Phase II Environmental Site Assessment

410 Queen Street,
Chatham, Ontario

Prepared For
1000414136 Ontario Ltd.

December 5th, 2023

BAE Environmental
18 Parkview Ave.,
Oro-Medonte, ON L0L 2E0
Phone (705) 715-1881
envsol@rogers.com

Providing Environmental Solutions Since 1997!

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

BAE Environmental (BAE) were retained by 1000414136 Ontario Ltd. to undertake a Phase II Environmental Site Assessment (ESA) at 410 Queen Street, Chatham, Ontario (Site). These investigations were conducted to reveal current environmental conditions for the subject property for financial purposes.

As no Record of Site Condition was required, the terms of reference for the Phase II ESA generally followed the current CSA Standard CAN/CSA-Z769-00 (R2018). All analysis was performed in accordance with O. Reg. 153/04 and compared to Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011) Criteria.

The subject property is located on the west corner of Queen Street and Park Avenue West. The Site is a rectangular shaped lot with a surface area of approximately 1,000 m^2. The property contains one (1) rectangular shaped site building that previously operated as a convenience store and restaurant. The site was redeveloped as a retail fuel outlet in 2019 however is now closed. The new petroleum equipment installed in 2019 on site consists of two (2) fibreglass underground storage tanks (USTs) with capacities of 2 x 110,000L. Four (4) concrete pump islands are located underneath a canopy that include four fuel dispensers.

Rubicon Environmental (2008) Inc. (REI) completed a Phase II ESA in April of 2019. The REI previous soil and groundwater investigations documented that there were no environmental concerns and no further investigations were required.

Current investigations consisted of reviewing previous reports, conducting a visual inspection of the subject and surrounding properties and conducting a sampling and analyses program concentrating in the areas of potential concern.

Field screening was undertaken and as a verification of the environmental conditions, representative groundwater samples were submitted to ALS Environmental Laboratory for independent chemical analysis of the Ontario Regulation 511/010 BTEX, VOC and F1, F2, F3 and F4 Petroleum Hydrocarbon Fractions (PHCs) Parameters. As verified in the laboratory results, all analyses met applicable MECP/EPA criteria. The analysis has verified that there were no environmental concerns identified in any of the samples obtained and analysed.

It is the opinion of BAE that the current and previous environmental assessments performed are consistent with and the chemical analysis meets current MECP/EPA Criteria. The Environmental Site Assessment results do not suggest any chemical contamination associated with current or historical activities at the subject property at levels in excess of applicable criteria. **No further environmental investigations are recommended at this time.**

2.0 INTRODUCTION

BAE Environmental (BAE) were retained by 1000414136 Ontario Ltd. to undertake a Phase II Environmental Site Assessment (ESA) at 410 Queen Street, Chatham, Ontario (Site). These investigations were conducted to reveal current environmental conditions for the subject property for financial purposes.

As no Record of Site Condition was required, the terms of reference for the Phase II ESA generally followed the current CSA Standard CAN/CSA-Z769-00 (R2018). All analysis was performed in accordance with O. Reg. 153/04 and compared to Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011) Criteria. The specific requirements for carrying out a Phase II ESA are set out in Part VIII of Ontario Regulation 153/04 - as amended by O. Reg. 511 (July, 2011).

3.0 SCOPE OF WORK

The scope of work was completed to determine if there appeared to be any indications of environmental impairment on the property which could present liability. Supplemental ESA investigations were undertaken and included:

- Performing background investigations and reviewing previous environmental reports.
- Accessing and redeveloping monitoring wells and conducting a Groundwater Sampling Program in the areas of potential concern to ascertain the subsurface conditions.
- Obtaining and submitting for independent chemical analysis, representative samples for analyses of the Ontario Regulation 511/11 Benzene, Toluene, Ethylbenzene, Xylene, VOC and F1, F2, F3 and F4 Petroleum Fraction Parameters; and,
- Completion of the engineering report.

4.0 PREVIOUS INVESTIGATIONS

All and any pertinent reports or information were requested by BAE. Rubicon Environmental (2008) Inc. (REI) completed a Phase II ESA in April of 2019. The REI previous investigations documented that there were no environmental concerns and no further investigations were required. Following are the conclusions from this investigation. "*Based on the findings of this investigation, it is the opinion of Rubicon Environmental (2008) Inc. that there is no hydrocarbon impairment associated with the former petroleum storage equipment. The subject property meets the applicable MECP O.Reg 511/09 criteria. The site does not pose an environmental risk to operate under continued commercial land-use, as an upgraded retail fuel outlet. No further environmental investigation is recommended at this time.*"

5.0 SITE DESCRIPTION

The Site is located on the west corner of Queen Street and Park Avenue West. It is a rectangular shaped lot with a surface area of approximately 1,000 m^2. The property contains one (1) rectangular shaped site building that previously operated as a convenience store and restaurant. The site was redeveloped as a retail fuel outlet in 2019 however is now closed. The new petroleum equipment installed in 2019 on site consists of two (2) fibreglass underground storage tanks (USTs) with capacities of 2 x 110,000L. Four (4) concrete pump islands are located underneath a canopy and include four double-sided fuel dispensers. The Site location is shown on Figure 1. The Site and surrounding area are shown on Figure 2. The Site and sample locations are shown on Figure 3.

8.0 PHYSICAL SETTING

8.1 Geology and Physiography

The Chatham—Wheatley area is covered by up to 65 m of unconsolidated, Quaternary material. Middle and Upper Devonian shales and limestones underlie the region but do not outcrop. Middle Devonian limestone of the Dundee Formation sub crops in the southwestern corner of the region near the town of Wheatley and further east near the hamlet of Port Alma.

Shales and limestones of the Middle Devonian Hamilton Group overlie the Dundee Formation. The 'Hamilton Group sub crops over much of the western part of the area. The youngest rock unit in the area is the Upper Devonian Kettle point Formation. The black shale of this covers most of the eastern portion of the area.

8.2 Groundwater and Surface Water

The topography in the vicinity of the subject site is relatively flat. Surface water drainage is directed toward a catch basin on the east-southeast portion of the property. The nearest body of water to the study site is the Thames River, located approximately 1.3km northwest of the site. Groundwater was encountered at an average 2.8 metres below grade in the onsite monitoring wells.

Figure 1: Site Location

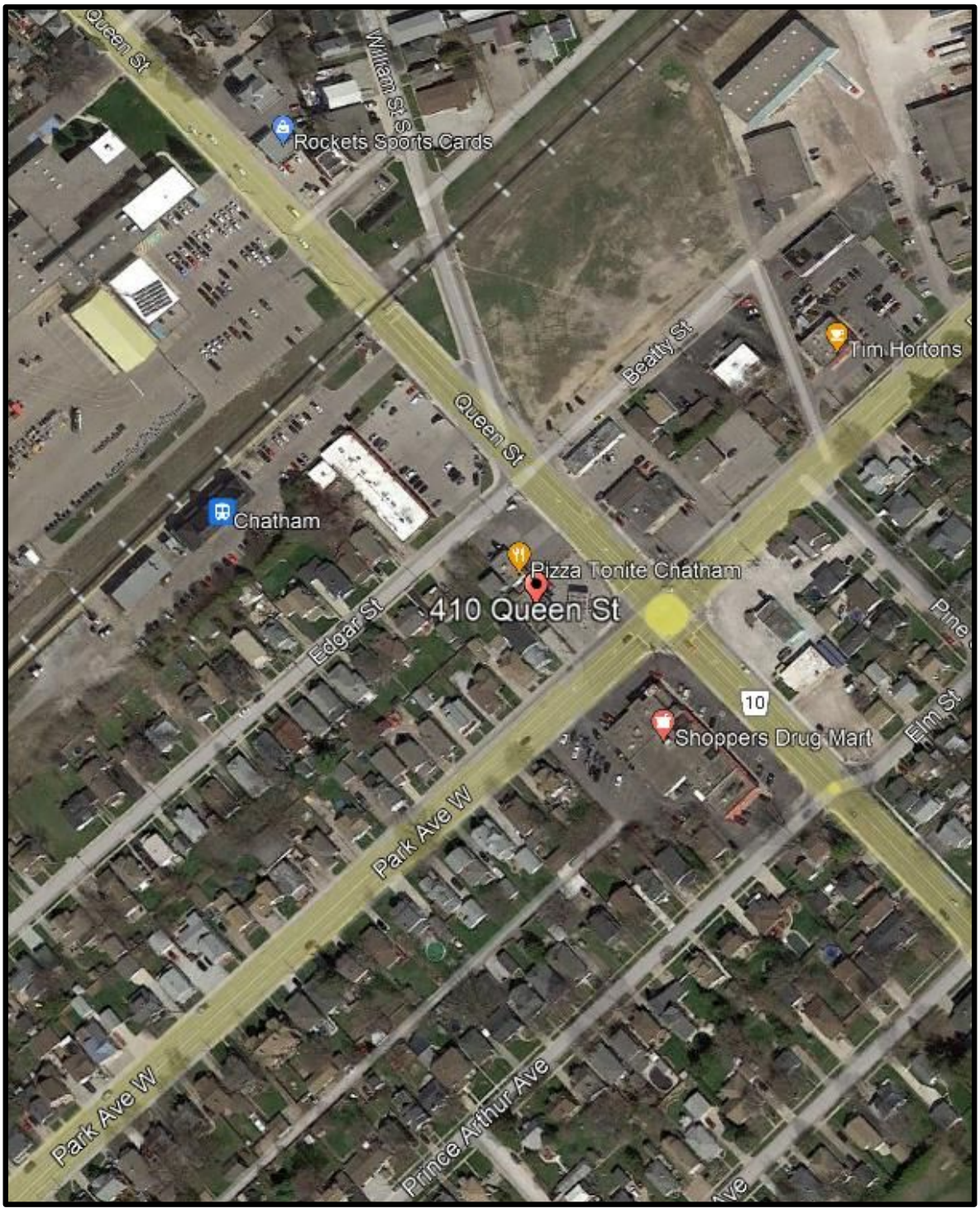


Figure 2: Site and Surrounding Area Layout

8.3 Other Services

The site is serviced with hydro, telephone and natural gas services. Sanitary sewers and municipal water are available in this area.

9.0 PHASE II ESA INVESTIGATIONS

BAE personnel conducted the Phase II ESA onsite investigations on November 7, 2023. Background information obtained from the previous ESA investigations in conjunction with onsite investigations were performed to determine parameters of potential concern for the subject and neighbouring properties. From these investigations it was determined that the potential parameters of concern were the Ontario Regulation 511/010 VOC, BTEX and F1, F2, F3 and F4 Petroleum Hydrocarbon Fractions (PHCs) Parameters, potentially emanating from previous onsite petroleum storage.

Onsite investigations consisted of a visual inspection of the property and conducting a Groundwater Sampling program. The Phase II ESA was conducted to ascertain the surficial and subsurface conditions and to assess the need for further investigations. This section of the report describes the methodology and results of the Phase II ESA. Figure 3 shows the sample locations.

9.1 Soil Sampling

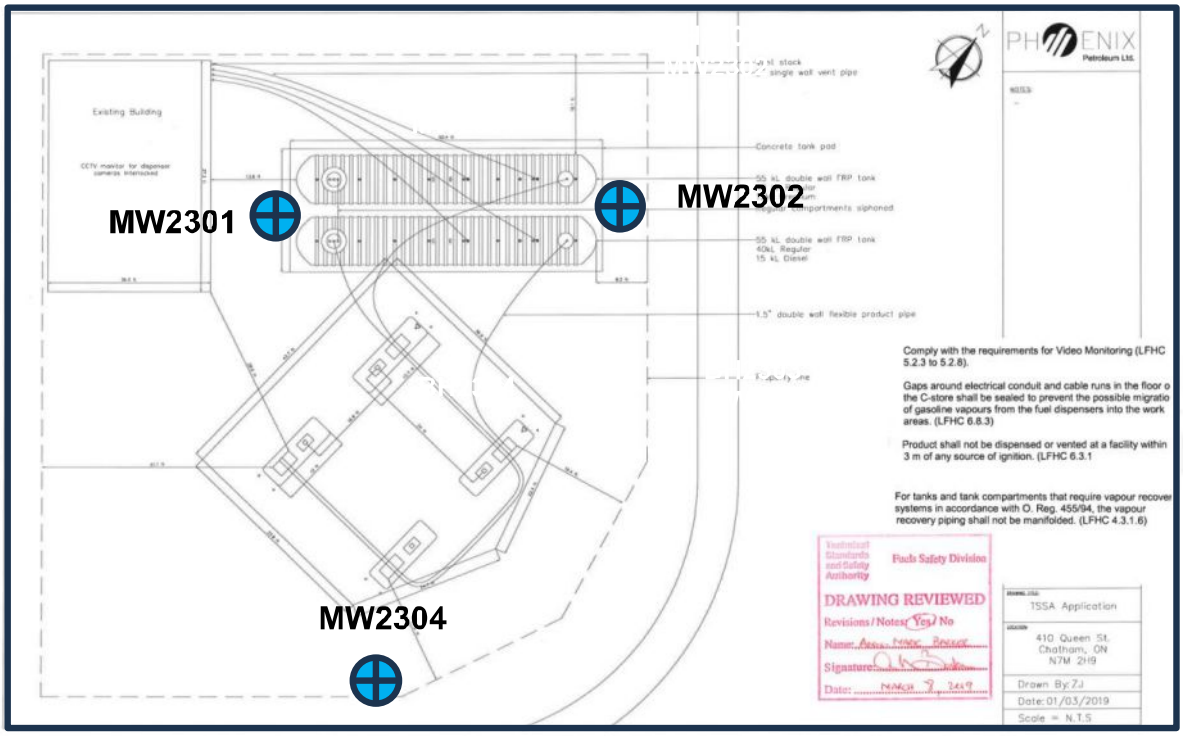
Soil sampling was carried out in April 2019 prior to the installation of the new underground storage tanks. The results were provided to TSSA for approval. All analysis met applicable MECP/EPA Criteria.

9.2 Groundwater Sampling

Three groundwater monitoring wells were redeveloped as current monitoring wells. Groundwater was encountered at an average depth of 2.8 mbgl. Groundwater samples were obtained from MW2301, MW2302 and MW2304. The wells were redeveloped by purging 3 x volume prior to sampling and analyses. During development of the monitoring wells, qualitative observations were made of watercolour, clarity, the presence or absence of any hydrocarbon sheen, and any odours present. There was no indication of any impairment in any of the wells.

Water samples were collected directly into laboratory supplied sample containers preinoculated with any necessary preservatives. Dedicated (one pair per sample), disposable nitrile gloves were used throughout the proceedings. Vials that contained samples to be analyzed for volatile compounds were inverted after filling and inspected to ensure that no head space was present in any vial. Samples were placed in a cooler and stored on ice until delivered to the analytical laboratory. The water samples were analyzed for the selected parameters as outlined in the following tables.

Figure 3: Borehole and Monitoring Well Locations



9.3 Investigation Results

As a verification of the subsurface conditions, representative samples were submitted to ALS Environmental Laboratory for independent chemical analysis of the Ontario Regulation 511/11 Benzene, Toluene, Ethylbenzene, Xylene Parameters, VOC Parameters and F1, F2, F3 and F4 Petroleum Fraction Parameters.

As outlined below in Section 11 Laboratory Chemical Analysis, all analyses met applicable MECP/EPA Criteria for all parameters. The analysis has verified that there is no concern for petroleum from the ongoing use of pumps, transfer lines or USTs.

10.0 APPLICABLE GOVERNMENT GUIDELINES

The current subsurface investigation was conducted generally in accordance with Part XV.1 of the Environmental Protection Act and Ontario Regulation 153/04 (O. Reg. 153/04) - as amended by O. Reg. 511 (July, 2011). All analysis was performed in accordance with O. Reg. 153/04 and compared to Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011) Criteria. The specific requirements for carrying out a Phase II ESA are set out in Part VIII of Ontario Regulation 153/04 - as amended by O. Reg. 511 (July, 2011).

The following rationale was used to determine the applicable site criteria:

Site Sensitivity: There were no sensitive environmental sites identified within 30m of the site. Based on the information gathered during this investigation and previous investigations in the area, there is more than 2 m of overburden at the site.

Land Use: The site was originally developed as commercial, therefore the site will be considered to be commercial land use.

Groundwater Use: The site is serviced by a municipal water supply. Based on this situation, the non-potable groundwater criteria would apply.

Depth and Soil Texture Criteria Selection: For this report, the full-depth criteria will be used for comparison of the analytical results.

The native and fill soils underlying the site were not analysed for fine particles and thus do not warrant usage of the fine textured soil classification. Therefore, the coarse textured soil classification will be used for comparison of analytical data.

Based on the above information and assumptions, the criteria for this site corresponds to commercial land use criteria for coarse textured soil using the full-depth approach and Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011).

11.0 LABORATORY CHEMICAL ANALYSES

All laboratory analyses were completed by an independent, accredited lab, ALS Laboratory Group of Richmond Hill/ Waterloo, Ontario (ALS). ALS is a CAEAL Registered and Accredited laboratory according to O. Reg. 153/04 section 47 (1) and ALS used the analytical methods as described in *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (*MOE 2011, O. Reg. 511/11). Appendix II of this report contains the detailed laboratory certificates of analyses. All analysis was performed in accordance with O. Reg. 511/11 and compared to Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011). The analytical results for these samples were compared to Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011) criteria. Representative samples were submitted from MW2301, MW2302 and MW2304 for the BTEX, VOC and F1-F4 Parameters. As presented above and in the attached Certificates of Analysis, all analyses met applicable MECP/EPA Criteria for all parameters. The analysis has verified that there is no concern of petroleum from the pumps, transfer lines or USTs.

12.0 CONCLUSIONS

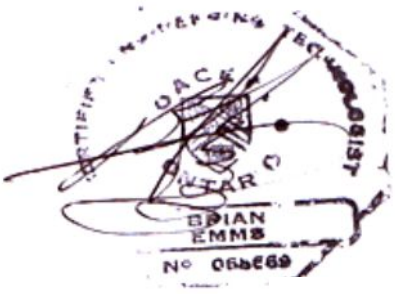
Field screening was undertaken and as a verification of the environmental conditions, representative samples were submitted to ALS Environmental Laboratory for independent chemical analysis of the Ontario Regulation 511/11 BTEX, VOC and F1, F2, F3 and F4 Petroleum Fraction Parameters. As shown in the lab results, all analyses met applicable MECP/EPA Criteria for all parameters. The analysis has verified that there is no concern from the petroleum handling and storage equipment.

It is the opinion of BAE that the previous and current environmental assessments performed are consistent with and meet current MECP/EPA/TSSA Criteria. The Environmental Site Assessment results do not suggest any chemical contamination associated with current or historical activities at the subject property and has determined that there is no evidence of any offsite impaction, or is likely to impact in the future, any adjacent public Right of Ways at levels in excess of applicable criteria. **No further environmental investigations are recommended at this time.**

13.0 QUALIFICATIONS OF ASSESSORS

This investigation was completed by Brian A. Emms, C.E.T. and reviewed by Sahil Kazi, M.Eng. P.Eng. Jointly, the above have performed hundreds of ESAs and site remediation for various financial institutions, municipal governments, insurance companies, law firms and the private sector.

Respectfully Submitted,
BAE Environmental



Brian A. Emms, C.E.T.
Senior Env. Technologist

TABLE 1: GROUNDWATER CHEMICAL ANALYSES – BTEX

PARAMETER	CRITERIA	MDL	MW2301
BTEX			
Benzene	44	0.50	<0.50
Toluene	18000	0.50	<0.50
Ethylbenzene	2300	0.50	<0.50
Xylenes (Total)	4200	0.50	<0.50

All values in ug/l - ppb - parts per billion, MDL- Method Detection Limit, *Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011) Subsurface groundwater criteria for commercial use for a potable groundwater condition.

TABLE 2: GROUNDWATER CHEMICAL ANALYSES - F1, F2, F3, F4

PARAMETER	Criteria	MDL	MW2301	MW2302	MW2304
F1 (C6-C10)	750	25	<25	<25	<25
F2 (C10-C16)	150	100	<100	<100	<100
F3 (C16-C34)	500	250	<250	<250	<250
F4 (C34-C50)	500	250	<250	<250	<250

All values in ug/l - ppb - parts per billion, MDL- Method Detection Limit, *Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition (July 2011) Subsurface groundwater criteria for commercial use for a potable groundwater condition.

TABLE 3: GROUNDWATER CHEMICAL ANALYSES - VOCs

PARAMETER	CRITERIA	MDL	MW2302	MW2304
Acetone	130000	30	<30	<30
Benzene	430	0.50	<0.50	<0.50
Bromodichloromethane	85000	2.0	<2.0	<2.0
Bromoform	770	5.0	<5.0	<5.0
Bromomethane	56	0.50	<0.50	<0.50
Carbon tetrachloride	8.4	0.20	<0.20	<0.20
Chlorobenzene	630	0.50	<0.50	<0.50
Dibromochloromethane	82000	2.0	<2.0	<2.0
Chloroform	22	1.0	<1.0	<1.0
1,2-Dibromoethane	0.83	0.20	<0.20	<0.20
1,2-Dichlorobenzene	9600	0.50	<0.50	<0.50
1,3-Dichlorobenzene	9600	0.50	<0.50	<0.50
1,4-Dichlorobenzene	67	0.50	<0.50	<0.50
Dichlorodifluoromethane	4400	2.0	<2.0	<2.0
1,1-Dichloroethane	3100	0.50	<0.50	<0.50
1,2-Dichloroethane	12	0.50	<0.50	<0.50
1,1-Dichloroethylene	17	0.50	<0.50	<0.50
cis-1,2-Dichloroethylene	17	0.50	<0.50	<0.50
trans-1,2-Dichloroethylene	17	0.50	<0.50	<0.50
1,3-Dichloropropene (cis & trans)	45	0.50	<0.50	<0.50
Methylene Chloride	5500	5.0	<5.0	<5.0
1,2-Dichloropropane	140	0.50	<0.50	<0.50
cis-1,3-Dichloropropene	NV	0.30	<0.30	<0.30

PARAMETER	CRITERIA	MDL	MW2302	MW2304
trans-1,3-Dichloropropene	NV	0.30	<0.30	<0.30
Ethyl Benzene	2300	0.50	<0.50	<0.50
n-Hexane	520	0.50	<0.50	<0.50
Methyl Ethyl Ketone	1500000	20	<20	<20
Methyl Isobutyl Ketone	580000	20	<20	<20
MTBE	1400	2.0	<2.0	<2.0
Styrene	9100	0.50	<0.50	<0.50
1,1,1,2-Tetrachloroethane	28	0.50	<0.50	<0.50
1,1,2,2-Tetrachloroethane	15	0.50	<0.50	<0.50
Tetrachloroethylene	*17	0.50	<0.50	<0.50
Toluene	18000	0.50	<0.50	<0.50
1,1,1-Trichloroethane	6700	0.50	<0.50	<0.50
1,1,2-Trichloroethane	30	0.50	<0.50	<0.50
Trichloroethylene	17	0.50	<0.50	<0.50
Trichlorofluoromethane	2500	5.0	<5.0	<5.0
Vinyl chloride	1.7	0.50	<0.50	<0.50
o-Xylene		0.50	<0.50	<0.50
m+p-Xylenes		0.50	<0.50	<0.50
Xylenes (Total)	4200	0.71	<0.71	<0.71

All values in ug/g - ppm - parts per million, MDL- Method Detection Limit, *Part XV.1 of the *Environmental Protection Act* – Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, (July 2011).

APPENDIX I
Limitations

LIMITATIONS

This Phase II ESA was performed for 1000414136 Ontario Ltd. (Client) in order to investigate potential environmental impacts at 410 Queen Street, Chatham, Ontario (Site). Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present. No environmental site assessment can wholly eliminate uncertainty regarding the potential for environmental impacts on a property. Performance of this Phase II ESA to the standards established by BAE is intended to reduce, but not eliminate, uncertainty regarding the potential for environmental impacts on the Site and recognizes reasonable limits on time and cost.

This Phase II ESA was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site. The scope of work completed by BAE, as part of this Phase II ESA, is not sufficient (in and of itself) to meet the requirements for the submission of a Record of Site Condition (RSC) in accordance with Ontario Regulation 153/04 (as amended). If an RSC is an intended end product of work conducted at the Site, further consultation and/or work will be required. This report was prepared for the exclusive use of the Client 1000414136 Ontario Ltd., subject to the terms, conditions and limitations contained within the duly authorized proposal for this project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the sole responsibility of such third parties. BAE accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. If additional parties require reliance on this report, written authorization from BAE will be required.

BAE disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice. BAE will not provide results or information to any party unless disclosure by BAE is required by law. BAE makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

APPENDIX II
Certificates of Analysis

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WT2336397**	Page	: 1 of 9
Client	: **8577382 Canada Inc. - BAE Environmental**	Laboratory	: ALS Environmental - Waterloo
Contact	: Brian Emms	Account Manager	: Emily Smith
Address	: 18 Parkview Avenue Oro Medonte ON Canada L0L 2E0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 705 715 1881	Telephone	: +1 519 886 6910
Project	: BAE/8623	Date Samples Received	: 07-Nov-2023 16:45
PO	: ----	Date Analysis Commenced	: 08-Nov-2023
C-O-C number	: 20-1004798	Issue Date	: 10-Nov-2023 16:35
Sampler	: B Emms		
Site	: ----		
Quote number	: Waterloo 2022 Price List		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Jeremy Gingras	Supervisor - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Sarah Birch	VOC Section Supervisor	VOC, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non -infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
-	no units
µg/L	micrograms per litre

>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit .

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	Method/Lab	LOR	Unit	Client sample ID: MW2301 Sampling date/time: 07-Nov-2023 10:00 WT2336397-001	ON153/04 T3-NPGW-C-All	ON153/04 T3-NPGW-F-All	--	--	--	--
Volatile Organic Compounds										
Benzene	E611A/WT	0.50	µg/L	<0.50	44 µg/L	430 µg/L	--	--	--	--
Ethylbenzene	E611A/WT	0.50	µg/L	<0.50	2300 µg/L	2300 µg/L	--	--	--	--
Toluene	E611A/WT	0.50	µg/L	<0.50	18000 µg/L	18000 µg/L	--	--	--	--
Xylene, m+p-	E611A/WT	0.40	µg/L	<0.40	--	--	--	--	--	--
Xylene, o-	E611A/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Xylenes, total	E611A/WT	0.50	µg/L	<0.50	4200 µg/L	4200 µg/L	--	--	--	--
BTEX, total	E611A/WT	1.0	µg/L	<1.0	--	--	--	--	--	--
Hydrocarbons										
F1 (C6-C10)	E581.F1-L/WT	25	µg/L	<25	750 µg/L	750 µg/L	--	--	--	--
F2 (C10-C16)	E601.SG/WT	100	µg/L	<100	150 µg/L	150 µg/L	--	--	--	--
F3 (C16-C34)	E601.SG/WT	250	µg/L	<250	500 µg/L	500 µg/L	--	--	--	--
F4 (C34-C50)	E601.SG/WT	250	µg/L	<250	500 µg/L	500 µg/L	--	--	--	--
F1-BTEX	EC580/WT	25	µg/L	<25	750 µg/L	750 µg/L	--	--	--	--
Hydrocarbons, total (C6-C50)	EC581SG/WT	240	µg/L	<370	--	--	--	--	--	--
Chromatogram to baseline at nC50	E601.SG/WT		-	YES	--	--	--	--	--	--
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	E601.SG/WT	1.0	%	85.6	--	--	--	--	--	--
Dichlorotoluene, 3,4-	E581.F1-L/WT	1.0	%	101	--	--	--	--	--	--
Bromofluorobenzene, 4-	E611A/WT	1.0	%	95.8	--	--	--	--	--	--
Difluorobenzene, 1,4-	E611A/WT	1.0	%	100	--	--	--	--	--	--

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

No Breaches Found

Key:

ON153/04 — Ontario Regulation 153/04 - April 15, 2011 Standards (JUL, 2011)

T3-NPGW-C-All — 153 T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)

T3-NPGW-F-All — 153 T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	Method/Lab	LOR	Unit	MW2303 (Client sample ID) 07-Nov-2023 11:00 (Sampling date/time) WT2336397-002	ON153/04 T3-NPGW-C-AI I	ON153/04 T3-NPGW-F-AII	--	--	--	--
Volatile Organic Compounds										
Acetone	E611D/WT	20	µg/L	<20	130000 µg/L	130000 µg/L	--	--	--	--
Benzene	E611D/WT	0.50	µg/L	<0.50	44 µg/L	430 µg/L	--	--	--	--
Bromodichloromethane	E611D/WT	0.50	µg/L	<0.50	85000 µg/L	85000 µg/L	--	--	--	--
Bromoform	E611D/WT	0.50	µg/L	<0.50	380 µg/L	770 µg/L	--	--	--	--
Bromomethane	E611D/WT	0.50	µg/L	<0.50	5.6 µg/L	56 µg/L	--	--	--	--
Carbon tetrachloride	E611D/WT	0.20	µg/L	<0.20	0.79 µg/L	8.4 µg/L	--	--	--	--
Chlorobenzene	E611D/WT	0.50	µg/L	<0.50	630 µg/L	630 µg/L	--	--	--	--
Chloroform	E611D/WT	0.50	µg/L	<0.50	2.4 µg/L	22 µg/L	--	--	--	--
Dibromochloromethane	E611D/WT	0.50	µg/L	<0.50	82000 µg/L	82000 µg/L	--	--	--	--
Dibromoethane, 1,2-	E611D/WT	0.20	µg/L	<0.20	0.25 µg/L	0.83 µg/L	--	--	--	--
Dichlorobenzene, 1,2-	E611D/WT	0.50	µg/L	<0.50	4600 µg/L	9600 µg/L	--	--	--	--
Dichlorobenzene, 1,3-	E611D/WT	0.50	µg/L	<0.50	9600 µg/L	9600 µg/L	--	--	--	--
Dichlorobenzene, 1,4-	E611D/WT	0.50	µg/L	<0.50	8 µg/L	67 µg/L	--	--	--	--
Dichlorodifluoromethane	E611D/WT	0.50	µg/L	<0.50	4400 µg/L	4400 µg/L	--	--	--	--
Dichloroethane, 1,1-	E611D/WT	0.50	µg/L	<0.50	320 µg/L	3100 µg/L	--	--	--	--
Dichloroethane, 1,2-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	12 µg/L	--	--	--	--
Dichloroethylene, 1,1-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Dichloroethylene, cis-1,2-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Dichloroethylene, trans-1,2-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Dichloromethane	E611D/WT	1.0	µg/L	<1.0	610 µg/L	5500 µg/L	--	--	--	--
Dichloropropane, 1,2-	E611D/WT	0.50	µg/L	<0.50	16 µg/L	140 µg/L	--	--	--	--
Dichloropropylene, cis+trans-1,3-	E611D/WT	0.50	µg/L	<0.50	5.2 µg/L	45 µg/L	--	--	--	--
Dichloropropylene, cis-1,3-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Dichloropropylene, trans-1,3-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Ethylbenzene	E611D/WT	0.50	µg/L	<0.50	2300 µg/L	2300 µg/L	--	--	--	--
Hexane, n-	E611D/WT	0.50	µg/L	<0.50	51 µg/L	520 µg/L	--	--	--	--
Methyl ethyl ketone [MEK]	E611D/WT	20	µg/L	<20	470000 µg/L	1500000 µg/L	--	--	--	--
Methyl isobutyl ketone [MIBK]	E611D/WT	20	µg/L	<20	140000 µg/L	580000 µg/L	--	--	--	--
Methyl-tert-butyl ether [MTBE]	E611D/WT	0.50	µg/L	<0.50	190 µg/L	1400 µg/L	--	--	--	--
Styrene	E611D/WT	0.50	µg/L	<0.50	1300 µg/L	9100 µg/L	--	--	--	--

alsglobal.com

Page : 5 of 9
Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Analyte	Method/Lab	LOR	Unit	WT2336397-002 (Continued)	ON153/04 T3-NPGW-C-AII	ON153/04 T3-NPGW-F-AII	--	--	--	--
Volatile Organic Compounds - Continued										
Tetrachloroethane, 1,1,1,2-	E611D/WT	0.50	µg/L	<0.50	3.3 µg/L	28 µg/L	--	--	--	--
Tetrachloroethane, 1,1,2,2-	E611D/WT	0.50	µg/L	<0.50	3.2 µg/L	15 µg/L	--	--	--	--
Tetrachloroethylene	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Toluene	E611D/WT	0.50	µg/L	<0.50	18000 µg/L	18000 µg/L	--	--	--	--
Trichloroethane, 1,1,1-	E611D/WT	0.50	µg/L	<0.50	640 µg/L	6700 µg/L	--	--	--	--
Trichloroethane, 1,1,2-	E611D/WT	0.50	µg/L	<0.50	4.7 µg/L	30 µg/L	--	--	--	--
Trichloroethylene	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Trichlorofluoromethane	E611D/WT	0.50	µg/L	<0.50	2500 µg/L	2500 µg/L	--	--	--	--
Vinyl chloride	E611D/WT	0.50	µg/L	<0.50	0.5 µg/L	1.7 µg/L	--	--	--	--
Xylene, m+p-	E611D/WT	0.40	µg/L	<0.40	--	--	--	--	--	--
Xylene, o-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Xylenes, total	E611D/WT	0.50	µg/L	<0.50	4200 µg/L	4200 µg/L	--	--	--	--
BTEX, total	E611D/WT	1.0	µg/L	<1.0	--	--	--	--	--	--
Hydrocarbons										
F1 (C6-C10)	E581.F1-L/WT	25	µg/L	<25	750 µg/L	750 µg/L	--	--	--	--
F2 (C10-C16)	E601.SG/WT	100	µg/L	<100	150 µg/L	150 µg/L	--	--	--	--
F3 (C16-C34)	E601.SG/WT	250	µg/L	<250	500 µg/L	500 µg/L	--	--	--	--
F4 (C34-C50)	E601.SG/WT	250	µg/L	<250	500 µg/L	500 µg/L	--	--	--	--
F1-BTEX	EC580/WT	25	µg/L	<25	750 µg/L	750 µg/L	--	--	--	--
Hydrocarbons, total (C6-C50)	EC581SG/WT	240	µg/L	<370	--	--	--	--	--	--
Chromatogram to baseline at nC50	E601.SG/WT		-	YES	--	--	--	--	--	--
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	E601.SG/WT	1.0	%	78.9	--	--	--	--	--	--
Dichlorotoluene, 3,4-	E581.F1-L/WT	1.0	%	82.2	--	--	--	--	--	--
Bromofluorobenzene, 4-	E611D/WT	1.0	%	89.6	--	--	--	--	--	--
Difluorobenzene, 1,4-	E611D/WT	1.0	%	94.1	--	--	--	--	--	--

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

No Breaches Found

Page	:	6 of 9
Work Order	:	WT2336397
Client	:	8577382 Canada Inc. - BAE Environmental
Project	:	BAE/8623

Key:

ON153/04	Ontario Regulation 153/04 - April 15, 2011 Standards (JUL, 2011)
T3-NPGW-C-All	153 T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)
T3-NPGW-F-All	153 T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

alsglobal.com

Page : 7 of 9
Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Analytical Results

Sub-Matrix: Water
(Matrix: Water)

Analyte	Method/Lab	LOR	Unit	Client sample ID: MW2304 Sampling date/time: 07-Nov-2023 12:00 WT2336397-003	ON153/04 T3-NPGW-C-All	ON153/04 T3-NPGW-F-All	--	--	--	--
Volatile Organic Compounds										
Acetone	E611D/WT	20	µg/L	<20	130000 µg/L	130000 µg/L	--	--	--	--
Benzene	E611D/WT	0.50	µg/L	<0.50	44 µg/L	430 µg/L	--	--	--	--
Bromodichloromethane	E611D/WT	0.50	µg/L	<0.50	85000 µg/L	85000 µg/L	--	--	--	--
Bromoform	E611D/WT	0.50	µg/L	<0.50	380 µg/L	770 µg/L	--	--	--	--
Bromomethane	E611D/WT	0.50	µg/L	<0.50	5.6 µg/L	56 µg/L	--	--	--	--
Carbon tetrachloride	E611D/WT	0.20	µg/L	<0.20	0.79 µg/L	8.4 µg/L	--	--	--	--
Chlorobenzene	E611D/WT	0.50	µg/L	<0.50	630 µg/L	630 µg/L	--	--	--	--
Chloroform	E611D/WT	0.50	µg/L	<0.50	2.4 µg/L	22 µg/L	--	--	--	--
Dibromochloromethane	E611D/WT	0.50	µg/L	<0.50	82000 µg/L	82000 µg/L	--	--	--	--
Dibromoethane, 1,2-	E611D/WT	0.20	µg/L	<0.20	0.25 µg/L	0.83 µg/L	--	--	--	--
Dichlorobenzene, 1,2-	E611D/WT	0.50	µg/L	<0.50	4600 µg/L	9600 µg/L	--	--	--	--
Dichlorobenzene, 1,3-	E611D/WT	0.50	µg/L	<0.50	9600 µg/L	9600 µg/L	--	--	--	--
Dichlorobenzene, 1,4-	E611D/WT	0.50	µg/L	<0.50	8 µg/L	67 µg/L	--	--	--	--
Dichlorodifluoromethane	E611D/WT	0.50	µg/L	<0.50	4400 µg/L	4400 µg/L	--	--	--	--
Dichloroethane, 1,1-	E611D/WT	0.50	µg/L	<0.50	320 µg/L	3100 µg/L	--	--	--	--
Dichloroethane, 1,2-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	12 µg/L	--	--	--	--
Dichloroethylene, 1,1-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Dichloroethylene, cis-1,2-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Dichloroethylene, trans-1,2-	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Dichloromethane	E611D/WT	1.0	µg/L	<1.0	610 µg/L	5500 µg/L	--	--	--	--
Dichloropropane, 1,2-	E611D/WT	0.50	µg/L	<0.50	16 µg/L	140 µg/L	--	--	--	--
Dichloropropylene, cis+trans-1,3-	E611D/WT	0.50	µg/L	<0.50	5.2 µg/L	45 µg/L	--	--	--	--
Dichloropropylene, cis-1,3-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Dichloropropylene, trans-1,3-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Ethylbenzene	E611D/WT	0.50	µg/L	<0.50	2300 µg/L	2300 µg/L	--	--	--	--
Hexane, n-	E611D/WT	0.50	µg/L	<0.50	51 µg/L	520 µg/L	--	--	--	--
Methyl ethyl ketone [MEK]	E611D/WT	20	µg/L	<20	470000 µg/L	1500000 µg/L	--	--	--	--
Methyl isobutyl ketone [MIBK]	E611D/WT	20	µg/L	<20	140000 µg/L	580000 µg/L	--	--	--	--
Methyl-tert-butyl ether [MTBE]	E611D/WT	0.50	µg/L	<0.50	190 µg/L	1400 µg/L	--	--	--	--
Styrene	E611D/WT	0.50	µg/L	<0.50	1300 µg/L	9100 µg/L	--	--	--	--

alsglobal.com

Analyte	Method/Lab	LOR	Unit	WT2336397-003 (Continued)	ON153/04 T3-NPGW-C-AII	ON153/04 T3-NPGW-F-AII	--	--	--	--
Volatile Organic Compounds - Continued										
Tetrachloroethane, 1,1,1,2-	E611D/WT	0.50	µg/L	<0.50	3.3 µg/L	28 µg/L	--	--	--	--
Tetrachloroethane, 1,1,2,2-	E611D/WT	0.50	µg/L	<0.50	3.2 µg/L	15 µg/L	--	--	--	--
Tetrachloroethylene	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Toluene	E611D/WT	0.50	µg/L	<0.50	18000 µg/L	18000 µg/L	--	--	--	--
Trichloroethane, 1,1,1-	E611D/WT	0.50	µg/L	<0.50	640 µg/L	6700 µg/L	--	--	--	--
Trichloroethane, 1,1,2-	E611D/WT	0.50	µg/L	<0.50	4.7 µg/L	30 µg/L	--	--	--	--
Trichloroethylene	E611D/WT	0.50	µg/L	<0.50	1.6 µg/L	17 µg/L	--	--	--	--
Trichlorofluoromethane	E611D/WT	0.50	µg/L	<0.50	2500 µg/L	2500 µg/L	--	--	--	--
Vinyl chloride	E611D/WT	0.50	µg/L	<0.50	0.5 µg/L	1.7 µg/L	--	--	--	--
Xylene, m+p-	E611D/WT	0.40	µg/L	<0.40	--	--	--	--	--	--
Xylene, o-	E611D/WT	0.30	µg/L	<0.30	--	--	--	--	--	--
Xylenes, total	E611D/WT	0.50	µg/L	<0.50	4200 µg/L	4200 µg/L	--	--	--	--
BTEX, total	E611D/WT	1.0	µg/L	<1.0	--	--	--	--	--	--
Hydrocarbons										
F1 (C6-C10)	E581.F1-L/WT	25	µg/L	<25	750 µg/L	750 µg/L	--	--	--	--
F2 (C10-C16)	E601.SG/WT	100	µg/L	<100	150 µg/L	150 µg/L	--	--	--	--
F3 (C16-C34)	E601.SG/WT	250	µg/L	<250	500 µg/L	500 µg/L	--	--	--	--
F4 (C34-C50)	E601.SG/WT	250	µg/L	<250	500 µg/L	500 µg/L	--	--	--	--
F1-BTEX	EC580/WT	25	µg/L	<25	750 µg/L	750 µg/L	--	--	--	--
Hydrocarbons, total (C6-C50)	EC581SG/WT	240	µg/L	<370	--	--	--	--	--	--
Chromatogram to baseline at nC50	E601.SG/WT		-	YES	--	--	--	--	--	--
Bromobenzotrifluoride, 2- (F2-F4 surrogate)	E601.SG/WT	1.0	%	85.7	--	--	--	--	--	--
Dichlorotoluene, 3,4-	E581.F1-L/WT	1.0	%	88.6	--	--	--	--	--	--
Bromofluorobenzene, 4-	E611D/WT	1.0	%	89.3	--	--	--	--	--	--
Difluorobenzene, 1,4-	E611D/WT	1.0	%	94.1	--	--	--	--	--	--

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

No Breaches Found

Page	:	9 of 9
Work Order	:	WT2336397
Client	:	8577382 Canada Inc. - BAE Environmental
Project	:	BAE/8623

Key:

ON153/04	Ontario Regulation 153/04 - April 15, 2011 Standards (JUL, 2011)
T3-NPGW-C-All	153 T3-Non-Potable Ground Water-All Types of Property Uses (Coarse)
T3-NPGW-F-All	153 T3-Non-Potable Ground Water-All Types of Property Uses (Fine)

alsglobal.com

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	**WT2336397**	Page	1 of 10
Client	8577382 Canada Inc. - BAE Environmental	Laboratory	ALS Environmental - Waterloo
Contact	Brian Emms	Account Manager	Emily Smith
Address	18 Parkview Avenue Oro Medonte ON Canada L0L 2E0	Address	60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone		Telephone	+1 519 886 6910
Project	BAE/8623	Date Samples Received	07-Nov-2023 16:45
PO	----	Date Analysis Commenced	08-Nov-2023
C-O-C number	20-1004798	Issue Date	10-Nov-2023 16:36
Sampler	B Emms 705 715 1881		
Site	----		
Quote number	Waterloo 2022 Price List		
No. of samples received	3		
No. of samples analysed	3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	Position	Laboratory Department
Jeremy Gingras	Supervisor - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Sarah Birch	VOC Section Supervisor	Waterloo VOC, Waterloo, Ontario

alsglobal.com

Page	:	2 of 10
Work Order	:	WT2336397
Client	:	8577382 Canada Inc. - BAE Environmental
Project	:	BAE/8623

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Page : 3 of 10
Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 1227742)											
TY2311554-001	Anonymous	Acetone	67-64-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Benzene	71-43-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromomethane	74-83-9	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dibromoethane, 1,2-	106-93-4	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorodifluoromethane	75-71-8	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Hexane, n-	110-54-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

alsglobal.com

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Volatile Organic Compounds (QC Lot: 1227742) - continued											
TY2311554-001	Anonymous	Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1228136)											
WT2336260-001	Anonymous	Benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1227743)											
TY2311554-001	Anonymous	F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	<25	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1228135)											
WT2336260-001	Anonymous	F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	<25	0	Diff <2x LOR	----

Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 1227742)						
Acetone	67-64-1	E611D	20	µg/L	<20	----
Benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611D	0.5	µg/L	<0.50	----
Bromomethane	74-83-9	E611D	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611D	0.2	µg/L	<0.20	----
Chlorobenzene	108-90-7	E611D	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
Dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	----
Dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	<0.20	----
Dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	----
Dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611D	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	<0.30	----
Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
Hexane, n-	110-54-3	E611D	0.5	µg/L	<0.50	----
Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	----
Methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611D	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----

alsglobal.com

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 1227742) - continued						
Toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611D	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	----
Volatile Organic Compounds (QCLot: 1228136)						
Benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 1227743)						
F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	----
Hydrocarbons (QCLot: 1227788)						
F2 (C10-C16)	----	E601.SG	100	µg/L	<100	----
F3 (C16-C34)	----	E601.SG	250	µg/L	<250	----
F4 (C34-C50)	----	E601.SG	250	µg/L	<250	----
Hydrocarbons (QCLot: 1228135)						
F1 (C6-C10)	----	E581.F1-L	25	µg/L	<25	----

Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1227742)									
Acetone	67-64-1	E611D	20	µg/L	100 µg/L	124	70.0	130	----
Benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
Bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
Bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	110	70.0	130	----
Bromomethane	74-83-9	E611D	0.5	µg/L	100 µg/L	110	60.0	140	----
Carbon tetrachloride	56-23-5	E611D	0.2	µg/L	100 µg/L	100	70.0	130	----
Chlorobenzene	108-90-7	E611D	0.5	µg/L	100 µg/L	96.8	70.0	130	----
Chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
Dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	105	70.0	130	----
Dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	100 µg/L	104	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	96.5	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	100 µg/L	94.2	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	93.9	70.0	130	----
Dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	100 µg/L	93.2	60.0	140	----
Dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	100 µg/L	105	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	100 µg/L	112	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	100 µg/L	95.6	70.0	130	----
Dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	112	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	100 µg/L	101	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	100	70.0	130	----
Ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	92.1	70.0	130	----
Hexane, n-	110-54-3	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
Methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	113	70.0	130	----
Methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	100 µg/L	91.9	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	100	70.0	130	----
Styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	96.3	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	100 µg/L	99.3	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	122	70.0	130	----
Tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	97.4	70.0	130	----
Toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	94.5	70.0	130	----

Page : 8 of 10
Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1227742) - continued									
Trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	94.8	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
Trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	96.7	70.0	130	----
Trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	100 µg/L	98.5	60.0	140	----
Vinyl chloride	75-01-4	E611D	0.5	µg/L	100 µg/L	106	60.0	140	----
Xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	95.4	70.0	130	----
Xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	95.1	70.0	130	----
Volatile Organic Compounds (QCLot: 1228136)									
Benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.8	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	95.7	70.0	130	----
Toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	86.8	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	98.0	70.0	130	----
Xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	99.1	70.0	130	----
Hydrocarbons (QCLot: 1227743)									
F1 (C6-C10)	----	E581.F1-L	25	µg/L	2000 µg/L	94.1	80.0	120	----
Hydrocarbons (QCLot: 1227788)									
F2 (C10-C16)	----	E601.SG	100	µg/L	3685.12 µg/L	102	70.0	130	----
F3 (C16-C34)	----	E601.SG	250	µg/L	7481.33 µg/L	107	70.0	130	----
F4 (C34-C50)	----	E601.SG	250	µg/L	4274.88 µg/L	106	70.0	130	----
Hydrocarbons (QCLot: 1228135)									
F1 (C6-C10)	----	E581.F1-L	25	µg/L	2000 µg/L	105	80.0	120	----

alsglobal.com

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1227742)										
TY2311554-001	Anonymous	Acetone	67-64-1	E611D	122 µg/L	100 µg/L	122	60.0	140	---
		Benzene	71-43-2	E611D	103 µg/L	100 µg/L	103	60.0	140	---
		Bromodichloromethane	75-27-4	E611D	108 µg/L	100 µg/L	108	60.0	140	---
		Bromoform	75-25-2	E611D	111 µg/L	100 µg/L	111	60.0	140	---
		Bromomethane	74-83-9	E611D	103 µg/L	100 µg/L	103	60.0	140	---
		Carbon tetrachloride	56-23-5	E611D	102 µg/L	100 µg/L	102	60.0	140	---
		Chlorobenzene	108-90-7	E611D	97.6 µg/L	100 µg/L	97.6	60.0	140	---
		Chloroform	67-66-3	E611D	106 µg/L	100 µg/L	106	60.0	140	---
		Dibromochloromethane	124-48-1	E611D	105 µg/L	100 µg/L	105	60.0	140	---
		Dibromoethane, 1,2-	106-93-4	E611D	103 µg/L	100 µg/L	103	60.0	140	---
		Dichlorobenzene, 1,2-	95-50-1	E611D	97.7 µg/L	100 µg/L	97.7	60.0	140	---
		Dichlorobenzene, 1,3-	541-73-1	E611D	97.9 µg/L	100 µg/L	97.9	60.0	140	---
		Dichlorobenzene, 1,4-	106-46-7	E611D	97.1 µg/L	100 µg/L	97.1	60.0	140	---
		Dichlorodifluoromethane	75-71-8	E611D	66.5 µg/L	100 µg/L	66.5	60.0	140	---
		Dichloroethane, 1,1-	75-34-3	E611D	105 µg/L	100 µg/L	105	60.0	140	---
		Dichloroethane, 1,2-	107-06-2	E611D	112 µg/L	100 µg/L	112	60.0	140	---
		Dichloroethylene, 1,1-	75-35-4	E611D	99.3 µg/L	100 µg/L	99.3	60.0	140	---
		Dichloroethylene, cis-1,2-	156-59-2	E611D	105 µg/L	100 µg/L	105	60.0	140	---
		Dichloroethylene, trans-1,2-	156-60-5	E611D	102 µg/L	100 µg/L	102	60.0	140	---
		Dichloromethane	75-09-2	E611D	112 µg/L	100 µg/L	112	60.0	140	---
		Dichloropropane, 1,2-	78-87-5	E611D	105 µg/L	100 µg/L	105	60.0	140	---
		Dichloropropylene, cis-1,3-	10061-01-5	E611D	98.6 µg/L	100 µg/L	98.6	60.0	140	---
		Dichloropropylene, trans-1,3-	10061-02-6	E611D	96.6 µg/L	100 µg/L	96.6	60.0	140	---
		Ethylbenzene	100-41-4	E611D	93.6 µg/L	100 µg/L	93.6	60.0	140	---
		Hexane, n-	110-54-3	E611D	99.8 µg/L	100 µg/L	99.8	60.0	140	---
		Methyl ethyl ketone [MEK]	78-93-3	E611D	98 µg/L	100 µg/L	98.3	60.0	140	---
		Methyl isobutyl ketone [MIBK]	108-10-1	E611D	82 µg/L	100 µg/L	82.1	60.0	140	---
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	101 µg/L	100 µg/L	101	60.0	140	---
		Styrene	100-42-5	E611D	95.2 µg/L	100 µg/L	95.2	60.0	140	---
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611D	100 µg/L	100 µg/L	100	60.0	140	---
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611D	120 µg/L	100 µg/L	120	60.0	140	---

Page	:	10 of 10
Work Order	:	WT2336397
Client	:	8577382 Canada Inc. - BAE Environmental
Project	:	BAE/8623

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1227742) - continued										
TY2311554-001	Anonymous	Tetrachloroethylene	127-18-4	E611D	98.5 µg/L	100 µg/L	98.5	60.0	140	----
		Toluene	108-88-3	E611D	96.1 µg/L	100 µg/L	96.1	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611D	96.0 µg/L	100 µg/L	96.0	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611D	105 µg/L	100 µg/L	105	60.0	140	----
		Trichloroethylene	79-01-6	E611D	97.9 µg/L	100 µg/L	97.9	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611D	92.6 µg/L	100 µg/L	92.6	60.0	140	----
		Vinyl chloride	75-01-4	E611D	92.9 µg/L	100 µg/L	92.9	60.0	140	----
		Xylene, m+p-	179601-23-1	E611D	195 µg/L	200 µg/L	97.7	60.0	140	----
		Xylene, o-	95-47-6	E611D	96.6 µg/L	100 µg/L	96.6	60.0	140	----
Volatile Organic Compounds (QCLot: 1228136)										
WT2336260-001	Anonymous	Benzene	71-43-2	E611A	96.2 µg/L	100 µg/L	96.2	60.0	140	----
		Ethylbenzene	100-41-4	E611A	97.7 µg/L	100 µg/L	97.7	60.0	140	----
		Toluene	108-88-3	E611A	87.8 µg/L	100 µg/L	87.8	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	200 µg/L	200 µg/L	100	60.0	140	----
		Xylene, o-	95-47-6	E611A	101 µg/L	100 µg/L	101	60.0	140	----
Hydrocarbons (QCLot: 1227743)										
TY2311554-001	Anonymous	F1 (C6-C10)	----	E581.F1-L	1610 µg/L	2000 µg/L	80.4	60.0	140	----
Hydrocarbons (QCLot: 1228135)										
WT2336260-001	Anonymous	F1 (C6-C10)	----	E581.F1-L	1790 µg/L	2000 µg/L	89.6	60.0	140	----

alsglobal.com

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2336397**	Page	: 1 of 7
Client	: **8577382 Canada Inc. - BAE Environmental**	Laboratory	: ALS Environmental - Waterloo
Contact	: Brian Emms	Account Manager	: Emily Smith
Address	: 18 Parkview Avenue Oro Medonte ON Canada L0L 2E0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 705 715 1881	Telephone	: +1 519 886 6910
Project	: BAE/8623	Date Samples Received	: 07-Nov-2023 16:45
PO	: ----	Issue Date	: 10-Nov-2023 16:34
C-O-C number	: 20-1004798		
Sampler	: B Emms		
Site	: ----		
Quote number	: Waterloo 2022 Price List		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

alsglobal.com

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)										
Glass vial (sodium bisulfate) MW2301	E581.F1-L	07-Nov-2023	08-Nov-2023	14 days	1 days	✓	08-Nov-2023	14 days	1 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)										
Glass vial (sodium bisulfate) MW2303	E581.F1-L	07-Nov-2023	08-Nov-2023	14 days	1 days	✓	08-Nov-2023	14 days	1 days	✓
Hydrocarbons : CCME PHC - F1 by Headspace GC-FID (Low Level)										
Glass vial (sodium bisulfate) MW2304	E581.F1-L	07-Nov-2023	08-Nov-2023	14 days	1 days	✓	08-Nov-2023	14 days	1 days	✓
Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) [ON MECP] MW2301	E601.SG	07-Nov-2023	08-Nov-2023	40 days	1 days	✓	10-Nov-2023	40 days	2 days	✓
Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) [ON MECP] MW2303	E601.SG	07-Nov-2023	08-Nov-2023	40 days	1 days	✓	10-Nov-2023	40 days	2 days	✓
Hydrocarbons : Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) [ON MECP] MW2304	E601.SG	07-Nov-2023	08-Nov-2023	40 days	1 days	✓	10-Nov-2023	40 days	2 days	✓
Volatile Organic Compounds : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) MW2301	E611A	07-Nov-2023	08-Nov-2023	14 days	1 days	✓	08-Nov-2023	14 days	1 days	✓

Work Order : WT2336397
Client : 8577382 Canada Inc. - BAE Environmental
Project : BAE/8623

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW2303	E611D	07-Nov-2023	08-Nov-2023	14 days	1 days	✓	08-Nov-2023	14 days	1 days	✓
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate) MW2304	E611D	07-Nov-2023	08-Nov-2023	14 days	1 days	✓	08-Nov-2023	14 days	1 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	Method	QC Lot #	QC	Regular	Actual	Expected	Evaluation
Laboratory Duplicates (DUP)							
BTEX by Headspace GC-MS	E611A	1228136	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	1227743	2	34	5.8	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1227742	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
BTEX by Headspace GC-MS	E611A	1228136	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	1227743	2	34	5.8	5.0	✓
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	1227788	1	18	5.5	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1227742	1	20	5.0	5.0	✓
Method Blanks (MB)							
BTEX by Headspace GC-MS	E611A	1228136	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	1227743	2	34	5.8	5.0	✓
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG	1227788	1	18	5.5	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1227742	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
BTEX by Headspace GC-MS	E611A	1228136	1	20	5.0	5.0	✓
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L	1227743	2	34	5.8	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	1227742	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
CCME PHC - F1 by Headspace GC-FID (Low Level)	E581.F1-L ALS Environmental - Waterloo	Water	CCME PHC in Soil - Tier 1 (mod)	CCME Fraction 1 (F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
Silica Gel Treated CCME PHCs - F2-F4sg by GC-FID	E601.SG ALS Environmental - Waterloo	Water	CCME PHC in Soil - Tier 1 (mod)	Sample extracts are subjected to in-situ silica gel treatment prior to analysis by GC-FID for CCME hydrocarbon fractions (F2-F4). Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
BTEX by Headspace GC-MS	E611A ALS Environmental - Waterloo	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (Eastern Canada List) by Headspace GC-MS	E611D ALS Environmental - Waterloo	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
F1-BTEX	EC580 ALS Environmental - Waterloo	Water	CCME PHC in Soil - Tier 1	F1-BTEX is calculated as follows: F1-BTEX = F1 (C6-C10) minus benzene, toluene, ethylbenzene and xylenes (BTEX).
SUM F1 to F4 where F2-F4 is SG treated	EC581SG ALS Environmental - Waterloo	Water	CCME PHC in Soil - Tier 1	Hydrocarbons, total (C6-C50) is the sum of CCME Fraction F1(C6-C10), F2(C10-C16), F3(C16-C34), and F4(C34-C50), where F2-F4 have been treated with silica gel. F4G-sg is not used within this calculation due to overlap with other fractions.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Waterloo	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Waterloo	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

Chain of Custody (COC) / Analytical Request Form

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

COC Number: 20 - 1004708

Environmental Division
Waterloo
Work Order Reference
WT2336397

Telephone: +1 519 886 6910

Report To (Contact and company name below will appear on the final report)

- Company: BAE Environmental
- Contact: B. Emms
- Phone: 705-715-1881
- Company address below will appear on the final report
- Street:
- City/Province:
- Postal Code: L0L 2E0

Invoice To

- Same as Report To ☐ YES ☐ NO
- Copy of Invoice with Report ☐ YES ☐ NO
- Company:
- Contact:

Reports / Recipients

- Select Report Format: ☒ PDF ☐ EXCEL ☐ EDD (DIGITAL)
- Merge QC/QCI Reports with COA ☒ YES ☐ NO ☐ N/A
- ☒ Compare Results to Criteria on Report - provide details below if box checked
- Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
- Email 1 or Fax: ehvsol@rogers.com
- Email 2
- Email 3

Invoice Recipients

- Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
- Email 1 or Fax
- Email 2

Turnaround Time (TAT) Requested

- ☒ Routine [R] if received by 3pm M-F - no surcharges apply
- ☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- ☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- ☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- ☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- ☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

- ALS Account # / Quote #:
- Job #: BAE/8623
- PO / AFE:
- LSD:

Oil and Gas Required Fields (client use)

- AFE/Cost Center:
- PO#
- Major/Minor Code:
- Routing Code:
- Requisitioner:
- Location:

ALS Lab Work Order # (ALS use only): WT2336397

ALS Contact: E. Smith

Sampler: B. Emms

Analysis Request (Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below)

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Number of Containers	BTEX F1	VOC F1	F2,3,4	Samples on Hold	Extended Storage Required	Suspected Hazard (see notes)
	MW2301	07-11-23	10:00	GW	4	X	X	X			
	MW2303	↓	11:00	GW	4		X	X			
	MW2304		12:00	GW	4		X	X			

Drinking Water (DW) Samples[1] (client use)

- Are samples taken from a Regulated DW System? ☐ YES ☒ NO
- Are samples for human consumption/ use? ☐ YES ☒ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Table 3 ICI

Sample Receipt Details (ALS use only)

- Cooling Method: ☒ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
- Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
- Cooler Custody Seals Intact: ☐ YES ☐ N/A
- Sample Custody Seals Intact: ☐ YES ☐ N/A
- Initial Cooler Temperatures °C
- Final Cooler Temperatures °C: 4.5

Shipment Release (client use)			Initial Shipment Reception (ALS use only)			Final Shipment Reception (ALS use only)		
Released by: [signature]	Date: 7 Nov. 23	Time:	Received by:	Date:	Time:	Received by: TS	Date: Nov 7/23	Time: 16:45

Refer to back page for ALS locations and sampling information. WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

VW-209
OR-435

APPENDIX III
Field Screening Apparatus

Environmental Protection Development September 2001
Agency Washington, DC 20460

Innovative Technology Verification Report

Field Measurement Technologies for Total Petroleum Hydrocarbons in Soil Dexsil® Corporation PetroFLAG™ System

EPA/600/R-01/092
September 2001

Innovative Technology Verification Report

Dexsil® Corporation PetroFLAG™ System

Prepared by
Tetra Tech EM Inc.
200 East Randolph Drive, Suite 4700
Chicago, Illinois 60601
Contract No. 68-C5-0037
Dr. Stephen Billets
Characterization and Monitoring Branch
Environmental Sciences Division
Las Vegas, Nevada 89193-3478
National Exposure Research Laboratory
Office of Research and Development
U.S. Environmental Protection Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Research and Development
Washington, DC 20460

ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM

VERIFICATION STATEMENT

TECHNOLOGY TYPE: **FIELD MEASUREMENT DEVICE**
APPLICATION: **MEASUREMENT OF TOTAL PETROLEUM HYDROCARBONS**

TECHNOLOGY NAME: **PetroFLAG™ SYSTEM**
COMPANY: **DEXSIL® CORPORATION**
ADDRESS: **ONE HAMDEN PARK DRIVE**
HAMDEN, CT 06517
WEB SITE: **http://www.dexsil.com**
TELEPHONE: **(203) 288-3509**

VERIFICATION PROGRAM DESCRIPTION

The U.S. Environmental Protection Agency (EPA) created the Superfund Innovative Technology Evaluation (SITE) and Environmental Technology Verification (ETV) Programs to facilitate deployment of innovative technologies through performance verification and information dissemination. The goal of these programs is to further environmental protection by substantially accelerating the acceptance and use of improved and cost-effective technologies. These programs assist and inform those involved in design, distribution, permitting, and purchase of environmental technologies. This document summarizes results of a demonstration of the PetroFLAG™ System developed by Dexsil® Corporation (Dexsil).

PROGRAM OPERATION

Under the SITE and ETV Programs, with the full participation of the technology developers, the EPA evaluates and documents the performance of innovative technologies by developing demonstration plans, conducting field tests, collecting and analyzing demonstration data, and preparing reports. The technologies are evaluated under rigorous quality assurance (QA) protocols to produce well-documented data of known quality. The EPA National Exposure Research Laboratory, which demonstrates field sampling, monitoring, and measurement technologies, selected Tetra Tech EM Inc. as the verification organization to assist in field testing seven field measurement devices for total petroleum hydrocarbons (TPH) in soil. This demonstration was funded by the SITE Program.

DEMONSTRATION DESCRIPTION

In June 2000, the EPA conducted a field demonstration of the PetroFLAG™ System and six other field measurement devices for TPH in soil. This verification statement focuses on the PetroFLAG™ System; a similar statement has been prepared for each of the other six devices. The performance and cost of the PetroFLAG™ System were compared to those of an off-site laboratory reference method, "Test Methods for Evaluating Solid Waste" (SW-846) Method 8015B (modified). To verify a wide range of performance attributes, the demonstration had both primary and secondary objectives. The primary objectives included (1) determining the method detection limit, (2) evaluating the accuracy and precision of TPH measurement, (3) evaluating the effect of interferents, and (4) evaluating the effect of moisture content on TPH measurement for each device. Additional primary objectives were to measure sample throughput and estimate TPH measurement costs. Secondary objectives included (1) documenting the skills and training required to properly operate the device, (2) documenting the portability of the device, (3) evaluating the device's durability, and (4) documenting the availability of the device and associated spare parts.

The PetroFLAG™ System was demonstrated by using it to analyze 66 soil environmental samples, 79 soil performance evaluation (PE) samples, and 36 liquid PE samples. In addition to these 181 samples, 10 extract duplicates prepared using the environmental samples were analyzed. The environmental samples were collected in four areas contaminated with gasoline, diesel, or other petroleum products, and the PE samples were obtained from a commercial provider. Dexsil chose not to analyze soil samples collected in a fifth area because Dexsil believed that the natural organic material in the area would adversely impact the PetroFLAG™ System's ability to accurately measure TPH. In addition, Dexsil chose not to analyze low- and medium-concentration-range weathered gasoline soil PE samples because according to Dexsil, the PetroFLAG™ System was not sensitive to weathered gasoline concentrations of less than 1,000

milligrams per kilogram. Collectively, the environmental and PE samples provided the different matrix types and the different levels and types of petroleum hydrocarbon contamination needed to perform a comprehensive evaluation of the PetroFLAG™ System. A complete description of the demonstration and a summary of its results are available in the "Innovative Technology Verification Report: Field Measurement Devices for Total Petroleum Hydrocarbons in Soil—Dexsil® Corporation.

TECHNOLOGY DESCRIPTION

The PetroFLAG™ System manufactured by Dexsil is based on emulsion turbidimetry, which involves measurement of the light scattered by an emulsion. With the PetroFLAG™ System, a proprietary, nonpolar, organic solvent mixture composed of alcohols, primarily methanol, is used to extract petroleum hydrocarbons from soil samples. A proprietary developer solution that is polar in nature and that acts as an emulsifier is added to a sample extract in order to precipitate the aromatic and aliphatic hydrocarbons and form uniformly sized micelles. Light at a wavelength of 585 nanometers is passed through the emulsion, and the amount of light scattered by the emulsion at a 90-degree angle is measured using a turbidimeter. The TPH concentration in the emulsion is then determined by comparing the turbidity reading for the emulsion to that for a reference standard or to a standard calibration curve. According to Dexsil, the TPH concentration thus measured is a function of the mean molecular weight of the hydrocarbons present in the sample. During the demonstration, extraction of petroleum hydrocarbons in a given soil sample was typically completed by adding 10 milliliters (mL) of proprietary methanol mixture extraction solvent to 10 grams of the sample. To form an emulsion, 2 mL of sample extract was then decanted into a vial containing 4 mL of developer solution. The emulsion was analyzed using the PetroFLAG™ Analyzer (turbidimeter) to obtain a direct measurement of the TPH concentration in the soil sample.

VERIFICATION OF PERFORMANCE

To ensure data usability, data quality indicators for accuracy, precision, representativeness, completeness, and comparability were assessed for the reference method based on project-specific QA objectives. Although the reference method results generally exhibited a negative bias, based on the results for the data quality indicators, the reference method results were considered to be of adequate quality. The bias was considered to be significant primarily for low- and medium concentration- range soil samples containing diesel, which made up only 13 percent of the total number of samples analyzed during the demonstration. The reference method recoveries observed during the demonstration were typical of the recoveries obtained by most organic analytical methods for environmental samples. In general, the user should exercise caution when evaluating the accuracy of a field measurement device by comparing it to reference methods because the reference methods themselves may have limitations. Key demonstration findings are summarized below for the primary objectives.

Method Detection Limit: Based on the TPH results for seven low-concentration-range diesel soil PE samples, the method detection limits were determined to be 20 and 6.32 milligrams per kilogram for the PetroFLAG™ System and reference method, respectively.

Accuracy and Precision: Seventy-one of 97 PetroFLAG™ System results (73 percent) used to draw conclusions regarding whether the TPH concentration in a given sampling area or sample type exceeded a specified action level agreed with those of the reference method; 26 PetroFLAG™ System conclusions were false positives. There were no false negatives. Of 91 PetroFLAG™ System results used to assess measurement bias, 11 were within 30 percent, 9 were within 30 to 50 percent, and 71 were not within 50 percent of the reference method results; 82 PetroFLAG™ System results were biased high, and 9 were biased low. For soil environmental samples, the PetroFLAG™ System results were statistically (1) the same as the reference method results for one of the four sampling areas and (2) different from the reference method results for three of the sampling areas. For soil PE samples, the PetroFLAG™ System

results were statistically (1) the same as the reference method results for high concentration- range diesel samples and (2) different from the reference method results for blank samples, high-concentration range weathered gasoline samples, and low- and medium-concentration-range diesel samples. For liquid PE samples, the PetroFLAG™ System results were statistically different from the reference method results for both weathered gasoline and diesel samples. The PetroFLAG™ System results correlated highly with the reference method results for one of the four sampling areas and diesel soil PE samples (the square of the correlation coefficient [R2] values were greater than 0.90, and F-test probability values were less than 5 percent). The PetroFLAG™ System results correlated moderately with the reference method results for two of the four sampling areas (R2 values were 0.84 and 0.86, and F-test probability values were less than 5 percent). The PetroFLAG™ System results correlated weakly with the reference method results for one of the four sampling areas and weathered gasoline soil PE samples (R2 values were 0.42 and 0.10, respectively, and F-test probability values were greater than 5 percent). Comparison of the PetroFLAG™ System and reference method median relative standard deviations (RSD) showed that the PetroFLAG™ System and the reference method exhibited similar overall precision. Specifically, the median RSD ranges were 6 to 19 percent and 5.5 to 16 percent for the PetroFLAG™ System and reference method, respectively. The analytical precision was about the same for the PetroFLAG™ System (a median relative percent difference of 5) and reference method (a median relative percent difference of 4).

Effect of Interferents: The PetroFLAG™ System showed a mean response of less than 5 percent for neat methyl-tert-butyl ether (MTBE) and tetrachloroethene (PCE) and for soil spiked with humic acid. The device's mean responses for neat Stoddard solvent; turpentine; and 1,2,4-trichlorobenzene were 42.5, 103, and 16 percent, respectively. The reference method showed varying mean responses for MTBE (39 percent); PCE (17.5 percent); Stoddard solvent (85 percent); turpentine (52 percent); 1,2,4-trichlorobenzene (50 percent); and humic acid (0 percent). For the demonstration, MTBE and Stoddard solvent were included in the definition of TPH.

Effect of Moisture Content: The PetroFLAG™ System showed a statistically significant decrease (17 percent) in TPH results when the soil moisture content was increased from 9 to 16 percent for weathered gasoline soil PE samples; the reference method TPH results were unaffected. Both PetroFLAG™ System and reference method TPH results were unaffected when the soil moisture content was increased from less than 1 to 9 percent for diesel soil PE samples.

Measurement Time: From the time of sample receipt, Dexsil required 50 hours, 40 minutes, to prepare a draft data package containing TPH results for 181 samples and 10 extract duplicates compared to 30 days for the reference method, which was used to analyze 199 samples and 13 extract duplicates.

Key demonstration findings are summarized below for the secondary objectives.

Skill and Training Requirements: The PetroFLAG™ System can be operated by one person with basic wet chemistry skills. The sample analysis procedure for the device can be learned in the field with a few practice attempts.

Portability: The PetroFLAG™ System is battery-operated and requires no alternating current power source. The device can be easily moved between sampling areas in the field, if necessary.

Durability and Availability of the Device: All items in the PetroFLAG™ System are available from Dexsil. During a 6-month warranty period, Dexsil will supply replacement parts for the device by overnight courier service at no cost. During the demonstration, none of the device's reusable items malfunctioned or was damaged.

In summary, during the demonstration, the PetroFLAG™ System exhibited the following desirable characteristics of a field TPH measurement device: (1) good precision, (2) lack of sensitivity to interferents that are not petroleum hydrocarbons (PCE and humic acid), (3) low measurement costs, and (4) ease of use. In addition, the PetroFLAG™ System exhibited moderate sample throughput. Based on action level conclusions and statistical correlations, the PetroFLAG™ System TPH results compared well with those of the reference method; however, the device exhibited a high bias, and its TPH results were determined to be statistically different from those of the reference method. In addition, turpentine and 1,2,4-trichlorobenzene biased the device's TPH results high. Moreover, an increase in soil moisture content biased the device's TPH results low for weathered gasoline soil PE samples. Collectively, the demonstration findings indicated that the user should exercise caution when considering the device for a specific field TPH measurement application.

Original signed by

Gary J. Foley, Ph.D.
Director
National Exposure Research Laboratory
Office of Research and Development

P001-0102

RKI INSTRUMENTS

ONE TO SIX GAS PORTABLE MONITOR

Gas Detection For Life

EAGLE™ Model

Features

- Simultaneous detection of up to 6 different gases
- Over 250 gas monitoring configurations
- Widest range of gas sensors available
- PPM / LEL hydrocarbon detection
- Powerful long-life pump with 125' range
- Low flow pump shut off and alarm
- Methane elimination switch for environmental use
- Security "Adjustment Lockout Switch"
- Up to 30 hours of continuous operation
- IR Sensors available for CO_2, % LEL CH_4, and 0-100% volume CH_4
- Transformer testing version available
- Alkaline or Ni-Cad capability
- Ergonomic RFI/EMI/Chemical resistant case
- Datalogging option
- Autocalibration
- Intrinsically safe design, CSA/NRTL & UL Classified (most versions)

RKI is proud to produce the most versatile portable gas detector on the market. The EAGLE is a powerful instrument that does more than offer standard confined space protection. The EAGLE also provides detection combinations never before offered in a portable gas monitor featuring the industry's widest selection of high quality, long life and field proven sensors.

The EAGLE's ergonomic design offers easy access to controls such as autocalibration, alarm silence, demand zero, peak hold and a wide variety of other features. Each channel has 2 alarm levels plus TWA and STEL alarms for toxic channels. Alarm levels are adjustable and can be latching or self resetting.

Standard features on the EAGLE are not available on other competitive units. These features include PPM/LEL hydrocarbon detection and a methane elimination switch for environmental applications. For quick response and recovery, the EAGLE has a strong internal pump which can draw samples from over 125 feet. The EAGLE will continuously operate for over 30 hours on alkaline batteries or 18 hours on Ni-Cads. Many accessories such as long hoses, special probes, datalogging, continuous operation adapters, remote alarms and strobes, dilution fittings, internal hydrophobic filter, etc, are available to help satisfy almost any application. Rugged, weatherproof, easy to operate and maintain, the EAGLE is the industry's answer to portable gas detection.

RKI Instruments, Inc. • 1855 Whipple Rd. Hayward, CA 94544 • Phone (800) 754-5165 • (510) 441-5656 • Fax (510) 441-5650

World Leader In Gas Detection & Sensor Technology
www.rkiinstruments.com

EAGLE™ Model

Enclosure	Weatherproof, chemical resistant, RFI/EMI coated high impact poly-carbonate-polyester blend. Can be set in rain or into 2.5" of water without damage. Ergonomically balanced with rugged top mounted handle.
Dimensions	10.5" L x 5.9" W 7" H
Weight	5 lbs
Detection Principle	Catalytic combustion, electrochemical cell, galvanic cell, and infrared.
Sensor Life	2 years under normal conditions.
Sampling Method	Powerful, long-life pump (over 6,000 hours) can draw samples over 125 feet. Flow rate approximately 2.0 SCFH.
Display	4 x 20 LCD readout with backlighting. Viewed through window in case top. Displays readings & status of all channels simultaneously.
Alarms	2 alarms per channel plus TWA and STEL alarms. Fully adjustable for levels, latching or self reset and silenceable.
Alarm Method	Buzzer 85dB at 30 cm, dual high intensity LED's, and flashing display.
Controls	6 external push buttons for operation, demand zero, and autocalibration. Buttons also access LEL/ppm, alarm silence, peak hold, TWA / STEL values, battery status and many other features.
Continuous Operating Hours	30 hours minimum using alkaline batteries, or 18 hours using Ni-Cads.
Power Source	Size D batteries, 4 alkaline or Ni-Cad. Charger has alkaline recognition to prevent battery damage if charging is attempted with alkalines.
Operating Temp. & Humidity	-10°C to 40°C (14°F to 104°F), 0 to 95% RH, non-condensing.
Indication Accuracy	Maximum variance +/- 5% of full scale.
Response Time	30 seconds to 90% (for most gases).
Safety Design	Intrinsically Safe, Class I, Division 1, Groups A, B, C and D. CSA / NRTL & UL Classified (most versions).
Standard Accessories	Shoulder strap, alkaline batteries, hydrophobic probe and 5 foot hose (for special toxic gas versions, shorter teflon hose used without probe).
Optional Accessories	• Datalogging of up to 4 gases (No datalogging possible on 5 or 6 gas versions or versions with more than 2 toxic sensors). • Remote alarm • Dilution fitting (50/50) • Ni-Cad batteries • Battery charger, 115 VAC, 220 VAC, or 12 VDC • Continous Operation Adapter, 115 VAC or 12 VDC • Extra loud buzzer • Extension Probes • Internal Hydrophobic Filter (strongly recommended)
Warranty	One year material and workmanship.

Gases & Detectable Ranges

Standard Confined Space Gases	
Hydrocarbons (CH_4, std)	0 - 100% LEL 0 - 50,000 ppm
Oxygen (O_2)	0 - 40% Vol.
Carbon Monoxide (CO)	0 - 500 ppm
Hydrogen Sulfide (H_2S)	0 - 100 ppm
Super Toxics and Other Gases	
Ammonia (NH_3)	0 - 75 ppm
Arsine (AsH_3)	0 - 1 ppm 0 - 200 ppb
Carbon Dioxide (CO_2) (I R Sensor)	0 - 5,000 ppm 0 - 10,000 ppm 0 - 5% Vol. 0 - 20% Vol. 0 - 50% Vol.
Chlorine (Cl_2)	0 - 3 ppm
Fluorine (F_2)	0 - 5 ppm
Hydrogen Fluoride (HF)	0 - 9 ppm
Hydrogen Chloride (HCl)	0 - 5 ppm
Hydrogen Cyanide (HCN)	0 - 30 ppm
Methane (CH_4) (IR Sensor)	0 - 100% LEL 0 - 100% Vol.
Nitrogen Dioxide (NO_2)	0 - 15 ppm
Nitric Oxide (NO)	0 - 100 ppm
Ozone (O_3)	0 - 1 ppm
Phosphine (PH_3)	0 - 1 ppm
Silane (SiH_4)	0 - 15 ppm
Sulfur Dioxide (SO_2)	0 - 30 ppm

The EAGLE can be provided with up to 6 gas sensors (2 Toxics maximum from "super toxics" list). Please specify gas combination when ordering.

Special Features

- Low Flow alarm shuts pump off to avoid damage to instrument.
- Hydrophobic filter disc in probe.
- Internal dust filter (or optional internal hydrophobic filter).
- Quick autocalibration using 4 in 1 calibration gas standard.
- Single gas calibration capability.
- Methane elimination switch for environmental applications.
- "Adjustment Lockout Switch" for added security.
- Confirmation beep (silenceable).
- Backlight, automatic for alarms and by demand with adjustable time.
- Meets EPA Method 21 protocol for fugitive emissions testing.

RKI Instruments, Inc.

1855 Whipple Road
Hayward, CA 94544

Toll Free: (800) 754-5165
Phone: (510) 441-5656
Fax: (510) 441-5650

mail4rki@rkiinstruments.com
www.rkiinstruments.com

Authorized Distributor:

MiniRAE 3000

Portable Handheld VOC Monitor

The MiniRAE 3000 is the most advanced handheld volatile organic compound (VOC) monitor on the market. Its photoionization detector's (PID) extended range of **0 to 15,000 ppm** makes it an ideal instrument for applications from industrial hygiene to leak detection and HazMat.

The **RF modem allows real-time data transmissions** with a base controller located up to 500 feet away from the MiniRAE 3000 (or two miles with optional RAELink3 portable modem). A personal computer can be used as the base station for a MiniRAE 3000 system. The standard ProRAE Remote software is capable of monitoring the input of up to 64 remotely located monitors, including MiniRAE 3000, AreaRAE, etc.

Key Features

- **Proven PID technology**
  The patented sensor provides the following unique features:
  - 3-second response time
  - Extended range up to 15,000 ppm with improved linearity
  - Humidity compensation with integral humidity and temperature sensors
- **Real-time wireless** data transmission with built-in RF modem or Bluetooth
- **Designed for simple service** Easy access to lamp and sensor in seconds without tools
- **Big graphic display** for easy overview of gas type, Correction Factor and concentration
- **Field-interchangeable battery pack** replaced in seconds without tools
- **Integrated flashlight** for better view in dark conditions
- **User-friendly screens, including dataplot chart view**
- **Integrated RAE Systems Correction Factors list for more than 200 compounds** to measure more chemicals than any other PID
- **Multi-language support** with 12 languages encoded
- **Rugged housing** withstands use in harsh environments
  - IP67 waterproof design for easy cleaning and decontamination in water
  - Strong protective removable rubber boot

Additional Advantages

- View real-time sensor data and alarm status at headquarters or command center
- Automatic lamp type recognition
- Duty-cycling™ lamp and sensor auto-cleaning technology
- Tough, flexible inlet Flexi-Probe™
- 3 large keys operable with 3 layers of gloves
- Strong, built-in sample pump draws up to 100 feet (30m) horizontally or vertically
- Loud, 95dB audible alarm
- Bright red flashing visual alarm
- Interchangeable drop-in Lithium-Ion and alkaline battery packs
- Charging cradle doubles as an external battery charger
- Compatible with AutoRAE™ calibration station
- ProRAE Remote software simultaneously controls and displays readings for up to 64 remote detectors
- License-free, ISM band RF transmission with communication range up to 500 feet (2 miles with optional RAELink3 modem)
- Optional RAELink3 modem provides GPS capability to track and display readings from remote detectors and provide up to 2 miles' long-distance transmission
- Datalogging with up to 6 months of data at one-minute intervals
- 3-year 10.6 eV lamp warranty

Wireless

AutoRAE Compatible

www.raesystems.com

ISO 9001 CERT FIED ATEX

RAE SYSTEMS

MiniRAE 3000

Specifications*

Detector Specifications

Size	10" L x 3.0" W x 2.5" H (25.5 cm x 7.6 cm x 6.4 cm)
Weight	26 oz (738 g)
Sensors	Photoionization sensor with standard 10.6 eV or optional 9.8 eV or 11.7 eV lamps
Battery	• Rechargeable, external field-replaceable Lithium-Ion battery pack • Alkaline battery adapter
Operating Hours	16 hours of operation (12 hours with alkaline battery)
Display Graphic	4 lines, 28 x 43 mm, with LED backlight for enhanced display readability
Keypad	1 operation and 2 programming keys, 1 flashlight on/off
Direct Readout	Instantaneous reading • VOCs as ppm by volume • High values • STEL and TWA • Battery and shutdown voltage • Date, time, temperature
Alarms	95dB at 12" (30 cm) buzzer and flashing red LED to indicate exceeded preset limits • High: 3 beeps and flashes per second • Low: 2 beeps and flashes per second • STEL and TWA: 1 beep and flash per second • Alarms latching with manual override or automatic reset • Additional diagnostic alarm and display message for low battery and pump stall
EMI/RFI	Highly resistant to EMI/RFI. Compliant with EMC directive (2004/108/EC); R & TTE directive (1999/5/EC)
IP Rating	• IP67 unit off and without flexible probe • IP65 unit running
Datalogging	Standard 6 months at one-minute intervals
Calibration	Two-point or three-point calibration for zero and span. Calibration memory for 8 calibration gases, alarm limits, span values and calibration dates
Sampling Pump	• Internal, integrated flow rate at 500 cc/mn • Sample from 100' (30m) horizontally and vertically
Low Flow Alarm	• Auto pump shutoff at low-flow condition
Communication	• Download data and upload instrument set-up from PC through charging cradle or optional Bluetooth™ • Wireless data transmission through built-in RF modem
Frequency	902 to 928 MHz (license-free), 2.400 to 2.4835 GHz (license-free), 433 MHz, 869 MHz
RF Range	Up to 500' (152m; 900 MHz, 433 Mhz, 869 Mhz), extendable with RAELink3 Repeater to 2 miles (3.2km)
Hazard Area Approval	• **US and Canada:** c SP us, Classified as Intrinsically Safe for use in Class I, Division 1 Groups A, B, C, D • **Europe:** ATEX II 2G EEx ia IIC T4
Temperature	-4° to 122° F (-20° to 50° C)
Humidity	0% to 95% relative humidity (non-condensing)
Attachments	Durable bright yellow rubber boot
Warranty	3 years for 10.6 eV lamp, 1 year for pump, battery, sensor and instrument

*Specifications are subject to change

Sensor Specifications

Gas Monitor	Range	Resolution	Response Time T90
VOCs	0 to 999.9 ppm 1000 to 15,000 ppm	0.1 ppm 1 ppm	< 3 s < 3 s

Monitor only includes:

- MiniRAE 3000 Monitor, Model PGM-7320
- Wireless communication module built in, as specified
- Datalogging with ProRAE Studio Package for Windows™ 98, 2000, NT, ME & XP
- Charging/download adapter
- RAE UV lamp, as specified
- Flex-I-Probe™
- External filter
- Rubber boot
- Alkaline battery adapter
- Lamp-cleaning kit
- Tool kit
- Operation CD-ROM
- Operation & Maintenance manual
- Soft leather case

Monitor with accessories kit adds:

- Hard transport case with pre-cut foam padding
- Charging/download cradle
- 5 Porous metal filters and O-rings
- Organic vapor zeroing kit
- Gas outlet port adapter and tubing

Optional calibration kit adds:

- 100 ppm isobutylene calibration gas, 34L
- Calibration regulator and flow controller

Optional Guaranteed Cost of Ownership Program:

- 4-year repair and replacement guarantee
- Annual maintenance service

RAE Systems Inc.
3775 North First Street
San Jose, CA 95134 USA
raesales@raesystems.com

USA/Canada 1-877-723-2878
Europe/Russia +45 8652 5155
Middle East/Australia +971 4 3639 427
China +86 10 58858788
Asia +852 2669 0828

www.raesystems.com

DS-1018-02

Solinst®

Interface Meter

Model 122 Data Sheet

Get Quote | More Info

Interface Meter
Model 122

Solinst Oil/Water Interface Meters give clear and accurate measurements of product level and thickness in wells and tanks.

Determination of both light (floating) non-aqueous phase liquids (LNAPL) and dense (sinking) non-aqueous phase liquids (DNAPL) is quick and easy. The factory-sealed probes are pressure proof and tapes are available in a range of lengths from 65 - 1000 ft (20 - 300 m).

The 5/8" (16 mm) diameter P1 Probe allows easy access through tight spaces and into narrow wells. The Probe is designed for use in various monitoring applications.

Hazardous Locations Use

The Model 122 Interface Meter has been approved by the Canadian Standards Association (CSA) for use in explosive environments. It is suitable for use in hazardous locations Class I, Groups C&D.

The grounding strap is a safety essential when the meter is used in potentially explosive environments. It also ensures that the electronics are properly protected.

Operating Principles

Product (Non-conductive liquid) = Steady light and tone

Water (Conductive liquid) = Intermittent light and tone

To detect liquids, Solinst Interface Meters use an infra-red beam and detector. When the probe enters a liquid the beam is refracted away from the detector which activates an audible tone and light. If the liquid is a non-conductive oil/product the signals are steady. If the liquid is water (conductive liquid greater than 50 µS/cm), the conductivity of the water completes a conductivity circuit. This overrides the infra-red circuit, and the tone and light are intermittent.

Both sensors use exactly the same zero point, giving accuracy as good as 1/200 ft or 1.0 mm. The high accuracy enables the sensors to detect the slightest sheen of oil on the surface of the water; this is indicated by a rapid intermittent tone.

Accurate, Reliable, Robust

- Designed for rugged field use
- Stable electronics with automatic circuitry testing
- Tape uses stranded stainless steel conductors:
  - non-stretch; does not corrode
  - resists kinking and breaks
  - easy to repair and splice
- Sturdy free-standing reel with carrying handle

High Quality Design

The state-of-the-art electronics include automatic circuitry testing when the 'On' button is used; 120 hours of on-time battery life; clear signals; and high accuracy.

Infra-red refraction is used to detect liquids and conductivity to distinguish water. Both optical and electronic sensors are precisely aligned at the same zero point. A steady light and tone indicate product. Water is indicated by intermittent signals.

The factory sealed probe does not need to be accessed by the user. An integral stainless steel shield protects the sensors. It is set permanently into place, yet allows for easy cleaning.

The circuits are powered by 2 standard 9V batteries which are housed in easy-access drawers in the faceplate of the reel.

Features

- Sensor accuracy to 1/200 ft or 1.0 mm
- Certified intrinsically safe
- 5/8" (16 mm) diameter probe
- Easy access batteries: minimum 120 hours of life
- Automatic shut off after 10 minutes
- Inexpensive, simple repairs
- 3 year warranty

Model 122 & 122M are CSA approved for use in hazardous locations Class I, Groups C&D

High Quality Groundwater and Surface Water Monitoring Instrumentation

Solinst®

Solinst

Interface Meter

Mini Interface Meter

Model 122M

The 122 Mini is a convenient small version of the Solinst Interface Meter, small enough to fit in a backpack. A custom carrying bag is also an option. The Mini is available in 65 ft or 20 m lengths.

The 5/8" (16 mm) diameter probe is attached to narrow 1/4" (6 mm) tape, which is accurately marked each 1/100 ft or millimeter. Enhanced electronics allow operation for up to 300 hours of on-time, using one 9V battery.

Obtaining Product Measurements

To measure the thickness of a product layer, lower the probe into the well until the signals activate. If there is an oil/product layer on the top of the water (LNAPL), the light and tone will be steady, indicating an air/product interface.

Read the depth off the permanently marked tape. Lower the probe further into the water, where the signals become intermittent, then pull back up and take a reading at the product/water interface. The thickness of the product layer is then determined by subtracting the first reading from the second.

If there is only water in the well and no product, there will only be intermittent (water) signals.

The presence or absence of dense (sinking) non-aqueous layers (DNAPL) is determined by continuing to lower the probe to the bottom of the well.

If the steady tone and light return, this indicates a non-conductive liquid. Measure the depth and continue lowering the probe until it touches bottom and the tape goes slack.

To determine the thickness of the DNAPL layer, subtract the first reading from the bottom depth.

Model 122 P1 and 122M Probes

Probes

122 P1: 5/8" diameter (16 mm) stainless steel. The beam is emitted from within a cone-shaped tip made from rigid polyurethane. The tip is protected by an integral stainless steel shield. This probe is excellent for the vast majority of product monitoring situations.

122M Probe: 5/8" diameter (16 mm) stainless steel. Similar to the P1 but shorter.

Tape

The easy-to-read markings on the tape are permanently heat-stamped into the tape. The dog bone shaped tape avoids adherence to wet surfaces in wells. It is resistant to most chemicals, and the smooth surface of the tape is easy to decontaminate, and easy to handle.

M2 Feet and tenths: with markings every 1/100 ft.
M3 Meters and centimeters: with markings every mm.
N2 and **N3** As above, but on the narrow 1/4" (6 mm) tape for the 122 Mini Interface Meter.

Standard Equipment

Each standard meter is provided with a grounding clip, cleaning brush, a convenient carrying bag with shoulder strap, and a tape guide/datum.

The tape guide may be used to provide support for the reel on the well casing. It acts as a datum allowing repeatably accurate measurements; ensures that the probe hangs in the centre of the well; and protects the tape from damage.

It is essential to use the grounding clip to ensure safety and proper function of the electronics in all applications.

Printed in Canada
September 2, 2009

For further information contact: Solinst Canada Ltd.
Fax: +1 (905) 873-1992; (800) 516-9081 Tel: +1 (905) 873-2255; (800) 661-2023
35 Todd Road, Georgetown, Ontario Canada L7G 4R8
Web Site: www.solinst.com E-mail: instruments@solinst.com

Solinst

Appendix IV
Part XV.1 of the *Environmental Protection Act*
Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

TABLE 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition

Table 2	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Acenaphthene	(29) 7.9	(29) 7.9	(29) 21	4.1
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	1
Acetone	(28) 16	(28) 16	(28) 16	2700
Aldrin	0.05	0.05	(0.11) 0.088	0.35
Anthracene	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	2.4
Antimony	7.5	7.5	(50) 40	6
Arsenic	11	18	18	25
Barium	390	390	670	1000
Benzene	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	5
Benz[a]anthracene	(0.63) 0.5	(0.63) 0.5	0.96	1
Benzo[a]pyrene	0.078	0.3	0.3	0.01
Benzo[b]fluoranthene	0.78	0.78	0.96	0.1
Benzo[ghi]perylene	(7.8) 6.6	(7.8) 6.6	9.6	0.2
Benzo[k]fluoranthene	0.78	0.78	0.96	0.1
Beryllium	(5) 4	(5) 4	(10) 8	4
Biphenyl 1,1'-	(1.1) 0.31	(1.1) 0.31	(210) 52	0.5
Bis(2-chloroethyl)ether	0.5	0.5	0.5	5
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(1.8) 0.67	(13) 11	120
Bis(2-ethylhexyl)phthalate	5	5	(35) 28	10
Boron (Hot Water Soluble)*	1.5	1.5	2	NA
Boron (total)	120	120	120	5000
Bromodichloromethane	(1.9) 1.5	(1.9) 1.5	(1.9) 1.5	16
Bromoform	(0.26) 0.27	(0.26) 0.27	(1.7) 0.61	25
Bromomethane	0.05	0.05	0.05	0.89
Cadmium	1	1.2	1.9	2.7
Carbon Tetrachloride	(0.12) 0.05	(0.12) 0.05	(0.71) 0.21	(5) 0.79
Chlordane	0.05	0.05	0.05	7
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	10
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	30
Chloroform	(0.18) 0.05	(0.18) 0.05	(0.18) 0.47	(22) 2.4
Chlorophenol, 2-	(2) 1.6	(2) 1.6	(3.9) 3.1	8.9
Chromium Total	160	160	160	50
Chromium VI	(10) 8	(10) 8	(10) 8	25
Chrysene	(7.8) 7	(7.8) 7	9.6	0.1
Cobalt	22	22	(100) 80	3.8
Copper	(180) 140	(180) 140	(300) 230	87
Cyanide (CN-)	0.051	0.051	0.051	66
Dibenz[a h]anthracene	0.1	0.1	0.1	0.2
Dibromochloromethane	(2.9) 2.3	(2.9) 2.3	(2.9) 2.3	25
Dichlorobenzene, 1,2-	(1.7) 1.2	(1.7) 1.2	(1.7) 1.2	3
Dichlorobenzene, 1,3-	(6) 4.8	(6) 4.8	(12) 9.6	59
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.097) 0.083	(0.57) 0.2	1
Dichlorobenzidine, 3,3'-	1	1	1	0.5
Dichlorodifluoromethane	(25) 16	(25) 16	(25) 16	590
DDD	3.3	3.3	4.6	10
DDE	(0.33) 0.26	(0.33) 0.26	(0.65) 0.52	10
DDT	0.078	1.4	1.4	2.8
Dichloroethane, 1,1-	(0.6) 0.47	(0.6) 0.47	(0.6) 0.47	5
Dichloroethane, 1,2-	0.05	0.05	0.05	(5) 1.6
Dichloroethylene, 1,1-	0.05	0.05	(0.48) 0.064	(14) 1.6
Dichloroethylene, 1,2-cis-	(2.5) 1.9	(2.5) 1.9	(2.5) 1.9	(17) 1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(0.75) 0.084	(2.5) 1.3	(17) 1.6
Dichlorophenol, 2,4-	(0.27) 0.19	(0.27) 0.19	(0.27) 0.19	20
Dichloropropane, 1,2-	(0.085) 0.05	(0.085) 0.05	(0.68) 0.16	5
Dichloropropene,1,3-	(0.081) 0.05	(0.081) 0.05	(0.081) 0.059	0.5
Dieldrin	0.05	0.05	(0.11) 0.088	0.35

Page 4

Table 2	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	0.5	38
Dimethylphthalate	0.5	0.5	0.5	38
Dimethylphenol, 2,4-	(53) 38	(53) 38	(53) 38	59
Dinitrophenol, 2,4-	(2.9) 2	(2.9) 2	(2.9) 2	10
Dinitrotoluene, 2,4 & 2,6-	0.5	0.5	0.5	5
Dioxane, 1,4	0.2	1.8	1.8	50
Dioxin/Furan (TEQ)	0.000013	0.000013	0.000099	0.000015
Endosulfan	0.04	0.04	(0.38) 0.3	1.5
Endrin	0.04	0.04	0.04	0.48
Ethylbenzene	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
Ethylene dibromide	0.05	0.05	0.05	0.2
Fluoranthene	0.69	0.69	9.6	0.41
Fluorene	(69) 62	(69) 62	(69) 62	120
Heptachlor	0.15	0.15	0.19	1.5
Heptachlor Epoxide	0.05	0.05	0.05	0.048
Hexachlorobenzene	0.52	0.52	0.66	1
Hexachlorobutadiene	(0.014) 0.012	(0.014) 0.012	(0.095) 0.031	(0.6) 0.44
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	1.2
Hexachloroethane	(0.071) 0.089	(0.071) 0.089	(0.43) 0.21	2.1
Hexane (n)	(34) 2.8	(34) 2.8	(88) 46	(520) 51
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	(0.48) 0.38	(0.95) 0.76	0.2
Lead	45	120	120	10
Mercury	(1.8) 0.25	(1.8) 0.27	(20) 3.9	(1) 0.29
Methoxychlor	0.13	0.13	1.6	6.5
Methyl Ethyl Ketone	(44) 16	(44) 16	(88) 70	1800
Methyl Isobutyl Ketone	(4.3) 1.7	(4.3) 1.7	(210) 31	640
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	0.15
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	15
Methylene Chloride	(0.96) 0.1	(0.96) 0.1	(2) 1.6	50
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(3.4) 0.99	(42) 30	3.2
Molybdenum	6.9	6.9	40	70
Naphthalene	(0.75) 0.6	(0.75) 0.6	(28) 9.6	11
Nickel	(130) 100	(130) 100	(340) 270	100
Pentachlorophenol	0.1	0.1	(3.3) 2.9	30
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	(65) 55	750
Petroleum Hydrocarbons F2	(150) 98	(150) 98	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(1300) 300	(2500) 1700	500
Petroleum Hydrocarbons F4	(5600) 2800	(5600) 2800	(6600) 3300	500
Phenanthrene	(7.8) 6.2	(7.8) 6.2	(16) 12	1
Phenol	9.4	9.4	9.4	890
Polychlorinated Biphenyls	0.35	0.35	1.1	3
Pyrene	78	78	96	4.1
Selenium	2.4	2.4	5.5	10
Silver	(25) 20	(25) 20	(50) 40	1.5
Styrene	(2.2) 0.7	(2.2) 0.7	(43) 34	5.4
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.05) 0.058	(0.11) 0.087	1.1
Tetrachloroethane, 1,1,2,2-	0.05	0.05	(0.094) 0.05	1
Tetrachloroethylene	(2.3) 0.28	(2.3) 0.28	(2.5) 1.9	(17) 1.6
Thallium	1	1	3.3	2
Toluene	(6) 2.3	(6) 2.3	(9) 6.4	24
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(1.4) 0.36	(16) 3.2	70
Trichloroethane, 1,1,1-	(3.4) 0.38	(3.4) 0.38	(12) 6.1	200
Trichloroethane, 1,1,2-	0.05	0.05	(0.11) 0.05	(5) 4.7
Trichloroethylene	(0.52) 0.061	(0.52) 0.061	(0.61) 0.55	(5) 1.6
Trichlorofluoromethane	(5.8) 4	(5.8) 4	(5.8) 4	150
Trichlorophenol, 2,4,5-	(5.5) 4.4	(5.5) 4.4	(10) 9.1	8.9
Trichlorophenol, 2,4,6-	(2.9) 2.1	(2.9) 2.1	(2.9) 2.1	2
Uranium	23	23	33	20
Vanadium	86	86	86	6.2
Vinyl Chloride	(0.022) 0.02	(0.022) 0.02	(0.25) 0.032	(1.7) 0.5

Page 5

Table 2	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Xylene Mixture	(25) 3.1	(25) 3.1	(30) 26	300
Zinc	340	340	340	1100
Electrical Conductivity (mS/cm)	0.7	0.7	1.4	NA
Chloride	NA	NA	NA	790000
Sodium Adsorption Ratio	5	5	12	NA
Sodium	NA	NA	NA	490000

Notes

( ) Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are appliable to both 1-methyl naphthallene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

APPENDIX V
Qualifications of Assessors

BAE Environmental personnel have been providing *Environmental Solutions* since 1997, including environmental consulting, contracting and project management services in an expedient, cost-effective manner.

BAE offers certified expertise and commitment and has performed hundreds of Phase One, Phase One and Phase Two Environmental Site Assessments, specialising in Brownfield Rehabilitation, soil and groundwater remediation, tank removal / decommissioning, real estate transactions, peer review, and Emergency SII Response for various financial institutions, municipal governments, insurance companies, law firms and the private sector.

The main objective of BAE is to remove the uncertainty often associated with the environmental concerns of today, and to afford our clients peace of mind. Our clients know that they are receiving the most cost and time effective solutions from the latest of technologies, with a hands on, common sense, approach. BAE is unique in that we are a streamline firm that has the ability to provide prompt, attentive service for each project from beginning to end. We are not married to any one technology as many other firms are which allows us to investigate the most appropriate time and cost effective technology for each individual situation. BAE also makes use of several forms of in-situ, enhanced bioremediation using the latest technologies. In-situ bioremediation allows our clients to carry on with normal business/residential operations while their property is being remediated. Our firm offers this service with results for most sites in 3-9 months along with reduced costs compared to conventional dig and haul methods. BAE although does have a cost-effective relationship to quickly dispose of impacted soil to MOE Licensed Landfills or Soil Restoration Facilities.

BAE covers all of Ontario, concentrating on the Central Ontario Region from Toronto to the shores of Georgian Bay, across to North Bay and south.

BAE also draws from a broad range of professional associates, which include accredited laboratories, architects, construction firms, chemists, drilling companies, environmental lawyers, environmental/ geological/ hydrogeological and structural Professional Engineers, micro-biologists, planners, as well as from a base of Professional Geo-Scientists and Certified Engineering Technologists.

BRIAN A. EMMS, C.E.T.

Certified Environmental Engineering Technologist

EDUCATION:

Jan 1995 – Dec 1997 Georgian College of Applied Arts and Technology

Environmental Engineering Technology

1994 - 1996 International Correspondence Schools

Wildlife and Forestry Conservation

1978 - 1980 St. Clair College, Ontario Management Development Program

ADDITIONAL ENVIRONMENTAL COURSES:

- Waste Auditing / Reduction Planning Certificate
- Bill 143 Compliance Program Workshop
- Environmental Landscaping
- ISO 14001 Environmental Management Systems Workshop
- Phase One and Phase One Environmental Site Assessments-Lexus
- Remediation By Natural Attenuation
- MOE-RSC& SSRA Guideline Best Practices and pitfalls
- Erosion Control and Soil Stabilisation
- Remediation Technologies For Groundwater
- Environmental Field Screening Technologies 2002
- Brownfield Remediation

Environmental Regulation & Compliance 2002

- Contaminated & Hazardous Waste Site Management Course-2004
- Dealing With Industrial Contaminated Land Regulation & Compliance -2005
- Dealing With Industrial Contaminated Land Regulation & Compliance - 2006
- New Environmental Technologies in Canada – 2007
- Mould Identification, Analysis and Remediation – 2008
- Dealing With Industrial Contaminated Land Regulation & Compliance - 2009, 2010, 2011
- US EPA Practical Models to Support Remediation Strategy Decision-Making -2012
- US EPA Understanding of LNAPL Behavior in the Subsurface- State of Science vs. State of Practice, Parts 1, 2 & 3 - 2015
- Texas Commission on Environmental Quality - Corrective Action at Leaking Petroleum Storage Tank Sites – 2016
- US EPA Understanding of LNAPL Behavior in the Subsurface – 2017
- US EPA Using LNAPL Science, the LCSM, and LNAPL Goals to Select an LNAPL Remedial Technology –

2018

- PFAS Contamination in Minnesota: Lessons Learned, Fate and Transport, and Reducing Exposure - 2019
- Brownfields Regulation and Compliance - 2019

RELATED EXPERIENCE:

February 2001- Present BAE Environmental previously Environmental Solutions - Senior Environmental Technologist

- marketing, contract negotiations, project administration / management, * II and III Environmental Site Assessments / remediation, Emergency SII Response, geotechnical investigations, Brownfield Rehabilitation, Mould Recognition and Removal.

May 1997-January 2001 Prominent Environmental Firm.
Branch / Project Manager
Barrie, ON

* marketing, contract negotiations, project administration / management, Phase One, II and III Environmental Site Assessments \ remediation, report writing, RSC
* Geotechnical investigations, asbestos abatement, demolition, liaison between clients and government agencies.

Memberships: Ontario Association of Certified Engineering Technicians and Technologists
Certified Member (OACETT)
Canadian Environmental Certification Approvals Board (CECAB)

Accomplishments: Royal Victoria Hospital Volunteer
United Nations Peacekeeper in Cyprus
Participant in the Development of Ministry of Municipal Affairs and Housing – Brownfields Showcase

APPENDIX VI
Borehole Record

COMMENTS : masl: meter above sea level • SS: Split-Spoon

LOGGED BY ATOPP
CHECKED BY AT

Elevation (masl)	% Recovery	Soil Sample ID	Soil Lab Analyses	Sample Type	Graphic Log	Material Description	HS VC as Isobutylene (ppm)	HS VC as Hexane (ppm)	Depth (m)	Well Diagram MW1
219.5		1		AU		Asphalt • A Gravel Brown Sand Fill • Moisture: medium / low • Odour: No • Staining: No	0 ppm	0.0	0.5	
219		2		SS		Brown Sand Fill • Moisture: low • Odour: No • Staining: No	0 ppm	0.0	1	
218.5		3		SS		Brown Sand Fill • Moisture: low • Odour: No • Staining: No	0 ppm	0.0	1.5	
218									2	
217.5		4	VOCs PHCs pH	SS		Brown Sand w. Trace Silt • Moisture: med/high • Odour: No • Staining: No	0 ppm	0.0	2.5	
217									3	
216.5		5		SS		Brown Sand & Gravel w. Trace Silt • Moisture: saturated • Odour: No • Staining: No	0 ppm	0.0	3.5	
216		6		SS		Brown Sand & Gravel w. Trace Silt • Moisture: saturated • Odour: No • Staining: No	0 ppm	0.0	4	
215.5									4.5	
215		7		SS		Brown Sand & Gravel w. Trace Silt • Moisture: saturated • Odour: No • Staining: No	0 ppm	0.0	5	
214.5									5.5	Well Installed to 15'