

Report No. 2499-03-01

**ENVIRONMENTAL CHARACTERIZATION
OF SOILS**

**Québec City Armoury
Lot 1 – Relocation of Public Utilities
Québec (Québec)**

ARCOP/DFS/STGM Consortium of Architects

**File No. 2499-03
November 2014**



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INDEX

CCME:	Canadian Council of Ministers of the Environment
L.E.Q. ltée:	Laboratoires d'Expertises de Québec ltée
MDDELCC:	Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques
NBC:	National Battlefields Commission
PAH:	Polycyclic aromatic hydrocarbon
PH C ₁₀ -C ₅₀ :	Petroleum hydrocarbon C ₁₀ -C ₅₀
PWGSC:	Public Works and Government Services Canada



TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION.....	1
2.0 SUMMARY DESCRIPTION OF THE SITE.....	3
3.0 ENVIRONMENTAL CHARACTERIZATION OPERATIONS	4
3.1 Boreholes	5
3.2 Soil sample collection	6
3.3 Surveying and levelling.....	7
4.0 DESCRIPTION OF SOILS AND GROUNDWATER.....	8
5.0 LABORATORY CHEMICAL ANALYSES	10
5.1 Analysis laboratory	10
5.2 Interpretive criteria.....	10
5.3 Analysis parameters	11
5.4 Laboratory chemical analysis methods	11
6.0 CHEMICAL ANALYSIS RESULTS	12
6.1 Soil chemical analysis results	12
6.2 Quality control assurance program	15
7.0 CONCLUSIONS AND RECOMMENDATIONS	17
8.0 LIMITING CONDITIONS	20
9.0 QUALIFICATIONS.....	22
APPENDIX “A”	Location of Soundings and Distribution of Contamination
APPENDIX “B”:	Photographic Compendium
APPENDIX “C”:	Borehole Reports F-101 to F-104 (August 2014) Test Pit Reports PE-9 (June 2013)
APPENDIX “D”:	Detailed Chemical Analysis Results Chemical Analysis Certificates for Boreholes F-101 to F-104 Chemical Analysis Certificate for Test Pit PE-9
APPENDIX “E”:	Grille de gestion des sols contaminés excavés intérimaire



1.0 INTRODUCTION

A team of geotechnical, environmental and soils and materials engineering consultants from L.E.Q. Itée was contracted by the ARCOP/DFS/STGM consortium of architects to conduct an environmental characterization of soils on the properties concerned by the installation of new underground infrastructures between Avenue Wilfrid-Laurier and the Plains of Abraham in Québec City. More specifically, the site under study corresponds to a portion of lots 1 213 692, 1 213 699, 1 315 031 and 1 315 203 of the *Cadastré du Québec*.

These operations are supplemental to the *Exhaustive Environmental Characterization of Soils* study conducted by our firm on the property of the Québec City Armoury in 2013 (Reference No. 2499-01-01). The purpose of this supplemental *Environmental Characterization of Soils* study is to evaluate the environmental quality of the soils on site in order to provide guidelines to PWGSC concerning its off-site management of these materials. The evaluation of the environmental quality of the soils on the site was conducted in accordance with the MDDELCC's *Politique de protection des sols et de réhabilitation des terrains contaminés* (policy on soil protection and the remediation of contaminated land - in French only, hereinafter "the Policy") and CCME criteria.

This report includes all of the results of the work carried out as well as the resulting comments, recommendations and conclusions. This report was prepared specifically for the exclusive use of the ARCOP/DFS/STGM consortium and PWGSC as part of the Québec City Armoury reconstruction project. With the exception of the Department of National Defence, the Ville de Québec and their business partners, including other professionals involved with the project's completion, as applicable, no other person, body or entity may use this report without the written consent of L.E.Q. Itée, a representative of the Department of National Defence, a



representative of the ARCOP/DFS/STGM consortium and a representative of PWGSC.



2.0 SUMMARY DESCRIPTION OF THE SITE

Located in the La Cité-Limoilou borough in the city of Québec, the property under study corresponds to a portion of Avenue Wilfrid-Laurier, a portion of a parking lot used by the NBC as well as a portion of land on the Plains of Abraham. The sector covered by these operations corresponds to a portion of lots 1 213 692, 1 213 699, 1 315 031 and 1 315 203 of the *Cadastre du Québec*, with a surface area of approximately 2,428 square metres. The centre point of the site's geographic coordinates is approximately 46°48'20" north latitude and 71°12'53" west longitude (MTM/NAD 83). Other than the southeastern portion occupied by the Plains of Abraham, which is covered in grass, the rest of the surface is paved with asphalt. The boundaries of the sector covered by these operations are presented in Drawing No. 2499-03-01 in Appendix "A".



3.0 ENVIRONMENTAL CHARACTERIZATION OPERATIONS

The sounding program was prepared by Mr. Frédéric Lortie, engineer, who is in charge of environmental projects at L.E.Q. Itée, in collaboration with representatives of the client. To meet the objectives outlined above, the following work was carried out under the supervision of L.E.Q. Itée technical staff:

- Investigating the presence of underground public infrastructures (Vidéotron Itée, Bell Canada, Ville de Québec, Hydro-Québec Distribution, Gaz Métro, etc.) by the Info-Excavation service, Travaux publics de la ville de Québec and PWGSC;
- Drilling four boreholes, identified as F-101 to F-104, on August 20, 2014;
- Installing observation tubes in boreholes F-101 and F-104 to measure groundwater levels. This work was also carried out during the borehole drilling operations;
- Continuous soil sampling at each borehole in accordance with the recommendations set forth by the MDDELCC;
- Measuring water levels in the observation tubes placed in boreholes F-101 and F-104. This work was carried out on August 20 and 25, 2014;
- Applying a quality control program to the sample analysis results, including a field duplicate analyses of at least 10%;



- Delivering the soil samples to the Agat laboratory in Québec City for chemical analysis;
- Surveying and levelling of the borehole locations.

All of the operations listed above were carried out in accordance with the recommendations set forth in the *Guide de caractérisation des terrains* (site characterization guide – in French only) published by the MDDELCC. Location Plan No. 2499-03-01 in Appendix “A” shows the borehole locations and the Photographic Compendium in Appendix “B” provides the context in which these operations were carried out.

After the field work was completed, a chemical analysis of selected soil samples was conducted. Sample selection was based on organoleptic indicators as well as the geological and hydrogeological context of the site under study.

3.1 Boreholes

Boreholes F-101 to F-104 were drilled on August 20, 2014 using a trailer-mounted Diedrich D-50 corer equipped with a hollow auger to a depth of 1.07 to 3.66 metres from the surface. The boreholes were performed in accordance with the objectives of the study and accessibility of the site.

A standardized 50.8-millimetre (outside diameter) split spoon was used to recover soil samples for the purposes of visual description and laboratory analysis. During the sampling operations, standard penetration trials were conducted in accordance with standard NQ 2501-140.



Observation tubes made from bottom-perforated 19-millimetre PVC pipes were inserted in boreholes F-101 and F-104 in order to subsequently measure groundwater levels.

For more information, the stratigraphy of the borehole sites is described in section 4.0 and further detailed in the borehole reports in Appendix “C”.

3.2 Soil sample collection

A strict management procedure in compliance with the *Guide d'échantillonnage à des fins d'analyses environnementales : Cahier 5 - Échantillonnage des sols* (sampling guide for environmental analysis - booklet 5 – soil sampling - in French only) from the MDDELCC was used during sample collection, identification, temporary storage and transportation so as to preserve their integrity until they were delivered to the analysis laboratory that was hired for the purposes of the contract.

Before any soil samples were collected, the instruments were first washed with a brush and soapy water, and then successively rinsed with demineralised water, acetone, hexane, acetone, and demineralised water.

All soil samples were carefully placed in brand new glass jars and sealed with airtight screw-on lids. As the jars were filled, care was taken to minimize contact with the atmosphere so as to avoid the loss of volatile organic components, as applicable.

The samples were clearly identified with the borehole number, sample number and sampling date. Table 1 below provides an explanation of the terms used in identifying the samples.



TABLE I
SAMPLE NOMENCLATURE

Abbreviation	Meaning
F	Borehole
CF	Sample collected using a split spoon
DUP	Duplicate or control sample

Samples were kept in a cooler at a temperature of approximately 4°C, then temporarily stored at a safe location. After the field work was completed, samples were delivered to our laboratory in Québec City where they were kept at a cool temperature ($\pm 4^{\circ}\text{C}$) in a refrigerator. Selected samples were then sent to the analysis laboratory that was hired to conduct the chemical analyses.

3.3 Surveying and levelling

Borehole locations were determined by L.E.Q. Itée technical staff based on a location plan provided by the client. The boreholes were positioned so as to avoid the risk of encountering any underground lines.

X, Y and Z plotting of all sounding locations was conducted using an Ashtech ProMark 200 dual-frequency network RKT rover. The location of each borehole is presented in Location Plan 2499-03-01 in Appendix “A”. It should be noted that the location of test pit PE-9, which was carried out in June 2013, (Reference Report No. 2499-01-01) is also presented in the location plan.



4.0 DESCRIPTION OF SOILS AND GROUNDWATER

Stratigraphy of the soils encountered while drilling boreholes F-101 to F-104 is summarized in Table II below, and further detailed in the borehole reports presented in Appendix “C”. It should be noted that the sounding report for test pit PE-9 from June 2013 (Reference Report No. 2499-01-01) is also presented in Appendix “C”.

TABLE II
SOIL STRATIGRAPHY SUMMARY

Stratigraphy	Boreholes and depth (m)			
	F-101	F-102	F-103	F-104
Asphalt	0.00-0.09	0.00-0.05	0.00-0.05	0.00-0.12
Fill	0.09-0.58	0.05-1.13	0.05-0.69	0.12-0.34
Granular soil generated from alterations of the bedrock*	0.58-0.73	---	0.69-1.25	---
Friable rock	0.73-1.07	1.13-1.83	---	0.34-0.99
Bedrock	1.07	1.83	1.25	0.99
End of the borehole	1.07	3.66	1.25	2.54

* Grain size equivalent to sandy silt; a small amount of gravel.

Fill material composition in all boreholes varied from sand to gravel and contained traces of silt to sandy silt with a small amount of gravel. Small fragments of asphalt, incineration residues and concrete were noted in proportions of <2% to <10% depending on the location.

A visual examination of the bedrock has revealed that it is generally composed of clayey limestone. The RQD rock quality designation index measured along the centerline of the core samples varied from 0% to 81%, which indicates that rock quality varies from very poor to good.



Groundwater observation tubes were placed in boreholes F-101 and F-104. At the time measurements were read on August 20 and 25, 2014, no groundwater was found at the depths reached by the boreholes. It should be noted, however, that groundwater levels may vary significantly with the seasons, amounts of precipitation and alterations of the physical environment such as the addition of trench drains, etc.



5.0 LABORATORY CHEMICAL ANALYSES

5.1 Analysis Laboratory

All chemical analyses conducted as part of this contract were performed by the Agat laboratory in Québec City. This laboratory is recognized and certified by the MDDELCC. The analysis certificate is presented in Appendix “D”. It should be noted that the analysis certificate for the samples collected from test pit PE-9 in June 2013 (Reference Report No. 2499-01-01) is also presented in Appendix “D”.

5.2 Interpretive criteria

In order to provide the client with guidelines regarding off-site management of the excavation waste that will be generated during the project’s execution, the soil sample chemical analysis results were interpreted on the basis of the generic criteria set forth in the MDDELCC’s Policy. For this project, the background levels used for metals are those that apply to the Appalachian geological province.

In addition, given that the sections of the NBC parking lot and the Plains of Abraham are under federal jurisdiction, the soil sample chemical analysis results were also interpreted on the basis of CCME requirements.

For the property under federal jurisdiction, the CCME commercial criterion was considered as the threshold on the basis of which the excavated soils would have to be disposed of at a contaminated soil treatment facility approved by the MDDELCC. For the right-of-way on Avenue Wilfrid-Laurier, which is under provincial jurisdiction, level “C” of the MDDELCC Policy’s generic criteria was considered as the threshold on the basis of which excavated soils would have to



be taken off-site to a contaminated soil treatment facility approved by the MDDELCC.

5.3 Analysis parameters

Analysis parameters were selected on the basis of the analysis results from the *Exhaustive Environmental Characterization of Soils* study conducted by our firm on the Québec City Armoury property in 2013 (Reference No. 2499-01-01, March 2014). Analysis parameters were selected from the following:

- PH C₁₀-C₅₀;
- PAH;
- Metals (As, Ag, Ba, Cd, Co, Cr, Cu, Mn, Mb, Sn, Ni, Pb and Zn);
- Mercury.

Sample selection was guided by the geological and hydrogeological context of the site as well as visual and olfactory observations by the site technician, which were subsequently validated by the L.E.Q. Itée project manager.

5.4 Laboratory chemical analysis methods

The analysis methods, limits of detectability of those methods and a summary of Agat's internal quality control program are presented in Appendix "D".



6.0 CHEMICAL ANALYSIS RESULTS

The following section presents the results of the soil sample analyses as well as the quality control applied to those results. The analysis certificates and tables detailing the chemical analysis results are presented in Appendix “D”.

6.1 Soil chemical analysis results

Table III below indicates the environmental soil classification of the samples collected in boreholes F-101 to F-104 in accordance with MDDELCC and CCME requirements. Chemical analyses were performed on a total of seven soil samples and one duplicate sample.

TABLE III
SUMMARY OF THE CHEMICAL ANALYSIS RESULTS

Sounding	Sample	Depth (m)	Parameter analyzed			
			PH C ₁₀ -C ₅₀	PAH	Metals	Mercury
F-101	1-CF A	0.09 to 0.29	A-B	A-B <CCME	<A <CCME	--
	1-CF B	0.29 to 0.55	--	<A <CCME	<A <CCME	<A <CCME
F-102	1-CF B	0.22 to 0.51	<A	<A <CCME	<A <CCME	<A <CCME
	2-CF	0.52 to 1.13	--	A-B <CCME	B-C ≥CCME	--
F-103	1-CF A	0.05 to 0.24	<A	<A <CCME	<A <CCME	<A <CCME
	1-CF B	0.24 to 0.51	--	B-C <CCME	B-C ≥CCME	--
F-104	1-CF A	0.12 to 0.34	B-C	A-B <CCME	B-C <CCME	--
	1-CF A DUP	0.12 to 0.34	--	--	B-C <CCME	--

< A, A-B, B-C, > C: Generic criteria ranges of the MDDELCC's Policy;
 CCME: CCME commercial criterion;
 --: Parameter not analyzed.

With regard to soil compliance with federal requirements, two samples failed to meet applicable requirements for the site under study. Among the metals analyzed, concentrations of arsenic above the CCME criterion were measured in samples F-102 / 2-CF and F-103/1-CF B.

As for the environmental quality of the soils with regard to provincial requirements, out of all the results of the chemical analyses performed, three samples revealed concentrations in the Policy's "B-C" range and one sample revealed concentrations in the "A-B" range. More specifically, "B-C"-range concentrations of PH C₁₀-C₅₀, PAHs and/or metals were measured in samples



F-102/2-CF, F-103/1-CF B and F-104/1-CF A and “A-B”-level concentrations of PH C₁₀-C₅₀ and PAHs were measured in sample F-101/1-CF A.

Table IV below shows the environmental classification of the soils collected from test pit PE-9 during the 2013 fieldwork operations on the adjacent property (Reference No. 2499-01-01) on the basis of MDDELCC and CCME requirements:

TABLE IV
SUMMARY OF THE CHEMICAL ANALYSIS RESULTS

Sounding	Sample	Depth (m)	Parameter analyzed			
			PH C ₁₀ -C ₅₀	PAH	Metals	Mercury
PE-9	3-VR	0.43 to 1.45	<A	B-C <CCME	>C ≥CCME	--

< A, A-B, B-C, > C: Generic criteria ranges of the MDDELCC’s Policy;
CCME: CCME commercial criterion;
--: Parameter not analyzed.

The analysis results for the sample collected from test pit PE-9 do not meet the applicable requirements for the site under study. Measurements revealed concentrations of metals (more specifically arsenic and nickel) above the CCME commercial criterion. As for provincial requirements, the sample analyzed revealed PAH contamination in the “B-C” range and metal contamination above the “C” level of the MDDELCC Policy.

It should be noted that there are no CCME criteria for PH C₁₀-C₅₀. Detailed tables of chemical analysis results and the analysis certificates are presented in Appendix “D”.



6.2 Quality control assurance program

The Agat analysis laboratory abides by a strict internal quality control protocol so as to ensure compliance of the analysis methods and the credibility of the results. This protocol includes the use of duplicate samples, calibration benches and fortified samples. This information is available on each of the analysis certificates presented in Appendix “D”.

In addition to the quality control procedures used by the analysis laboratory, L.E.Q. Itée also collected one duplicate soil sample, which was sent for analysis to control for the chemical analyses presented. Quality control is carried out by evaluating the difference between the results using the following formula:

$$\text{Diff. (\%)} = \frac{(C1-C2)}{((C1+C2)/2)} \times 100$$

Based on the MDDELCC’s *“Guide des procédures d’assurance et contrôle de la qualité pour les travaux analytiques contractuels en chimie”* (procedural guidelines for quality assurance and control of contractual chemical analyses – in French only) a difference of less than 30% is therefore deemed acceptable.

Table V below presents the results.



TABLE V
RESULT VALIDITY CONTROL BY DUPLICATE ANALYSIS

Sample	Duplicate	Parameter analyzed	Concentrations (ppm)		Difference (%)
			Sample	Duplicate	
F-104/ 1-CF A	F-104/ 1-CF A DUP	Silver	<0.5	<0.5	0
		Arsenic	11	12	9
		Barium	1 070	1 190	11
		Cadmium	<0.9	<0.9	0
		Chromium	<45	<45	0
		Cobalt	<15	<15	0
		Copper	<40	<40	0
		Tin	<5	<5	0
		Manganese	253	256	1
		Molybdenum	<2	<2	0
		Nickel	<30	<30	0
		Lead	40	37	8
		Zinc	<100	<100	0

Based on the acceptability criteria described above, the concentrations measured in the sample and its duplicate are deemed acceptable.



7.0 CONCLUSIONS AND RECOMMENDATIONS

An environmental characterization of soils study was carried out in August 2014 on the properties concerned by the installation of new underground infrastructures between Avenue Wilfrid-Laurier and the Plains of Abraham in Québec City. More specifically, the site under study corresponds to a portion of lots 1 213 692, 1 213 699, 1 315 031 and 1 315 203 of the *Cadastré du Québec*.

The purpose of this study was to determine the level of contamination of the soils on site in order to provide guidelines to PWGSC concerning its off-site management of these materials. The environmental quality of the soils on the site was evaluated in accordance with the MDDELCC Policy and CCME criteria.

Operations consisted of drilling four boreholes identified as F-101 to F-104. Representative soil samples were collected during the borehole drilling operations, after which a chemical analysis was performed on selected samples. It should be noted that the analysis results for samples collected from test pit PE-9 in 2013 (L.E.Q. Itée Reference No. 2499-01-01) were also considered in this study.

With regards to the environmental compliance of the soils with federal requirements, three samples failed to meet the applicable requirements for the site under study. Concentrations of metals above the CCME commercial criterion were measured in samples F-102 / 2-CF, F-103 / 1-CF B and PE-9/3-VR. As for the environmental quality of the soils in terms of provincial requirements, out of all of the chemical analysis results, one sample revealed concentrations above the Policy's "C" level, three samples revealed concentrations in the "B-C" range and one sample revealed concentrations in the "A-B" range. More specifically, concentrations of metals above the "C" level were measured in sample



PE-9 / 3-VR, concentrations of PH C₁₀-C₅₀, PAHs and/or metals in the “B-C” range were measured in samples F-102 / 2-CF, F-103 / 1-CF B and F-104 / 1-CF A, and concentrations of PH C₁₀-C₅₀ and PAHs in the “A-B” range were measured in sample F-101/1-CF A.

In light of these results, an environmental follow-up study of the excavation operations will be required during the project’s execution.

For the properties under federal jurisdiction (NBC parking lot and the Plains of Abraham), the CCME commercial criterion will have to be considered as the threshold on the basis of which excavated soils must be disposed of at a contaminated soil facility approved by the MDDELCC. For the right-of-way located on Avenue Wilfrid-Laurier, level “C” of the MDDELCC Policy’s generic criteria will have to be considered as the threshold on the basis of which excavated soils would have to be taken off-site to a contaminated soil treatment facility approved by the MDDELCC. In addition, all soils contaminated beyond criterion “A” of the MDDELCC Policy must be managed, after excavation, in accordance with the Policy’s *Grille de gestion des sols contaminés excavés intérimaire* (interim contaminated excavated soil management schedule – in French only) as well as the *Regulation respecting contaminated soil storage and contaminated soil transfer stations*. The *Grille de gestion des sols contaminés excavés intérimaire* is presented in Appendix “E” (in French only).

Drawing No. 2499-03-01 in Appendix “A” presents the borehole locations and the chemical analysis results. The levels of contamination, depths of the boreholes and the nature of the contamination are also provided.



Lastly, it is important to specify that given the imprecise location of several underground public utilities in the right-of-way on Avenue Wilfrid-Laurier, and in order to avoid any damage, borehole F-104 had to be positioned at some distance from those utilities. As a result, it is important to point out that potentially contaminated fill materials are likely to be encountered at greater depths in the trench axis of the existing lines. Should such materials be encountered, they would have to be the subject of an environmental characterization study.



8.0 LIMITING CONDITIONS

This report is exclusively intended for the client for whom it was prepared. The information contained herein is provided to the best of our knowledge and in light of the data available to L.E.Q. ltée at the time it was drafted. This report must be considered as a whole and no individual portions may be used separately. Any use of this report by a third party, or any decision made by a third party on the basis of the content of this report, is the responsibility of that third party.

Any sketches or drawings that appear in or are attached to this report, as well as any statements that specify dimensions, capacities, quantities or distances are approximate and are solely provided to help the reader visualize the property.

In addition, it is important to mention that an environmental characterization study consists of spot sampling of a given site. As a result, the environmental, geological, hydrogeological and/or geotechnical conditions between sampling points may differ from the actual conditions revealed by the soundings, which provided the conditions on the basis of which our remarks and information were issued. The sample analysis results are only representative of the specific location and depth of the sampling site, the rest being the result of reasonable extrapolation. In addition, the time factor must be considered, as from moment the soundings are carried out, conditions may change as a result of a spill, natural events or direct or indirect human intervention on or at some distance from the site.



In light of the above, it is important to mention that the contents of this report and its conclusions are only applicable to the period of time that precedes the release date of this report. Any opinions concerning laws and/or regulations are presented herein for technical purposes and must not be interpreted as legal advice.



9.0 QUALIFICATIONS

The work was supervised by Mr. Frédéric Lortie, engineer, who is in charge of environmental projects at L.E.Q. Itée. Mr. Lortie has held a civil engineering degree since graduating in April 2009 and has worked in this field since 2007.

Mr. Lortie hereby certifies that the study was conducted with full impartiality and independence and with no interference on the part of L.E.Q. Itée management or its clients.

In addition, throughout the entire duration of this study, Mr. Lortie was aware of no conflicts of interest with regard to this property.



We remain available to provide any additional information.

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Québec City, November 28, 2014

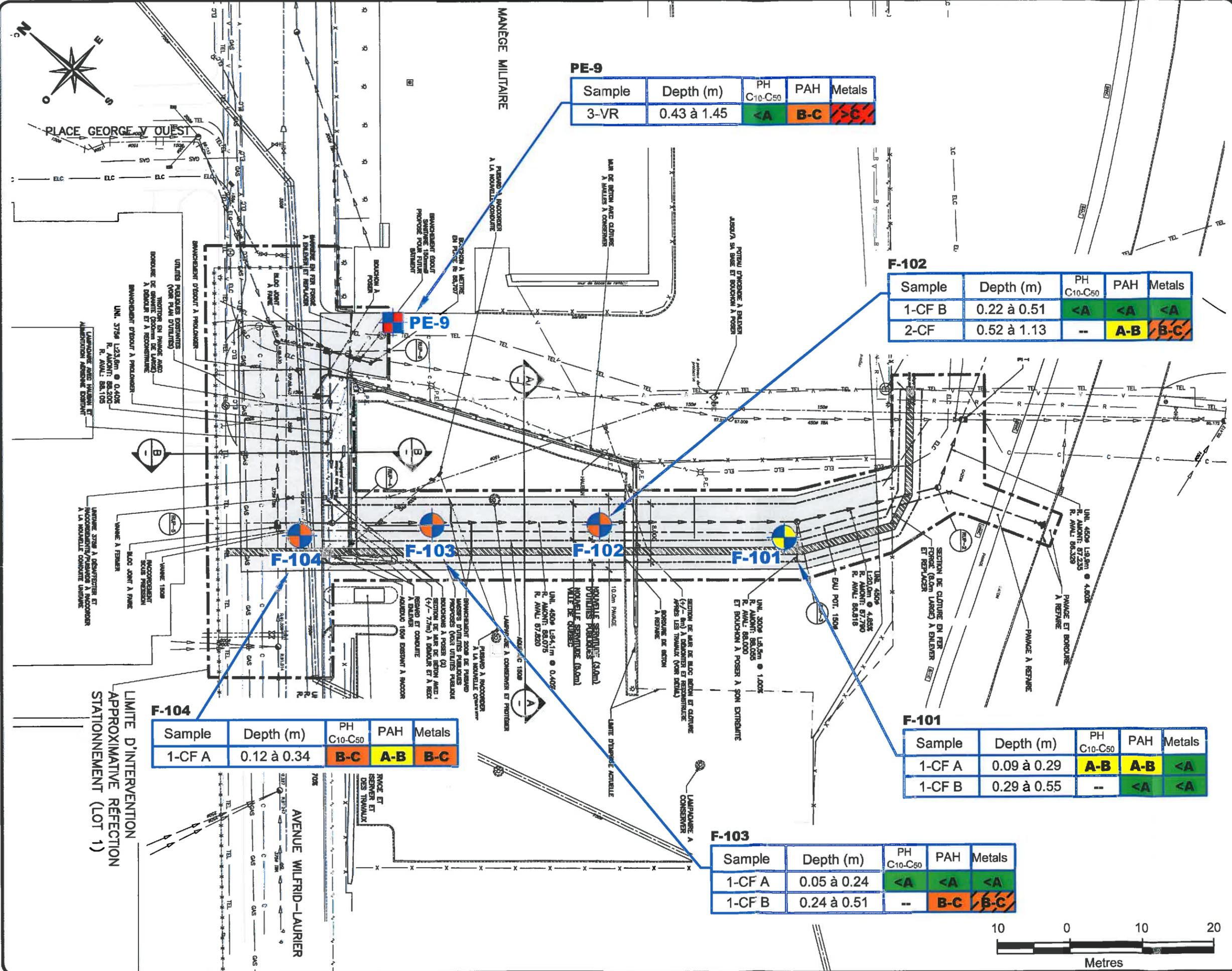
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APPENDIX “A”

Location of Soundings and Distribution of Contamination
Drawing No. 2499-03-01



PE-9

Sample	Depth (m)	PH C10-C50	PAH	Metals
3-VR	0.43 à 1.45	<A	B-C	>C

F-102

Sample	Depth (m)	PH C10-C50	PAH	Metals
1-CF B	0.22 à 0.51	<A	<A	<A
2-CF	0.52 à 1.13	--	A-B	B-C

F-104

Sample	Depth (m)	PH C10-C50	PAH	Metals
1-CF A	0.12 à 0.34	B-C	A-B	B-C

F-101

Sample	Depth (m)	PH C10-C50	PAH	Metals
1-CF A	0.09 à 0.29	A-B	A-B	<A
1-CF B	0.29 à 0.55	--	<A	<A

F-103

Sample	Depth (m)	PH C10-C50	PAH	Metals
1-CF A	0.05 à 0.24	<A	<A	<A
1-CF B	0.24 à 0.51	--	B-C	B-C

Legend:

F-101 Borehole drilled in August 2014

PE-9 Test Pit from June 2013 (L.E.Q. reference Itée No. 2499-01-01)

Plage de contamination

<A	A-B
B-C	>C
≥CCME	

Prepared for:
ARCOP/DFS/STGM Consortium

Prepared by:



LABORATOIRES D'EXPERTISES DE QUÉBEC LTÉE
Géotechnique, environnement et ingénierie des sols et matériaux.

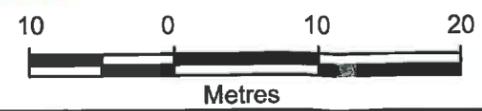
Seal:



Project Title:
Environmental Characterization of Soils
Québec City Armoury
Lot 1 - Relocation of Public Utilities
Québec (Québec)

Drawing Title:
Location of Soundings and
Distribution of Contamination

Drawing: D.S. / F.L.	Scale: 1:500	Project No.: 2499-03
Verified: F.L.	Date: November 2014	Drawing No.: 2499-03-01



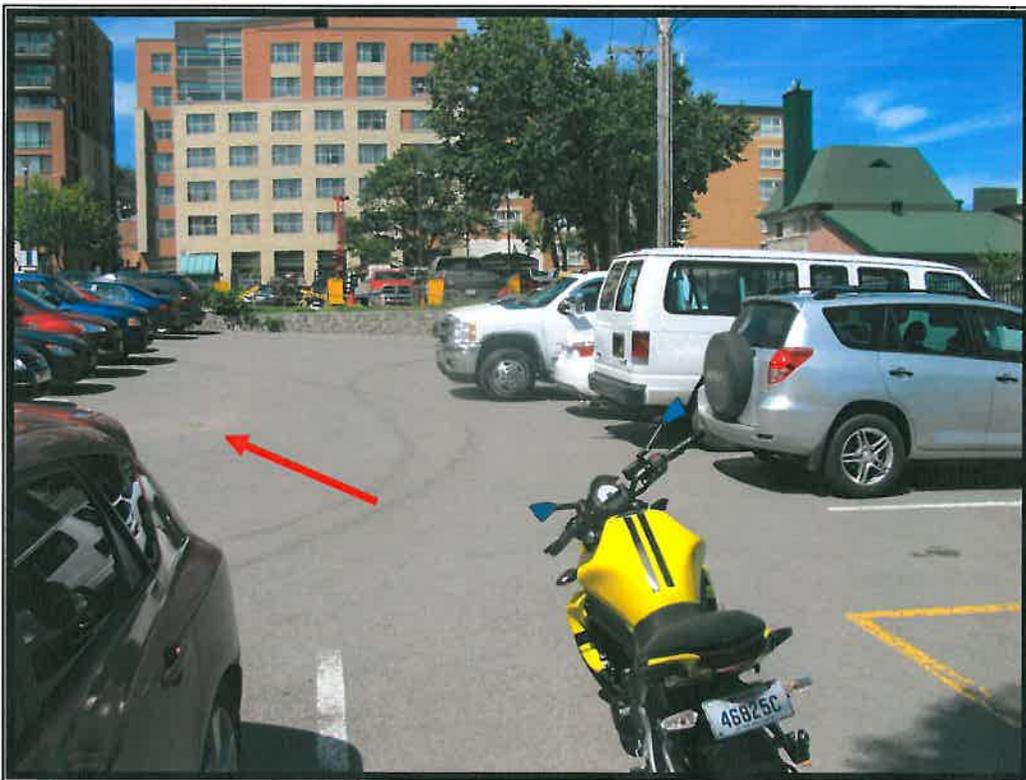
APPENDIX “B”

Photographic Compendium
Pictures Nos. 1 and 2

Photographic Compendium



Picture 1 : Drilling of borehole F-103. The picture was taken facing North. (2014-08-20)



Picture 2 : Location for borehole F-101. The picture was taken facing North-West. (2014-08-20)

APPENDIX “C”

Borehole Reports F-101 à F-104 drilled in August 2014
Test Pit Reports PE-9 excavated in June 2013.



GENERAL

EXPLANATION OF THE BOREHOLE RECORD FORM

FV-1003 (2011-05)

The object of the Borehole Record is to assemble all the field and laboratory data regarding the soil, bedrock and ground water conditions obtained during the investigation at each borehole.

PROFILE

Elevation: This column gives the elevation of boundaries between various geological strata. The elevation refers to the datum given in the general heading.

Description: Each geological stratum is described using the standard classification given below.

The proportion of each constituent part of the soil as defined by the grain size range is denoted by the terms given below. The compactness of granular soils is defined by the Standard Penetration Value and the consistency of cohesive soils by the shear strength.

Classification

Particle sizes

Clay	smaller than 0.002 mm
Silt	0.002 to 0.08 mm
Sand	0.08 to 5.00 mm
Gravel	5.00 to 80 mm
Cobbles	80 to 300 mm
Boulders	larger than 300 mm

Descriptive terms

Proportion

"trace"	1 to 10%
"some"	10 to 20%
Adjective (e.g. gravelly, silty)	20 to 35%
"and" (e.g. sand and gravel)	35 to 50%

Compactness

Standard Penetration Test "N" Value (blows per 0.3 m)

Very loose	0 to 4
Loose	4 to 10
Medium or compact	10 to 30
Dense	30 to 50
Very dense	over 50

Consistency

Shear strength (kPa)

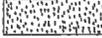
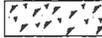
Very soft	less than 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	over 200

Degree of plasticity

Liquid limit

Low	less than 30%
Medium	between 30 and 50%
High	more than 50%

Stratigraphy: In this column the hatching symbols follow the symbols of the United Soil Classification System. The basic soil types are designated by the following symbols:

	Clay		Sand		Cobbles and/or boulders
	Silt		Gravel		Organic soil

GROUND WATER

The depth to ground water level as measured in the borehole is given in this column. The observation dates are given in the graph column at the right.

SAMPLES

Condition: The location, length and condition of each sample is shown in this column. The sample condition is defined by the symbols in the general heading.

Number & type: Each sample of the borehole is designated by the number as shown in this column. The sample type is also shown by a symbol that refers to the legend given in the general heading.

Recovery: Soil sample and rock core recoveries are given in percent of the penetration of the sampler. The sample length is equal to the distance from the top of the sample to the cutting edge irrespective of whether the lower part of the sample is lost.

R.Q.D.: The Rock Quality Designation is obtained by summing up the total length of core recovered but counting only those pieces of core which are 10 cm in length or longer, given in per cent of the core run.

$$R.Q.D. = \frac{\sum li \geq 10 \text{ cm}}{Lcr}$$

TESTS

Laboratory tests and results of *in-situ* tests are shown in this column at their corresponding depths.

Standard Penetration Test Values, commonly designated as "N" values, are given in this column. This value is obtained by dropping a 63.5 kg hammer onto the drill rods from a height of 760 mm. The number of blows necessary to produce the penetration of the last 305 mm of the 51 mm standard split spoon sampler is regarded as the "N" value.

GRAPH

Any pertinent observations noted during drilling and in the laboratory are given in the column. Also shown graphically are the results of Atterberg limits and moisture content tests as well as those of the 51 mm cone dynamic penetration test when performed. This latter penetration test consists in the continuous driving of a 51 mm diameter 60 degrees cone under constant energy, generally 475 joules, and thus differs from the Standard Penetration Test.



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BOREHOLE LOG

Number: 2499-03

Hole #: F-101

Elevation: 91,25 m

Date: 2014-08-20

Project: Environmental Characterisation of Soils - Québec City Armoury Lot 1

Location: NBC Parking Area, Wilfrid-Laurier Avenue, Québec

Equipment used: Diedrich-50 Casing si Auger, NW Hammer weight: 63,5 kg Drop: 760 mm	Sample type CF Split spoon sampler CR Diamond core LA Wash sample TA Auger sample TM Thin-wall sampler PS Fixed piston sampler	Symbols Groundwater level Ach Chemical analysis Ag Grain size analysis (sieving) Sed Grain size analysis (sedimentation) Wc Natural water content Wl Liquid limit Wp Plastic limit	Hydrocarbures Odour No non-existent Li Light Mo Moderate Pe persistent Visual aspect No non-existent Sc scattered Sat Saturated
Sample condition Disturbed Good Lost			

Profile			Str	Ground water	Samples			Tests	Odour	Visual Aspect	Notes						
Depth (m)	Elev (m)	Description			Cond	No et type	Rec (%)										
	91,25																
	91,16	Asphalt. (0.09 m)															
	90,96	Fill made up of gray gravelly sand, trace of silt. (0.29 m)															
0,5	90,67	Fill made up of brownish- gray sand, some gravel and silt. Presence of incineration residue (<2%). (0.58 m)															
	90,52																
1	90,18	Black silty and gravelly sand created by bedrock alteration. (0.73 m)									An open 19 mm diameter tube was left in the borehole to determine groundwater level. <table style="margin-left: auto; margin-right: auto;"> <tr> <td>Date</td> <td>Depth (m)</td> </tr> <tr> <td>2014-08-20</td> <td>Dry</td> </tr> <tr> <td>2014-08-25</td> <td>Dry</td> </tr> </table>	Date	Depth (m)	2014-08-20	Dry	2014-08-25	Dry
Date	Depth (m)																
2014-08-20	Dry																
2014-08-25	Dry																
		Gray friable rock. (1.07 m)															
1,5		Refusal upon reaching bedrock. End of drilling.															



BOREHOLE LOG

Number: 2499-03
Hole #: F-102
Elevation: 92,75 m
Date: 2014-08-20

Project: Environmental Characterisation of Soils - Québec City Armoury Lot 1
Location: NBC Parking Area, Wilfrid-Laurier Avenue, Québec

Equipment used: Diedrich-50	Sample type	Symbols	Hydrocarbures
Casing si Auger, NW	CF Split spoon sampler	Groundwater level	Odour
Hammer weight: 63,5 kg	CR Diamond core	Ach Chemical analysis	No non-existent
Drop: 760 mm	LA Wash sample	Ag Grain size analysis (sieving)	Li Light
	TA Auger sample	Sed Grain size analysis (sedimentation)	Mo Moderate
	TM Thin-wall sampler	Wc Natural water content	Pe persistent
	PS Fixed piston sampler	Wl Liquid limit	Visual aspect
		Wp Plastic limit	No non-existent
			Sc scattered
			Sat Saturated

Profile			Str	Samples			Tests	Odour	visual Aspect	Notes
Depth (m)	Elev (m)	Description		Cond	No et type	Rec (%)				
	92,75									
	92,70	Asphalt.								
	92,53	(0.05 m)								
		Fill made up of gray sand and gravel, some silt.		1-CF	65	N=43, Ach		In	In	
0,5	92,23	(0.22 m)								
		Fill made up of grayish-black silty and gravelly sand.		2-CF	25	N=14, Ach		In	In	
		(0.52 m)								
		Fill made up of grayish-brown silty sand, some gravel. Presence of incineration residue and organic materials (<2%)								
1	91,62	(1.13 m)								
		Gray friable bedrock.		3-CF	70	N=39		In	In	
1,5										
	90,92	(1.83 m)		4-CF	0	50/50mm Refusal		In	In	
2		Bedrock: Clayey limestone. Very poor to good quality.								
				5-CR	100	RQD=51%		In	In	
2,5										
				6-CR	100	RQD=19%		In	In	
3										
				7-CR	95	RQD=81%		In	In	
	89,09	(3.66 m)								
		End of drilling.								



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BOREHOLE LOG

Number: 2499-03

Hole #: F-103

Elevation: 92,77 m

Date: 2014-08-20

Project: Environmental Characterisation of Soils - Québec City Armoury Lot 1

Location: NBC Parking Area, Wilfrid-Laurier Avenue, Québec

Equipment used: Diedrich-50 Casing si Auger, NW Hammer weight: 63,5 kg Drop: 760 mm	Sample type CF Split spoon sampler CR Diamond core LA Wash sample TA Auger sample TM Thin-wall sampler PS Fixed piston sampler	Symbols Groundwater level Ach Chemical analysis Ag Grain size analysis (sieving) Sed Grain size analysis (sedimentation) Wc Natural water content Wl Liquid limit Wp Plastic limit	Hydrocarbures Odour No non-existent Li Light Mo Moderate Pe persistent Visual aspect No non-existent Sc scattered Sat Saturated
Sample condition Disturbed Good Lost			

Profile			Str	Samples		Tests	Odour	visual Aspect	Notes
Depth (m)	Elev (m)	Description		Cond	No et type (%)				
	92,77								
	92,72	Asphalt. (0.05 m)							
	92,53	Fill made up of brown gravelly sand, some silt. Presence of incineration residue, bricks, glass, and mortar (5%). (0.24 m)		1-CF	72 N=14, Ach		In	In	
0,5	92,08	Fill made up of black sandy silt, some gravel. Presence of incineration residue and pieces of bricks and mortar (2%). (0.69 m)		2-CF	54 N=18		In	In	
1	91,52	Black silty and gravelly sand created by bedrock alteration. (1.25 m)		3-CF	67 50/30mm Refusal		In	In	
1,5		Refusal on probable bedrock. End of drilling.							



BOREHOLE LOG

Number: 2499-03

Hole #: F-104

Elevation: 92,36 m

Date: 2014-08-20

Project: Environmental Characterisation of Soils - Québec City Armoury Lot 1

Location: Wilfrid-Laurier Avenue, Québec

Equipment used: Diedrich-50
Casing si Auger, NW
Hammer weight: 63,5 kg
Drop: 760 mm

Sample type
CF Split spoon sampler
CR Diamond core
LA Wash sample
TA Auger sample
TM Thin-wall sampler
PS Fixed piston sampler

Symbols
▽ Groundwater level
Ach Chemical analysis
Ag Grain size analysis (sieving)
Sed Grain size analysis (sedimentation)
Wc Natural water content
Wl Liquid limit
Wp Plastic limit

Hydrocarbures
Odour
No non-existent
Li Light
Mo Moderate
Pe persistent
Visual aspect
No non-existent
Sc scattered
Sat Saturated

Sample condition

Disturbed  Good  Lost 

Profile

Depth (m)	Elev (m)	Description	Str	Ground water	Samples			Tests	Odour	Visual Aspect	Notes
					Cond	No et type	Rec (%)				
	92,36										
	92,24	Asphalt. (0.12 m)									
0,5	92,02	Fill made up of gray sand, some gravel and some silt. Presence of incineration residue, and pieces of asphalt and concrete (<10%). (0.34 m)				1-CF	56	N=53, Ach, Dup	In	In	
	91,37	Gray friable bedrock. (0.99 m)				2-CF	48	N=58/250mm Refus	In	In	
1		Bedrock: Clayey limestone. Very poor to good quality.				3-CR	98	RQD=0%	In	In	An open 19 mm diameter tube was left in the borehole to determine groundwater level. Date Depth (m) 2014-08-20 Dry 2014-08-25 Dry
1,5						4-CR	100	RQD=45%	In	In	
2						5-CR	100	RQD=74%	In	In	
2,5	89,82	(2.54 m) End of drilling.									
3											



TEST PIT REPORT

Number: 2499-00
Hole #: PE-9
Elevation:
Total depth: 1,45 m
Date: 2013-06-06

Project: ENVIRONMENTAL CHARACTERIZATION OF SOILS PH.III
Location: QUÉBEC CITY ARMOURY

Equipment used:

Volume du godet :

Technician: A.T.

Duration of excavation:

Easy: Average: Difficult:

Depth (m)	Samples			Description	Str	Cobbles and boulders (% and diameter)	End of pit:
	loc.	no.	Tests				
0		1-VR	ACH DUP	Asphalt. (0,08m)		Cobbles (5%, 110mm) Boulders (2%, 400mm)	
		2-VR		Fill: Gray gravel and sand, trace of silt. (0,23m)			
				Fill: Brown sand, trace of silt and gravel. (0,43m)			
1		3-VR		Fill: Brownish-black gravelly silt. Presence of rock fragments. Presence of incineration residue (1%) and brick (2%), and glass (<2%) debris. (1,45m)			
				End of the test pit. (1,45m)			
2							
3							

Symbols

- Groundwater level
- TA : Taken with auger
- VR : Manually taken
- Ag : Grain size analysis (sieving)
- Sed : Grain size analysis (se)
- ACH : Chemical analysis
- Wc : Water content
- Ll : Liquid limit
- Pl : Plastic limit

Groundwater: Non observed

Depth: m

Water infiltration: None

Pit dimension: 2,9 X 3,4

Wall:

Depth: m

Comments:

Already excavated.

APPENDIX “D”

Detailed Chemical Analysis Results
Chemical Analysis Certificates for Boreholes F-101 to F-104
Chemical Analysis Certificates for Test Pit PE-9

TABLE A-1 : SOIL CHEMICAL ANALYSIS RESULTS

ANALYSIS PARAMETER	MDELCC			CCME									
	GENERIC CRITERIA (mg/kg, ppm)			CRITERIA (mg/kg, ppm)		F-101		F-102		F-103		F-104	
Sounding : Sample : Depth (m) : Date of Sampling :	A ⁽¹⁾	B	C	RESIDENTIAL / PARKS	COMMERCIAL	1-CF A 0.09 to 0.29 2014-08-20	1-CF B 0.29 to 0.55 2014-08-20	1-CF B 0.22 to 0.51 2014-08-20	2-CF 0.52 to 1.13 2014-08-20	1-CF A 0.05 to 0.24 2014-08-20	1-CF B 0.24 to 0.51 2014-08-20	1-CF A 0.12 to 0.34 2014-08-20	1-CF A DUP 0.12 to 0.34 2014-08-20
METALS													
Silver	0.8	20	40	20	40	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Arsenic	15	30	50	12	12	<5	<5	<5	<u>27*</u>	<5	<u>26*</u>	11	12
Baryum	265	500	2000	500	2000	77	91	53	1290	110	1320	1070	1190
Cadmium	1.3	5	20	10	22	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9	<0.9
Chrome	75	250	800	64	87	<45	<45	<45	<45	<45	<45	<45	<45
Cobalt	20	50	300	50	300	<15	<15	<15	<15	<15	<15	<15	<15
Copper	50	100	500	63	91	<40	<40	<40	<40	<40	<40	<40	<40
Tin	5	50	300	50	300	<5	<5	<5	<5	<5	<u>6</u>	<5	<5
Manganese	1000	1000	2200	11000	NA	218	166	180	298	397	445	253	256
Mercury	0.2	10	40	6.6	24	--	<2	<2	--	<2	--	--	--
Molybdenum	2	10	40	10	40	<2	<2	<2	<u>5</u>	<2	<2	<2	<2
Nickle	55	100	500	50	50	<30	<30	<30	<30	<30	33	<30	<30
Lead	40	500	1 000	140	260	<30	<30	<30	<u>60</u>	<30	<u>59</u>	<u>40</u>	37
Zinc	130	500	1 500	200	360	<100	<100	<100	<100	<100	<100	<100	<100
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)													
Acenaphthene	0.1	10	100	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>0.1</u>	<0.1	--
Acenaphthylene	0.1	10	100	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>0.3</u>	<0.1	--
Anthracene	0.1	10	100	2.5	32	<0.1	<0.1	<0.1	<u>0.1</u>	<0.1	<u>0.8</u>	<0.1	--
Benzo(a)pyrene	0.1	1	10	1	10	<0.1	<0.1	<0.1	<u>0.2</u>	<0.1	<u>2.9</u>	<0.1	--
Benzo(e)pyrene	0.1	1	10	20	72	<0.1	<0.1	<0.1	<u>0.2</u>	<0.1	<u>4.0</u>	<u>0.1</u>	--
Benzo(b+j+k)fluoranthene	0.1	1	10	1	10	<0.1	<0.1	<0.1	<u>0.4</u>	<0.1	<u>6.0</u>	<0.1	--
Benzo(c)phenanthrene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>0.4</u>	<0.1	--
Benzo(g,h,i)perylene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<u>0.2</u>	<0.1	<u>3.1</u>	<u>0.1</u>	--
Chrysene	0.1	1	10	--	--	<u>0.1</u>	<0.1	<0.1	<u>0.3</u>	<0.1	<u>3.1</u>	<u>0.2</u>	--
Dibenzo(a,h)anthracene	0.1	1	10	1	10	<0.1	<0.1	<0.1	<0.1	<0.1	<u>1.0</u>	<0.1	--
Dibenzo(a,i)pyrene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>1.2</u>	<0.1	--
Dibenzo(a,h)pyrene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>0.3</u>	<0.1	--
Dibenzo(a,l)pyrene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>0.2</u>	<0.1	--
7,12-Dimethylbenzo(a)anthracene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Fluoranthene	0.1	10	100	50	180	<0.1	<0.1	<0.1	<u>0.8</u>	<0.1	<u>5.4</u>	<u>0.2</u>	--
Fluorene	0.1	10	100	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<u>0.2</u>	<0.1	--
Indeno(1,2,3-cd)pyrene	0.1	1	10	1	10	<0.1	<0.1	<0.1	<u>0.1</u>	<0.1	<u>2.9</u>	<0.1	--
3-Methylcholanthrene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Naphtalene	0.1	5	50	0.6	22	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
Phenanthrene	0.1	5	50	5	50	<0.1	<0.1	<0.1	<u>0.6</u>	<0.1	<u>2.8</u>	<u>0.1</u>	--
Pyrene	0.1	10	100	10	100	<0.1	<0.1	<0.1	<u>0.6</u>	<0.1	<u>4.5</u>	<u>0.2</u>	--
1-Methylnaphtalene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
2-Methylnaphtalene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
1,3-Dimethylnaphtalene	0.1	1	10	--	--	<u>0.2</u>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
2,3,5-Trimethylnaphtalene	0.1	1	10	--	--	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	--
INTEGRATING PARAMETERS													
Petroleum hydrocarbons C10-C50	300	700	3 500	--	--	327	--	179	--	<100	--	826	--

*: Concentration exceeds the CCME's commercial criteria;

and Underlined : Concentration lies within the "A-B" criteria of the "Policy";

700 Concentration lies within the "B-C" criteria of the "Policy";

3 500 Concentration exceeds criteria "C" of the "Policy".

(1): The basic contents used for the metals were those applicable to the Appalachian Geological Province.

TABLE A-2 : SOIL CHEMICAL ANALYSIS RESULTS

ANALYSIS PARAMETER	MDELCC			CCME		PE-9 3-VR 0.43 to 1.45 2013-06-06	PE-9 3-VR DUP 0.43 to 1.45 2013-06-06			
	GENERIC CRITERIA (mg/kg ppm)			CRITERIA (mg/kg ppm)						
Sounding Sample Depth (m) Date of Sampling	A ⁽¹⁾	B	C	RESIDENTIAL / PARK	COMMERCIAL					
MÉTAUX										
Silver	0.8	20	40	20	40	<0.5	--			
Arsenic	15	30	50	12	12	58*	--			
Barium	265	500	2000	500	2000	1300	--			
Cadmium	1.3	5	20	10	22	<0.9	--			
Cobalt	20	50	300	50	300	<15	--			
Chrome	75	250	800	64	87	<45	--			
Copper	50	100	500	63	91	42	--			
Tin	5	50	300	50	300	7	--			
Manganese	1000	1000	2200	11000	NA	386	--			
Mercury	0.2	10	40	6.6	24	--	--			
Molybdenum	2	10	40	10	40	6	--			
Nickel	55	100	500	50	50	59*	--			
Lead	40	500	1 000	140	260	48	--			
Selenium	3	3	10	1	2.9	1.4	--			
Zinc	130	500	1 500	200	360	134	--			
OTHER INORGANIC COMPOUNDS										
Total Sulfur	400	1000	2000	--	--	--	--			
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)										
Acenaphthene	0.1	10	100	--	--	0.2	--			
Acenaphthylene	0.1	10	100	--	--	<0.1	--			
Anthracene	0.1	10	100	2.5	32	0.5	--			
Benzo(a)pyrene	0.1	1	10	1	10	1.6	--			
Benzo(e)pyrene	0.1	1	10	20	72	1.4	--			
Benzo(b+j+k)fluoranthene	0.1	1	10	1	10	2.1	--			
Benzo(c)phenanthrene	0.1	1	10	--	--	0.2	--			
Benzo(g,h,i)perylene	0.1	1	10	--	--	0.8	--			
Chrysene	0.1	1	10	--	--	1.5	--			
Dibenzo(a,h)anthracene	0.1	1	10	1	10	0.2	--			
Dibenzo(a,i)pyrene	0.1	1	10	--	--	0.5	--			
Dibenzo(a,h)pyrene	0.1	1	10	--	--	<0.1	--			
Dibenzo(a,l)pyrene	0.1	1	10	--	--	<0.1	--			
7,12-Dimethylbenzo(a)anthracene	0.1	1	10	--	--	<0.1	--			
Fluoranthene	0.1	10	100	50	180	3.1	--			
Fluorene	0.1	10	100	--	--	0.2	--			
Indeno(1,2,3-cd)pyrene	0.1	1	10	1	10	0.8	--			
3-Methylcholanthrene	0.1	1	10	--	--	<0.1	--			
Naphthalene	0.1	5	50	0.6	22	0.1	--			
Phenanthrene	0.1	5	50	5	50	1.7	--			
Pyrene	0.1	10	100	10	100	2.4	--			
1-Methylnaphtalene	0.1	1	10	--	--	0.2	--			
2-Methylnaphtalene	0.1	1	10	--	--	0.2	--			
1,3-Dimethylnaphtalene	0.1	1	10	--	--	0.2	--			
2,3,5-Trimethylnaphtalene	0.1	1	10	--	--	<0.1	--			
INTEGRATING PARAMETERS										
Petroleum hydrocarbons C10-C50	300	700	3 500	--	--	136	233			

*: Concentration exceeds the CCME's commercial criteria;

and Underlined : Concentration lies within the "A-B" criteria of the "Policy";

700 Concentration lies within the "B-C" criteria of the "Policy";

3 500 Concentration exceeds criteria "C" of the "Policy".

(1): The basic contents used for the metals were those applicable to the Appalachian Geological Province.

**CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
2320, RUE DE CELLES
QUEBEC, QC G2C1X8
(418) 845-0858**

ATTENTION TO: Frederic Lortie

PROJECT: 2499-03

AGAT WORK ORDER: 14Q878848

SOIL ANALYSIS REVIEWED BY: Christian Robert, Chimiste

TRACE ORGANICS REVIEWED BY: Catherine Angers-Grenier, Chimiste

DATE REPORTED: 2014-08-25

VERSION*: 3

PAGES (INCLUDING COVER): 12

Should you require any information regarding this analysis please contact your client services representative at (418) 266-5511

***NOTES**

VERSION 3: English version.

F-101 à F-104

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: 14Q878848
PROJECT: 2499-03

350, rue Franquet
Québec, Québec
CANADA G1P 4P3
TEL (418)268-5511
FAX (418)653-2335
<http://www.agatlabs.com>

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
SAMPLED BY: F.P.

ATTENTION TO: Frederic Lortie
SAMPLING SITE: Manège CCBN

Metals (Soil)											
DATE RECEIVED: 2014-08-21						DATE REPORTED: 2014-08-25					
Parameter	Unit	SAMPLE DESCRIPTION: F-101 1CF A					SAMPLE DESCRIPTION: F-101 1CF B				
		G / S: A	G / S: B	G / S: C	G / S: D	RDL	F-101 1CF A	F-101 1CF B	F-102 1CF B	F-102 2CF	F-103 1CF A
		SAMPLE TYPE: Soil					SAMPLE TYPE: Soil				
		DATE SAMPLED: 2014-08-20					DATE SAMPLED: 2014-08-20				
		5718710					5718740				
		5718741					5718742				
		5718743					5718743				
Silver	mg/kg	0.8	20	40	200	0.5	<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]
Arsenic	mg/kg	15	30	50	250	5	<5[<A]	<5[<A]	<5[<A]	27[A-B]	<5[<A]
Barium	mg/kg	265	500	2000	10000	20	77[<A]	91[<A]	53[<A]	1290[B-C]	110[<A]
Cadmium	mg/kg	1.3	5	20	100	0.9	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]
Chromium	mg/kg	75	250	800	4000	45	<45[<A]	<45[<A]	<45[<A]	<45[<A]	<45[<A]
Cobalt	mg/kg	20	50	300	1500	15	<15[<A]	<15[<A]	<15[<A]	<15[<A]	<15[<A]
Copper	mg/kg	50	100	500	2500	40	<40[<A]	<40[<A]	<40[<A]	<40[<A]	<40[<A]
Tin	mg/kg	5	50	300	1500	5	<5[<A]	<5[<A]	<5[<A]	<5[<A]	<5[<A]
Manganese	mg/kg	1000	1000	2200	11000	10	218[<A]	166[<A]	180[<A]	298[<A]	397[<A]
Mercury	mg/kg	0.2	2	10	50	0.2	<0.2[<A]	<0.2[<A]	<0.2[<A]	<0.2[<A]	<0.2[<A]
Molybdenum	mg/kg	2	10	40	200	2	<2[<A]	<2[<A]	<2[<A]	5[A-B]	<2[<A]
Nickel	mg/kg	55	100	500	2500	30	<30[<A]	<30[<A]	<30[<A]	<30[<A]	<30[<A]
Lead	mg/kg	40	500	1000	5000	30	<30[<A]	<30[<A]	<30[<A]	60[A-B]	<30[<A]
Zinc	mg/kg	130	500	1500	7500	100	<100[<A]	<100[<A]	<100[<A]	<100[<A]	<100[<A]

Certified By:

Christian Robert

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Certificate of Analysis

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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:F.P.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège CCBN

Metals (Soil)									
DATE RECEIVED: 2014-08-21					DATE REPORTED: 2014-08-25				
Parameter	Unit	SAMPLE DESCRIPTION:				F-104 1CF A			
		G / S: A	G / S: B	G / S: C	G / S: D	RDL	F-103 1CF B	F-104 1CF A	DUP
		SAMPLE TYPE: Soil				Soil			
		DATE SAMPLED: 2014-08-20				2014-08-20			
						5718744 5718745 5718746			
Silver	mg/kg	0.8	20	40	200	0.5	<0.5[<A]	<0.5[<A]	<0.5[<A]
Arsenic	mg/kg	15	30	50	250	5	26[A-B]	11[<A]	12[<A]
Barium	mg/kg	265	500	2000	10000	20	1920[B-C]	1070[B-C]	1190[B-C]
Cadmium	mg/kg	1.3	5	20	100	0.9	<0.9[<A]	<0.9[<A]	<0.9[<A]
Chromium	mg/kg	75	250	800	4000	45	<45[<A]	<45[<A]	<45[<A]
Cobalt	mg/kg	20	50	300	1500	15	<15[<A]	<15[<A]	<15[<A]
Copper	mg/kg	50	100	500	2500	40	<40[<A]	<40[<A]	<40[<A]
Tin	mg/kg	5	50	300	1500	5	6[A-B]	<5[<A]	<5[<A]
Manganese	mg/kg	1000	1000	2200	11000	10	445[<A]	253[<A]	256[<A]
Molybdenum	mg/kg	2	10	40	200	2	<2[<A]	<2[<A]	<2[<A]
Nickel	mg/kg	55	100	500	2500	30	33[<A]	<30[<A]	<30[<A]
Lead	mg/kg	40	500	1000	5000	30	59[A-B]	40[A]	37[<A]
Zinc	mg/kg	130	500	1500	7500	100	<100[<A]	<100[<A]	<100[<A]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC-PTC A Appalaches, B Refers to QC-PTC (B), C Refers to QC-PTC (C), D Refers to QC RESC (Annex 1)

Certified By:

Christian Robert



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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:F.P.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège CCBN

PAHs (Soil)												
DATE RECEIVED: 2014-08-21							DATE REPORTED: 2014-08-25					
Parameter	Unit	SAMPLE DESCRIPTION:					RDL	SAMPLE TYPE:				
		G / S : A	G / S : B	G / S : C	G / S : D	F-101 1CF A		F-101 1CF B	F-102 1CF B	F-102 2CF	F-103 1CF A	
DATE SAMPLED:							Soil					
2014-08-20							2014-08-20					
5718710							5718740					
5718741							5718742					
5718743												
Acenaphthene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Acenaphthylene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Anthracene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.1[A]	<0.1[<A]	
Benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.2[A-B]	<0.1[<A]	
Benzo(a)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.2[A-B]	<0.1[<A]	
Benzo(e)pyrene	mg/kg					0.1	<0.1	<0.1	<0.1	0.2	<0.1	
Benzo (b+j+k) fluoranthene	mg/kg	0.1	1	10	136	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.4[A-B]	<0.1[<A]	
Benzo(c)phenanthrene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Benzo(g,h,i)perylene	mg/kg	0.1	1	10	18	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.2[A-B]	<0.1[<A]	
Chrysene	mg/kg	0.1	1	10	34	0.1	0.1[A]	<0.1[<A]	<0.1[<A]	0.3[A-B]	<0.1[<A]	
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	82	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dimethyl-7,12 benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Fluoranthene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.8[A-B]	<0.1[<A]	
Fluorene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.1[A]	<0.1[<A]	
Methyl-3 cholanthrene	mg/kg	0.1	1	10	150	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Naphthalene	mg/kg	0.1	5	50	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Phenanthrene	mg/kg	0.1	5	50	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.6[A-B]	<0.1[<A]	
Pyrene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.6[A-B]	<0.1[<A]	
Methyl-1 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Methyl-2 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dimethyl-1,3 naphthalene	mg/kg	0.1	1	10	56	0.1	0.2[A-B]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Trimethyl-2,3,5 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	

Certified By:

Catherine Angers Theriault



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Certificate of Analysis

AGAT WORK ORDER: 14Q878848
PROJECT: 2499-03

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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
SAMPLED BY:F.P.

ATTENTION TO: Frederic Lortie
SAMPLING SITE:Manège CCBN

PAHs (Soil)										
DATE RECEIVED: 2014-08-21				DATE REPORTED: 2014-08-25						
Surrogate	Unit	Acceptable Limits	SAMPLE DESCRIPTION:		F-101 1CF A		F-101 1CF B		F-102 1CF B	
			SAMPLE TYPE:	DATE SAMPLED:	Soil	Soil	Soil	Soil	Soil	Soil
					2014-08-20	2014-08-20	2014-08-20	2014-08-20	2014-08-20	2014-08-20
					5718710	5718740	5718741	5718742	5718743	5718743
Acenaphthene-d10	%	40-140			102	96	107	109	104	
Benzo(a)anthracene-d12	%	40-140			103	98	105	112	105	
Pyrene-d10	%	40-140			105	100	108	111	106	

Certified By:

Catherine Suzanne Desrosiers



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SAMPLED BY:F.P.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège CCBN

PAHs (Soil)								
DATE RECEIVED: 2014-08-21					DATE REPORTED: 2014-08-25			
Parameter	Unit	G / S: A	G / S: B	G / S: C	G / S: D	RDL	SAMPLE DESCRIPTION: F-103 1CF B	F-104 1CF A
							Soil	Soil
							DATE SAMPLED: 2014-08-20	2014-08-20
							5718744	5718745
Acenaphthene	mg/kg	0.1	10	100	100	0.1	0.1[A]	<0.1[<A]
Acenaphthylene	mg/kg	0.1	10	100	100	0.1	0.3[A-B]	<0.1[<A]
Anthracene	mg/kg	0.1	10	100	100	0.1	0.8[A-B]	<0.1[<A]
Benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	2.9[B-C]	<0.1[<A]
Benzo(a)pyrene	mg/kg	0.1	1	10	34	0.1	4.0[B-C]	0.1[A]
Benzo(e)pyrene	mg/kg					0.1	2.2	0.1
Benzo (b+j+k) fluoranthene	mg/kg	0.1	1	10	136	0.1	6.0[B-C]	<0.1[<A]
Benzo(c)phenanthrene	mg/kg	0.1	1	10	56	0.1	0.4[A-B]	<0.1[<A]
Benzo(g,h,i)perylene	mg/kg	0.1	1	10	18	0.1	3.1[B-C]	0.1[A]
Chrysene	mg/kg	0.1	1	10	34	0.1	3.1[B-C]	0.2[A-B]
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	82	0.1	1.0[B]	<0.1[<A]
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	34	0.1	1.2[B-C]	<0.1[<A]
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	34	0.1	0.3[A-B]	<0.1[<A]
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	34	0.1	0.2[A-B]	<0.1[<A]
Dimethyl-7,12 benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]
Fluoranthene	mg/kg	0.1	10	100	100	0.1	5.4[A-B]	0.2[A-B]
Fluorene	mg/kg	0.1	10	100	100	0.1	0.2[A-B]	<0.1[<A]
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	34	0.1	2.9[B-C]	<0.1[<A]
Methyl-3 cholanthrene	mg/kg	0.1	1	10	150	0.1	<0.1[<A]	<0.1[<A]
Naphthalene	mg/kg	0.1	5	50	56	0.1	<0.1[<A]	<0.1[<A]
Phenanthrene	mg/kg	0.1	5	50	56	0.1	2.8[A-B]	0.1[A]
Pyrene	mg/kg	0.1	10	100	100	0.1	4.5[A-B]	0.2[A-B]
Methyl-1 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]
Methyl-2 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]
Dimethyl-1,3 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]
Trimethyl-2,3,5 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]

Catherine Angers Theriault 

Certified By:

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SAMPLED BY:F.P.

ATTENTION TO: Frederic Lortie
SAMPLING SITE:Manège CCBN

PAHs (Soil)				
DATE RECEIVED: 2014-08-21			DATE REPORTED: 2014-08-25	
Surrogate	Unit	Acceptable Limits	SAMPLE DESCRIPTION: F-103 1CF B SAMPLE TYPE: Soil DATE SAMPLED: 2014-08-20 5718744	F-104 1CF A Soil 2014-08-20 5718745
Acenaphthene-d10	%	40-140	105	97
Benzo(a)anthracene-d12	%	40-140	125	107
Pyrene-d10	%	40-140	111	100

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC PTC (Criteria A), B Refers to QC PTC (Criteria B), C Refers to QC PTC (Criteria C), D Refers to QC RESC (Annex 1)

Certified By:

Catherine Angers-Therrien



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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:F.P.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège CCBN

Petroleum Hydrocarbons C10-C50 (Soil)											
DATE RECEIVED: 2014-08-21						DATE REPORTED: 2014-08-25					
		SAMPLE DESCRIPTION: F-101 1CF A				F-102 1CF B		F-103 1CF A		F-104 1CF A	
		SAMPLE TYPE: Soil				Soil		Soil		Soil	
		DATE SAMPLED: 2014-08-20				2014-08-20		2014-08-20		2014-08-20	
Parameter	Unit	G / S: A	G / S: B	G / S: C	G / S: D	RDL	5718710	5718741	5718743	5718745	
Petroleum Hydrocarbons C10-C50	mg/kg	300	700	3500	10000	100	327[A-B]	179[<A]	<100[<A]	826[B-C]	
Surrogate	Unit	Acceptable Limits									
Nonane	%			40-140			132	132	130	133	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC PTC (Criteria A), B Refers to QC PTC (Criteria B), C Refers to QC PTC (Criteria C), D Refers to QC RESC (Annex 1)

Certified By:

Catherine Angers-Therrien



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Quality Assurance

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
 PROJECT: 2499-03
 SAMPLED BY: F.P.

AGAT WORK ORDER: 14Q878848
 ATTENTION TO: Frederic Lortie
 SAMPLING SITE: Manège CCBN

Soil Analysis															
RPT Date: 2014-08-25			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK			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
Metals (Soil)															
Silver	5718741	5718741	< 0.5	< 0.5	0.0%	< 0.5	104%	80%	120%	107%	80%	120%	108%	70%	130%
Arsenic	5718741	5718741	< 5	< 5	0.0%	< 5	89%	80%	120%	100%	80%	120%	106%	70%	130%
Barium	5718741	5718741	53	56	5.5%	< 20	86%	80%	120%	100%	80%	120%	104%	70%	130%
Cadmium	5718741	5718741	< 0.9	< 0.9	0.0%	< 0.9	88%	80%	120%	96%	80%	120%	101%	70%	130%
Chromium	5718741	5718741	< 45	< 45	0.0%	< 45	NA	80%	120%	98%	80%	120%	101%	70%	130%
Cobalt	5718741	5718741	< 15	< 15	0.0%	< 15	88%	80%	120%	100%	80%	120%	104%	70%	130%
Copper	5718741	5718741	< 40	< 40	0.0%	< 40	80%	80%	120%	94%	80%	120%	95%	70%	130%
Tin	5718741	5718741	< 5	< 5	0.0%	< 5	NA	80%	120%	112%	80%	120%	116%	70%	130%
Manganese	5718741	5718741	180	179	0.6%	< 10	87%	80%	120%	96%	80%	120%	112%	70%	130%
Molybdenum	5718741	5718741	< 2	< 2	0.0%	< 2	88%	80%	120%	103%	80%	120%	106%	70%	130%
Nickel	5718741	5718741	< 30	< 30	0.0%	< 30	82%	80%	120%	95%	80%	120%	95%	70%	130%
Lead	5718741	5718741	< 30	< 30	0.0%	< 30	92%	80%	120%	106%	80%	120%	102%	70%	130%
Zinc	5718741	5718741	< 100	< 100	0.0%	< 100	81%	80%	120%	93%	80%	120%	96%	70%	130%
Metals (Soil)															
Mercury	5725888		< 0.2	< 0.2	0.0%	< 0.2	104%	80%	120%	NA	80%	120%	126%	70%	130%

Certified By:

Christian Robert



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Quality Assurance

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

AGAT WORK ORDER: 14Q878848

PROJECT: 2499-03

ATTENTION TO: Frederic Lortie

SAMPLED BY: F.P.

SAMPLING SITE: Manège CCBN

Trace Organics Analysis

RPT Date: 2014-08-25

PARAMETER	Batch	Sample Id	DUPLICATE			REFERENCE MATERIAL				METHOD BLANK			MATRIX SPIKE		
			Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons C10-C50 (Soil)															
Petroleum Hydrocarbons C10-C50	1	NA	NA	NA	0.0%	< 100	97%	70%	130%	NA	100%	100%	NA	60%	140%
Nonane	1	NA	NA	NA	0.0%	83	86%	40%	140%	NA	100%	100%	NA	40%	140%
PAHs (Soil)															
Acenaphthene	1	NA	NA	NA	0.0%	< 0.1	110%	70%	130%	NA	100%	100%	NA	60%	140%
Acenaphthylene	1	NA	NA	NA	0.0%	< 0.1	111%	70%	130%	NA	100%	100%	NA	60%	140%
Anthracene	1	NA	NA	NA	0.0%	< 0.1	114%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(a)anthracene	1	NA	NA	NA	0.0%	< 0.1	99%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(a)pyrene	1	NA	NA	NA	0.0%	< 0.1	107%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(e)pyrene	1	NA	NA	NA	0.0%	< 0.1	97%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(c)phenanthrene	1	NA	NA	NA	0.0%	< 0.1	105%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(g,h,i)perylene	1	NA	NA	NA	0.0%	< 0.1	102%	70%	130%	NA	100%	100%	NA	60%	140%
Chrysene	1	NA	NA	NA	0.0%	< 0.1	105%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,h)anthracene	1	NA	NA	NA	0.0%	< 0.1	82%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,i)pyrene	1	NA	NA	NA	0.0%	< 0.1	94%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,h)pyrene	1	NA	NA	NA	0.0%	< 0.1	84%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,l)pyrene	1	NA	NA	NA	0.0%	< 0.1	91%	70%	130%	NA	100%	100%	NA	60%	140%
Dimethyl-7,12 benzo(a)anthracene	1	NA	NA	NA	0.0%	< 0.1	112%	70%	130%	NA	100%	100%	NA	60%	140%
Fluoranthene	1	NA	NA	NA	0.0%	< 0.1	112%	70%	130%	NA	100%	100%	NA	60%	140%
Fluorene	1	NA	NA	NA	0.0%	< 0.1	109%	70%	130%	NA	100%	100%	NA	60%	140%
Indeno(1,2,3-cd)pyrene	1	NA	NA	NA	0.0%	< 0.1	94%	70%	130%	NA	100%	100%	NA	60%	140%
Methyl-3 cholanthrene	1	NA	NA	NA	0.0%	< 0.1	106%	70%	130%	NA	100%	100%	NA	60%	140%
Naphthalene	1	NA	NA	NA	0.0%	< 0.1	103%	70%	130%	NA	100%	100%	NA	60%	140%
Phenanthrene	1	NA	NA	NA	0.0%	< 0.1	105%	70%	130%	NA	100%	100%	NA	60%	140%
Pyrene	1	NA	NA	NA	0.0%	< 0.1	111%	70%	130%	NA	100%	100%	NA	60%	140%
Methyl-1 naphthalene	1	NA	NA	NA	0.0%	< 0.1	102%	70%	130%	NA	100%	100%	NA	60%	140%
Methyl-2 naphthalene	1	NA	NA	NA	0.0%	< 0.1	110%	70%	130%	NA	100%	100%	NA	60%	140%
Dimethyl-1,3 naphthalene	1	NA	NA	NA	0.0%	< 0.1	100%	70%	130%	NA	100%	100%	NA	60%	140%
Trimethyl-2,3,5 naphthalene	1	NA	NA	NA	0.0%	< 0.1	102%	70%	130%	NA	100%	100%	NA	60%	140%
Acenaphthene-d10	1	NA	NA	NA	0.0%	90	100%	40%	140%	NA	100%	100%	NA	40%	140%
Benzo(a)anthracene-d12	1	NA	NA	NA	0.0%	93	107%	40%	140%	NA	100%	100%	NA	40%	140%
Pyrene-d10	1	NA	NA	NA	0.0%	89	101%	40%	140%	NA	100%	100%	NA	40%	140%

Catherine Angers  

Certified By:

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Method Summary

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
AGAT WORK ORDER: 14Q878848
PROJECT: 2499-03
ATTENTION TO: Frederic Lortie
SAMPLED BY: F.P.
SAMPLING SITE: Manège CCBN

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis					
Silver	2014-08-22	2014-08-25	MET-161-6106F, 6108F	MA. 200 - Mét 1.2R2	ICP/MS
Arsenic	2014-08-22	2014-08-25	MET-161-6107F	EPA 3050, EPA 6020	ICP-MS
Barium	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Cadmium	2014-08-22	2014-08-25	MET-161-6106F, 6108F	MA. 200 - Mét 1.2R2	ICP/MS
Chromium	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Cobalt	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Copper	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Tin	2014-08-22	2014-08-25	MET-161-6106F, 6108F	MA. 200 - Mét 1.2R2	ICP/MS
Manganese	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Molybdenum	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Nickel	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Mercury	2014-08-26	2014-08-26	MET-161-6107F	EPA 245.5	FIMS
Lead	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Zinc	2014-08-22	2014-08-25	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES



Method Summary

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

AGAT WORK ORDER: 14Q878848

PROJECT: 2499-03

ATTENTION TO: Frederic Lortie

SAMPLED BY:F.P.

SAMPLING SITE:Manège CCBN

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis					
Acenaphtene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Acenaphthylene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Anthracene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(a)anthracene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(a)pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(e)pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo (b+j+k) fluoranthene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(c)phenanthrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(g,h,i)perylene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Chrysene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,h)anthracene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,i)pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,h)pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,l)pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dimethyl-7,12 benzo(a)anthracene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Fluoranthene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Fluorene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Indeno(1,2,3-cd)pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Methyl-3 cholanthrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Naphthalene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Phenanthrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Pyrene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Methyl-1 naphthalene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Methyl-2 naphthalene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dimethyl-1,3 naphthalene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Trimethyl-2,3,5 naphthalene	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Acenaphtene-d10	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(a)anthracene-d12	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Pyrene-d10	2014-08-21	2014-08-22	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Petroleum Hydrocarbons C10-C50	2014-08-22	2014-08-22	ORG-160-5100F	MEF 410 - HYD. 1.0	GC/FID
Nonane	2014-08-22	2014-08-22	PA-S-HCP	MA. 400 - HYD 1.0	GC/FID



**CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
2320, RUE DE CELLES
QUEBEC, QC G2C1X8
(418) 845-0858**

ATTENTION TO: Frederic Lortie

PROJECT: 2499-00

AGAT WORK ORDER: 13Q724970

SOIL ANALYSIS REVIEWED BY: Francois Boutin, Chimiste

TRACE ORGANICS REVIEWED BY: Francois Boutin, Chimiste

DATE REPORTED: 2014-02-17

VERSION*: 2

PAGES (INCLUDING COVER): 16

Should you require any information regarding this analysis please contact your client services representative at (418) 266-5511

***NOTES**

VERSION 2: English version.

PE-9

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: 13Q724970

PROJECT: 2499-00

350, rue Franquet
 Québec, Québec
 CANADA G1P 4P3
 TEL (418)268-5511
 FAX (418)653-2335
<http://www.agatlabs.com>

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

Metals (soil)												
DATE RECEIVED: 2013-06-11							DATE REPORTED: 2014-02-17					
Parameter	Unit	G / S: A	G / S: B	G / S: C	G / S: D	RDL	SAMPLE DESCRIPTION:	PE-2 1VR	PE-3 3VR	PE-4 3VR	PE-5 1VR	PE-5 2VR
							SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
							DATE SAMPLED:	2013-06-06	2013-06-06	2013-06-06	2013-06-06	2013-06-06
								4445600	4445601	4445602	4445604	4445605
Arsenic	mg/kg	6	30	50	250	5	<5[<A]	<5[<A]	<5[<A]	26[A-B]	12[A-B]	60[C-D]
Silver	mg/kg	2	20	40	200	0.5	<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]
Cadmium	mg/kg	1.5	5	20	100	0.9	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]
Barium	mg/kg	200	500	2000	10000	20	<20[<A]	23[<A]	1110[B-C]	89[<A]	1470[B-C]	
Chromium	mg/kg	85	250	800	4000	45	<45[<A]	<45[<A]	<45[<A]	<45[<A]	<45[<A]	
Copper	mg/kg	40	100	500	2500	40	<40[<A]	<40[<A]	2260[C-D]	114[B-C]	42[A-B]	
Tin	mg/kg	5	50	300	1500	5	<5[<A]	<5[<A]	17[A-B]	<5[<A]	6[A-B]	
Cobalt	mg/kg	15	50	300	1500	15	<15[<A]	<15[<A]	<15[<A]	<15[<A]	23[A-B]	
Mercury	mg/kg	0.2	2	10	50	0.2	<0.2[<A]	<0.2[<A]	0.5[A-B]	<0.2[<A]	<0.2[<A]	
Nickel	mg/kg	50	100	500	2500	30	<30[<A]	<30[<A]	<30[<A]	<30[<A]	45[<A]	
Lead	mg/kg	50	500	1000	5000	30	<30[<A]	<30[<A]	253[A-B]	34[<A]	34[<A]	
Manganese	mg/kg	770	1000	2200	11000	10	113[<A]	122[<A]	365[<A]	201[<A]	261[<A]	
Zinc	mg/kg	110	500	1500	7500	100	<100[<A]	<100[<A]	223[A-B]	<100[<A]	112[A-B]	
Molybdenum	mg/kg	2	10	40	200	2	<2[<A]	<2[<A]	3[A-B]	<2[<A]	6[A-B]	
Selenium	mg/kg	1	3	10	50	1.0	<1.0[<A]	<1.0[<A]	1.2[A-B]	<1.0[<A]	1.4[A-B]	

Certified By:




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Certificate of Analysis

AGAT WORK ORDER: 13Q724970

PROJECT: 2499-00

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 FAX (418)653-2335
<http://www.agatlabs.com>

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

Metals (soil)												
DATE RECEIVED: 2013-06-11							DATE REPORTED: 2014-02-17					
Parameter	Unit	SAMPLE DESCRIPTION:					RDL	PE-6 2VR	PE-6 3VR	PE-7 1VR	PE-8 1VR	PE-8 2VR
		G / S: A	G / S: B	G / S: C	G / S: D	Soil		Soil	Soil	Soil	Soil	
		SAMPLE TYPE:					DATE SAMPLED:	4445606	4445607	4445608	4445609	4445610
Arsenic	mg/kg	6	30	50	250	5	<5[<A]	36[B-C]	32[B-C]	9[A-B]	57[C-D]	
Silver	mg/kg	2	20	40	200	0.5	<0.5[<A]	<0.5[<A]	1.1[<A]	<0.5[<A]	<0.5[<A]	
Cadmium	mg/kg	1.5	5	20	100	0.9	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]	<0.9[<A]	
Barium	mg/kg	200	500	2000	10000	20	103[<A]	976[B-C]	1340[B-C]	399[A-B]	1400[B-C]	
Chromium	mg/kg	85	250	800	4000	45	<45[<A]	<45[<A]	<45[<A]	<45[<A]	<45[<A]	
Copper	mg/kg	40	100	500	2500	40	<40[<A]	<40[<A]	<40[<A]	<40[<A]	104[B-C]	
Tin	mg/kg	5	50	300	1500	5	<5[<A]	8[A-B]	5[A]	5[A]	21[A-B]	
Cobalt	mg/kg	15	50	300	1500	15	<15[<A]	<15[<A]	<15[<A]	<15[<A]	<15[<A]	
Mercury	mg/kg	0.2	2	10	50	0.2	<0.2[<A]	0.6[A-B]	0.4[A-B]	<0.2[<A]	2.3[B-C]	
Nickel	mg/kg	50	100	500	2500	30	<30[<A]	31[<A]	35[<A]	<30[<A]	36[<A]	
Lead	mg/kg	50	500	1000	5000	30	<30[<A]	43[<A]	90[A-B]	488[A-B]	543[B-C]	
Manganese	mg/kg	770	1000	2200	11000	10	225[<A]	306[<A]	332[<A]	225[<A]	444[<A]	
Zinc	mg/kg	110	500	1500	7500	100	<100[<A]	<100[<A]	<100[<A]	<100[<A]	537[B-C]	
Molybdenum	mg/kg	2	10	40	200	2	<2[<A]	6[A-B]	5[A-B]	<2[<A]	5[A-B]	
Selenium	mg/kg	1	3	10	50	1.0	<1.0[<A]	<1.0[<A]	1.1[A-B]	<1.0[<A]	1.6[A-B]	

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 13Q724970

PROJECT: 2499-00

350, rue Franquet
 Québec, Québec
 CANADA G1P 4P3
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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

Metals (soil)									
DATE RECEIVED: 2013-06-11					DATE REPORTED: 2014-02-17				
Parameter	Unit	SAMPLE DESCRIPTION:				SAMPLE TYPE:			
		G / S: A	G / S: B	G / S: C	G / S: D	PE-9 3VR	F5 2CF	F6 2CF	
						DATE SAMPLED:	2013-06-06	2013-05-24	2013-05-27
						RDL	4445611	4445614	4445615
Arsenic	mg/kg	6	30	50	250	5	58[C-D]	39[B-C]	39[B-C]
Silver	mg/kg	2	20	40	200	0.5	<0.5[<A]	<0.5[<A]	<0.5[<A]
Cadmium	mg/kg	1.5	5	20	100	0.9	<0.9[<A]	<0.9[<A]	<0.9[<A]
Barium	mg/kg	200	500	2000	10000	20	1300[B-C]	1960[B-C]	1770[B-C]
Chromium	mg/kg	85	250	800	4000	45	<45[<A]	<45[<A]	<45[<A]
Copper	mg/kg	40	100	500	2500	40	79[A-B]	42[A-B]	<40[<A]
Tin	mg/kg	5	50	300	1500	5	32[A-B]	7[A-B]	17[A-B]
Cobalt	mg/kg	15	50	300	1500	15	<15[<A]	16[A-B]	<15[<A]
Mercury	mg/kg	0.2	2	10	50	0.2	1.3[A-B]	0.3[A-B]	0.3[A-B]
Nickel	mg/kg	50	100	500	2500	30	32[<A]	59[A-B]	39[<A]
Lead	mg/kg	50	500	1000	5000	30	649[B-C]	48[<A]	92[A-B]
Manganese	mg/kg	770	1000	2200	11000	10	386[<A]	270[<A]	421[<A]
Zinc	mg/kg	110	500	1500	7500	100	2070[C-D]	134[A-B]	<100[<A]
Molybdenum	mg/kg	2	10	40	200	2	6[A-B]	10[B]	5[A-B]
Selenium	mg/kg	1	3	10	50	1.0	1.4[A-B]	1.6[A-B]	1.1[A-B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC PTC (Criteria A), B Refers to QC PTC (Criteria B), C Refers to QC PTC (Criteria C), D Refers to QC RESC (Annex 1)

4445614 Frozen sample

4445615 Frozen sample

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 13Q724970
PROJECT: 2499-00

350, rue Franquet
Québec, Québec
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TEL (418)268-5511
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<http://www.agatlabs.com>

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie
SAMPLING SITE:Manège militaire

Total sulfur (soil)						
DATE RECEIVED: 2013-06-11				DATE REPORTED: 2014-02-17		
		SAMPLE DESCRIPTION:		PE-1 2VR		
		SAMPLE TYPE:		Soil		
		DATE SAMPLED:		2013-06-06		
Parameter	Unit	G / S: A	G / S: B	G / S: C	RDL	4445599
Total Sulphur	mg/kg	400	1000	2000	400	<400[<A]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC PTC (Criteria A), B Refers to QC PTC (Criteria B), C Refers to QC PTC (Criteria C)
4445599 The analysis is performed at Montreal AGAT location.

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Certificate of Analysis

AGAT WORK ORDER: 13Q724970
PROJECT: 2499-00

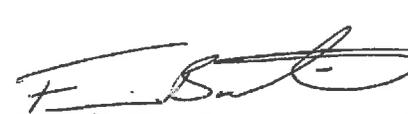
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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie
SAMPLING SITE:Manège militaire

PAHs (Soil)											
DATE RECEIVED: 2013-06-11						DATE REPORTED: 2014-02-17					
Parameter	Unit	SAMPLE DESCRIPTION:				SAMPLE TYPE:					
		G / S: A	G / S: B	G / S: C	G / S: D	PE-1 2VR	PE-2 1VR	PE-3 3VR	PE-4 3VR		
		DATE SAMPLED:				RDL					
		2013-06-06				4445599					
		2013-06-06				4445600					
		2013-06-06				4445601					
		2013-06-06				4445602					
Acenaphtene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Acenaphthylene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Anthracene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.3[A-B]	
Benzo(a)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.3[A-B]	
Benzo(e)pyrene	mg/kg					0.1	<0.1	<0.1	<0.1	0.2	
Benzo (b+j+k) fluoranthene	mg/kg	0.1	1	10	136	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.3[A-B]	
Benzo(c)phenanthrene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Benzo(g,h,i)perylene	mg/kg	0.1	1	10	18	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.1[A]	
Chrysene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.3[A-B]	
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	82	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dimethyl-7,12 benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Fluoranthene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.6[A-B]	
Fluorene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.1[A]	
Methyl-3 cholanthrene	mg/kg	0.1	1	10	150	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Naphthalene	mg/kg	0.1	5	50	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Phenanthrene	mg/kg	0.1	5	50	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.4[A-B]	
Pyrene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.5[A-B]	
Methyl-1 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Methyl-2 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Dimethyl-1,3 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	
Trimethyl-2,3,5 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	

Certified By:




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Certificate of Analysis

AGAT WORK ORDER: 13Q724970

PROJECT: 2499-00

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FAX (418)653-2335
<http://www.agatlabs.com>

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

PAHs (Soil)							
DATE RECEIVED: 2013-06-11			DATE REPORTED: 2014-02-17				
Surrogate	Unit	Acceptable Limits	SAMPLE DESCRIPTION:	PE-1 2VR	PE-2 1VR	PE-3 3VR	PE-4 3VR
			SAMPLE TYPE:	Soil	Soil	Soil	Soil
			DATE SAMPLED:	2013-06-06	2013-06-06	2013-06-06	2013-06-06
				4445599	4445800	4445601	4445602
Acenaphtene-d10	%	40-140		83	106	97	95
Benzo(a)anthracene-d12	%	40-140		85	108	98	97
Pyrene-d10	%	40-140		80	103	94	92

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SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

PAHs (Soil)											
DATE RECEIVED: 2013-06-11						DATE REPORTED: 2014-02-17					
Parameter	Unit	SAMPLE DESCRIPTION:				PE-5 1VR		PE-5 2VR		PE-6 3VR	
		G / S : A	G / S : B	G / S : C	G / S : D	RDL	4445604	RDL	4445605	4445606	4445607
		SAMPLE TYPE:				Soil		Soil		Soil	
		DATE SAMPLED:				2013-06-06		2013-06-06		2013-06-06	
Acenaphthene	mg/kg	0.1	10	100	100	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Acenaphthylene	mg/kg	0.1	10	100	100	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Anthracene	mg/kg	0.1	10	100	100	1.0	<1.0[<B]	0.1	0.2[A-B]	<0.1[<A]	<0.1[<A]
Benzo(a)anthracene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	0.4[A-B]	<0.1[<A]	<0.1[<A]
Benzo(a)pyrene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	0.3[A-B]	<0.1[<A]	<0.1[<A]
Benzo(e)pyrene	mg/kg					1.0	<1.0	0.1	0.2	<0.1	<0.1
Benzo (b+j+k) fluoranthene	mg/kg	0.1	1	10	136	1.0	<1.0[<B]	0.1	0.3[A-B]	<0.1[<A]	<0.1[<A]
Benzo(c)phenanthrene	mg/kg	0.1	1	10	56	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Benzo(g,h,i)perylene	mg/kg	0.1	1	10	18	1.0	<1.0[<B]	0.1	0.2[A-B]	<0.1[<A]	<0.1[<A]
Chrysene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	0.3[A-B]	<0.1[<A]	<0.1[<A]
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	82	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	0.1[A]	<0.1[<A]	<0.1[<A]
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Dimethyl-7,12 benzo(a)anthracene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Fluoranthene	mg/kg	0.1	10	100	100	1.0	<1.0[<B]	0.1	0.8[A-B]	<0.1[<A]	<0.1[<A]
Fluorene	mg/kg	0.1	10	100	100	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	34	1.0	<1.0[<B]	0.1	0.1[A]	<0.1[<A]	<0.1[<A]
Methyl-3 cholanthrene	mg/kg	0.1	1	10	150	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Naphthalene	mg/kg	0.1	5	50	56	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Phenanthrene	mg/kg	0.1	5	50	56	1.0	<1.0[<B]	0.1	0.7[A-B]	<0.1[<A]	<0.1[<A]
Pyrene	mg/kg	0.1	10	100	100	1.0	<1.0[<B]	0.1	0.7[A-B]	<0.1[<A]	<0.1[<A]
Methyl-1 naphthalene	mg/kg	0.1	1	10	56	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Methyl-2 naphthalene	mg/kg	0.1	1	10	56	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Dimethyl-1,3 naphthalene	mg/kg	0.1	1	10	56	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]
Trimethyl-2,3,5 naphthalene	mg/kg	0.1	1	10	56	1.0	<1.0[<B]	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]

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PROJECT: 2499-00

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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

PAHs (Soil)							
DATE RECEIVED: 2013-06-11			DATE REPORTED: 2014-02-17				
Surrogate	Unit	Acceptable Limits	SAMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	PE-5 1VR Soil 2013-06-06 4445604	PE-5 2VR Soil 2013-06-06 4445605	PE-6 2VR Soil 2013-06-06 4445606	PE-6 3VR Soil 2013-06-06 4445607
Acenaphtene-d10	%	40-140		93	96	89	92
Benzo(a)anthracene-d12	%	40-140		94	98	89	94
Pyrene-d10	%	40-140		100	95	84	89

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SAMPLING SITE:Manège militaire

PAHs (Soil)												
DATE RECEIVED: 2013-06-11							DATE REPORTED: 2014-02-17					
Parameter	Unit	G / S: A	G / S: B	G / S: C	G / S: D	RDL	SAMPLE DESCRIPTION:	PE-7 1VR	PE-8 1VR	PE-8 2VR	PE-9 3VR	F2 3CF
							SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
							DATE SAMPLED:	2013-06-07	2013-06-07	2013-06-07	2013-06-06	2013-05-23
								4445608	4445609	4445610	4445611	4445613
Acenaphthene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.2[A-B]	<0.1[<A]
Acenaphthylene	mg/kg	0.1	10	100	100	0.1	0.2[A-B]	0.1[A]	0.1[A]	<0.1[<A]	<0.1[<A]	<0.1[<A]
Anthracene	mg/kg	0.1	10	100	100	0.1	0.2[A-B]	0.3[A-B]	0.2[A-B]	0.5[A-B]	0.5[A-B]	<0.1[<A]
Benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	1.7[B-C]	0.9[A-B]	0.9[A-B]	1.6[B-C]	1.6[B-C]	<0.1[<A]
Benzo(a)pyrene	mg/kg	0.1	1	10	34	0.1	1.5[B-C]	0.7[A-B]	0.9[A-B]	1.4[B-C]	1.4[B-C]	<0.1[<A]
Benzo(e)pyrene	mg/kg					0.1	1.1	0.5	0.7	1.0	1.0	<0.1
Benzo(b+j+k) fluoranthene	mg/kg	0.1	1	10	136	0.1	2.4[B-C]	1.2[B-C]	1.4[B-C]	2.1[B-C]	2.1[B-C]	<0.1[<A]
Benzo(c)phenanthrene	mg/kg	0.1	1	10	56	0.1	0.3[A-B]	0.1[A]	0.1[A]	0.2[A-B]	0.2[A-B]	<0.1[<A]
Benzo(g,h,i)perylene	mg/kg	0.1	1	10	18	0.1	0.8[A-B]	0.4[A-B]	0.5[A-B]	0.8[A-B]	0.8[A-B]	<0.1[<A]
Chrysene	mg/kg	0.1	1	10	34	0.1	1.5[B-C]	0.9[A-B]	1.0[B]	1.5[B-C]	1.5[B-C]	<0.1[<A]
Dibenzo(a,h)anthracene	mg/kg	0.1	1	10	82	0.1	0.2[A-B]	<0.1[<A]	0.1[A]	0.2[A-B]	0.2[A-B]	<0.1[<A]
Dibenzo(a,i)pyrene	mg/kg	0.1	1	10	34	0.1	0.5[A-B]	0.3[A-B]	0.3[A-B]	0.5[A-B]	0.5[A-B]	<0.1[<A]
Dibenzo(a,h)pyrene	mg/kg	0.1	1	10	34	0.1	0.1[A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]
Dibenzo(a,l)pyrene	mg/kg	0.1	1	10	34	0.1	0.1[A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]
Dimethyl-7,12 benzo(a)anthracene	mg/kg	0.1	1	10	34	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]
Fluoranthene	mg/kg	0.1	10	100	100	0.1	2.9[A-B]	1.7[A-B]	1.9[A-B]	3.1[A-B]	3.1[A-B]	<0.1[<A]
Fluorene	mg/kg	0.1	10	100	100	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	0.2[A-B]	0.2[A-B]	<0.1[<A]
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	1	10	34	0.1	0.8[A-B]	0.4[A-B]	0.5[A-B]	0.8[A-B]	0.8[A-B]	<0.1[<A]
Methyl-3 cholanthrene	mg/kg	0.1	1	10	150	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]
Naphthalene	mg/kg	0.1	5	50	56	0.1	0.1[A]	<0.1[<A]	0.1[A]	0.1[A]	0.1[A]	<0.1[<A]
Phenanthrene	mg/kg	0.1	5	50	56	0.1	0.5[A-B]	1.1[A-B]	0.8[A-B]	1.7[A-B]	1.7[A-B]	<0.1[<A]
Pyrene	mg/kg	0.1	10	100	100	0.1	2.6[A-B]	1.3[A-B]	1.5[A-B]	2.4[A-B]	2.4[A-B]	<0.1[<A]
Methyl-1 naphthalene	mg/kg	0.1	1	10	56	0.1	0.1[A]	<0.1[<A]	0.1[A]	0.2[A-B]	0.2[A-B]	<0.1[<A]
Methyl-2 naphthalene	mg/kg	0.1	1	10	56	0.1	0.1[A]	<0.1[<A]	0.2[A-B]	0.2[A-B]	0.2[A-B]	<0.1[<A]
Dimethyl-1,3 naphthalene	mg/kg	0.1	1	10	56	0.1	0.2[A-B]	<0.1[<A]	0.2[A-B]	0.2[A-B]	0.2[A-B]	0.1[A]
Trimethyl-2,3,5 naphthalene	mg/kg	0.1	1	10	56	0.1	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]	<0.1[<A]

Certified By:



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Certificate of Analysis

AGAT WORK ORDER: 13Q724970

PROJECT: 2499-00

350, rue Franquet
 Québec, Québec
 CANADA G1P 4P3
 TEL (418)266-5511
 FAX (418)653-2335
<http://www.agatlabs.com>

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

SAMPLED BY:A.T.

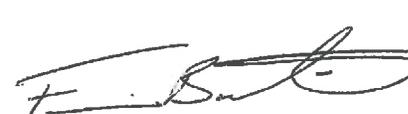
ATTENTION TO: Frederic Lortie

SAMPLING SITE:Manège militaire

PAHs (Soil)						
DATE RECEIVED: 2013-06-11			DATE REPORTED: 2014-02-17			
Surrogate	Unit	Acceptable Limits	SAMPLE DESCRIPTION: SAMPLE TYPE: DATE SAMPLED:	PE-7 1VR Soil 2013-06-07 4445608	PE-8 1VR Soil 2013-06-07 4445609	F2 3CF Soil 2013-05-23 4445613
Acenaphthene-d10	%	40-140	PE-8 2VR Soil 2013-06-07 4445610	PE-9 3VR Soil 2013-06-06 4445611	87	89
Benzo(a)anthracene-d12	%	40-140	85	95	89	92
Pyrene-d10	%	40-140	87	93	85	86

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC PTC (Criteria A), B Refers to QC PTC (Criteria B), C Refers to QC PTC (Criteria C), D Refers to QC RESC (Annex 1)
 4445604 The LDR was increased due to the dilution performed on the sample.
 4445613 Frozen sample

Certified By:




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CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
SAMPLED BY:A.T.

ATTENTION TO: Frederic Lortie
SAMPLING SITE:Manège militaire

Petroleum Hydrocarbons C10-C50 (Soil)													
DATE RECEIVED: 2013-06-11							DATE REPORTED: 2014-02-17						
Parameter	Unit	G / S: A	G / S: B	G / S: C	G / S: D	RDL	SAMPLE DESCRIPTION:	PE-1 2VR	PE-2 1VR	PE-3 3VR	PE-4 3VR	PE-4 3VR DUP	
							SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil	
							DATE SAMPLED:	2013-06-06	2013-06-06	2013-06-06	2013-06-06	2013-06-06	
Petroleum Hydrocarbons C10-C50	mg/kg	300	700	3500	10000	100		4445599	4445600	4445601	4445602	4445603	
Surrogate	Unit	Acceptable Limits											
Nonane	%	40-140							120	125	116	95	105
Parameter	Unit	G / S: A	G / S: B	G / S: C	G / S: D	RDL	SAMPLE DESCRIPTION:	PE-5 1VR	PE-6 2VR	PE-9 3VR	PE-9 3VR DUP		
							SAMPLE TYPE:	Soil	Soil	Soil	Soil		
							DATE SAMPLED:	2013-06-06	2013-06-06	2013-06-06	2013-06-06		
Petroleum Hydrocarbons C10-C50	mg/kg	300	700	3500	10000	100		4445604	4445606	4445611	4445612		
Surrogate	Unit	Acceptable Limits											
Nonane	%	40-140							120	116	122	112	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to QC PTC (Criteria A), B Refers to QC PTC (Criteria B), C Refers to QC PTC (Criteria C), D Refers to QC RESC (Annex 1)

Certified By:



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Quality Assurance

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
 PROJECT: 2499-00
 SAMPLED BY: A.T.

AGAT WORK ORDER: 13Q724970
 ATTENTION TO: Frederic Lortie
 SAMPLING SITE: Manège militaire

Soil Analysis															
RPT Date: 2014-02-17			DUPLICATE			REFERENCE MATERIAL				METHOD BLANK			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
Total sulfur (soil)															
Total Sulphur	1	NA	NA	NA	0.0%	< 400	107%	80%	120%	95%	80%	120%	118%	80%	120%
Metals (soil)															
Arsenic	1	NA	NA	NA	0.0%	< 5	80%	80%	120%	NA	100%	100%	NA	70%	130%
Cadmium	1	NA	NA	NA	0.0%	< 0.9	99%	80%	120%	NA	80%	120%	NA	70%	130%
Chromium	1	NA	NA	NA	0.0%	< 45	90%	80%	120%	NA	100%	100%	NA	70%	130%
Copper	1	NA	NA	NA	0.0%	< 40	106%	80%	120%	NA	80%	120%	NA	70%	130%
Tin	1	NA	NA	NA	0.0%	< 5	99%	80%	120%	NA	80%	120%	NA	70%	130%
Mercury	4445600	4445600	< 0.2	< 0.2	0.0%	< 0.2	110%	100%	100%	NA	100%	100%	116%	70%	130%
Nickel	1	NA	NA	NA	0.0%	< 30	95%	80%	120%	NA	80%	120%	NA	70%	130%
Lead	1	NA	NA	NA	0.0%	< 30	90%	80%	120%	NA	80%	120%	NA	70%	130%
Zinc	1	NA	NA	NA	0.0%	< 100	93%	80%	120%	NA	80%	120%	NA	70%	130%
Metals (soil)															
Silver	1	NA	NA	NA	0.0%	< 0.5	103%	80%	120%	104%	80%	120%	NA	70%	130%
Barium	1	NA	NA	NA	0.0%	< 20	NA	80%	120%	102%	80%	120%	NA	70%	130%
Cobalt	1	NA	NA	NA	0.0%	< 15	90%	80%	120%	101%	80%	120%	NA	70%	130%
Manganese	1	NA	NA	NA	0.0%	< 10	98%	80%	120%	105%	80%	120%	NA	70%	130%
Molybdenum	1	NA	NA	NA	0.0%	< 2	97%	80%	120%	NA	80%	120%	NA	70%	130%
Selenium	1	NA	NA	NA	0.0%	< 1.0	88%	80%	120%	97%	80%	120%	NA	70%	130%

Certified By:



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Quality Assurance

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
 PROJECT: 2499-00
 SAMPLED BY: A.T.

AGAT WORK ORDER: 13Q724970
 ATTENTION TO: Frederic Lortie
 SAMPLING SITE: Manège militaire

Trace Organics Analysis

RPT Date: 2014-02-17			DUPLICATE			REFERENCE MATERIAL			METHOD BLANK			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measure d Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Petroleum Hydrocarbons C10-C50 (Soil)															
Petroleum Hydrocarbons C10-C50	1	4445600	< 100	< 100	0.0%	< 100	93%	70%	130%	NA	100%	100%	80%	60%	140%
Nonane	1	4445600	125	118	5.8%	125	122%	40%	140%	NA	100%	100%	130%	40%	140%
PAHs (Soil)															
Acenaphtene	1	NA	NA	NA	0.0%	< 0.1	98%	70%	130%	NA	100%	100%	NA	60%	140%
Acenaphthylene	1	NA	NA	NA	0.0%	< 0.1	104%	70%	130%	NA	100%	100%	NA	60%	140%
Anthracene	1	NA	NA	NA	0.0%	< 0.1	102%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(a)anthracene	1	NA	NA	NA	0.0%	< 0.1	103%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(a)pyrene	1	NA	NA	NA	0.0%	< 0.1	93%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(e)pyrene	1	NA	NA	NA	0.0%	< 0.1	100%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo (b+j+k) fluoranthene	1	NA	NA	NA	0.0%	< 0.1	93%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(c)phenanthrene	1	NA	NA	NA	0.0%	< 0.1	103%	70%	130%	NA	100%	100%	NA	60%	140%
Benzo(g,h,i)perylene	1	NA	NA	NA	0.0%	< 0.1	83%	70%	130%	NA	100%	100%	NA	60%	140%
Chrysene	1	NA	NA	NA	0.0%	< 0.1	98%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,h)anthracene	1	NA	NA	NA	0.0%	< 0.1	73%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,i)pyrene	1	NA	NA	NA	0.0%	< 0.1	115%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,h)pyrene	1	NA	NA	NA	0.0%	< 0.1	100%	70%	130%	NA	100%	100%	NA	60%	140%
Dibenzo(a,l)pyrene	1	NA	NA	NA	0.0%	< 0.1	117%	70%	130%	NA	100%	100%	NA	60%	140%
Dimethyl-7,12 benzo(a)anthracene	1	NA	NA	NA	0.0%	< 0.1	100%	70%	130%	NA	100%	100%	NA	60%	140%
Fluoranthene	1	NA	NA	NA	0.0%	< 0.1	106%	70%	130%	NA	100%	100%	NA	60%	140%
Fluorene	1	NA	NA	NA	0.0%	< 0.1	103%	70%	130%	NA	100%	100%	NA	60%	140%
Indeno(1,2,3-cd)pyrene	1	NA	NA	NA	0.0%	< 0.1	87%	70%	130%	NA	100%	100%	NA	60%	140%
Methyl-3 cholanthrene	1	NA	NA	NA	0.0%	< 0.1	81%	70%	130%	NA	100%	100%	NA	60%	140%
Naphthalene	1	NA	NA	NA	0.0%	< 0.1	97%	70%	130%	NA	100%	100%	NA	60%	140%
Phenanthrene	1	NA	NA	NA	0.0%	< 0.1	98%	70%	130%	NA	100%	100%	NA	60%	140%
Pyrene	1	NA	NA	NA	0.0%	< 0.1	100%	70%	130%	NA	100%	100%	NA	60%	140%
Methyl-1 naphthalene	1	NA	NA	NA	0.0%	< 0.1	102%	70%	130%	NA	100%	100%	NA	60%	140%
Methyl-2 naphthalene	1	NA	NA	NA	0.0%	< 0.1	100%	70%	130%	NA	100%	100%	NA	60%	140%
Dimethyl-1,3 naphthalene	1	NA	NA	NA	0.0%	< 0.1	106%	70%	130%	NA	100%	100%	NA	60%	140%
Trimethyl-2,3,5 naphthalene	1	NA	NA	NA	0.0%	< 0.1	99%	70%	130%	NA	100%	100%	NA	60%	140%
Acenaphtene-d10	1	NA	NA	NA	0.0%	93	120%	40%	140%	NA	100%	100%	NA	40%	140%
Benzo(a)anthracene-d12	1	NA	NA	NA	0.0%	95	123%	40%	140%	NA	100%	100%	NA	40%	140%
Pyrene-d10	1	NA	NA	NA	0.0%	90	120%	40%	140%	NA	100%	100%	NA	40%	140%

Certified By:



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Method Summary

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC
AGAT WORK ORDER: 13Q724970
PROJECT: 2499-00
ATTENTION TO: Frederic Lortie
SAMPLED BY:A.T.
SAMPLING SITE:Manège militaire

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis					
Silver	2013-06-18	2013-06-18	MET-161-6106F, 6108F	MA. 200 - Mét 1.2R2	ICP/MS
Arsenic	2013-06-14	2013-06-18	MET-161-6107F	EPA 3050, EPA 6020	ICP-MS
Cadmium	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Chromium	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Barium	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Copper	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Tin	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Mercury	2013-06-13	2013-06-13	MET-161-6107F	EPA 245.5	FIMS
Cobalt	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Nickel	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Lead	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Manganese	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Zinc	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Molybdenum	2013-06-14	2013-06-14	MET-161-6102F	MA. 200 - Mét 1.1 ; MA. 203 - Mét 3.1	ICP/OES
Selenium	2013-06-18	2013-06-18	MET-161-6106F	EPA 3050, EPA 6020	ICP-MS
Total Sulphur	2013-06-13	2013-06-13	INOR-101-6056F	MA.310-CS	COMBUSTION

Method Summary

CLIENT NAME: LABORATOIRE D'EXPERTISE DE QUEBEC

AGAT WORK ORDER: 13Q724970

PROJECT: 2499-00

ATTENTION TO: Frederic Lortie

SAMPLED BY:A.T.

SAMPLING SITE:Manège militaire

PARAMETER	DATE PREPARED	DATE ANALYZED	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis					
Acenaphtene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Acenaphthylene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Anthracene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(a)anthracene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(a)pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(e)pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo (b+j+k) fluoranthene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(c)phenanthrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(g,h,i)perylene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Chrysene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,h)anthracene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,i)pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,h)pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dibenzo(a,l)pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dimethyl-7,12 benzo(a)anthracene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Fluoranthene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Fluorene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Indeno(1,2,3-cd)pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Methyl-3 cholanthrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Naphthalene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Phenanthrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Pyrene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Methyl-1 naphthalene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Methyl-2 naphthalene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Dimethyl-1,3 naphthalene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Trimethyl-2,3,5 naphthalene	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Acenaphtene-d10	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Benzo(a)anthracene-d12	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Pyrene-d10	2013-06-14	2013-06-14	ORG-160-5102F	MA. 400 - HAP 1.1	GC/MS
Petroleum Hydrocarbons C10-C50	2013-06-14	2013-06-14	ORG-160-5100F	MEF 410 - HYD. 1.0	GC/FID
Nonane	2013-06-14	2013-06-14	PA-S-HCP	MA. 400 - HYD 1.0	GC/FID

APPENDIX “E”

Grille de gestion des sols contaminés excavés intérimaire
(Interim Contaminated Excavated Soil Management Schedule)

GRILLE DE GESTION DES SOLS CONTAMINÉS EXCAVÉS INTÉRIMAIRE

Tirée de la « Politique de protection des sols et de réhabilitation des terrains contaminés » (1999)
du ministère du Développement durable, de l'Environnement et de la Lutte contre les changements
climatiques du Québec.

NIVEAU DE CONTAMINATION	OPTIONS DE GESTION
<A	1. Utilisation sans restriction.
Plage A-B	<ol style="list-style-type: none"> 1. Utilisation comme matériaux de remblayage sur les terrains contaminés à vocation résidentielle en voie de réhabilitation* ou sur tout terrain à vocation commerciale ou industrielle, à la condition que leur utilisation n'ait pas pour effet d'augmenter la contamination** du terrain récepteur et, de plus, pour un terrain à vocation résidentielle que les sols n'émettent pas d'odeurs d'hydrocarbures perceptibles. 2. Utilisation comme matériaux de recouvrement journalier dans un lieu d'enfouissement sanitaire (LES). 3. Utilisation comme matériaux de recouvrement final dans un LES à la condition qu'ils soient recouverts de 15 centimètres de sol propre.
Plage B-C	<ol style="list-style-type: none"> 1. Décontamination de façon optimale*** dans un lieu de traitement autorisé et gestion selon le résultat obtenu. 2. Utilisation comme matériaux de remblayage sur le terrain d'origine à la condition que leur utilisation n'ait pas pour effet d'augmenter la contamination** du terrain et que l'usage du terrain soit à vocation commerciale ou industrielle. 3. Utilisation comme matériaux de recouvrement journalier dans un LES.
>C	<ol style="list-style-type: none"> 1. Décontamination de façon optimale*** dans un lieu de traitement autorisé et gestion selon le résultat obtenu. 2. Si l'option précédente est impraticable, dépôt définitif dans un lieu d'enfouissement sécuritaire autorisé pour recevoir des sols.

* Les terrains à vocation résidentielle en voie de réhabilitation sont ceux voués à un usage résidentiel dont une caractérisation a démontré une contamination supérieure au critère B et où l'apport de sols en provenance de l'extérieur sera requis lors des travaux de restauration.

** La contamination réfère à la nature des contaminants et leur concentration.

*** Le traitement optimal est défini pour l'ensemble des contaminants par l'atteinte du critère B ou la réduction de 80% de la concentration initiale et pour les volatils par l'atteinte du critère B. À cet égard, les volatils sont définis comme étant les contaminants dont le point d'ébullition est <180°C ou dont la constante de la loi de Henry est supérieure à $6,58 \times 10^{-7}$ atm-m³/g incluant les contaminants identifiés dans la section III de la grille des critères de sols incluse à l'annexe 2 de la politique de protection des sols et de réhabilitation des terrains contaminés.