel #2, and lube oil. Neither BTEX nor TPH were detected in the six samples collected at the Dingwall DFO-SCH. All six samples reached baseline at C₃₂ (Tables B.5 and B.6).

No exceedances of the Atlantic RBCA Tier 1 Version 3.0 RBSLs and SESLs for the Protection of Freshwater and Marine Aquatic Life, CCME SQGs, Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills, or Nova Scotia Tier 1 EQS were noted in any of the six samples collected (Tables B.5 and B.6).

3.4 PCBs Concentrations

PCBs were not detected in any of the six samples collected at the Dingwall DFO-SCH and no exceedances of the CEPA Disposal at Sea Lower Level Screening Criteria, CCME SQGs for all land use applications, Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills, or Nova Scotia Tier 1 EQS were noted in any of the six samples collected (Tables B.7 and B.8).

3.5 DDT Concentrations

Total DDT refers to the sum of dichlorodiphenyldichloroethylene (DDE), dichlorodiphenyldichloroethane (DDD), and DDT. Neither DDE, DDD, or DDT were detected in any of the six samples collected at the Dingwall DFO-SCH, and no exceedances of the CEPA Disposal at Sea Lower Level Screening Criteria, CCME SQGs for all land use applications, Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills, or Nova Scotia Tier 1 EQS were noted in any of the six samples collected (Tables B.7 and B.8).

3.6 Carbon Content

Samples collected from the Dingwall DFO-SCH showed total carbon content ranging from <0.15 to 0.855 percent (%) (Table B.9). TOC was not detected in any of the samples. In the two samples where carbon was detected, TIC was the only type, ranging from 0.17 to 0.78% (Table B.9).

3.7 Grain Size Distribution

Sediment composition is described in Figure 3.1 and Table 3.1 below. Figure 3.1 illustrates the overall sediment composition from the samples collected within the SCH, expressed as percentages to show the average grain size distributions. Table 3.1 breaks down the sediment composition at each sampling location.

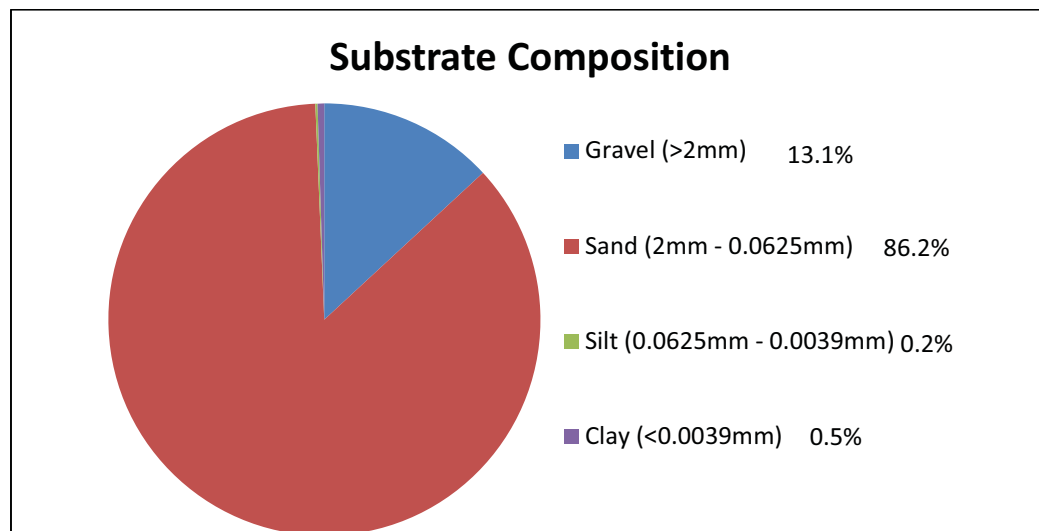


Figure 3.1 Substrate Composition Averaged from Sampling Locations at the Dingwall DFO-SCH, Nova Scotia

Table 3.1 Dominant Sediment Types at Each Sample Location

Sample ID	Sediment Distribution			
	Primary Substrate	Secondary Substrate	Tertiary Substrate	Quaternary Substrate
DW-6	Sand	-	-	-
DW-15	Sand	Gravel	-	-
DW-24	Sand	Clay	-	-
DW-30	Gravel	Sand	-	-
DW-65	Sand	Clay/Silt	-	-
DW-71	Sand	Silt	-	-

Notes:

"-" indicates none detected.

"/" indicates equal amounts of substrate.

4.0 BENTHIC PHOTOGRAPH DESCRIPTION

A series of underwater photographs were taken at each of the sampling locations, in order to depict the substrate and any flora and fauna at the site. These photographs are presented in Appendix A, while descriptions of the photographs collected at each sampling location are provided below.

Sample Station DW-6

The substrate appears to be primarily sand. No flora or fauna are present in the photo, but one small piece of macrofloral debris is present.

Sample Station DW-15

The substrate appears to be primarily sand with lesser amounts of gravel. No flora or fauna are present in the photo, but the divers noted the presence of 10 small hermit crabs.

Sample Station DW-24

The substrate appears to be primarily sand. No flora or fauna are present in the photo, but one small piece of macrofloral debris is present.

Sample Station DW-30

The substrate appears to be predominantly gravel and cobble. Shell hash is present in the photo but no flora or fauna were observed. The divers noted the presence of a few small hermit crabs.

Sample Station DW-65

The substrate appears to be primarily sand. No flora or fauna are present in the photo, but one small piece of macrofloral debris is present.

Sample Station DW-71

The substrate appears to be predominantly silt with some sand. Clam/worm holes and macrofloral debris are present, but otherwise the photos are devoid of flora or fauna. The substrate is also covered in small areas by the filamentous bacteria *Beggiatoa*.

5.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

All samples collected were labelled on site using a waterproof marker with the date, sample site identifier, and sample number. The samples were placed upright on ice inside a cooler for safe storage and transport, and were delivered to the laboratory following program completion. A copy of the Chain of Custody (COC) that accompanied the samples is provided in Appendix C. Additional samples were collected to safeguard against loss or damage during transport, and will be stored and refrigerated until the PWGSC Project Manager provides approval to dispose/destroy the samples.

Sample collection, preparation, and analyses followed guidance provided in the afore-referenced Environment Canada document. Samples were analyzed by an accredited laboratory with CALA and/or ISO/IEC 17025 and are certified by the Standards Council of Canada (SCC) for each selected chemical analyses of this program. The complete set of analytical results, including laboratory QA/QC and Certificates of Analyses for all parameters tested, are provided in Appendix C.

The laboratory undertakes internal duplicate analyses for QA/QC purposes. Laboratory duplicate analyses were performed on all of the parameters analyzed for this program to meet internal QA/QC objectives for the Dingwall samples submitted. No discrepancies were noted by the laboratory for the analyses performed.

To assess the quality of the analytical data, a review of the internal laboratory QA/QC results was completed and included a review of laboratory duplicate analyses, method blanks, surrogates, spike samples, and QA/QC standards. This review did not reveal any information or discrepancies that may affect the analytical results of the Dingwall samples.

A senior Amec Foster Wheeler reviewer has reviewed this report prior to its release. The limitations of this document are provided in Appendix D.

6.0 CONCLUSION

The analytical results of the six samples collected and analyzed from the Dingwall DFO-SCH indicate no guideline exceedances.

7.0 CLOSING

This document has been prepared and reviewed by the following people:

Prepared by:

DRAFT

Maureen Cameron-MacMillan, M.Sc.
Intermediate Project Professional

Reviewed by:

DRAFT

Beth Cameron, M.Sc.
Senior Project Professional

8.0 REFERENCES

- Atlantic Risk-Based Corrective Action (RBCA). 2012. Atlantic RBCA (Risk-Based Corrective Action), for Petroleum Impacted Sites in Atlantic Canada Tier I Version 3, User Guidance. Issued on, July 2012. Available online at: http://www.atlanticrbca.com/data_eng/ATLANTIC_RBCA_User_Guidance_v3_July_2012doc_final.pdf.
- Canadian Council of Ministers of the Environment (CCME). 1999a (updates). Soil Quality Guidelines (SQGs) for the Protection of Environment and Human Health in agricultural, residential/parkland, and commercial/industrial applications. Available online at: <http://cegg-rcqe.ccme.ca/en/index.html#void>.
- Canadian Council of Ministers of the Environment (CCME). 1999b (updates). CCME Sediment Quality Guidelines - Interim Sediment Quality Guidelines and Marine and Estuarine Probable Effects Levels. Available online at: <http://cegg-rcqe.ccme.ca/en/index.html#void>.
- Canadian Council of Ministers of the Environment (CCME). 1999c (updates). Canadian Water Quality Guidelines, 1999 with updates. Available on-line at: <http://cegg-rcqe.ccme.ca/en/index.html#void>.
- Canadian Council of Ministers of the Environment (CCME). 2008. Canadian Soil Quality Guidelines Carcinogenic and other Polycyclic Aromatic Hydrocarbons (PAHS) (Environmental and Human Health Effects) Scientific Supporting Document, PN 1401, ISBN 978-1-896997-79-7 PDF. Available on-line at: www.ccme.ca.
- Environment Canada. 1994. Guidance document on collection and preparation of sediments for physicochemical characterization and biological testing. Environmental Protection Series. Report EPS 1/RM/29, December 1994.
- Environment Canada. 1995. User's Guide to the Application Form for Ocean Disposal. Report EPS 1/MA/1, December 1995.
- Environmental Protection Agency (EPA). 1994. Methodology 1312 - Synthetic Precipitation Leaching Procedure.
- Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. Available on-line at: http://www.hc-sc.gc.ca/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf.
- Nova Scotia Department of Environment. 2013. Notification of Contamination Protocol. Nova Scotia Tier 1 Environmental Quality Standards (EQS)
- Nova Scotia Environment and Labour (NSEL). 1992. Guidelines for Disposal of Contaminated Solids in Landfills.



APPENDIX A

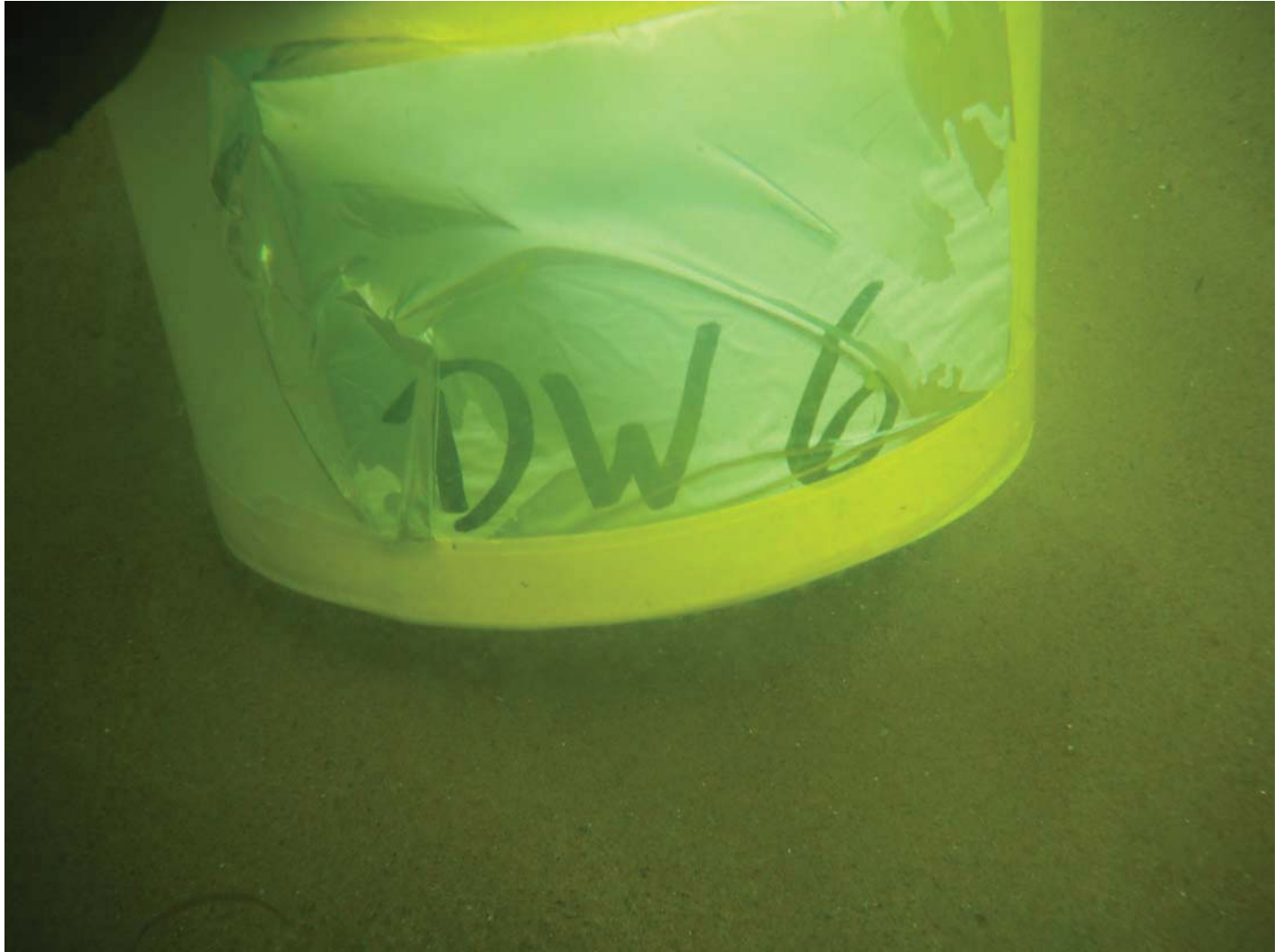
Photo Log

Dingwall DFO-SCH

Sample Stations:

**DW-6
DW-15
DW-24
DW-30
DW-65
DW-71**

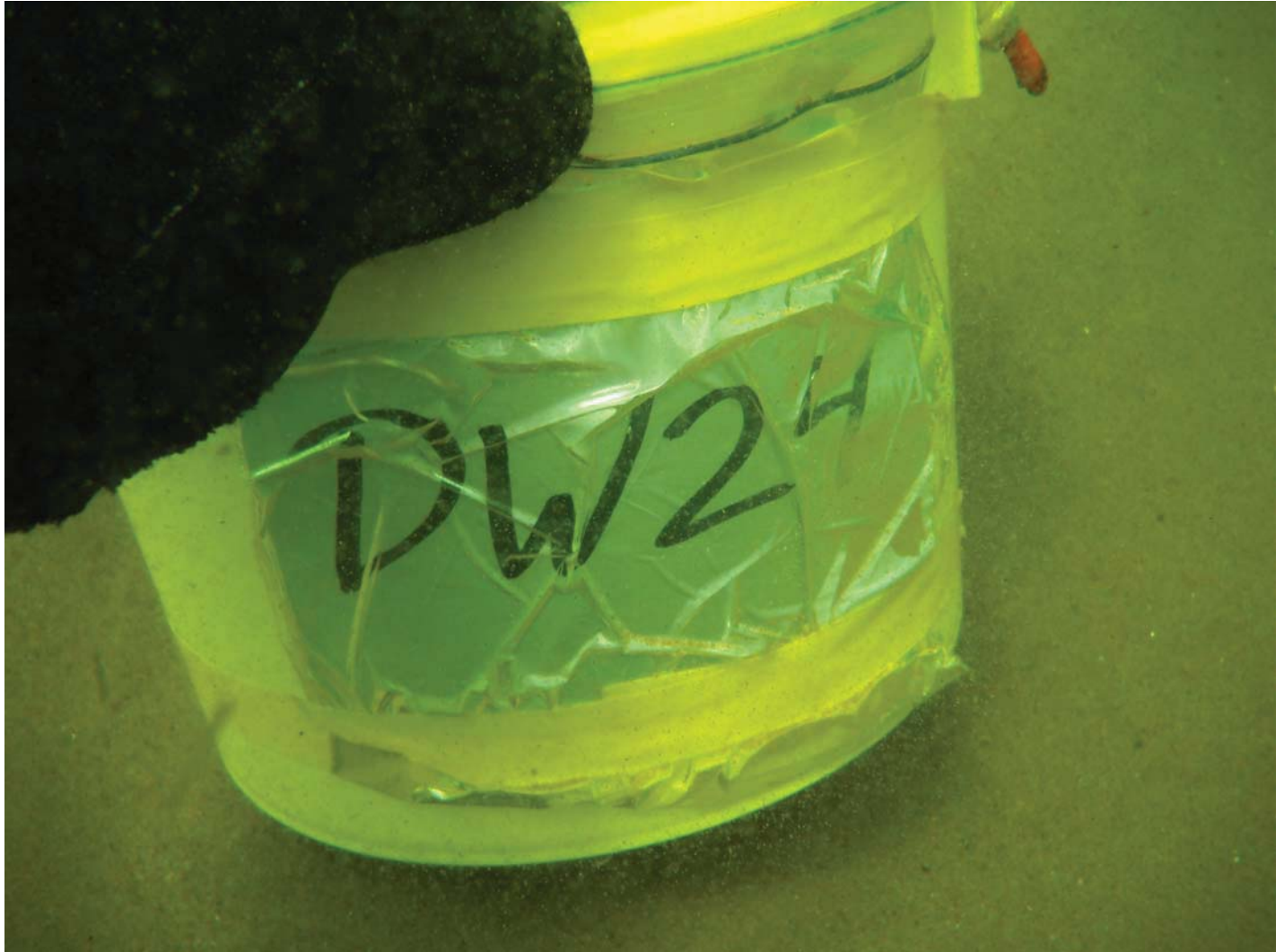
DW-6



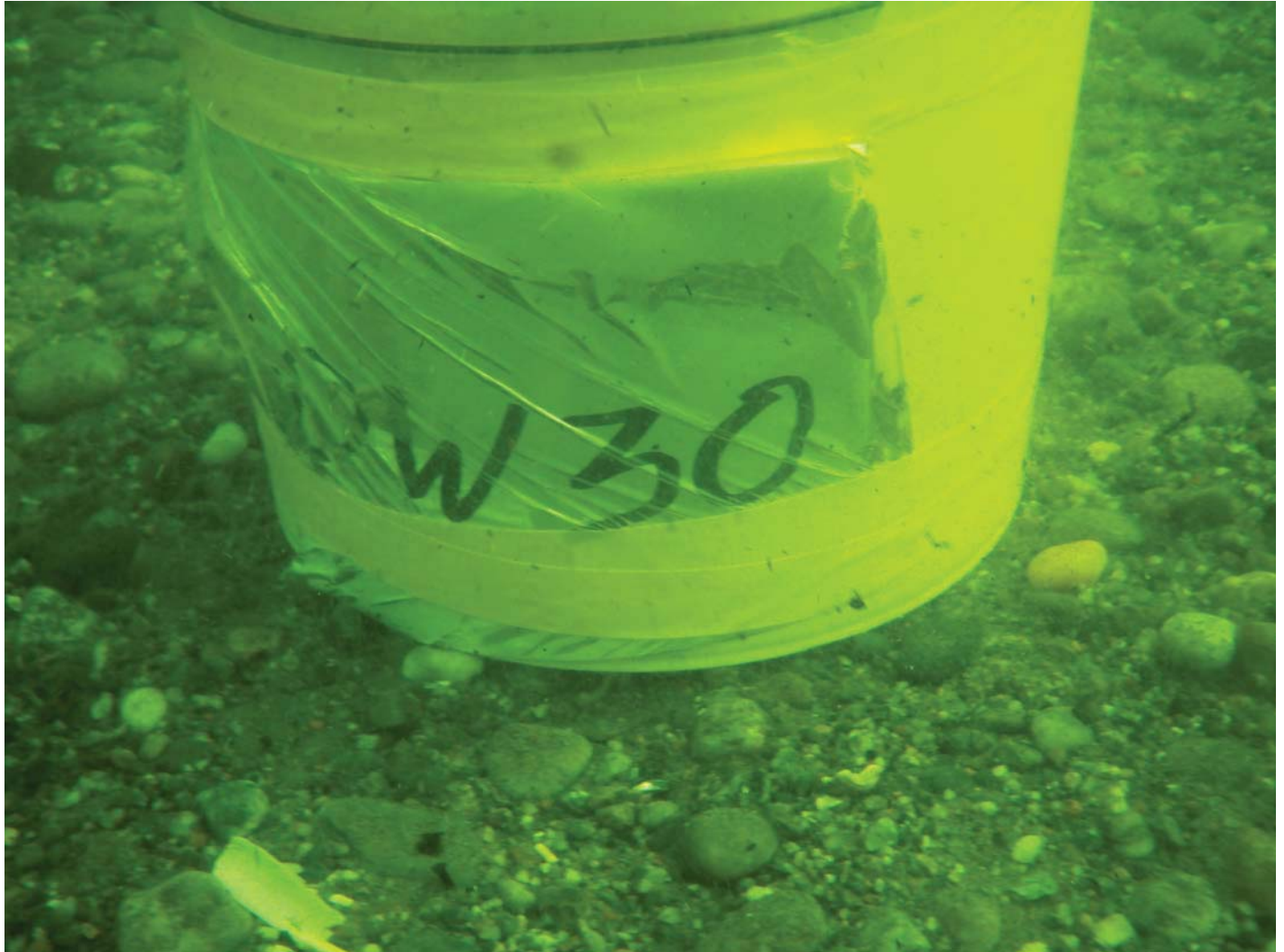
DW-15



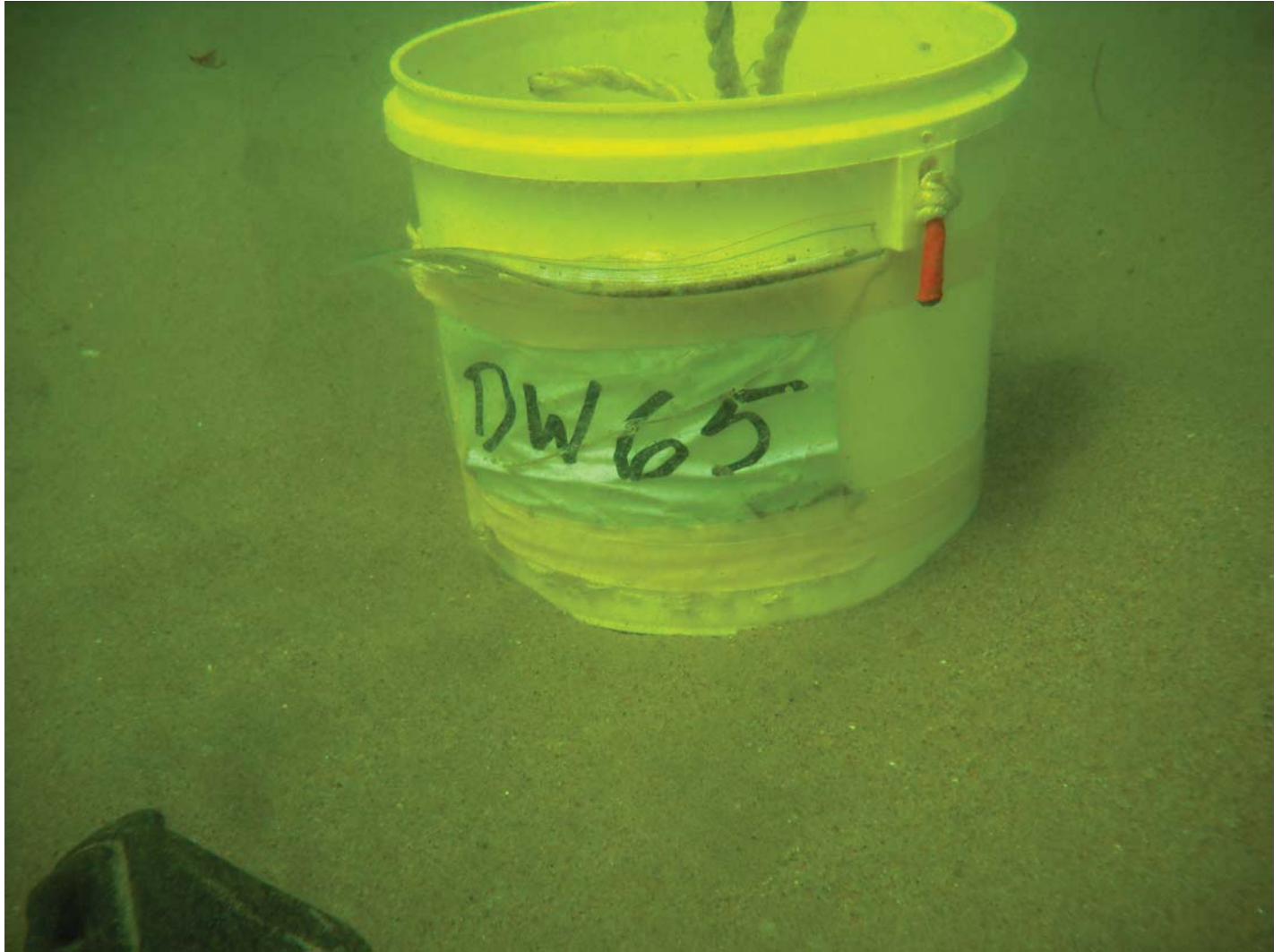
DW-24



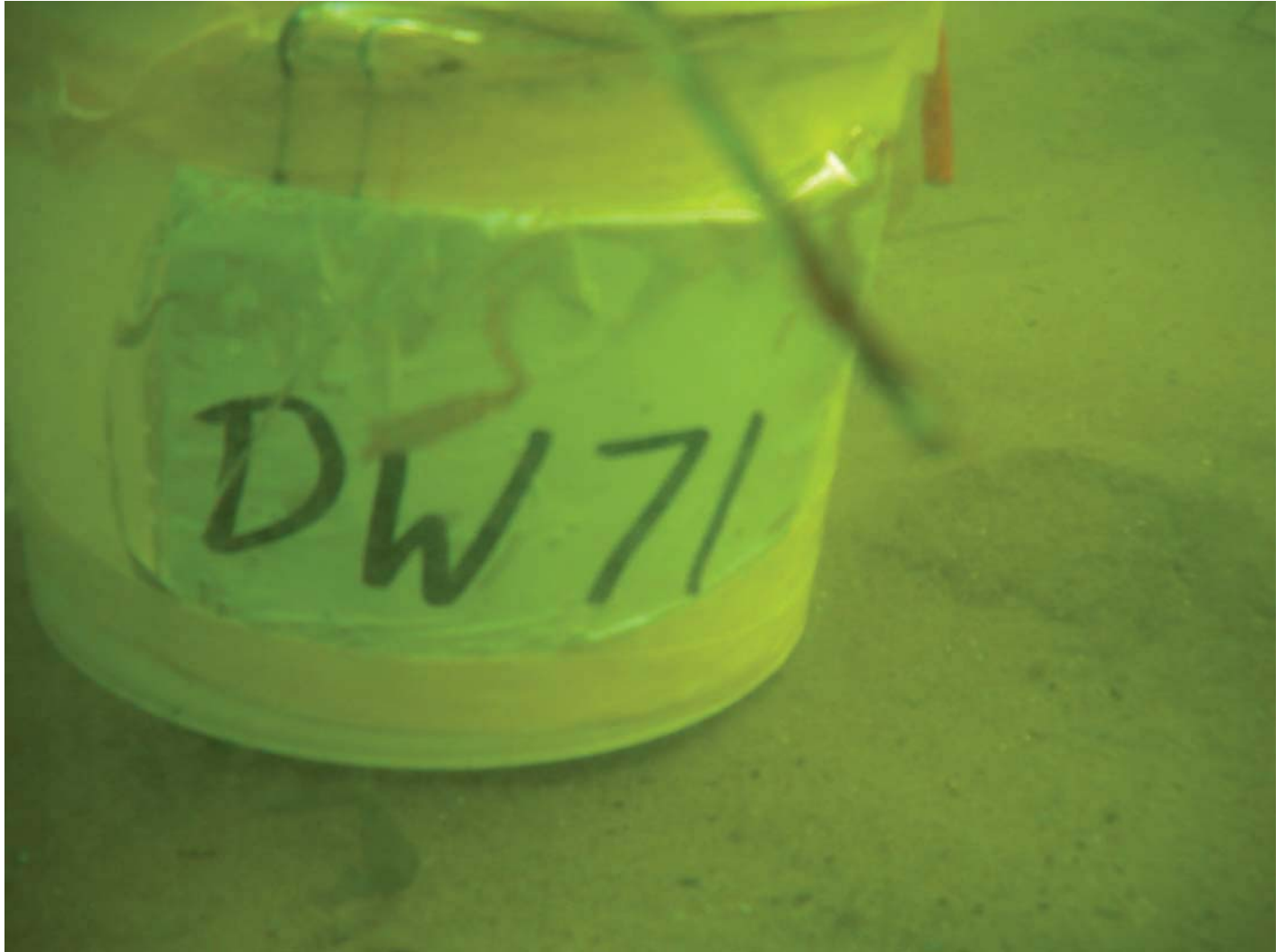
DW-30



DW-65



DW-71





APPENDIX B

Analytical Summary Tables

Table B.1 PAH Results for Marine Sediments as Compared to Federal Criteria - Dingwall DFO-SCH, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date						CEPA Disposal at Sea Screening Criteria - Lower Level	CCME Sediment Quality Guidelines				CCME Soil Quality Guidelines					
			DW-6	DW-15	DW-24	DW-30	DW-65	DW-71		Probable Effects Levels		Human Health		Environmental Health					
										Freshwater		Marine		Potable Water	Direct Contact	Soil Contact		Soil and Food Ingestion	Freshwater Life
										Freshwater	Marine	Freshwater	Marine			Agricultural, Residential/ Parkland, Commercial and Industrial Land Uses	Agricultural, Residential/ Parkland, Commercial and Industrial Land Uses		
Polycyclic Aromatic Hydrocarbon (PAH) Results																			
1-Methylnaphthalene	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0202	0.201								
2-Methylnaphthalene	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.00671	0.0889					21.5	0.28		
Acenaphthene	0.00671		<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	0.00387	0.128						320		
Acenaphthylene	0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.00387	0.128								
Anthracene	0.04		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.0469	0.245			2.5	61.5				
Benzo(a)anthracene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0371	0.748								
Benzo(a)pyrene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0371	0.365					0.6			
Benzo(b)fluoranthene	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0319	0.763			20	72	0.6	8800		
Benzo(b)fluoranthene	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1							6.2			
Benzo(g,h)perylene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01										
Benzo(k)fluoranthene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01							6.2			
Chrysene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01										
Dibenz(a,h)anthracene	0.006		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.0571	0.108								
Fluoranthene	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.00622	0.00622								
Fluorene	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.111	2.355			50	180	15.4			
Indeno(1,2,3-cd)pyrene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0212	0.144					15.4	0.25		
Naphthalene	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01										
Perylene	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0346	0.391					8.8	0.013		
Phenanthrene	0.04		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.0419	0.515					43	0.046		
Pyrene	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.067	1.398					7.7			
Total PAH	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.053	0.153								
Index of Additive Cancer Risk (IACR)	Calculation	None	0.51	0.51	0.51	0.51	0.51	0.51	0.51					1					
Benzo(a)pyrene TPE (10 ⁻⁵)	Calculation	mg/kg	0.0146	0.0146	0.0146	0.0146	0.0146	0.0146	0.0146							5.3			
Creosote or Coal Tar source suspected/known?	yes/no		No	No	No	No	No	No	No										
Uncertainty Factor Applied	yes/no		No	No	No	No	No	No	No										
Benzo(a)pyrene TPE (10 ⁻⁵) with UF	Calculation	mg/kg	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable							5.3			

NOTE(S):
 All results below the laboratory detection limit were divided by 2 prior to further calculations.
 Total PAH calculation based on the sum of 16 individual PAH compounds (acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluorene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene) as per guidance from Environment Canada, 2009.
 Additive Cancer Risk (IACR) = (Benz(a)anthracene)/0.33mg/kg + (Benzo(a)pyrene)/0.37mg/kg + (Benzo(b)fluoranthene)/0.16mg/kg + (Benzo(g,h,i)perylene)/6.8mg/kg + (Benzo(k)fluoranthene)/0.034mg/kg + ((Chrysene)/2.1mg/kg) + ((Dibenz(a,h)anthracene)/0.23mg/kg) + ((Indeno(1,2,3-cd)pyrene)/2.7mg/kg).
 Total Potency Equivalent (TPE) based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10⁻⁵).
 Benzo(a)pyrene TPE (10⁻⁵) = Sum of PAH concentration multiplied by their respective Benzo(a)pyrene Potency Equivalency Factors: ((Benz(a)anthracene)*0.1) + ((Benzo(b)fluoranthene)*0.1) + ((Benzo(g,h,i)perylene)*0.01) + ((Chrysene)*0.01) + ((Dibenz(a,h)anthracene)*1) + ((Indeno(1,2,3-cd)pyrene)*0.1).
 Benzo(a)pyrene TPE Uncertainty Factor = 3.
 Light values indicate results below detection limit.

Table B.3 Metal Results for Marine Sediments as Compared to Federal Criteria - Dingwall DFO-SCH, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date							CEPA Disposal at Sea Screening Criteria - Lower Level	CCME Sediment Quality Guidelines				CCME Soil Quality Guidelines			
			11-May-15								Interim Sediment Quality Guidelines		Probable Effects Levels		Agricultural Land Use	Residential/ Parkland Land Use	Commercial Land Use	Industrial Land Use
											Freshwater	Marine	Freshwater	Marine				
Aluminum	10		1850	2300	1870	2430	1950	2300						20	20	40	40	
Antimony	1		<1	<1	<1	<1	<1	<1	<1									
Arsenic	1		<1	<1	<1	<1	<1	<1	<1						12	12	12	12
Barium	5		56	50	40	11	52	23		5.9	7.24	17.0	41.6	750	500	2000	2000	
Beryllium	2		<2	<2	<2	<2	<2	<2	<2					4		8	8	
Boron (Total)	2		2	2	<2	<2	<2	2										
Boron (Hot Water Soluble)	0.10		1.3	1.3	1.2	2.8	1.4	1.6										
Cadmium	0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.6	0.6	0.7	3.5	4.2	1.4	10	22	22	
Chromium (Hexavalent)	0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4						0.4	0.4	1.4	1.4	
Chromium (Total)	2		4	5	4	5	4	5		37.3	52.3	90.0	160	64	64	87	87	
Cobalt	1		3	2	2	2	1	2						40	50	300	300	
Copper	2		2	3	3	4	2	3	81*	35.7	18.7	197	108	63	63	91	91	
Iron	50		3640	4350	3730	4710	3890	4180										
Lead	0.5		18	21	17	21	21	23	66*	35.0	30.2	91.3	112	70	140	260	600	
Manganese	2		107	143	105	132	115	113										
Mercury (Total)	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.75	0.17	0.13	0.486	0.7	6.6	6.6	24	50	
Molybdenum	2		<2	<2	<2	<2	<2	<2						5	10	40	40	
Nickel	2		3	3	3	4	3	3						50	50	50	50	
Selenium	1		<1	<1	<1	<1	<1	<1						1	1	2.9	2.9	
Silver	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						20	20	40	40	
Strontium	5		<5	5	5	47	5	7										
Thallium	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1						1	1	1	1	
Tin	2		3	3	3	3	3	3						5	50	300	300	
Uranium	0.1		0.3	0.3	0.3	0.3	0.3	0.3						23	23	33	300	
Vanadium	2		6	9	7	8	7	7	160*	123	124	315	271	130	130	130	130	
Zinc	5		15	20	16	19	16	21						200	200	360	360	

NOTE(S):

*Former Interim Rejection Limits (1991) which are not currently used to screen for ocean based disposal permitting but may be considered in terms of further investigation prior to issuance of an Ocean Disposal Permit (Victor Li, Environment Canada, pers. comm., June 2002).

Light values indicate results below detection limit.

Table B.4 Metal Results for Marine Sediments as Compared to Provincial Criteria - Dingwall DFO-SCH, Nova Scotia

Table B-4 - Test Results for Marine Sediments as Compared to Potentially Toxic Substances in Sediment										Nova Scotia Tier 1 Environmental Quality Standards									
Parameter	RDL	Units	Sample Identification and Date							Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992)	Sediment Environment				Potable and Non-Potable Sites with Coarse- and Fine-Grained Soils				
			DW-6	DW-15	DW-24	DW-30	DW-45	DW-71	Freshwater		Marine	Agricultural Land Use	Residential/ Parkland Land Use	Commercial Land Use	Industrial Land Use				
11-May-15																			
Aluminum	10		1850	2300	1870	2430	1950	2300		40	25	7.5	15400	15400	198000				
Antimony	1		<1	<1	<1	<1	<1	<1		50	17	31			63				
Arsenic	1		<1	<1	<1	<1	<1	<1		2000		41.6			31				
Barium	5		56	50	40	11	52	23		8		400	10000	15000	140000				
Beryllium	2		<2	<2	<2	<2	<2	<2		2		5	38	320	320				
Boron (Total)	2		2	2	<2	<2	<2	2				4300	4300	24000	24000				
Boron (Hot Water Soluble)	0.10		1.3	1.3	1.2	2.8	1.4	1.6		20	3.5	4.2	1.4	49	192				
Cadmium	0.3		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		8		0.4	160	1300	1300				
Chromium (Hexavalent)	0.4		<0.4	<0.4	<0.4	<0.4	<0.4	<0.4		800	90	160	52	220	2300				
Chromium (Total)	2		4	5	4	5	4	5		300			20	22	250				
Cobalt	1		3	2	2	2	1	2		500	197	108	63	1100	4000				
Copper	2		2	3	3	4	2	3					11000	11000	144000				
Iron	50		3640	4350	3730	4710	3890	4180		43766			140	260	740				
Lead	0.5		1.8	2.1	1.7	2.1	2.1	2.3		1000	91.3	112	70						
Manganese	2		107	143	105	132	115	113		1100									
Mercury (Total)	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		10	0.486	0.7	6.6	24	99				
Molybdenum	2		<2	<2	<2	<2	<2	<2		40			40	110	1200				
Nickel	2		3	3	3	4	3	3		500	75		50	330	2200				
Selenium	1		<1	<1	<1	<1	<1	<1		10	2		1	80	125				
Silver	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		40	1	2.2	20	77	490				
Strontium	5		<5	5	5	47	5	7					9400	9400	122000				
Thallium	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		1			1	1	1				
Tin	2		3	3	3	3	3	3		300			5	9400	9400				
Uranium	0.1		0.3	0.3	0.3	0.3	0.3	0.3					23	23	33				
Vanadium	2		6	9	7	8	7	7		200			39	39	160				
Zinc	5		15	20	16	19	16	21		1500	315	271	200	5600	47000				

NOTE(S):

Light values indicate results below detection limit.

Table B.5 BTEX/TPH Results for Marine Sediments as Compared to Federal Criteria - Dingwall DFO-SCH, Nova Scotia

Sample ID	Date	Units	BTEX Concentrations				Petroleum Hydrocarbon Fraction Concentrations					Reached Baseline at C32	Resemblance	FOC	
			Benzene	Toluene	Ethylbenzene	Xylene	C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₂₁	C ₂₁ -C ₃₂	Modified TPH (Less BTEX)				MTBE
DW-6	11-May-14	mg/kg	<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance	
DW-15			<0.005	<0.04	<0.01	<0.05	<3	<3	<15	<15	<20	<0.050	Yes	No Resemblance	
DW-24			<0.005	<0.04	<0.01	<0.05	<3	<3	<15	<15	<20	<0.050	Yes	No Resemblance	
DW-30			<0.005	<0.04	<0.01	<0.05	<3	<3	<15	<15	<20	<0.050	Yes	No Resemblance	
DW-65			<0.005	<0.04	<0.01	<0.05	<3	<3	<15	<15	<20	<0.050	Yes	No Resemblance	
DW-71			<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<20	<0.050	Yes	No Resemblance		
RDL			0.005	0.04	0.01	0.05	3	15	15	15	20	0.050			
Guidelines			Benzene	Toluene	Ethylbenzene	Xylene	Gasoline	Diesel / No. 2 Fuel Oil	No. 6 Oil/ Lube Oil	Modified TPH (Less BTEX)	MTBE				
Atlantic RBCA Tier I Version 3.0															
Risk-Based Screening Levels for Soil															
Agricultural/ Residential Land Use	Potable		0.042	0.35	0.065	8.8	74	270	1100						
	Fine-Grained Soil		0.094	0.74	0.13	22	1900	4700	10000						
Non-Potable	Coarse-Grained Soil		0.099	77	30	8.8	74	270	1100						
	Fine-Grained Soil		2.3	10000	9300	210	2100	8600	10000						
Commercial/ Industrial Land Use	Potable		0.042	0.35	0.065	11	870	1800	10000						
	Fine-Grained Soil		0.094	0.74	0.13	22	1900	4700	10000						
Non-Potable	Coarse-Grained Soil		2.5	10000	10000	110	870	4000	10000						
	Fine-Grained Soil		33	10000	10000	10000	10000	10000	10000						
Residential Saturation	Coarse-Grained Soil		890	450	240	340	TBD	TBD	TBD						
	Fine-Grained Soil		1000	480	250	360	TBD	TBD	TBD						
Sediment Ecological Screening Levels for the Protection of Freshwater and Marine Aquatic Life															
Sediment Type (based on standard FOC =	Typical		1.2	1.4	1.2	1.3	15	25	43						
	Other		5.4	6.1	5	5.5	67	110	190						
CCME Soil Quality Guidelines															
Agricultural, Residential/ Parkland, Commercial, and Industrial Land Uses	Surface		0.03	0.37	0.082	11.0									
	Fine-Grained Soil		0.0068	0.08	0.018	2.4									
Subsoil	Coarse-Grained Soil		0.03	0.37	0.082	11.0									
	Fine-Grained Soil		0.0068	0.08	0.018	2.4									

NOTE(S):

Fraction of Organic Content (FOC) = g-carbon/g-soil

CCME Soil Quality Guidelines for benzene based on an incremental lifetime cancer risk (ILCR) of 1 in 100,000 (10⁻⁵).

Light values indicate results below detection limit.

Table B.6 BTEX/TPH Results for Marine Sediments as Compared to Provincial Criteria - Dingwall DFO-SCH, Nova Scotia

Sample ID	Date	Units	BTEX Concentrations				Petroleum Hydrocarbon Fraction Concentrations					Reached Baseline at C32	Resemblance	
			Benzene	Toluene	Ethylbenzene	Xylene	C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₂₁	C ₂₁ -C ₃₂	Modified TPH (Less BTEX)			MTBE
DW-6	11-May-14	mg/kg	<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance
DW-15			<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance
DW-24			<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance
DW-30			<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance
DW-65			<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance
DW-71			<0.005	<0.04	<0.01	<0.05	<3	<15	<15	<15	<20	<0.050	Yes	No Resemblance
RDL			0.005	0.04	0.01	0.05	3	15	15	15	20	0.050		
Guidelines			Benzene	Toluene	Ethylbenzene	Xylene	Gasoline	Diesel / No. 2 Fuel Oil	No. 6 Oil/ Lube Oil	Modified TPH (Less BTEX)	MTBE			
Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992)														
			5	30	50	50								
Nova Scotia Tier 1 Environmental Quality Standards														
Sediment														
Sediment Environment			1.2	1.4	1.2	1.3	15	25	43					
Freshwater			1.2	1.4	1.2	1.3	15	25	43					
Marine														
Soils														
Agricultural Land Use	Potable	Coarse-Grained Soil	0.042	0.35	0.065	8.8	74	150	300			0.05		
		Fine-Grained Soil	0.094	0.74	0.13	22	210	150	1300			0.05		
	Non-Potable	Coarse-Grained Soil	0.99	75	30	88	74	150	300			0.05		
Residential/ Parkland Land Use	Potable	Coarse-Grained Soil	2.3	10000	120	65	210	150	1300			1.1		
		Coarse-Grained Soil	0.042	0.35	0.065	8.8	74	270	1100			0.05		
		Fine-Grained Soil	0.094	0.74	0.13	22	1900	4700	10000			0.05		
Commercial and Industrial Land Uses	Potable	Coarse-Grained Soil	0.99	77	30	88	74	270	1100			0.05		
		Fine-Grained Soil	2.3	10000	9300	210	2100	8600	10000			1.1		
	Potable	Coarse-Grained Soil	0.042	0.35	0.065	11	870	1800	10000			0.062		
		Fine-Grained Soil	0.094	0.74	0.13	22	1900	4700	10000			0.05		
	Non-Potable	Coarse-Grained Soil	2.5	10000	10000	110	870	4000	10000			0.57		
		Fine-Grained Soil	33	10000	10000	10000	10000	10000	10000			7.4		

NOTE(S):
Light values indicate results below detection limit.

Table B.7 PCB and DDT Results for Marine Sediments as Compared to Federal Criteria - Dingwall DFO-SCH, Nova Scotia

Table 27: PCB and DDT Results for Marine Sediments as Compared to Background - August 21 to October 10, 2004																		
Parameter	RDL	Units	Sample Identification and Date							CEPA Disposal at Sea Screening Criteria - Lower Level	CCME Sediment Quality Guidelines				CCME Soil Quality Guidelines			
			DW-6	DW-15	DW-24	DW-30	DW-65	DW-71	11-May-15			Interim Sediment Quality Guidelines	Marine and Estuarine Probable Effects Levels		Agricultural Land Use	Residential/ Parkland Land Use	Commercial/ Industrial Land Use	
Polychlorinated Biphenyl (PCB) Results																		
Aroclor 1016	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1221	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1232	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1242	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1248	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1254	0.0633		<0.0633	<0.0633	<0.0633	<0.0633	<0.0633	<0.0633	<0.0633	0.060	0.0633	0.340	0.709					
Aroclor 1260	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1262	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Aroclor 1268	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1								
Dieldrin	0.0007		<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.00285	0.00071	0.00667	0.0043			
Total PCB Concentration	0.0215		<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	0.1	0.0341	0.0215	0.277	0.189	0.5	1.3	
Dichloro-Diphenyl-Trichloroethane (DDT) Results																		
o,p-DDE	0.001	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001							
p,p-DDE	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001							
o,p-DDD	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001							
p,p-DDD	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001							
o,p-DDT	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001							
p,p-DDT	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001							
o,p-DDT + p,p-DDT	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00119	0.00119	0.00477	0.00477				
o,p-DDD +p,p-DDD	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00354	0.00122	0.00851	0.00781				
o,p-DDT + p,p-DDE	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00142	0.00207	0.00675	0.037400				
total DDT (calculated)	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001				0.7	0.7	12	

NOTE(S):

Light values indicate results below detection limit.

Table B.3 PCB and DDT Results for Marine Sediments as Compared to Provincial Criteria - Dingwall DFO-SCH, Nova Scotia

Parameter		RDL	Units	Sample Identification and Date						Nova Scotia Guidelines for Disposal of Contaminated Solids in Landfills (1992)	Sediment Environment		Potable Site						Non-Potable Site									
				DW-6	DW-15	DW-24	DW-30	DW-65	DW-71				Fine-Grained Soils			Coarse-Grained Soils			Fine-Grained Soils	Coarse-Grained Soils	Fine- and Coarse-Grained Soils							
											Freshwater	Marine	Agricultural Land Use	Residential/Parkland Land Use	Commercial Land Use	Industrial Land Use	Agricultural Land Use	Residential/Parkland Land Use					Commercial Land Use	Industrial Land Use				
Polychlorinated Biphenyl (PCB) Results																												
Aroclor 1016				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1221				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1232				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1242				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1248				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1254				0.0633	<0.0633	<0.0633	<0.0633	<0.0633	<0.0633	<0.0633																		
Aroclor 1260				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1262				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Aroclor 1268				0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1																		
Dieldrin				0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.00667	0.0043	0.055	0.59	0.59	0.44	1.3	0.055	0.044	1.1	22	33	1.3	0.044	5.1	44		
Total PCB Concentration				0.0215	<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	0.277	0.189	1.3	22	33	33	33	1.3	0.055	1.1	22	33	33	1.3	0.044	5.1	44	
Dichloro-Biphenyl-Trichloroethane (DDT) Results																												
o,p-DDD				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
p,p-DDD				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
o,p-DDD + p,p-DDD				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
o,p-DDT				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
p,p-DDT				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
o,p-DDT + p,p-DDT				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
o,p-DDD + p,p-DDD				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
o,p-DDD + p,p-DDD + p,p-DDT				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001																		
Total DDT (calculated)				0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00477	0.00477	0.7	220	340	1600	0.7	0.7	0.7	220	340	1600	0.7	0.7	0.7	220	340	1600
NOTE(S):																												
Light values indicate results below detection limit.																												

Table B.9 Grain Size and Carbon Content Results for Marine Sediments - Dingwall DFO-SCH, Nova Scotia

Parameter	RDL	Units	Sample Identification and Date						
			DW-6	DW-15	DW-24	DW-30	DW-65	DW-71	
			11 May 2015						
Grain Size Results									
< PHI -4 (12.5 mm)	0.1	%	100	100	100	100	100	100	100
< PHI -3 (9.5 mm)	0.1		100	100	100	100	100	100	
< PHI -2 (4.75 mm)	0.1		100	100	100	86.1	100	100	
< PHI -1 (2 mm)	0.1		100	76.4	99.7	46.3	100	99.7	
< PHI 0 (1 mm)	0.1		98.8	47.5	99.4	19.6	99.6	99.2	
< PHI +1 (1/2 mm)	0.1		88.7	34.6	94.6	14.5	94.9	97.5	
< PHI +2 (1/4 mm)	0.1		44.9	28.3	53.4	9.6	34.8	48.2	
< PHI +3 (1/8 mm)	0.1		2.1	4	3.2	1.5	5	4.2	
< PHI +4 (1/16 mm)	0.1		1.6	1.3	1.4	1	2.2	1.6	
< PHI +5 (1/32 mm)	0.1		1.4	0.9	1.3	1	1.2	1.6	
< PHI +6 (1/64 mm)	0.1		1.1	0.9	1	0.9	1.2	1.6	
< PHI +7 (1/128 mm)	0.1		0.9	0.8	1	0.8	1.1	1.3	
< PHI +8 (1/256 mm)	0.1		0.9	0.8	1	0.8	1.1	1.3	
< PHI +9 (1/512 mm)	0.1		0.8	0.8	1	0.7	1	1.2	
Gravel	1		<1	24	<1	54	<1	<1	
Sand	1		98	75	98	45	98	98	
Silt	1		<1	<1	<1	<1	1	<1	
Clay	1		<1	<1	1	<1	1	1	
Other									
Total Organic Carbon (TOC)	0.15	%	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	
Total Inorganic Caron (TIC)	0.15	%	<0.15	0.17	<0.15	0.78	<0.15	<0.15	
Total Carbon (TC)	Calculation	%	<0.15	0.245	<0.15	0.855	<0.15	<0.15	

NOTE(S):

All results below the laboratory detection limit were divided by 2 prior to further calculations.

Light values indicate results below detection limit.



APPENDIX C

QA/QC, COC, and Laboratory Certificates of Analyses

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
50 TROOP AVENUE, UNIT 300
DARTMOUTH, NS B3B1Z1
(902) 468-2848

ATTENTION TO: Maureen Cameron-MacMillan

PROJECT: TV151207

AGAT WORK ORDER: 15X973377

SOIL ANALYSIS REVIEWED BY: Laura Baker, Inorganics Data Reporter

TRACE ORGANICS REVIEWED BY: Jennifer Patterson, Organics Supervisor

DATE REPORTED: Jun 08, 2015

PAGES (INCLUDING COVER): 23

VERSION*: 4

Should you require any information regarding this analysis please contact your client services representative at (902) 468-8718

***NOTES**

VERSION 4: Final report, issued, June 8, 2015.
Version 3: Partial Report - excluding Grain Size Graph, issued, May 27, 2015.
Version 2: Partial Report for Organic Parameters only, issued, May 22, 2015.
Version 1: Partial Report for BTEX.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.



Certificate of Analysis

AGAT WORK ORDER: 15X973377
PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

AMEC - Available Metals in Soil											
DATE RECEIVED: 2015-05-14				DATE REPORTED: 2015-06-08							
Parameter	Unit	SAMPLE DESCRIPTION:				DW-6	DW-15	DW-24	DW-30	DW-65	DW-71
		SAMPLE TYPE:		Soil		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:	RDL	5/11/2015	6540641	5/11/2015	6540647	5/11/2015	6540654	5/11/2015	6540667
G / S											
Aluminum	mg/kg	10	1850	1850	2300	1870	2430	1950	2300		
Antimony	mg/kg	1	<1	<1	<1	<1	<1	<1	<1		
Arsenic	mg/kg	1	<1	<1	<1	<1	<1	<1	<1		
Barium	mg/kg	5	56	50	50	40	11	52	23		
Beryllium	mg/kg	2	<2	<2	<2	<2	<2	<2	<2		
Boron	mg/kg	2	2	2	2	<2	<2	<2	2		
Cadmium	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		
Chromium	mg/kg	2	4	5	5	4	5	4	5		
Cobalt	mg/kg	1	3	2	2	2	2	1	2		
Copper	mg/kg	2	2	3	3	3	4	2	3		
Iron	mg/kg	50	3640	4350	4710	3730	4710	3890	4180		
Lead	mg/kg	0.5	1.8	2.1	2.1	1.7	2.1	2.1	2.3		
Lithium	mg/kg	5	6	8	8	6	8	7	8		
Manganese	mg/kg	2	107	143	143	105	132	115	113		
Molybdenum	mg/kg	2	<2	<2	<2	<2	<2	<2	<2		
Nickel	mg/kg	2	3	3	3	3	4	3	3		
Selenium	mg/kg	1	<1	<1	<1	<1	<1	<1	<1		
Silver	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Strontium	mg/kg	5	<5	5	5	5	47	5	7		
Thallium	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
Tin	mg/kg	2	3	3	3	3	3	3	3		
Uranium	mg/kg	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
Vanadium	mg/kg	2	6	9	9	7	8	7	7		
Zinc	mg/kg	5	15	20	20	16	19	16	21		

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6540641-6540673 Results are based on the dry weight of the sample.

Certified By:

Laura Pahn



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

AMEC - Hexavalent Chromium in Soil									
DATE RECEIVED: 2015-05-14				DATE REPORTED: 2015-06-08					
SAMPLE DESCRIPTION:									
SAMPLE TYPE:									
DATE SAMPLED:									
G / S									
Parameter	Unit	RDL	DW-6	DW-15	DW-24	DW-30	DW-65	DW-71	
			Soil	Soil	Soil	Soil	Soil	Soil	
			5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	
			6540641	6540647	6540654	6540660	6540667	6540673	
Chromium, Hexavalent	mg/kg	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

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

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

AMEC - TOC/TIC

DATE RECEIVED: 2015-05-14

DATE REPORTED: 2015-06-08

Parameter	Unit	SAMPLE DESCRIPTION:		SAMPLE TYPE:		DATE SAMPLED:		RDL		DW-6	DW-15	DW-24	DW-30	DW-65	DW-71
		G / S	RDL	G / S	RDL	G / S	RDL	G / S	RDL	Soil	Soil	Soil	Soil	Soil	Soil
										5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015
Total Organic Carbon by Walkley Black	%		0.15		<0.15		<0.15		<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Total Inorganic Carbon, Calculated	%		0.15		<0.15		0.17		<0.15	<0.15	0.78	<0.15	<0.15	<0.15	<0.15

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

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLED BY:

Grain Size Analysis (Sieve & Pipette)									
DATE RECEIVED: 2015-05-14				DATE REPORTED: 2015-06-08					
Parameter	Unit	SAMPLE DESCRIPTION:		SAMPLE TYPE:		DATE SAMPLED:		G / S	
		DW-6	DW-15	DW-24	DW-30	DW-65	DW-71		
Particle Size Distribution (<12.5mm, -4 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<9.5mm, -3 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<4.75mm, -2 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<2mm, -1 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1mm, 0 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/2mm, 1 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/4mm, 2 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/8mm, 3 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/16mm, 4 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/32mm, 5 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/64mm, 6 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/128mm, 7 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/256mm, 8 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (<1/512mm, 9 PHI)	%	0.1	100	100	100	100	100	100	100
Particle Size Distribution (Gravel)	%	1	24	<1	54	<1	<1	<1	<1
Particle Size Distribution (Sand)	%	1	75	98	45	98	98	98	98
Particle Size Distribution (Silt)	%	1	<1	<1	<1	1	<1	<1	<1
Particle Size Distribution (Clay)	%	1	<1	1	<1	1	1	1	1
Particles >75um	%	1	98	98	99	97	98	98	98
Classification	Coarse/Fine	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse	Coarse

Certified By:

Laurel Bahr



AGAT Laboratories

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLED BY:

Grain Size Analysis (Sieve & Pipette)	
DATE RECEIVED: 2015-05-14	DATE REPORTED: 2015-06-08

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

Certified By: _____



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

HWE Boron (Soil)									
DATE RECEIVED: 2015-05-14				DATE REPORTED: 2015-06-08					
SAMPLE DESCRIPTION:									
SAMPLE TYPE: Soil									
DATE SAMPLED: 5/11/2015									
G / S RDL									
Parameter	Unit	G / S	RDL	DW-6	DW-15	DW-24	DW-30	DW-65	DW-71
Boron (Hot Water Soluble)	µg/g	0.10	1.29	1.33	1.22	2.84	1.36	6540667	6540673

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard; Refers to T1(All)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

Mercury Analysis in Soil									
DATE RECEIVED: 2015-05-14				DATE REPORTED: 2015-06-08					
SAMPLE DESCRIPTION:									
SAMPLE TYPE: Soil									
DATE SAMPLED: 5/11/2015									
G / S RDL									
Parameter	Unit	DW-6	DW-15	DW-24	DW-30	DW-65	DW-71		
		Soil	Soil	Soil	Soil	Soil	Soil		
		5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015		
		6540641	6540647	6540654	6540660	6540667	6540673		
		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Mercury	mg/kg	0.05	0.05						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6540641-6540673 Results are based on the dry weight of the soil.

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
http://www.agatlabs.com

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLED BY:

AMEC - Atlantic RBCA Tier 1 Hydrocarbons in Soil + Silica Gel + Creosote

DATE RECEIVED: 2015-05-14

DATE REPORTED: 2015-06-08

SAMPLE DESCRIPTION:		DW-6		DW-15		DW-24		DW-30		DW-65		DW-71	
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil	
Parameter	Unit	G / S	RDL	DATE SAMPLED:	5/11/2015	DATE SAMPLED:	5/11/2015	DATE SAMPLED:	5/11/2015	DATE SAMPLED:	5/11/2015	DATE SAMPLED:	5/11/2015
Methyl-t-Butyl-Ether (MTBE)	mg/kg		0.050		<0.050		<0.050		<0.050		<0.050		<0.050
Benzene	mg/kg		0.005		<0.005		<0.005		<0.005		<0.005		<0.005
Toluene	mg/kg		0.04		<0.04		<0.04		<0.04		<0.04		<0.04
Ethylbenzene	mg/kg		0.01		<0.01		<0.01		<0.01		<0.01		<0.01
Xylene (Total)	mg/kg		0.05		<0.05		<0.05		<0.05		<0.05		<0.05
C6-C10 (less BTEX)	mg/kg		3		<3		<3		<3		<3		<3
>C10-C21 Hydrocarbons	mg/kg		15		<15		<15		<15		<15		<15
>C21-C32 Hydrocarbons	mg/kg		15		<15		<15		<15		<15		<15
Modified TPH (Tier 1)	mg/kg		20		<20		<20		<20		<20		<20
Resemblance Comment					NR		NR		NR		NR		NR
Creosote Comment					NR		NR		NR		NR		NR
Return to Baseline at C32					Y		Y		Y		Y		Y
% Moisture	%		1		28		22		19		23		23
Silica Gel Cleanup					N		N		N		N		N
Surrogate	Unit	Acceptable Limits											
Isobutylbenzene - EPH	%		60-140		92		103		89		96		91
Isobutylbenzene - VPH	%		60-140		94		86		63		69		80
n-Dotriacontane - EPH	%		60-140		N/A		N/A		N/A		N/A		N/A

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

6540641-6540673 Results are based on the dry weight of the soil.

EPH surrogate not available (NA) due to matrix interference.

Resemblance Comment Key:

GF - Gasoline Fraction

WGF - Weathered Gasoline Fraction

GR - Product in Gasoline Range

FOF - Fuel Oil Fraction

WFOF - Weathered Fuel Oil Fraction

FR - Product in Fuel Oil Range

LOF - Lube Oil Fraction

UC - Unidentified Compounds

NR - No Resemblance

NA - Not Applicable

Certified By:

J. Patterson



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLED BY:

AMEC - DDT in Soil									
DATE RECEIVED: 2015-05-14				DATE REPORTED: 2015-06-08					
Parameter		SAMPLE DESCRIPTION:		DW-6	DW-15	DW-24	DW-30	DW-65	DW-71
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
		DATE SAMPLED:		5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015
Unit	G / S	RDL	6540641	6540647	6540654	6540660	6540667	6540673	6540673
Dieldrin (Hfx 2012-03)	µg/kg	0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
o,p'-DDD (Hfx 2012-03)	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o,p'-DDE (Hfx 2012-03)	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o,p'-DDT (Hfx 2012-03)	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
p,p'-DDD (Hfx 2012-03)	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
p,p'-DDE (Hfx 2012-03)	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
p,p'-DDT (Hfx 2012-03)	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o,p'-DDT + p,p'-DDT	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o,p'-DDD + p,p'-DDD	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
o,p'-DDE + p,p'-DDE	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total DDT	µg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

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

Certified By:

J. Patterson



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLED BY:

AMEC - PCB Arochlor

DATE RECEIVED: 2015-05-14

DATE REPORTED: 2015-06-08

Parameter		Unit		SAMPLE DESCRIPTION:		DW-6	DW-15	DW-24	DW-30	DW-65	DW-71
				SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil
				DATE SAMPLED:	RDL	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015
Aroclor 1242		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254		mg/kg		0.0633		<0.0633	<0.0633	<0.0633	<0.0633	<0.0633	<0.0633
Aroclor 1260		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1016		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1262		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1268		mg/kg		0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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

6540641-6540673 Results are based on the dry weight of the soil.

Certified By:

J. Patterson



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLED BY:

AMEC - Polycyclic Aromatic Hydrocarbons in Soil

DATE RECEIVED: 2015-05-14

DATE REPORTED: 2015-06-08

Parameter	Unit	SAMPLE DESCRIPTION:		DW-6 Soil	DW-15 Soil	DW-24 Soil	DW-30 Soil	DW-65 Soil	DW-71 Soil
		DATE SAMPLED:	G / S						
1-Methylnaphthalene	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Methylnaphthalene	mg/kg	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	mg/kg	0.00671		<0.00671	<0.00671	<0.00671	<0.00671	<0.00671	<0.00671
Acenaphthylene	mg/kg	0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Acridine	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anthracene	mg/kg	0.04		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Benzo(a)anthracene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(b-f)fluoranthene	mg/kg	0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(e)pyrene	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(a,h)anthracene	mg/kg	0.006		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Fluoranthene	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Fluorene	mg/kg	0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(1,2,3)pyrene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Perylene	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Phenanthrene	mg/kg	0.04		<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Pyrene	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Quinoline	mg/kg	0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total PAH	mg/kg	0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
% Moisture	%			28	16	22	19	23	23
Surrogate		Unit	Acceptable Limits						
Nitrobenzene-d5	%		50-140	123	115	104	107	114	120
2-Fluorobiphenyl	%		50-140	117	108	112	114	117	125
Terphenyl-d14	%		50-140	107	104	101	112	106	108

Certified By:

J. Patterson



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

AMEC - Polycyclic Aromatic Hydrocarbons in Soil	
DATE RECEIVED: 2015-05-14	DATE REPORTED: 2015-06-08

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6540641-6540673 Results are based on the dry weight of the soil.

Certified By:

J. Patterson



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

11 Morris Drive, Unit 122
Dartmouth, Nova Scotia
CANADA B3B 1M2
TEL (902)468-8718
FAX (902)468-8924
<http://www.agatlabs.com>

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR
SAMPLING SITE:

ATTENTION TO: Maureen Cameron-MacMillan
SAMPLED BY:

AMEC - Total Polychlorinated Biphenyls									
DATE RECEIVED: 2015-05-14			DATE REPORTED: 2015-06-08						
SAMPLE DESCRIPTION:			DW-6	DW-15	DW-24	DW-30	DW-65	DW-71	
SAMPLE TYPE:			Soil	Soil	Soil	Soil	Soil	Soil	
DATE SAMPLED:			5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	5/11/2015	
G / S			RDL	6540647	6540654	6540660	6540667	6540673	
Parameter	Unit		0.0215	<0.0215	<0.0215	<0.0215	<0.0215	<0.0215	
Total Polychlorinated Biphenyls			mg/kg						

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6540641-6540673 Results are based on the dry weight of the soil.

Certified By:

J. Patterson

Quality Assurance

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:

SAMPLED BY:

Soil Analysis															
RPT Date: Jun 08, 2015			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

AMEC - Available Metals in Soil

Aluminum	5152015	6540673	2300	2320	0.9%	< 10	120%	80%	120%	119%	80%	120%	119%	70%	130%
Antimony	5152015	6540673	< 1	< 1	0.0%	< 1	91%	80%	120%	101%	80%	120%	85%	70%	130%
Arsenic	5152015	6540673	< 1	< 1	0.0%	< 1	96%	80%	120%	94%	80%	120%	88%	70%	130%
Barium	5152015	6540673	23	23	0.0%	< 5	105%	80%	120%	101%	80%	120%	96%	70%	130%
Beryllium	5152015	6540673	< 2	< 2	0.0%	< 2	109%	80%	120%	101%	80%	120%	79%	70%	130%
Boron	5152015	6540673	2	2	0.0%	< 2	111%	80%	120%	102%	80%	120%	82%	70%	130%
Cadmium	5152015	6540673	< 0.3	< 0.3	0.0%	< 0.3	106%	80%	120%	103%	80%	120%	92%	70%	130%
Chromium	5152015	6540673	5	5	0.0%	< 2	110%	80%	120%	110%	80%	120%	95%	70%	130%
Cobalt	5152015	6540673	2	2	0.0%	< 1	114%	80%	120%	106%	80%	120%	85%	70%	130%
Copper	5152015	6540673	3	3	0.0%	< 2	114%	80%	120%	108%	80%	120%	79%	70%	130%
Iron	5152015	6540673	4180	4420	5.6%	< 50	117%	80%	120%	113%	80%	120%	90%	70%	130%
Lead	5152015	6540673	2.31	2.13	8.1%	< 0.5	104%	80%	120%	104%	80%	120%	92%	70%	130%
Lithium	5152015	6540673	8	8	0.0%	< 5	109%	70%	130%	101%	70%	130%	97%	70%	130%
Manganese	5152015	6540673	113	113	0.0%	< 2	116%	80%	120%	112%	80%	120%	93%	70%	130%
Molybdenum	5152015	6540673	< 2	< 2	0.0%	< 2	101%	80%	120%	100%	80%	120%	91%	70%	130%
Nickel	5152015	6540673	3	3	0.0%	< 2	113%	80%	120%	107%	80%	120%	86%	70%	130%
Selenium	5152015	6540673	< 1	< 1	0.0%	< 1	105%	80%	120%	103%	80%	120%	82%	70%	130%
Silver	5152015	6540673	< 0.5	< 0.5	0.0%	< 0.5	104%	80%	120%	102%	80%	120%	91%	70%	130%
Strontium	5152015	6540673	7	7	0.0%	< 5	103%	80%	120%	100%	80%	120%	97%	70%	130%
Thallium	5152015	6540673	< 0.1	< 0.1	0.0%	< 0.1	100%	80%	120%	104%	80%	120%	NA	70%	130%
Tin	5152015	6540673	3	3	0.0%	< 2	102%	80%	120%	101%	80%	120%	95%	70%	130%
Uranium	5152015	6540673	0.3	0.3	0.0%	< 0.1	99%	80%	120%	100%	80%	120%	88%	70%	130%
Vanadium	5152015	6540673	7	8	13.3%	< 2	111%	80%	120%	104%	80%	120%	93%	70%	130%
Zinc	5152015	6540673	21	22	4.7%	< 5	110%	80%	120%	113%	80%	120%	87%	70%	130%

AMEC - Hexavalent Chromium in Soil

Chromium, Hexavalent	1	6540673	<0.4	0.4		< 0.4	94%	80%	120%	100%	80%	120%		80%	120%
----------------------	---	---------	------	-----	--	-------	-----	-----	------	------	-----	------	--	-----	------

AMEC - TOC/TIC

Total Organic Carbon by Walkley Black	7040	641	<0.15	<0.15	NA	< 0.15	87%	80%	120%	NA	80%	120%	NA	80%	120%
---------------------------------------	------	-----	-------	-------	----	--------	-----	-----	------	----	-----	------	----	-----	------

Mercury Analysis in Soil

Mercury	1	6540654	< 0.05	< 0.05	0.0%	< 0.05	106%	70%	130%		70%	130%	106%	70%	130%
---------	---	---------	--------	--------	------	--------	------	-----	------	--	-----	------	------	-----	------

HWE Boron (Soil)

Boron (Hot Water Soluble)	6562089		0.17	0.17	0.0%	< 0.10	96%	60%	140%	100%	70%	130%	97%	60%	140%
---------------------------	---------	--	------	------	------	--------	-----	-----	------	------	-----	------	-----	-----	------

Soil Analysis - Total Organic Carbon (W-B Wet Oxidation)

Total Organic Carbon	7040	641	< 0.15	< 0.15	NA	< 0.15	87%	80%	120%				NA	80%	120%
----------------------	------	-----	--------	--------	----	--------	-----	-----	------	--	--	--	----	-----	------

Quality Assurance

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Jun 08, 2015			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Comments: If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Total Carbon in Soil

Carbon - Total	6552879	2.08	2.08	0.4%	< 0.02	102%	80%	120%
----------------	---------	------	------	------	--------	------	-----	------

Certified By:



Quality Assurance

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jun 08, 2015			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

AMEC - Total Polychlorinated Biphenyls

Total Polychlorinated Biphenyls	1	6540641	< 0.0215	< 0.0215	0.0%	< 0.0215	114%	70%	130%	120%	60%	130%	NA	60%	130%
---------------------------------	---	---------	----------	----------	------	----------	------	-----	------	------	-----	------	----	-----	------

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

AMEC - PCB Arochlor

Aroclor 1242	62	6540654	<0.05	<0.05	NA	< 0.1	106%	70%	130%	79%	70%	130%	74%	60%	140%
Aroclor 1254	62	6540654	<0.05	<0.05	NA	< 0.0633	97%	70%	130%	80%	70%	130%	71%	60%	140%
Aroclor 1260	62	6540654	<0.05	<0.05	NA	< 0.1	126%	70%	130%	104%	70%	130%	95%	60%	140%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

AMEC - Polycyclic Aromatic Hydrocarbons in Soil

1-Methylnaphthalene	1	6535218	5.10	4.01	23.9%	< 0.05	101%	50%	140%	127%	50%	140%	NA	50%	140%
2-Methylnaphthalene	1	6535218	20.6	16.2	23.9%	< 0.02	101%	50%	140%	135%	50%	140%	61%	50%	140%
Acenaphthene	1	6535218	< 0.00671	< 0.00671	0.0%	< 0.00671	113%	50%	140%	131%	50%	140%	NA	50%	140%
Acenaphthylene	1	6535218	< 0.005	< 0.005	0.0%	< 0.005	92%	50%	140%	99%	50%	140%	131%	50%	140%
Acridine	1	6535218	0.32	0.40	22.2%	< 0.05	131%	50%	140%	106%	50%	140%	NA	50%	140%
Anthracene	1	6535218	0.16	0.13	20.7%	< 0.04	93%	50%	140%	101%	50%	140%	93%	50%	140%
Benzo(a)anthracene	1	6535218	0.20	0.16	22.2%	< 0.01	99%	50%	140%	103%	50%	140%	106%	50%	140%
Benzo(a)pyrene	1	6535218	0.10	0.08	22.2%	< 0.01	95%	50%	140%	99%	50%	140%	101%	50%	140%
Benzo(b)fluoranthene	1	6535218	0.06	0.05	18.2%	< 0.05	101%	50%	140%	94%	50%	140%	117%	50%	140%
Benzo(b+j)fluoranthene	1	6535218	< 0.1	< 0.1	0.0%	< 0.1	97%	50%	140%	98%	50%	140%	97%	50%	140%
Benzo(e)pyrene	1	6535218	0.10	0.08	22.2%	< 0.05	95%	50%	140%	112%	50%	140%	101%	50%	140%
Benzo(ghi)perylene	1	6535218	0.08	0.06	28.6%	< 0.01	95%	50%	140%	104%	50%	140%	106%	50%	140%
Benzo(k)fluoranthene	1	6535218	0.05	0.05	0.0%	< 0.01	117%	50%	140%	123%	50%	140%	115%	50%	140%
Chrysene	1	6535218	0.13	0.10	26.1%	< 0.01	95%	50%	140%	109%	50%	140%	102%	50%	140%
Dibenzo(a,h)anthracene	1	6535218	< 0.006	< 0.006	0.0%	< 0.006	90%	50%	140%	84%	50%	140%	101%	50%	140%
Fluoranthene	1	6535218	0.14	0.12	15.4%	< 0.05	105%	50%	140%	111%	50%	140%	129%	50%	140%
Fluorene	1	6535218	< 0.02	< 0.02	0.0%	< 0.02	94%	50%	140%	116%	50%	140%	NA	50%	140%
Indeno(1,2,3)pyrene	1	6535218	0.04	0.05	22.2%	< 0.01	86%	50%	140%	79%	50%	140%	88%	50%	140%
Naphthalene	1	6535218	21.6	16.2	28.6%	< 0.01	105%	50%	140%	130%	50%	140%	104%	50%	140%
Perylene	1	6535218	< 0.05	< 0.05	0.0%	< 0.05	96%	50%	140%	111%	50%	140%	98%	50%	140%
Phenanthrene	1	6535218	1.01	1.09	7.6%	< 0.04	99%	50%	140%	108%	50%	140%	86%	50%	140%
Pyrene	1	6535218	0.93	0.77	18.8%	< 0.05	103%	50%	140%	109%	50%	140%	103%	50%	140%
Quinoline	1	6535218	< 0.05	< 0.05	0.0%	< 0.05	117%	50%	140%	123%	50%	140%	115%	50%	140%

AMEC - Atlantic RBCA Tier 1 Hydrocarbons in Soil + Silica Gel + Creosote

Methyl-t-Butyl-Ether (MTBE)	1	6540667	<0.050	<0.050	0.0%	< 0.050	60%	60%	140%	67%	60%	140%	77%	60%	140%
Benzene	1	6540667	<0.005	<0.005	0.0%	< 0.005	67%	60%	140%	66%	60%	140%	70%	30%	130%
Toluene	1	6540667	<0.04	<0.04	0.0%	< 0.04	67%	60%	140%	79%	60%	140%	69%	30%	130%
Ethylbenzene	1	6540667	<0.01	<0.01	0.0%	< 0.01	65%	60%	140%	77%	60%	140%	67%	30%	130%
Xylene (Total)	1	6540667	<0.05	<0.05	0.0%	< 0.05	76%	60%	140%	89%	60%	140%	78%	30%	130%

Quality Assurance

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jun 08, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
C6-C10 (less BTEX)	1	6540667	<3	<3	0.0%	< 3	127%	60%	140%	112%	60%	140%	125%	30%	130%
>C10-C21 Hydrocarbons	1	6542806	91	115	23.3%	< 15	NA	60%	140%	125%	60%	140%	NA	30%	130%
>C21-C32 Hydrocarbons	1	6542806	143	210	38.0%	< 15	90%	60%	140%	125%	60%	140%	NA	30%	130%

Comments: Matrix spike not available (NA); sample concentration is greater than 2X the spike concentration.

AMEC - DDT in Soil

Dieldrin (Hfx 2012-03)	1	6540641	< 0.7	< 0.7	0.0%	< 0.7	117%	60%	130%	104%	70%	130%	88%	60%	130%
o,p'-DDD (Hfx 2012-03)	1	6540641	< 1.0	< 1.0	0.0%	< 1.0	118%	60%	130%	104%	70%	130%	98%	60%	130%
o,p'-DDE (Hfx 2012-03)	1	6540641	< 1.0	< 1.0	0.0%	< 1.0	98%	60%	130%	110%	70%	130%	89%	60%	130%
o,p'-DDT (Hfx 2012-03)	1	6540641	< 1.0	< 1.0	0.0%	< 1.0	92%	60%	130%	83%	70%	130%	76%	60%	130%
p,p'-DDD (Hfx 2012-03)	1	6540641	< 1.0	< 1.0	0.0%	< 1.0	122%	60%	130%	85%	70%	130%	110%	60%	130%
p,p'-DDE (Hfx 2012-03)	1	6540641	< 1.0	< 1.0	0.0%	< 1.0	97%	60%	130%	94%	70%	130%	85%	60%	130%
p,p'-DDT (Hfx 2012-03)	1	6540641	< 1.0	< 1.0	0.0%	< 1.0	125%	60%	130%	121%	70%	130%	99%	60%	130%

Certified By:



Method Summary

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Aluminum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Antimony	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Arsenic	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Barium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Beryllium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Boron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cadmium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Cobalt	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Copper	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Iron	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Lead	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Lithium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP-MS
Manganese	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Molybdenum	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Nickel	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Selenium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Silver	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Strontium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Thallium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Tin	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Uranium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Vanadium	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Zinc	MET-121-6105 & MET-121-6103	EPA SW 846 6020A/3050B & SM 3125	ICP/MS
Chromium, Hexavalent	INOR-121-6029	SSSA 5;25 p. 683	SPECTROPHOTOMETER
Total Organic Carbon by Walkley Black	SOIL 0480; SOIL 0110; SOIL 0120	NELSON 1996; SHEPPARD 2007	SPECTROPHOTOMETER
Total Inorganic Carbon, Calculated			CALCULATION
Particle Size Distribution (<12.5mm, -4 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<9.5mm, -3 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<4.75mm, -2 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE

Method Summary

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Particle Size Distribution (<2mm, -1 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1mm, 0 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/2mm, 1 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/4mm, 2 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/8mm, 3 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/16mm, 4 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/32mm, 5 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/64mm, 6 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/128mm, 7 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/256mm, 8 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (<1/512mm, 9 PHI)	INOR-121-6034	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Gravel)	INOR-121-6031	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Sand)	INOR-121-6031	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Silt)	INOR-121-6031	ASTM D-422-63	SIEVE & PIPETTE
Particle Size Distribution (Clay)	INOR-121-6031	ASTM D-422-63	SIEVE & PIPETTE
Particles >75um	INOR-121-6031, INOR-121-6034	ASTM D-422-63	CALCULATED
Classification	INOR-121-6031, INOR-121-6031	Atlantic RBCA	CALCULATED
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Mercury	INOR-121-6101 & INOR-121-6107	Based on EPA 245.5 & SM 3112B	CV/AA
Total Organic Carbon	SOIL 0480; SOIL 0110; SOIL 0120	NELSON 1996; SHEPPARD 2007	SPECTROPHOTOMETER
Carbon - Total	INOR-181-6027	ASTM E1915-11	COMBUSTION

Method Summary

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Methyl-t-Butyl-Ether (MTBE)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Benzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Toluene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Ethylbenzene	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
Xylene (Total)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
C6-C10 (less BTEX)	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C10-C21 Hydrocarbons	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
>C21-C32 Hydrocarbons	VOL-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Modified TPH (Tier 1)	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Resemblance Comment	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS/FID
Creosote Comment			GC/FID
Return to Baseline at C32	ORG-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
% Moisture	LAB-131-4024	Topp, G.C. 1993. Soil Water Content. CSSS	GRAVIMETRIC
Silica Gel Cleanup			GC/FID
Isobutylbenzene - EPH	VOL-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Isobutylbenzene - VPH	VOL-120-5013	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/MS
n-Dotriacontane - EPH	VOL-120-5007	Atlantic RBCA Guidelines for Laboratories Tier 1	GC/FID
Dieldrin (Hfx 2012-03)	ORG-120-5108		GC/ECD
o,p'-DDD (Hfx 2012-03)	ORG-120-5108		GC/ECD
o,p'-DDE (Hfx 2012-03)	ORG-120-5108		GC/ECD
o,p'-DDT (Hfx 2012-03)	ORG-120-5108		GC/ECD
p,p'-DDD (Hfx 2012-03)	ORG-120-5108		GC/ECD
p,p'-DDE (Hfx 2012-03)	ORG-120-5108		GC/ECD
p,p'-DDT (Hfx 2012-03)	ORG-120-5108		GC/ECD
o,p'-DDT + p,p'-DDT	ORG-120-5108	Based on EPA SW-846/6510 C-8080-8081 A	GC/ECD
o,p'-DDD + p,p'-DDD	ORG-120-5108	Based on EPA SW-846/6510 C-8080-8081 A	GC/ECD
o,p'-DDE + p,p'-DDE	ORG-120-5108	Based on EPA SW-846/6510 C-8080-8081 A	GC/ECD
Total DDT	Calculation	Calculation	GC/FID
Aroclor 1242	TO 0400	EPA 8082	GC/ECD
Aroclor 1248	TO 0400	EPA 8082	GC/ECD
Aroclor 1254	TO 0400	EPA 8082	GC/ECD
Aroclor 1260	TO 0400	EPA 8082	GC/ECD
Aroclor 1016	TO 0400	EPA 8082	GC/ECD
Aroclor 1221	TO 0400	EPA 8082	GC/ECD
Aroclor 1232	TO 0400	EPA 8082	GC/ECD

Method Summary

CLIENT NAME: AMEC FOSTER WHEELER ENVIRO&INFRASTR

AGAT WORK ORDER: 15X973377

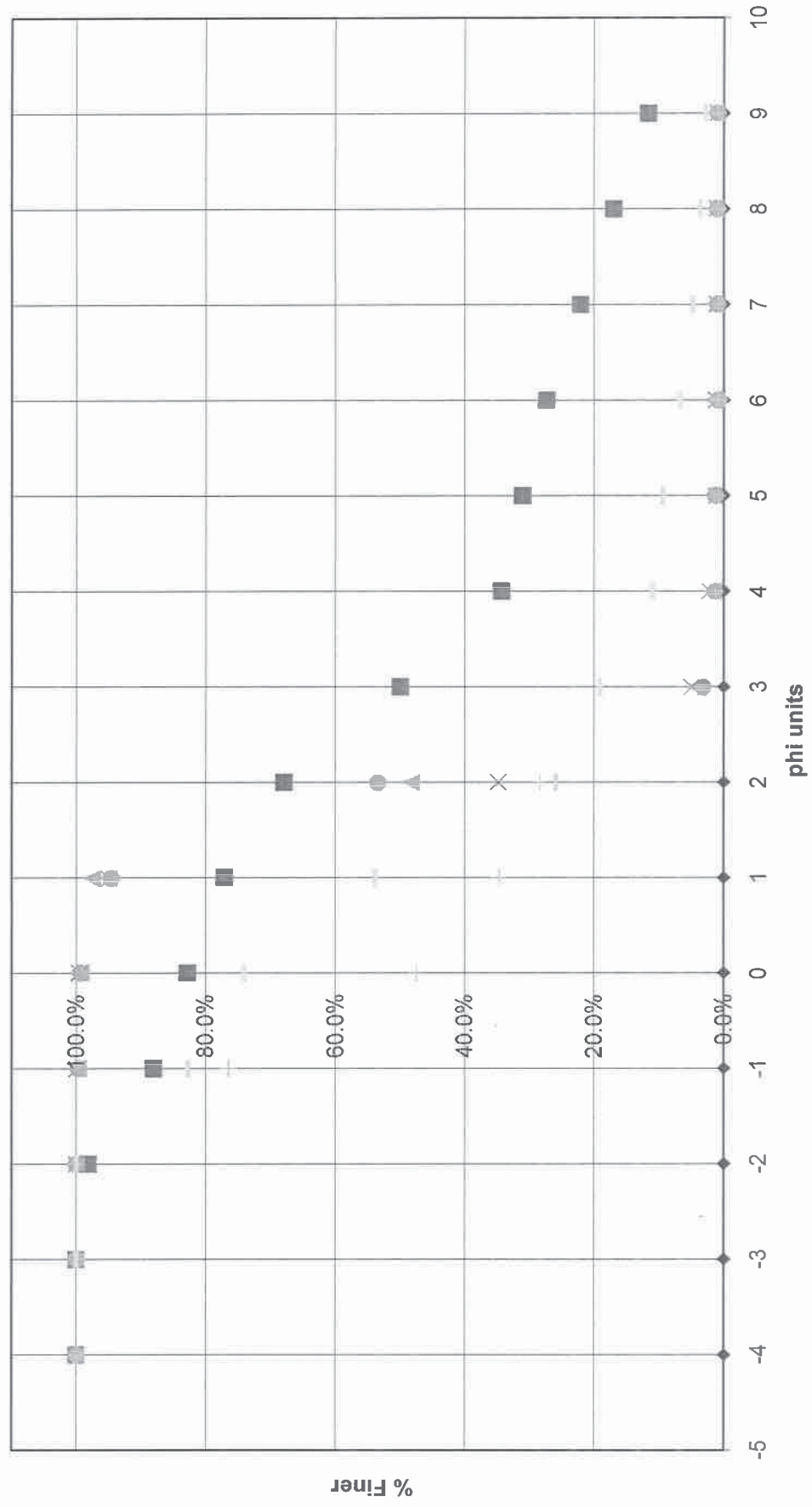
PROJECT: TV151207

ATTENTION TO: Maureen Cameron-MacMillan

SAMPLING SITE:
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Aroclor 1262	TO 0400	EPA 8082	GC/ECD
Aroclor 1268	TO 0400	EPA 8082	GC/ECD
1-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Methylnaphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acenaphthylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Acridine	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(a)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(b+j)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(e)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(ghi)perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Benzo(k)fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Chrysene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Dibenzo(a,h)anthracene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluoranthene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Fluorene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Indeno(1,2,3)pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Naphthalene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Perylene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Phenanthrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Pyrene	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Quinoline	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Total PAH			
% Moisture			GRAVIMETRIC
Nitrobenzene-d5	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
2-Fluorobiphenyl	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Terphenyl-d14	ORG-120-5104	EPA SW846/3541/3510/8270C	GC/MS
Total Polychlorinated Biphenyls	ORG-120-5106	EPA SW846/8081/8080	GC/ECD

Particle Size Distribution





Phone: 902-468-8718
Fax: 902-468-8924
www.agatlabs.com

Laboratory use only

Arrival Condition: 30 ☐ Good ☐ Poor (complete 'notes') 15x973377
 Arrival Temperature: _____ AGAT Job Number: _____
 Notes: _____

Drinking Water Sample (y/n):	N	Req. No.

Waterworks Number:

[illegible]



APPENDIX D

Limitations

LIMITATIONS

1. The work performed in the preparation of this report and the conclusions presented are subject to the following:
 1. The Standard Terms and Conditions which form a part of our Professional Services Contract.
 2. The Scope of Services.
 3. Time and Budgetary limitations as described in our Contract.
 4. The Limitations stated herein.
2. No other warranties or representations, either expressed or implied, are made as to the professional services provided under the terms of our Contract, or the conclusions presented.
3. The information presented in this report is based on sampling techniques which are considered industry-standard for this type of assessment (i.e., samples collected by divers using standard procedures commonly accepted by PWGSC).
4. The sediment characteristics at the Site were assessed, within the limitations set out above, having due regard for applicable environmental regulations as of the date of the analytical reporting.
5. No request for information about the site history or operating practices within the site boundaries has been included in the scope of work for this project.
6. Sample collection and testing was carried out in accordance with the terms of our contract. Other substances, or different quantities of substances testing for, may be present on Site and may be revealed by different or other testing not provided for in our contract.
7. This report is for the sole use of the party to whom it is addressed unless expressly stated otherwise in the report or contract. Any use which any third party makes of the report, in whole or the part, or any reliance thereon or decisions made based on any information or conclusions in the report is the sole responsibility of such third party. Amec Foster Wheeler accepts no responsibility whatsoever for damages or loss of any nature or kind suffered by any such third party as a result of actions taken or not taken or decisions made in reliance on the report or anything set out therein.