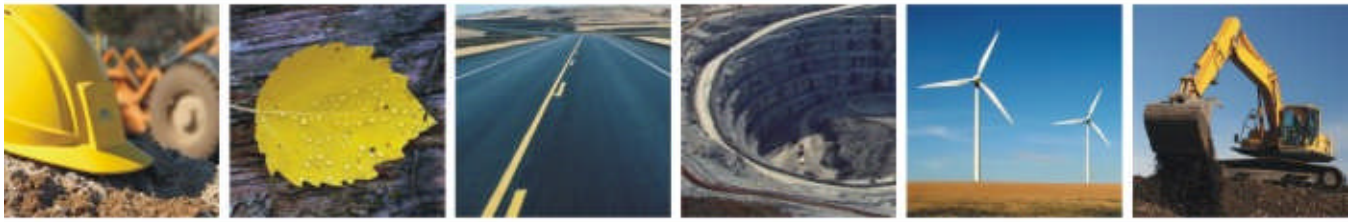
VILLAGE OF BARONS

UNDERGROUND STORAGE TANK REMOVAL AND MONITORING
AMA SITE #9558



REPORT

MARCH 2011
ISSUED FOR USE
EBA FILE: L22101183.004

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A TETRA TECH COMPANY

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of the Village of Barons and their agents. EBA, A Tetra Tech Company (EBA), does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than the Village of Barons, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's Geo-environmental Report - General Conditions are provided in Appendix A of this report.

EBA, A Tetra Tech Company
442 - 10 Street North
Lethbridge, AB T1H 2C7 CANADA
p. 403.329.9009 f. 403.328.8817

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 General

EBA, A Tetra Tech Company (EBA), was retained by the Village of Barons (Village) to administer a contract for the decommissioning of an abandoned underground storage tank (UST) and removal of impacted soils in the area of the UST, located at 124 Main Street, in the Village of Barons, Alberta. Alberta Municipal Affairs (AMA) provided funding for this project under the Tank Site Remediation Program, AMA Site No. 9558.

The contract, including the decommissioning of the UST, removal and disposal of petroleum hydrocarbon (PHC) impacted soils within the tank nest, and backfilling of the excavation, was awarded to Hazco Environmental Services (Hazco) of Calgary, Alberta.

EBA was onsite to monitor Hazco's activities, characterize the soils within the tank nest for potential residual hydrocarbon impacts, and summarize monitoring details in a report. The work was conducted according to our terms and conditions, provided in Appendix A.

EBA previously conducted a Phase II and Phase III Environmental Site Assessment (ESA) at the site, the results of which were reported under a separate cover (EBA File No. L22101183.001).

1.2 Objectives

The first step towards management of contaminated sites is to remove the primary source as soon as practicable. Given the site assessment data previously obtained during the Phase II and Phase III ESA, complex urban site conditions, and site status, the desired remedial objective was to remove the existing UST and remove and dispose an estimated volume (130 m^3) of PHC impacted soils.

Additional contamination was anticipated to exist beyond the proposed limits of the excavation. However, this material was not removed given the complex urban conditions. In the event of a discovery of increasing plume size, EBA was to develop alternative remediation options, which will likely include the development of a risk management plan (RMP).

1.3 Scope of Work

The scope of work for the UST removal and monitoring program was as follows:

- Retained Hazco as the tank removal contractor upon authorization from the Village and the AMA.
- Administered the contract on behalf of the Village.
- Advised Hazco to make necessary arrangements for utility locates and any other notification required.
- Conducted a preconstruction meeting with Hazco.
- Attended an on-site tailgate safety meeting and pre-job hazard assessment prior to the commencement of any fieldwork.
- Observed and documented on-site activities conducted by Hazco.

- Conducted soil sampling within the tank nest to assess the presence of subsurface vapours, potential free-phase liquids, and soil quality.
- Collected bulk soil samples from the base and sidewalls of the tank nest in order to field screen for combustible soil vapour headspace concentrations.
- Submitted 25 confirmatory soil samples (including 3 duplicate samples) for laboratory analysis of benzene, toluene, ethylbenzene, and xylene (BTEX), and PHC fractions F1 to F4.
- Prepared a summary report of the site activities and findings.

1.4 Qualifications of Assessors

Mr. Deryck Masterman, B.Sc., A.Ag., prepared the tender documents, monitored site activities, and conducted the field screening and sampling. Mr. Masterman is a project manager for EBA's Lethbridge environment practice and has conducted numerous environmental site assessments.

Mr. Jaymes Going, B.Sc., conducted the analytical review and prepared this report. Mr. Going is an environmental scientist for EBA's Lethbridge environment practice and has over three years of experience in the environmental industry.

Ms. Mandi Parker, P.Ag., assisted with the interpretation of the findings and conducted the preliminary review. Ms. Parker is the team leader for EBA's Lethbridge environment practice and has over ten years of experience in the environmental industry.

Mr. Henri Carriere, P.Eng., M.N.R.M., assisted with the interpretation of the findings and conducted the final review of the report. Mr. Carriere is a project director in EBA's environment practice in Calgary and has over 17 years of experience in the environmental industry.

2.0 BACKGROUND INFORMATION

There was one ESA previously conducted at the subject site by EBA. The following environmental report was available for the site and is summarized in Table A below.

Table A: Previous Reporting Summary

Title	Prepared by	Prepared for	Date	File Number
Phase II and Phase III Environmental Site Assessment	EBA Engineering Consultants Ltd.	Village of Barons	October 2009	L22101183.001

The Phase II and Phase III ESA identified a previously unknown UST, and concentrations exceeding applicable guidelines to the surrounding soil/and or groundwater. It was recommended that the UST be removed from the site and remedial activities be explored.

3.0 TENDER/CONTRACTOR AWARD

Mr. Masterman of EBA prepared and issued the UST removal tender document on behalf of the Village.

Five bids were received by EBA. Mr. Masterman was present during the bid opening and was requested to provide a recommendation letter. EBA prepared a letter recommending the award of the contract to Hazco which was issued to the Village and the AMA on September 23, 2010.

The contract between the Village and Hazco was awarded and the project commenced on November 2, 2010.

4.0 FIELDWORK

This section summarizes field observations during the UST excavation, removal, and excavation backfilling activities. Figures 1 (Site Location Plan), Figure 2 (Detailed Site Plan), and Figure 3 (Confirmatory Sampling of Excavation Limits) are provided in the Figures section of this report and Site Photographs (Photos) are provided in Appendix B.

4.1 Safety Meeting/Line Locates

Utility locates, including private locates, were coordinated by Hazco and conducted by Alberta Line Finder before the UST excavation commenced.

Mr. Masterman of EBA attended the safety meeting held by Hazco on November 2, 2010. Others in attendance at that meeting were Mr. Jeff Shewchuck, Mr. Ken Akitt, Mr. Timothy Valkenburg, and Mr. Tom Deis, of Hazco. EBA also conducted a tailgate safety meeting at this time.

4.2 Excavation and Underground Storage Tank [UST] Removal

The asphalt and concrete sidewalk above the UST was cut (approximately 6.3 m by 5.2 m) on November 2, 2010. The asphalt and the concrete were removed using a trackhoe and piled on the northeast side of the excavation, and were later hauled to the Lethbridge Waste and Recycling Centre for disposal. Unimpacted backfill above the UST, to a depth of approximately 0.6 m was segregated from the impacted material using a trackhoe and stockpiled on the northwest side of the excavation (see Photo 1).

Prior to the removal of the UST, combustible vapour concentrations within the tank were measured by Hazco using a RKI Eagle and no vapour concentrations were identified. The UST (approximately 2000 L) was then removed from the tank nest using a trackhoe and placed on the east side of the excavation for inspection. The tank was visually inspected by Mr. Shewchuk, of Hazco. A large hole at the base of the UST as well as significant corrosion was noted. Labels were not present on the tank.

Hazco crushed the tank on site using the trackhoe and disposed of it at the Lethbridge Waste and Recycling Centre. A Statue of Declaration was provided by Hazco stating that the storage tank was removed and destroyed. A copy of the Statue of Declaration can be found in Appendix C.

Following removal of the UST, excavation of the suspected PHC impacted soil commenced to a depth of approximately 4.5 m (depth to bedrock in the area of the excavation). Impacted soil was stockpiled along

the north side of the excavation, and 356.42 tonnes were later hauled to the Lethbridge Waste and Recycling Centre (waste manifest is included in Appendix D). Waste characterization for acceptance to the Lethbridge Waste and Recycling Centre was obtained prior to the excavation and UST removal. While conducting drilling at AMA Site No. 9557, east of the site, a borehole was advanced within the excavation limits of the UST and a composite sample sent for analysis. The excavation required dewatering (see Photo 7) prior to backfilling due to groundwater infiltration. Badger Daylighting was contracted by Hazco to remove and dispose of approximately 4 m^3 of PHC impacted water to Palko Environmental Ltd., near Claresholm, Alberta.

Additional excavation of impacted soil to the west, east, and south was not undertaken due to limiting factors. These included urban infrastructure (buildings and unexposed utilities to the west and east) and concerns raised by the Village regarding risk of damage to the rooting system of the mature trees within the park south of the excavation.

4.3 Confirmatory Sampling Program

Due to the depth and slope of the excavation, a trackhoe was used to collect the required soil samples from the excavation. Samples were collected from the north, east, west, and south walls, as well as the base of the excavation. Due to the size of the excavation, between five to nine samples per wall were collected for a total of 35 samples.

Samples were collected for vapour screening, which included placing samples into plastic bags and allowing the samples to volatilize for a minimum of 15 minutes. Bagged samples were measured for combustible vapour concentrations (CVCs) using a RKI Eagle portable gas monitor. A summary table of the CVC measurements obtained from the excavation is attached as Table 1.

Soil samples were collected and then placed into laboratory-provided 500 mL glass jars for chemical analysis. Samples were packed tightly to minimize losses of volatile organic compounds (VOCs). The samples were handled using nitrile gloves and were sealed, labelled, and documented on a chain-of-custody (COC) form, and delivered to the Purolator depot in Lethbridge on November 3, 2010 and November 4, 2010 for delivery to Exova Laboratories in Calgary, Alberta.

Based on the CVC measurements (Table 1), 25 samples were submitted to Exova for analysis of PHC fractions F1 to F4, and BTEX.

4.4 Backfilling Excavation

On November 5, 2010 and November 6, 2010, the unimpacted soil from the excavation was backfilled into the excavation using a trackhoe. Material was placed in 30 cm to 40 cm lifts and then packed using a Wacker™ remote control packer. Three passes were made using the Wacker™ prior to placement of new lift.

An additional 348 m^3 of clay fill, obtained from River Rock Gravel, located near Monarch, Alberta, was used to complete the backfilling of the excavation. Above the clay fill, crushed gravel was placed and packed to the lower level of asphalt in preparation for new asphalt placement. A senior geotechnical technologist from EBA was on site periodically to observe the backfill and compaction.

Density measurements (using a Troxler®) were taken of the material and were compared to a Standard Proctor value for that material. A total of ten locations at various depths were subjected to field density measurements. The compaction of the upper 2.5 m of fill material achieved 98% of the maximum Proctor density. Some future ground settlement should be expected, however. The density test locations and results are shown in Appendix E.

5.0 COMPARATIVE GUIDELINES

To assist in assessing the quality of soil analyzed during the UST removal at the site, Alberta Environments (AENVs) Tier 1 Soil and Groundwater Remediation Guidelines were applied. The site is located within an area of commercial buildings and residential dwellings. The most sensitive land use within 30 m of the site is residential and residential guidelines were used.

Previous drilling at the site demonstrated that the underling soils are predominantly fined-grained. The depth to groundwater at the time of the original assessment ranged between 2.15 metres below ground level (mbgl) and 2.62 mbgl, (see EBA Report File No. L22101183.001).

The chemicals of potential concern associated with gasoline include the monocyclic aromatic hydrocarbons (BTEX) and the aliphatic hydrocarbons F1 (C_6 to C_{10} hydrocarbon chain), F2 (C_{11} to C_{16} hydrocarbon chain), F3 (C_{17} to C_{24} hydrocarbon chain), and F4 (longer than C_{25} hydrocarbon chains).

6.0 RESULTS

This section summarizes analytical results for the confirmatory samples. Laboratory analytical results, including methods of analyses, are attached as Appendix F of this report. A summary table of soil analytical results is provided in Table 2 and Table 2a.

Samples obtained from the south, east, and west sidewalls and base of the excavation were found to have concentrations of benzene, ethylbenzene, xylenes, and PHC (fractions F1 and F2) above the AENV Tier 1 Guidelines.

Concentrations of benzene (0.059 mg/kg) and ethylbenzene (4.09 mg/kg) on the west wall of the excavation, at sample area W3 at a depth of 4.0 m, were greater than the applied guidelines.

Concentrations of ethylbenzene (0.524 mg/kg) on the east wall of the excavation, at sample area E5 at a depth of 4.5 m, were greater than the applied guideline.

Concentrations of benzene (0.062 mg/kg) and ethylbenzene (4.02 mg/kg) on the south wall of the excavation, at sample area S3 at a depth of 4.0 m, were greater than the applied guidelines.

Concentrations of benzene at sample locations B4 (0.216 mg/kg), B5 (0.161 mg/kg), B6 (0.782 mg/kg), B8 (0.085 mg/kg), and B9 (0.134 mg/kg), ethylbenzene at sample locations B5 (0.228 mg/kg), B6 (0.794 mg/kg), B8 (1.17 mg/kg), and B9 (8.66 mg/kg), xylenes at sample location B6 (5.05 mg/kg), PHC fraction F1 at sample location B9 (1220 mg/kg), and PHC fraction F2 at sample locations B6 (165 mg/kg), and B9 (694 mg/kg) at the base of the excavation, at depths ranging from 4.4 m to 5.0 m, were greater than the applied guidelines.

7.0 QUALITY ASSURANCE/QUALITY CONTROL [QA/QC] DUPLICATE AND BLANK RESULTS

Duplicate samples were collected at sample locations S3 (duplicate S3b), W3 (duplicate W3b), and E6 (duplicate E6b) and analyzed for BTEX and PHC (fraction F1 to F4). The relative percent difference (RPD) for duplicate samples was calculated using the following formula:

$$RPD = \left(\frac{a-b}{\frac{a+b}{2}} \right) \times 100\%$$

Some metals parameters contained concentrations that were less than the method detection limits; therefore, RPDs could not be calculated. RPDs were also not calculated if one or both analyses contained a concentration that was within five times the reportable detection limit (RDL). Elevated analytical variability is common when analyte concentrations are within a factor of five of the RDL; therefore, requesting a corrective action report from the laboratory is not necessary. RPDs greater than 30% are discussed below.

The results of the RPD testing at S3 and S3b showed that the RPD percentages ranged from 0.0% to 22.9%, except for the ethylbenzene, xylenes, and PHC fraction F1 RPDs which were 35.0%, 60.7%, and 94.7%, respectively. The RPD testing at W3 and W3b showed that the RPD percentages ranged from 3.5% to 28.6%. The RPD testing at E6 and E6b was not calculated as the results were within a factor of five of the RDL. The discrepancy in the ethylbenzene, xylenes, and PHC fraction F1 concentrations at S3 and S3b was likely caused by either a nugget effect or heterogeneity in the soil samples, as all other parameters contained an RPD within an acceptable range that confirms the validity of the testing method used by Exova.

Based on the above results, EBA considers the analytical reproducibility to be acceptable for the present application.

8.0 CONCLUSIONS

The UST was removed and soil practical to excavate in regards to PHC impacted material was also removed and landfilled. However, impacted material was left in place due to potential risks to adjacent infrastructure and vegetation.

Soil analytical results show that PHC affected soils (with concentrations of one or more of BTEX, PHC fractions F1 to F2 greater than the applicable guidelines) remain unexcavated along the south, east, and west wall of the excavation, as well at the base of the excavation. Fill was imported to replace the contaminated soils removed from the excavation and to fill the void left from the previous UST.

9.0 DISCUSSION/RECOMMENDATIONS

Based on the collected information a RMP should be considered for this site. The RMP would require discussions with AENV and the Village.

2.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

EBA, A Tetra Tech Company

Jaymes Going, B.Sc.
Environmental Scientist
Environment Practice
Direct Line: 403.329.9009 x236
jgoing@eba.ca

Mandi Parker, P.Ag.
Team Leader/Environmental Consultant
Environment Practice
Direct Line: 403.329.9009 x224
mparker@eba.ca

PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.
Signature
Date March 15, 2011
PERMIT NUMBER: P245
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

reviewed by:
Henri P. Carriere, P.Eng., M.N.R.M.
Project Director
Environmental Science, Environment Practice
Direct Line: 403.723.6862
hcarriere@eba.ca

/tlp

REFERENCES

Alberta Environment, 2010. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Environmental Policy Branch. Edmonton, Alberta.

EBA Engineering Consultants Ltd. 2009. Phase II and Phase III Environmental Site Assessment. 124 Main Street (Lot 17, Block 2, Plan 2605X). Barons, Alberta (EBA File No. L22101183.001).

TABLES

Table 1: Combustible Vapour Concentration Readings

Sample Location	Depth (m)	Submitted for Analysis	Combustible Vapour
N1	3.0	No	20 ppm
N2	3.0	No	15 ppm
N3	4.0	Yes	15 ppm
N4	2.5	Yes	20 ppm
N5	4.0	Yes	0 ppm
N6	2.5	Yes	25 ppm
N7	4.0	Yes	0 ppm
N8	4.0	Yes	0 ppm
S1	4.0	No	330 ppm
S2	4.0	No	3 %
S3	4.0	Yes	5 %
S4	2.0	Yes	0 ppm
S5	2.0	Yes	0 ppm
E1	3.0	No	5 ppm
E2	3.0	No	0 ppm
E3	4.0	Yes	15 ppm
E4	2.5	Yes	10 ppm
E5	4.0	Yes	25 ppm
E6	2.5	Yes	5 ppm
W1	3.0	No	24 %
W2	4.0	Yes	0 ppm
W3	4.0	Yes	310 ppm
W4	4.0	Yes	9 %
W5	2.0	Yes	0 ppm
W6	2.0	Yes	0 ppm
W7	2.0	Yes	0 ppm
B1	4.0	No	222 ppm
B2	4.0	No	24 %
B3	4.0	No	3 %
B4	4.5	Yes	130 ppm
B5	4.5	Yes	3 %
B6	4.5	Yes	7 %
B7	4.4	Yes	15 ppm
B8	4.4	Yes	5 %
B9	4.4	Yes	6 %

Table 2: Soil Analytical Results

Parameter	Units	Teir 1[1] Residential	Teir 1[2] Residential	N4	W5	W6	W7	N3	N5	N6	N7	N8	W2	W3	W3B	W4
				2.0m	2.0m	2.0m	2.0m	4.5m	4.5m	2.0m	4.0m	4.0m	4.0m	4.0m	4.0m	4.0m
PHCs and Other Organics				Soil (<3 mbg)				Subsoil (>3 mbg)								
Benzene	mg/kg	0.046	0.046	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.015	**0.059**	0.041	0.013
Toluene	mg/kg	0.52	0.52	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	mg/kg	0.11	0.11	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	**4.09**	**3.66**	<0.010
Total Xylenes	mg/kg	15	15	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.24	0.15	0.02
F1 C6-C10	mg/kg	--	--	<4	<4	<4	<4	5	<4	<4	5	<4	7	251	238	32
F1 -BTEX	mg/kg	210	420	<4	<4	<4	<4	5	<4	<4	5	<4	7	247	234	32
F2c C10-C16	mg/kg	150	300	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	174	147	12
F3c C16-C34	mg/kg	1300	2600	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
F4c C34-C50	mg/kg	5600	10,000	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F4HTGCc C34-C50+	mg/kg	--	--	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
% C50+	%	--	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Routine Parameters																
Moisture	%	--	--	26.1	22	23.4	24.3	26.6	23.8	22.7	18.4	24.7	28.2	22.6	23.2	25.7

Notes:

1. Alberta Environment's, December 2010, Soil and Groundwater Remediation Guidelines.
2. Alberta Environment's, December 2010, Subsoil Remediation Guidelines.
3. mbg = metres below grade
4. -- = no guideline
5. **Bold** = concentration is greater than the applied guideline.

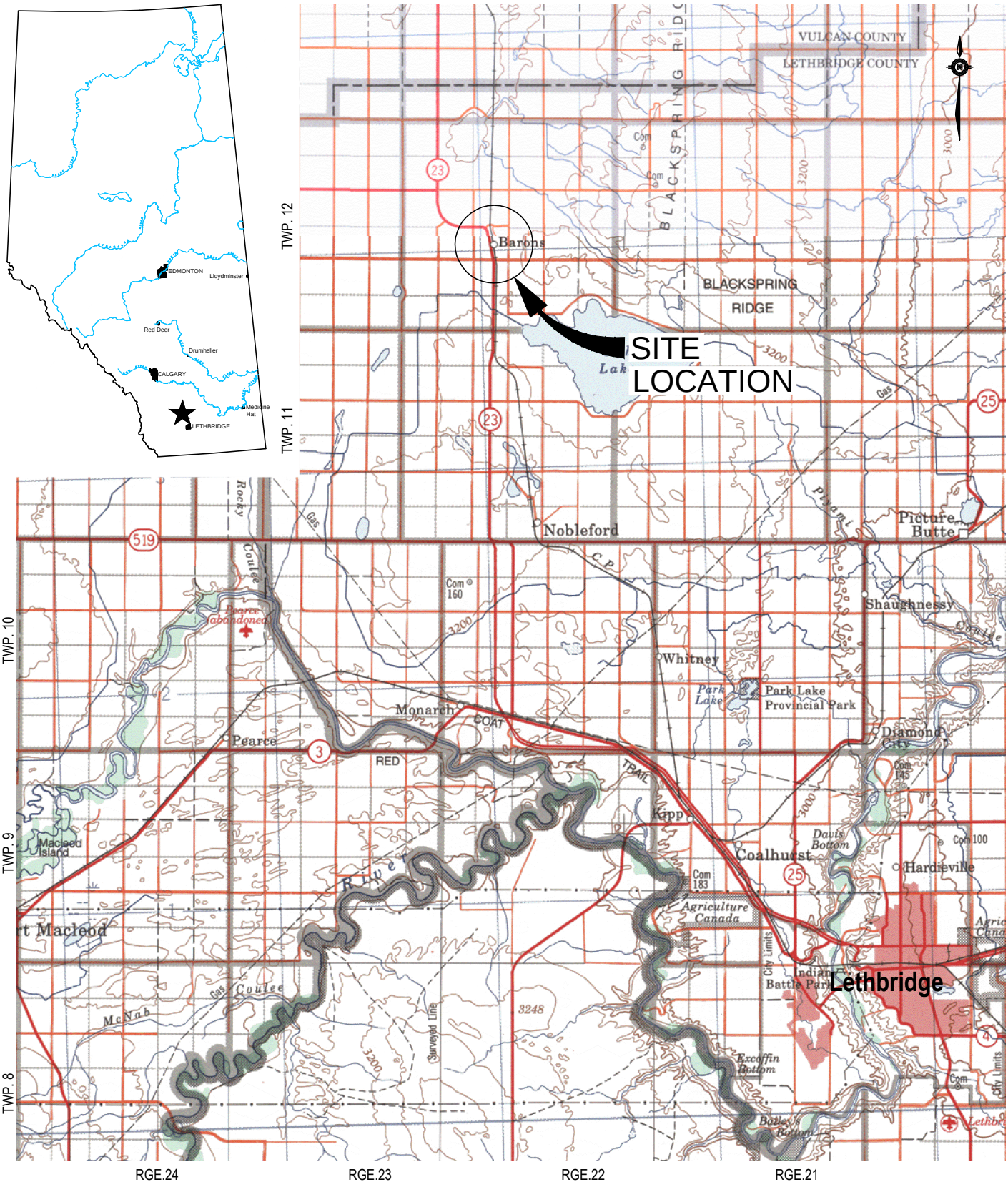
Table 2A: Soil Analytical Results

Parameter	Units	Teir 1[1] Residential	Teir 1[2] Residential	E4	E6	E6B	S4	S5	B4	B5	B6	B7	B8	B9	E3	S3	S3B	E5
				2.0m	2.0m	2.0m	2.0m	2.0m	5.0m	5.0m	5.0m	4.4m	4.4m	4.4m	4.5m	4.0m	4.0m	4.5m
PHCs and Other Organics				Soil (<3 mbg)					Subsoil (>3 mbg)									
Benzene	mg/kg	0.046	0.046	<0.004	<0.004	<0.004	<0.004	<0.004	**0.216**	**0.161**	**0.782**	**0.030**	**0.085**	**0.134**	<0.004	**0.062**	**0.086**	<0.004
Toluene	mg/kg	0.52	0.52	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ethylbenzene	mg/kg	0.11	0.11	<0.010	<0.010	<0.010	<0.010	<0.010	0.089	**0.228**	**0.794**	0.047	**1.17**	**8.66**	<0.010	**4.02**	**6.58**	**0.524**
Total Xylenes	mg/kg	15	15	<0.010	<0.010	<0.010	<0.010	<0.010	0.28	0.52	**5.05**	0.02	1.65	6.65	<0.010	0.13	0.3	<0.010
F1 C6-C10	mg/kg	--	--	<4	<4	<4	<4	<4	48	51	180	34	179	1240	<4	239	876	158
F1 -BTEX	mg/kg	210	420	<4	<4	<4	<4	<4	47	50	173	34	176	**1220**	<4	235	**869**	157
F2c C10-C16	mg/kg	150	300	<10	<10	<10	<10	<10	52	46	165	<10	178	**694**	<10	246	246	60
F3c C16-C34	mg/kg	1300	2600	<30	<30	<30	<30	<30	<30	36	38	<30	<30	119	<30	37	<30	<30
F4c C34-C50	mg/kg	5600	10,000	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
F4HTGCc C34-C50+	mg/kg	--	--	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
% C50+	%	--	--	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Routine Parameters																		
Moisture	%	--	--	21.1	21.2	23.7	24	22	18.7	22.3	15.5	14.2	14.5	13.4	28.5	25.6	22.9	28.2

Notes:

1. Alberta Environment's, December 2010, Soil and Groundwater Remediation Guidelines.
2. Alberta Environment's, December 2010, Subsoil Remediation Guidelines.
3. mbg = metres below grade
4. -- = no guideline
5. **Bold** = concentration is greater than the applied guideline.

FIGURES



LEGEND

NOTES
BASED ON DRAWING PROVIDED BY THE CANADA CENTRE FOR MAPPING, NATURAL RESOURCES CANADA. INFORMATION CURRENT AS OF 1975.

NOT TO SCALE.

CLIENT
Village of Barons

UST DECOMMISSIONING BARONS, ALBERTA

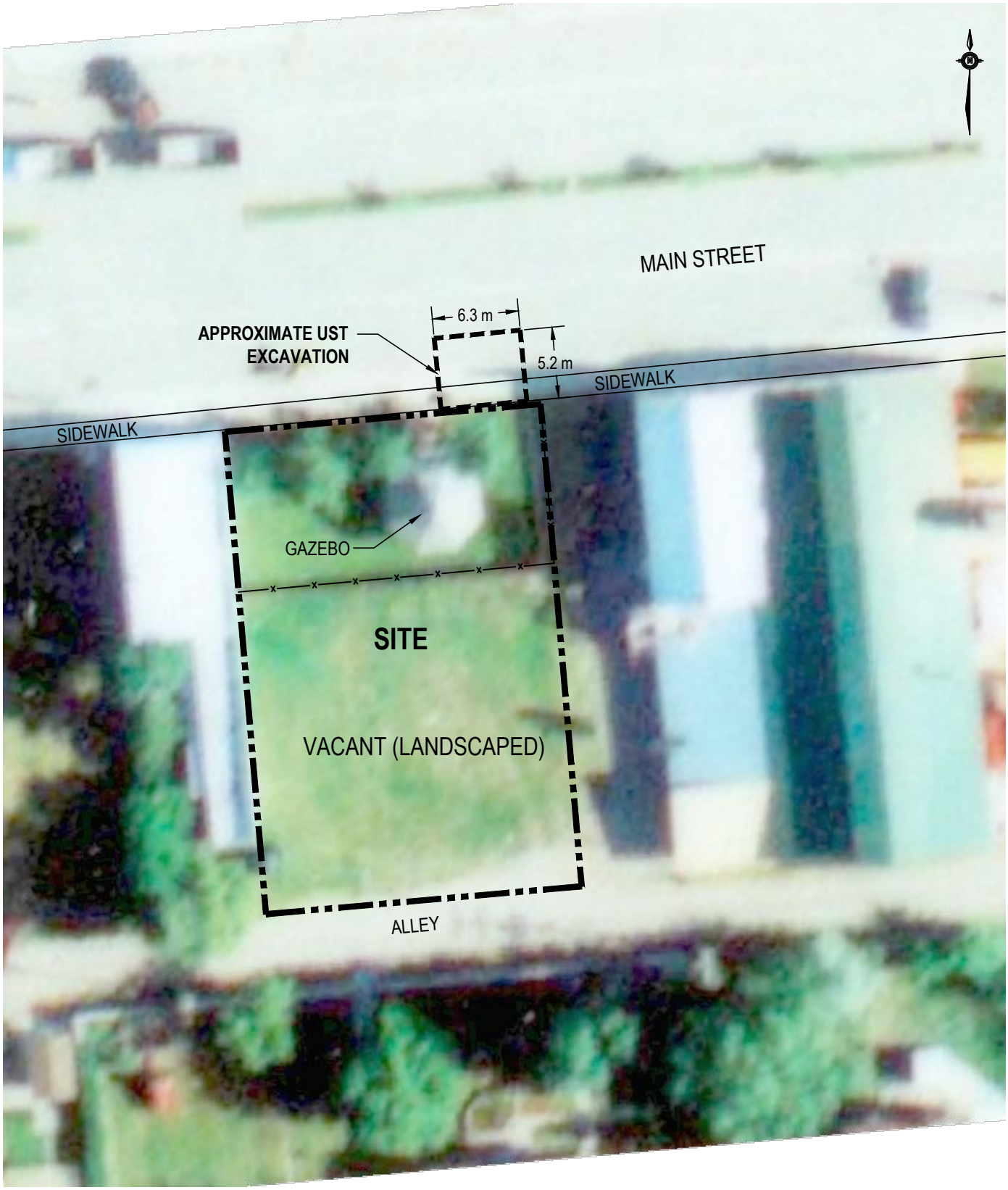
SITE LOCATION PLAN

A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
L22101183.004	LCH	JG	0

OFFICE	DATE
EBA-Lethbridge	February 8, 2011

Figure 1



LEGEND

SITE BOUNDARY

FENCE

0 4 10 20 m

APPROXIMATE SCALE 1:400

CLIENT

Village of Barons
(AMA Site 9558)

UST DECOMMISSIONING BARONS, ALBERTA

DETAILED SITE LOCATION

PROJECT NO.	DWN	CKD	REV
L22101183.004	LCH	JG	0

OFFICE	DATE
EBA-Lethbridge	March 3, 2011

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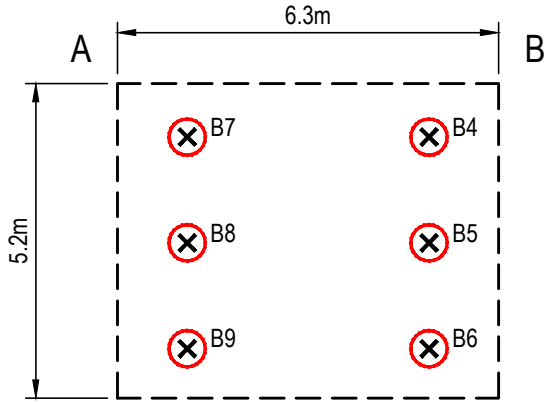
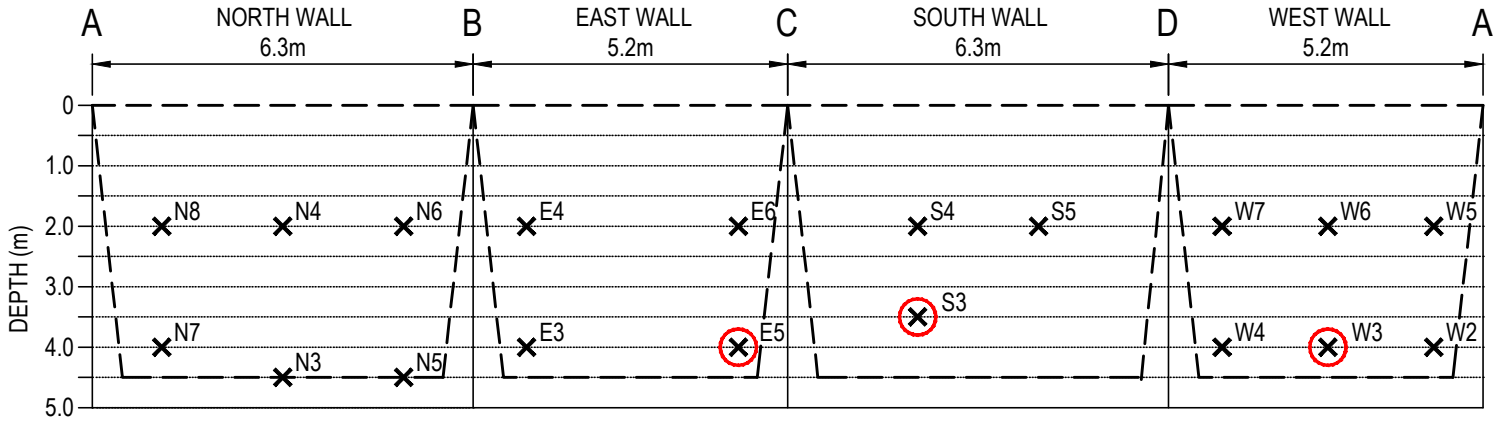
Figure 2



EXCAVATION BASE



EXCAVATION PROFILE

LEGEND

× - SAMPLE LOCATION SUBMITTED FOR ANALYSIS

⊗ - GREATER THAN APPLIED GUIDELINES

0 2 5m

SCALE 1:125

CLIENT

Village of Barons
(AMA Site 9558)

UST DECOMMISSIONING
BARONS, ALBERTA

CONFIRMATORY SAMPLING OF EXCAVATION LIMITS

PROJECT NO.	DWN	CKD	REV
L22101183.004	LCH	JG	0

OFFICE	DATE
EBA-Lethbridge	March 8, 2011

Figure 3

A TETRA TECH COMPANY

APPENDIX A

APPENDIX A GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA’s client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA’s Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA’s instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

APPENDIX B PHOTOGRAPHS

Photo 1: View looking south at trackhoe excavating tank nest.

Photo 2: View looking east at Main Street and stockpiled soil.

Photo 3: View of western extent of work area and adjacent business.

Photo 4: View looking west at Main Street.

Photo 5: View looking east at underground storage tank within the excavation.

Photo 6: View showing south and west walls and base of excavation. Darker coloured areas are indications of staining.

Photo 7: View looking east at excavation, showing groundwater infiltration.

Photo 8: View looking southwest at excavation. Note fill material on left hand side of photograph to stabilize east wall.

APPENDIX C

APPENDIX C STATUE OF DECLARATION

Statutory Declaration
of Progress Payment Distribution by Contractor

Standard Construction Document

CCDC 9A - 2001

To be made by the Contractor **prior to payment** when required as a condition for either:

- ☐ second and subsequent progress payments; or
- ☐ release of holdback.

The last application for progress payment for which the Declarant has received payment is No. _____ dated the _____ day of _____, in the year _____.

Identification of Contract

Name of Contract (Location and description of the Work as it appears in the Contract Documents)

Contract # L22101183.003 Destruction and Disposal of UST

Date of Contract: 30th (*Day*) September (*Month*) 2010 (*Year*)

Name of Owner	Name of Contractor
Village of Barons	EBA Engineering Consultants Ltd.

Identification of Declarant

Name of Declarant	Position or Title (of office held with Contractor)
David England	Director - Projects - Alberta

Declaration

I solemnly declare that, as of the date of this declaration, I am an authorized signing officer, partner or sole proprietor of the Contractor named in the Contract identified above, and as such have authority to bind the Contractor, and have personal knowledge of the fact that all accounts for labour, subcontracts, products, services, and construction machinery and equipment which have been incurred directly by the Contractor in the performance of the work as required by the Contract, and for which the Owner might in any way be held responsible, have been paid in full as required by the Contract up to and including the latest progress payment received, as identified above, except for:

1) holdback monies properly retained,
2) payments deferred by agreement, or
3) amounts withheld by reason of legitimate dispute which have been identified to the party or parties, from whom payment has been withheld.

I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

Declared before me in Calgary, Alberta (*City/Town and Province*) this 17th day of February, in the year 2011.

JUDY CRAIG
A Commissioner for Oaths
In and for the Province of Alberta
My Commission Expires June 21, 2012

Signature of Declarant

(A Commissioner for Oaths, Notary Public, Justice of the Peace, etc.)

The making of a false or fraudulent declaration is a contravention of the Criminal Code of Canada, and could carry, upon conviction, penalties including fines or imprisonment.

APPENDIX D

APPENDIX D WASTE MANIFEST

INVOICE

City of Lethbridge
Waste & Recycling Centre
910 4 Avenue South

Lethbridge, AB, T1J 0P6
Tel. : (403) 315-1497 Fax. : (403) 394-0429

Invoice No. : 17421

Billed To : Hazco / Village of Barons
#103 3355 114 Avenue SE
Calgary, AB, T2Z 0K7
Attention : Victor Hogan 403 651 2148

For Period : 01-Nov-2010 to 30-Nov-2010
Account No. : 101911
Invoice No. : 17421
Invoice Date : 10-Jan-2011
Due Date : 09-Feb-2011

Date	Trn #	Vehicle ID	Time In	Material	Net (tn)	Fee ($)
11/03/10	LL490729	EMARD1	16:21	102	22.64	
11/04/10	LL490781	EMARD1	09:26	102	27.02	
11/04/10	LL490782	LITO2	09:30	102	26.74	
11/04/10	LL490841	LITO2	11:36	102	28.42	
11/04/10	LL490853	EMARD1	11:53	102	27.26	
11/04/10	LL490915	EMARD1	14:12	102	25.48	
11/04/10	LL490922	LITO2	14:21	102	25.17	
11/04/10	LL490970	EMARD1	16:19	102	28.20	
11/05/10	LL491020	EMARD1	09:23	102	27.30	
11/05/10	LL491022	LITO2	09:28	102	26.54	
11/05/10	LL491099	EMARD1	11:57	102	29.20	
11/05/10	LL491106	LITO2	12:07	102	31.44	
11/05/10	LL491170	EMARD1	14:10	102	31.01	
			Grand Totals :		356.42	
				Total Fee :		

Terms : Accounts are payable within 30 days from the end of the billing period.
Credit privileges may be suspended on payments not received by February 09, 2011 and interest charges of 1 % per month or any part thereof, will be applied on the overdue accounts.

APPENDIX E

APPENDIX E DENSITY TEST LOCATIONS AND RESULTS

EBA Engineerin

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **L22101183.004**

Project: Village of Barons
Site Reconnaissance- Site 9558
UST Removal & Remedial Acts

Client: **Village of Barons**
PO Box 129
Barons AB
T0L 0G0

Att'n: **barons@figment.ca**

Test Apparatus : Nuclear Machine No: 36073

Soil Description: Clay, Gravelly, Sandy, Some Silt

Temperature Air: 18.0 °C Soil: °C

Specified Compaction: 98.0

Compaction Standard: ASTM D698

Minimum Dry Density:

Maximum Dry Density: **1950**

Optimum M.C.: 11.0

Date Tested: **2010.11.05** By: KW

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
1 /200	2m W & 3m N of SE corner of excavation	-2.5	10.3	1946	99.8
2 /300	5m W & 2m N of SE corner of excavation	-2.5	11.2	1952	100.1
3 /300	1m W & 2m N of SE corner of excavation	-2.0	10.7	1938	99.4
4 /300	1m N & 2m E of SW corner of excavation	-2.0	11.1	1942	99.6

Remarks: Excavation Backfill

c.c.
FILE COPY

Reviewed By:

barons@figment.ca
Village of Barons
PO Box 129
Barons AB
T0L 0G0

eba

EBA Engineerin

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **L22101183.004**

Project: Village of Barons
Site Reconnaissance- Site 9558
UST Removal & Remedial Acts

Client: **Village of Barons**
PO Box 129
Barons AB
T0L 0G0

Att'n: **barons@figment.ca**

Test Apparatus : Nuclear Machine No: 36073

Soil Description: Gravel, Sandy, Some Clay & Silt

Temperature Air: 10.0 °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: ASTM D698

Minimum Dry Density: ____

Maximum Dry Density: **2100**

Optimum M.C.: 9.0

Date Tested: **2010.11.06** By: KW

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
5 /300	3m W & 1m N of SE corner of excavation	-1.0	8.8	2092	99.6
6 /300	3m N & 5m W of SE corner of excavation	-1.0	9.2	2081	99.1
7 /300	1m E & 3m N of SW corner of excavation	-1.0	8.5	2098	99.9

Remarks: Excavation Backfill

Reviewed By: _____

c.c.
FILE COPY

barons@figment.ca
Village of Barons
PO Box 129
Barons AB
T0L 0G0

eba

EBA Engineering

DENSITY TEST RESULTS

ASTM Designation D2922 & D3017, or D1556

Project No: **L22101183.004**

Project: Village of Barons
Site Reconnaissance- Site 9558
UST Removal & Remedial Acts

Client: **Village of Barons**
PO Box 129
Barons AB
T0L 0G0

Att'n: **barons@figment.ca**

Test Apparatus : Nuclear Machine No: 36073

Soil Description: Gravel, Sandy, Some Silt

Temperature Air: 13.0 °C Soil: ____ °C

Specified Compaction: 98.0

Compaction Standard: ASTM D698

Minimum Dry Density: ____

Maximum Dry Density: **2250**

Optimum M.C.: 6.5

Date Tested: **2010.11.06** By: KW

Test No./ Probe Depth	Location	Elevation	% Moisture Content	Dry Density Kg/m^3	% Compaction
8 /150	5m N & 2m W of SE corner of excavation	0.0	6.0	2246	99.8
9 /150	2m N & 5m W of SE corner of excavation	0.0	5.8	2214	98.4
10 /150	3m N & 3m E of SW corner of excavation	0.0	6.1	2217	98.5

Remarks: Excavation Backfill

Reviewed By: _____

c.c.
FILE COPY

barons@figment.ca
Village of Barons
PO Box 129
Barons AB
T0L 0G0

APPENDIX F

APPENDIX F LABORATORY ANALYTICAL RESULTS

Exova

Invoice

Invoice #	10-618940
Print Date:	Nov 08, 2010
Agreement ID:	73751

Client Number: EBAENGCO01
Bill Paid By:

EBA Engineering Consultants Ltd

115, 200 Rivercrest Drive SE
Calgary, AB, Canada T2C 2X5

Attention: Accounts Payable

Primary Administrator:
Deryck Masterman
EBA Engineering Consultants Ltd - Lethbridge, AB

Deliver Original Invoice to:
Deryck Masterman
EBA Engineering Consultants Ltd - Lethbridge, AB

Main Contact:
Deryck Masterman
EBA Engineering Consultants Ltd

Lots represented on this invoice:
772555

PO Number	Reference	Location	Project Code
	Barons Remediation L22101183.004	124 Main St., Barons,	A175833

Quantity	Code	Service Description	Rush Charge	Unit Price	Extended
12.00	CCMEC	CCME Petroleum Hydrocarbons in Soil by Cold Extraction	0 %	$ 105.00	$ 1260.00
12.00	DISP90	Disposal fee - 90 day sample retention	0 %	$ 2.00	$ 24.00

Subtotal:	$	1284.00
GST/HST:	$	64.20
PST:	$	0.00
Total:	$	1348.20
Prepaid:	$	0.00
Net:	$	1348.20

Remit payment to:
Exova Canada Inc., c/o C25017, PO Box 2532, Station M, Calgary, Alberta, T2P 5P9
For wire payments:
Exova Canada Inc., Account# 66662 01306 13; Bank: Scotiabank, Toronto, ON; Routing #/ABA: 026002532; Swift - NOSCCATT

GST Number: 881290324RT
Terms Net: 30 days - Interest Charged @ 2% per month (24% per annum) on accounts over 30 days
Please direct questions concerning this invoice to Client Services.

Exova
Bay #5, 2712-37 Avenue N.E.
Calgary, Alberta
T1Y-5L3, Canada

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F: +1 (403) 291-2021
E: Calgary@exova.com
W: www.exova.com

Report Transmission Cover Page

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

Contact & Affiliation	Address	Delivery Commitments
Deryck Masterman EBA Engineering Consultants Ltd -	442 - 10 Street N. Lethbridge, Alberta T1H 2C7 Phone: (403) 329-9009 Fax: (403) 328-8817 Email: dmasterman@eba.ca	On [Lot Verification] send (COA) by Email - Single Report On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Multiple Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (COC, Test Report, Invoice) by Email - Merge Reports

Notes To Clients:

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T1Y-5L3, Canada

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E: Calgary@exova.com
W: www.exova.com

Sample Custody

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

Sample Disposal Date: February 06, 2011

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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T1Y-5L3, Canada

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F: +1 (403) 291-2021
E: Calgary@exova.com
W: www.exova.com

Analytical Report

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

		Reference Number	772555-1	772555-2	772555-3	
		Sample Date	Nov 02, 2010	Nov 02, 2010	Nov 02, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	NE Base / B4 / 5.0 / M	CE Base / B5 / 5.0 / M	SE Base / B6 / 5.0 / M	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
Benzene	Dry Weight	mg/kg	0.216	0.161	0.782	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	0.089	0.228	0.794	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	0.28	0.52	5.05	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	48	51	180	4
F1 -BTEX	Dry Weight	mg/kg	47	50	173	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	52	46	165	10
F3c C16-C34	Dry Weight	mg/kg	<30	36	38	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	18.70	22.30	15.50	

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W: www.exova.com

Analytical Report

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

		Reference Number	772555-4	772555-5	772555-6	
		Sample Date	Nov 02, 2010	Nov 02, 2010	Nov 02, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	N.E Wall / E3 / 4.5 / M	N.E Wall / E4 / 2.0 / M	S.E Wall / E5 / 4.5 / M	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	0.524	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	158	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	157	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	<10	<10	60	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	28.50	21.10	28.20	

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Analytical Report

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

		Reference Number	772555-7	772555-8	772555-9	
		Sample Date	Nov 02, 2010	Nov 02, 2010	Nov 02, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	S.E Wall / E6 / 2.0 / M	W.N Wall / N3 / 4.5 / M	W.N Wall / N4 / 2.0 / M	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	<4	5	<4	4
F1 -BTEX	Dry Weight	mg/kg	<4	5	<4	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	4-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	<10	<10	<10	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	21.20	26.60	26.10	

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Exova

Analytical Report

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

Reference Number			772555-10	772555-11	772555-12
Sample Date			Nov 02, 2010	Nov 02, 2010	Nov 02, 2010
Sample Time			NA	NA	NA
Sample Location					
Sample Description			E.N Wall / N5 / 4.5 / M	E.N Wall / N6 / 2.0 / M	S.E Wall / E6B / 2.0 / M
Matrix			Soil	Soil	Soil
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	5-Nov-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	5-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	<4	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	<4	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			4-Nov-10	4-Nov-10	5-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	<10	<10	<10	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	23.80	22.70	23.70	

Approved by:

Michael Yohemas, BSc
Laboratory Operations Manager

Exova
Bay #5, 2712-37 Avenue N.E.
Calgary, Alberta
T1Y-5L3, Canada

T: +1 (403) 291-2022
F: +1 (403) 291-2021
E: Calgary@exova.com
W: www.exova.com

Methodology and Notes

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St., Barons, AB
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
Date Reported:	Nov 8, 2010
Report Number:	1380588

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
BTEX-CCME - Soil	CCME	*	Reference Method for Canada-Wide Standard for PHC in Soil, CWS PHCS TIER 1	04-Nov-10	Exova Calgary
BTEX-CCME - Soil	US EPA	*	US EPA method, 8260B/5035	04-Nov-10	Exova Calgary
TEH-CCME-Soil (Shake)	CCME	*	Reference Method for Canada-Wide Standard for PHC in Soil, CWS PHCS TIER 1	04-Nov-10	Exova Calgary

** Reference Method Modified*

References

CCME	Canadian Council of Ministers of the Environment
US EPA	US Environmental Protection Agency Test Methods

Comments:

Exova
Bay #5, 2712-37 Avenue N.E.
Calgary, Alberta
T1Y-5L3, Canada

T: +1 (403) 291-2022
F: +1 (403) 291-2021
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Analytical Report

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	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772555**
Control Number:	A175833
Date Received:	Nov 4, 2010
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Report Number:	1380588

Petroleum Hydrocarbons in Soil

Batch Notes

1. The method used complies with the Reference Method for the Canada Wide Standards for Petroleum Hydrocarbons in Soil - Tier 1, April 2001, including Addendum 1, and is accredited for use in Exova.
2. Modifications of the method: See Notes and Methodology for nonconformances (if applicable).
3. Qualifications on results: See Notes and Methodology for nonconformances (if applicable).
4. Silica gel treatment is performed for fractions F2, F3, F4.
5. F1-BTEX: BTEX has been subtracted from the F1 fraction.
6. If analyzed, naphthalene has been subtracted from fraction F2 and selected PAHs have been subtracted from fraction F3.
7. F4HTGC is reported when more than 5% of the total carbon envelope elutes past C_{50}.
8. Exova does not routinely report Gravimetric Heavy Hydrocarbons (F4G or F4G-sg), F4HTGC through extended range high temperature GC is reported instead.
9. When both F4(C_{34}-C_{50}) and F4HTGC are reported, F4HTGC is the final F4 that is to be used for interpreting the CWS.
10. Quality criteria met for the batch: Data is reported in Quality Control Section of report (if requested).
    -nC_6 and nC_{10} response factors (RF) are within 30% of RF for toluene
    -nC_{10}, nC_{16} and nC_{34} RFs are within 10% of each other
    -nC_{50} RF is within 30% of the average RF for nC_{10}+nC_{16}+nC_{34}
    -linearity is within 15% for each of the calibrated carbon ranges
11. Batch data for analytical quality control are available on request.
12. Extraction and analysis holding times were met: See Notes and Methodology for nonconformances (if applicable).

Approved by:

Michael Yohemas, BSc
Laboratory Operations Manager

772555

Exova

Control Number A175833

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Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Exova location and proper sampling protocol

Billing Address:	Copy of Report:	**Copy of Report To:**	Copy of invoice:
Company: EBA		Company:	Send invoice to this address for approval
Address: 442 - 10 ST N. Lethbridge AB T1H 2C7	QA/QC Report	Address: SAME.	
Attention: Deryck Masterman	Report Result: e-mail X	Attention:	Report Result: e-mail
Phone: 403.329.9009	Results Online	Phone:	Results Online
Fax:	Fax	Fax:	Fax
Cell: 403.634.0763	Mail	Cell:	Mail
e-mail: dmasterman@eba.ca		e-mail:	

Information to be included on Report and Invoice

Project ID: L22101183.004
Project Name: Barons Remediation
Project Location: 124 Main St., Barons, AB.
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

PRIORITY

Please contact laboratory prior to submitting any RUSH samples.

Upon filling out this section, client accepts that surcharges will be applied to this analysis.

If not all samples require RUSH, please indicate in special instructions.

Date Required: Nov. 4, 2010
Signature:

Sample Custody (Please Print)
Sampled by: DM
Company EBA Signature

I authorize Exova to proceed with the work indicated on this form:

Date: Nov 3, 2010 Initial: DM
Received by: Sample Temp.
Waybill #: 263 190 668 Date NOV 4 10 8:45
Company PWO Time

Special Instructions / Comments

Please indicate which regulations you are required to meet:
- [ ] Health Canada Drinking Water Quality
- [X] Alberta Tier 1
- [ ] Other: _____

	Sample Identification	Location	Depth IN	Depth CM	(M)	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	BTEX, F1-F4	Enter tests above (✓ relevant samples below)
1	B4	NE BASE		5.0		NOV 2	SOIL	GRAB	2	✓	
2	B5	CE BASE		5.0		NOV 2	SOIL	GRAB	2	✓	
3	B6	SE BASE		5.0		NOV 2	SOIL	GRAB	2	✓	
4	E3	NE. E WALL		4.5		NOV 2	SOIL	GRAB	2	✓	
5	E4	NE. E WALL		2.0		NOV 2	SOIL	GRAB	2	✓	
6	E5	SE. E WALL		4.5		NOV 2	SOIL	GRAB	2	✓	
7	E6	SE. E WALL		2.0		NOV 2	SOIL	GRAB	2	✓	
8	N3	W.N. WALL		4.5		NOV 2	SOIL	GRAB	2	✓	
9	N4	W.N. WALL		2.0		NOV 2	SOIL	GRAB	2	✓	
10	N5	E.N. WALL		4.5		NOV 2	SOIL	GRAB	2	✓	
11	N6.	E.N. WALL		2.0		NOV 2	SOIL	GRAB	2	✓	

NOTE: All hazardous samples must be labeled according to WHMIS guidelines.

ED 077-00

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Bay #5, 2712-37 Avenue N.E.
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Report Transmission Cover Page

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Contact & Affiliation	Address	Delivery Commitments
Deryck Masterman EBA Engineering Consultants Ltd -	442 - 10 Street N. Lethbridge, Alberta T1H 2C7 Phone: (403) 329-9009 Fax: (403) 328-8817 Email: dmasterman@eba.ca	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Multiple Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (COC, Test Report, Invoice) by Email - Merge Reports

Notes To Clients:

Exova
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Calgary, Alberta
T1Y-5L3, Canada

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Sample Custody

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Sample Disposal Date: February 10, 2011

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

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Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Reference Number		772854-1	772854-2	772854-3
Sample Date		Nov 04, 2010	Nov 04, 2010	Nov 04, 2010
Sample Time		NA	NA	NA
Sample Location				
Sample Description		North Wall / N7 / 4.0 / M	North Wall / N8 / 4.0 / M	South Wall / S3 / 4.0 / M
Matrix		Soil	Soil	Soil

Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	0.062	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	4.02	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	0.13	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	5	<4	239	4
F1 -BTEX	Dry Weight	mg/kg	5	<4	235	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	<10	<10	246	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	37	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	18.40	24.70	25.60	

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Bay #5, 2712-37 Avenue N.E.
Calgary, Alberta
T1Y-5L3, Canada

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Analytical Report

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Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Reference Number		772854-4	772854-5	772854-6
Sample Date		Nov 04, 2010	Nov 04, 2010	Nov 04, 2010
Sample Time		NA	NA	NA
Sample Location				
Sample Description		South Wall / S4 / 2.0 / M	South Wall / S5 / 2.0 / M	Base / B7 / 4.4 / M
Matrix		Soil	Soil	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	0.030	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	0.047	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	0.02	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	34	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	34	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	<10	<10	<10	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	24.00	22.00	14.20	

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	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

		Reference Number	772854-7	772854-8	772854-9	
		Sample Date	Nov 04, 2010	Nov 04, 2010	Nov 04, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Base / B8 / 4.4 / M	Base / B9 / 4.4 / M	West Wall / W2 / 4.0 / M	
		Matrix	Soil	Soil	Soil	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
Benzene	Dry Weight	mg/kg	0.085	0.134	0.015	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	1.17	8.66	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	1.65	6.65	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	179	1240	7	4
F1 -BTEX	Dry Weight	mg/kg	176	1220	7	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	178	694	<10	10
F3c C16-C34	Dry Weight	mg/kg	<30	119	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	14.50	13.40	28.20	

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	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Reference Number		772854-10	772854-11	772854-12
Sample Date		Nov 04, 2010	Nov 04, 2010	Nov 04, 2010
Sample Time		NA	NA	NA
Sample Location				
Sample Description		West Wall / W3 / 4.0 / M	West Wall / W4 / 4.0 / M	West Wall / W5 / 2.0 / M
Matrix		Soil	Soil	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
Benzene	Dry Weight	mg/kg	0.059	0.013	<0.004	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	4.09	<0.010	<0.010	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	0.24	0.02	<0.010	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	251	32	<4	4
F1 -BTEX	Dry Weight	mg/kg	247	32	<4	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	174	12	<10	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	22.60	25.70	22.00	

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Calgary, Alberta
T1Y-5L3, Canada

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Analytical Report

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Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
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	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Reference Number		772854-13	772854-14	772854-15
Sample Date		Nov 04, 2010	Nov 04, 2010	Nov 04, 2010
Sample Time		NA	NA	NA
Sample Location				
Sample Description		West Wall / W6 / 2.0 / M	West Wall / W7 / 2.0 / M	South Wall / S3b / 4.0 / M
Matrix		Soil	Soil	Soil

Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
Benzene	Dry Weight	mg/kg	<0.004	<0.004	0.086	0.004
Toluene	Dry Weight	mg/kg	<0.005	<0.005	<0.005	0.005
Ethylbenzene	Dry Weight	mg/kg	<0.010	<0.010	6.58	0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	<0.010	<0.010	0.30	0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F1 C6-C10	Dry Weight	mg/kg	<4	<4	876	4
F1 -BTEX	Dry Weight	mg/kg	<4	<4	869	4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10	5-Nov-10	5-Nov-10	
F2c C10-C16	Dry Weight	mg/kg	<10	<10	246	10
F3c C16-C34	Dry Weight	mg/kg	<30	<30	<30	30
F4c C34-C50	Dry Weight	mg/kg	<20	<20	<20	20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20	<20	<20	20
% C50+		%	<5	<5	<5	
Silica Gel Cleanup						
Silica Gel Cleanup			Done	Done	Done	
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	23.40	24.30	22.90	

Exova
Bay #5, 2712-37 Avenue N.E.
Calgary, Alberta
T1Y-5L3, Canada

T: +1 (403) 291-2022
F: +1 (403) 291-2021
E: Calgary@exova.com
W: www.exova.com

Analytical Report

Bill To:	EBA Engineering Consultants Ltd	Project:	
Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
	442 - 10 Street N.	Name:	Barons Remediation
	Lethbridge, AB, Canada	Location:	124 Main St. Barons, Ab.
	T1H 2C7	LSD:	
Attn:	Deryck Masterman	P.O.:	
Sampled By:	DM	Acct code:	
Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Reference Number	772854-16
Sample Date	Nov 04, 2010
Sample Time	NA
Sample Location	
Sample Description	West Wall / W3b / 4.0 / M
Matrix	Soil

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil						
Extraction Date			5-Nov-10			
Benzene	Dry Weight	mg/kg	0.041			0.004
Toluene	Dry Weight	mg/kg	<0.005			0.005
Ethylbenzene	Dry Weight	mg/kg	3.66			0.010
Total Xylenes (m,p,o)	Dry Weight	mg/kg	0.15			0.010
Volatile Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10			
F1 C6-C10	Dry Weight	mg/kg	238			4
F1 -BTEX	Dry Weight	mg/kg	234			4
Extractable Petroleum Hydrocarbons - Soil						
Extraction Date			5-Nov-10			
F2c C10-C16	Dry Weight	mg/kg	147			10
F3c C16-C34	Dry Weight	mg/kg	<30			30
F4c C34-C50	Dry Weight	mg/kg	<20			20
F4HTGCc C34-C50+	Dry Weight	mg/kg	<20			20
% C50+		%	<5			
Silica Gel Cleanup						
Silica Gel Cleanup			Done			
Soil % Moisture						
Moisture	Soil % Moisture	% by weight	23.20			

Approved by:

Michael Yohemas, BSc
Laboratory Operations Manager

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Methodology and Notes

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Company:	EBA		

Lot ID:	**772854**
Control Number:	A175834
Date Received:	Nov 5, 2010
Date Reported:	Nov 12, 2010
Report Number:	1381724

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
BTEX-CCME - Soil	CCME	*	Reference Method for Canada-Wide Standard for PHC in Soil, CWS PHCS TIER 1	05-Nov-10	Exova Calgary
BTEX-CCME - Soil	US EPA	*	US EPA method, 8260B/5035	05-Nov-10	Exova Calgary
TEH-CCME-Soil (Shake)	CCME	*	Reference Method for Canada-Wide Standard for PHC in Soil, CWS PHCS TIER 1	05-Nov-10	Exova Calgary

** Reference Method Modified*

References

CCME	Canadian Council of Ministers of the Environment
US EPA	US Environmental Protection Agency Test Methods

Comments:

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Analytical Report

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Report To:	EBA Engineering Consultants Ltd	ID:	L22101183.004
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Petroleum Hydrocarbons in Soil

Batch Notes

1. The method used complies with the Reference Method for the Canada Wide Standards for Petroleum Hydrocarbons in Soil - Tier 1, April 2001, including Addendum 1, and is accredited for use in Exova.
2. Modifications of the method: See Notes and Methodology for nonconformances (if applicable).
3. Qualifications on results: See Notes and Methodology for nonconformances (if applicable).
4. Silica gel treatment is performed for fractions F2, F3, F4.
5. F1-BTEX: BTEX has been subtracted from the F1 fraction.
6. If analyzed, naphthalene has been subtracted from fraction F2 and selected PAHs have been subtracted from fraction F3.
7. F4HTGC is reported when more than 5% of the total carbon envelope elutes past C_{50}.
8. Exova does not routinely report Gravimetric Heavy Hydrocarbons (F4G or F4G-sg), F4HTGC through extended range high temperature GC is reported instead.
9. When both F4(C_{34}-C_{50}) and F4HTGC are reported, F4HTGC is the final F4 that is to be used for interpreting the CWS.
10. Quality criteria met for the batch: Data is reported in Quality Control Section of report (if requested).
    -nC_6 and nC_{10} response factors (RF) are within 30% of RF for toluene
    -nC_{10}, nC_{16} and nC_{34} RFs are within 10% of each other
    -nC_{50} RF is within 30% of the average RF for nC_{10}+nC_{16}+nC_{34}
    -linearity is within 15% for each of the calibrated carbon ranges
11. Batch data for analytical quality control are available on request.
12. Extraction and analysis holding times were met: See Notes and Methodology for nonconformances (if applicable).

Approved by:

Michael Yohemas, BSc
Laboratory Operations Manager