Remedial Action Plan for Part of the Paisley Clythe Watermain

Area of Buried Drums

Guelph, Ontario

Prepared For: City of Guelph

COMMUNITIES

TRANSPORTATION

BUILDINGS

INFRASTRUCTURE

MMM GROUP

January 2015 10-12108-001-EN1

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January 20, 2015
10-12108-001-EN1

Prasoon Adhikari, P.Eng.
Environmental Engineer
City of Guelph
Planning, Building, Engineering and Environment
1 Carden Street
Guelph, ON N1H 3A1

Dear Prasoon,

Subject: Proposed Remedial Action Plan
Area of Buried Drums, Wellington Street West, Guelph, Ontario

Please find enclosed the remedial action plan for the removal of drums at Howitt Creek and Wellington Street West in Guelph, Ontario. The remedial action plan is intended as a scope of work to be provided to eligible contractors for the purpose of providing a quote. This revision has addressed comments received from the Ministry of the Environment and Climate Change.

If you have any questions, please contact me.

Yours truly,

MMM GROUP LIMITED

Carolyn Adams, P.Eng.
Manager
Environmental Management

cc. Majde Qaqish, P.Eng., City of Guelph
Alex Green, MMM
Mani Ruprai, MMM
Peter Barrington, MMM

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EXECUTIVE SUMMARY

Buried drums were exposed during the construction of the York Trunk Sewer Paisley Clythe watermain in Guelph, Ontario. The affected area is on the west side of Wellington Avenue West, between Waterloo Avenue and Edinburgh Road South, adjacent to the northeast of Howitt Creek (the "Site"). Although the surrounding area is currently mainly used for residential purposes, it was historically used for industry and waste disposal.

The liquid released to the ground contained a mixture of industrial solvents. Impacted soil and liquid were removed from the excavation and managed offsite. The trench was backfilled, over geotextile fabric, to control air emissions. The Site has been secured with fencing until remediation of the area can be completed and construction of the watermain can continue.

In October 2014, a subsurface environmental investigation advanced 11 test pits to assess the general soil and groundwater quality in the area of the buried drums. Groundwater was not encountered in sufficient quantity to obtain representative samples. Results of soil sampling indicated poor quality fill impacted with metals and polycyclic aromatic hydrocarbons with limited other contaminant concentrations that would be consistent with the release of industrial solvents.

A geophysical survey using electromagnetic and ground penetrating radar techniques identified anomalies that could indicate soil or groundwater contamination, drums or other smaller metal objects. As part of this Remedial Action Plan (RAP), the areas of identified anomalies will be exposed under controlled conditions to confirm the presence or absence of drums. Any drums will be removed, along with any visibly impacted soil.

Verification sampling for the identified contaminants of concern will be conducted of the soil remaining at the Site and results will be evaluated against Ministry of the Environment and Climate Change (MOECC) Table 2 site condition standards for industrial, commercial or community (ICC) in a potable groundwater setting with coarse-textured soils that will be applied for guidance purposes. However, only soil associated with contamination from the drums and soil within the watermain alignment will be removed as part of this RAP.

The Remediation Contractor retained to complete the RAP will prepare the Site, ensure effective controls for sediment and erosion control, develop and implement a spill response and contingency plan, control dust and manage groundwater and surface water.

Once the area is cleared of any drums, fill material within the alignment of the watermain construction will be removed by the General Contractor, in accordance with the soil management plan presented within. The soil management plan requires removal of impacted soil within the watermain alignment, tracking of any material imported for site restoration, water management and employee health and safety. Geotextile fabric will be installed to segregate the impacted fill that will be managed in place and any soil cap provided as part of the watermain construction.

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1.0 INTRODUCTION

1.1 Background

MMM Group Limited (MMM) was retained by the City of Guelph (the "City") to conduct engineering services in support of the construction of the York Trunk Sewer Paisley Clythe watermain in Guelph, Ontario. On September 2, 2014, buried drums were exposed during the construction of the watermain, on the west side of Wellington Avenue West, between Waterloo Avenue and Edinburgh Road South, adjacent to the northeast of Howitt Creek (the "Site"). The Site location is provided in Figure 1 and a Site plan in Figure 2.

The Site consists of an undeveloped area adjacent to Wellington Avenue West, extending approximately 160 m northeast of Howitt Creek. At the time of the investigation, the area had been prepared for construction of the watermain through the removal of surface soil along the portion of the Site closest to Howitt Creek.

The excavator punctured one drum, releasing mixed solvent fluid. The green-blue liquid emitted a sweet, solvent or fuel-like odour. It was pumped into a container and stored onsite. The following day, seven additional drums were also punctured, releasing similar liquid. Impacted soil and liquid were removed from the excavation and managed offsite and the trench was backfilled, over geotextile fabric, to control air emissions. Sampling of liquid, soil and air during the initial cleanup of the release indicated that the fluids in the drums consisted of a mixture of typical industrial solvents.

A temporary fence has been erected around the area of disturbed soil to secure the Site until remediation of the area can be completed and construction of the watermain can continue.

In October 2014, MMM conducted a subsurface environmental investigation through the advancement of 11 test pits to assess the general soil and groundwater quality in the area of the buried drums. Groundwater was not encountered in sufficient quantity to obtain representative samples. Results of soil sampling (outlined in this remedial action plan) indicated fill impacted mainly with metals and polycyclic aromatic hydrocarbons (PAHs); however, there were also limited (in area and concentration) impacts that would be consistent with the release of industrial solvents.

1.2 Site History

MMM reviewed historical reports and records (e.g., aerial photos, fire insurance plans, etc.) to identify environmental concerns related to past Site uses. Based on this review, it was determined that a landfill (Bristol Street Site landfill) was present in the vicinity of the Site in 1959 and 1960. The Sterling Rubber Company was present southwest of the Site as early as 1930. The details on the Sterling Rubber Company buildings and activities that took place indicated that past operations included dripping, drying and curing of rubber products, onsite storage of raw materials, and the use of a coal boiler system at the Site.

These previous uses of the Site are the likely source of the encountered buried drums and impacted soil.

1.3 Geophysics Survey

A geophysical survey using electromagnetic and ground penetrating radar techniques was performed by multiVIEW Locates Inc. (multiVIEW) as part of the drum investigation. multiVIEW provided their report with interpretation of subsurface data obtained for the area between Howitt Creek to the south and the water main crossing of Wellington Street West to the north (Appendix A). This report indicated that there were areas of subsurface anomalies that could represent drums, other (smaller) buried metals or soil/groundwater contamination. Seven areas, ranging from 2 to 5 m in diameter were identified to most likely represent buried drums. The conclusions of the geophysics investigation identified areas of significance, stated in the multiVIEW report are as follows:

- *One zone of relatively low bulk ground conductivity on the western part of the survey area indicating potential contamination;*
- *Large negative Inphase values on the western part of the survey area indicate near-surface metal objects;*
- *Relative high conductivity anomalies on the northern/southern parts of the survey grid indicate fence lines;*
- *Seven conductivity anomalies with positive Inphase peaks represent metallic objects; and*
- *Forty-two GPR reflective responses suggesting buried objects.*

These areas are identified on Figures 4-1 through 4-3 in the multiVIEW report provided in Appendix A.

1.4 Potential Contaminants of Concern

Based on the results of liquid, soil and ambient air analysis (AirZone 2014a) included in Appendix B, the liquid released from the discovered drums contained a mixture of solvents, including volatile compounds such as benzene, toluene, ethylbenzene, styrene and xylene as well as phenolic compounds such as naphthalene, phenol, cresol and 2,4-dimethylphenol. Primary potential contaminants of concern are volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) (e.g., PAHs and phenols). Metals, petroleum hydrocarbon compounds (PHCs), and polychlorinated biphenyls (PCBs) are also of concern due to the industrial nature of the contaminant source.

1.5 Applicable Site Condition Standards

Generic site condition standards (SCS) established by the Ministry of the Environment and Climate Change (MOECC) in their document: *Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, April 2011 (the "Standard") were used as guidance to assess soil quality at the Site. Since the City of Guelph uses groundwater for their municipal water source, MOECC Table 2 - Full Depth Generic SCS established for potable groundwater conditions for industrial, commercial or community (ICC) land uses, with coarse-textured soil were considered to be relevant for the Site.

2.0 SOIL AND GROUNDWATER QUALITY

2.1 Soil Characteristics

A test pit investigation conducted on October 22 and 23, 2014 recovered nine samples representing worst case and native conditions observed in 11 test pits (MMM 2014). The results of analysis of the soil samples indicated that fill material (see logs in Appendix C) has been impacted by metals and PAHs, with VOCs and PHCs identified to a limited extent at one location. The concentrations of one or more contaminants exceeded the SCS (Figure 3) in each sample of fill submitted for analysis. These results are consistent with the assumption that soil impacts are only coincident with fill, and not indicative of gross contamination in the investigation area as a result of leaks from buried drums.

The results of the investigation suggest that fill extends approximately 100 m to the northeast from Howitt Creek. Evidence of drums was observed during the investigation and it is anticipated that drums will be encountered particularly at the southern limits of the excavation area. While impacts are slightly deeper closer to Howitt Creek, on average, it appears that fill extends to approximately 2 m below grade. The excavation for watermain installation will extend deeper than the observed limit of the fill and the depth of this investigation. Therefore, installation of the watermain should not require additional excavation to remove impacted fill.

It is assumed that the impacted fill extends across the undeveloped area at the edge of Wellington Avenue West (15 m wide), and the approximate volume of impacted fill, including drums, is estimated to be 3,000 m^3. To effectively continue the construction of the watermain, the drums will be removed under the protocols established in this Remedial Action Plan (RAP). The management of soil beyond the buried drums and the watermain alignment will be incorporated into the overall management of impacts from former landfills and historical industrial areas of the City.

A summary of soil characteristics, along with a comparison of the results of analysis to the applicable MOECC SCS are presented in Appendix D. A sample from test pit TP3A was submitted for toxicity characteristic leaching procedure (TCLP) analyses of metals and inorganics, VOCs, PHCs, and PCBs and was reported as non-hazardous. This should approximately represent waste soil conditions that may be encountered during the remediation. However, based on sampling of the material during the release of drum contents in September 2014, materials that show evidence of impacts from solvents may be classified as hazardous.

The drums represent a source of potential ongoing contamination; therefore their removal and excavation of the impacted soil around them will be required. Once drums have been removed from the area, the watermain installation can proceed under the existing contract.

2.2 Groundwater Characteristics

No water samples were collected from the drum investigation. Existing monitoring well location BH7 was found to be dry, likely due to local dewatering activities. There was insufficient water accumulation in the test pits to permit sample collection.

3.0 REMEDIAL ACTION PLAN

3.1 Remediation Criteria

Based on the test pit investigation, drums are anticipated to be present mainly in the area within 50 m of Howitt Creek. The areas identified as anomalies in the geophysics investigation (Appendix B), are to be exposed under controlled conditions to confirm the presence or absence of drums. Any drums are to be removed, along with any visibly impacted soil around the drums or elsewhere.

As discussed, the contaminants of potential concern in the soil have been identified as VOCs, SVOCs, metals, PHCs and PCBs. Verification sampling will be conducted of the soil remaining at the Site and results will be evaluated against MOECC Table 2 ICC SCS. However, only soil associated with contamination from the drums and soil within the watermain alignment will be removed as part of this RAP.

3.2 Site Preparation

Site preparation activities to remove the drums will be the responsibility of the Remediation Contractor and include:

- Installing (or enhancing existing) protective fencing, (i.e., wire fence or wooden hoarding with locking gates) around the perimeter, for public protection and to provide Site security;
- Confirming the locations of buried services; and
- Installing methods for soil erosion and sediment control, as required by the contract for the construction of the watermain.

3.3 Remediation Plan

Under the full-time supervision of a MMM environmental technician, it is planned to remove all of the drums and impacted soils associated with the drums from the Site using the forces of a specialized Remediation Contractor. Once the area is cleared of any drums, fill material within the alignment of the watermain construction will be removed by the General Contractor, in accordance with the soil management plan presented in Section 4. Geotextile fabric will be installed to segregate the impacted fill that will be managed in place and any soil cap provided as part of the watermain construction.

3.3.1 Drum Removal

Based on the multiVIEW geophysical survey, drums are anticipated to be encountered at the southern limits of the Site. Drums will be carefully exposed to allow pumping of liquid contents (if present) into a suitable container for removal as hazardous liquid waste. Drums, and any solid contents, if present, will be loaded directly into lugger bins for offsite disposal as solid hazardous waste. Soils with visible impacts observed adjacent to drums (estimated to be approximately 400 m^3) will also be loaded into the lugger bins with the drums for offsite disposal as solid hazardous waste (subject to confirmatory TCLP analysis) in accordance with Ontario regulations.

The Remediation Contractor will establish and adhere to a spill response and contingency plan. In the event that drums are breached prior to the removal of liquid contents, liquid that escapes to surrounding soil will be pumped or absorbed immediately and the impacted soil along with the breached drum and any absorbed liquid will be removed by excavator and placed into a sealable container (e.g., lugger bin). These materials will be managed offsite as hazardous waste, (subject to confirmatory TCLP analysis) in accordance with Ontario regulations.

Any new evidence of drums or chemical contamination will be removed by the Remediation Contractor.

MMM's environmental technician will conduct verification sampling, with the assistance of the Remediation Contractor to confirm post-remedial conditions of the trench excavation and drum removal areas.

3.3.2 Trench Excavation

Following the drum removal, the watermain trench excavation will continue and the construction will remove approximately 500 m^3 of impacted fill that will be disposed offsite as solid non-hazardous waste at a MOECC licensed landfill facility.

3.3.3 Verification Sampling

The Remediation Contractor will facilitate verification sampling conducted by MMM's environmental technician to confirm post-remedial conditions at the Site. Samples will be collected for both field and laboratory testing. The field testing will include monitoring of organic vapours using a photoionization detector (PID). Confirmatory soil samples collected after the removal of drums and visibly impacted soil will be submitted to a Canadian Association for Laboratory Accreditation (CALA) or Standards Council of Canada (SCC) accredited laboratory for the analysis of VOCs, SVOCs, PHCs, metals and PCBs and compared with the MOECC SCS. Duplicate samples will be analyzed for quality control purposes.

Additional sampling may be required if liquid releases occur during the removal or if conditions suggestive of previously unknown releases from drums are encountered.

3.3.4 Geotextile Installation

The General Contractor will install a geotextile fabric upon the conclusion of watermain construction, as part of the overall site restoration. This will demarcate the interface between soil left in place and backfill imported as a cap over the area, should any excavation be conducted in this area in the future. The geotextile fabric is not intended as a risk management measure and does not require monitoring or maintenance.

3.4 Spill Response and Contingency

Given the deteriorated condition of drums observed at the Site, it is likely that drums will be breached during their removal. Therefore, the Remediation Contractor shall prepare a Spill Response and Contingency Plan appropriate for the assessed risk associated with an uncontrolled release during site activities (e.g., drum contents or fuel) which shall be reviewed by the MOECC prior to the initiation of work. As a minimum, the Remediation Contractor shall maintain, onsite, materials necessary for adequate spill response for release of unknown liquids from drums, along with any other spills that may occur from construction equipment.

The type of spill response materials will be suitable for the liquid contaminants that may be onsite (i.e., drum contents, fuels in trucks and equipment, hydraulic fluid, etc.). In particular, spill response specifications will include the following requirements:

- Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by excavation and backfilling operations.
- Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible onsite.
- Promptly report spills and releases potentially causing damage to the environment to:
    - MOECC Spills Action Centre and any other authority having jurisdiction or interest in spill or release including any conservation authority, water supply authorities, drainage authority, road authority, and fire department.
    - City of Guelph Project Manager.
    - Owner of pollutant, if known.
    - Person having control over pollutant, if known.
    - MMM.

3.5 Ambient Air Monitoring

The City of Guelph will retain an Air Monitoring consultant to conduct ambient air monitoring for the duration of the remediation (removal of drums only). Air monitoring shall include, but not be limited to:

- Real-time monitoring of the workers' breathing zone for total VOCs using a PID or equivalent.
    - Should downwind PID measurements exceed 0.5 ppm for a 30 minute period, additional safety precautions shall be undertaken (e.g. donning of air purifying respirator) during excavation, or stopping work until VOC concentrations have decreased to less than 0.5 ppm.
- Ambient air sampling with active or passive sampling devices will be collected on a daily basis during removal of drums only to ensure the safety of workers and surrounding area:
    - Monitoring for airborne total suspended particulate (TSP) and VOCs upwind and downwind of the drum removal area to confirm dust control measures:
        - Particulate concentrations will be measured by gravimetric analysis, in accordance with the requirements identified in the "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" (Dec. 1996) Section 5.5, Air Sampling, and Section 8, Quality Assurance/Quality Control;
        - VOC concentrations will be measured by NIOSH methods;
        - Analysis of samples will be conducted by an accredited laboratory.

- Air concentrations will be compared to applicable Ministry of Labour and MOECC regulatory limits (e.g., OSHA, Ontario Regulation (O. Reg.) 419, O. Reg. 833 as amended, etc.); and
- Produce a final air monitoring summary report.

3.6 Dewatering

The shallow groundwater table is inferred to be below the watermain trench. However, seasonal variations may raise the groundwater table into the trench area. In order to remove soil or fill below the water table, a temporary construction period dewatering system may be required. If so, the requirements of the Permit to Take Water (PTTW), issued by the MOECC for the York Trunk Sewer – Paisley Clythe Watermain project will be followed for all dewatering activities.

PTTW protocols have been established as part of the construction contract and the requirements of the MOECC permit will apply to any dewatering required of the drum removal and watermain construction. Subject to confirmation of water quality and treatment as necessary, the permit allows for collected water to be discharged to sanitary sewer. The permit doesn't allow for the discharge to natural water courses.

3.7 Reporting and Documentation

During implementation of the RAP, the Remediation Contractor will document the removal of drums through written records of weigh bills and photographic documentation of each area. The quantities of drums, impacted soil and other waste materials will be characterized in conformance to Ontario Regulation 347 General – Waste. Record keeping during remediation will be the responsibility of the Remediation Contractor and will include daily records indicating the following:

- date and description of Site conditions, including weather
- dust control measures
- management of waste materials (quantities, characteristics, disposal site locations)
- onsite sampling conducted by MMM's environmental technician, and
- implementation of any spill response or contingency plan activation.

The Remediation Contractor will provide this information to MMM upon request.

4.0 SOIL MANAGEMENT PLAN

4.1 Existing Soil Management Requirements

Based on the results of the test pit investigation, impacted fill extends approximately 100 m to the northeast from Howitt Creek and 15 m along the undeveloped edge of Wellington Avenue West, to an average depth of 2 m below grade. The total approximate volume of impacted fill, including drums, is 3,000 m^3. The soil at the Site has been characterized as containing metals and PAHs, and to a lesser extent, VOCs and PHCs at concentrations that exceed MOECC Table 2 SCS. Soil that will require removal as part of the watermain construction will be managed offsite.

All drums will be removed prior to continuing the watermain construction. The watermain trench will be excavated through the area of impacted fill; however, the trench excavation, using trench box methods, will require removal of only approximately 500 m^3 of material. Reuse of this material was evaluated; however, re-grading options limit the potential for placement of fill material in the immediate area. Therefore, the fill excavated for the trench will be removed and disposed offsite as solid non-hazardous waste. Based on results of air monitoring during the test pitting program (AirZone 2014b), excavation and removal of the fill material will not require real-time, confirmatory air sampling.

Fill was not observed in the area northeast of TP9 (as shown in Figure 2), and the native soil sampled from this area had not been impacted from previous industrial activities. Native soil excavated for the construction of the watermain can remain onsite.

To support the removal of impacted soil, the Contractor (Remediation or General, as applicable and referred to simply as Contractor for the purpose of soil management) will implement a soil management plan that will include, but not be limited to the following:

- Develop and implement a site operation scheme showing areas for construction traffic, construction materials, stockpiled material (if required), and the progression of works.
- The Contractor shall excavate soil within the proposed watermain trench in a manner that minimizes the generation of dust. The Contractor will prevent the release of stockpiled soils through erosion by maintaining the impacted material within the excavation limits to prevent run off and placing a tarp below and over impacted soil to prevent the migration of contaminants in dust or sediment runoff. Efforts will be made to avoid disturbance of the surrounding exposed soil.
- It is anticipated that standard equipment, including excavators, bulldozers and transport trucks will be used to excavate and load soil. Materials will be loaded directly into transport trucks and transported to a receiving site identified by the Contractor and confirmed by MMM to accept the material as identified. Site operations will be established to keep trucks hauling soil offsite outside the contaminated work area. Equipment that comes in contact with contaminated soil or water will be appropriately decontaminated prior to moving across uncontaminated soil and departure from the site.
- Once loaded, the trucks will travel on municipally identified truck routes to the designated receiving site(s).
- Materials designated as solid non-hazardous waste will be transported to a waste receiving site or soil treatment facility approved by MOECC to accept materials contaminated with VOCs, SVOCs, metals, PAHs and/or PCBs.
- The waste material will be weighed at the receiving site, for the purpose of material tracking and contract payment.

Contract oversight will be provided by the Consultant (Qualified Person, as defined by O. Reg. 153/04, or an environmental technician under the supervision of a Qualified Person) as established prior to the initial identification of buried drums, to confirm that Site conditions are consistent with soil reports and that contract requirements are being met by the Contractor.

It is not anticipated that it will be necessary for impacted material to be stockpiled. As a contingency; however, if conditions prove necessary, any stockpiled material shall be placed within a silt fence enclosure and covered by a tarp at the end of each day. If stockpiled material

will not be removed for offsite disposal as solid non-hazardous waste, MMM will arrange for sampling to support alternative offsite uses. The specific testing will depend on the requirements of the alternative use but will include, at a minimum, analysis of VOCs, SVOCs and metals. The Contractor must allow a minimum three day period (72 hours) for sampling and testing material, and written clearance by MMM prior to moving stockpiled material offsite.

4.2 Imported Material

Imported fill material may be required for trench backfill and for establishing a cap over the geotextile liner. Only materials suitable for the intended Site use (e.g., MOECC Table 2 ICC) will be accepted for construction. In accordance with MOECC best management practices (Ministry of the Environment 2014) the chemical conditions of the imported fill source site will reviewed (from environmental site assessment reports, as available) by MMM and subject to the City's approval.

For soil, this will require that it be chemically tested at a frequency consistent with source site conditions and MOECC requirements.

4.3 Dust Control

The General Contractor Contractor shall produce a dust control plan, and submit for review by MMM. The Remediation Contractor will be required to adhere to this dust control plan. Standard dust control measures will be implemented by the General Contractor and Remediation Contractor, to ensure that excessive dust is not generated during soil excavation, based on regular visual inspections. The chemical analysis of soil indicates that, after drum removal, specific air quality control measures or testing will not be necessary. Standard dust and air quality control measures may include:

- Conduct excavation using methods to minimize raising dust from construction operations.
- Implement and maintain dust and particulate control measures (such as water spraying) during construction and in accordance with applicable regulations.
- Limit vehicle speeds onsite to reduce the generation of dust from traffic.
- Provide positive means to prevent airborne dust from dispersing into atmosphere. Use potable water for misting system for dust and particulate control or use chemical means for water misting system for dust and particulate control where necessary and only with MMM's prior written approval.
- As required, use appropriate covers on trucks hauling impacted and fine or dusty material. Use watertight vehicles to haul wet materials.
- Any surfaces used by trucks will be graded as required to limit surface silt content (to approximately less than 10 percent). Paved surfaces on adjacent streets will be swept regularly to control dust.
- Prevent dust from spreading to adjacent property sites.
- Work may be stopped at any time when control of dust and particulates is inadequate for wind conditions present at site, or when visual monitoring indicates that release of dust and particulates into atmosphere is excessive. The appropriate Contractor would be required to

make changes to their operations prior to resuming any excavation, handling, processing, or any other work that may cause release of dust or particulates.

4.4 Water Management

The Contractor will maintain the excavation free of water. Dewatering may be necessary during excavation and the PTTW approved by the MOECC shall be followed for all dewatering activities.

5.0 WORKER HEALTH AND SAFETY

When implementing the RAP and/or any subsequent soil management, the General Contractor and Remediation Contractor shall meet applicable regulatory requirements with respect to occupational health and safety for the Site with the contaminants identified in Section 2 above. Workers will be required to uphold the standard health and safety practices of their employers, the General Contractor or Remediation Contractor. The General Contractor shall produce a health and safety plan that shall include measures related to occupational hygiene, personal protective equipment, contingency plans and contact information for their personnel, both onsite and offsite. The Remediation Contractor shall review the established plan and supplement with their health and safety protocols, as required.

The health and safety plans will be submitted to MMM to ensure that they adequately address the physical and chemical hazards associated with Site activities. The health and safety protocols will be reviewed at Site meetings and during Site visits.

6.0 SIGNATURES

This RAP incorporates protocols that are standard in the construction industry and are therefore acceptable to municipalities and regulatory agencies.

Submitted by:

MMM GROUP LIMITED

Asif Rashid, P.Eng.
Project Manager
Environmental Management

Carolyn Adams, P.Eng.
Manager
Environmental Management

7.0 REFERENCES

AirZone One Ltd., September 2014(a). *A Report Summarizing the Results for Ambient Monitoring to Determine Airborne VOCs at Wellington Street Water Main Project In Guelph, Ontario*. Project No. J14117.

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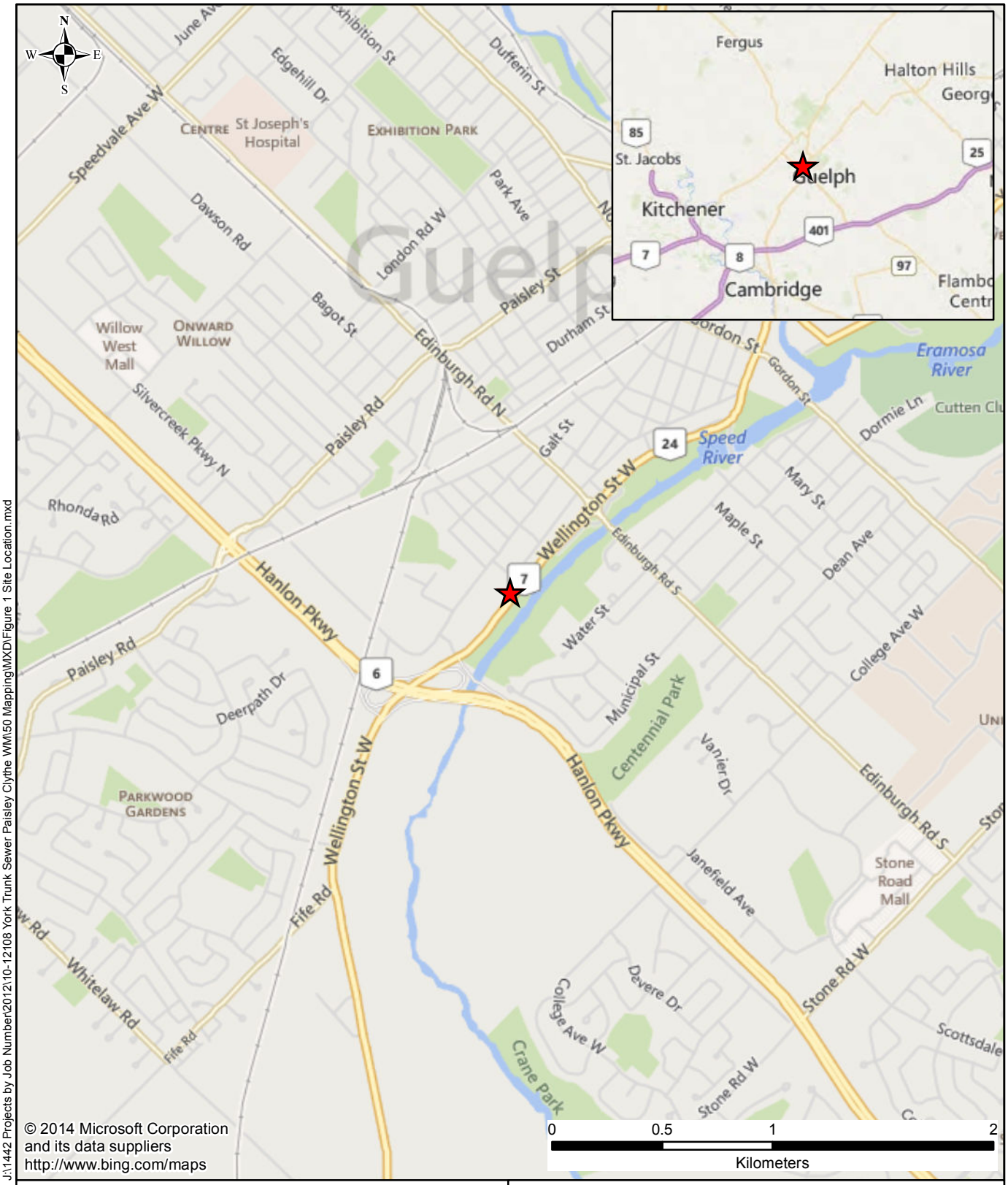
FIGURES



J:\1442 Projects by Job Number\2012\10-12108 York Trunk Sewer Paisley Clythe WMI50 Mapping\MXD\Figure 1 Site Location.mxd

Legend

★ Site Location

Client:	**City of Guelph**
Title:	**Site Location**
Prepared By:	MMM GROUP
10-12108-001	Scale as Shown / Review: AFJ
Date: November 2014	**Figure: 1**
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J:\1442 Projects by Job Number\2012\10-12108 York Trunk Sewer Paisley Clythe WM\50 Mapping\MXD\Figure 2 Final Test Pit Locations.mxd

Legend

Test Pit

- No fill present
- Fill present

Client: **City of Guelph**

Title: **Paisley Clythe Watermain Test Pit Locations**

Prepared by: MMM GROUP

10-12109	Scale as Shown	Review: AFJ
Date: November 2014	**Figure: 2**	
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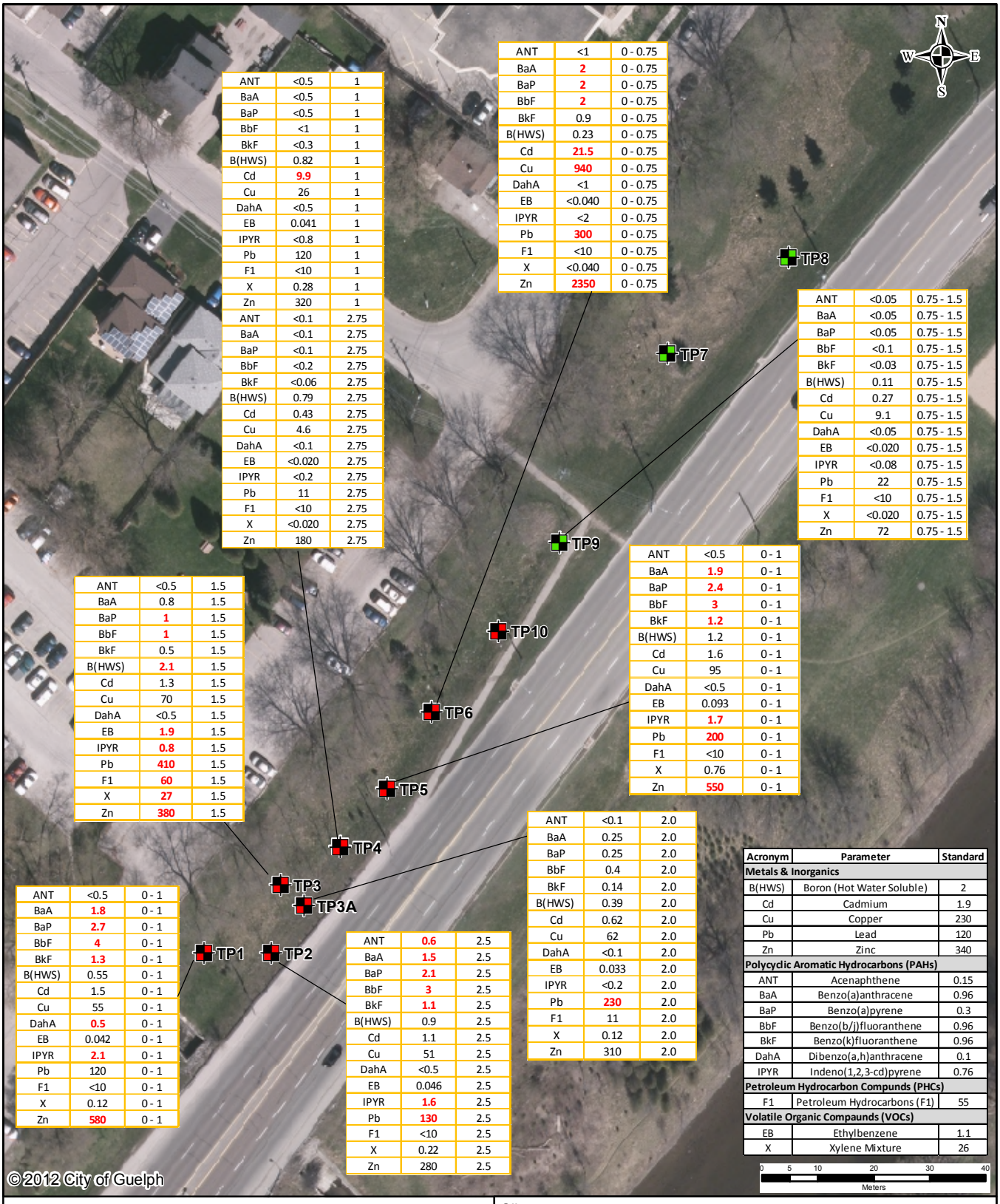

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BaP	<0.5	1
BbF	<1	1
BkF	<0.3	1
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Cd	**9.9**	1
Cu	26	1
DahA	<0.5	1
EB	0.041	1
IPYR	<0.8	1
Pb	120	1
F1	<10	1
X	0.28	1
Zn	320	1
ANT	<0.1	2.75
BaA	<0.1	2.75
BaP	<0.1	2.75
BbF	<0.2	2.75
BkF	<0.06	2.75
B(HWS)	0.79	2.75
Cd	0.43	2.75
Cu	4.6	2.75
DahA	<0.1	2.75
EB	<0.020	2.75
IPYR	<0.2	2.75
Pb	11	2.75
F1	<10	2.75
X	<0.020	2.75
Zn	180	2.75

ANT	<1	0 - 0.75
BaA	**2**	0 - 0.75
BaP	**2**	0 - 0.75
BbF	**2**	0 - 0.75
BkF	0.9	0 - 0.75
B(HWS)	0.23	0 - 0.75
Cd	**21.5**	0 - 0.75
Cu	**940**	0 - 0.75
DahA	<1	0 - 0.75
EB	<0.040	0 - 0.75
IPYR	<2	0 - 0.75
Pb	**300**	0 - 0.75
F1	<10	0 - 0.75
X	<0.040	0 - 0.75
Zn	**2350**	0 - 0.75

ANT	<0.05	0.75 - 1.5
BaA	<0.05	0.75 - 1.5
BaP	<0.05	0.75 - 1.5
BbF	<0.1	0.75 - 1.5
BkF	<0.03	0.75 - 1.5
B(HWS)	0.11	0.75 - 1.5
Cd	0.27	0.75 - 1.5
Cu	9.1	0.75 - 1.5
DahA	<0.05	0.75 - 1.5
EB	<0.020	0.75 - 1.5
IPYR	<0.08	0.75 - 1.5
Pb	22	0.75 - 1.5
F1	<10	0.75 - 1.5
X	<0.020	0.75 - 1.5
Zn	72	0.75 - 1.5

ANT	<0.5	1.5
BaA	0.8	1.5
BaP	**1**	1.5
BbF	**1**	1.5
BkF	0.5	1.5
B(HWS)	**2.1**	1.5
Cd	1.3	1.5
Cu	70	1.5
DahA	<0.5	1.5
EB	**1.9**	1.5
IPYR	**0.8**	1.5
Pb	**410**	1.5
F1	**60**	1.5
X	**27**	1.5
Zn	**380**	1.5

ANT	<0.5	0 - 1
BaA	**1.9**	0 - 1
BaP	**2.4**	0 - 1
BbF	**3**	0 - 1
BkF	**1.2**	0 - 1
B(HWS)	1.2	0 - 1
Cd	1.6	0 - 1
Cu	95	0 - 1
DahA	<0.5	0 - 1
EB	0.093	0 - 1
IPYR	**1.7**	0 - 1
Pb	**200**	0 - 1
F1	<10	0 - 1
X	0.76	0 - 1
Zn	**550**	0 - 1

ANT	<0.5	0 - 1
BaA	**1.8**	0 - 1
BaP	**2.7**	0 - 1
BbF	**4**	0 - 1
BkF	**1.3**	0 - 1
B(HWS)	0.55	0 - 1
Cd	1.5	0 - 1
Cu	55	0 - 1
DahA	**0.5**	0 - 1
EB	0.042	0 - 1
IPYR	**2.1**	0 - 1
Pb	120	0 - 1
F1	<10	0 - 1
X	0.12	0 - 1
Zn	**580**	0 - 1

ANT	**0.6**	2.5
BaA	**1.5**	2.5
BaP	**2.1**	2.5
BbF	**3**	2.5
BkF	**1.1**	2.5
B(HWS)	0.9	2.5
Cd	1.1	2.5
Cu	51	2.5
DahA	<0.5	2.5
EB	0.046	2.5
IPYR	**1.6**	2.5
Pb	**130**	2.5
F1	<10	2.5
X	0.22	2.5
Zn	280	2.5

ANT	<0.1	2.0
BaA	0.25	2.0
BaP	0.25	2.0
BbF	0.4	2.0
BkF	0.14	2.0
B(HWS)	0.39	2.0
Cd	0.62	2.0
Cu	62	2.0
DahA	<0.1	2.0
EB	0.033	2.0
IPYR	<0.2	2.0
Pb	**230**	2.0
F1	11	2.0
X	0.12	2.0
Zn	310	2.0

Acronym	Parameter	Standard
Metals & Inorganics		
B(HWS)	Boron (Hot Water Soluble)	2
Cd	Cadmium	1.9
Cu	Copper	230
Pb	Lead	120
Zn	Zinc	340
Polycyclic Aromatic Hydrocarbons (PAHs)		
ANT	Acenaphthene	0.15
BaA	Benzo(a)anthracene	0.96
BaP	Benzo(a)pyrene	0.3
BbF	Benzo(b/j)fluoranthene	0.96
BkF	Benzo(k)fluoranthene	0.96
DahA	Dibenzo(a,h)anthracene	0.1
IPYR	Indeno(1,2,3-cd)pyrene	0.76
Petroleum Hydrocarbon Compunds (PHCs)		
F1	Petroleum Hydrocarbons (F1)	55
Volatile Organic Compaunds (VOCs)		
EB	Ethylbenzene	1.1
X	Xylene Mixture	26

J:\1442 Projects by Job Number\2012\10-12108 York Trunk Sewer Paisley Clythe WM\50 Mapping\MXD\Figure 3 Soil Exceedances.mxd

Legend

Test Pit

No fill present

Fill present

BaA | 1.8 | 0-1

Parameter | Concentration (ug/g) | Depth (m)

Note: Red bolded concentrations exceed the applicable MOE Table 2 standards.

Client: **City of Guelph**

Title: **Soil Exceedances**

Prepared by: MMM GROUP

10-12108 | Scale as Shown | Review: AFJ

Date: November 2014

Figure: 3

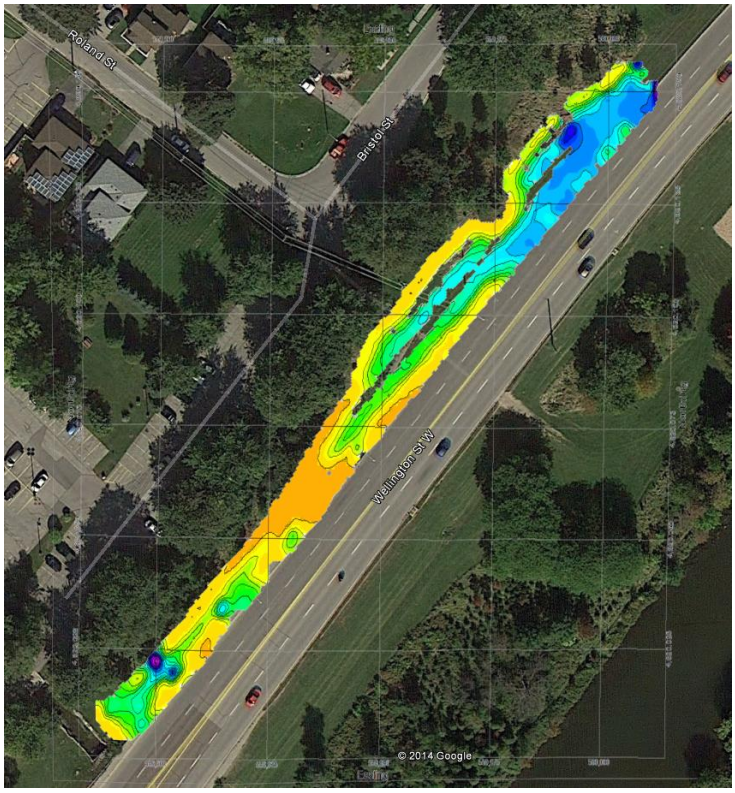
APPENDIX A – Geophysical Report

multiVIEW Locates Inc.
Phone: 1-800-363-3116
Fax: 1-866-571-5946
325 Matheson Blvd., East, Mississauga, ON, L4Z 1X8
www.multiVIEW.ca

GEOPHYSICAL INTERPRETATION REPORT

Regarding Frequency Domain Electromagnetic (FDEM) and Ground Penetrating Radar (GPR) for

Environmental Site Assessment



Submitted to:

MMM Group Limited

100 Commerce Valley Drive West, Thornhill, ON, Canada L3T 0A1
Carolyn Adams, M.A.Sc., P.Eng, Manager, Environmental Management

Prepared by:

multiVIEW Locates Inc.

325 Matheson Blvd. East, Mississauga, ON, L4Z 1X8
Evelio Martinez, M.Sc., P.Geo, Senior Geophysicist

September 25, 2014

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1 INTRODUCTION

MMM Group Limited retained multiVIEW Locates Inc. to carry out detailed Frequency Domain Electromagnetic (FDEM) and Ground Penetrating Radar (GPR) in support of Environmental Site Assessment (ESA) at Wellington Street West, east of Hanlon Parkway, Guelph, ON.

The acquisition, processing and analysis of FDEM and GPR data were performed according to professionally regulated industry standards. The data interpretation contained in this report is based on the analysis of the responses recorded during the acquisition and processing stage.

The images and figures presented in the body of the report are scaled to fit the report page size and should be used for illustration purposes only. Detailed maps and images of the data and results are available in the digital archive supplied along with this interpretation report.

The interpretation of the data obtained during this investigation is intended for guidance during ESA. Interpretation and use of the geophysical data during any subsequent programs is subject to the Law of Physics and Technical limitations of the exploration techniques. The criteria and models used for the interpretation of the acquired geophysical data are not unique and may not represent the actual features present on site.

1.1 SURVEY OBJECTIVES

The primary objective of the survey was to locate and delineate the spatial position of potential underground metal drums and to assess the potential for contamination beyond the drum's area along the proposed alignment of the watermain.

2 PROJECT OVERVIEW

Detailed multi-parameter geophysical study was completed FDEM and GPR survey techniques. The electromagnetic data acquisition was performed using Geonics EM31 instrumentation. For the GPR data acquisition a Sensors & Software NOGGIN system was utilized. The geophysical exploration and acquisition phase of the survey was completed on 19/09/2014. The raw data and survey results presented as digital plan maps and sections are:

- FDEM Quadrature response (soil conductivity mapping).
- FDEM Inphase response (metallic content mapping).
- GPR Signal Amplitude Depth Slices
- GPR Cross-Sections
- Integrated Interpretation Plan Maps

2.1 GENERAL LOCATION

The survey areas are located on the Wellington Street West, east of Hanlon Parkway, Guelph, ON (Figure 2-1).

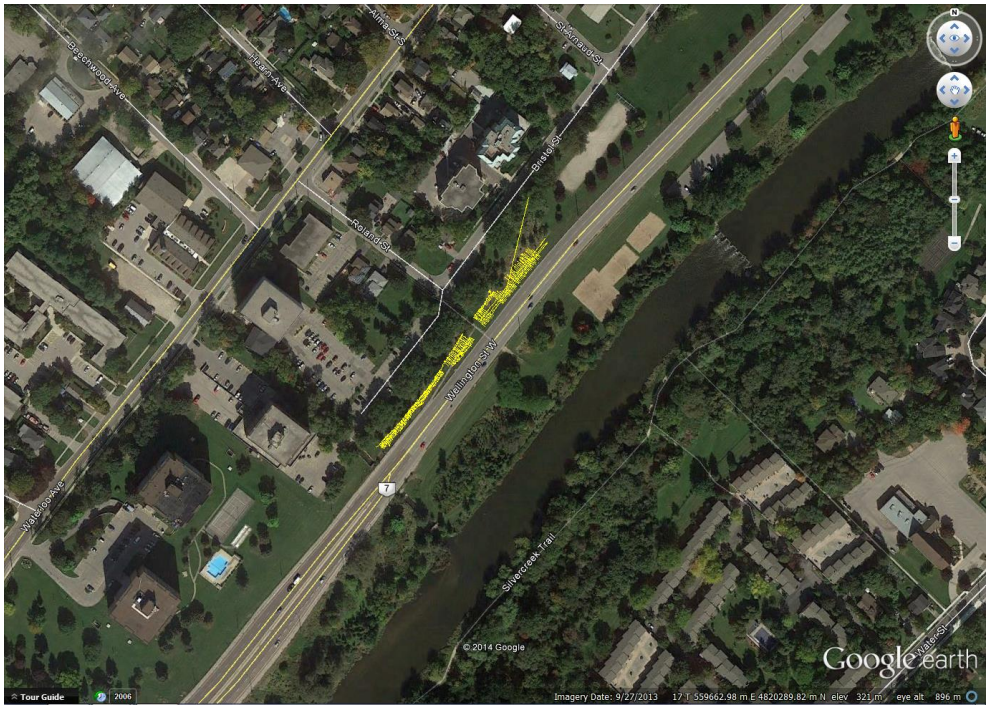

Figure 2-1: Site General Location Map

General Location Map captured from Google Maps. 19/09/2014

2.2 OVERALL SITE CONDITIONS

The surface of the grid consisted of relatively levelled terrain with grass and scrubs covering large part of the survey area.

3 METHODOLOGY

Geophysical data acquisition and processing included:

- Geophysical survey grid installment.
- FDEM and GPR Data Acquisition.
- Site Photographing and Documentation.
- Data Interpretation and Presentation.

3.1 SURVEY GRID INSTALLMENT

Survey profiles and reference stations for the data acquisition were established on the survey area according to client requirements.

A Trimble GEO XH 6000 global positioning system (GPS) was used to record the position of data collection points. The time synchronized EM31-GPS readings were recorded at 2 second intervals while the operator traversed the survey areas.

The extent of the survey comprises two GPR grids and one FDEM grid covering the open spaces east of the previously removed drums and spill area. The reference station for GPR-Grid1 (Station 0+00) was established at the south-west corner of the survey area with UTM coordinates 559899mE/4820016mN (NAD83, Zone 17N). The reference stations for GPR-Grid2 (Station 0+00) were established at the central-east portion survey area with UTM coordinates 559959mE/4820100mN (NAD83, Zone 17N).

Starting from the reference location, the survey profiles were installed with parallel lines and increasing stations on the direction of the travel across the entire area. Geographic data and elevations were acquired for each of the profiles for the purpose of grid establishment and positioning correction. The survey grids were installed with east-west and north-south lines across the entire survey area. The nominal station spacing for the grids was approximately 1 meter excluding dense vegetated and obstructed areas.

3.2 FREQUENCY DOMAIN ELECTROMAGNETIC DATA ACQUISITION

FDEM data acquisition was conducted across the site using an EM31 system manufactured by Geonics Limited Ltd. The EM31 instrumentation provides data for indirect detection of buried metal objects and soil conductivity mapping to 3 to 6 meters depth using a horizontal coplanar coil configuration. A general system configuration is shown in Figure 3-1.

The measurement units of the system are “milli-Siemens per meter” (mS/m) for the Quadrature component and “parts per thousand” (ppt) for the Inphase component of the measured electromagnetic field.

The electromagnetic data were acquired at approximate station spacing of 0.2 meters along lines spaced at 1 meter apart, excluding a dense vegetated areas.

Figure 3-1: Photo Illustrating the Frequency Domain EM31 Acquisition System Setup

3.3 Ground Penetrating Radar Data Acquisition

GPR electromagnetic signal transmitted into the subsurface and reflected by the structures, geological features and buried objects are recorded by GPR instrumentation permitting real-time interpretation of subsurface features to a depth.

The GPR data were acquired with station spacing of 0.05m along the grid profiles established for all the survey grids. Over the scanned areas, the GPR profiling was run in multiple orientations with perpendicular cross lines spaced at 1 meter intervals. The GPR survey was completed using a Noggin 250MHz GPR system manufactured by Sensors & Software Inc.

3.4 Site Documentation

Photos at each survey location were taken to illustrate the location of the survey grids, site conditions, and objects that may interfere with the data acquisition and quality. Photographs for each survey site are available for further references and consultation in the digital archive.

3.5 Data Processing and Presentation

Unusual soil conditions, contamination and natural subsurface disturbances are expressed as quadrature or conductivity anomalous zones. Generally the soil and materials over these zones have higher porosity and higher water content (including clay content) than surrounding consolidated soil or materials, therefore higher conductivity is reflected in the acquired electromagnetic data. The rate of change in conductivity measurements or quadrature is generally greater in the vicinity of non-native materials and slowly varying in areas of native materials. High concentration of contaminants and metallic minerals in the subsoil produce high conductivity responses. By mapping high conductivity or

quadrature electromagnetic anomalies it is possible to infer the location of different waste materials, contaminated zones and leachates.

Oil contaminants cause series of changes in physical, chemical and biological properties of soil (Modin et al., 1997; Sauck, 1998; Atekwana, 2001), mainly during first several months after contamination. Just after contamination a high resistivity anomaly marks contaminated zone, but after several months, as a result of biodegradation of contaminants under the influence of bacteria, this zone reveals a low resistivity anomaly (Geofís Intl vol.45 no.3 México jul./sep. 2006).

Inphase responses will have a well-defined positive peak over buried metal objects, greatly facilitating quick and accurate location of a target in the field. In general, positive Inphase anomalies are representative of metallic masses. Inphase responses with high positive values indicate metal objects parallel to the orientation of the instrument coils. Positive anomalous values are commonly associated with buried metal objects. Inphase responses greater than twenty parts per thousand (ppt) of the total field strength are interpreted as metallic objects. Alternatively, strong negative Inphase values are observed when high conductive objects such as iron or steel are oriented perpendicular and near to instrument coils.

By integrating Quadrature in conjunction with the Inphase data, it is possible to discriminate buried metal objects from different types of soils, waste and existing contaminated zones. Local areas with high conductivity responses may be interpreted to represent more conductive non-homogeneous fill materials.

GPR uses the physical principles of electromagnetic waves propagation throughout media. The GPR transmitted signal will be reflected, refracted and diffracted from the boundaries between objects with different dielectric properties. Buried object detection and mapping using GPR is possible due to the dielectric contrast between scanned objects and the soil matrix.

The GPR anomaly identification was accomplished by examining the subsurface electromagnetic reflection characteristics such as continuous anomalous trending and high amplitude hyperbolic reflection identification and areal reflection mapping.

Results of the GPR are presented plan maps at different depth levels (GPR signal amplitude depth slices) and in sectional views (distance versus depth profiles) extracted from the line raw data as required for the interpretation. The inferred location of all identified features and interpreted anomalous zones was documented and transferred to digital drawings.

4 RESULTS

Results of the FDEM and GPR data collected at Wellington Street West, east of Hanlon Parkway, Guelph, ON served to delineate Quadrature anomalies representing changes in soil conditions potentially associated to contamination. The nature of the Quadrature electromagnetic anomalies is difficult to establish due to the presence of surface metallic objects and fence lines near the survey profiles, although the amplitude and extent of the anomalies observed in the raw data allow us to differentiate variations in the conductivity above the background level.

Interpretation compilation of FDEM and GPR data are presented in Figure 4-1.

Colour contour maps of the measured FDEM Quadrature and Inphase components were created for the survey area. For the colour contoured grids, the background electromagnetic responses are represented by green to yellow-green colours (cool colours); and the anomalous responses are denoted by orange to red colour contours. The Quadrature component of the measured electromagnetic field is shown in the maps using a dynamic range from -25 to 600 mS/m (Figure 4-2). The Inphase component (Figure 4-3) is shown in the maps using a dynamic range from -5 to 20 ppt.

GPR signal amplitude contour grids and interpretation for the selected GPR profiles are shown in Figure 4-4 and Figure 4-5. High amplitude hyperbolic GPR reflections may either indicate the presence of buried utilities, metal objects or drums. Large area chaotic reflective zones indicate soil disturbance.

Areas of overlapping GPR and FDEM anomalous zones that do not correspond with known subsurface features (i.e. known utility lines) or surface metallic objects that are large in nature represent potential underground drums or large buried metallic objects. The penetration depth of the GPR technique is primarily dependent on the soil conductivity. For this survey the approximate depth of GPR signal penetration at was 2-3 meters.

Interpretation of the GPR and FDEM data for the investigated area indicates:

- One zone of relatively low bulk ground conductivity has been delineated on the western part of the survey grid (Figure 4-1). The spatial position of this anomaly may be related to contamination from former drums on the western end of the grid (Figure 4-3). Increased conductivity east of this zone, along with positive Inphase anomalies suggests increase on the metal content. Large negative Inphase values nearby suggest near-surface metal object.
- Relatively high conductivity anomalies are observed on the northern and southern parts of the survey grid along fence lines.
- At least seven well-defined conductivity anomalies with positive Inphase peaks are representative of metallic masses.
- Forty two GPR reflective features of various sizes on Grid 1 and Grid 2.

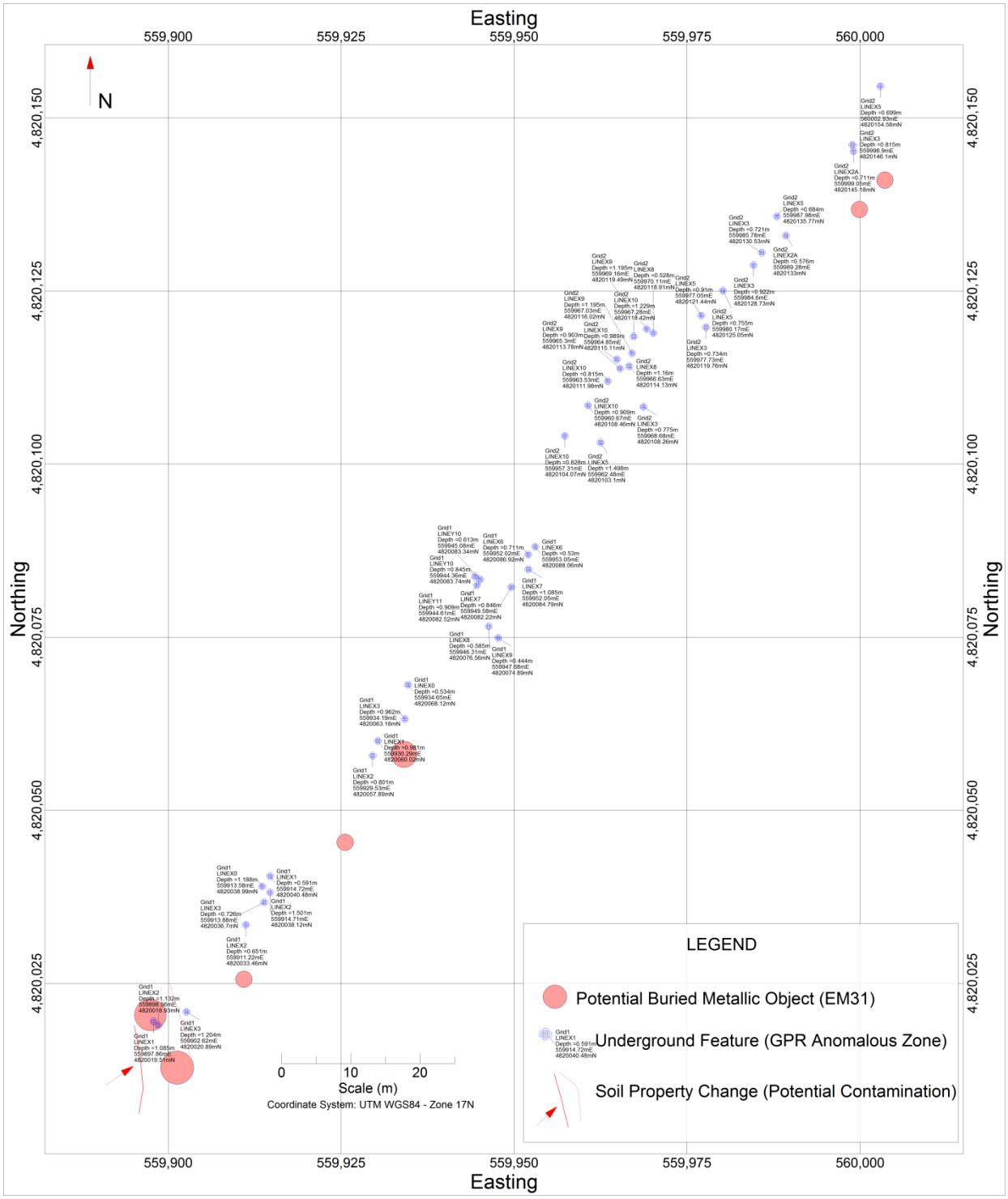

Figure 4-1: Integrated Interpretation Plan Map

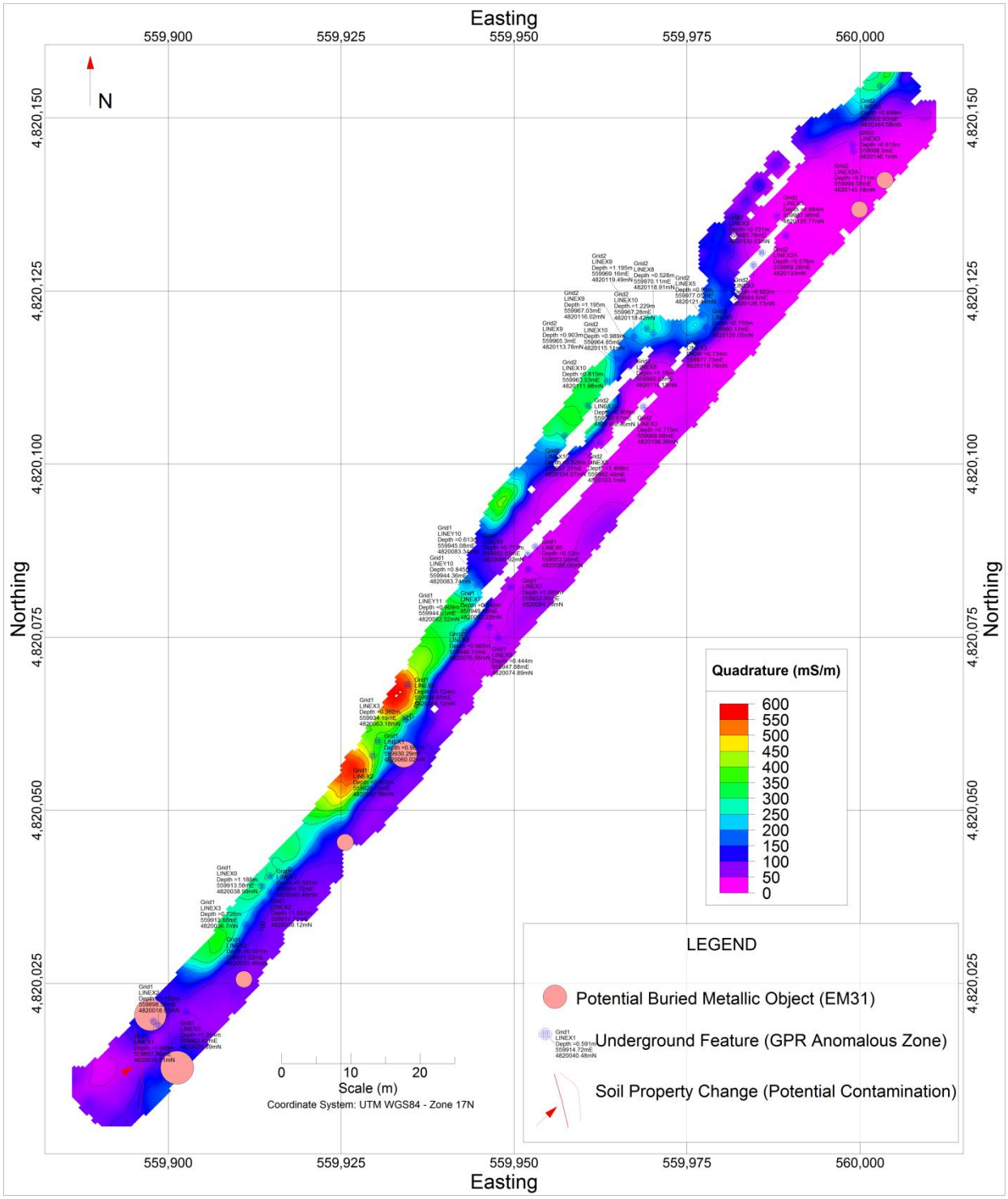

Figure 4-2: Quadrature Colour Contour Grid Map

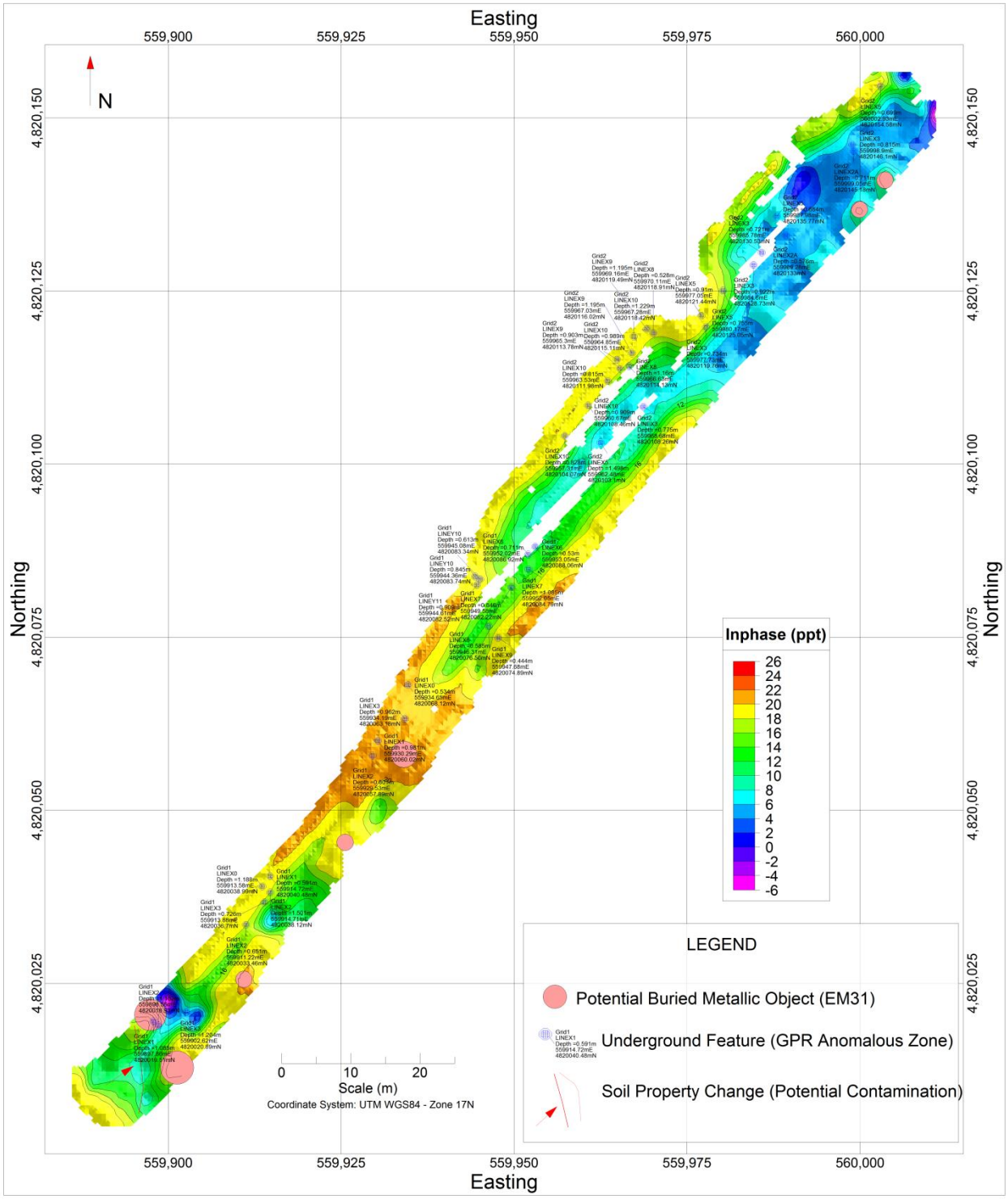

Figure 4-3: Inphase Colour Contour Grid Map

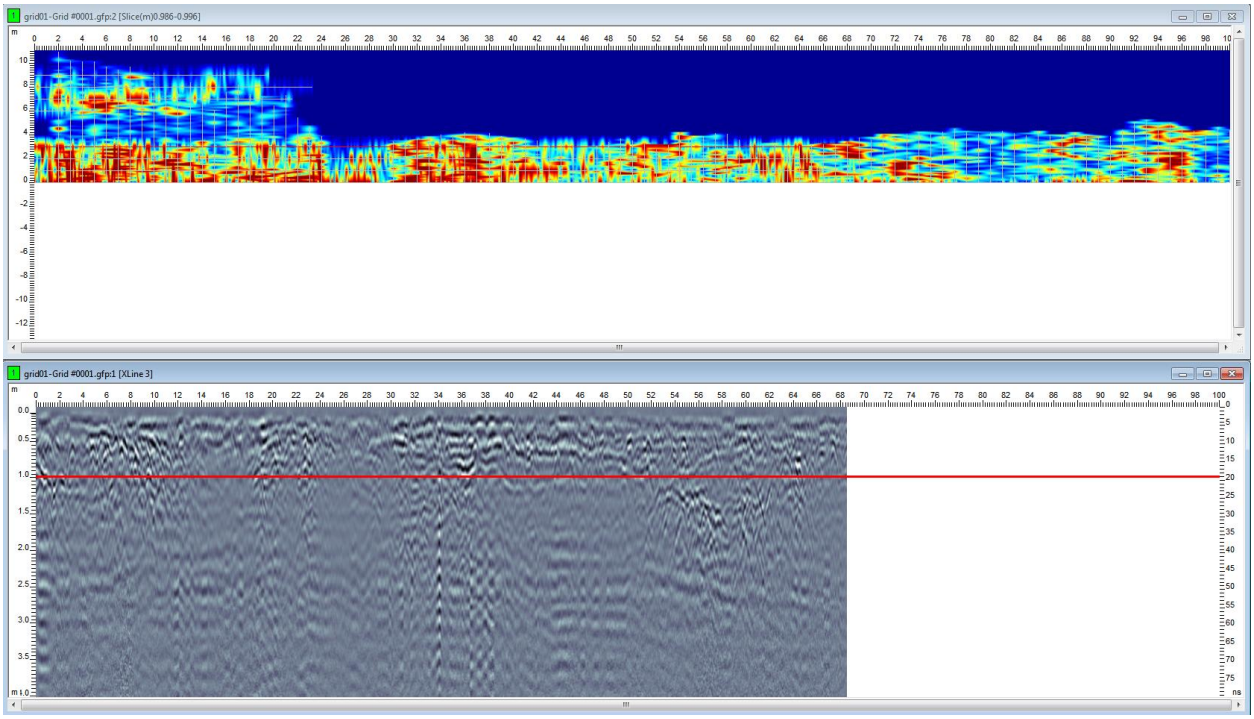

Figure 4-4: GPR-Grid1 SA Colour Contour Grid at 1m depth with Profile XLine3 Section

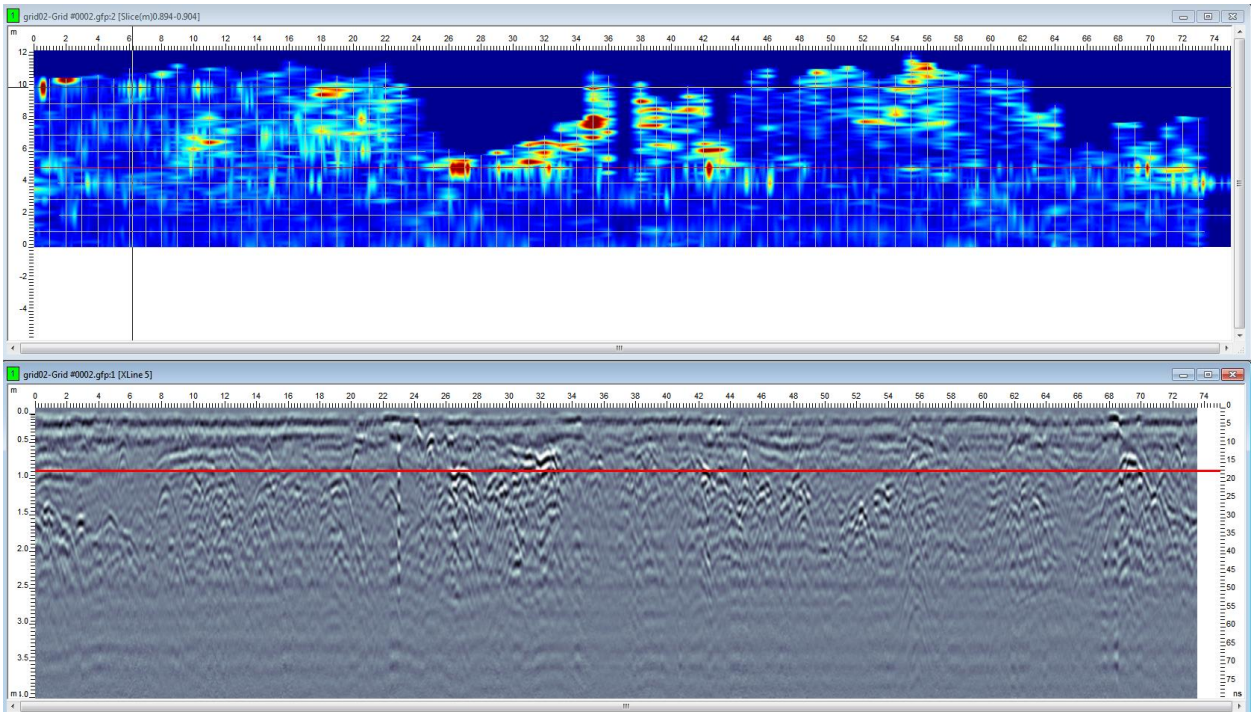

Figure 4-5: GPR-Grid2 SA Colour Contour Grid at 1m depth with Profile XLine5 Section

5 CONCLUSION AND RECOMMENDATIONS

FDEM and GPR data acquisition and analysis was conducted at Wellington Street West, east of Hanlon Parkway, Guelph, ON for Environmental Site Assessment. The geophysical survey results served to delineate distinct conductivity anomalous zones and metallic responses from the Frequency Domain Electromagnetic (FDEM) and Ground Penetrating Radar (GPR) raw data that represent changes in the soil properties, potential contaminated zones and buried metallic objects. Zones with increased porosity and moisture, clay materials and elevated contamination may also be the source of the interpreted electromagnetic responses.

The strong amplitude of the inphase responses indicates potential buried metal masses. The electromagnetic response in immediate vicinity of above ground metallic objects produces a fairly broad halo of elevated electromagnetic responses around these features. A summary interpretation for the investigated area indicates:

- One zone of relatively low bulk ground conductivity on the western part of the survey area indicating potential contamination.
- Large negative Inphase values on the western part of the survey area indicate near-surface metal objects.
- Relative high conductivity anomalies on the northern/southern parts of the survey grid indicate fence lines.
- Seven conductivity anomalies with positive Inphase peaks represent metallic objects.
- Forty two GPR reflective responses suggesting buried objects.

The interpretation presented in this report will assist the senior engineer to effectively conduct site assessment over the analysed profiles. Although, the reconnaissance nature of the survey with relatively wide line spacing and sampling interval, is only a valid approach for obtaining a broad picture of the site conditions.

Further analysis of the data collected in context with all available information should be consulted in order to corroborate the interpretation presented in this assessment report. When physically locating the interpreted electromagnetic results for testing, it is recommended to properly correlate the grid stations with the survey stations presented on the digital maps and available drawings. Additional information regarding advantages and limitations of this geophysical technique is provided in the appendices of this report.

Respectfully Submitted,

[signature and date]

Evelio Martinez, M.Sc., P.Geo

Senior Geophysicist
multiVIEW Locates Inc.

Table 1: Digital Archive Content

Folder	Content
…//Deliverables/	Digital copy of the survey results, including survey contract, final documents and maps
…//Figures /	Screen captured images of the geophysical maps and sketches, including site photographs
…//Maps/	Grid maps, utility locates and interpretation maps
…//Raw Data/	Acquired raw data and processing results
…//Reports/	Field and geophysical survey reports and presentations with the survey results

Table 2: Project Specification List

Contract	
MLI Project Reference Number	27876
Report Date	September 25, 2014
Client	
Legal Name	MMM Group Limited
Address	100 Commerce Valley Drive West, Thornhill, ON, Canada L3T 0A1
Phone	905.882.4211 ext. 6535
Fax	905.882.1857
Contact	
Client Representative:	Carolyn Adams, M.A.Sc., P.Eng
Qualifications:	Manager, Environmental Management
Email	Carolyn Adams <AdamsC@mmm.ca>
Survey	
Survey Description	Geophysical Survey for Environmental Site Assessment
Methodology	Frequency Domain Electromagnetic (FDEM) and Ground Penetrating Radar (GPR)
Location	Wellington Street West, east of Hanlon Parkway, Guelph, ON
Execution Date	19/09/2014
Contractor	
Survey by:	multiVIEW Locates Inc.
Responsible	Evelio Martinez, M.Sc., P.Geo
Qualifications	Senior Geophysicist
Phone	905-601-5400
Email	emartinez@multiview.ca

APPENDIX B – Air Monitoring Reports

AirZOne
Comprehensive Air Quality Services

A Report Summarizing the Results for Ambient Monitoring to Determine Airborne VOCs at Wellington Street Water Main Project in Guelph, Ontario

Prepared For:
MMM Group Limited
100 Commerce Valley Drive West
Thornhill, Ontario
L3T 0A1

Prepared By:
Airzone One Ltd.
222 Matheson Blvd. East
Mississauga, Ontario
L4Z 1X1

Project Number J14117
Report No: 1

September 12, 2014

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Introduction

The city of Guelph is installing new water and sewer lines along Wellington St. near Howitt Creek. A city contractor was excavating a trench during the week of September 1 when some barrels were discovered buried in the soil. The barrels appeared very old and had been punctured by the excavation equipment. The barrels contained an unknown liquid which escaped to the soil. The liquid was a bluish-green colour with a strong odour resembling solvents or fuels. Work on the water project was stopped to address the spill. The spilled liquid and associated rainwater were transferred to storage tanks while the barrels and contaminated soil were removed to a containment area. The trench was covered with a membrane and clean soil to control odourous emissions.

As the nature and origin of the liquid within the barrels was unknown the City and its contractor, MMM Group Ltd. ("MMM"), arranged to have the air and water/liquid tested. Odours were at times strong during the removal process and generated some complaints from nearby residents. Air monitoring locations were established in the immediate areas of the excavation zone and the containment area. Fence line and background (baseline) measurements were also collected. The air monitoring program was designed to measure volatile organic compounds (VOCs) over two periods (prior to, and, immediately following removal of the exposed contaminated material) as these were the suspected compounds emitting into the air. Water samples were collected from the two storage tanks.

Measurements of Airborne Volatile Organic Compounds (VOCs)

Several sampling locations were established in the vicinity of the excavation area, the soil containment area, and at a background location. The background location was selected based on the predominant wind direction at the time samples were set-up; at this time wind was generally from the south west. A handheld, direct-reading instrument equipped with a photo ionization detector (PID) was used to assist with sample location selection. The PID displays total volatile organic compounds (TVOC) which is the sum of the VOCs in air. Areas with high levels of TVOC were selected as potential locations as well as other areas of interest. Sampling locations around the excavation area and containment area were situated in each quadrant to account for potential changes in wind direction and still allow monitoring of source emissions. Figure 1 identifies the sampling locations overlaid on a satellite view of the site. Table 1 describes the sampling locations and the types of samples collected at each location. Thermal desorption tubes were used in several locations to measure short term concentrations to assist in determining peak air concentration levels of emitted compounds. Passive sampling devices (PSDs) were deployed for longer periods to measure concentrations of VOCs that can be referenced to MOE ambient air quality criteria (AAQCs).

Figure 1 Sampling Locations; Wellington St. And Hanlon Pkwy, Guelph

Legend (See Table 1 for a description of the sample locations)

- *Notations 1-21 correspond with PSD sample IDs ending in 1-21*
- *Notations A-H correspond with TD Tube sample IDs ending in A-H*

Table 1- Sampling Location Summary at the Water Main site on Wellington St., Guelph

Notation	Location	VOCs - PSD Method	VOCs - TD Method
1,12	West of Excavation	2	-
2,13	North of Excavation	2	-
3,14,B	East of Excavation	2	1
4,15	South of Excavation	2	-
5, 16, C, H	East of Containment Area	2	2
6, 17	North of Containment Area	2	-
7, 18	West of Containment Area	2	-
8, 19	South of Containment Area	2	-
9, 20, E	Fence line (downwind of Containment area)	2	1
10, 21, D	Background	2	1
A	Excavation Area under membrane	-	1
11, 22, F,G	Field Blanks	2	2
	TOTAL	22	8

See the appendix for photographs of some sampling locations

Sampling and Analysis Methods for Air Monitoring

All air samples were processed at the Airzone laboratory. The laboratory, and more specifically the method of measurement for VOCs, is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) using the ISO 17025:2005 protocol. This program requires a comprehensive QA/QC program including auditing of methods, participation in CALA mandated proficiency testing programs and the use of qualified, certified suppliers for external laboratory services. Airzone uses standard methods of analysis validated by the Environmental Protection Agency (EPA), Ministry of Environment (MoE), National Institute of Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA) or the Ontario Ministry of Labour (MOL). The methods of sampling and analysis are described below. Water samples were processed at AGAT laboratories which is also accredited by CALA.

Volatile Organic Compounds (VOCs) – Passive Samples (SIM and SCAN mode)

Airborne concentration levels of VOCs were measured with protocols based on NIOSH methods 1003 (Halogenated Hydrocarbons), 1005 (Methylene Chloride), 1019 (1,1,2,2-Tetrachloroethane), 1022 (Trichloroethylene), 1400 (Alcohols I), 1401 (Alcohols II), 1403 (Alcohols IV), 1450 (Esters I), 1457 (Ethyl Acetate), 1500 (Hydrocarbons, 36-126°C BP), 1501 (Hydrocarbons, Aromatic), 1552 (Terpenes), 2549 (VOC), and 5517 (Polychlorobenzenes).

Air was sampled with a 3M 3500 organic vapour monitor (OVM) passive sampling devices (PSDs). VOCs pass through the diffusion membrane at known sampling rates and adsorb on a charcoal-impregnated disk within the monitor. Samples are extracted with solvent and analyzed by gas chromatography-mass spectrometry (GC-MS).

Airborne concentrations were based on the amounts collected in each sample, blank results, and the accurate air volumes (from elapsed sampling time and sampling rates). Air concentrations were compared to current AAQCs.

Volatile Organic Compounds (VOCs) – Thermal Desorption Method

Samples were analyzed using a modified TO-17 method. In the field, most samples were collected the afternoon of September 4th with Carbo-Trap™ 300 at approximately 50 mL/min for about 20 min. Samples were analysed by thermal desorption/concentration with gas chromatography-mass spectrometry (GC-MS).

Full air sampling details are provided in the Appendix.

Water Sampling

Water samples were collected on September 4th and 5th, 2014. Due to the urgency of the request, samples were collected from two large waste water holding tanks (designated Blue and Red) using 40 mL amber vials on September 4th. The blue tank was a heavy steel container accessed through a small hatch in the roof. The red tank was a heavy steel container with an open roof. The vials were lowered to the water line using a rope. Two (2) samples were collected from the blue tank (B1 & B2) and 3 samples were collected from the red tank (R1, R2, & R3). The purpose of the sampling was to provide speciated VOC analysis to correlate to results of the air sampling.

On September 5th additional requests were made by MMM to analyse water samples for BNA, PAH, and PCB. A larger amount of water sample was required; therefore two 1 L samples were collected from the Red and Blue water storage containers.

Results

Results for airborne VOCs on September 4th, 2014 are provided in Table 2 while samples collected on September 5th, 2014 are provided in Table 3. VOC samples collected with TD tubes are provided in Table 4. Water analysis results are provided in the appendix. Airborne concentrations of individual VOCs are expressed as micrograms per cubic metre of air ($\mu g/m^3$). A result denoted as "BDL or <" indicates that the concentration was below the detection level of the measurement method. Detection limits and AAQC values for each parameter are also provided with the tables.

Table 2. Airborne Concentrations of VOC at the Water Main Site on Wellington St., Guelph. Results are expressed as µg/m^3. Samples were collected between ~4:30 pm Sept. 4th and ~8:00 am Sept. 5th, 2014

	Sample I.D.														AAQC 2012 For Averaging Times:			
Parameters	**CAS #**	**J14117-PSD-1**	**J14117-VOC-1 Repeat**	**J14117-PSD-2**	**J14117-PSD-3**	**J14117-PSD-4**	**J14117-PSD-5**	**J14117-PSD-6**	**J14117-PSD-7**	**J14117-PSD-8**	**J14117-PSD-9**	**J14117-VOC-9 Repeat**	**J14117-PSD-10**	**J14117-VOC-11**	**10 min**	**1 hour**	**24 hour**	**Annual**
Pentane (nC_5)	109-66-0	0.84	0.87	1.40	1.75	1.00	1.46	1.41	1.07	1.21	1.63	1.58	1.81	< 0.2				
Ethanol	64-17-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		19000		
2,2-Dimethylbutane	75-83-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
iso-Propyl alcohol (IPA)	67-63-0	< 0.2	< 0.2	< 0.2	2.98	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			7300	
Dichloromethane	75-09-2	1.98	2.22	2.63	3.11	1.77	1.37	1.29	2.09	2.33	1.22	1.35	2.80	< 0.2			220	44
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	0.27	0.22	< 0.2	0.36	< 0.2	< 0.2	0.36	< 0.2	< 0.2	< 0.2	< 0.2			7000	
Hexane (nC_6)	110-54-3	< 0.2	< 0.2	< 0.2	0.26	< 0.2	< 0.2	0.24	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			7500	
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1000	
Ethyl acetate	141-78-6	< 0.2	< 0.2	< 0.2	0.23	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		19000		
Chloroform	67-66-3	1.22	1.34	1.58	2.02	1.42	1.80	1.76	1.55	1.52	1.64	1.75	1.65	< 0.2			1	0.2
2-Methylhexane	591-76-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Carbon tetrachloride	56-23-5	0.52	0.54	0.53	0.27	0.48	0.70	0.53	0.54	0.49	0.48	0.51	0.90	< 0.2			2.4	
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.41	< 0.2	< 0.2	0.34	0.31	0.26	< 0.2			2	0.4
Benzene	71-43-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.22	< 0.2	< 0.2	0.43	< 0.2	< 0.2	< 0.2	< 0.2			2.3	0.45
2,2,4-Trimethylpentane	540-84-1	< 0.2	< 0.2	1.93	0.99	1.60	0.31	0.75	< 0.2	0.90	0.62	0.67	0.32	< 0.2				
Heptane	142-82-5	0.52	0.50	< 0.2	0.45	0.40	< 0.2	0.21	0.49	< 0.2	< 0.2	< 0.2	0.31	< 0.2			11000	
Trichloroethylene	79-01-6	0.55	0.58	0.65	0.59	0.63	0.69	0.71	0.70	0.66	0.69	0.73	0.71	< 0.2			12	2.3
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	0.28	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1200	
Toluene	108-88-3	8.33	8.6	12.2	66.1	12.0	30.3	12.2	10.8	10.8	17.9	18.6	5.21	0.24			2000	
Octane (nC_8)	111-65-9	< 0.2	< 0.2	< 0.2	0.39	< 0.2	< 0.2	0.54	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	61800			
Tetrachloroethylene	127-18-4	0.23	< 0.2	0.30	0.24	0.21	0.22	0.25	< 0.2	0.25	< 0.2	< 0.2	< 0.2	< 0.2			360	
n-Butyl acetate	123-86-4	0.53	0.59	0.57	0.93	0.87	1.10	0.94	0.75	0.52	< 0.2	< 0.2	0.41	< 0.2	1000	15000		
Ethylbenzene	100-41-4	0.50	0.46	0.73	4.15	0.71	3.58	0.74	0.61	0.70	1.26	1.33	0.39	< 0.2	1900		1000	
(m+p)-Xylene	108-38-3 / 106-42-3	1.56	1.64	2.52	14.1	2.44	10.8	2.25	1.87	2.20	3.90	4.02	0.75	< 0.2	3000		730	
o-Xylene	95-47-6	0.71	0.73	1.25	8.36	1.11	5.28	0.90	0.71	0.90	1.86	1.94	0.23	< 0.2	3000		730	
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	0.58	< 0.2	0.28	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
a-Pinene	80-56-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Decane (nC_{10})	124-18-5	1.66	1.71	2.34	3.43	2.45	1.67	1.92	1.58	0.92	1.88	1.98	2.20	< 0.2		60000		
1,3,5-Trimethylbenzene	108-67-8	0.72	0.71	1.42	9.47	1.27	2.53	0.60	0.54	0.54	0.96	1.01	< 0.2	< 0.2			220	
1,2,4-Trimethylbenzene	95-63-6	1.47	1.47	3.13	25.5	2.75	7.18	< 0.2	1.10	1.39	2.91	3.04	< 0.2	< 0.2			220	
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	0.57	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,4-Dichlorobenzene	106-46-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			95	
1,3-Diethylbenzene	141-93-5	1.66	1.74	3.53	20.0	3.58	4.41	1.18	0.98	1.19	2.07	2.09	< 0.2	< 0.2				
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Dodecane (nC_{12})	112-40-3	2.27	2.37	4.49	4.80	4.02	1.85	2.01	3.01	2.33	2.61	2.61	3.39	< 0.2				
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
Naphthalene	91-20-3	< 0.2	< 0.2	0.75	8.23	0.97	2.67	1.02	0.68	0.56	1.46	1.42	0.29	< 0.2	50		22.5	
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Tetradecane (nC_{14})	629-59-4	3.48	3.81	4.07	4.97	5.16	3.45	3.31	5.08	3.01	3.20	3.35	3.39	< 0.2				
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				

< = below detection limit; method detection limit is 0.2 µg/m^3

Repeat = a laboratory repeat analysis was performed for QA/QC purposes

Table 3. Airborne Concentrations of VOC at the Water Main Site on Wellington St., Guelph. All results are expressed as µg/m^3. Samples were collected between ~5:00 pm Sept. 5th and ~1:00 pm Sept. 6th, 2014.

	Sample I.D.														AAQC 2012 For Averaging Times:			
Sample I.D.	**CAS #**	**J14117-PSD-12**	**J14117-PSD-12 Repeat**	**J14117-PSD-13**	**J14117-PSD-14**	**J14117-PSD-15**	**J14117-PSD-16**	**J14117-PSD-17**	**J14117-PSD-18**	**J14117-PSD-19**	**J14117-PSD-20**	**J14117-PSD-20 Repeat**	**J14117-PSD-21**	**J14117-PSD-22**	**10 min**	**1 hour**	**24 hour**	**Annual**
Pentane (nC_5)	109-66-0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Ethanol	64-17-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		19000		
2,2-Dimethylbutane	75-83-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
iso-Propyl alcohol (IPA)	67-63-0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			7300	
Dichloromethane	75-09-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			220	44
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			7000	
Hexane (nC_6)	110-54-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			7500	
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1000	
Ethyl acetate	141-78-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		19000		
Chloroform	67-66-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1	0.2
2-Methylhexane	591-76-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Carbon tetrachloride	56-23-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			2.4	
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			2	0.4
Benzene	71-43-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			2.3	0.45
2,2,4-Trimethylpentane	540-84-1	0.21	0.23	0.39	0.27	< 0.2	0.43	0.52	0.45	< 0.2	0.51	0.49	0.33	< 0.2				
Heptane	142-82-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			11000	
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			12	2.3
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1200	
Toluene	108-88-3	1.79	1.89	2.90	9.10	2.72	2.12	1.29	2.24	1.84	1.31	1.28	2.17	< 0.2			2000	
Octane (nC_8)	111-65-9	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	61800			
Tetrachloroethylene	127-18-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			360	
n-Butyl acetate	123-86-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	1000	15000		
Ethylbenzene	100-41-4	< 0.2	< 0.2	0.27	0.37	< 0.2	0.38	< 0.2	< 0.2	0.27	< 0.2	< 0.2	< 0.2	< 0.2	1900		1000	
(m+p)-Xylene	108-38-3 / 106-42-3	0.43	0.48	0.60	1.28	0.56	0.86	0.65	0.62	0.78	0.50	0.48	0.42	< 0.2	3000		730	
o-Xylene	95-47-6	< 0.2	< 0.2	< 0.2	0.72	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	3000		730	
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
a-Pinene	80-56-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Decane (nC_{10})	124-18-5	0.82	0.73	0.57	0.34	0.38	0.78	0.26	< 0.2	< 0.2	0.70	0.62	0.70	< 0.2		60000		
1,3,5-Trimethylbenzene	108-67-8	< 0.2	< 0.2	0.26	0.95	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			220	
1,2,4-Trimethylbenzene	95-63-6	< 0.2	< 0.2	0.51	2.58	0.24	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			220	
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,4-Dichlorobenzene	106-46-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			95	
1,3-Diethylbenzene	141-93-5	0.29	0.29	0.52	1.56	0.34	0.28	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.34	< 0.2				
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Dodecane (nC_{12})	112-40-3	1.74	1.73	1.15	1.16	1.95	2.47	2.68	2.26	1.80	0.48	0.49	2.52	< 0.2				
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
Naphthalene	91-20-3	< 0.2	< 0.2	0.34	0.71	< 0.2	0.39	< 0.2	< 0.2	0.28	< 0.2	< 0.2	< 0.2	< 0.2	50		22.5	
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Tetradecane (nC_{14})	629-59-4	2.20	2.39	2.01	1.77	0.50	0.38	< 0.2	< 0.2	0.90	0.56	0.56	0.44	< 0.2				
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				

< = below detection limit; method detection limit is 0.2 µg/m^3

Repeat = a laboratory repeat analysis was performed for QA/QC purposes

Table 4. Airborne Concentrations of VOC at the Site on Wellington St., Guelph. All results are expressed as µg/m^3. Samples were collected using TD tubes between 3:20 pm and 4:30 pm on September 4, 2014 but sample H was collected the next morning.

Parameters	Sample I.D.								AAQC 2012			
									For Averaging Times:			
	Method Detection Limit	J14117-TD-A	J14117 TD-B	J14117 TD-C	J14117 TD-D	J14117 TD-E	J14117 TD-F	J14117-TD-H	10 min	1 hour	24 hour	Annual
Aliphatic Hydrocarbons												
Pentane	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	1.6				
2,2-Dimethylbutane	0.5	16.9	8.0	14.1	1.6	2.3	<0.5	<0.5				
1-Hexene	0.5	10.8	2.3	3.4	<0.5	<0.5	<0.5	<0.5				
Hexane	0.5	8.9	1.3	2.4	<0.5	<0.5	<0.5	2.6			7500	
2-Methylhexane	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	1.2				
Heptane	0.5	2.6	<0.5	1.0	<0.5	<0.5	<0.5	3.0			11000	
2-Methyl heptane	0.5	3.6	4.3	<0.5	<0.5	<0.5	<0.5	2.6				
Octane	0.5	21.0	19.2	0.6	<0.5	<0.5	<0.5	4.8	61800			
Nonane	0.5	15.9	27.2	0.7	<0.5	<0.5	<0.5	2.4				
Decane	0.5	77.5	96.2	2.8	0.6	1.1	<0.5	2.1		60000		
Undecane	0.5	255	602	6.0	<0.5	2.7	<0.5	22.8				
Dodecane	0.5	180	104	3.5	1.5	1.6	<0.5	5.3				
Tridecane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5				
Tetradecane	0.5	84.3	<0.5	2.7	<0.5	2.7	<0.5	14.3				
Aromatic Hydrocarbons												
Benzene	0.5	4.6	1.5	1.5	<0.5	<0.5	<0.5	5.9			2.3	0.45
Toluene	0.5	2600	1690	75.8	<0.5	30.2	<0.5	763			2000	
Ethylbenzene	0.5	476	358	10.2	0.6	3.9	<0.5	34.1	1900		1000	
(m+p)-Xylene	0.5	501	1205	35.3	0.6	15.1	<0.5	140	3000		730	
o-Xylene	0.5	469	727	18.8	<0.5	7.5	<0.5	90.9	3000		730	
Cumene	0.5	52.9	64.5	1.4	<0.5	0.6	<0.5	9.5			400	
Propyl benzene	0.5	210	175	3.5	<0.5	2.7	<0.5	47.5				
1,3,5-Trimethyl benzene	0.5	4490	3510	78.7	<0.5	7.3	<0.5	303			220	
1,2,4-Trimethylbenzene	0.5	4560	3560	80.2	0.8	34.9	<0.5	308			220	
p-Cymene	0.5	41.5	30.9	<0.5	<0.5	<0.5	<0.5	6.1				
1,2,3-Trimethyl benzene	0.5	1080	971	18.8	<0.5	8.6	<0.5	70.7				

< = below detection limit; method detection limit is 0.5 µg/m^3

Discussion

Trench excavations at the water main project on Wellington St, Guelph, occurring during the week of September 1, 2014 uncovered an historical landfill site which contained buried barrels. The landfill site (according to the City) is from the 1950's. The barrels were in poor condition and were inadvertently punctured during the excavation. In an effort to promptly identify the contents of the barrels and determine whether this posed a health risk to the public and the workers, air samples were deployed on September 4th, 2014 as soon as possible. Based on the sensitive nature of the study, time restrictions, and the urgency to identify the unknown barrel contents, samples were collected until September 5th, 2014 after about 15 hours exposure. This allowed preliminary PSD data to be available by the end of the day September 5th. Another set of samples were deployed in the afternoon on September 5th, 2014 following removal of the contaminated soil from the containment area, offsite transport of the contaminated water, and covering of contaminated soil with membrane and clean soil to reduce odours.

Concentrations of VOCs in the samples from September 4th varied but in general are low and in most cases were below respective AAQC in the areas tested. In general the compounds detected were solvent-like hydrocarbons typically used in manufacturing.

The highest concentration measured was for toluene (66.1 $\mu g/m^3$ - see Table 2) which was collected downwind of the excavation area. As expected, samples measured directly downwind of the source had higher concentrations than those measured upwind or at peripheral locations. But overall the levels are much lower than the acceptable limits.

The samples collected on September 5th are much lower than those collected on September 4th. The highest concentration was for Toluene (9.10 $\mu g/m^3$ - see Table 3) and was also collected downwind of the excavation area. This is a reduction of about 80% indicating the effectiveness of the membrane and soil covering in reducing odours emanating from the contaminated soil.

Airborne chloroform concentrations were the only levels that exceeded MOE AAQC, and only exceeded in the samples collected before the mitigation measures were implemented. However background chloroform measurements are comparable to the other on-site samples. The background sample was collected upwind from the contaminated zones and, according to Environment Canada, winds remained from the southwest during the sampling period (see Table 5a) though they fell to low speeds overnight. Therefore chloroform concentrations in the samples may have come from a non-related source off-site. However, air plume meander, under very low night time wind speeds, may also have caused some spill-related VOCs to reach the background location.

Airborne chloroform concentrations at all locations were reduced significantly during the second sampling period, after mitigation efforts were implemented on-site, and fell below detection levels. Speciated VOC water analysis (Appendix; AGAT Work Order 14T885014, p. 3 of 7) did not reveal high levels of chloroform but neat samples of drum contents would have been desirable to confirm/deny presence of chloroform in the spilled liquid. While the source of chloroform is not known with certainty it is likely from the spill and so continued mitigation efforts should manage community exposures. Furthermore, should the spill be the source, it is likely that air concentration levels at sensitive receptors,

such as the apartment buildings west of the active areas, were much lower than measured at the near-source locations on-site. Should the spill not be the source then unknown off-site sources may have caused the elevated chloroform levels.

The results of the speciated VOC analysis of water (Appendix; AGAT Work Order 14T885014) indicated measurable levels of benzene, toluene, ethylbenzene, xylenes and styrene. Toluene had the highest levels of all these compounds. These results are in accord with the air sampling results indicating the spill to be the predominant sources of air concentrations of VOCs at the sampling site.

TD tube results (Table 4) are representative of short-term "peak" values and are more comparable to 10 minute AAQC guideline values. Values are higher than the longer-term PSD results, as expected, though no values exceeded the 10 minute AAQCs, where available. Furthermore, samples exhibiting the highest levels (A and B) were taken very close to the source and, in one case (A), under the membrane used as mitigation.

Observations and Recommendations

- ***Outdoor/Ambient Conditions During Sampling Period*** – Hourly data for ambient temperature, relative humidity, wind direction, and wind speed, as recorded from Guelph Turfgrass[1], is provided below for the sampling period (September 4-6).

[1] Climate data obtained from Environment Canada internet site: http://climate.weather.gc.ca/climateData/hourlydata_e.html?StationID=45407&timeframe=1&cmdB1=Go&cmdB2=Go&Year=2014&Month=9&Day=6&cmdB2=Go#

Table 5a. Hourly Climate Data for Guelph Area on September 4th and 5th, 2014 during 1st Round of Sampling.

Time of Day	Temperature (°C)	Relative Humidity (%)	Wind Direction (10's deg)	Wind Speed (km/h)
15:00	26.8	53	22	13
16:00	26.1	53	20	11
17:00	25.7	58	21	7
18:00	24.4	62	20	8
19:00	22.9	67	19	7
20:00	22.2	69	19	10
21:00	21.7	69	20	11
22:00	22.4	67	23	9
23:00	22.3	70	23	9
0:00	21.5	75	20	3
1:00	20.6	83	24	3
2:00	20.7	85	20	6
3:00	21.2	88	22	9
4:00	21.1	90	24	4
5:00	21.2	91	23	5
6:00	21.0	92	26	4
7:00	22.0	89	22	7
8:00	23.2	85	22	10

Table 5b. Hourly Climate Data for Guelph Area on September 5th and 6th, 2014 during 2nd Round of Sampling.

Time of Day	Temperature (°C)	Relative Humidity (%)	Wind Direction (10's deg)	Wind Speed (km/h)
17:00	27.6	72	22	15
18:00	27.2	74	23	13
19:00	18.3	97	24	7
20:00	18.4	98	13	2
21:00	18.7	98	16	4
22:00	18.7	98	16	9
23:00	18.9	99	25	5
0:00	19.0	99	18	10
1:00	19.3	99	22	9
2:00	19.4	99	22	10
3:00	19.1	99	27	8
4:00	14.7	96	33	12
5:00	14.3	97	28	7
6:00	14.5	98	28	8
7:00	14.9	97	28	10
8:00	15.1	95	29	14
9:00	15.7	91	31	15
10:00	17.0	82	30	15
11:00	18.5	76	30	20
12:00	19.7	72	30	16
13:00	19.1	69	32	16

Recommendations:

- ***Conduct additional ambient VOC monitoring during the excavation of the contaminated material from the trench and again after all of the contaminated material is removed.***
- ***Conduct additional ambient VOC monitoring during any further excavations in the area.***
- ***Conduct occupational exposure monitoring on workers in and around the trench excavation during removal of contaminated material and exploratory excavations to ensure compliance with MoL Regulation 833.***
- ***Consider the use of air purifying respirators (APRs) by workers in the trench area during contaminated soil removal and exploratory excavations.***
- ***Obtain samples of removed drum liquid for organics analysis (if possible), or obtain samples from any future drums that may be found.***

If you have questions about this report, please contact Ryan Dignard (ext. 103), Franco Di Giovanni(ext. 102), or Phil Fellin (ext. 105).

Sincerely,

Airzone One Ltd.

Authored by:

Ryan Dignard, ROHT
Registered Occupational Hygiene Technologist

Reviewed by:

Phil Fellin, M.Sc.
Manager, Air Monitoring & Analysis

APPENDIX

- **LABORATORY RESULTS**
  - Airzone One Ltd. – Airborne VOC
  - AGAT Laboratories – PCBs, BNA, PAH, VOC
- **Site Photographs**

Airborne VOC Results

AirZOne

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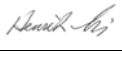
Final

SAMPLE ANALYSIS REPORT

Project Number:	**J14117**
Report Date:	**September 8, 2014**
Analysis Date:	**September 5, 2014**
Receipt Date:	**September 5, 2014**
Client project #	
Instrument	**Gas Chromatography/ Mass Spectrometry (GC/MS)**
Method:	**VPOC.1**
Sample Type:	**3M™ Passive Diffusion Monitor**

RESULTS	**Unit :**								**µg/m³**						
Sample I.D.	**CAS #**	**J14117-PSD-1**	**J14117-VOC-1 Repeat**	**J14117-PSD-2**	**J14117-PSD-3**	**J14117-PSD-4**	**J14117-PSD-5**	**J14117-PSD-6**	**J14117-PSD-7**	**J14117-PSD-8**	**J14117-PSD-9**	**J14117-VOC-9 Repeat**	**J14117-PSD-10**	**J14117-VOC-11**
Pentane (nC_5)	109-66-0	0.84	0.87	1.40	1.75	1.00	1.46	1.41	1.07	1.21	1.63	1.58	1.81	< 0.2
Ethanol	64-17-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2-Dimethylbutane	75-83-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
iso-Propyl alcohol (IPA)	67-63-0	< 0.2	< 0.2	< 0.2	2.98	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichloromethane	75-09-2	1.98	2.22	2.63	3.11	1.77	1.37	1.29	2.09	2.33	1.22	1.35	2.80	< 0.2
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	0.27	0.22	< 0.2	0.36	< 0.2	< 0.2	0.36	< 0.2	< 0.2	< 0.2	< 0.2
Hexane (nC_6)	110-54-3	< 0.2	< 0.2	< 0.2	0.26	< 0.2	< 0.2	0.24	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl acetate	141-78-6	< 0.2	< 0.2	< 0.2	0.23	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloroform	67-66-3	1.22	1.34	1.58	2.02	1.42	1.80	1.76	1.55	1.52	1.64	1.75	1.65	< 0.2
2-Methylhexane	591-76-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Carbon tetrachloride	56-23-5	0.52	0.54	0.53	0.27	0.48	0.70	0.53	0.54	0.49	0.48	0.51	0.90	< 0.2
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.41	< 0.2	< 0.2	0.34	0.31	0.26	< 0.2
Benzene	71-43-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.22	< 0.2	< 0.2	0.43	< 0.2	< 0.2	< 0.2	< 0.2
2,2,4-Trimethylpentane	540-84-1	< 0.2	< 0.2	1.93	0.99	1.60	0.31	0.75	< 0.2	0.90	0.62	0.67	0.32	< 0.2
Heptane	142-82-5	0.52	0.50	< 0.2	0.45	0.40	< 0.2	0.21	0.49	< 0.2	< 0.2	< 0.2	0.31	< 0.2
Trichloroethylene	79-01-6	0.55	0.58	0.65	0.59	0.63	0.69	0.71	0.70	0.66	0.69	0.73	0.71	< 0.2
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	0.28	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	108-88-3	8.33	8.6	12.2	66.1	12.0	30.3	12.2	10.8	10.8	17.9	18.6	5.21	0.24
Octane (nC_8)	111-65-9	< 0.2	< 0.2	< 0.2	0.39	< 0.2	< 0.2	0.54	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachloroethylene	127-18-4	0.23	< 0.2	0.30	0.24	0.21	0.22	0.25	< 0.2	0.25	< 0.2	< 0.2	< 0.2	< 0.2
n-Butyl acetate	123-86-4	0.53	0.59	0.57	0.93	0.87	1.10	0.94	0.75	0.52	< 0.2	< 0.2	0.41	< 0.2
Ethylbenzene	100-41-4	0.50	0.46	0.73	4.15	0.71	3.58	0.74	0.61	0.70	1.26	1.33	0.39	< 0.2
(m+p)-Xylene	108-38-3 / 106-42-3	1.56	1.64	2.52	14.1	2.44	10.8	2.25	1.87	2.20	3.90	4.02	0.75	< 0.2
o-Xylene	95-47-6	0.71	0.73	1.25	8.36	1.11	5.28	0.90	0.71	0.90	1.86	1.94	0.23	< 0.2
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	0.20	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	0.58	< 0.2	0.28	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
a-Pinene	80-56-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Decane (nC_{10})	124-18-5	1.66	1.71	2.34	3.43	2.45	1.67	1.92	1.58	0.92	1.88	1.98	2.20	< 0.2
1,3,5-Trimethylbenzene	108-67-8	0.72	0.71	1.42	9.47	1.27	2.53	0.60	0.54	0.54	0.96	1.01	< 0.2	< 0.2
1,2,4-Trimethylbenzene	95-63-6	1.47	1.47	3.13	25.5	2.75	7.18	< 0.2	1.10	1.39	2.91	3.04	< 0.2	< 0.2
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	0.57	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,4-Dichlorobenzene	106-46-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Diethylbenzene	141-93-5	1.66	1.74	3.53	20.0	3.58	4.41	1.18	0.98	1.19	2.07	2.09	< 0.2	< 0.2
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dodecane (nC_{12})	112-40-3	2.27	2.37	4.49	4.80	4.02	1.85	2.01	3.01	2.33	2.61	2.61	3.39	< 0.2
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Naphthalene	91-20-3	< 0.2	< 0.2	0.75	8.23	0.97	2.67	1.02	0.68	0.56	1.46	1.42	0.29	< 0.2
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetradecane (nC_{14})	629-59-4	3.48	3.81	4.07	4.97	5.16	3.45	3.31	5.08	3.01	3.20	3.35	3.39	< 0.2
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
TVOC		28.8	29.8	46	185	44.9	82.3	35.1	34.2	33.3	46.7	48.2	25.0	0.24

Comments	**The samples were extracted with solvent. Compounds were determined by Gas Chromatography/ Mass Spectrometry (GC/MS). The method detection limit is 0.2 µg/m³. No other significant compounds were detected in GC-MS SCAN Mode.**
QA/QC	**Multipoint calibration curve (linear regression = 0.99). These samples were spiked with deuterated internal standards. Results were corrected with internal standard, lab blank and recovery.**
Analyst	**Henrik Li** 
Reviewer	**Phil Fellin** 

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AirZOne
Comprehensive Air Quality Services

SAMPLE ANALYSIS REPORT

Project Number:	**J14117-2**
Report Date:	**September 9, 2014**
Analysis Date:	**September 8, 2014**
Receipt Date:	**September 8, 2014**
Client project #	
Instrument	**Gas Chromatography/ Mass Spectrometry (GC/MS)**
Method:	**VPOC.1**
Sample Type:	**3M™ Passive Diffusion Monitor**

RESULTS	**Unit :**													
Sample I.D.	**CAS #**	**J14117-PSD-12**	**J14117-PSD-12 Repeat**	**J14117-PSD-13**	**J14117-PSD-14**	**J14117-PSD-15**	**J14117-PSD-16**	**J14117-PSD-17**	**J14117-PSD-18**	**J14117-PSD-19**	**J14117-PSD-20**	**J14117-PSD-20 Repeat**	**J14117-PSD-21**	**J14117-PSD-22**
Pentane (nC_5)	109-66-0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethanol	64-17-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2-Dimethylbutane	75-83-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
iso-Propyl alcohol (IPA)	67-63-0	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichloromethane	75-09-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexane (nC_6)	110-54-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl acetate	141-78-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chloroform	67-66-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylhexane	591-76-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Carbon tetrachloride	56-23-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzene	71-43-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2,4-Trimethylpentane	540-84-1	0.21	0.23	0.39	0.27	< 0.2	0.43	0.52	0.45	< 0.2	0.51	0.49	0.33	< 0.2
Heptane	142-82-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	108-88-3	1.79	1.89	2.90	9.10	2.72	2.12	1.29	2.24	1.84	1.31	1.28	2.17	< 0.2
Octane (nC_8)	111-65-9	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachloroethylene	127-18-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n-Butyl acetate	123-86-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethylbenzene	100-41-4	< 0.2	< 0.2	0.27	0.37	< 0.2	0.38	< 0.2	< 0.2	0.27	< 0.2	< 0.2	< 0.2	< 0.2
(m+p)-Xylene	108-38-3 / 106-	0.43	0.48	0.60	1.28	0.56	0.86	0.65	0.62	0.78	0.50	0.48	0.42	< 0.2
o-Xylene	95-47-6	< 0.2	< 0.2	< 0.2	0.72	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
a-Pinene	80-56-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Decane (nC_{10})	124-18-5	0.82	0.73	0.57	0.34	0.38	0.78	0.26	< 0.2	< 0.2	0.70	0.62	0.70	< 0.2
1,3,5-Trimethylbenzene	108-67-8	< 0.2	< 0.2	0.26	0.95	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4-Trimethylbenzene	95-63-6	< 0.2	< 0.2	0.51	2.58	0.24	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,4-Dichlorobenzene	106-46-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Diethylbenzene	141-93-5	0.29	0.29	0.52	1.56	0.34	0.28	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.34	< 0.2
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dodecane (nC_{12})	112-40-3	1.74	1.73	1.15	1.16	1.95	2.47	2.68	2.26	1.80	0.48	0.49	2.52	< 0.2
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Naphthalene	91-20-3	< 0.2	< 0.2	0.34	0.71	< 0.2	0.39	< 0.2	< 0.2	0.28	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetradecane (nC_{14})	629-59-4	2.20	2.39	2.01	1.77	0.50	0.38	< 0.2	< 0.2	0.90	0.56	0.56	0.44	< 0.2
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
TVOC		7.49	7.74	9.51	20.8	6.69	8.08	5.40	5.56	5.86	4.05	3.92	6.92	< 0.2

Comments	**The samples were extracted with solvent. Compounds were determined by Gas Chromatography/ Mass Spectrometry (GC/MS). The method detection limit is 0.2 µg/m³. No other significant compounds were detected in GC-MS SCAN Mode.**
QA/QC	**Multipoint calibration curve (linear regression = 0.99). These samples were spiked with deuterated internal standards. Results were corrected with internal standard, lab blank and recovery.**
Analyst	**Henrik Li**
Reviewer	**Phil Fellin**

To:
Ms. Carolyn Adams
MMM Group Limited
100 Commerce Valley Drive West

Thornhill, Ontario
L3T 0A1
Phone: (905) 890-8629

AirZOne
Comprehensive Air Quality Services

Sample Analysis Report

Airzone Project Number:	J14117
Client Project Number:	
Report Date:	September 11, 2014
Analysis Date:	September 11, 2014
Sample Receipt Date	September 5, 2014
Analytical Method:	Thermal Desorption/Gas Chromatography/Mass spectrometry(TD/GC/MS)
Unit:	All results reported in $\mu g/m^3$
Sample Type:	Thermodesorption tubes

Results	Method Detection Limit	J14117-TD-A	J14117 TD-B	J14117 TD-C	J14117 TD-D	J14117 TD-E	J14117 TD-F	J14117-TD-H
Aliphatic Hydrocarbons								
2-Methylbutane	0.5	<0.5	0.7	0.7	<0.5	<0.5	<0.5	3.7
Pentane	0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	1.6
2,2-Dimethylbutane	0.5	16.9	8.0	14.1	1.6	2.3	<0.5	<0.5
2-Methylpentane	0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	1.2
Cyclopentane	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3-Methylpentane	0.5	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
1-Hexene	0.5	10.8	2.3	3.4	<0.5	<0.5	<0.5	<0.5
Hexane	0.5	8.9	1.3	2.4	<0.5	<0.5	<0.5	2.6
2.4-Dimethylpentane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl cyclopentane	0.5	2.0	<0.5	<0.5	<0.5	<0.5	<0.5	0.7
3-Methy-1-hexene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
3-Methyl-1,3-pentadiene(Z)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
3-Methyl-1,3-pentadiene (E)	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
2-Methylhexane	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
2,3-Dimethyl pentane	0.5	1.4	2.0	<0.5	<0.5	<0.5	<0.5	0.6
Cyclohexane	0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
3-Methylhexane	0.5	7.1	8.6	1.1	<0.5	<0.5	<0.5	8.9
Iso-Octane	0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cyclohexene	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Heptane	0.5	2.6	<0.5	1.0	<0.5	<0.5	<0.5	3.0
2,5-Dimethyl hexane	0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5
Methyl cyclohexane	0.5	11.0	<0.5	<0.5	<0.5	<0.5	<0.5	4.0
Ethyl cyclopentane	0.5	<0.5	1.0	<0.5	<0.5	<0.5	<0.5	<0.5
2-Methyl heptane	0.5	3.6	4.3	<0.5	<0.5	<0.5	<0.5	2.6
3-Methyl heptane	0.5	96.9	7.4	<0.5	<0.5	<0.5	<0.5	0.9
2,2,5-Trimethyl hexane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
t-1,4-Dimethyl cyclohexane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Octane	0.5	21.0	19.2	0.6	<0.5	<0.5	<0.5	4.8
1,1-Dimethyl cyclohexane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
t-1,2-Dimethyl cyclohexane	0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5
c-1,4-Dimethyl cyclohexane	0.5	1.7	1.9	<0.5	<0.5	<0.5	<0.5	<0.5
Propyl cyclopentane	0.5	5.3	7.0	<0.5	<0.5	<0.5	<0.5	17.1
c-1,2-Dimethyl cyclohexane	0.5	0.6	0.8	<0.5	<0.5	<0.5	<0.5	<0.5
2+4-Methyl octane	0.5	4.1	3.1	<0.5	<0.5	<0.5	<0.5	0.5
3-Methyl octane	0.5	4.1	7.2	<0.5	<0.5	<0.5	<0.5	0.7
Nonane	0.5	15.9	27.2	0.7	<0.5	<0.5	<0.5	2.4
3,7-Dimethyl-1-octene	0.5	1.1	2.0	<0.5	<0.5	<0.5	<0.5	1.2
Decane	0.5	77.5	96.2	2.8	0.6	1.1	<0.5	2.1
Undecane	0.5	255	602	6.0	<0.5	2.7	<0.5	22.8
Dodecane	0.5	180	104	3.5	1.5	1.6	<0.5	5.3
Tridecane	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetradecane	0.5	84.3	<0.5	2.7	<0.5	2.7	<0.5	14.3
Aromatic Hydrocarbons								
Benzene	0.5	4.6	1.5	1.5	<0.5	<0.5	<0.5	5.9
Toluene	0.5	2600	1690	75.8	<0.5	30.2	<0.5	763
Ethylbenzene	0.5	476	358	10.2	0.6	3.9	<0.5	34.1
(m+p)-Xylene	0.5	501	1205	35.3	0.6	15.1	<0.5	140
o-Xylene	0.5	469	727	18.8	<0.5	7.5	<0.5	90.9
Cumene	0.5	52.9	64.5	1.4	<0.5	0.6	<0.5	9.5
Propyl benzene	0.5	210	175	3.5	<0.5	2.7	<0.5	47.5
1,3,5-Trimethyl benzene	0.5	4490	3510	78.7	<0.5	7.3	<0.5	303
1,2,4-Trimethylbenzene	0.5	4560	3560	80.2	0.8	34.9	<0.5	308
p-Cymene	0.5	41.5	30.9	<0.5	<0.5	<0.5	<0.5	6.1
1,2,3-Trimethyl benzene	0.5	1080	971	18.8	<0.5	8.6	<0.5	70.7
TVOC		15300	13200	364	6	121	<0.5	1880

Comments	Hydrocarbons (>C5) and contaminants were analyzed by GC/MSD
QA/QC	Standards of hydrocarbons (> C5) were prepared at Airzone.
Analyst	Alexander Vlasenko
Manager Air Monitoring	Phil Fellin

Water Results

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: MISC AGAT CLIENT ON, ON (403)

ATTENTION TO: Ryan Dignord

PROJECT: J14117

AGAT WORK ORDER: 14T885014

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Sep 11, 2014

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

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

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 14T885014

PROJECT: J14117

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Ryan Dignord

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PHCs F1 (-BTEX) (Water)

DATE RECEIVED: 2014-09-05

DATE REPORTED: 2014-09-11

		SAMPLE DESCRIPTION:		B-1	B-2	R-1	R-2	R-3
		SAMPLE TYPE:		Solvent	Solvent	Solvent	Solvent	Solvent
		DATE SAMPLED:		9/4/2014	9/4/2014	9/4/2014	9/4/2014	9/4/2014
Parameter	Unit	G / S	RDL	5784332	5784345	5784346	5784348	5784349
F1 (C6 to C10)	µg/L		25	4200	7800	8100	16000	13000
F1 (C6 to C10) minus BTEX	µg/L		25	1200	140	700	1200	330

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

5784332-5784349 The C6-C10 fraction is calculated using Toluene response factor.
Total C6-C10 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
Extraction and holding times were met for this sample.

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 14T885014

PROJECT: J14117

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Ryan Dignord

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2014-09-05

DATE REPORTED: 2014-09-11

SAMPLE DESCRIPTION:				B-1	B-2	R-1		R-2	R-3
SAMPLE TYPE:				Solvent	Solvent	Solvent		Solvent	Solvent
DATE SAMPLED:				9/4/2014	9/4/2014	9/4/2014		9/4/2014	9/4/2014
Parameter	Unit	G / S	RDL	5784332	5784345	5784346	RDL	5784348	5784349
Dichlorodifluoromethane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Vinyl Chloride	µg/L		17.0	<17.0	<17.0	<17.0	170	<170	<170
Bromomethane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Trichlorofluoromethane	µg/L		40.0	<40.0	<40.0	<40.0	400	<400	<400
Acetone	µg/L		100	<100	<100	<100	1000	<1000	<1000
1,1-Dichloroethylene	µg/L		30.0	<30.0	<30.0	<30.0	300	<300	<300
Methylene Chloride	µg/L		30.0	<30.0	<30.0	<30.0	300	<300	<300
trans- 1,2-Dichloroethylene	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Methyl tert-butyl ether	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
1,1-Dichloroethane	µg/L		30.0	<30.0	<30.0	<30.0	300	<300	<300
Methyl Ethyl Ketone	µg/L		100	<100	<100	<100	1000	<1000	<1000
cis- 1,2-Dichloroethylene	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Chloroform	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
1,2-Dichloroethane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
1,1,1-Trichloroethane	µg/L		30.0	<30.0	<30.0	<30.0	300	<300	<300
Carbon Tetrachloride	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Benzene	µg/L		20.0	<20.0	20	<20.0	200	<200	<200
1,2-Dichloropropane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Trichloroethylene	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Bromodichloromethane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Methyl Isobutyl Ketone	µg/L		100	<100	<100	<100	1000	<1000	<1000
1,1,2-Trichloroethane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Toluene	µg/L		20.0	2800	7100	6900	200	14000	12000
Dibromochloromethane	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
Ethylene Dibromide	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
Tetrachloroethylene	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
1,1,1,2-Tetrachloroethane	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
Chlorobenzene	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
Ethylbenzene	µg/L		10.0	25	62	54	100	110	110
m & p-Xylene	µg/L		20.0	98	270	250	200	370	310

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Certificate of Analysis

AGAT WORK ORDER: 14T885014

PROJECT: J14117

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Ryan Dignord

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2014-09-05

DATE REPORTED: 2014-09-11

SAMPLE DESCRIPTION:				B-1	B-2	R-1		R-2	R-3
SAMPLE TYPE:				Solvent	Solvent	Solvent		Solvent	Solvent
DATE SAMPLED:				9/4/2014	9/4/2014	9/4/2014		9/4/2014	9/4/2014
Parameter	Unit	G / S	RDL	5784332	5784345	5784346	RDL	5784348	5784349
Bromoform	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
Styrene	µg/L		10.0	24	58	56	100	<100	<100
1,1,2,2-Tetrachloroethane	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
o-Xylene	µg/L		10.0	94	210	200	100	320	250
1,3-Dichlorobenzene	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
1,4-Dichlorobenzene	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
1,2-Dichlorobenzene	µg/L		10.0	<10.0	<10.0	<10.0	100	<100	<100
1,3-Dichloropropene	µg/L		30.0	<30.0	<30.0	<30.0	300	<300	<300
Xylene Mixture	µg/L		20.0	190	480	450	200	690	560
n-Hexane	µg/L		20.0	<20.0	<20.0	<20.0	200	<200	<200
Surrogate	Unit	Acceptable Limits							
Toluene-d8	% Recovery	50-140		122	120	120		117	120
4-Bromofluorobenzene	% Recovery	50-140		108	120	117		106	106

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

5784332-5784346 Dilution factor=100
The sample was diluted to keep the target compounds in the calibration range of the instrument and avoid contaminating the Purge and Trap system. The reporting detection limit has been corrected for the dilution factor used.

5784348-5784349 Dilution factor=1000
The sample was diluted to keep the target compounds in the calibration range of the instrument and avoid contaminating the Purge and Trap system. The reporting detection limit has been corrected for the dilution factor used.

Certified By:

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Quality Assurance

CLIENT NAME: MISC AGAT CLIENT ON
AGAT WORK ORDER: 14T885014
PROJECT: J14117
ATTENTION TO: Ryan Dignord
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis

RPT Date: Sep 11, 2014			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	1		< 0.20	< 0.20	0.0%	< 0.20	120%	50%	140%	120%	50%	140%	127%	50%	140%
Vinyl Chloride	1		< 0.17	< 0.17	0.0%	< 0.17	94%	50%	140%	89%	50%	140%	92%	50%	140%
Bromomethane	1		< 0.20	< 0.20	0.0%	< 0.20	102%	50%	140%	97%	50%	140%	96%	50%	140%
Trichlorofluoromethane	1		< 0.40	< 0.40	0.0%	< 0.40	121%	50%	140%	124%	50%	140%	128%	50%	140%
Acetone	1		< 1.0	< 1.0	0.0%	< 1.0	111%	50%	140%	105%	50%	140%	94%	50%	140%
1,1-Dichloroethylene	1		< 0.30	< 0.30	0.0%	< 0.30	119%	50%	140%	108%	60%	130%	100%	50%	140%
Methylene Chloride	1		< 0.30	< 0.30	0.0%	< 0.30	112%	50%	140%	120%	60%	130%	123%	50%	140%
trans- 1,2-Dichloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	92%	50%	140%	102%	60%	130%	95%	50%	140%
Methyl tert-butyl ether	1		< 0.20	< 0.20	0.0%	< 0.20	76%	50%	140%	85%	60%	130%	82%	50%	140%
1,1-Dichloroethane	1		< 0.30	< 0.30	0.0%	< 0.30	98%	50%	140%	104%	60%	130%	92%	50%	140%
Methyl Ethyl Ketone	1		< 1.0	< 1.0	0.0%	< 1.0	76%	50%	140%	74%	50%	140%	73%	50%	140%
cis- 1,2-Dichloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	92%	50%	140%	102%	60%	130%	95%	50%	140%
Chloroform	1		< 0.20	< 0.20	0.0%	< 0.20	93%	50%	140%	98%	60%	130%	91%	50%	140%
1,2-Dichloroethane	1		< 0.20	< 0.20	0.0%	< 0.20	72%	50%	140%	87%	60%	130%	82%	50%	140%
1,1,1-Trichloroethane	1		< 0.30	< 0.30	0.0%	< 0.30	91%	50%	140%	105%	60%	130%	100%	50%	140%
Carbon Tetrachloride	1		< 0.20	< 0.20	0.0%	< 0.20	94%	50%	140%	102%	60%	130%	105%	50%	140%
Benzene	1		< 0.20	< 0.20	0.0%	< 0.20	71%	50%	140%	79%	60%	130%	73%	50%	140%
1,2-Dichloropropane	1		< 0.20	< 0.20	0.0%	< 0.20	73%	50%	140%	81%	60%	130%	75%	50%	140%
Trichloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	90%	50%	140%	89%	60%	130%	82%	50%	140%
Bromodichloromethane	1		< 0.20	< 0.20	0.0%	< 0.20	80%	50%	140%	90%	60%	130%	86%	50%	140%
Methyl Isobutyl Ketone	1		< 1.0	< 1.0	0.0%	< 1.0	91%	50%	140%	77%	50%	140%	80%	50%	140%
1,1,2-Trichloroethane	1		< 0.20	< 0.20	0.0%	< 0.20	88%	50%	140%	99%	60%	130%	92%	50%	140%
Toluene	1		< 0.20	< 0.20	0.0%	< 0.20	84%	50%	140%	99%	60%	130%	93%	50%	140%
Dibromochloromethane	1		< 0.10	< 0.10	0.0%	< 0.10	84%	50%	140%	93%	60%	130%	92%	50%	140%
Ethylene Dibromide	1		< 0.10	< 0.10	0.0%	< 0.10	81%	50%	140%	86%	60%	130%	82%	50%	140%
Tetrachloroethylene	1		< 0.20	< 0.20	0.0%	< 0.20	94%	50%	140%	106%	60%	130%	103%	50%	140%
1,1,1,2-Tetrachloroethane	1		< 0.10	< 0.10	0.0%	< 0.10	99%	50%	140%	102%	60%	130%	100%	50%	140%
Chlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	82%	50%	140%	98%	60%	130%	93%	50%	140%
Ethylbenzene	1		< 0.10	< 0.10	0.0%	< 0.10	72%	50%	140%	89%	60%	130%	81%	50%	140%
m & p-Xylene	1		< 0.20	< 0.20	0.0%	< 0.20	74%	50%	140%	92%	60%	130%	84%	50%	140%
Bromoform	1		< 0.10	< 0.10	0.0%	< 0.10	82%	50%	140%	94%	60%	130%	90%	50%	140%
Styrene	1		< 0.10	< 0.10	0.0%	< 0.10	67%	50%	140%	78%	60%	130%	74%	50%	140%
1,1,2,2-Tetrachloroethane	1		< 0.10	< 0.10	0.0%	< 0.10	88%	50%	140%	97%	60%	130%	92%	50%	140%
o-Xylene	1		< 0.10	< 0.10	0.0%	< 0.10	69%	50%	140%	74%	60%	130%	65%	50%	140%
1,3-Dichlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	67%	50%	140%	80%	60%	130%	73%	50%	140%
1,4-Dichlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	80%	50%	140%	93%	60%	130%	88%	50%	140%
1,2-Dichlorobenzene	1		< 0.10	< 0.10	0.0%	< 0.10	71%	50%	140%	81%	60%	130%	75%	50%	140%
1,3-Dichloropropene	1		< 0.30	< 0.30	0.0%	< 0.30	74%	50%	140%	82%	60%	130%	77%	50%	140%
n-Hexane	1		< 0.20	< 0.20	0.0%	< 0.20	126%	50%	140%	128%	60%	130%	126%	50%	140%

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Quality Assurance

CLIENT NAME: MISC AGAT CLIENT ON
AGAT WORK ORDER: 14T885014
PROJECT: J14117
ATTENTION TO: Ryan Dignord
SAMPLING SITE:
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Sep 11, 2014			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - PHCs F1 (-BTEX) (Water)															
F1 (C6 to C10)	1		< 25	< 25	0.0%	< 25	88%	60%	140%	80%	60%	140%	79%	60%	140%

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 14T885014

PROJECT: J14117

ATTENTION TO: Ryan Dignord

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS

AGAT Laboratories

CHAIN OF CUSTODY RECORD

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Mississauga, Ontario; L4Z 1Y2
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http://webearth.agatlabs.com

LABORATORY USE ONLY
Arrival Condition: ☑ Good ☐ Poor (complete "notes")
Arrival Temperature: 9.9 AGAT WO #: 14 885014
Notes:

Client Information
Company: Airzone One Ltd.
Contact: Ryan Dignard
Address: 222 Matheson Boulevard East
Mississauga
Phone: 905-890-6957 xt. 103 Fax:
Project: J14117 PO:
AGAT Quotation #:
Please note, if quotation number is not provided, client will be billed full price for analysis.

Invoice To Same as Above? (Yes) / No (circle)
Company:
Contact:
Address:
Phone: Fax:

Report Information - reports to be sent to:
1. Name: Ryan Dignard
Email: rdignard@airzoneone.com
2. Name: Franco DiGiovanni
Email: fdi-giovanni@airzoneone.com

Report Format
☐ Single Sample per page
☐ Multiple Samples per page
☐ Results by fax

Turnaround Time (TAT) Required*
Regular TAT:
☐ 5 to 7 Working Days
Rush TAT: (please provide prior notification)
Rush Surcharges Apply
☐ 3 to 5 Working Days
☐ 2 Working Days
☒ 1 Working Day
OR
DATE REQUIRED (Rush surcharges may apply):
*TAT is exclusive of weekends and statutory holidays

Regulatory Requirements
☐ Regulation 153 Table ____ (Indicate one) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (check one) ☐ Coarse ☐ Med/Fine
☐ Sewer Use Region ____ (Indicate one) ☐ Sanitary ☐ Storm
☐ Regulation 558 ☐ CCME ☐ Other (indicate) ____
☐ Prov. Water Quality Objectives (PWQO)
☐ Nutrient Management Act (NMA)

Is this a drinking water sample (potable water intended for human consumption)?
☐ Yes ☒ No (If "Yes" please use the Drinking Water Chain of Custody Record)

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments Site/ Sample Information	Metals and Inorganics	Metal Scan (excluding Hg, B, Cr6)	CCME Fractions 1 to 4	VOCs	PAHs	PCBs	TCLP Metals/Inorganics	TCLP	Storm Sewer Use	Sanitary Sewer Use	LABORATORY USE ONLY LAB SAMPLE ID
B-1	4 Sep '14	4:30pm	WATER	1				X	X							
B-2	"	"	"	1				X	X							
L-1	"	"	"	1				X	X							
L-2	"	"	"	1				X	X							
L-3	"	"	"	1				X	X							

Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time
		Mike A See.S	3:10
Samples Relinquished By (print name & sign)	Date/Time	Samples Received By (print name & sign)	Date/Time

Pink Copy - Client
Yellow + Golden Copy - AGAT
White Copy - AGAT

PAGE ____ of ____
NO:

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http://www.agatlabs.com

CLIENT NAME: MISC AGAT CLIENT ON, ON (403)

ATTENTION TO: Ryan Dignard

PROJECT: J14117

AGAT WORK ORDER: 14T885738

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Sep 10, 2014

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

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

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 14T885738

PROJECT: J14117

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Ryan Dignard

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - BNA (full) + PAHs (Water)

DATE RECEIVED: 2014-09-08

DATE REPORTED: 2014-09-10

		SAMPLE DESCRIPTION:		B-1	R-1
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		9/5/2014	9/5/2014
Parameter	Unit	G / S	RDL	5782143	5782146
Naphthalene	µg/L		2.00	600	700
Acenaphthylene	µg/L		2.00	<2.00	<2.00
Acenaphthene	µg/L		2.00	<2.00	<2.00
Fluorene	µg/L		2.00	<2.00	<2.00
Phenanthrene	µg/L		1.00	<1.00	<1.00
Anthracene	µg/L		1.00	<1.00	<1.00
Fluoranthene	µg/L		2.00	<2.00	<2.00
Pyrene	µg/L		2.00	<2.00	<2.00
Benz(a)anthracene	µg/L		2.00	<2.00	<2.00
Chrysene	µg/L		1.00	<1.00	<1.00
Benzo(b)fluoranthene	µg/L		1.00	<1.00	<1.00
Benzo(k)fluoranthene	µg/L		1.00	<1.00	<1.00
Benzo(a)pyrene	µg/L		0.10	<0.10	<0.10
Indeno(1,2,3-cd)pyrene	µg/L		2.00	<2.00	<2.00
Dibenz(a,h)anthracene	µg/L		2.00	<2.00	<2.00
Benzo(g,h,i)perylene	µg/L		2.00	<2.00	<2.00
Phenol	µg/L		10.0	1400	1600
Bis(2-chloroethyl)ether	µg/L		5.0	<5.0	<5.0
2-Chlorophenol	µg/L		5.0	<5.0	<5.0
o-Cresol	µg/L		5.0	16000	14000
Bis(2-chloroisopropyl)ether	µg/L		5.0	<5.0	<5.0
m&p-Cresol	µg/L		5.0	30000	27000
2,4-Dimethylphenol	µg/L		5.0	7900	6300
2,4-Dichlorophenol	µg/L		3.0	<3.0	<3.0
1,2,4-Trichlorobenzene	ug/L		5.0	<5.0	<5.0
p-Chloroaniline	µg/L		10.0	<10.0	<10.0
2-and 1-methyl Naphthalene	µg/L		5.0	24	33
2,4,6-Trichlorophenol	µg/L		2.0	<2.0	<2.0
2,4,5-Trichlorophenol	µg/L		2.0	<2.0	<2.0
1,1'-Biphenyl	µg/L		5.0	<5.0	<5.0

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 14T885738

PROJECT: J14117

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Ryan Dignard

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - BNA (full) + PAHs (Water)

DATE RECEIVED: 2014-09-08

DATE REPORTED: 2014-09-10

		SAMPLE DESCRIPTION:		B-1	R-1
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		9/5/2014	9/5/2014
Parameter	Unit	G / S	RDL	5782143	5782146
Dimethyl phthalate	µg/L		5.0	<5.0	<5.0
2,4 and 2,6-Dinitrotoluene	µg/L		5.0	<5.0	<5.0
Diethyl phthalate	µg/L		5.0	<5.0	<5.0
Pentachlorophenol	µg/L		5.0	<5.0	<5.0
3,3'-dichlorobenzidine	µg/L		5.0	<5.0	<5.0
Bis(2-Ethylhexyl)phthalate	µg/L		5.0	<5.0	<5.0
2,4-Dinitrophenol	µg/L		100	<100	<100
Surrogate	Unit	Acceptable Limits			
2,4,6-Tribromophenol	%	50-140		NA	95
Chrysene-d12	%	50-140		59	72

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

5782143 To meet the MOE Reporting limits the sample extract was analysed using two separate GC/MS methods. The full scan BNA method is capable of detecting most of the compounds at the RDLs except for several PAHs. The PAHs were analysed using a SIM mode GC/MS method.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.
Dilution factor=10
The sample was diluted because it contains high level of hydrocarbons. The reporting detection limit was adjusted
Recoveries of 2,4,6-triboromophenol in this sample was below our allowable QC range because of the nature of this sample.

5782146 To meet the MOE Reporting limits the sample extract was analysed using two separate GC/MS methods. The full scan BNA method is capable of detecting most of the compounds at the RDLs except for several PAHs. The PAHs were analysed using a SIM mode GC/MS method.
Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.
Dilution factor=10
The sample was diluted because it contains high level of hydrocarbons. The reporting detection limit was adjusted

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 14T885738

PROJECT: J14117

CLIENT NAME: MISC AGAT CLIENT ON

ATTENTION TO: Ryan Dignard

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - PCBs (Water)

DATE RECEIVED: 2014-09-08

DATE REPORTED: 2014-09-10

		SAMPLE DESCRIPTION:		B-2	R-2
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		9/5/2014	9/5/2014
Parameter	Unit	G / S	RDL	5782145	5782147
Aroclor 1242	µg/L		0.1	<0.1	<0.1
Aroclor 1248	µg/L		0.1	<0.1	<0.1
Aroclor 1254	µg/L		0.1	<0.1	<0.1
Aroclor 1260	µg/L		0.1	<0.1	<0.1
Polychlorinated Biphenyls	µg/L		0.1	<0.1	<0.1
Surrogate	Unit	Acceptable Limits			
Decachlorobiphenyl	%	60-140		101	95

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

Certified By:

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Quality Assurance

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 14T885738

PROJECT: J14117

ATTENTION TO: Ryan Dignard

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Sep 10, 2014			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - BNA (full) + PAHs (Water)															
Naphthalene	1		< 0.20	< 0.20	0.0%	< 0.20	101%	50%	140%	71%	50%	140%	77%	50%	140%
Acenaphthylene	1		< 0.20	< 0.20	0.0%	< 0.20	101%	50%	140%	78%	50%	140%	81%	50%	140%
Acenaphthene	1		< 0.20	< 0.20	0.0%	< 0.20	103%	50%	140%	76%	50%	140%	79%	50%	140%
Fluorene	1		< 0.20	< 0.20	0.0%	< 0.20	97%	50%	140%	71%	50%	140%	75%	50%	140%
Phenanthrene	1		< 0.10	< 0.10	0.0%	< 0.10	103%	50%	140%	77%	50%	140%	81%	50%	140%
Anthracene	1		< 0.10	< 0.10	0.0%	< 0.10	105%	50%	140%	82%	50%	140%	84%	50%	140%
Fluoranthene	1		< 0.20	< 0.20	0.0%	< 0.20	105%	50%	140%	85%	50%	140%	87%	50%	140%
Pyrene	1		< 0.20	< 0.20	0.0%	< 0.20	108%	50%	140%	92%	50%	140%	95%	50%	140%
Benz(a)anthracene	1		< 0.20	< 0.20	0.0%	< 0.20	92%	50%	140%	76%	50%	140%	81%	50%	140%
Chrysene	1		< 0.10	< 0.10	0.0%	< 0.10	98%	50%	140%	86%	50%	140%	90%	50%	140%
Benzo(b)fluoranthene	1		< 0.10	< 0.10	0.0%	< 0.10	121%	50%	140%	67%	50%	140%	65%	50%	140%
Benzo(k)fluoranthene	1		< 0.10	< 0.10	0.0%	< 0.10	126%	50%	140%	80%	50%	140%	76%	50%	140%
Benzo(a)pyrene	1		< 0.01	< 0.01	0.0%	< 0.01	131%	50%	140%	78%	50%	140%	76%	50%	140%
Indeno(1,2,3-cd)pyrene	1		< 0.20	< 0.20	0.0%	< 0.20	92%	50%	140%	69%	50%	140%	70%	50%	140%
Dibenz(a,h)anthracene	1		< 0.20	< 0.20	0.0%	< 0.20	95%	50%	140%	71%	50%	140%	72%	50%	140%
Benzo(g,h,i)perylene	1		< 0.20	< 0.20	0.0%	< 0.20	98%	50%	140%	72%	50%	140%	70%	50%	140%
Phenol	1		< 1.0	< 1.0	0.0%	< 1.0	71%	30%	130%	57%	30%	130%	58%	30%	130%
Bis(2-chloroethyl)ether	1		< 0.5	< 0.5	0.0%	< 0.5	79%	50%	140%	63%	50%	140%	53%	50%	140%
2-Chlorophenol	1		< 0.5	< 0.5	0.0%	< 0.5	72%	50%	140%	61%	50%	140%	52%	50%	140%
o-Cresol	1		< 0.5	< 0.5	0.0%	< 0.5	69%	50%	140%	50%	50%	140%	52%	50%	140%
Bis(2-chloroisopropyl)ether	1		< 0.5	< 0.5	0.0%	< 0.5	96%	50%	140%	62%	50%	140%	79%	50%	140%
m&p-Cresol	1		< 0.5	< 0.5	0.0%	< 0.5	76%	50%	140%	50%	50%	140%	54%	50%	140%
2,4-Dimethylphenol	1		< 0.5	< 0.5	0.0%	< 0.5	73%	30%	130%	55%	30%	130%	52%	30%	130%
2,4-Dichlorophenol	1		< 0.3	< 0.3	0.0%	< 0.3	85%	50%	140%	61%	50%	140%	66%	50%	140%
1,2,4-Trichlorobenzene	1		< 0.5	< 0.5	0.0%	< 0.5	84%	50%	140%	65%	50%	140%	69%	50%	140%
p-Chloroaniline	1		< 1.0	< 1.0	0.0%	< 1.0	47%	30%	130%	55%	30%	130%	65%	30%	130%
2-and 1-methyl Naphthalene	1		< 0.5	< 0.5	0.0%	< 0.5	74%	50%	140%	62%	50%	140%	67%	50%	140%
2,4,6-Trichlorophenol	1		< 0.2	< 0.2	0.0%	< 0.2	85%	50%	140%	63%	50%	140%	65%	50%	140%
2,4,5-Trichlorophenol	1		< 0.2	< 0.2	0.0%	< 0.2	81%	50%	140%	74%	50%	140%	65%	50%	140%
1,1'-Biphenyl	1		< 0.5	< 0.5	0.0%	< 0.5	NA	50%	140%	70%	50%	140%	72%	50%	140%
Dimethyl phthalate	1		< 0.5	< 0.5	0.0%	< 0.5	98%	50%	140%	78%	50%	140%	78%	50%	140%
2,4 and 2,6-Dinitrotoluene	1		< 0.5	< 0.5	0.0%	< 0.5	115%	50%	140%	96%	50%	140%	98%	50%	140%
Diethyl phthalate	1		< 0.5	< 0.5	0.0%	< 0.5	95%	50%	140%	73%	50%	140%	78%	50%	140%
Pentachlorophenol	1		< 0.5	< 0.5	0.0%	< 0.5	74%	50%	140%	56%	50%	140%	71%	50%	140%
3,3'-dichlorobenzidine	1		< 0.5	< 0.5	0.0%	< 0.5	91%	30%	130%	72%	30%	130%	73%	30%	130%
Bis(2-Ethylhexyl)phthalate	1		< 0.5	< 0.5	0.0%	< 0.5	99%	50%	140%	87%	50%	140%	96%	50%	140%
2,4-Dinitrophenol	1		< 10	< 10	0.0%	< 10	130%	30%	130%	59%	30%	130%	30%	30%	130%
O. Reg. 153(511) - PCBs (Water)															

AGAT Laboratories

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CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 14T885738

PROJECT: J14117

ATTENTION TO: Ryan Dignard

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Sep 10, 2014			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Aroclor 1242	1		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1248	1		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1254	1		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Aroclor 1260	1		< 0.1	< 0.1	0.0%	< 0.1	NA	60%	140%	NA	60%	140%	NA	60%	140%
Polychlorinated Biphenyls	1		< 0.1	< 0.1	0.0%	< 0.1	96%	60%	140%	99%	60%	140%	78%	60%	140%

Certified By:

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Method Summary

CLIENT NAME: MISC AGAT CLIENT ON

AGAT WORK ORDER: 14T885738

PROJECT: J14117

ATTENTION TO: Ryan Dignard

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Naphthalene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Acenaphthylene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Acenaphthene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Fluorene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Phenanthrene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Anthracene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Fluoranthene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Pyrene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Benz(a)anthracene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Chrysene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Benzo(b)fluoranthene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Benzo(k)fluoranthene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Benzo(a)pyrene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Dibenz(a,h)anthracene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Benzo(g,h,i)perylene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Phenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Bis(2-chloroethyl)ether	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2-Chlorophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
o-Cresol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Bis(2-chloroisopropyl)ether	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
m&p-Cresol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4-Dimethylphenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4-Dichlorophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
1,2,4-Trichlorobenzene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
p-Chloroaniline	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2-and 1-methyl Naphthalene	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4,6-Trichlorophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4,5-Trichlorophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
1,1'-Biphenyl	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Dimethyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4 and 2,6-Dinitrotoluene	ORG-91-5114	EPA SW-846 3510 & 8270	GC/MS
Diethyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Pentachlorophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
3,3'-dichlorobenzidine	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Bis(2-Ethylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4-Dinitrophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Chrysene-d12	ORG-91-5114	EPA SW-846 3510C & 8270	GC/MS
Aroclor 1242	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1248	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1254	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Aroclor 1260	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Polychlorinated Biphenyls	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD

Site Photographs

Figure 2 – Excavation Trench prior to complete membrane and soil coverage (Looking North East)

Figure 3. Sample location 1 – Excavation Trench completely covered (Looking North East)

Figure 4. Sample location 5 – Containment Area (Looking South West)

Figure 5. Sample location 8 – Containment Area (Looking South)

Figure 6. Sample location 6 – Containment Area (Looking West)

Figure 7. Sample location 9 – Fence Line (Looking North)

Figure 8. Looking South West – View of Water Storage Containers

Figure 9. Sampler with Rain Shield

AirZOne
Comprehensive Air Quality Services

A Report Summarizing the Results for Ambient and Occupational Hygiene Monitoring to Determine Airborne VOCs During Test Pit Excavations at Wellington Street Water Main Project in Guelph, Ontario

Prepared For:
MMM Group Limited
100 Commerce Valley Drive West
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L3T 0A1

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Project Number J14117
Report No: 2

November 7, 2014

TABLE OF CONTENTS

PART A – Ambient Air Quality

Introduction

The city of Guelph is installing new water and sewer lines along Wellington St. near Howitt Creek. In early September, a city contractor was excavating a trench and discovered some barrels buried in the soil. The barrels appeared very old and had been punctured by the excavation equipment. The barrels contained an unknown liquid which escaped to the soil. The liquid was a bluish-green colour with a strong odour resembling solvents or fuels. Work on the water project was stopped to address the spill. The spilled liquid and associated rainwater were transferred to storage tanks while the barrels and contaminated soil were removed to a containment area. The trench was covered with a membrane and clean soil to control odourous emissions. Air, water, and soil samples were collected to determine the type of substance that was likely in the barrels. Airzone staff provided monitoring during the initial discovery stage with results submitted to MMM Group Ltd. (MMM) 12 September 2014.

Following the discovery of the barrels and subsequent shut-down of the worksite, the city, MOE, and consulting parties developed a plan to delineate the historical landfill site before proceeding further with the project. The excavation trench was scanned using equipment which could locate objects buried in the soil. Areas with suspected buried material were logged for future investigation. Test pits were planned for October 22nd and 23rd 2014 which would investigate these suspected buried objects. The original plan called for 8 test pits to be dug along the trench line. In the end there were 11 test pits in total.

Airzone was requested to conduct ambient monitoring on both days during the opening of the test pits. Occupational hygiene monitoring was also conducted to monitor worker exposures in the immediate area of the openings.

Measurements of Airborne Volatile Organic Compounds (VOCs)

Several ambient sampling locations were established in the vicinity of the test pit excavation area on October 22nd and 23rd, 2014, including, South, East, West, and North of the test pit areas for a particular day. These sampling locations were situated in each quadrant to account for potential changes in wind direction and still allow monitoring of source emissions. A sample was also collected at the fenceline of the excavation area nearest to the closest apartment building, generally at a south-west location of the excavation area. The background location was selected based on the predominant wind direction at the time samples were set-up on each day; at this time wind was generally from the north. Passive sampling devices (PSDs) were deployed for 24-hour periods to measure ambient concentrations of VOCs that can be referenced to MOE ambient air quality criteria (AAQCs). Thermal desorption tubes were used in several locations to measure short term concentrations to assist in determining peak air concentration levels of emitted compounds. Figure 1 identifies the sampling locations chosen for analysis (based on wind directions) and presented here overlaid on a satellite view of the site; these represent a

subset of all the ambient samples taken. Table 1 describes the sampling locations and the types of samples collected and analyzed at each location. Based on the predominant wind direction from the north (see Table 5a and 5b), samples from the south and the fenceline (south-west) were analyzed, along with the upwind north samples as shown in fig. 1..

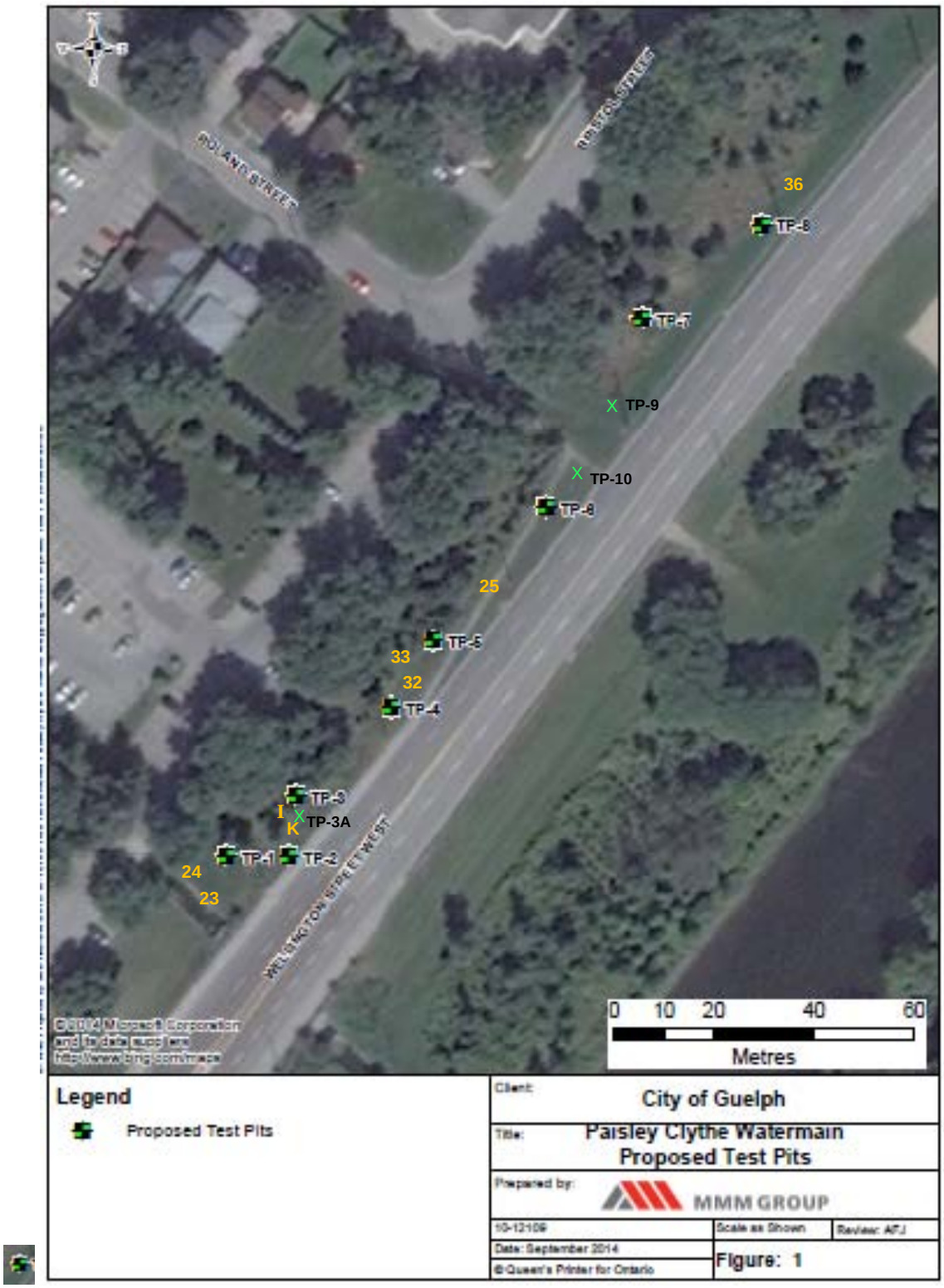


Figure 1 Ambient Sampling Locations for Test Pit Excavations; Wellington St. & Hanlon Pkwy, Guelph

Legend (See Table 1 for a description of the sample locations)

- *Notations 23-25 (Oct. 22) & 32,33,36 (Oct. 23) correspond with PSD sample IDs ending with those numbers*
- *Notations I and K correspond with TD Tube sample IDs ending in I and K*

Table 1 Analyzed Sampling Location Summary During Test Pit Excavations on Wellington St., Guelph, on October 22nd (samples 23-25) & 23rd (samples 32, 33 and 36), 2014

Notation	Location	VOCs - PSD Method	VOCs - TD Method
23, 32	South of Test Pit Excavations (Downwind)	2	-
24, 33	Fence line, SW of Test Pit Excavations	2	-
25, 36	North of Test Pit Excavations (Upwind)	2	-
I	Headspace of drum from Test Pit 3	-	1
K	South of Lip of Test Pit 3A on Oct. 23rd	-	1
31, 40, J	Field Blanks	2	1
	TOTAL	8	3

See the appendix for photographs of some sampling locations

Sampling and Analysis Methods for Air Monitoring

All air samples were processed at the Airzone laboratory. The laboratory, and more specifically the method of measurement for VOCs, is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) using the ISO 17025:2005 protocol. This program requires a comprehensive QA/QC program including auditing of methods, participation in CALA mandated proficiency testing programs and the use of qualified, certified suppliers for external laboratory services. Airzone uses standard methods of analysis validated by the Environmental Protection Agency (EPA), Ministry of Environment (MoE), National Institute of Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA) or the Ontario Ministry of Labour (MOL). The methods of sampling and analysis are described below.

Volatile Organic Compounds (VOCs) – Passive Samples (SIM and SCAN mode)

Airborne concentration levels of VOCs were measured with protocols based on NIOSH methods 1003 (Halogenated Hydrocarbons), 1005 (Methylene Chloride), 1019 (1,1,2,2-Tetrachloroethane), 1022 (Trichloroethylene), 1400 (Alcohols I), 1401 (Alcohols II), 1403 (Alcohols IV), 1450 (Esters I), 1457 (Ethyl Acetate), 1500 (Hydrocarbons, 36-126°C BP), 1501 (Hydrocarbons, Aromatic), 1552 (Terpenes), 2549 (VOC), and 5517 (Polychlorobenzenes).

Air was sampled with 3M 3500 organic vapour monitor (OVM) passive sampling devices (PSDs). VOCs pass through the diffusion membrane at known sampling rates and adsorb on a charcoal-impregnated disk within the monitor. Samples are extracted with solvent and analyzed by gas chromatography-mass spectrometry (GC-MS).

Airborne concentrations were based on the amounts collected in each sample, blank results, and the accurate air volumes (from elapsed sampling time and sampling rates). Air concentrations were compared to current AAQCs.

Volatile Organic Compounds (VOCs) – Thermal Desorption Method

Samples were analyzed using a modified TO-17 method. In the field, samples were collected with Carbo-Trap™ 300 at approximately 50 mL/min for about 20 min. Samples were analysed by thermal desorption/concentration with gas chromatography-mass spectrometry (GC-MS).

Results

Results for airborne VOC on October 22nd, 2014 are provided in Table 2 while VOC results for October 23rd, 2014 are provided in Table 3. VOC samples collected with TD tubes are provided in Table 4. Airborne concentrations of individual VOCs are expressed as micrograms per cubic metre of air ($\mu g/m^3$). A result denoted as "BDL or <" indicates that the concentration was below the detection level of the measurement method. Detection limits and AAQC values for each parameter are also provided with the tables.

Table 5a and 5b provide meteorological data for the approximate 24-hour periods of 9 a.m. Oct. 22 to 8 a.m. Oct. 23, and 8 a.m. Oct. 23 to 8 a.m. Oct. 24, respectively, when the ambient samplers were deployed.

Table 2. Airborne Concentrations of Ambient VOC during Test Pit Excavations on Wellington St., Guelph. Results are expressed as µg/m^3. Samples were collected between ~9:00 am Oct. 22nd and ~8:00 am Oct. 23rd, 2014

	Sample I.D.					AAQC 2012 For Averaging Times:			
Parameters	**CAS #**	**J14117-3-PSD-23**	**J14117-3-PSD-24**	**J14117-3-PSD-25**	**J14117-3-PSD-31**	**10 min**	**1 hour**	24 hour	**Annual**
Pentane (nC_5)	109-66-0	5.73	3.86	4.41	< 0.2				
Ethanol	64-17-5	0.53	0.43	0.35	< 0.2		19000		
2,2-Dimethylbutane	75-83-2	0.60	0.61	0.48	< 0.2				
iso-Propyl alcohol (IPA)	67-63-0	53.0	46.6	47.9	< 0.2			7300	
Dichloromethane	75-09-2	2.63	1.22	1.73	< 0.2			220	44
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	< 0.2	< 0.2			7000	
Hexane (nC_6)	110-54-3	1.51	0.52	0.55	< 0.2			7500	
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	1.65	1.70	1.26	< 0.2			1000	
Ethyl acetate	141-78-6	1.62	0.62	0.94	< 0.2		19000		
Chloroform	67-66-3	< 0.2	< 0.2	< 0.2	< 0.2			1	0.2
2-Methylhexane	591-76-4	0.95	< 0.2	0.38	< 0.2				
Carbon tetrachloride	56-23-5	0.30	0.39	0.27	< 0.2			2.4	
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2			2	0.4
Benzene	71-43-2	1.70	1.38	1.28	< 0.2			2.3	0.45
2,2,4-Trimethylpentane	540-84-1	12.4	4.81	2.91	< 0.2				
Heptane	142-82-5	1.06	0.48	0.63	< 0.2			11000	
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2	< 0.2			12	2.3
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	< 0.2				
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2			1200	
Toluene	108-88-3	17.0	5.78	8.13	0.32			2000	
Octane (nC_8)	111-65-9	0.73	0.45	0.27	< 0.2	61800			
Tetrachloroethylene	127-18-4	< 0.2	< 0.2	< 0.2	< 0.2			360	
n-Butyl acetate	123-86-4	1.67	1.79	1.45	< 0.2	1000	15000		
Ethylbenzene	100-41-4	0.84	0.65	0.24	< 0.2	1900		1000	
(m+p)-Xylene	108-38-3 / 106-42-3	7.05	5.30	1.02	< 0.2	3000		730	
o-Xylene	95-47-6	1.96	1.48	0.30	< 0.2	3000		730	
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	< 0.2			400	
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	< 0.2			400	
a-Pinene	80-56-8	0.60	< 0.2	< 0.2	< 0.2				
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2				
Decane (nC_{10})	124-18-5	5.50	5.23	5.17	0.26		60000		
1,3,5-Trimethylbenzene	108-67-8	< 0.2	< 0.2	< 0.2	< 0.2			220	
1,2,4-Trimethylbenzene	95-63-6	0.75	0.63	0.32	< 0.2			220	
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2				
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2				
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	< 0.2				
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2				
1,4-Dichlorobenzene	106-46-7	1.40	1.37	1.33	< 0.2			95	
1,3-Diethylbenzene	141-93-5	< 0.2	< 0.2	< 0.2	< 0.2				
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2				
Dodecane (nC_{12})	112-40-3	6.01	4.63	7.90	< 0.2				
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2			400	
Naphthalene	91-20-3	1.00	1.06	1.33	< 0.2	50		22.5	
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2				
Tetradecane (nC_{14})	629-59-4	6.34	5.98	9.37	< 0.2				
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2				

< = below detection limit; method detection limit is 0.2 µg/m^3

Table 3. Airborne Concentrations of Ambient VOC during Test Pit Excavations on Wellington St., Guelph. Results are expressed as µg/m^3. Samples were collected between ~8:30 am Oct. 23rd and ~7:30 am Oct. 24th, 2014

	Sample I.D.						AAQC 2012 For Averaging Times:			
Parameters	**CAS #**	**J14117-3-PSD-32**	**J14117-3-PSD-33**	**J14117-3-PSD-36**	**J14117-3-PSD-40**	**J14117-3-PSD-40 Repeat**	**10 min**	**1 hour**	24 hour	**Annual**
Pentane (nC_5)	109-66-0	5.31	3.59	3.75	< 0.2	< 0.2				
Ethanol	64-17-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2		19000		
2,2-Dimethylbutane	75-83-2	0.79	0.24	1.18	< 0.2	< 0.2				
iso-Propyl alcohol (IPA)	67-63-0	17.2	8.23	12.3	< 0.2	< 0.2			7300	
Dichloromethane	75-09-2	1.37	1.26	1.16	< 0.2	< 0.2			220	44
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			7000	
Hexane (nC_6)	110-54-3	0.56	< 0.2	< 0.2	< 0.2	< 0.2			7500	
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	1.86	< 0.2	0.90	< 0.2	< 0.2			1000	
Ethyl acetate	141-78-6	0.57	< 0.2	< 0.2	< 0.2	< 0.2		19000		
Chloroform	67-66-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1	0.2
2-Methylhexane	591-76-4	0.23	< 0.2	0.27	< 0.2	< 0.2				
Carbon tetrachloride	56-23-5	0.25	0.50	0.21	< 0.2	< 0.2			2.4	
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			2	0.4
Benzene	71-43-2	1.82	< 0.2	0.28	< 0.2	< 0.2			2.3	0.45
2,2,4-Trimethylpentane	540-84-1	2.05	0.50	4.28	< 0.2	< 0.2				
Heptane	142-82-5	0.73	< 0.2	< 0.2	< 0.2	< 0.2			11000	
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			12	2.3
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			1200	
Toluene	108-88-3	6.07	1.79	1.22	0.30	0.32			2000	
Octane (nC_8)	111-65-9	0.25	< 0.2	< 0.2	< 0.2	< 0.2	61800			
Tetrachloroethylene	127-18-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			360	
n-Butyl acetate	123-86-4	2.78	1.59	1.64	< 0.2	< 0.2	1000	15000		
Ethylbenzene	100-41-4	0.39	0.20	< 0.2	< 0.2	< 0.2	1900		1000	
(m+p)-Xylene	108-38-3 / 106-42-3	1.59	0.65	0.68	< 0.2	< 0.2	3000		730	
o-Xylene	95-47-6	0.42	< 0.2	< 0.2	< 0.2	< 0.2	3000		730	
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
a-Pinene	80-56-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Decane (nC_{10})	124-18-5	6.39	2.05	5.51	< 0.2	< 0.2		60000		
1,3,5-Trimethylbenzene	108-67-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			220	
1,2,4-Trimethylbenzene	95-63-6	0.52	< 0.2	< 0.2	< 0.2	< 0.2			220	
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
1,4-Dichlorobenzene	106-46-7	1.51	< 0.2	< 0.2	< 0.2	< 0.2			95	
1,3-Diethylbenzene	141-93-5	0.26	< 0.2	< 0.2	< 0.2	< 0.2				
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Dodecane (nC_{12})	112-40-3	7.70	< 0.2	1.99	< 0.2	< 0.2				
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2			400	
Naphthalene	91-20-3	1.47	< 0.2	< 0.2	< 0.2	< 0.2	50		22.5	
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				
Tetradecane (nC_{14})	629-59-4	8.45	1.07	2.72	< 0.2	< 0.2				
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2				

< = below detection limit; method detection limit is 0.2 µg/m^3

Repeat = a laboratory repeat analysis was performed for QA/QC purposes

Table 4. Airborne Concentrations of VOC during Test Pit Excavations on Wellington St., Guelph. Results are expressed as µg/m^3. Samples were collected using TD tubes on October 23rd, 2014.

Parameters	Sample I.D.				AAQC 2012			
	Method Detection Limit	J14117-TD-I	J14117-TD-J	J14117-TD-K	For Averaging Times:			
					10 min	1 hour	24 hour	Annual
Aliphatic Hydrocarbons								
Pentane	0.5	5078.8	<0.5	<0.5				
2,2-Dimethylbutane	0.5	2695.8	2.9	20.1				
1-Hexene	0.5	75.0	<0.5	<0.5				
Hexane	0.5	730.9	4.0	1.6			7500	
2-Methylhexane	0.5	58.5	<0.5	1.6				
Heptane	0.5	2378.0	<0.5	68.6			11000	
2-Methyl heptane	0.5	1143.4	<0.5	95.5				
Octane	0.5	2758.7	<0.5	792.4	61800			
Nonane	0.5	412.6	<0.5	18.5				
Decane	0.5	2491.1	0.5	11.7		60000		
Undecane	0.5	3675	<0.5	19.5				
Dodecane	0.5	1883	<0.5	4.4				
Tridecane	0.5	107.7	<0.5	<0.5				
Tetradecane	0.5	156.2	<0.5	14.5				
Aromatic Hydrocarbons								
Benzene	0.5	106.5	2.0	1.7			2.3	0.45
Toluene	0.5	13217	1	1209			2000	
Ethylbenzene	0.5	19731	<0.5	2623.7	1900		1000	
(m+p)-Xylene	0.5	25894	<0.5	5177	3000		730	
o-Xylene	0.5	6712	<0.5	2547.9	3000		730	
Cumene	0.5	1348.4	<0.5	94.7			400	
Propyl benzene	0.5	2370	<0.5	24.8				
1,3,5-Trimethyl benzene	0.5	4110	<0.5	146			220	
1,2,4-Trimethylbenzene	0.5	4173	<0.5	149			220	
p-Cymene	0.5	730.2	<0.5	2.6				
1,2,3-Trimethyl benzene	0.5	2364	<0.5	38.9				

< = below detection limit; method detection limit is 0.5 µg/m^3

Discussion

Trench excavations at the water main project on Wellington St, Guelph, occurring during the week of September 1, 2014 uncovered an historical landfill site which contained buried barrels. The landfill site (according to the City) is from the 1950's. The barrels were in poor condition and were inadvertently punctured during the excavation. The trench and contaminated soil were covered with a membrane and clean soil to reduce odours and exposures while a remediation plan was developed to safely remove the material.

As part of the subsequent remediation project, the site required delineation to determine the size of the contaminated zone. Special equipment was used to survey the ground for buried materials or objects like drums, debris, etc. This data was then used to propose test pit excavation locations to investigate the objects further. Eight (8) test pits were initially proposed and were opened on October 22nd and October 23rd, 2014. An additional three (3) test pits were added to the investigation during the excavations to adequately delineate the area.

Air samples were deployed around the proposed test pit areas (see Fig. 1). Test pits 1 -4 were opened on October 22nd while test pits 5-10 and 3A were opened on October 23rd. The samples were deployed in each quadrant (not all shown in Fig. 1) to take into account predominant wind directions. Winds on the two sampling days were primarily out of the North. Therefore, for each day, the southerly samples, the south-west fenceline samples, and the northerly (background) samples were analysed.

Ambient concentrations of VOCs in the samples from October 22nd varied, but in general were low in the areas tested. In general the compounds detected were solvent-like hydrocarbons typically used in manufacturing as well as hydrocarbons that may originate from vehicles on the nearby roadway. The highest ambient concentrations measured were for isopropyl alcohol and toluene (53.0 µg/m^3 17.0 µg/m^3 respectively - see Table 2) in the sample collected downwind of the test pits. Benzene approached the AAQC most closely (74%) but did not exceed it. As expected, samples measured directly downwind of the excavation area had higher concentrations than those measured upwind or at peripheral locations. However, the background sample also had significant amounts of target compounds. Overall the ambient levels were much lower than the acceptable AAQC limits.

The samples collected on October 23rd were lower than those collected on October 22nd. The highest concentration was for isopropyl alcohol (17.2 µg/m^3 - see Table 3), collected downwind of the excavation area. This set of samples was collected for tests pits 5-10. Test pits 7 & 8 had clean fill in the excavations and low readings on the PID (see discussion in Part B for occupational testing) and therefore additional test pits, 9 and 10, were excavated to more accurately delineate the edge of the contaminated zone. The number of clean areas excavated on Oct. 23 is one possible reason why the air samples had lower levels than the previous day. Benzene approached the AAQC most closely (79%) but did not exceed it.

TD tube results (Table 4) are representative of short-term "peak" values and were collected to aid in the identification of airborne contaminants from the drum material that was discovered in test pit 3 on Oct. 22 and when test pit 3A was excavated on Oct. 23. The concentrations measured in the headspace of the

drum (TD-I) and at the lip of test pit 3A (TD-K) were very high and should not be directly compared to AAQC criteria as they were not taken for human exposure assessments.

Other Observations

- ***Outdoor/Ambient Conditions During Sampling Period*** – Hourly data for ambient temperature, relative humidity, wind direction, and wind speed, as recorded from Kitchener-Waterloo[1,2], is provided below for the sampling period (October 22-24).

Table 5a. Hourly Climate Data for Guelph Area on October 22nd to 23rd, 2014 during Test Pit Excavations.

Time of Day	Temperature (°C)	Relative Humidity (%)	Wind Direction (10's deg)	Wind Speed (km/h)
9:00	6.3	74	36	17
10:00	8.5	70	36	15
11:00	10.6	64	4	15
12:00	12.3	61	2	15
13:00	12.0	60	35	15
14:00	13.2	56	35	17
15:00	13.1	55	36	18
16:00	12.8	54	1	17
17:00	11.3	62	1	9
18:00	9.3	68	2	9
19:00	7.4	74	36	11
20:00	5.8	79	35	13
21:00	4.9	86	34	9
22:00	3.2	90	34	11
23:00	3.6	92	33	5
0:00	1.9	96	32	8
1:00	2.0	96	30	8
2:00	1.3	98	30	8
3:00	1.5	97	30	8
4:00	2.3	98	29	5
5:00	0.0	98	30	5
6:00	0.6	99	30	11
7:00	1.5	98	29	8
8:00	4.3	94	31	9

[1] Climate data for Oct. 22 -23, 2014 obtained from Environment Canada internet site: http://climate.weather.gc.ca/climateData/hourlydata_e.html?StationID=48569&Month=10&Day=22&Year=2014&timeframe=1 and http://climate.weather.gc.ca/climateData/hourlydata_e.html?StationID=48569&Month=10&Day=23&Year=2014&timeframe=1

[2] Climate data for Oct. 23-24, 2014 obtained from Environment Canada internet site: http://climate.weather.gc.ca/climateData/hourlydata_e.html?StationID=48569&Month=10&Day=23&Year=2014&timeframe=1 and http://climate.weather.gc.ca/climateData/hourlydata_e.html?StationID=48569&Month=10&Day=23&Year=2014&timeframe=1

Table 5b. Hourly Climate Data for Guelph Area on October 23rd and 24th, 2014 during Test Pit Excavations.

Time of Day	Temperature (°C)	Relative Humidity (%)	Wind Direction (10's deg)	Wind Speed (km/h)
8:00	4.3	94	31	9
9:00	7.9	80	35	11
10:00	10.7	70	32	15
11:00	13.6	58	33	17
12:00	14.9	55	33	15
13:00	15.6	53	32	18
14:00	15.3	54	30	18
15:00	14.9	54	30	21
16:00	14.2	54	30	22
17:00	12.4	63	31	13
18:00	9.1	73	30	11
19:00	9.0	76	33	15
20:00	6.9	85	31	11
21:00	5.3	89	32	5
22:00	3.2	95	30	8
23:00	2.4	96	30	11
0:00	2.0	96	30	9
1:00	0.8	98	30	8
2:00	1.0	98	31	8
3:00	-0.9	99	29	8
4:00	-0.4	99	30	11
5:00	0.1	99	36	5
6:00	-2.5	99	29	9
7:00	1.3	99	33	11
8:00	2.7	98	36	5

PART B – Occupational Hygiene Monitoring

Introduction

The city of Guelph is installing new water and sewer lines along Wellington St. near Howitt Creek. In early September, a city contractor was excavating a trench and discovered some barrels buried in the soil. The barrels appeared very old and had been punctured by the excavation equipment. The barrels contained an unknown liquid which escaped to the soil. The liquid was a bluish-green colour with a strong odour resembling solvents or fuels. Work on the water project was stopped to address the spill. The spilled liquid and associated rainwater were transferred to storage tanks while the barrels and contaminated soil were removed to a containment area. The trench was covered with a membrane and clean soil to control odourous emissions. Air, water, and soil samples were collected to determine the type of substance that was likely in the barrels. Airzone staff provided monitoring during the initial discovery stage with results submitted to MMM Group Ltd. (MMM) 12 September 2014.

Following the discovery of the barrels and subsequent shut-down of the worksite, the city, MOE, and consulting parties developed a plan to delineate the historical landfill site before proceeding further with the project. The excavation trench was scanned using equipment which could locate objects buried in the soil. Areas with suspected buried material were logged for future investigation. Test pits were planned for October 22nd and 23rd 2014 which would investigate these suspected buried objects. The original plan called for 8 test pits to be dug along the trench line. In the end there were 11 test pits excavated in total.

Airzone was requested to conduct occupational monitoring on both days during the opening of the test pits. Two workers at the site were monitored each day including the excavator operator and the technician conducting soil sampling. Real-time TVOC monitoring was also requested to monitor breathing zone (BZ) levels; should BZ levels exceed 0.5 ppm for greater than 30 minutes then this defined the action level for staff to don appropriate PPE.

Sampling Approach

The test pit phase was conducted on October 22nd and 23rd, 2014.

Two PSD occupational samples were deployed on each day, one on the excavator operator, Mr. Jake Hundert of Trevita, and one on the MMM representative directing the excavations and collecting soil samples, Mr. Dan Neerhof.

Also, as a safety measure, a handheld, direct-reading instrument (ppbRAE 3000) equipped with a photo ionization detector (PID) was used to monitor real-time VOC concentrations. The PID displays total volatile organic compounds (TVOC) which is the sum of all the VOCs in air.

PID measurements were generally obtained in the BZ at the downwind edge of each test pit. Some PID readings were occasionally taken at a lower level at the lip of the test pit. As

requested by Mr. Neerhof, some readings were also collected at the bucket of the backhoe, in the headspace of ziplok bags of soil samples, or in the test pit itself.

Table 6. Air Sampling locations for Occupational Hygiene Samples at during Test Pit Excavation in Guelph on October 22nd and 23rd, 2014.

Sample Location	VOCs	
	Oct. 22, 2014	Oct. 23, 2014
Excavator Operator	1 P	1 P
Excavation Director & Soil Sampling Technician	1 P	1 P
Total number of samples	2	2

P = personal sample

Thus, a total of 4 samples were collected over the two days, plus a field blank for quality control purposes, for a total of 5 analyses for occupational exposure.

Air samples were collected using 3M passive sampling devices (PSD) suspended from the worker's shirt collar in the vicinity of the breathing zone to represent the unprotected exposure without benefit of PPE.

Field blanks were exposed and immediately sealed during the testing. These are used to determine if other interferences are present in the area where sampling occurred, taking into account sample handling and transport. Blank is treated as a sample in all respects including, storage, preservation and all analytical procedures. Upon completion of sampling, samples were sealed, transported to the laboratory, and analyzed.

Analysis

All air samples were processed at the Airzone laboratory. The laboratory, and more specifically the method of measurement for VOCs, is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) using the ISO 17025:2005 protocol. This program requires a comprehensive QA/QC program including auditing of methods, participation in CALA mandated proficiency testing programs and the use of qualified, certified suppliers for external laboratory services. Airzone uses standard methods of analysis validated by the Environmental Protection Agency (EPA), Ministry of Environment (MoE), National Institute of Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA) or the Ontario Ministry of Labour (MOL). The methods of sampling and analysis are described below.

Volatile Organic Compounds (VOCs) – Passive Samples (SIM and SCAN mode)

Airborne concentration levels of VOCs were measured with protocols based on NIOSH methods 1003 (Halogenated Hydrocarbons), 1005 (Methylene Chloride), 1019 (1,1,2,2-Tetrachloroethane), 1022 (Trichloroethylene), 1400 (Alcohols I), 1401 (Alcohols II), 1403

(Alcohols IV), 1450 (Esters I), 1457 (Ethyl Acetate), 1500 (Hydrocarbons, 36-126°C BP), 1501 (Hydrocarbons, Aromatic), 1552 (Terpenes), 2549 (VOC), and 5517 (Polychlorobenzenes).

Air was sampled with a 3M 3500 organic vapour monitor (OVM) passive sampling devices (PSDs). VOCs pass through the diffusion membrane at known sampling rates and adsorb on a charcoal-impregnated disk within the monitor. Samples are extracted with solvent and analyzed by gas chromatography-mass spectrometry (GC-MS).

Airborne concentrations were based on the amounts collected in each sample, blank results, and the accurate air volumes (from elapsed sampling time and sampling rates). Air concentrations were compared to current MOL occupational exposure levels.

Results

Results for personal exposure VOC concentrations (time-weighted averages) are provided in Table 7. Results are expressed as micrograms per cubic metre of air ($\mu g/m^3$). A "BDL" or "<" in the table denotes a concentration below the detection limit of the measurement method. Detection limits and regulatory exposure limits are also listed in the table.

Following Table 7, a summary section is provided for the PID readings, expressed as parts per billion (ppb) or parts per million (ppm), as appropriate.

Permissible Exposure Values

Permissible exposure values are outlined in the Ontario Ministry of Labour (MoL) Regulation respecting Control of Exposure to Biological or Chemical Agents, O. Reg. 833, R.R.O. 1990 (as amended 513/92; 597/94; 388/00; 100/04; 16/05; 77/05; 177/05; 607/05; 83/07; 248/08; 491/09; 419/10, 149/12) and O. Reg. 490/09 for Designated Substances. As part of these regulations, an employer is required to take measures to reduce airborne concentrations to levels less than the TWA, STEL, and C limits (as defined below)[3].

TWA **Time-Weighted Average Limit**	**STEL** **Short-Term Exposure Limit**	**C** **Ceiling Limit**
❑ Refers to the time-weighted average airborne concentrations of substances and represents conditions to which it is believed that nearly all workers may be repeatedly exposed, day after day, for a working lifetime without adverse health effects.	❑ Refers to airborne concentrations to which workers can be exposed for short periods provided that the daily TWA is not exceeded. The STEL is based on the following conditions: • *May not exceed 15 minutes' duration at one time;* • *May not occur more than four (4) times in a workday; and* • *Must be separated by at least 60 minutes between successive exposures.*	❑ Refers to the maximum airborne concentrations that workers can be exposed to at any time.
❑ TWA are concentrations to which a worker may be exposed in a work day or work week.	❑ Where a STEL is not listed, a worker shall not be exposed to a concentration three times the TWA for the agent **for any period of 30 minutes**.	❑ Where a ceiling limit is not listed, a worker shall not be exposed to a concentration five times the TWA for the agent **for any period**.

These values represent airborne concentrations and conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse health effects. However, there is a wide variation in individual susceptibility and a small percentage of workers may experience discomfort at concentrations below the threshold limit; a smaller percentage may be affected more seriously by aggravating pre-existing conditions. Hyper-susceptibility or unusual responsiveness may be the result of genetic factors, age, personal habits, medication or previous exposures.

Employers must also ensure that exposures are below the calculated mixture exposure value. This value is used to determine the permissible exposure level for mixtures of airborne chemical agents which have similar health effects or which can exert additive or synergistic health effects. The permissible limit of the mixture has been exceeded when the TWA-mix value exceeds 1.0.

[3] As of July 1, 2010, in order to harmonize exposure limit terminology with the American Conference of Governmental Industrial Hygienists (ACGIH), the Ontario MoL adopted the use of the terms time-weighted average limit (TWA), short-term exposure limit (STEL), and ceiling limit (C) to replace the previous MoL terms of Time-Weighted Average Exposure Value (TWAEV), Short-Term Exposure Value (STEV), and Ceiling Exposure Value (CEV). If the agent is listed in the Ontario Table, exposure shall not exceed the TWA, STEL, or C set out in the Ontario Table. If the agent is not listed in the Ontario Table but is listed in the ACGIH Table, exposure shall not exceed the TWA, STEL, or C set out in the ACGIH Table.

In order to calculate the combined effect on the body, the TWA-mix value is calculated as follows:

$$\sum \frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_3}{T_3} + ... \frac{C_n}{T_n} = TWA - mix\ value$$

where:

C	=	concentration measured
T	=	corresponding TWA limit
1	=	chemical compound 1
2	=	chemical compound 2
3	=	chemical compound 3
n	=	chemical compound n

Personal Exposure - Occupational Results

Table 7. Airborne Concentrations of Personal VOC Exposure During Test Pit Excavations on Wellington St., Guelph. All results are expressed as µg/m^3.

Sample Identification	J14117-3-PSD-29	J14117-3-PSD-30	J14117-3-PSD-37	J14117-3-PSD-38	O.Reg. 833 TWA (µg/m^3) [a]	Notes [b]
Sample Location	Mr. Jake Hundert Oct. 22, 2014	Mr. Dan Neerhof Oct. 22, 2014	Mr. Jake Hundert Oct. 23, 2014	Mr. Dan Neerhof Oct. 23, 2014		
Pentane	21.3	26.3	7.38	5.70	1770000	
Ethanol	10.3	8.64	< 0.2	< 0.2	1884000	c
2,2-Dimethylbutane	3.53	3.17	6.06	5.89	1760000	d
iso-Propyl alcohol	395	428	99.1	99.3	492000	
Dichloromethane	13.8	28.6	5.47	5.64	174000	
Hexane	6.37	15.8	< 0.2	< 0.2	176000	
Methyl ethyl ketone	8.14	9.08	4.49	3.17	590000	
Ethyl acetate	7.55	22.4	0.30	< 0.2	1440000	
Chloroform	0.67	0.74	0.29	0.35	49000	
2-Methylhexane	2.73	8.46	1.94	< 0.2	1640000	e
1,2-Dichloroethane	0.39	< 0.2	0.97	< 0.2	40000	f
Benzene	4.89	3.76	0.44	< 0.2	1600	g
2,2,4-Trimethylpentane	18.1	10.3	13.4	27.6	1400000	h
Heptane	3.92	8.11	1.27	2.01	1640000	
Trichloroethylene	0.30	< 0.2	< 0.2	< 0.2	54000	
Methyl isobutyl ketone	1.30	3.68	< 0.2	< 0.2	82000	
Toluene	74.6	175	6.62	2.00	75000	
Octane	< 0.2	1.39	< 0.2	0.78	1400000	
n-Butyl acetate	9.29	7.92	5.78	4.50	713000	
Ethylbenzene	5.77	2.14	0.75	1.07	87000	
(m+p)-Xylene	55.7	14.7	6.33	11.3	435000	i
o-Xylene	13.7	3.93	1.19	2.27	435000	i
Styrene	1.42	4.00	< 0.2	< 0.2	149000	
Cumene	0.37	0.48	< 0.2	< 0.2	246000	
a-Pinene	2.81	9.83	< 0.2	< 0.2	150000	j
Decane	25.9	35.6	24.5	21.5	350000	k
1,3,5-Trimethylbenzene	0.83	0.36	< 0.2	< 0.2	123000	i
1,2,4-Trimethylbenzene	< 0.2	3.13	< 0.2	< 0.2	123000	i
d-Limonene	0.74	2.74	< 0.2	< 0.2	150000	m
1,4-Dichlorobenzene	6.29	6.33	< 0.2	0.54	60000	
1,3-Diethylbenzene	1.28	0.68	0.31	< 0.2	NE	
Dodecane	28.3	35.0	9.40	8.34	350000	k
Naphthalene	5.37	5.41	< 0.2	< 0.2	52000	
Tetradecane	31.1	35.6	12.5	16.6	350000	k
TWA-mix value	0.006	0.007	0.0008	0.0006	1	

" < " = below detection limit; method detection limit is 0.02 mg/m^3

All VOCs in the field blanks (J14117-3-PSD-31 & J14117-3-PSD-40) were below the detection limit.

Note: Only those compounds above the detection limit are presented in Table 7. A full list of compounds analyzed can be found in the analytical report in the appendix.

a = any TWA values provided as ppm were converted to µg/m^3 assuming standard temperature and pressure for molar volume of air

b = legend for notes is on following page

Notes for Table 7

c = no TWA established; reference limit is short-term exposure limit

d = exposure limit is for isomers of hexane

e = no Ont. or ACGIH TWA established; substance is isomer of heptane, so heptane exposure limit provided for reference

f = 1,2-Dichloroethane listed as Ethylene Dichloride in ACGIH (exposure limit is 10 ppm)

g = from O.Reg. 490/09 - Designated Substances

h = no Ont. or ACGIH TWA established; substance is isomer of octane, so octane exposure limit is provided for reference

i = exposure limit is for sum of all isomers

j = no Ont. or ACGIH TWA established; Swedish Occupational Exposure Limit (OEL) for a-Pinene, 150 mg/m^3, provided for reference

k = no Ont. or ACGIH TWA established; Swedish OEL for Decane and higher aliphatic hydrocarbons, 350 mg/m^3, provided for reference

m = no Ont. or ACGIH TWA established; Swedish OEL for d-Limonene, 150 mg/m^3, is provided for reference

NOTE: exposure limits from other jurisdictions or organizations other than MoL & ACGIH are proveded as reference guidelines only. They are not standards or regulations having any legal obligation or force in Ontario.

Results in Table 7 indicate that airborne concentrations of personal VOC exposures during the test pit excavations were well below their respective permissible occupational exposure limits (which are listed as µg/m^3 in Table 7, but which are typically provided as mg/m^3 in MOL or ACGIH documents for occupational exposures).

Also the TWA-mix value for each sample was less than 1 which is acceptable.

PID Measurements

As an additional safety measure during test pit excavations, a handheld, direct-reading instrument (ppbRAE 3000) equipped with a photo ionization detector (PID) was used to monitor real-time VOC concentrations. The PID measures total volatile organic compounds (TVOC), the sum of all airborne VOCs.

PID measurements were generally obtained in the breathing zone (BZ) at the downwind edge of each test pit. Some PID readings were occasionally taken at a lower level at the lip of the test pit. As requested by Mr. Neerhof, some readings were also collected near excavated soil in the bucket of the backhoe, in the headspace of Ziploc bags of soil samples, or in the test pit itself.

In general, readings were 0 ppm in the BZ beside the test pits, even when some readings were observed at the lip of the test pit (e.g., test pit #2, #3 and #4 on Oct. 22, and test pit 3A on Oct. 23, 2014). A brief summary of the PID readings from each of the test pit excavations is provided below. A calibration certificate and a more detailed log of the PID readings (handwritten pages) are provided in the appendix.

Graphs of the PID readings are presented in Figure 2a and 2b (for Oct. 22 and 23, respectively).

PID Readings Summary (in order of the test pit excavations)

October 22, 2013

Test Pit #2
Generally 0 ppm at BZ throughout excavation, even with some higher readings at lip of test pit or at backhoe bucket of removed soil (max. reading 860 ppb or 0.9 ppm)

Test Pit #1
0 ppm at BZ throughout excavation

Test Pit #3
0 ppm at BZ at start of excavation
A drum containing a blue/white solid resin was encountered at about 1 m depth in the test pit.
As the drum began to be uncovered, readings up to 5 to 6 ppm were observed at the lip of the test pit.
Backhoe operator entered the 1 m deep pit and inserted the probe tip of the PID into a hole in the drum. Readings were over 900 ppm.
However, readings were still 0 ppm at BZ near the pit.
As drum was excavated from the pit by backhoe and drum was crushed sufficiently to fit inside a new drum for containment, readings at BZ fluctuated into the hundreds of ppb (i.e., 4 – 70 – 550 ppb, or 0.5 ppm; 50 – 76 – 21 – 65 – 133 – 0 – 478 – 0 – 669 ppb; max 0.7 ppm).
There was no sustained or consistent readings in the BZ above 0.5 ppm for any consecutive few minutes, let alone for any 30 minute period.

Test Pit #4
0 ppm at BZ throughout excavation, even with some readings at lip of test pit ranging up to 1 – 2 ppm, and some measurements of headspace in Ziploc bags of soil samples of 4.7 ppm (TP4-1) and 0.6 ppm. (TP4-2).

October 23, 2013

Test Pit #5
0 ppm at BZ throughout excavation, even with some readings at lip of test pit ranging up to 0.2 ppm, and some measurements of headspace in Ziploc bags of soil samples of 9.7 ppm (TP5-1), 2.7 ppm. (TP5-2), and 3.7 ppm. (TP5-3).

Test Pit #6
0 ppm at BZ and at lip of test pit throughout excavation, even with some readings of headspace in ziplok bags of soil samples of 1.4 ppm (TP6-1), 1.2 ppm. (TP6-2), and 0 ppm. (TP6-3).

Test Pit #8, 7, 9, and 10
0 ppm at BZ and at lip of test pit throughout excavations.

Test Pit #3A
Readings remained at 0 in the BZ throughout the excavation, even though readings of 7 to 9 ppm were seen at the lip of the pit when it was first opened up, and readings continued to be several hundreds of ppb (i.e., up to 900 ppb or 0.9 ppm) at the lip of the pit throughout the 40 minutes of the excavation.

Figure 2 PID Measurements During Test Pit Excavations; Wellington St. & Hanlon Pkwy, Guelph

Figure 2a October 22, 2014

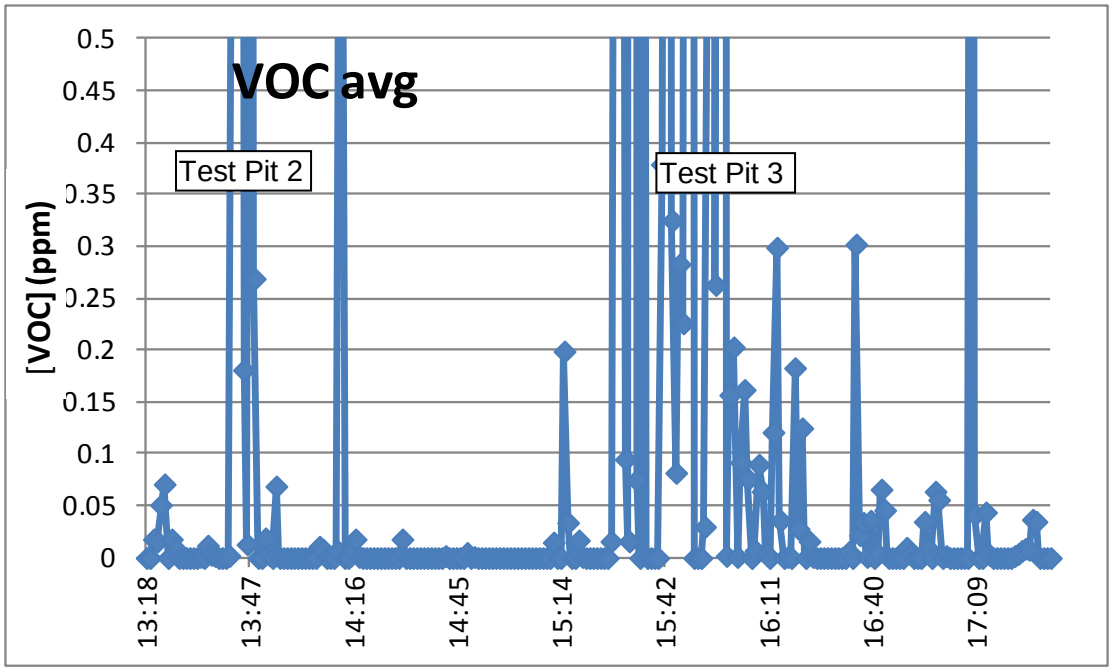
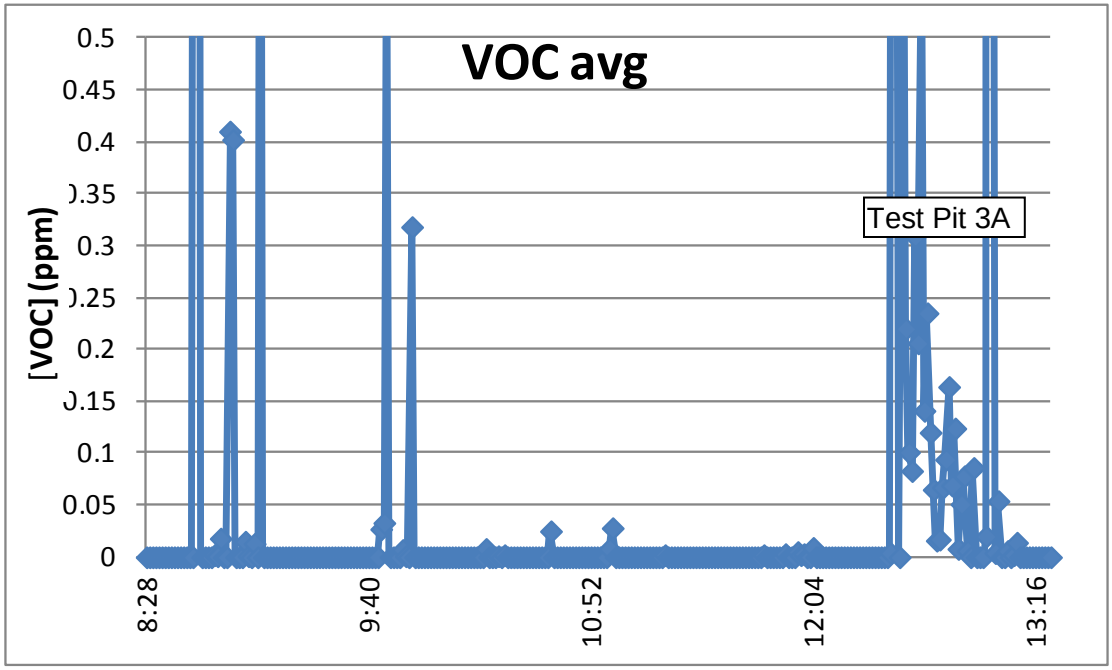


Figure 2b October 23, 2014



Discussion

A. Personal Exposures

Results in Table 7 indicate that all airborne concentrations of VOC that were detectable were very low and were well below the Ministry of Labour permissible exposure limits. The highest concentrations were for isopropyl alcohol and toluene, at a few hundred $\mu g/m^3$, but these are a thousand times below the permissible limits. All other VOCs were generally below 50 $\mu g/m^3$.

Overall, results of sampling indicate that airborne concentrations of VOCs in all personal samples were well below their respective permissible exposure limits as stipulated in the Ontario Ministry of Labour Regulation 833.

B. PID Readings

Results shown in Figure 2 indicate that TVOC readings above 0.5 ppm were intermittent and of short duration. Typically, the elevated readings were those obtained from the lip of the test pit, or, at the request of Mr. Neerhof, at the bucket of the backhoe when it contained excavated soil, in the headspace of Ziploc bags of soil samples, or near contaminant material in the test pits themselves.

Results summarized in the section titled "PID Measurements" indicate that, **in the breathing zone downwind of the test pits during excavation, there was no sustained or consistent reading above 0.5 ppm for any consecutive few minutes, let alone for any 30 minute period,** which was a principal criteria of the scope of work. Thus, it was not necessary to stop work or undertake any additional precautions (e.g., donning of air purifying respirator) during the test pit excavations.

The information in this Airzone report is based on the on-site observations and measurements as well as laboratory analysis of air samples collected at specific locations and times. The results are valid only for the time of testing and observations in the report are representative of conditions during the dates and times of the on-site visit by Airzone personnel. Statements made in the report are based solely on the information obtained as part of the investigation.

Recommendations:

- **Conduct additional ambient VOC monitoring and occupational exposure monitoring on workers in and around the trench excavation during removal of any contaminated materials to ensure compliance with AAQS and MoL Regulation 833.**

If you have questions about this report, please contact Ryan Dignard (ext. 103), Charles Geen (ext. 104), or Franco Di Giovanni(ext. 102).

Sincerely,

Airzone One Ltd.

Authored by:

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Reviewed by:

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APPENDIX

- **LABORATORY RESULTS**
  - Airzone One Ltd. – Airborne VOC
- **PID Calibration Certificate & Measurement Logs**
- **Site Photographs – Test Pit Phase**

- **LABORATORY RESULTS**
  - Airzone One Ltd. – Airborne VOC

AirZOne

Comprehensive Air Quality Services

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SAMPLE ANALYSIS REPORT

Project Number:	**J14117-3a**
Report Date:	**October 27, 2014**
Analysis Date:	**October 24, 2014**
Receipt Date:	**October 24, 2014**
Client project #	
Instrument	**Gas Chromatography/ Mass Spectrometry (GC/MS)**
Method:	**VPOC.1**
Sample Type:	**3M™ Passive Diffusion Monitor**

RESULTS	**Unit :**	**µg/m³**			
Sample I.D.	**CAS #**	**J14117-3-PSD-23**	**J14117-3-PSD-24**	**J14117-3-PSD-25**	**J14117-3-PSD-31**
Pentane (nC_5)	109-66-0	5.73	3.86	4.41	< 0.2
Ethanol	64-17-5	0.53	0.43	0.35	< 0.2
2,2-Dimethylbutane	75-83-2	0.60	0.61	0.48	< 0.2
iso-Propyl alcohol (IPA)	67-63-0	53.0	46.6	47.9	< 0.2
Dichloromethane	75-09-2	2.63	1.22	1.73	< 0.2
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	< 0.2	< 0.2
Hexane (nC_6)	110-54-3	1.51	0.52	0.55	< 0.2
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	1.65	1.70	1.26	< 0.2
Ethyl acetate	141-78-6	1.62	0.62	0.94	< 0.2
Chloroform	67-66-3	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylhexane	591-76-4	0.95	< 0.2	0.38	< 0.2
Carbon tetrachloride	56-23-5	0.30	0.39	0.27	< 0.2
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2
Benzene	71-43-2	1.70	1.38	1.28	< 0.2
2,2,4-Trimethylpentane	540-84-1	12.4	4.81	2.91	< 0.2
Heptane	142-82-5	1.06	0.48	0.63	< 0.2
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	< 0.2
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	108-88-3	17.0	5.78	8.13	0.32
Octane (nC_8)	111-65-9	0.73	0.45	0.27	< 0.2
Tetrachloroethylene	127-18-4	< 0.2	< 0.2	< 0.2	< 0.2
n-Butyl acetate	123-86-4	1.67	1.79	1.45	< 0.2
Ethylbenzene	100-41-4	0.84	0.65	0.24	< 0.2
(m+p)-Xylene	108-38-3/106-42-3	7.05	5.30	1.02	< 0.2
o-Xylene	95-47-6	1.96	1.48	0.30	< 0.2
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	< 0.2
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	< 0.2
a-Pinene	80-56-8	0.60	< 0.2	< 0.2	< 0.2
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2
Decane (nC_{10})	124-18-5	5.50	5.23	5.17	0.26
1,3,5-Trimethylbenzene	108-67-8	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4-Trimethylbenzene	95-63-6	0.75	0.63	0.32	< 0.2
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2
1,4-Dichlorobenzene	106-46-7	1.40	1.37	1.33	< 0.2
1,3-Diethylbenzene	141-93-5	< 0.2	< 0.2	< 0.2	< 0.2
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2
Dodecane (nC_{12})	112-40-3	6.01	4.63	7.90	< 0.2
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2
Naphthalene	91-20-3	1.00	1.06	1.33	< 0.2
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2
Tetradecane (nC_{14})	629-59-4	6.34	5.98	9.37	< 0.2
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2
TVOC		135	96.9	100	0.59

Comments	**The samples were extracted with solvent. Compounds were determined by Gas Chromatography/ Mass Spectrometry (GC/MS). The method detection limit is 0.2 µg/m³. No other significant compounds were detected in GC-MS SCAN Mode.**
QA/QC	**Multipoint calibration curve (linear regression = 0.99). These samples were spiked with deuterated internal standards. Results were corrected with internal standard, lab blank and recovery.**
Analyst	**Henrik Li**
Reviewer	**Phil Fellin**

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AirZOne
Comprehensive Air Quality Services

SAMPLE ANALYSIS REPORT

Project Number:	**J14117-3b**
Report Date:	**October 27, 2014**
Analysis Date:	**October 24, 2014**
Receipt Date:	**October 24, 2014**
Client project #	
Instrument	**Gas Chromatography/ Mass Spectrometry (GC/MS)**
Method:	**VPOC.1**
Sample Type:	**3M™ Passive Diffusion Monitor**

RESULTS	**Unit :**			**µg/m³**		
Sample I.D.	**CAS #**	**J14117-3-PSD-32**	**J14117-3-PSD-33**	**J14117-3-PSD-36**	**J14117-3-PSD-40**	**J14117-3-PSD-40 Repeat**
Pentane (nC_5)	109-66-0	5.31	3.59	3.75	< 0.2	< 0.2
Ethanol	64-17-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2,2-Dimethylbutane	75-83-2	0.79	0.24	1.18	< 0.2	< 0.2
iso-Propyl alcohol (IPA)	67-63-0	17.2	8.23	12.3	< 0.2	< 0.2
Dichloromethane	75-09-2	1.37	1.26	1.16	< 0.2	< 0.2
Methyl t-butyl ether (MTBE)	1634-04-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexane (nC_6)	110-54-3	0.56	< 0.2	< 0.2	< 0.2	< 0.2
Methyl ethyl ketone (2-Butanone, MEK)	78-93-3	1.86	< 0.2	0.90	< 0.2	< 0.2
Ethyl acetate	141-78-6	0.57	< 0.2	< 0.2	< 0.2	< 0.2
Chloroform	67-66-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylhexane	591-76-4	0.23	< 0.2	0.27	< 0.2	< 0.2
Carbon tetrachloride	56-23-5	0.25	0.50	0.21	< 0.2	< 0.2
1,2-Dichloroethane	107-06-2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Benzene	71-43-2	1.82	< 0.2	0.28	< 0.2	< 0.2
2,2,4-Trimethylpentane	540-84-1	2.05	0.50	4.28	< 0.2	< 0.2
Heptane	142-82-5	0.73	< 0.2	< 0.2	< 0.2	< 0.2
Trichloroethylene	79-01-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylheptane	107-83-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl isobutyl ketone (MIBK)	108-10-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Toluene	108-88-3	6.07	1.79	1.22	0.30	0.32
Octane (nC_8)	111-65-9	0.25	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachloroethylene	127-18-4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
n-Butyl acetate	123-86-4	2.78	1.59	1.64	< 0.2	< 0.2
Ethylbenzene	100-41-4	0.39	0.20	< 0.2	< 0.2	< 0.2
(m+p)-Xylene	108-38-3/106-42-3	1.59	0.65	0.68	< 0.2	< 0.2
o-Xylene	95-47-6	0.42	< 0.2	< 0.2	< 0.2	< 0.2
Styrene	100-42-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cumene	98-82-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
a-Pinene	80-56-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1,2,2-Tetrachloroethane	79-34-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Decane (nC_{10})	124-18-5	6.39	2.05	5.51	< 0.2	< 0.2
1,3,5-Trimethylbenzene	108-67-8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2,4-Trimethylbenzene	95-63-6	0.52	< 0.2	< 0.2	< 0.2	< 0.2
Pentachloroethane	76-01-7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
d-Limonene	5989-27-5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
p-Cymene	99-87-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	541-73-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,4-Dichlorobenzene	106-46-7	1.51	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Diethylbenzene	141-93-5	0.26	< 0.2	< 0.2	< 0.2	< 0.2
Hexachloroethane	67-72-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dodecane (nC_{12})	112-40-3	7.70	< 0.2	1.99	< 0.2	< 0.2
1,2,4-Trichlorobenzene	120-82-1	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Naphthalene	91-20-3	1.47	< 0.2	< 0.2	< 0.2	< 0.2
1,2,3-Trichlorobenzene	87-61-6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetradecane (nC_{14})	629-59-4	8.45	1.07	2.72	< 0.2	< 0.2
Hexadecane (nC_{16})	544-76-3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
TVOC		70.5	21.7	38.1	0.30	0.32

Comments	**The samples were extracted with solvent. Compounds were determined by Gas Chromatography/ Mass Spectrometry (GC/MS). The method detection limit is 0.2 µg/m³. No other significant compounds were detected in GC-MS SCAN Mode.**
QA/QC	**Multipoint calibration curve (linear regression = 0.99). These samples were spiked with deuterated internal standards. Results were corrected with internal standard, lab blank and recovery.**
Analyst	**Henrik Li**
Reviewer	**Phil Fellin**

ilac-MRA CALA Testing Accreditation No. A 3300

To:
Ms. Carolyn Adams
MMM Group Limited
100 Commerce Valley Drive W
Thornhill, Ontario
L3T 0A1
Phone: (905) 890-8629

AirZOne
Comprehensive Air Quality Services

Sample Analysis Report

Airzone Project Number:	J14117-3
Client Project Number:	
Report Date:	October 31, 2014
Analysis Date:	October 27, 2014
Sample Receipt Date	October 23, 2014
Analytical Method:	Thermal Desorption/Gas Chromatography/Mass
Unit:	All results reported in $\mu g/m^3$
Sample Type:	Thermodesorption tubes

Results	Method Detection Limit	TD-I	TD-J	TD-K
Aliphatic Hydrocarbons				
2-Methylbutane	0.5	0.80	<0.5	<0.5
Pentane	0.5	5079	<0.5	<0.5
2,2-Dimethylbutane	0.5	2696	2.9	20.1
2-Methylpentane	0.5	4.22	<0.5	1.23
Cyclopentane	0.5	135	<0.5	<0.5
3-Methylpentane	0.5	92.4	1.5	<0.5
1-Hexene	0.5	75.0	<0.5	<0.5
Hexane	0.5	731	4.0	1.6
2.4-Dimethylpentane	0.5	75.2	<0.5	<0.5
Methyl cyclopentane	0.5	67.3	2.0	<0.5
3-Methy-1-hexene	0.5	2.5	<0.5	<0.5
3-Methyl-1,3-pentadiene(Z)	0.5	3.4	<0.5	<0.5
3-Methyl-1,3-pentadiene (E)	0.5	3.4	<0.5	<0.5
2-Methylhexane	0.5	58.5	<0.5	1.65
2,3-Dimethyl pentane	0.5	46.0	<0.5	<0.5
Cyclohexane	0.5	26.2	<0.5	<0.5
3-Methylhexane	0.5	1797	<0.5	23.8
Iso-Octane	0.5	0.92	<0.5	<0.5
Cyclohexene	0.5	2.46	<0.5	<0.5
Heptane	0.5	2378	<0.5	68.6
2,5-Dimethyl hexane	0.5	63.1	<0.5	6.49
Methyl cyclohexane	0.5	2696	<0.5	54.3
Ethyl cyclopentane	0.5	65.4	<0.5	2.70
2-Methyl heptane	0.5	1143	<0.5	95.5
3-Methyl heptane	0.5	1657	<0.5	241
2,2,5-Trimethyl hexane	0.5	429	<0.5	41.9
t-1,4-Dimethyl cyclohexane	0.5	861	<0.5	95.5
Octane	0.5	2759	<0.5	792
1,1-Dimethyl cyclohexane	0.5	278	<0.5	43.5
t-1,2-Dimethyl cyclohexane	0.5	216	<0.5	25.8
c-1,4-Dimethyl cyclohexane	0.5	861	<0.5	95.5
Propyl cyclopentane	0.5	3472	<0.5	3351
c-1,2-Dimethyl cyclohexane	0.5	210	<0.5	43.1
2+4-Methyl octane	0.5	3856	<0.5	253
3-Methyl octane	0.5	7871	<0.5	125
Nonane	0.5	413	<0.5	18.5
3,7-Dimethyl-1-octene	0.5	76.1	<0.5	6.0
Decane	0.5	2491	0.5	11.7
Undecane	0.5	3675	<0.5	19.5
Dodecane	0.5	1883	<0.5	4.4
Tridecane	0.5	107.7	<0.5	<0.5
Tetradecane	0.5	156	<0.5	14.5
Aromatic Hydrocarbons				
Benzene	0.5	106	2.0	1.7
Toluene	0.5	13217	1	1209
Ethylbenzene	0.5	19731	<0.5	2624
(m+p)-Xylene	0.5	25894	<0.5	5177
o-Xylene	0.5	6712	<0.5	2548
Cumene	0.5	1348	<0.5	94.7
Propyl benzene	0.5	2370	<0.5	24.8
1,3,5-Trimethyl benzene	0.5	4110	<0.5	146
1,2,4-Trimethylbenzene	0.5	4173	<0.5	149
p-Cymene	0.5	730.2	<0.5	2.63
1,2,3-Trimethyl benzene	0.5	2364	<0.5	38.9
TVOC		129269	13	17475

Comments	Hydrocarbons (>C5) and contaminants were analyzed by GC/MSD Sample contained large amount of material (overloaded) which affected the regular procedure of the analysis
QA/QC	Standards of hydrocarbons (> C5) were prepared at Airzone.
Analyst	Alexander Vlasenko
Reviewer	Henrik Li

- **PID Calibration Certificate & Measurement Logs**

ARGUS-HAZCO

A better experience

Member of the Argus Group

ARGUS GROUP

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Mississauga ON, L5N 5Z2
Phone (905) 858-3215 · Fax (905) 858-3192
www.argus-hazco.com

Certificate of Calibration

Customer	Manufacturer	Model	Serial Number	Date of Service	Service Due
Argus-Hazco	RAE Systems	ppbRAE	594-901859	August 18, 2014	December 18, 2014

Reference Calibration Gas:	Pre-Calibration	Post-Calibration	Manufacturer	Lot Number
Zero Air 0.0pm	0.0ppm	0.0ppm	Argus-Hazco	35380
Isobutylene 100ppm	100.1ppm	100ppm	Argus-Hazco	47665

ARGUS-HAZCO does hereby certify that the above listed has been calibrated/certified using certified laboratory standards whose accuracy's are traceable to the National Institute of Standards and Technology.

Certified By: _____
Raymond Anderson
Service Technician

(1)

word from N **J14117 PID Readings (TVOC) for Test Pit Phase** DATE: Oct 22/14 TECH C.G.

Time	Location	TVOC (ppm) C.G.
0949	E (site # 15076) start up	0 ppb
0952	S (site # 15023)	0 ppb
10:25	at SW shut off instrument; delay due to issue with location of laneway & test pits are only	0 ppb 0 TWA 0 STEL 0 peak
13:19	Work start Test Pit #2 1m north of GM2	0 ppb
13:20	tested 1st bucket of soil	0 ppb
13:21-22	270 on S side, 250 ppb at piles/soil on N side	250-270
13:22-24	570, 860, 260, 277 but dissipates in mediated	9-20 ppb CG
13:29-30	9, 12, down about 3.5 ft	9-20 ppb
13:40	sample at BZ on way top of test pit	10-20 ppb
13:45	- from bucket got 7-8 ppm	
13:50	air beside field Tek Stave BZ	0-83 ppb
14:00		0 ppb
14:10		0 ppb
14:12	sample from bucket from 2.5 m reading via site 3 1/2 bk soil sample bag 3.8 ppm	TP2-3
14:14	started backfill of Test Pit #2	
14:20	Start of Test Pit #1 BZ	0 ppb
14:22-27	down to 1m depth all buckets 0 ppb	0 ppb
14:30	BZ air 0 ppb TP1-1 soil bag sample from 1m - 0.09 ppm (90 ppb)	0 ppb
1440	Sifted each bucket 14:30 - 14:40 all 0 ppb	0 ppb
14:46	last bucket; sampled at 2m TP1-2	0 ppb
14:47	start to backfill Test Pit #1	0 ppb

- in vicinity of workers every 10 min
- at edge of work zone every 30 min
- if high reading collect TD sample

J14117 PID Readings (TVOC) for Test Pit Phase DATE: Oct 22/14 TECH CG

Time	Location	TVOC (ppm)
15:10	start Test Pit #3	0 ppb
15:10-15:15	sniffed bracket all 0 ppb	
15:16	stopped backhoe; dug up an old paint can by shovel	up to 2.5 ppm (when first exposed in pit)
15:19	working to loosen can 16 – 250 ppb in pit	still 0 ppb at BZ height around pit
15:20		0 ppb
15:21 - 27	backhoe dug the pit wider in attempt to expose rest of soil	
15:28	started to lift drum out; readings up to 6 ppm	
15:30	some sort of hardened resin in the drum - readings still up to 5 ppm at edge of pit.	
15:33	in pit; backhoe operator climbed into the pit, only ~0.5 m deep ~1 m deep	
	I took ppbRAE reading with nozzle inside a hole in the drum	
		~900 ppm
15:36	still reading 0 ppb at BZ height around the pit	
15:37	readings on a piece of the resin outside the pit 12 ppm	
15:44	in sample bag with resin inside it, when a	300 ppm
	fresh surface was exposed of the resin - smells like paint	
15:45	still 0 ppb in ambient air at BZ around pit	
	work with backhoe trying to roll the drum to compact it	
15:54	4 - 70 - 550 ppb; then to zero, then to 3 ppm then to 16 ppb	
	(nothing sustained or consistent)	
1556	250 ppm when sniff beside the hard resin	
15:57 - 15:59	downwind at edge of pit 53 - 108 - 175 - 97 - 0 - 17 - 0	(and some higher readings near the hard resin to show the City of Guelph representative)
1600	downwind of pit & drum operation 50 - 76 - 21 - 65 - 133 - 0 - 478 - 0 - 669	
after 16:00	we all stand upwind (to N) of pit	
16:05	0 - 177 - 256 - 0	
	intermittent wafts of the vapour, but not sustained	
16:10	40 L pail of same material found 0 - 157 - 83 - 0	
16:11	0 ppb at pit edge (more drums discovered)	

decision to remove the material that has been exposed; then backfill hole

16:14 2 m away to N 0 ppb 2 m to S 0 ppb ~ 50 at edge of exclusion zone is 0 ppb

exclusion zone measurements not done on Test Pit # 2 d/t no high readings near at pit

Margin notes:

measurements downwind 5 ft test pit

- but near barrel once it is brought up

- constant measuring at work zone - no time to go at get TD tubes for sampling

J14117 PID Readings (TVOC) for Test Pit Phase

DATE: Oct 22/14 TECH CG

Time	Location	TVOC (ppm)
16:16	begin backfill; measure at backfill pile	0 ppb
	downwind of backfill pile	
	1 m from Test Pit #3	
16:20	finish backfill	0 ppb
16:23	at S site	0 ppb
16:24	at fenceline next	0 ppb
16:25	at E site	0 ppb
16:26	at W site	0 ppb
16:32	start Test Pit #4 (near anomaly EM3)	0 ppb
16:33-35		0 ppb
16:36	0 at BZ but 1-2 ppm down at top edge of pit	1-2 ppm
16:37	0 at BZ but 300-400 ppb at top edge of pit	300-400 ppb
16:40	0 at BZ but 158 at top edge of pit	158 ppb
1641-42	2 m W, N, E & S all 0 ppb	0 for edge of work zone of this pit.
1643	0 in BZ, but 800 ppb at lip of pit	
1647	0 in BZ, 0 at lip of pit	0 ppb
1650	0 in BZ, 147 at lip of pit.	0 ppb
1651-1654	all 0 at BZ height.	0 ppb.
1655	0 at BZ; 530 ppb at lip of pit	0 "
1655-56	0 at W, N, E & S 2 m from pit all 0 ppb	0 "
16:57	From bucket at 2.25 m is a ziplock soil sample 635 ppb TP4-2	
17:00	0 at BZ; 32 ppb at lip of pit	0 "
17:07	took a bucket sample part way up the pit. inside ziplock bag sample 4.7 ppm TP4-1	4.7 ppm in soil sample bag
17:10	start digging again; Dan wants to go to max digging depth of the CAT backhoe (min.)	0 ppb
17:12	0 at BZ, 16 at lip of pit	
17:20	0 at BZ, 0 at lip max depth of CAT 2.75 m	
17:23	just see a bit of water seeping in last bucket with water & soil 0 ppb	

measurement at SW corner of pit

17:24 ziplock soil sample of wet soil TP4-3 0.25 ppm (254 ppb)
17:25 start backfill of test pit #4
17:30 turn off instrument

wind light from N; almost calm in morning

J14117 PID Readings (TVOC) for Test Pit Phase DATE. Oct 23/14 Tech.: C.G

Time	Location	TVOC (ppm) C-9
0828	Start Test pit # 5	0 ppb
	left water with Dan while I laid out PSDs for ambient	
0845	Dan says all ambient measurements to now were 0 ppb	
	but ziplok of soil sample TP5-1 at 1m was 9.7 ppm	
0846	0 ambient, 0 ppb at lip of pit	0 ppb
0854	0 at BZ downwind of pit	0 ppb
0855	0 2 m S of pit (edge of exclusion zone)	0 ppb
0856	ziplok of soil sample at 1.5m TP5-2	2.7 ppm (5 ft W of BZ 0 ambient)
0903	0 in BZ ; 0 sniffing the soil in bucket from 2 m deep	
0904	0 in BZ ; 89-209 ppb at pit lip	
0905	0 at BZ, 0 2 m S, E & W of pit	0 ppb
0906	3.7 ppm in ziplok of soil sample TP5-3 from 2 m	
0908	Start backfill of test pit # 5	
0935	start TP #6 ; all measurements downwind at South side pit	0 ppb
0938	0 ppb at BZ, 0 at pit lip	0 ppb
0940	test teapot with blue powder inside	0 ppb
0943	0 at BZ, 0 at pit lip	0 ppb
0944	0 at 2 m S, W, N & 1m E of TP # 6	0 ppb
0946	1.4 ppm in ziplok of soil sample TP6-1	soil sample
0950	0 at BZ, 0 at pit lip	0 ppb
0955	from ziplok 1.2 ppm TP6-2, 0 at BZ, 0 at pit lip	0 ppb + soil sample
10:00	0 at BZ, 0 at pit lip	0 ppb
10:05	0 at BZ, 0 at pit lip	0 "
10:08	sniffed bucket of wet soil from bottom of pit 0 ppb	0 "
10:00	0 at BZ, 0 at pit lip	0 "
10:11	ziplok soil sample TP6-3 0 ppb	0 "
10:13	start backfill of Test Pit # 6 0 ppb	0 "

Wind is almost calm; slight direction change maybe from NW? for pit #8

J14117 PID Readings (TVOC) for Test Pit Phase DATE Oct 23/14 TECH: C.G.

Time	Location	TVOC (ppm)
10:36	start #6 RAE	
10:38	start test pit # 8	
10:40	0 at BZ, 0 at pit lip — CLEAN	0 ppb
10:45	0 at BZ, 0 at pit lip	0 "
10:48	0 at BZ, 0 at pit lip	0 "
10:51	0 at BZ, 0 at pit lip	0 "
10:54	start to backfill test pit # 8 0 at BZ	0 "
11:17	start test pit # 7 0 at BZ 0 at pit lip	0 "
11:20-23	several measurements over several minutes; all 0 — 0 at BZ, 0 at pit lip, 0 from discard pile	0 "
11:24	in soil sample ziplok bag 0 ppb — CLEAN	0 "
11:25	backfill test pit # 7	
11:30	start test pit # 9 - not originally planned, but as # 8 # 7 # 6 if only way between # 7 was clean	
11:31-38	0 at BZ, 0 at pit lip for several measurements over many minutes	0 ppb
11:40	0 at BZ, 0 at pit lip — CLEAN	0 "
11:43	ziplok soil sample TP9-1	0 ppb
11:44	start backfill of Test pit # 9	
11:51	start test pit # 10 not originally scheduled but only way between #9 & #6	0 ppb
11:52	0 at BZ, 0 at pit lip	0 "
11:54-56	0 at BZ, 0 at pit lip — some debris	0 "
11:58	0 " " 0 " " " — stopped digging; Dan logs the pit	
12:00 12:01 12:02	0 " " 0 " " "	
12:03	start backfill of test pit # 10	

all clean

wind from N open for pit #7

wind from N approx 5 m/s at S side of pit #9

Measure at S side of pit

Measured at east, south & SE of pit.

No exclusion zone measurements as work zone was all 0

Measure at S & W of pit

No exclusion zone measurements as work zone all 0

J14117 PID Readings (TVOC) for Test Pit Phase

DATE: Oct 23/14 TECH: C.G.

Time	Location	TVOC (ppm) ~~CH~~ ppb
	redo pit 3; call it 3A; where we found drum & light	reading yesterday
12:30	start test pit 3A	
	0 in BZ	
12:31	up to 9 ppm at pit lip - immediately goes back to 0	
12:32	0 in BZ up to 6.8 ppm at pit lip	
12:33	0 in BZ 59 - 150 ppb 1 ft above pit lip	when TD take is
12:37	0 in BZ	
12:39	~800 ppb next to brown goo from drum	
	but goes up over 3 ppm when next to	
	the blue white substance	
12:40	0 - 20 - 43 ppb in BZ; 0 ppb 2m South of pit (exclusion zone)	
12:41	0 in BZ, up to 900 ppb at pit lip	
12:44	sandy yellow layered substance in bucket; up to 780 ppb	
12:46	0 in BZ; up to 344 ppb at pit lip	
	always goes back to 0 above pit in BZ,	
	so vapours may be heavy & stay in pit	
12:48	as buckets come out, get readings up to 900	ppb
	from ppb RAE on top of cooler beside the TD-K	sample
12:49	0 in BZ, up to 635 ppb at pit lip; 0 ppb 2m S of pit (exclusion zone)	
12:51	as bucket swings by to downwind pile	
12:53	0 in BZ; up to 333 when bucket goes by	
12:57	0 in BZ, up to 340 at pit lip	
13:00	0 in BZ. up to 277 ppb at pit lip; 0 ppb 2m S & E of pit (exclusion zone)	
13:02	headspace reading from 2m TP3A-1 sample in ziploc bag	dark matter 41 ppm
13:04	0 in BZ, 372 ppb at pit lip	
13:08	0 in BZ, up to 89 ppb at pit lip	
13:10	pit depth at water table 0 in BZ, up to 150 ppb at pit lip; 0 ppb 2m S & E of pit (exclusion zone)	
13:19	stopped digging while Dan made notes on last bucket at 2.25 m; 0 in BZ Dan wants to see stuff in bucket; takes photo; then end	
13:21	Start backfill of test pit 3A : END	MiniRAE off @ 13:23

Z:\share\Active Projects\J14117 - MMM Guelph Spill\Test Pit Phase\J14117 PID Readings - Test Pit Phase

Photographs – Test Pit Excavation Phase

Photo 1 – Oct. 22, 2014: Ambient PSD at South location of test pit excavation area (Looking South West)

Photo 2 – Oct. 22, 2014: Ambient PSD at South West location (fenceline, closest to apartments) of test pit excavation area (Looking South West)

Photo 3 – Oct. 22, 2014: Ambient PSDs at South & South West (fenceline, closest to apartments) locations of test pit excavation area (Looking South)

Photo 4 – Oct. 22, 2014: Ambient PSD at North (upwind) location of test pit excavation area (Looking South)

Photo 5 – Oct. 22, 2014: Occupational PSD on excavator operator

Photo 6 – Oct. 22, 2014: Occupational PSD on excavation director / soil sampling tech

Photo 7 – Oct. 23, 2014: Ambient PSD at South & South West (fenceline, closest to apartments) locations of test pit excavation area (Looking North)

Photo 8 – Oct. 23, 2014: Ambient PSD at South & South West (fenceline, closest to apartments) locations of test pit excavation area (Looking South)

Photo 9 – Oct. 23, 2014: Test pit #8 excavation and ambient PSD at North (upwind) location of test pit excavation area (Looking North)

Photo 10 – close-up of ambient PSD Sampler with Rain Shield

Photo 11 – Oct. 23, 2014: TD tube sample from headspace of new drum which contains solid blue/white resin and drum remains from test pit 3 (excavated Oct. 22, 2014)

Photo 12 – Oct. 23, 2014: TD tube sample and PID measurements at test pit 3A

APPENDIX C – Finalized Field Logs

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP1

Project No. 10-12108-001-003
Project: Paisley-Clythe Feedermain
Location: Wellington Ave, E of Howitt Creek
Date Drilled: 10/22/2014 Logged By: DN
Drill Type: Excavation Checked By: AFJ
Drilling Contractor: Tervita

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**SILTY SAND** - Brown - Fill like material - Concrete / metal debris - Gravel / cobbles present - Compact - Moist - No staining / no odours	TP1-1	PHC, PAH, PCB, VOC & Inorganics	0.09 ▲
			TP1-2		0 ▲
98.00		End of test pit at 2.0 m Test pit terminated at 2.0 mbgs due to no staining or odours.			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP2

Project No. **10-12108-001-003**
Project: **Paisley-Clythe Feedermain**
Location: **Wellington Ave, E of Howitt Creek**
Date Drilled: **10/22/2014** Logged By: **DN**
Drill Type: **Excavation** Checked By: **AFJ**
Drilling Contractor: **Tervita**

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**FILL** - Brown - Sand, silt, gravel, cobbles - Some wood, plastic debris - Rootlets - Compact - Moist - Chemical odour present - No staining	TP2-1		▲ 1.3
98.75		- White layer, possible hardened resin observed - Steel pipe, possible cast iron pipe	TP2-2		▲ 0
			TP2-3	PHC, PAH, PCB, VOC & Inorganics	▲ 3.8
97.50		End of test pit at 2.5 m			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP3

Project No. **10-12108-001-003**
Project: **Paisley-Clythe Feedermain**
Location: **Wellington Ave, E of Howitt Creek**
Date Drilled: **10/22/2014** Logged By: **DN**
Drill Type: **Excavation** Checked By: **AFJ**
Drilling Contractor: **Tervita**

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		- Steel drum encountered at 0.5 mbgs - Drum in poor condition - Very strong sour odour	TP3-1	PHC, PAH, PCB, VOC & Inorganics	38 ▲
99.00		End of test pit at 1.0 m			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP3A

Project No. 10-12108-001-003
Project: Paisley-Clythe Feedermain
Location: Wellington Ave, E of Howitt Creek
Date Drilled: 10/23/2014 Logged By: DN
Drill Type: Excavation Checked By: AFJ
Drilling Contractor: Tervita

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**FILL** - Steel, glass and wood debris - Strong VOC chemical odour - Possible drum encounted along sidewall at 1.0 mbgs			
99.00		- Dark mustard yellow layer - No odours	TP3A-1	PHC, PAH, PCB, VOC & Inorganics. DUP 3 for PCB, PAH	▲ 41
98.00		- Black staining present			
97.75		End of test pit at 2.3 m Test pit terminated at 2.25 mbgs due to groundwater seepage into bottom of test pit.			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP4

Project No. 10-12108-001-003
Project: Paisley-Clythe Feedermain
Location: Wellington Ave, E of Howitt Creek
Date Drilled: 10/22/2014 Logged By: DN
Drill Type: Excavation Checked By: AFJ
Drilling Contractor: Tervita

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**FILL** - Brown - Sand and gravel - Steel drum, glass, plastic, metal debris present - Compact - Dry to moist	TP4-1	PHC, PAH, PCB, VOC & Inorganics	4.7 ▲
			TP4-2		0.6 ▲
97.50		- Moist to wet - Some groundwater seepage - No sheen or odours	TP4-3	PHC, PAH, PCB, VOC & Inorganics	0.25 ▲
97.25		End of test pit at 2.8 m			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP5

Project No. 10-12108-001-003
Project: Paisley-Clythe Feedermain
Location: Wellington Ave, E of Howitt Creek
Date Drilled: 10/23/2014 Logged By: DN
Drill Type: Excavation Checked By: AFJ
Drilling Contractor: Tervita

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**FILL** - Brown - Silty sand and gravel - Glass, wood, metal debris present - Damp to moist - No staining, no odours	TP5-1	PHC, PAH, PCB, VOC & Inorganics	9.7 ▲
99.00		**SILTY SAND** - Brown / dark grey - Some groundwater infiltration at 2.0 mbgs - No staining, no odours	TP5-2		2.7 ▲
			TP5-3		3.7 ▲
98.00		End of test pit at 2.0 m			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP6

Project No. 10-12108-001-003
Project: Paisley-Clythe Feedermain
Location: Wellington Ave, E of Howitt Creek
Date Drilled: 10/23/2014 Logged By: DN
Drill Type: Excavation Checked By: AFJ
Drilling Contractor: Tervita

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0					
		FILL - Brown - Silty sand, gravel /cobbles - Glass, plastic, metal debris present - Loose to compact - Damp to moist	TP6-1	PHC, PAH, PCB, VOC & Inorganics DUP 1 for Inorganics	1.4 ▲
99.25					
		SILTY SAND - Dark brown - Compact - Moist - No staining, no odours	TP6-2		1.2 ▲
98.75		- Becomming wet	TP6-3		0 ▲
98.15		- Gravel and cobbles - Groundwater infiltration at 2.0 mbgs			
98.00		End of test pit at 2.0 m			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP7

Project No. **10-12108-001-003**
Project: **Paisley-Clythe Feedermain**
Location: **Wellington Ave, E of Howitt Creek**
Date Drilled: **10/23/2014** Logged By: **DN**
Drill Type: **Excavation** Checked By: **AFJ**
Drilling Contractor: **Tervita**

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**TOPSOIL** - Dark brown - Silty sand - Compact - No evidence of fill materials - No staining, no odours			
99.70		**SILTY SAND AND GRAVEL** - Light brown - Some clay - Compact - Moist - No staining, no odours	TP7-1		0 ▲
98.50		End of test pit at 1.5 m Test pit terminated at 1.5 mbgs due to no evidence of fill material contamination.			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP8

Project No. **10-12108-001-003**
Project: **Paisley-Clythe Feedermain**
Location: **Wellington Ave, E of Howitt Creek**
Date Drilled: **10/23/2014** Logged By: **DN**
Drill Type: **Excavation** Checked By: **AFJ**
Drilling Contractor: **Tervita**

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**TOPSOIL** - Dark brown - Silty sand - No evidence of fill material - Compact - Moist - No staining, no odours			
99.70		**SILTY SAND AND GRAVEL** - Brown - Trace clay - Compact - No fill materials - Moist - No staining, no odours	TP8-1		0 ▲
98.25		End of test pit at 1.8 m Test pit terminated at 1.75 mbgs due to no evidence of contamination.			

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP9

Project No. **10-12108-001-003**
Project: **Paisley-Clythe Feedermain**
Location: **Wellington Ave, E of Howitt Creek**
Date Drilled: **10/23/2014** Logged By: **DN**
Drill Type: **Excavation** Checked By: **AFJ**
Drilling Contractor: **Tervita**

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**FILL** - Brown - Sand and gravel - Compact - Moist - No staining, no odours			
99.25		**SILTY SAND** - Light brown - Gravel/cobbles present - No fill materials present - Compact - Moist - No staining, no odours	TP9-1	PHC, PAH, PCB, VOC & Inorganics, DUP 2 for PHC, VOC	
98.50		End of test pit at 1.5 m			

MMM TP REPORT GUELPH LINE.GPJ GINT STD CANADA LAB.GDT 4/11/14

MMM GROUP

Figure No. _____

LOG OF TEST PIT TP10

Project No. **10-12108-001-003**
Project: **Paisley-Clythe Feedermain**
Location: **Wellington Ave, E of Howitt Creek**
Date Drilled: **10/23/2014** Logged By: **DN**
Drill Type: **Excavation** Checked By: **AFJ**
Drilling Contractor: **Tervita**

▲ Total Organic Volatiles (ppm)

DEPTH (m bgs)	LITHOLOGY	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Total Organic Volatiles (ppm) 200 400 600 800
100.0		**FILL** - Brown - Sand and gravel - Glass, steel, plastic, paper debris present - Compact - Moist - No staining, no odours			
98.75		**SILTY SAND** - Light brown - Gravel/cobbles present - Compact - No fill materials - No staining, no odours			
98.50		End of test pit at 1.5 m			

APPENDIX D – Summary of Analytical Results

Table 2: Summary of Analytical Results for Parameters Exceeding Standard in Soil Guelph Buried Drum Investigation

Sample ID Depth (m) Maxxam Job # Sampling Date	MOE Table 2 ICC Land Use	Units	TP1-1 0 to 1 B4J8671 22-Oct-2014	TP2-3 2.5 B4J8671 22-Oct-2014	TP3-1 1.5 B4J8671 22-Oct-2014	TP3A-1 2.0 B4J8671 AVERAGE 23-Oct-2014	TP4-1 1.0 B4J8671 22-Oct-2014	TP4-3 2.75 B4J8671 22-Oct-2014	TP5-1 0 to 1 B4J8671 23-Oct-2014	TP6-1 0 to 0.75 B4J8671 AVERAGE 23-Oct-2014	TP9-1 0.75 to 1.5 B4J8671 23-Oct-2014
Acenaphthylene	0.15	ug/g	<0.5	0.6	<0.5	<0.1	<0.5	<0.1	<0.5	<1	<0.05
Benzo(a)anthracene	0.96	ug/g	1.8	1.5	0.8	0.25	<0.5	<0.1	1.9	2	<0.05
Benzo(a)pyrene	0.3	ug/g	2.7	2.1	1	0.25	<0.5	<0.1	2.4	2	<0.05
Benzo(b/j)fluoranthene	0.96	ug/g	4	3	1	0.4	<1	<0.2	3	2	<0.1
Benzo(k)fluoranthene	0.96	ug/g	1.3	1.1	0.5	0.14	<0.3	<0.06	1.2	0.9	<0.03
Boron (Hot Water Soluble)	2	ug/g	0.55	0.9	2.1	0.39	0.82	0.79	1.2	0.23	0.11
Cadmium	1.9	ug/g	1.5	1.1	1.3	0.62	9.9	0.43	1.6	21.5	0.27
Copper	230	ug/g	55	51	70	62	26	4.6	95	940	9.1
Dibenzo(a,h)anthracene	0.1	ug/g	0.5	<0.5	<0.5	<0.1	<0.5	<0.1	<0.5	<1	<0.05
Ethylbenzene	1.1	ug/g	0.042	0.046	1.9	0.033	0.041	<0.020	0.093	<0.040	<0.020
Indeno(1,2,3-cd)pyrene	0.76	ug/g	2.1	1.6	0.8	<0.2	<0.8	<0.2	1.7	<2	<0.08
Lead	120	ug/g	120	130	410	230	120	11	200	300	22
Petroleum Hydrocarbons (F1 C6 - C10)	55	ug/g	<10	<10	60	11	<10	<10	<10	<10	<10
Xylene Mixture	26	ug/g	0.12	0.22	27	0.12	0.28	<0.020	0.76	<0.040	<0.020
Zinc	340	ug/g	580	280	380	310	320	180	550	2350	72
Test Pit Observations			Fill present.	Fill present, including possible hardened resin.	Fill present and steel drum encountered. Drum was secured onsite in overpack container.	Fill present. Strong solvent odour noted.	Fill present	Native soil underlying fill submitted for analysis as TP4-3.	Fill present. Depth of fill reduced with distance from Howitt Creek.	Fill present.	No fill present.

NOTE:
1. Sample from TP9 was submitted for analysis and considered to be representative of the native soil at TP7, TP8 and TP9. Consistency with native soil recovered at TP4-3 supports this conclusion.
2. Sample from TP10 not submitted for analysis, considered to be similar in chemical composition to fill observed at other test pits.

Notes:
MOE Table 2: Ontario Ministry of the Environment, "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, " April 2011. Generic Site Condition Standards for coarse-textured soils in a Potable Ground Water Condition for Industrial, Commercial and Community (ICC) land use.

AVERAGE indicates the calculated average of the sample and its duplicate, for the parameters identified in the text, for comparison to the standard.

100	Detection limit exceeds MOE Standard
100	Exceeds MOE

Your Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION
Your C.O.C. #: 490622-01-01

Attention: Andrea Ferguson Jones
MMM Group Limited
100 Commerce Valley Dr West
Thornhill, ON
CANADA L3T 0A1

Report Date: 2014/11/06
Report #: R3213439
Version: 6R

CERTIFICATE OF ANALYSIS – REVISED REPORT

MAXXAM JOB #: B4J8671
Received: 2014/10/23, 15:50

Sample Matrix: Soil
Samples Received: 19

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Methylnaphthalene Sum	10	N/A	2014/10/28	CAM SOP-00301	EPA 8270D m
ABN Compounds in soil by GC/MS	9	2014/10/24	2014/10/25	CAM SOP-00301	EPA 8270 m
ABN Compounds in soil by GC/MS	1	2014/10/24	2014/11/05	CAM SOP-00301	EPA 8270 m
Hot Water Extractable Boron	10	2014/10/27	2014/10/27	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum	10	N/A	2014/10/28	CAM SOP-00226	EPA 8260
Hexavalent Chromium in Soil by IC (1)	10	2014/10/28	2014/10/28	CAM SOP-00436	EPA 3060/7199 m
Dintrotoluene Sum	10	2014/10/23	2014/10/28	CAM SOP - 00301	EPA 8270
Petroleum Hydro. CCME F1 & BTEX in Soil	10	2014/10/24	2014/10/26	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil	10	2014/10/24	2014/10/25	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil	7	2014/10/31	2014/10/31	CAM SOP-00316	CCME CWS m
F4G (CCME Hydrocarbons Gravimetric)	7	2014/10/29	2014/10/29	CAM SOP-00316	CCME PHC-CWS m
Strong Acid Leachable Metals by ICPMS	10	2014/10/24	2014/10/27	CAM SOP-00447	EPA 6020A m
Moisture	12	N/A	2014/10/24	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	7	N/A	2014/10/29	CAM SOP-00445	Carter 2nd ed 51.2 m
Polychlorinated Biphenyl in Soil	9	2014/10/24	2014/10/24	CAM SOP-00309	EPA 8082 m
Polychlorinated Biphenyl in Soil	1	2014/10/24	2014/10/28	CAM SOP-00309	EPA 8082 m
Volatile Organic Compounds in Soil	10	2014/10/24	2014/10/27	CAM SOP-00228	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method:

Your Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION
Your C.O.C. #: 490622-01-01

Attention: Andrea Ferguson Jones
MMM Group Limited
100 Commerce Valley Dr West
Thornhill, ON
CANADA L3T 0A1

Report Date: 2014/11/06
Report #: R3213439
Version: 6R

CERTIFICATE OF ANALYSIS – REVISED REPORT

(i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

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

Encryption Key

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

Jolanta Goralczyk, Project Manager
Email: JGoralczyk@maxxam.ca
Phone# (905) 817-5751

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

RESULTS OF ANALYSES OF SOIL

Maxxam ID			YD0201	YD0202	YD0203	YD0204	YD0205	YD0206		
Sampling Date			2014/10/23	2014/10/23	2014/10/23	2014/10/22	2014/10/22	2014/10/22		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP9-1**	**TP6-1**	**TP1-1**	**TP3-1**	**TP4-3**	**RDL**	**QC Batch**
Inorganics										
Chromium (VI)	ug/g	**8**	<0.2	<0.2	<0.2	<0.2	1.2	<0.2	0.2	3799036
Moisture	%	**-**	15	10	37	16	16	23	1.0	3797742

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam ID			YD0207	YD0208	YD0209	YD0210		YD0211		
Sampling Date			2014/10/22	2014/10/23	2014/10/22	2014/10/23		2014/10/23		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01		490622-01-01		
	Units	**Criteria**	**TP4-1**	**TP5-1**	**TP2-3**	**DUP1**	**QC Batch**	**DUP2**	**RDL**	**QC Batch**
Inorganics										
Chromium (VI)	ug/g	**8**	<0.2	<0.2	<0.2	<0.2	3799036		0.2	
Moisture	%	**-**	25	28	27	35	3797742	10	1.0	3798347

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam ID			YD0212		YF0738	YF0739	YF0740	YF0741		
Sampling Date			2014/10/23		2014/10/23	2014/10/23	2014/10/22	2014/10/22		
COC Number			490622-01-01		490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**DUP3**	**QC Batch**	**TP3A-1**	**TP6-1**	**TP1-1**	**TP3-1**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	**-**	16	3797742	15	37	16	16	1.0	3804382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

RESULTS OF ANALYSES OF SOIL

Maxxam ID			YF0742	YF0743	YF0744		
Sampling Date			2014/10/22	2014/10/23	2014/10/22		
COC Number			490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP4-1**	**TP5-1**	**TP2-3**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	-	25	28	27	1.0	3804382

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			YD0201	YD0202	YD0203	YD0204	YD0205		
Sampling Date			2014/10/23	2014/10/23	2014/10/23	2014/10/22	2014/10/22		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP9-1**	**TP6-1**	**TP1-1**	**TP3-1**	**RDL**	**QC Batch**
Metals									
Hot Water Ext. Boron (B)	ug/g	**2**	0.39	0.11	0.25	0.55	**2.1**	0.050	3799890
Acid Extractable Antimony (Sb)	ug/g	**40**	17	<0.20	4.2	33	6.1	0.20	3798315
Acid Extractable Arsenic (As)	ug/g	**18**	10	1.7	13	5.6	7.7	1.0	3798315
Acid Extractable Barium (Ba)	ug/g	**670**	37	25	150	58	110	0.50	3798315
Acid Extractable Beryllium (Be)	ug/g	**8**	0.21	<0.20	0.27	0.27	0.38	0.20	3798315
Acid Extractable Boron (B)	ug/g	**120**	5.7	5.3	17	110	34	5.0	3798315
Acid Extractable Cadmium (Cd)	ug/g	**1.9**	0.62	0.27	**19**	1.5	1.3	0.10	3798315
Acid Extractable Chromium (Cr)	ug/g	**160**	9.8	9.6	38	160	20	1.0	3798315
Acid Extractable Cobalt (Co)	ug/g	**80**	4.6	3.3	8.5	5.3	11	0.10	3798315
Acid Extractable Copper (Cu)	ug/g	**230**	62	9.1	**910**	55	70	0.50	3798315
Acid Extractable Lead (Pb)	ug/g	**120**	**230**	22	**270**	120	**410**	1.0	3798315
Acid Extractable Molybdenum (Mo)	ug/g	**40**	1.6	<0.50	5.7	2.8	1.6	0.50	3798315
Acid Extractable Nickel (Ni)	ug/g	**270**	9.2	6.8	61	100	29	0.50	3798315
Acid Extractable Selenium (Se)	ug/g	**5.5**	0.86	<0.50	3.6	0.89	1.3	0.50	3798315
Acid Extractable Silver (Ag)	ug/g	**40**	<0.20	<0.20	0.81	0.50	0.25	0.20	3798315
Acid Extractable Thallium (Tl)	ug/g	**3.3**	0.064	0.054	0.092	0.087	0.10	0.050	3798315
Acid Extractable Uranium (U)	ug/g	**33**	1.1	0.38	0.56	0.39	0.44	0.050	3798315
Acid Extractable Vanadium (V)	ug/g	**86**	21	15	19	19	19	5.0	3798315
Acid Extractable Zinc (Zn)	ug/g	**340**	310	72	**2400**	**580**	**380**	5.0	3798315
Acid Extractable Mercury (Hg)	ug/g	**3.9**	1.7	0.096	0.73	0.22	1.4	0.050	3798315

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			YD0206	YD0207	YD0208	YD0209	YD0210		
Sampling Date			2014/10/22	2014/10/22	2014/10/23	2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP4-3**	**TP4-1**	**TP5-1**	**TP2-3**	**DUP1**	**RDL**	**QC Batch**
Metals									
Hot Water Ext. Boron (B)	ug/g	**2**	0.79	0.82	1.2	0.90	0.21	0.050	3799890
Acid Extractable Antimony (Sb)	ug/g	**40**	<0.20	1.7	2.1	4.5	3.7	0.20	3798315
Acid Extractable Arsenic (As)	ug/g	**18**	1.6	5.3	8.4	5.9	9.4	1.0	3798315
Acid Extractable Barium (Ba)	ug/g	**670**	10	56	71	46	99	0.50	3798315
Acid Extractable Beryllium (Be)	ug/g	**8**	<0.20	0.30	0.26	0.32	0.28	0.20	3798315
Acid Extractable Boron (B)	ug/g	**120**	6.7	6.6	10	7.0	7.7	5.0	3798315
Acid Extractable Cadmium (Cd)	ug/g	**1.9**	0.43	**9.9**	1.6	1.1	**24**	0.10	3798315
Acid Extractable Chromium (Cr)	ug/g	**160**	4.7	14	24	12	35	1.0	3798315
Acid Extractable Cobalt (Co)	ug/g	**80**	1.4	3.8	5.8	4.2	7.4	0.10	3798315
Acid Extractable Copper (Cu)	ug/g	**230**	4.6	26	95	51	**970**	0.50	3798315
Acid Extractable Lead (Pb)	ug/g	**120**	11	120	**200**	**130**	**330**	1.0	3798315
Acid Extractable Molybdenum (Mo)	ug/g	**40**	<0.50	0.60	2.8	0.72	6.4	0.50	3798315
Acid Extractable Nickel (Ni)	ug/g	**270**	2.4	11	51	12	61	0.50	3798315
Acid Extractable Selenium (Se)	ug/g	**5.5**	<0.50	0.80	0.83	1.1	4.8	0.50	3798315
Acid Extractable Silver (Ag)	ug/g	**40**	<0.20	<0.20	0.25	<0.20	0.85	0.20	3798315
Acid Extractable Thallium (Tl)	ug/g	**3.3**	<0.050	0.11	0.088	0.092	0.085	0.050	3798315
Acid Extractable Uranium (U)	ug/g	**33**	0.59	0.38	0.47	0.61	0.60	0.050	3798315
Acid Extractable Vanadium (V)	ug/g	**86**	7.9	20	17	20	20	5.0	3798315
Acid Extractable Zinc (Zn)	ug/g	**340**	180	320	**550**	280	**2300**	5.0	3798315
Acid Extractable Mercury (Hg)	ug/g	**3.9**	<0.050	0.32	0.91	0.31	0.84	0.050	3798315

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID			YD0201		YD0202		YD0203		YD0204		
Sampling Date			2014/10/23		2014/10/23		2014/10/23		2014/10/22		
COC Number			490622-01-01		490622-01-01		490622-01-01		490622-01-01		
	Units	**Criteria**	**TP3A-1**	**RDL**	**TP9-1**	**RDL**	**TP6-1**	**RDL**	**TP1-1**	**RDL**	**QC Batch**
Semivolatile Organics											
1,2,4-Trichlorobenzene	ug/g	**3.2**	<0.1	0.1	<0.05	0.05	<1	1	<0.5	0.5	3797590
1-Methylnaphthalene	ug/g	**30**	0.07	0.06	<0.03	0.03	<0.6	0.6	<0.3	0.3	3797590
2,4,5-Trichlorophenol	ug/g	**9.1**	<0.2	0.2	<0.08	0.08	<2	2	<0.8	0.8	3797590
2,4,6-Trichlorophenol	ug/g	**2.1**	<0.2	0.2	<0.1	0.1	<2	2	<1	1	3797590
2,4-Dichlorophenol	ug/g	**0.19**	<0.2	0.2	<0.1	0.1	<2	2	<1	1	3797590
2,4-Dimethylphenol	ug/g	**38**	0.5	0.4	<0.2	0.2	<4	4	<2	2	3797590
2,4-Dinitrophenol	ug/g	**2**	<1	1	<0.5	0.5	<10	10	<5	5	3797590
2,4-Dinitrotoluene	ug/g	**0.5**	<0.2	0.2	<0.1	0.1	<2	2	<1	1	3797590
2,6-Dinitrotoluene	ug/g	**0.5**	<0.2	0.2	<0.1	0.1	<2	2	<1	1	3797590
2-Chlorophenol	ug/g	**3.1**	<0.2	0.2	<0.08	0.08	<2	2	<0.8	0.8	3797590
2-Methylnaphthalene	ug/g	**30**	<0.06	0.06	<0.03	0.03	<0.6	0.6	<0.3	0.3	3797590
3,3'-Dichlorobenzidine	ug/g	**1**	<1	1	<0.5	0.5	<10	10	<5	5	3797590
Acenaphthene	ug/g	**21**	<0.06	0.06	<0.03	0.03	<0.6	0.6	<0.3	0.3	3797590
Acenaphthylene	ug/g	**0.15**	<0.1	0.1	<0.05	0.05	<1	1	<0.5	0.5	3797590
Anthracene	ug/g	**0.67**	<0.06	0.06	<0.03	0.03	<0.6	0.6	0.5	0.3	3797590
Benzo(a)anthracene	ug/g	**0.96**	0.2	0.1	<0.05	0.05	**2**	1	**1.8**	0.5	3797590
Benzo(a)pyrene	ug/g	**0.3**	0.2	0.1	<0.05	0.05	**2**	1	**2.7**	0.5	3797590
Benzo(b/j)fluoranthene	ug/g	**0.96**	0.3	0.2	<0.1	0.1	**2**	2	**4**	1	3797590
Benzo(g,h,i)perylene	ug/g	**9.6**	<0.2	0.2	<0.1	0.1	<2	2	2	1	3797590
Benzo(k)fluoranthene	ug/g	**0.96**	0.11	0.06	<0.03	0.03	0.9	0.6	**1.3**	0.3	3797590
Biphenyl	ug/g	**52**	<0.1	0.1	<0.05	0.05	<1	1	<0.5	0.5	3797590
Bis(2-chloroethyl)ether	ug/g	**0.5**	<0.4	0.4	<0.2	0.2	<4	4	<2	2	3797590
Bis(2-chloroisopropyl)ether	ug/g	**11**	<0.2	0.2	<0.1	0.1	<2	2	<1	1	3797590
Bis(2-ethylhexyl)phthalate	ug/g	**28**	<2	2	<1	1	<20	20	<10	10	3797590
Chrysene	ug/g	**9.6**	0.1	0.1	<0.05	0.05	1	1	1.4	0.5	3797590
Dibenz(a,h)anthracene	ug/g	**0.1**	<0.1	0.1	<0.05	0.05	<1	1	**0.5**	0.5	3797590
Diethyl phthalate	ug/g	**0.5**	<0.4	0.4	<0.2	0.2	<4	4	<2	2	3797590
Dimethyl phthalate	ug/g	**0.5**	<0.4	0.4	<0.2	0.2	<4	4	<2	2	3797590
Fluoranthene	ug/g	**9.6**	0.3	0.1	<0.05	0.05	3	1	3.3	0.5	3797590
Fluorene	ug/g	**62**	<0.06	0.06	<0.03	0.03	<0.6	0.6	<0.3	0.3	3797590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID			YD0201		YD0202		YD0203		YD0204		
Sampling Date			2014/10/23		2014/10/23		2014/10/23		2014/10/22		
COC Number			490622-01-01		490622-01-01		490622-01-01		490622-01-01		
	Units	**Criteria**	**TP3A-1**	**RDL**	**TP9-1**	**RDL**	**TP6-1**	**RDL**	**TP1-1**	**RDL**	**QC Batch**
Indeno(1,2,3-cd)pyrene	ug/g	**0.76**	<0.2	0.2	<0.08	0.08	<2	2	**2.1**	0.8	3797590
Naphthalene	ug/g	**9.6**	1.2	0.06	<0.03	0.03	<0.6	0.6	<0.3	0.3	3797590
p-Chloroaniline	ug/g	**0.5**	<0.4	0.4	<0.2	0.2	<4	4	<2	2	3797590
Pentachlorophenol	ug/g	**2.9**	<0.2	0.2	<0.1	0.1	<2	2	<1	1	3797590
Phenanthrene	ug/g	**12**	<0.1	0.1	<0.05	0.05	<1	1	1.3	0.5	3797590
Phenol	ug/g	**9.4**	2.4	0.2	<0.09	0.09	<2	2	<0.9	0.9	3797590
Pyrene	ug/g	**96**	0.3	0.1	<0.05	0.05	3	1	3.0	0.5	3797590
Calculated Parameters											
2,4- & 2,6-Dintrotoluene	ug/g	**-**	<0.28	0.28	<0.14	0.14	<2.8	2.8	<1.4	1.4	3796964
Methylnaphthalene, 2-(1-)	ug/g	**30**	<0.085	0.085	<0.042	0.042	<0.85	0.85	<0.42	0.42	3795894
Surrogate Recovery (%)											
2,4,6-Tribromophenol	%	-	84		58		100		104		3797590
2-Fluorobiphenyl	%	-	86		84		96		106		3797590
D14-Terphenyl (FS)	%	-	104		105		108		116		3797590
D5-Nitrobenzene	%	-	61		71		80		80		3797590

RDL = Reportable Detection Limit
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Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID			YD0205		YD0206		YD0207	YD0208		
Sampling Date			2014/10/22		2014/10/22		2014/10/22	2014/10/23		
COC Number			490622-01-01		490622-01-01		490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3-1**	**RDL**	**TP4-3**	**RDL**	**TP4-1**	**TP5-1**	**RDL**	**QC Batch**
Semivolatile Organics										
1,2,4-Trichlorobenzene	ug/g	**3.2**	<0.5	0.5	<0.1	0.1	<0.5	<0.5	0.5	3797590
1-Methylnaphthalene	ug/g	**30**	0.9	0.3	<0.06	0.06	<0.3	<0.3	0.3	3797590
2,4,5-Trichlorophenol	ug/g	**9.1**	<0.8	0.8	<0.2	0.2	<0.8	<0.8	0.8	3797590
2,4,6-Trichlorophenol	ug/g	**2.1**	<1	1	<0.2	0.2	<1	<1	1	3797590
2,4-Dichlorophenol	ug/g	**0.19**	<1	1	<0.2	0.2	<1	<1	1	3797590
2,4-Dimethylphenol	ug/g	**38**	<2	2	<0.4	0.4	<2	<2	2	3797590
2,4-Dinitrophenol	ug/g	**2**	<5	5	<1	1	<5	<5	5	3797590
2,4-Dinitrotoluene	ug/g	**0.5**	<1	1	<0.2	0.2	<1	<1	1	3797590
2,6-Dinitrotoluene	ug/g	**0.5**	<1	1	<0.2	0.2	<1	<1	1	3797590
2-Chlorophenol	ug/g	**3.1**	<0.8	0.8	<0.2	0.2	<0.8	<0.8	0.8	3797590
2-Methylnaphthalene	ug/g	**30**	1.3	0.3	<0.06	0.06	<0.3	<0.3	0.3	3797590
3,3'-Dichlorobenzidine	ug/g	**1**	<5	5	<1	1	<5	<5	5	3797590
Acenaphthene	ug/g	**21**	<0.3	0.3	<0.06	0.06	<0.3	<0.3	0.3	3797590
Acenaphthylene	ug/g	**0.15**	<0.5	0.5	<0.1	0.1	<0.5	<0.5	0.5	3797590
Anthracene	ug/g	**0.67**	0.3	0.3	<0.06	0.06	<0.3	0.6	0.3	3797590
Benzo(a)anthracene	ug/g	**0.96**	0.8	0.5	<0.1	0.1	<0.5	**1.9**	0.5	3797590
Benzo(a)pyrene	ug/g	**0.3**	**1.0**	0.5	<0.1	0.1	<0.5	**2.4**	0.5	3797590
Benzo(b/j)fluoranthene	ug/g	**0.96**	**1**	1	<0.2	0.2	<1	**3**	1	3797590
Benzo(g,h,i)perylene	ug/g	**9.6**	<1	1	<0.2	0.2	<1	2	1	3797590
Benzo(k)fluoranthene	ug/g	**0.96**	0.5	0.3	<0.06	0.06	<0.3	**1.2**	0.3	3797590
Biphenyl	ug/g	**52**	<0.5	0.5	<0.1	0.1	<0.5	<0.5	0.5	3797590
Bis(2-chloroethyl)ether	ug/g	**0.5**	<2	2	<0.4	0.4	<2	<2	2	3797590
Bis(2-chloroisopropyl)ether	ug/g	**11**	<1	1	<0.2	0.2	<1	<1	1	3797590
Bis(2-ethylhexyl)phthalate	ug/g	**28**	<10	10	<2	2	<10	<10	10	3797590
Chrysene	ug/g	**9.6**	0.6	0.5	<0.1	0.1	<0.5	1.6	0.5	3797590
Dibenz(a,h)anthracene	ug/g	**0.1**	<0.5	0.5	<0.1	0.1	<0.5	<0.5	0.5	3797590
Diethyl phthalate	ug/g	**0.5**	<2	2	<0.4	0.4	<2	<2	2	3797590
Dimethyl phthalate	ug/g	**0.5**	<2	2	<0.4	0.4	<2	<2	2	3797590
Fluoranthene	ug/g	**9.6**	1.4	0.5	<0.1	0.1	<0.5	3.9	0.5	3797590
Fluorene	ug/g	**62**	<0.3	0.3	<0.06	0.06	<0.3	<0.3	0.3	3797590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID			YD0205		YD0206		YD0207	YD0208		
Sampling Date			2014/10/22		2014/10/22		2014/10/22	2014/10/23		
COC Number			490622-01-01		490622-01-01		490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3-1**	**RDL**	**TP4-3**	**RDL**	**TP4-1**	**TP5-1**	**RDL**	**QC Batch**
Indeno(1,2,3-cd)pyrene	ug/g	**0.76**	**0.8**	0.8	<0.2	0.2	<0.8	**1.7**	0.8	3797590
Naphthalene	ug/g	**9.6**	0.6	0.3	<0.06	0.06	<0.3	<0.3	0.3	3797590
p-Chloroaniline	ug/g	**0.5**	<2	2	<0.4	0.4	<2	<2	2	3797590
Pentachlorophenol	ug/g	**2.9**	<1	1	<0.2	0.2	<1	<1	1	3797590
Phenanthrene	ug/g	**12**	0.8	0.5	<0.1	0.1	<0.5	2.0	0.5	3797590
Phenol	ug/g	**9.4**	<0.9	0.9	<0.2	0.2	<0.9	<0.9	0.9	3797590
Pyrene	ug/g	**96**	1.2	0.5	<0.1	0.1	<0.5	3.4	0.5	3797590
Calculated Parameters										
2,4- & 2,6-Dintrotoluene	ug/g	**-**	<1.4	1.4	<0.28	0.28	<1.4	<1.4	1.4	3796964
Methylnaphthalene, 2-(1-)	ug/g	**30**	2.3	0.42	<0.085	0.085	<0.42	<0.42	0.42	3795894
Surrogate Recovery (%)										
2,4,6-Tribromophenol	%	-	80		67		98	94		3797590
2-Fluorobiphenyl	%	-	104		86		100	98		3797590
D14-Terphenyl (FS)	%	-	112		104		110	106		3797590
D5-Nitrobenzene	%	-	80		72		80	78		3797590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID			YD0209		YD0212		
Sampling Date			2014/10/22		2014/10/23		
COC Number			490622-01-01		490622-01-01		
	Units	**Criteria**	**TP2-3**	**RDL**	**DUP3**	**RDL**	**QC Batch**
Semivolatile Organics							
1,2,4-Trichlorobenzene	ug/g	**3.2**	<0.5	0.5	<0.1	0.1	3797590
1-Methylnaphthalene	ug/g	**30**	<0.3	0.3	0.25	0.06	3797590
2,4,5-Trichlorophenol	ug/g	**9.1**	<0.8	0.8	<0.2	0.2	3797590
2,4,6-Trichlorophenol	ug/g	**2.1**	<1	1	<0.2	0.2	3797590
2,4-Dichlorophenol	ug/g	**0.19**	<1	1	<0.2	0.2	3797590
2,4-Dimethylphenol	ug/g	**38**	<2	2	0.9	0.4	3797590
2,4-Dinitrophenol	ug/g	**2**	<5	5	<1	1	3797590
2,4-Dinitrotoluene	ug/g	**0.5**	<1	1	<0.2	0.2	3797590
2,6-Dinitrotoluene	ug/g	**0.5**	<1	1	<0.2	0.2	3797590
2-Chlorophenol	ug/g	**3.1**	<0.8	0.8	<0.2	0.2	3797590
2-Methylnaphthalene	ug/g	**30**	<0.3	0.3	0.25	0.06	3797590
3,3'-Dichlorobenzidine	ug/g	**1**	<5	5	<1	1	3797590
Acenaphthene	ug/g	**21**	<0.3	0.3	0.10	0.06	3797590
Acenaphthylene	ug/g	**0.15**	**0.6**	0.5	<0.1	0.1	3797590
Anthracene	ug/g	**0.67**	0.5	0.3	0.11	0.06	3797590
Benzo(a)anthracene	ug/g	**0.96**	**1.5**	0.5	0.3	0.1	3797590
Benzo(a)pyrene	ug/g	**0.3**	**2.1**	0.5	0.3	0.1	3797590
Benzo(b/j)fluoranthene	ug/g	**0.96**	**3**	1	0.5	0.2	3797590
Benzo(g,h,i)perylene	ug/g	**9.6**	2	1	0.2	0.2	3797590
Benzo(k)fluoranthene	ug/g	**0.96**	**1.1**	0.3	0.17	0.06	3797590
Biphenyl	ug/g	**52**	<0.5	0.5	<0.1	0.1	3797590
Bis(2-chloroethyl)ether	ug/g	**0.5**	<2	2	<2 (1)	2	3797590
Bis(2-chloroisopropyl)ether	ug/g	**11**	<1	1	<2 (1)	2	3797590
Bis(2-ethylhexyl)phthalate	ug/g	**28**	<10	10	<2	2	3797590
Chrysene	ug/g	**9.6**	1.2	0.5	0.2	0.1	3797590
Dibenz(a,h)anthracene	ug/g	**0.1**	<0.5	0.5	<0.1	0.1	3797590
Diethyl phthalate	ug/g	**0.5**	<2	2	<0.4	0.4	3797590
Dimethyl phthalate	ug/g	**0.5**	<2	2	<0.4	0.4	3797590
Fluoranthene	ug/g	**9.6**	2.9	0.5	0.8	0.1	3797590
Fluorene	ug/g	**62**	<0.3	0.3	0.07	0.06	3797590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture
(1) Detection Limit was raised due to matrix interferences.

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

SEMI-VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID			YD0209		YD0212		
Sampling Date			2014/10/22		2014/10/23		
COC Number			490622-01-01		490622-01-01		
	Units	**Criteria**	**TP2-3**	**RDL**	**DUP3**	**RDL**	**QC Batch**
Indeno(1,2,3-cd)pyrene	ug/g	**0.76**	**1.6**	0.8	0.2	0.2	3797590
Naphthalene	ug/g	**9.6**	0.3	0.3	1.1	0.06	3797590
p-Chloroaniline	ug/g	**0.5**	<2	2	<0.4	0.4	3797590
Pentachlorophenol	ug/g	**2.9**	<1	1	<0.2	0.2	3797590
Phenanthrene	ug/g	**12**	1.7	0.5	0.2	0.1	3797590
Phenol	ug/g	**9.4**	<0.9	0.9	4.2	0.2	3797590
Pyrene	ug/g	**96**	2.5	0.5	0.9	0.1	3797590
Calculated Parameters							
2,4- & 2,6-Dintrotoluene	ug/g	**-**	<1.4	1.4	<0.28	0.28	3796964
Methylnaphthalene, 2-(1-)	ug/g	**30**	<0.42	0.42	0.50	0.085	3795894
Surrogate Recovery (%)							
2,4,6-Tribromophenol	%	-	78		107		3797590
2-Fluorobiphenyl	%	-	100		88		3797590
D14-Terphenyl (FS)	%	-	112		104		3797590
D5-Nitrobenzene	%	-	82		78		3797590

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0201	YD0202		YD0203		YD0204		
Sampling Date			2014/10/23	2014/10/23		2014/10/23		2014/10/22		
COC Number			490622-01-01	490622-01-01		490622-01-01		490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP9-1**	**RDL**	**TP6-1**	**RDL**	**TP1-1**	**RDL**	**QC Batch**
Calculated Parameters										
1,3-Dichloropropene (cis+trans)	ug/g	**0.059**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3796497
Volatile Organics										
Acetone (2-Propanone)	ug/g	**16**	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	3797862
Benzene	ug/g	**0.32**	<0.020	<0.020	0.020	<0.040	0.040	<0.020	0.020	3797862
Bromodichloromethane	ug/g	**1.5**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Bromoform	ug/g	**0.61**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Bromomethane	ug/g	**0.05**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Carbon Tetrachloride	ug/g	**0.21**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Chlorobenzene	ug/g	**2.4**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Chloroform	ug/g	**0.47**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Dibromochloromethane	ug/g	**2.3**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,2-Dichlorobenzene	ug/g	**1.2**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,3-Dichlorobenzene	ug/g	**9.6**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,4-Dichlorobenzene	ug/g	**0.2**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Dichlorodifluoromethane (FREON 12)	ug/g	**16**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,1-Dichloroethane	ug/g	**0.47**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,2-Dichloroethane	ug/g	**0.05**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,1-Dichloroethylene	ug/g	**0.064**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
cis-1,2-Dichloroethylene	ug/g	**1.9**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
trans-1,2-Dichloroethylene	ug/g	**1.3**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,2-Dichloropropane	ug/g	**0.16**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
cis-1,3-Dichloropropene	ug/g	**0.059**	<0.030	<0.030	0.030	<0.060	0.060	<0.030	0.030	3797862
trans-1,3-Dichloropropene	ug/g	**0.059**	<0.040	<0.040	0.040	<0.080	0.080	<0.040	0.040	3797862
Ethylbenzene	ug/g	**1.1**	0.033	<0.020	0.020	<0.040	0.040	0.042	0.020	3797862
Ethylene Dibromide	ug/g	**0.05**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Hexane	ug/g	**46**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Methylene Chloride(Dichloromethane)	ug/g	**1.6**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Methyl Isobutyl Ketone	ug/g	**31**	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	3797862
Methyl Ethyl Ketone (2-Butanone)	ug/g	**70**	<0.50	<0.50	0.50	<1.0	1.0	<0.50	0.50	3797862
Methyl t-butyl ether (MTBE)	ug/g	**1.6**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0201	YD0202		YD0203		YD0204		
Sampling Date			2014/10/23	2014/10/23		2014/10/23		2014/10/22		
COC Number			490622-01-01	490622-01-01		490622-01-01		490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP9-1**	**RDL**	**TP6-1**	**RDL**	**TP1-1**	**RDL**	**QC Batch**
Styrene	ug/g	**34**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,1,1,2-Tetrachloroethane	ug/g	**0.087**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,1,2,2-Tetrachloroethane	ug/g	**0.05**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Tetrachloroethylene	ug/g	**1.9**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Toluene	ug/g	**6.4**	0.61	<0.020	0.020	<0.040	0.040	0.35	0.020	3797862
1,1,1-Trichloroethane	ug/g	**6.1**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
1,1,2-Trichloroethane	ug/g	**0.05**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Trichloroethylene	ug/g	**0.55**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Vinyl Chloride	ug/g	**0.032**	<0.020	<0.020	0.020	<0.040	0.040	<0.020	0.020	3797862
p+m-Xylene	ug/g	**-**	0.092	<0.020	0.020	<0.040	0.040	0.089	0.020	3797862
o-Xylene	ug/g	**-**	0.026	<0.020	0.020	<0.040	0.040	0.034	0.020	3797862
Xylene (Total)	ug/g	**26**	0.12	<0.020	0.020	<0.040	0.040	0.12	0.020	3797862
Trichlorofluoromethane (FREON 11)	ug/g	**4**	<0.050	<0.050	0.050	<0.10	0.10	<0.050	0.050	3797862
Surrogate Recovery (%)										
4-Bromofluorobenzene	%	-	98	98		97		98		3797862
D10-o-Xylene	%	-	89	85		84		90		3797862
D4-1,2-Dichloroethane	%	-	92	95		95		95		3797862
D8-Toluene	%	-	98	98		98		98		3797862

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

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Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0205	YD0206	YD0207	YD0208		
Sampling Date			2014/10/22	2014/10/22	2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3-1**	**TP4-3**	**TP4-1**	**TP5-1**	**RDL**	**QC Batch**
Calculated Parameters								
1,3-Dichloropropene (cis+trans)	ug/g	**0.059**	<0.050	<0.050	<0.050	<0.050	0.050	3796497
Volatile Organics								
Acetone (2-Propanone)	ug/g	**16**	<0.50	<0.50	<0.50	<0.50	0.50	3797862
Benzene	ug/g	**0.32**	<0.020	<0.020	<0.020	<0.020	0.020	3797862
Bromodichloromethane	ug/g	**1.5**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Bromoform	ug/g	**0.61**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Bromomethane	ug/g	**0.05**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Carbon Tetrachloride	ug/g	**0.21**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Chlorobenzene	ug/g	**2.4**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Chloroform	ug/g	**0.47**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Dibromochloromethane	ug/g	**2.3**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,2-Dichlorobenzene	ug/g	**1.2**	0.63	<0.050	<0.050	<0.050	0.050	3797862
1,3-Dichlorobenzene	ug/g	**9.6**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,4-Dichlorobenzene	ug/g	**0.2**	0.071	<0.050	<0.050	0.13	0.050	3797862
Dichlorodifluoromethane (FREON 12)	ug/g	**16**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,1-Dichloroethane	ug/g	**0.47**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,2-Dichloroethane	ug/g	**0.05**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,1-Dichloroethylene	ug/g	**0.064**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
cis-1,2-Dichloroethylene	ug/g	**1.9**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
trans-1,2-Dichloroethylene	ug/g	**1.3**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,2-Dichloropropane	ug/g	**0.16**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
cis-1,3-Dichloropropene	ug/g	**0.059**	<0.030	<0.030	<0.030	<0.030	0.030	3797862
trans-1,3-Dichloropropene	ug/g	**0.059**	<0.040	<0.040	<0.040	<0.040	0.040	3797862
Ethylbenzene	ug/g	**1.1**	**1.9**	<0.020	0.041	0.093	0.020	3797862
Ethylene Dibromide	ug/g	**0.05**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Hexane	ug/g	**46**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Methylene Chloride(Dichloromethane)	ug/g	**1.6**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Methyl Isobutyl Ketone	ug/g	**31**	<0.50	<0.50	<0.50	<0.50	0.50	3797862
Methyl Ethyl Ketone (2-Butanone)	ug/g	**70**	<0.50	<0.50	<0.50	<0.50	0.50	3797862
Methyl t-butyl ether (MTBE)	ug/g	**1.6**	<0.050	<0.050	<0.050	<0.050	0.050	3797862

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0205	YD0206	YD0207	YD0208		
Sampling Date			2014/10/22	2014/10/22	2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3-1**	**TP4-3**	**TP4-1**	**TP5-1**	**RDL**	**QC Batch**
Styrene	ug/g	**34**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,1,1,2-Tetrachloroethane	ug/g	**0.087**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,1,2,2-Tetrachloroethane	ug/g	**0.05**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Tetrachloroethylene	ug/g	**1.9**	0.056	<0.050	<0.050	<0.050	0.050	3797862
Toluene	ug/g	**6.4**	0.93	<0.020	0.029	0.092	0.020	3797862
1,1,1-Trichloroethane	ug/g	**6.1**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
1,1,2-Trichloroethane	ug/g	**0.05**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Trichloroethylene	ug/g	**0.55**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Vinyl Chloride	ug/g	**0.032**	<0.020	<0.020	<0.020	<0.020	0.020	3797862
p+m-Xylene	ug/g	**-**	20	<0.020	0.20	0.63	0.020	3797862
o-Xylene	ug/g	**-**	6.7	<0.020	0.086	0.13	0.020	3797862
Xylene (Total)	ug/g	**26**	**27**	<0.020	0.28	0.76	0.020	3797862
Trichlorofluoromethane (FREON 11)	ug/g	**4**	<0.050	<0.050	<0.050	<0.050	0.050	3797862
Surrogate Recovery (%)								
4-Bromofluorobenzene	%	-	103	98	98	97		3797862
D10-o-Xylene	%	-	94	86	87	86		3797862
D4-1,2-Dichloroethane	%	-	94	96	96	97		3797862
D8-Toluene	%	-	98	97	97	97		3797862

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0209	YD0211		
Sampling Date			2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01		
	Units	**Criteria**	**TP2-3**	**DUP2**	**RDL**	**QC Batch**
Calculated Parameters						
1,3-Dichloropropene (cis+trans)	ug/g	**0.059**	<0.050	<0.050	0.050	3796497
Volatile Organics						
Acetone (2-Propanone)	ug/g	**16**	<0.50	<0.50	0.50	3797862
Benzene	ug/g	**0.32**	<0.020	<0.020	0.020	3797862
Bromodichloromethane	ug/g	**1.5**	<0.050	<0.050	0.050	3797862
Bromoform	ug/g	**0.61**	<0.050	<0.050	0.050	3797862
Bromomethane	ug/g	**0.05**	<0.050	<0.050	0.050	3797862
Carbon Tetrachloride	ug/g	**0.21**	<0.050	<0.050	0.050	3797862
Chlorobenzene	ug/g	**2.4**	<0.050	<0.050	0.050	3797862
Chloroform	ug/g	**0.47**	<0.050	<0.050	0.050	3797862
Dibromochloromethane	ug/g	**2.3**	<0.050	<0.050	0.050	3797862
1,2-Dichlorobenzene	ug/g	**1.2**	<0.050	<0.050	0.050	3797862
1,3-Dichlorobenzene	ug/g	**9.6**	<0.050	<0.050	0.050	3797862
1,4-Dichlorobenzene	ug/g	**0.2**	<0.050	<0.050	0.050	3797862
Dichlorodifluoromethane (FREON 12)	ug/g	**16**	<0.050	<0.050	0.050	3797862
1,1-Dichloroethane	ug/g	**0.47**	<0.050	<0.050	0.050	3797862
1,2-Dichloroethane	ug/g	**0.05**	<0.050	<0.050	0.050	3797862
1,1-Dichloroethylene	ug/g	**0.064**	<0.050	<0.050	0.050	3797862
cis-1,2-Dichloroethylene	ug/g	**1.9**	<0.050	<0.050	0.050	3797862
trans-1,2-Dichloroethylene	ug/g	**1.3**	<0.050	<0.050	0.050	3797862
1,2-Dichloropropane	ug/g	**0.16**	<0.050	<0.050	0.050	3797862
cis-1,3-Dichloropropene	ug/g	**0.059**	<0.030	<0.030	0.030	3797862
trans-1,3-Dichloropropene	ug/g	**0.059**	<0.040	<0.040	0.040	3797862
Ethylbenzene	ug/g	**1.1**	0.046	<0.020	0.020	3797862
Ethylene Dibromide	ug/g	**0.05**	<0.050	<0.050	0.050	3797862
Hexane	ug/g	**46**	<0.050	<0.050	0.050	3797862
Methylene Chloride(Dichloromethane)	ug/g	**1.6**	<0.050	<0.050	0.050	3797862
Methyl Isobutyl Ketone	ug/g	**31**	<0.50	<0.50	0.50	3797862
Methyl Ethyl Ketone (2-Butanone)	ug/g	**70**	<0.50	<0.50	0.50	3797862
Methyl t-butyl ether (MTBE)	ug/g	**1.6**	<0.050	<0.050	0.050	3797862

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0209	YD0211		
Sampling Date			2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01		
	Units	**Criteria**	**TP2-3**	**DUP2**	**RDL**	**QC Batch**
Styrene	ug/g	**34**	<0.050	<0.050	0.050	3797862
1,1,1,2-Tetrachloroethane	ug/g	**0.087**	<0.050	<0.050	0.050	3797862
1,1,2,2-Tetrachloroethane	ug/g	**0.05**	<0.050	<0.050	0.050	3797862
Tetrachloroethylene	ug/g	**1.9**	<0.050	<0.050	0.050	3797862
Toluene	ug/g	**6.4**	0.22	<0.020	0.020	3797862
1,1,1-Trichloroethane	ug/g	**6.1**	<0.050	<0.050	0.050	3797862
1,1,2-Trichloroethane	ug/g	**0.05**	<0.050	<0.050	0.050	3797862
Trichloroethylene	ug/g	**0.55**	<0.050	<0.050	0.050	3797862
Vinyl Chloride	ug/g	**0.032**	<0.020	<0.020	0.020	3797862
p+m-Xylene	ug/g	**-**	0.16	<0.020	0.020	3797862
o-Xylene	ug/g	**-**	0.056	<0.020	0.020	3797862
Xylene (Total)	ug/g	**26**	0.22	<0.020	0.020	3797862
Trichlorofluoromethane (FREON 11)	ug/g	**4**	<0.050	<0.050	0.050	3797862
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	-	98	98		3797862
D10-o-Xylene	%	-	89	88		3797862
D4-1,2-Dichloroethane	%	-	95	96		3797862
D8-Toluene	%	-	97	97		3797862

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			YD0201	YD0202	YD0203	YD0204	YD0205		
Sampling Date			2014/10/23	2014/10/23	2014/10/23	2014/10/22	2014/10/22		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP9-1**	**TP6-1**	**TP1-1**	**TP3-1**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
F1 (C6-C10)	ug/g	**55**	11	<10	<10	<10	**60**	10	3799175
F1 (C6-C10) - BTEX	ug/g	**55**	<10	<10	<10	<10	27	10	3799175
F2-F4 Hydrocarbons									
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	**3300**	710		580	670	320	200	3802738
F2 (C10-C16 Hydrocarbons)	ug/g	**230**	51	<10	<10	19	11	10	3798394
F3 (C16-C34 Hydrocarbons)	ug/g	**1700**	210	<50	280	230	140	50	3798394
F4 (C34-C50 Hydrocarbons)	ug/g	**3300**	110	<50	150	150	74	50	3798394
Reached Baseline at C50	ug/g	**-**	No	Yes	No	No	No		3798394
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	-	96	97	96	97	96		3799175
4-Bromofluorobenzene	%	-	108	105	104	107	111		3799175
D10-Ethylbenzene	%	-	88	91	92	87	87		3799175
D4-1,2-Dichloroethane	%	-	84	86	85	85	83		3799175
o-Terphenyl	%	-	90	86	90	87	91		3798394

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			YD0206	YD0207	YD0208	YD0209	YD0211		
Sampling Date			2014/10/22	2014/10/22	2014/10/23	2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP4-3**	**TP4-1**	**TP5-1**	**TP2-3**	**DUP2**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
F1 (C6-C10)	ug/g	**55**	<10	<10	<10	<10	<10	10	3799175
F1 (C6-C10) - BTEX	ug/g	**55**	<10	<10	<10	<10	<10	10	3799175
F2-F4 Hydrocarbons									
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	**3300**		660	640	600		200	3802738
F2 (C10-C16 Hydrocarbons)	ug/g	**230**	<10	28	10	21	<10	10	3798394
F3 (C16-C34 Hydrocarbons)	ug/g	**1700**	<50	310	270	300	<50	50	3798394
F4 (C34-C50 Hydrocarbons)	ug/g	**3300**	<50	110	160	170	<50	50	3798394
Reached Baseline at C50	ug/g	**-**	Yes	No	No	No	Yes		3798394
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	-	95	97	95	95	96		3799175
4-Bromofluorobenzene	%	-	101	107	106	108	102		3799175
D10-Ethylbenzene	%	-	92	92	91	91	87		3799175
D4-1,2-Dichloroethane	%	-	85	85	83	86	85		3799175
o-Terphenyl	%	-	90	92	92	95	96		3798394

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

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Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			YF0738	YF0739	YF0740	YF0741	YF0742		
Sampling Date			2014/10/23	2014/10/23	2014/10/22	2014/10/22	2014/10/22		
COC Number			490622-01-01	490622-01-01	490622-01-01	490622-01-01	490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP6-1**	**TP1-1**	**TP3-1**	**TP4-1**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	**230**	33	11	10	<10	25	10	3806498
F3 (C16-C34 Hydrocarbons)	ug/g	**1700**	130	190	140	70	220	50	3806498
F4 (C34-C50 Hydrocarbons)	ug/g	**3300**	59	79	81	<50	<50	50	3806498
Reached Baseline at C50	ug/g	**-**	Yes	Yes	Yes	Yes	Yes		3806498
Surrogate Recovery (%)									
o-Terphenyl	%	-	85	83	84	85	87		3806498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam ID			YF0743	YF0744		
Sampling Date			2014/10/23	2014/10/22		
COC Number			490622-01-01	490622-01-01		
	Units	**Criteria**	**TP5-1**	**TP2-3**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	**230**	<10	16	10	3806498
F3 (C16-C34 Hydrocarbons)	ug/g	**1700**	180	200	50	3806498
F4 (C34-C50 Hydrocarbons)	ug/g	**3300**	88	99	50	3806498
Reached Baseline at C50	ug/g	**-**	Yes	Yes		3806498
Surrogate Recovery (%)						
o-Terphenyl	%	-	93	88		3806498

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

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Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			YD0201	YD0202		YD0203		YD0204		
Sampling Date			2014/10/23	2014/10/23		2014/10/23		2014/10/22		
COC Number			490622-01-01	490622-01-01		490622-01-01		490622-01-01		
	Units	**Criteria**	**TP3A-1**	**TP9-1**	**RDL**	**TP6-1**	**RDL**	**TP1-1**	**RDL**	**QC Batch**
PCBs										
Aroclor 1242	ug/g	**-**	<0.010	<0.010	0.010	<0.020	0.020	<0.010	0.010	3798287
Aroclor 1248	ug/g	**-**	<0.010	<0.010	0.010	0.30	0.020	<0.010	0.010	3798287
Aroclor 1254	ug/g	**-**	<0.010	<0.010	0.010	0.090	0.020	<0.010	0.010	3798287
Aroclor 1260	ug/g	**-**	0.016	<0.010	0.010	0.049	0.020	0.64	0.010	3798287
Total PCB	ug/g	**1.1**	0.016	<0.010	0.010	0.44	0.020	0.94	0.010	3798287
Surrogate Recovery (%)										
Decachlorobiphenyl	%	-	86	108		72		88		3798287

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam ID			YD0205	YD0206	YD0207		YD0208		
Sampling Date			2014/10/22	2014/10/22	2014/10/22		2014/10/23		
COC Number			490622-01-01	490622-01-01	490622-01-01		490622-01-01		
	Units	**Criteria**	**TP3-1**	**TP4-3**	**TP4-1**	**RDL**	**TP5-1**	**RDL**	**QC Batch**
PCBs									
Aroclor 1242	ug/g	**-**	<0.010	<0.010	<0.010	0.010	<0.020	0.020	3798287
Aroclor 1248	ug/g	**-**	<0.010	<0.010	<0.010	0.010	0.98	0.020	3798287
Aroclor 1254	ug/g	**-**	0.027	<0.010	0.071	0.010	<0.020	0.020	3798287
Aroclor 1260	ug/g	**-**	0.44	<0.010	0.017	0.010	0.098	0.020	3798287
Total PCB	ug/g	**1.1**	0.60	<0.010	0.089	0.010	1.1	0.020	3798287
Surrogate Recovery (%)									
Decachlorobiphenyl	%	-	90	82	86		96		3798287

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			YD0209	YD0212		
Sampling Date			2014/10/22	2014/10/23		
COC Number			490622-01-01	490622-01-01		
	Units	**Criteria**	**TP2-3**	**DUP3**	**RDL**	**QC Batch**
PCBs						
Aroclor 1242	ug/g	-	<0.010	<0.010	0.010	3798287
Aroclor 1248	ug/g	-	<0.010	<0.010	0.010	3798287
Aroclor 1254	ug/g	-	<0.010	<0.010	0.010	3798287
Aroclor 1260	ug/g	-	0.016	0.020	0.010	3798287
Total PCB	ug/g	**1.1**	0.016	0.020	0.010	3798287
Surrogate Recovery (%)						
Decachlorobiphenyl	%	-	78	79		3798287

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition
Soil - Industrial/Commercial/Community Property Use - Coarse Texture

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YD0201 **Collected** 2014/10/23
Sample ID TP3A-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0201 Dup **Collected** 2014/10/23
Sample ID TP3A-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0202 **Collected** 2014/10/23
Sample ID TP9-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0202 Dup **Collected** 2014/10/23
Sample ID TP9-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YD0203 **Collected** 2014/10/23
Sample ID TP6-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0204 **Collected** 2014/10/22
Sample ID TP1-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0205 **Collected** 2014/10/22
Sample ID TP3-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YD0206 **Collected** 2014/10/22
Sample ID TP4-3 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0206 Dup **Collected** 2014/10/22
Sample ID TP4-3 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri

Maxxam ID YD0207 **Collected** 2014/10/22
Sample ID TP4-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0207 Dup **Collected** 2014/10/22
Sample ID TP4-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YD0208 **Collected** 2014/10/23
Sample ID TP5-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/28	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0209 **Collected** 2014/10/22
Sample ID TP2-3 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Automated Statchk
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/10/25	Milijana Avramovic
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
F4G (CCME Hydrocarbons Gravimetric)	BAL	3802738	2014/10/29	2014/10/29	Raheela Usmani
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0210 **Collected** 2014/10/23
Sample ID DUP1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Hot Water Extractable Boron	ICP	3799890	2014/10/27	2014/10/27	Archana Patel
Hexavalent Chromium in Soil by IC	IC/SPEC	3799036	2014/10/28	2014/10/28	Manoj Gera
Strong Acid Leachable Metals by ICPMS	ICP/MS	3798315	2014/10/24	2014/10/27	Viviana Canzonieri
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YD0211 **Collected** 2014/10/23
Sample ID DUP2 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	3796497	N/A	2014/10/28	Automated Statchk
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	3799175	2014/10/24	2014/10/26	Simon Xi
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3798394	2014/10/24	2014/10/25	Margaret Kulczyk-Stanko
Moisture	BAL	3798347	N/A	2014/10/24	Chamika Deeyagaha
Volatile Organic Compounds in Soil	GC/MS	3797862	2014/10/24	2014/10/27	Xueming Jiang

Maxxam ID YD0211 Dup **Collected** 2014/10/23
Sample ID DUP2 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Moisture	BAL	3798347	N/A	2014/10/24	Chamika Deeyagaha

Maxxam ID YD0212 **Collected** 2014/10/23
Sample ID DUP3 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Methylnaphthalene Sum	CALC	3795894	N/A	2014/10/28	Ewa Pranjic
ABN Compounds in soil by GC/MS	GC/MS	3797590	2014/10/24	2014/11/05	Milijana Avramovic
Dintrotoluene Sum	CALC	3796964	2014/10/28	2014/10/28	Automated Statchk
Moisture	BAL	3797742	N/A	2014/10/24	Chamika Deeyagaha
Polychlorinated Biphenyl in Soil	GC/ECD	3798287	2014/10/24	2014/10/24	Sarah Huang

Maxxam ID YF0738 **Collected** 2014/10/23
Sample ID TP3A-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

Maxxam ID YF0739 **Collected** 2014/10/23
Sample ID TP6-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/11/06

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YF0740 **Collected** 2014/10/22
Sample ID TP1-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

Maxxam ID YF0741 **Collected** 2014/10/22
Sample ID TP3-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

Maxxam ID YF0742 **Collected** 2014/10/22
Sample ID TP4-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

Maxxam ID YF0743 **Collected** 2014/10/23
Sample ID TP5-1 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

Maxxam ID YF0744 **Collected** 2014/10/22
Sample ID TP2-3 **Shipped**
Matrix Soil **Received** 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	3806498	2014/10/31	2014/10/31	Barbara Wowk
Moisture	BAL	3804382	N/A	2014/10/29	Min Yang

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Package 1	5.3°C
Package 2	8.0°C

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

GENERAL COMMENTS

Revised Report (2014/11/06): SVOC analysis: sample DUP3 reworked and reporting detection limits have been changed as per client request.

Results have been split onto separate reports as per client request.

F1-BTEX Analysis:
The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

ABN Analysis: Due to the sample matrix, some sample required dilution. Detection limits were adjusted accordingly.

Samples YF0738-YF0744: Ex Situ Silica Gel column cleanup performed prior PHC F2-F4 Analysis

Sample YD0203-01: VOC Analysis: Detection limits were raised due to high moisture content of soil provided.

ABN Analysis: Detection limits were adjusted for high moisture content.
PCB analysis: Detection limits were adjusted for high moisture content.

Sample YD0204-01: PCB analysis: Aroclor 1268 was detected in the sample. This Aroclor's presence is reflected in the total PCB value

Sample YD0205-01: PCB analysis: Aroclor 1268 was detected in the sample. This Aroclor's presence is reflected in the total PCB value

Sample YD0208-01: PCB Analysis: Due to high concentrations of the target analytes, sample required dilution. Detection limits were adjusted accordingly

Results relate only to the items tested.

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MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3797590	MA	Matrix Spike	2,4,6-Tribromophenol	2014/10/24		85	%	50 - 130
			2-Fluorobiphenyl	2014/10/24		86	%	50 - 130
			D14-Terphenyl (FS)	2014/10/24		107	%	50 - 130
			D5-Nitrobenzene	2014/10/24		75	%	50 - 130
			1,2,4-Trichlorobenzene	2014/10/24		74	%	50 - 130
			1-Methylnaphthalene	2014/10/24		86	%	50 - 130
			2,4,5-Trichlorophenol	2014/10/24		90	%	50 - 130
			2,4,6-Trichlorophenol	2014/10/24		87	%	50 - 130
			2,4-Dichlorophenol	2014/10/24		71	%	50 - 130
			2,4-Dimethylphenol	2014/10/24		85	%	30 - 130
			2,4-Dinitrophenol	2014/10/24		42	%	30 - 130
			2,4-Dinitrotoluene	2014/10/24		105	%	50 - 130
			2,6-Dinitrotoluene	2014/10/24		90	%	50 - 130
			2-Chlorophenol	2014/10/24		87	%	50 - 130
			2-Methylnaphthalene	2014/10/24		82	%	50 - 130
			3,3'-Dichlorobenzidine	2014/10/24		98	%	30 - 130
			Acenaphthene	2014/10/24		85	%	50 - 130
			Acenaphthylene	2014/10/24		84	%	50 - 130
			Anthracene	2014/10/24		93	%	50 - 130
			Benzo(a)anthracene	2014/10/24		96	%	50 - 130
			Benzo(a)pyrene	2014/10/24		102	%	50 - 130
			Benzo(b/j)fluoranthene	2014/10/24		104	%	50 - 130
			Benzo(g,h,i)perylene	2014/10/24		95	%	50 - 130
			Benzo(k)fluoranthene	2014/10/24		104	%	50 - 130
			Biphenyl	2014/10/24		86	%	50 - 130
			Bis(2-chloroethyl)ether	2014/10/24		79	%	50 - 130
			Bis(2-chloroisopropyl)ether	2014/10/24		82	%	50 - 130
			Bis(2-ethylhexyl)phthalate	2014/10/24		101	%	50 - 130
			Chrysene	2014/10/24		99	%	50 - 130
			Dibenz(a,h)anthracene	2014/10/24		98	%	50 - 130
			Diethyl phthalate	2014/10/24		101	%	50 - 130
			Dimethyl phthalate	2014/10/24		92	%	50 - 130
			Fluoranthene	2014/10/24		98	%	50 - 130
			Fluorene	2014/10/24		91	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2014/10/24		93	%	50 - 130
			Naphthalene	2014/10/24		84	%	50 - 130
			p-Chloroaniline	2014/10/24		65	%	30 - 130
			Pentachlorophenol	2014/10/24		64	%	50 - 130
			Phenanthrene	2014/10/24		92	%	50 - 130
			Phenol	2014/10/24		83	%	30 - 130
			Pyrene	2014/10/24		101	%	50 - 130
		Spiked Blank	2,4,6-Tribromophenol	2014/10/24		87	%	50 - 130
			2-Fluorobiphenyl	2014/10/24		91	%	50 - 130
			D14-Terphenyl (FS)	2014/10/24		103	%	50 - 130
			D5-Nitrobenzene	2014/10/24		81	%	50 - 130
			1,2,4-Trichlorobenzene	2014/10/24		87	%	50 - 130
			1-Methylnaphthalene	2014/10/24		94	%	50 - 130
			2,4,5-Trichlorophenol	2014/10/24		91	%	50 - 130
			2,4,6-Trichlorophenol	2014/10/24		93	%	50 - 130
			2,4-Dichlorophenol	2014/10/24		73	%	50 - 130
			2,4-Dimethylphenol	2014/10/24		84	%	30 - 130
			2,4-Dinitrophenol	2014/10/24		57	%	30 - 130
			2,4-Dinitrotoluene	2014/10/24		110	%	50 - 130
			2,6-Dinitrotoluene	2014/10/24		96	%	50 - 130
			2-Chlorophenol	2014/10/24		92	%	50 - 130

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Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3797590	MA	Spiked Blank	2-Methylnaphthalene	2014/10/24		89	%	50 - 130
			3,3'-Dichlorobenzidine	2014/10/24		54	%	30 - 130
			Acenaphthene	2014/10/24		90	%	50 - 130
			Acenaphthylene	2014/10/24		88	%	50 - 130
			Anthracene	2014/10/24		93	%	50 - 130
			Benzo(a)anthracene	2014/10/24		95	%	50 - 130
			Benzo(a)pyrene	2014/10/24		104	%	50 - 130
			Benzo(b/j)fluoranthene	2014/10/24		109	%	50 - 130
			Benzo(g,h,i)perylene	2014/10/24		98	%	50 - 130
			Benzo(k)fluoranthene	2014/10/24		108	%	50 - 130
			Biphenyl	2014/10/24		90	%	50 - 130
			Bis(2-chloroethyl)ether	2014/10/24		90	%	50 - 130
			Bis(2-chloroisopropyl)ether	2014/10/24		94	%	50 - 130
			Bis(2-ethylhexyl)phthalate	2014/10/24		99	%	50 - 130
			Chrysene	2014/10/24		98	%	50 - 130
			Dibenz(a,h)anthracene	2014/10/24		101	%	50 - 130
			Diethyl phthalate	2014/10/24		104	%	50 - 130
			Dimethyl phthalate	2014/10/24		96	%	50 - 130
			Fluoranthene	2014/10/24		98	%	50 - 130
			Fluorene	2014/10/24		94	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2014/10/24		96	%	50 - 130
			Naphthalene	2014/10/24		90	%	50 - 130
			p-Chloroaniline	2014/10/24		55	%	30 - 130
			Pentachlorophenol	2014/10/24		71	%	50 - 130
			Phenanthrene	2014/10/24		93	%	50 - 130
			Phenol	2014/10/24		88	%	30 - 130
			Pyrene	2014/10/24		97	%	50 - 130
		Method Blank	2,4,6-Tribromophenol	2014/10/24		71	%	50 - 130
			2-Fluorobiphenyl	2014/10/24		95	%	50 - 130
			D14-Terphenyl (FS)	2014/10/24		103	%	50 - 130
			D5-Nitrobenzene	2014/10/24		81	%	50 - 130
			1,2,4-Trichlorobenzene	2014/10/24	<0.05		ug/g	
			1-Methylnaphthalene	2014/10/24	<0.03		ug/g	
			2,4,5-Trichlorophenol	2014/10/24	<0.08		ug/g	
			2,4,6-Trichlorophenol	2014/10/24	<0.1		ug/g	
			2,4-Dichlorophenol	2014/10/24	<0.1		ug/g	
			2,4-Dimethylphenol	2014/10/24	<0.2		ug/g	
			2,4-Dinitrophenol	2014/10/24	<0.5		ug/g	
			2,4-Dinitrotoluene	2014/10/24	<0.1		ug/g	
			2,6-Dinitrotoluene	2014/10/24	<0.1		ug/g	
			2-Chlorophenol	2014/10/24	<0.08		ug/g	
			2-Methylnaphthalene	2014/10/24	<0.03		ug/g	
			3,3'-Dichlorobenzidine	2014/10/24	<0.5		ug/g	
			Acenaphthene	2014/10/24	<0.03		ug/g	
			Acenaphthylene	2014/10/24	<0.05		ug/g	
			Anthracene	2014/10/24	<0.03		ug/g	
			Benzo(a)anthracene	2014/10/24	<0.05		ug/g	
			Benzo(a)pyrene	2014/10/24	<0.05		ug/g	
			Benzo(b/j)fluoranthene	2014/10/24	<0.1		ug/g	
			Benzo(g,h,i)perylene	2014/10/24	<0.1		ug/g	
			Benzo(k)fluoranthene	2014/10/24	<0.03		ug/g	
			Biphenyl	2014/10/24	<0.05		ug/g	
			Bis(2-chloroethyl)ether	2014/10/24	<0.2		ug/g	
			Bis(2-chloroisopropyl)ether	2014/10/24	<0.1		ug/g	
			Bis(2-ethylhexyl)phthalate	2014/10/24	<1		ug/g	

MMM Group Limited
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Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3797590	MA	Method Blank	Chrysene	2014/10/24	<0.05		ug/g	
			Dibenz(a,h)anthracene	2014/10/24	<0.05		ug/g	
			Diethyl phthalate	2014/10/24	<0.2		ug/g	
			Dimethyl phthalate	2014/10/24	<0.2		ug/g	
			Fluoranthene	2014/10/24	<0.05		ug/g	
			Fluorene	2014/10/24	<0.03		ug/g	
			Indeno(1,2,3-cd)pyrene	2014/10/24	<0.08		ug/g	
			Naphthalene	2014/10/24	<0.03		ug/g	
			p-Chloroaniline	2014/10/24	<0.2		ug/g	
			Pentachlorophenol	2014/10/24	<0.1		ug/g	
			Phenanthrene	2014/10/24	<0.05		ug/g	
			Phenol	2014/10/24	<0.09		ug/g	
			Pyrene	2014/10/24	<0.05		ug/g	
		RPD	1,2,4-Trichlorobenzene	2014/10/24	NC		%	40
			1-Methylnaphthalene	2014/10/24	NC		%	40
			2,4,5-Trichlorophenol	2014/10/24	NC		%	40
			2,4,6-Trichlorophenol	2014/10/24	NC		%	40
			2,4-Dichlorophenol	2014/10/24	NC		%	40
			2,4-Dimethylphenol	2014/10/24	NC		%	40
			2,4-Dinitrophenol	2014/10/24	NC		%	40
			2,4-Dinitrotoluene	2014/10/24	NC		%	40
			2,6-Dinitrotoluene	2014/10/24	NC		%	40
			2-Chlorophenol	2014/10/24	NC		%	40
			2-Methylnaphthalene	2014/10/24	NC		%	40
			3,3'-Dichlorobenzidine	2014/10/24	NC		%	40
			Acenaphthene	2014/10/24	NC		%	40
			Acenaphthylene	2014/10/24	NC		%	40
			Anthracene	2014/10/24	NC		%	40
			Benzo(a)anthracene	2014/10/24	NC		%	40
			Benzo(a)pyrene	2014/10/24	NC		%	40
			Benzo(b/j)fluoranthene	2014/10/24	NC		%	40
			Benzo(g,h,i)perylene	2014/10/24	NC		%	40
			Benzo(k)fluoranthene	2014/10/24	NC		%	40
			Biphenyl	2014/10/24	NC		%	40
			Bis(2-chloroethyl)ether	2014/10/24	NC		%	40
			Bis(2-chloroisopropyl)ether	2014/10/24	NC		%	40
			Bis(2-ethylhexyl)phthalate	2014/10/24	NC		%	40
			Chrysene	2014/10/24	NC		%	40
			Dibenz(a,h)anthracene	2014/10/24	NC		%	40
			Diethyl phthalate	2014/10/24	NC		%	40
			Dimethyl phthalate	2014/10/24	NC		%	40
			Fluoranthene	2014/10/24	NC		%	40
			Fluorene	2014/10/24	NC		%	40
			Indeno(1,2,3-cd)pyrene	2014/10/24	NC		%	40
			Naphthalene	2014/10/24	NC		%	40
			p-Chloroaniline	2014/10/24	NC		%	40
			Pentachlorophenol	2014/10/24	NC		%	40
			Phenanthrene	2014/10/24	NC		%	40
			Phenol	2014/10/24	NC		%	40
			Pyrene	2014/10/24	NC		%	40
3797742	CC6	RPD	Moisture	2014/10/24	NC		%	20
3797862	XJI	Matrix Spike [YD0201-04]	4-Bromofluorobenzene	2014/10/27		102	%	60 - 140
			D10-o-Xylene	2014/10/27		92	%	60 - 130
			D4-1,2-Dichloroethane	2014/10/27		92	%	60 - 140

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QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3797862	XJI	Matrix Spike [YD0201-04]	D8-Toluene	2014/10/27		104	%	60 - 140
			Acetone (2-Propanone)	2014/10/27		88	%	60 - 140
			Benzene	2014/10/27		96	%	60 - 140
			Bromodichloromethane	2014/10/27		92	%	60 - 140
			Bromoform	2014/10/27		88	%	60 - 140
			Bromomethane	2014/10/27		101	%	60 - 140
			Carbon Tetrachloride	2014/10/27		102	%	60 - 140
			Chlorobenzene	2014/10/27		100	%	60 - 140
			Chloroform	2014/10/27		96	%	60 - 140
			Dibromochloromethane	2014/10/27		93	%	60 - 140
			1,2-Dichlorobenzene	2014/10/27		101	%	60 - 140
			1,3-Dichlorobenzene	2014/10/27		101	%	60 - 140
			1,4-Dichlorobenzene	2014/10/27		100	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2014/10/27		111	%	60 - 140
			1,1-Dichloroethane	2014/10/27		100	%	60 - 140
			1,2-Dichloroethane	2014/10/27		92	%	60 - 140
			1,1-Dichloroethylene	2014/10/27		110	%	60 - 140
			cis-1,2-Dichloroethylene	2014/10/27		94	%	60 - 140
			trans-1,2-Dichloroethylene	2014/10/27		100	%	60 - 140
			1,2-Dichloropropane	2014/10/27		95	%	60 - 140
			cis-1,3-Dichloropropene	2014/10/27		90	%	60 - 140
			trans-1,3-Dichloropropene	2014/10/27		89	%	60 - 140
			Ethylbenzene	2014/10/27		98	%	60 - 140
			Ethylene Dibromide	2014/10/27		92	%	60 - 140
			Hexane	2014/10/27		107	%	60 - 140
			Methylene Chloride(Dichloromethane)	2014/10/27		103	%	60 - 140
			Methyl Isobutyl Ketone	2014/10/27		90	%	60 - 140
			Methyl Ethyl Ketone (2-Butanone)	2014/10/27		91	%	60 - 140
			Methyl t-butyl ether (MTBE)	2014/10/27		94	%	60 - 140
			Styrene	2014/10/27		104	%	60 - 140
			1,1,1,2-Tetrachloroethane	2014/10/27		98	%	60 - 140
			1,1,2,2-Tetrachloroethane	2014/10/27		92	%	60 - 140
			Tetrachloroethylene	2014/10/27		108	%	60 - 140
			Toluene	2014/10/27		100	%	60 - 140
			1,1,1-Trichloroethane	2014/10/27		100	%	60 - 140
			1,1,2-Trichloroethane	2014/10/27		90	%	60 - 140
			Trichloroethylene	2014/10/27		101	%	60 - 140
			Vinyl Chloride	2014/10/27		104	%	60 - 140
			p+m-Xylene	2014/10/27		102	%	60 - 140
			o-Xylene	2014/10/27		98	%	60 - 140
			Trichlorofluoromethane (FREON 11)	2014/10/27		105	%	60 - 140
		Spiked Blank	4-Bromofluorobenzene	2014/10/27		102	%	60 - 140
			D10-o-Xylene	2014/10/27		99	%	60 - 130
			D4-1,2-Dichloroethane	2014/10/27		98	%	60 - 140
			D8-Toluene	2014/10/27		101	%	60 - 140
			Acetone (2-Propanone)	2014/10/27		95	%	60 - 140
			Benzene	2014/10/27		96	%	60 - 130
			Bromodichloromethane	2014/10/27		95	%	60 - 130
			Bromoform	2014/10/27		94	%	60 - 130
			Bromomethane	2014/10/27		104	%	60 - 140
			Carbon Tetrachloride	2014/10/27		100	%	60 - 130
			Chlorobenzene	2014/10/27		99	%	60 - 130
			Chloroform	2014/10/27		98	%	60 - 130
			Dibromochloromethane	2014/10/27		97	%	60 - 130

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3797862	XJI	Spiked Blank	1,2-Dichlorobenzene	2014/10/27		101	%	60 - 130
			1,3-Dichlorobenzene	2014/10/27		98	%	60 - 130
			1,4-Dichlorobenzene	2014/10/27		98	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2014/10/27		109	%	60 - 140
			1,1-Dichloroethane	2014/10/27		100	%	60 - 130
			1,2-Dichloroethane	2014/10/27		97	%	60 - 130
			1,1-Dichloroethylene	2014/10/27		107	%	60 - 130
			cis-1,2-Dichloroethylene	2014/10/27		96	%	60 - 130
			trans-1,2-Dichloroethylene	2014/10/27		99	%	60 - 130
			1,2-Dichloropropane	2014/10/27		98	%	60 - 130
			cis-1,3-Dichloropropene	2014/10/27		95	%	60 - 130
			trans-1,3-Dichloropropene	2014/10/27		96	%	60 - 130
			Ethylbenzene	2014/10/27		95	%	60 - 130
			Ethylene Dibromide	2014/10/27		97	%	60 - 130
			Hexane	2014/10/27		105	%	60 - 130
			Methylene Chloride(Dichloromethane)	2014/10/27		106	%	60 - 130
			Methyl Isobutyl Ketone	2014/10/27		101	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2014/10/27		101	%	60 - 140
			Methyl t-butyl ether (MTBE)	2014/10/27		95	%	60 - 130
			Styrene	2014/10/27		104	%	60 - 130
			1,1,1,2-Tetrachloroethane	2014/10/27		98	%	60 - 130
			1,1,2,2-Tetrachloroethane	2014/10/27		99	%	60 - 130
			Tetrachloroethylene	2014/10/27		103	%	60 - 130
			Toluene	2014/10/27		96	%	60 - 130
			1,1,1-Trichloroethane	2014/10/27		99	%	60 - 130
			1,1,2-Trichloroethane	2014/10/27		95	%	60 - 130
			Trichloroethylene	2014/10/27		100	%	60 - 130
			Vinyl Chloride	2014/10/27		102	%	60 - 130
			p+m-Xylene	2014/10/27		98	%	60 - 130
			o-Xylene	2014/10/27		95	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2014/10/27		101	%	60 - 130
		Method Blank	4-Bromofluorobenzene	2014/10/27		99	%	60 - 140
			D10-o-Xylene	2014/10/27		87	%	60 - 130
			D4-1,2-Dichloroethane	2014/10/27		100	%	60 - 140
			D8-Toluene	2014/10/27		96	%	60 - 140
			Acetone (2-Propanone)	2014/10/27	<0.50		ug/g	
			Benzene	2014/10/27	<0.020		ug/g	
			Bromodichloromethane	2014/10/27	<0.050		ug/g	
			Bromoform	2014/10/27	<0.050		ug/g	
			Bromomethane	2014/10/27	<0.050		ug/g	
			Carbon Tetrachloride	2014/10/27	<0.050		ug/g	
			Chlorobenzene	2014/10/27	<0.050		ug/g	
			Chloroform	2014/10/27	<0.050		ug/g	
			Dibromochloromethane	2014/10/27	<0.050		ug/g	
			1,2-Dichlorobenzene	2014/10/27	<0.050		ug/g	
			1,3-Dichlorobenzene	2014/10/27	<0.050		ug/g	
			1,4-Dichlorobenzene	2014/10/27	<0.050		ug/g	
			Dichlorodifluoromethane (FREON 12)	2014/10/27	<0.050		ug/g	
			1,1-Dichloroethane	2014/10/27	<0.050		ug/g	
			1,2-Dichloroethane	2014/10/27	<0.050		ug/g	
			1,1-Dichloroethylene	2014/10/27	<0.050		ug/g	
			cis-1,2-Dichloroethylene	2014/10/27	<0.050		ug/g	
			trans-1,2-Dichloroethylene	2014/10/27	<0.050		ug/g	
			1,2-Dichloropropane	2014/10/27	<0.050		ug/g	
			cis-1,3-Dichloropropene	2014/10/27	<0.030		ug/g	

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3797862	XJI	Method Blank	trans-1,3-Dichloropropene	2014/10/27	<0.040		ug/g	
			Ethylbenzene	2014/10/27	<0.020		ug/g	
			Ethylene Dibromide	2014/10/27	<0.050		ug/g	
			Hexane	2014/10/27	<0.050		ug/g	
			Methylene Chloride(Dichloromethane)	2014/10/27	<0.050		ug/g	
			Methyl Isobutyl Ketone	2014/10/27	<0.50		ug/g	
			Methyl Ethyl Ketone (2-Butanone)	2014/10/27	<0.50		ug/g	
			Methyl t-butyl ether (MTBE)	2014/10/27	<0.050		ug/g	
			Styrene	2014/10/27	<0.050		ug/g	
			1,1,1,2-Tetrachloroethane	2014/10/27	<0.050		ug/g	
			1,1,2,2-Tetrachloroethane	2014/10/27	<0.050		ug/g	
			Tetrachloroethylene	2014/10/27	<0.050		ug/g	
			Toluene	2014/10/27	<0.020		ug/g	
			1,1,1-Trichloroethane	2014/10/27	<0.050		ug/g	
			1,1,2-Trichloroethane	2014/10/27	<0.050		ug/g	
			Trichloroethylene	2014/10/27	<0.050		ug/g	
			Vinyl Chloride	2014/10/27	<0.020		ug/g	
			p+m-Xylene	2014/10/27	<0.020		ug/g	
			o-Xylene	2014/10/27	<0.020		ug/g	
			Xylene (Total)	2014/10/27	<0.020		ug/g	
			Trichlorofluoromethane (FREON 11)	2014/10/27	<0.050		ug/g	
		RPD [YD0201-04]	Acetone (2-Propanone)	2014/10/27	NC		%	50
			Benzene	2014/10/27	NC		%	50
			Bromodichloromethane	2014/10/27	NC		%	50
			Bromoform	2014/10/27	NC		%	50
			Bromomethane	2014/10/27	NC		%	50
			Carbon Tetrachloride	2014/10/27	NC		%	50
			Chlorobenzene	2014/10/27	NC		%	50
			Chloroform	2014/10/27	NC		%	50
			Dibromochloromethane	2014/10/27	NC		%	50
			1,2-Dichlorobenzene	2014/10/27	NC		%	50
			1,3-Dichlorobenzene	2014/10/27	NC		%	50
			1,4-Dichlorobenzene	2014/10/27	NC		%	50
			Dichlorodifluoromethane (FREON 12)	2014/10/27	NC		%	50
			1,1-Dichloroethane	2014/10/27	NC		%	50
			1,2-Dichloroethane	2014/10/27	NC		%	50
			1,1-Dichloroethylene	2014/10/27	NC		%	50
			cis-1,2-Dichloroethylene	2014/10/27	NC		%	50
			trans-1,2-Dichloroethylene	2014/10/27	NC		%	50
			1,2-Dichloropropane	2014/10/27	NC		%	50
			cis-1,3-Dichloropropene	2014/10/27	NC		%	50
			trans-1,3-Dichloropropene	2014/10/27	NC		%	50
			Ethylbenzene	2014/10/27	NC		%	50
			Ethylene Dibromide	2014/10/27	NC		%	50
			Hexane	2014/10/27	NC		%	50
			Methylene Chloride(Dichloromethane)	2014/10/27	NC		%	50
			Methyl Isobutyl Ketone	2014/10/27	NC		%	50
			Methyl Ethyl Ketone (2-Butanone)	2014/10/27	NC		%	50
			Methyl t-butyl ether (MTBE)	2014/10/27	NC		%	50
			Styrene	2014/10/27	NC		%	50
			1,1,1,2-Tetrachloroethane	2014/10/27	NC		%	50
			1,1,2,2-Tetrachloroethane	2014/10/27	NC		%	50
			Tetrachloroethylene	2014/10/27	NC		%	50
			Toluene	2014/10/27	2.6		%	50
			1,1,1-Trichloroethane	2014/10/27	NC		%	50

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3797862	XJI	RPD [YD0201-04]	1,1,2-Trichloroethane	2014/10/27	NC		%	50
			Trichloroethylene	2014/10/27	NC		%	50
			Vinyl Chloride	2014/10/27	NC		%	50
			p+m-Xylene	2014/10/27	NC		%	50
			o-Xylene	2014/10/27	NC		%	50
			Xylene (Total)	2014/10/27	2.5		%	50
			Trichlorofluoromethane (FREON 11)	2014/10/27	NC		%	50
3798287	SHG	Matrix Spike [YD0202-02]	Decachlorobiphenyl	2014/10/24		103	%	60 - 130
			Aroclor 1260	2014/10/24		88	%	60 - 130
			Total PCB	2014/10/24		88	%	60 - 130
		Spiked Blank	Decachlorobiphenyl	2014/10/24		111	%	60 - 130
			Aroclor 1260	2014/10/24		91	%	60 - 130
			Total PCB	2014/10/24		91	%	60 - 130
		Method Blank	Decachlorobiphenyl	2014/10/24		111	%	60 - 130
			Aroclor 1242	2014/10/24	<0.010		ug/g	
			Aroclor 1248	2014/10/24	<0.010		ug/g	
			Aroclor 1254	2014/10/24	<0.010		ug/g	
			Aroclor 1260	2014/10/24	<0.010		ug/g	
			Total PCB	2014/10/24	<0.010		ug/g	
		RPD [YD0202-02]	Aroclor 1242	2014/10/24	NC		%	50
			Aroclor 1248	2014/10/24	NC		%	50
			Aroclor 1254	2014/10/24	NC		%	50
			Aroclor 1260	2014/10/24	NC		%	50
			Total PCB	2014/10/24	NC		%	50
3798315	VIV	Matrix Spike [YD0206-01]	Acid Extractable Antimony (Sb)	2014/10/27		106	%	75 - 125
			Acid Extractable Arsenic (As)	2014/10/27		104	%	75 - 125
			Acid Extractable Barium (Ba)	2014/10/27		101	%	75 - 125
			Acid Extractable Beryllium (Be)	2014/10/27		111	%	75 - 125
			Acid Extractable Boron (B)	2014/10/27		100	%	75 - 125
			Acid Extractable Cadmium (Cd)	2014/10/27		105	%	75 - 125
			Acid Extractable Chromium (Cr)	2014/10/27		102	%	75 - 125
			Acid Extractable Cobalt (Co)	2014/10/27		99	%	75 - 125
			Acid Extractable Copper (Cu)	2014/10/27		100	%	75 - 125
			Acid Extractable Lead (Pb)	2014/10/27		98	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2014/10/27		101	%	75 - 125
			Acid Extractable Nickel (Ni)	2014/10/27		101	%	75 - 125
			Acid Extractable Selenium (Se)	2014/10/27		104	%	75 - 125
			Acid Extractable Silver (Ag)	2014/10/27		101	%	75 - 125
			Acid Extractable Thallium (Tl)	2014/10/27		97	%	75 - 125
			Acid Extractable Uranium (U)	2014/10/27		99	%	75 - 125
			Acid Extractable Vanadium (V)	2014/10/27		107	%	75 - 125
			Acid Extractable Zinc (Zn)	2014/10/27		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2014/10/27		96	%	75 - 125
		Spiked Blank	Acid Extractable Antimony (Sb)	2014/10/27		105	%	80 - 120
			Acid Extractable Arsenic (As)	2014/10/27		104	%	80 - 120
			Acid Extractable Barium (Ba)	2014/10/27		102	%	80 - 120
			Acid Extractable Beryllium (Be)	2014/10/27		104	%	80 - 120
			Acid Extractable Boron (B)	2014/10/27		107	%	80 - 120
			Acid Extractable Cadmium (Cd)	2014/10/27		102	%	80 - 120
			Acid Extractable Chromium (Cr)	2014/10/27		98	%	80 - 120
			Acid Extractable Cobalt (Co)	2014/10/27		98	%	80 - 120
			Acid Extractable Copper (Cu)	2014/10/27		100	%	80 - 120
			Acid Extractable Lead (Pb)	2014/10/27		97	%	80 - 120

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3798315	VIV	Spiked Blank	Acid Extractable Molybdenum (Mo)	2014/10/27		99	%	80 - 120
			Acid Extractable Nickel (Ni)	2014/10/27		104	%	80 - 120
			Acid Extractable Selenium (Se)	2014/10/27		104	%	80 - 120
			Acid Extractable Silver (Ag)	2014/10/27		98	%	80 - 120
			Acid Extractable Thallium (Tl)	2014/10/27		96	%	80 - 120
			Acid Extractable Uranium (U)	2014/10/27		97	%	80 - 120
			Acid Extractable Vanadium (V)	2014/10/27		104	%	80 - 120
			Acid Extractable Zinc (Zn)	2014/10/27		108	%	80 - 120
			Acid Extractable Mercury (Hg)	2014/10/27		99	%	80 - 120
		Method Blank	Acid Extractable Antimony (Sb)	2014/10/27	<0.20		ug/g	
			Acid Extractable Arsenic (As)	2014/10/27	<1.0		ug/g	
			Acid Extractable Barium (Ba)	2014/10/27	<0.50		ug/g	
			Acid Extractable Beryllium (Be)	2014/10/27	<0.20		ug/g	
			Acid Extractable Boron (B)	2014/10/27	<5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2014/10/27	<0.10		ug/g	
			Acid Extractable Chromium (Cr)	2014/10/27	<1.0		ug/g	
			Acid Extractable Cobalt (Co)	2014/10/27	<0.10		ug/g	
			Acid Extractable Copper (Cu)	2014/10/27	<0.50		ug/g	
			Acid Extractable Lead (Pb)	2014/10/27	<1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2014/10/27	<0.50		ug/g	
			Acid Extractable Nickel (Ni)	2014/10/27	<0.50		ug/g	
			Acid Extractable Selenium (Se)	2014/10/27	<0.50		ug/g	
			Acid Extractable Silver (Ag)	2014/10/27	<0.20		ug/g	
			Acid Extractable Thallium (Tl)	2014/10/27	<0.050		ug/g	
			Acid Extractable Uranium (U)	2014/10/27	<0.050		ug/g	
			Acid Extractable Vanadium (V)	2014/10/27	<5.0		ug/g	
			Acid Extractable Zinc (Zn)	2014/10/27	<5.0		ug/g	
			Acid Extractable Mercury (Hg)	2014/10/27	<0.050		ug/g	
		RPD [YD0206-01]	Acid Extractable Antimony (Sb)	2014/10/27	NC		%	30
			Acid Extractable Arsenic (As)	2014/10/27	NC		%	30
			Acid Extractable Barium (Ba)	2014/10/27	3.8		%	30
			Acid Extractable Beryllium (Be)	2014/10/27	NC		%	30
			Acid Extractable Boron (B)	2014/10/27	NC		%	30
			Acid Extractable Cadmium (Cd)	2014/10/27	NC		%	30
			Acid Extractable Chromium (Cr)	2014/10/27	NC		%	30
			Acid Extractable Cobalt (Co)	2014/10/27	0.3		%	30
			Acid Extractable Copper (Cu)	2014/10/27	1.2		%	30
			Acid Extractable Lead (Pb)	2014/10/27	0.9		%	30
			Acid Extractable Molybdenum (Mo)	2014/10/27	NC		%	30
			Acid Extractable Nickel (Ni)	2014/10/27	NC		%	30
			Acid Extractable Selenium (Se)	2014/10/27	NC		%	30
			Acid Extractable Silver (Ag)	2014/10/27	NC		%	30
			Acid Extractable Thallium (Tl)	2014/10/27	NC		%	30
			Acid Extractable Uranium (U)	2014/10/27	4.4		%	30
			Acid Extractable Vanadium (V)	2014/10/27	NC		%	30
			Acid Extractable Zinc (Zn)	2014/10/27	2.1		%	30
			Acid Extractable Mercury (Hg)	2014/10/27	NC		%	30
3798347	CC6	RPD [YD0211-01]	Moisture	2014/10/24	1		%	20
3798394	MKS	Matrix Spike [YD0202-03]	o-Terphenyl	2014/10/25		90	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/25		95	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2014/10/25		97	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2014/10/25		99	%	50 - 130
		Spiked Blank	o-Terphenyl	2014/10/25		91	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/25		93	%	80 - 120

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MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3798394	MKS	Spiked Blank	F3 (C16-C34 Hydrocarbons)	2014/10/25		95	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2014/10/25		97	%	80 - 120
		Method Blank	o-Terphenyl	2014/10/24		88	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/24	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2014/10/24	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2014/10/24	<50		ug/g	
		RPD [YD0202-03]	F2 (C10-C16 Hydrocarbons)	2014/10/25	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2014/10/25	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2014/10/25	NC		%	30
3799036	MGE	Matrix Spike						
		[YD0207-01]	Chromium (VI)	2014/10/28		40 (1)	%	75 - 125
		QC Standard	Chromium (VI)	2014/10/28		110	%	80 - 120
		Spiked Blank	Chromium (VI)	2014/10/28		93	%	80 - 120
		Method Blank	Chromium (VI)	2014/10/28	<0.2		ug/g	
		RPD [YD0207-01]	Chromium (VI)	2014/10/28	NC		%	35
3799175	JXI	Matrix Spike	1,4-Difluorobenzene	2014/10/26		96	%	60 - 140
			4-Bromofluorobenzene	2014/10/26		107	%	60 - 140
			D10-Ethylbenzene	2014/10/26		96	%	60 - 140
			D4-1,2-Dichloroethane	2014/10/26		85	%	60 - 140
			F1 (C6-C10)	2014/10/26		80	%	60 - 140
		Spiked Blank	1,4-Difluorobenzene	2014/10/26		96	%	60 - 140
			4-Bromofluorobenzene	2014/10/26		108	%	60 - 140
			D10-Ethylbenzene	2014/10/26		90	%	60 - 140
			D4-1,2-Dichloroethane	2014/10/26		84	%	60 - 140
			F1 (C6-C10)	2014/10/26		93	%	80 - 120
		Method Blank	1,4-Difluorobenzene	2014/10/26		97	%	60 - 140
			4-Bromofluorobenzene	2014/10/26		102	%	60 - 140
			D10-Ethylbenzene	2014/10/26		88	%	60 - 140
			D4-1,2-Dichloroethane	2014/10/26		84	%	60 - 140
			F1 (C6-C10)	2014/10/26	<10		ug/g	
			F1 (C6-C10) - BTEX	2014/10/26	<10		ug/g	
		RPD	F1 (C6-C10)	2014/10/26	NC		%	30
			F1 (C6-C10) - BTEX	2014/10/26	NC		%	30
3799890	APT	Matrix Spike						
		[YD0201-01]	Hot Water Ext. Boron (B)	2014/10/27		98	%	75 - 125
		Spiked Blank	Hot Water Ext. Boron (B)	2014/10/27		94	%	75 - 125
		Method Blank	Hot Water Ext. Boron (B)	2014/10/27	<0.050		ug/g	
		RPD [YD0201-01]	Hot Water Ext. Boron (B)	2014/10/27	6.5		%	40
3802738	RUS	Matrix Spike	F4G-sg (Grav. Heavy Hydrocarbons)	2014/10/29		96	%	65 - 135
		Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2014/10/29		98	%	65 - 135
		Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2014/10/29	<100		ug/g	
		RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2014/10/29	NC		%	50
3806498	BWW	Spiked Blank	o-Terphenyl	2014/10/31		84	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/31		80	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2014/10/31		92	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2014/10/31		97	%	80 - 120
		Method Blank	o-Terphenyl	2014/10/31		82	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2014/10/31	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2014/10/31	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2014/10/31	<50		ug/g	

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method

MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).
(1) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.

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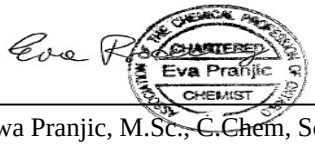
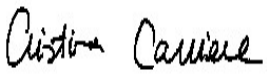
Validation Signature Page

Maxxam Job #: B4J8671

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



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



Cristina Carriere, Scientific Services

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Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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RUSH

Maxxam Analytics
Canada L5N 2L8 Tel:(905) 817-5700 Toll-Free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

23-Oct-14 15:50
Jolanta Goralczyk
B4J8671
MAF ENV-598

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#22101 MMM Group Limited	Company Name:	MMM Group	Quotation #:	B47123
Attention:	Accounts Payable	Attention:	Andrea Ferguson Jones	P.O. #:	
Address:	100 Commerce Valley Dr West Thornhill ON L3T 0A1	Address:	Ferguson_Jones A@ mmm. ca	Project:	10-12108-001-002
Tel:	(905) 882-1100 Fax: (905) 882-0055	Tel:	Fax:	Project Name:	Guelph dam Investigation
Email:	accountspayable@mmm.ca	Email:	EDD@ mmm. ca	Site #:	
				Sampled By:	R. Needhot

C#490622-01-01

Quote Order #: 90622

Project Manager: Jolanta Goralczyk

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☐ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☒ Ind/Comm ☐ Coarse	☐ Reg 558. ☐ Storm Sewer Bylaw	
☐ Table 3 ☐ Agri/Other ☐ For RSC	☐ MISA Municipality _____	
☐ Table ___	☐ PWQO	
	☐ Other _____	

Include Criteria on Certificate of Analysis (Y/N)? _____

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: 3 day TAT Time Required: ___ ☒
Rush Confirmation Number: JG2014102104 *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 Semivolatiles Package (Soil)	O.Reg 153 Volatile Organics (Soil)	O.Reg 153 Metals Package (Soil)	O.Reg 153 PCBs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Water)	O.Reg 153 Volatile Organics (Water)	O.Reg 153 Semivolatiles Package (Water)	O.Reg 153 Metals Package (Water)	O.Reg 153 PCBs (Water)	# of Bottles	Comments
1		TP3A-1	Oct 23,14	pm	Soil		X	X	X	X	X							
2		TP9-1	Oct 23,14	pm	Soil		X	X	X	X	X							
3		TP6-1	Oct 23,14	pm	Soil		X	X	X	X	X							
4		TP1-1	Oct 22,14	pm	Soil		X	X	X	X	X							
5		TP3-1	Oct 22,14	pm	Soil		X	X	X	X	X							
6		TP4-3	Oct 22,14	pm	Soil		X	X	X	X	X							
7		TP4-1	Oct 22,14	pm	Soil		X	X	X	X	X							
8		TP5-1	Oct 23,14	am	Soil		X	X	X	X	X							
9		TP2-3	Oct 22	pm	Soil		X	X	X	X	X							
10		DUP 1	Oct 23	am	Soil					X								

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
R. Needhot	14/10/23	19:50	Khue Hoang Greval	2014/10/23	15:50	

Laboratory Use Only				
Time Sensitive	Temperature (°C) on Receipt	Custody Seal	Yes	No
	5/5/6	Present		✓
		Intact		✓

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxam Yellow: Client

5/10/19

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-Free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#22101 MMM Group Limited	Company Name:	MMM Group	Quotation #:	B47123	Maxxam Job #: B4J8671 MAF	Bottle Order #: 490622
Attention:	Accounts Payable	Attention:	Andrea Ferguson Jones	P.O. #:			
Address:	100 Commerce Valley Dr West Thornhill ON L3T 0A1	Address:		Project:	10-12108-001-002	COC #: C#490622-03-01	Project Manager: Jolanta Goralczyk
Tel:	(905) 882-1100 Fax: (905) 882-0055	Tel:	FergusonJonesA@mmm.ca Fax:	Project Name:	Guelph Dram Investigation		
Email:	accountspayable@mmm.ca	Email:	EDD @ mmm.ca	Site #:			
				Sampled By:	D. Neerhof		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☒ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558. ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☐ PWQO
- ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: 5 day Time Required: ___ ☒
Rush Confirmation Number: JG2014102104 (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 Semivolatiles Package (Soil)	O.Reg 153 Volatile Organics (Soil)	O.Reg 153 Metals Package (Soil)	O.Reg 153 PCBs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Water)	O.Reg 153 Volatile Organics (Water) TCLP MEALS	O.Reg 153 Semivolatiles Package (Water) TCLP VOC	O.Reg 153 Metals Package (Water) TCLP PCB	O.Reg 153 PCBs (Water) TCLP PHC	# of Bottles	Comments
1		Dup 2	Oct 23,14	pm	Soil		X		X								4	
2		Dup 3	Oct 23,14	pm	Soil			X			X						2	
3																		
4		TCLP	Oct 23,14	pm	Soil								X	X	X	X	6	
5																		
6																		
7																		
8																		
9																		
10																		

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
Dan Neerhof	14/10/23	15:50	Harman Grewal	2014/10/23	15:50		Time Sensitive	Temperature (°C) on Receipt 5/5/16	Custody Seal	Yes	No
				2014/10/23					Present		JJ
									Intact		JJ

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

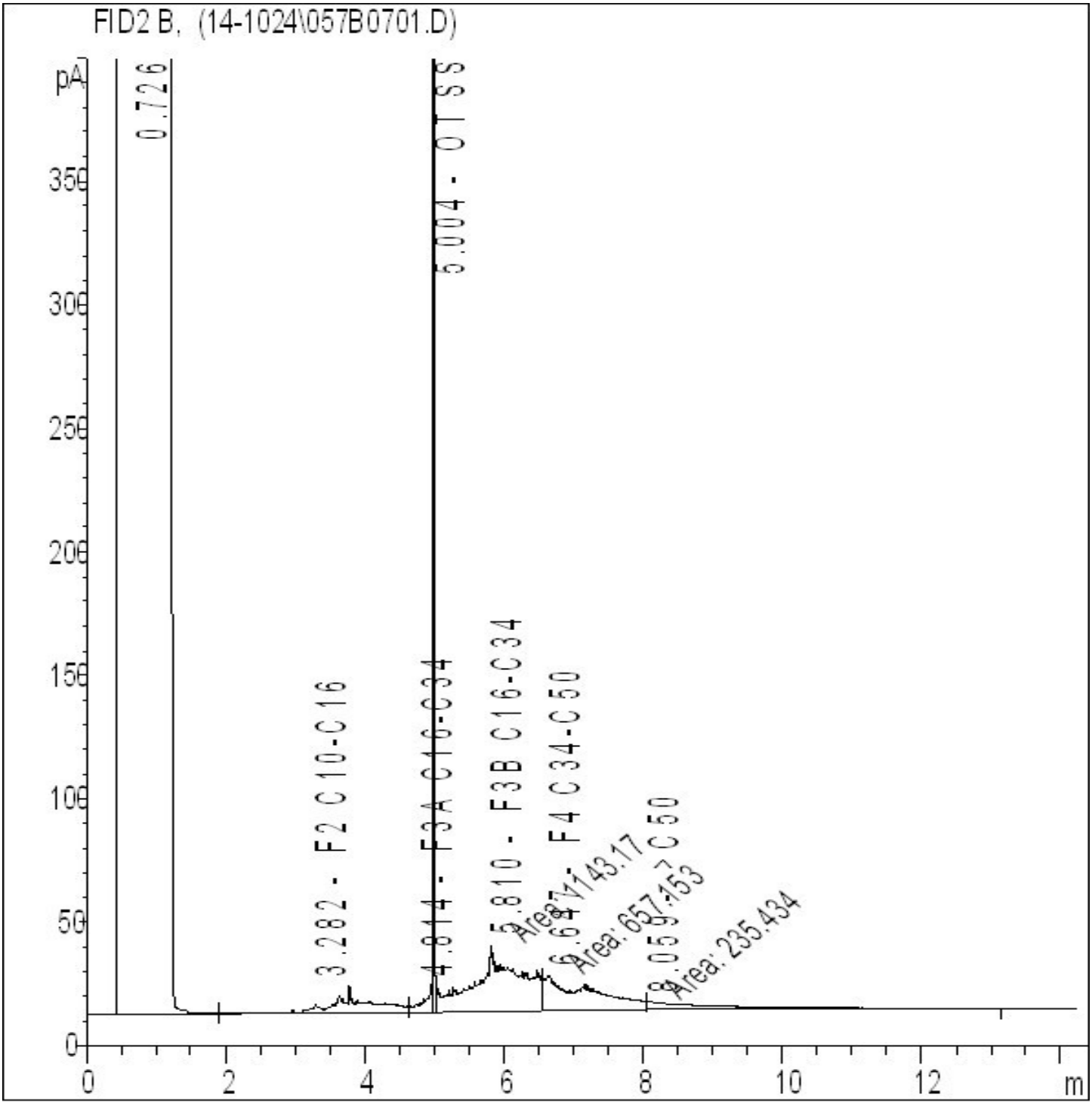
White: Maxxam Yellow: Client

5/10/14

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0201

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP3A-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



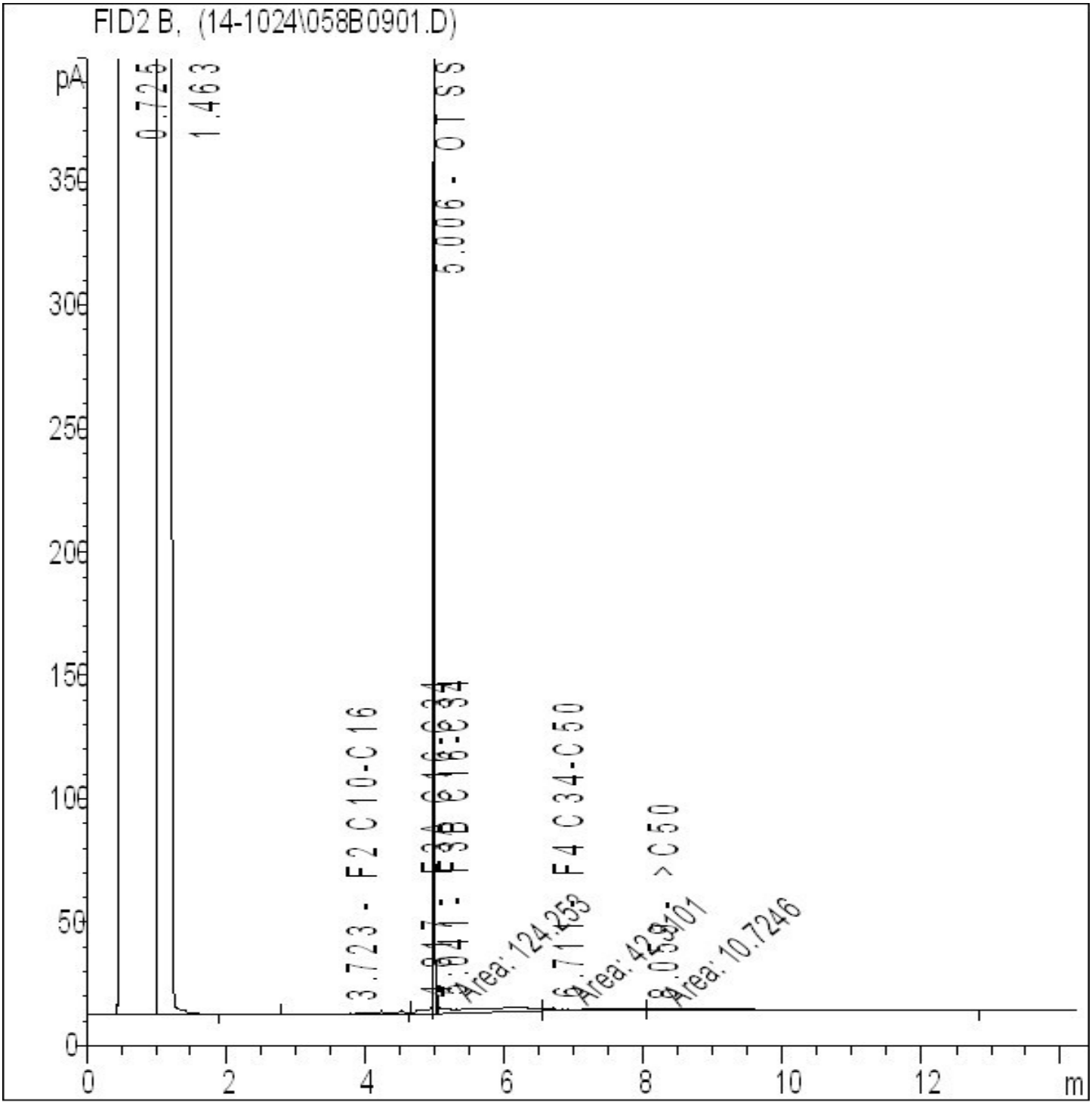
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Success Through Science®

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0202

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP9-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

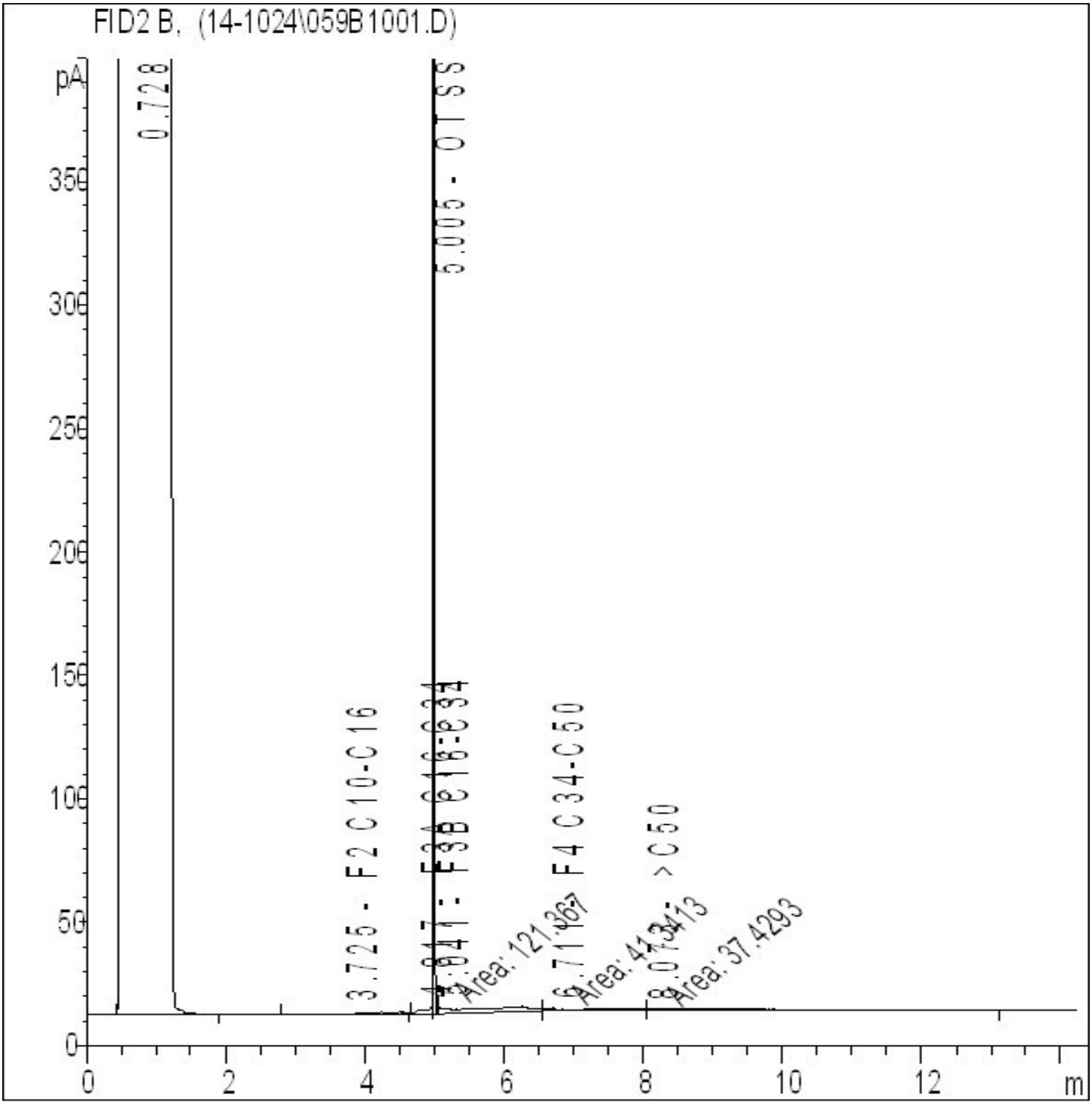


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0202 Lab-Dup

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP9-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

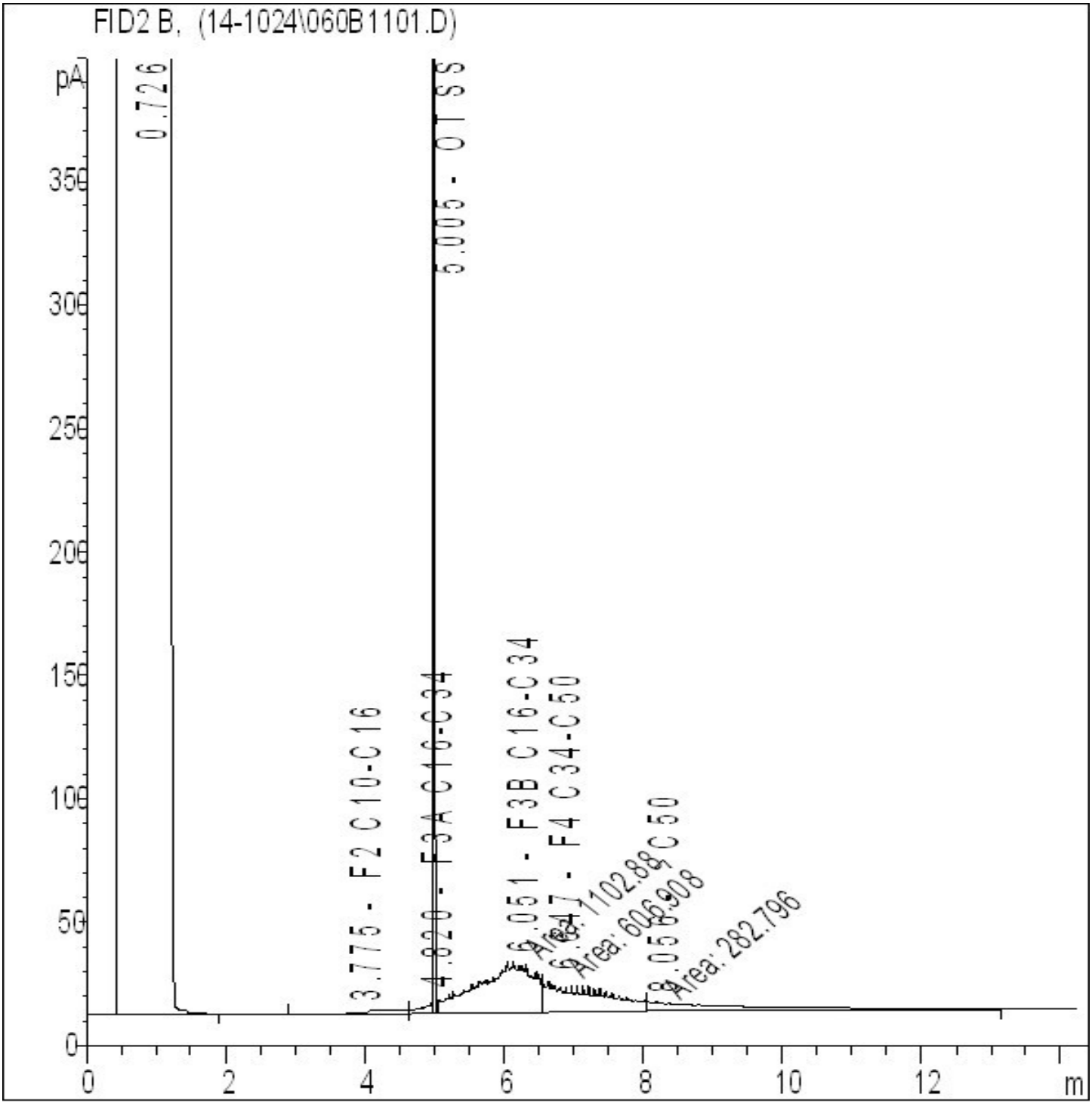


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0203

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP6-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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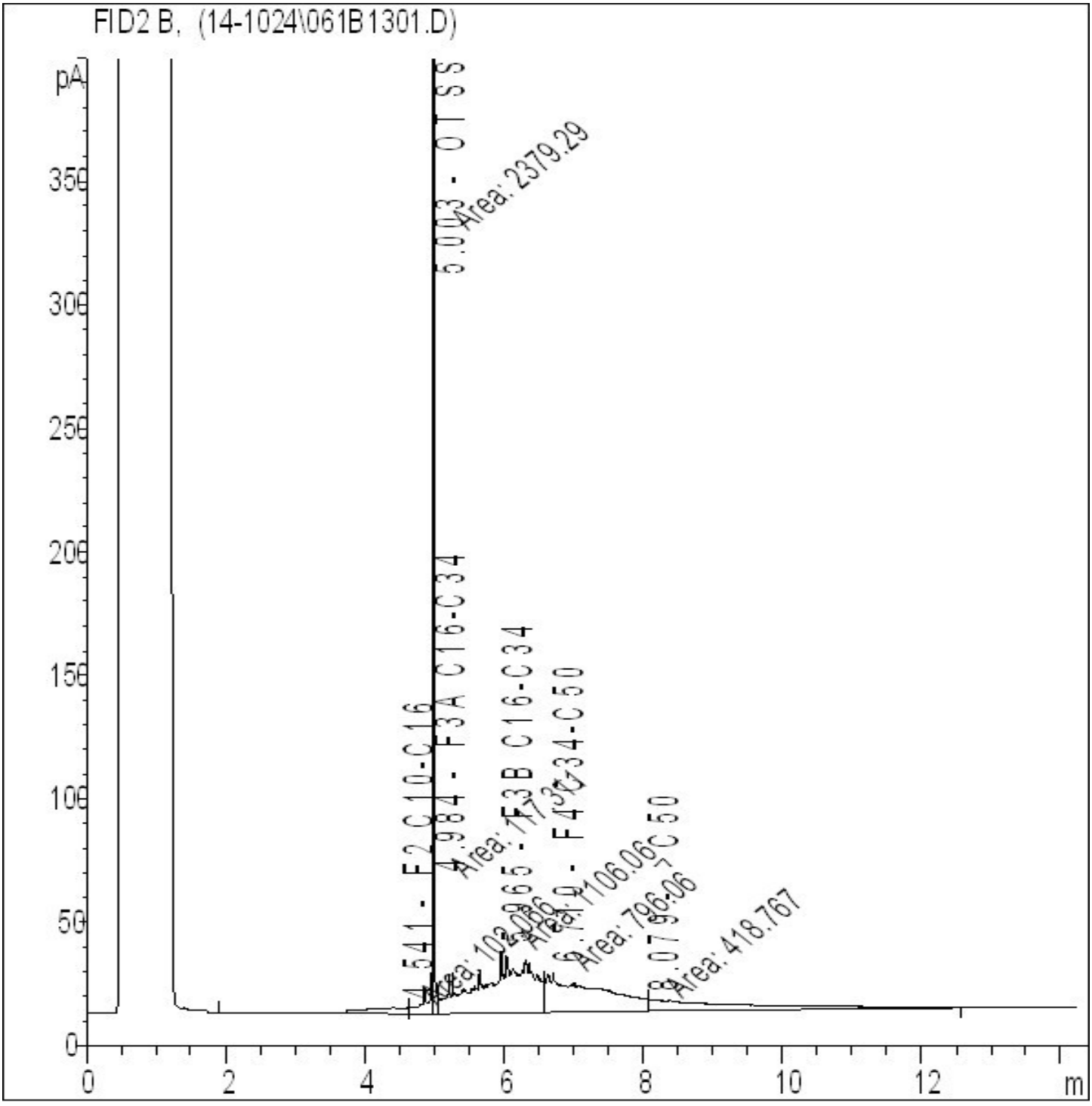
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0204

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP1-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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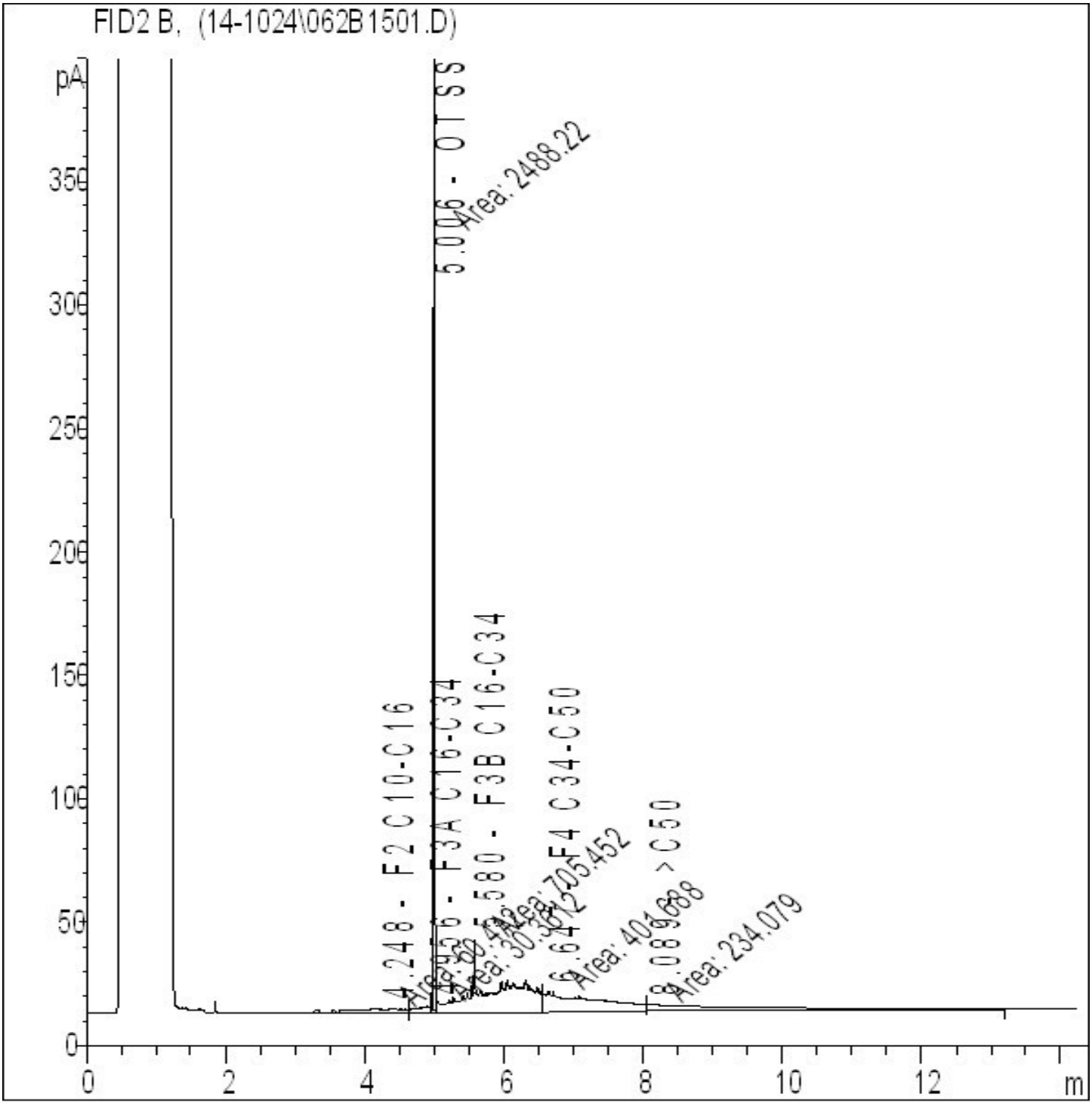
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0205

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP3-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

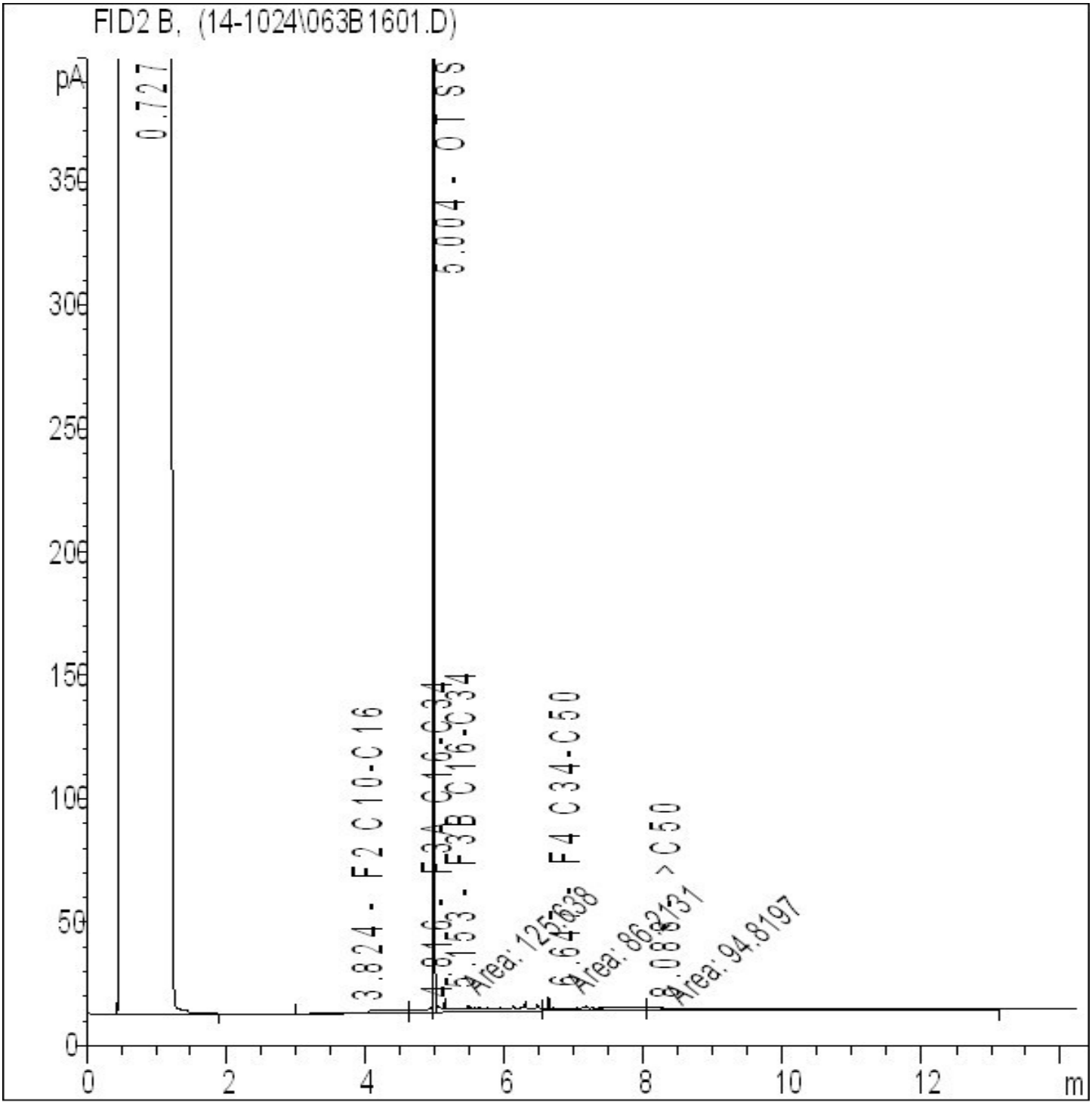


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0206

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP4-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

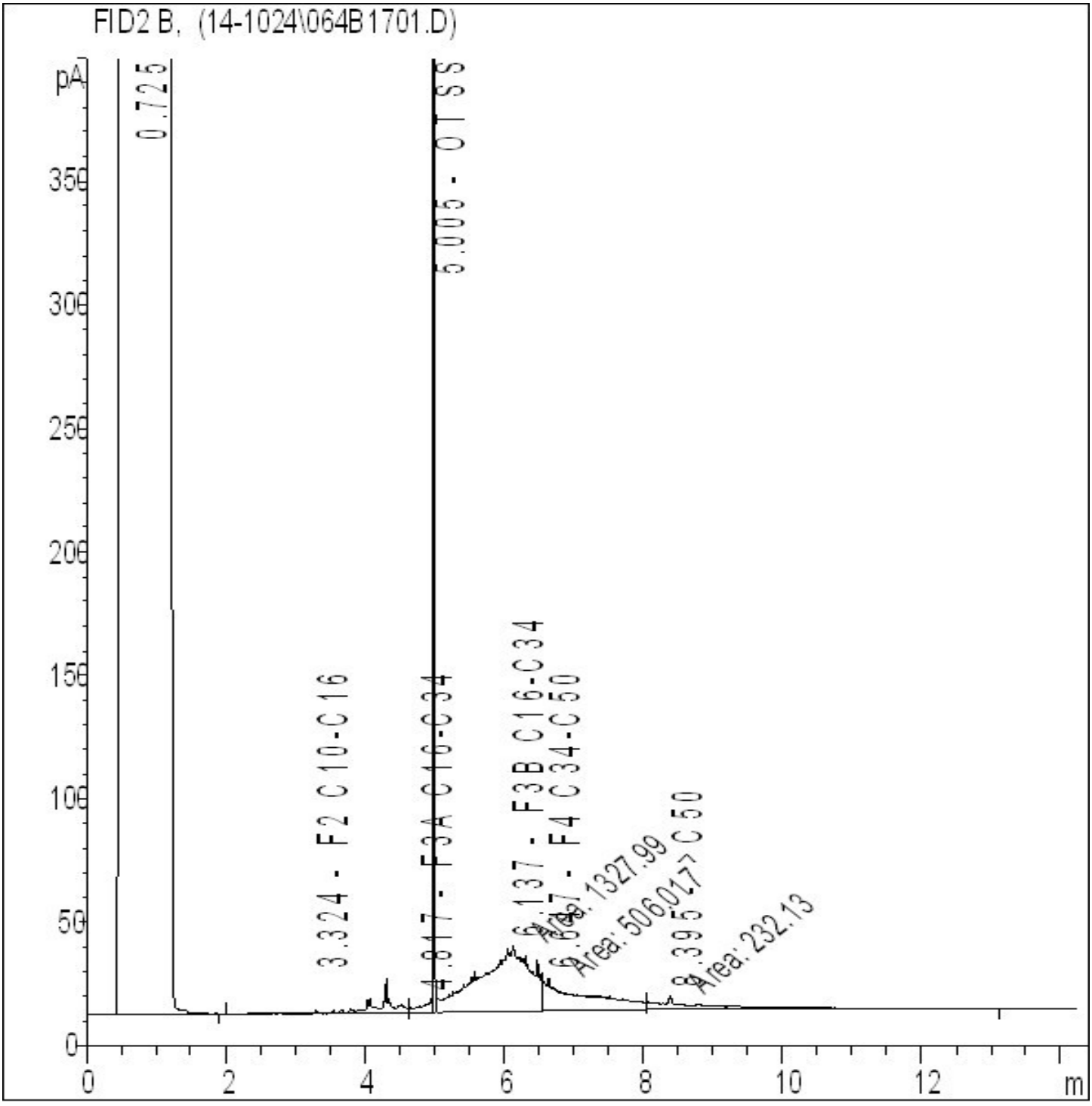


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0207

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP4-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

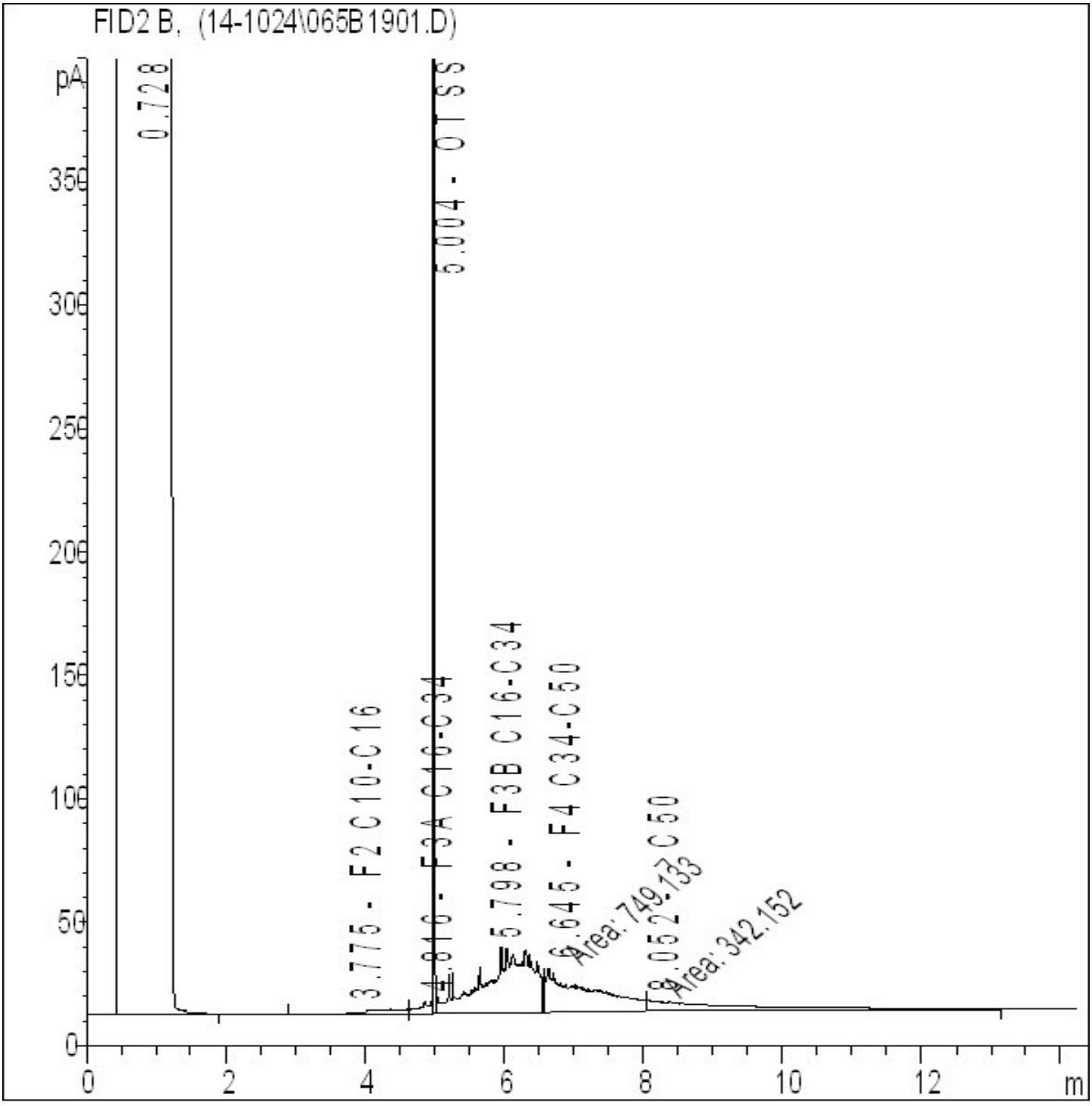


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0208

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP5-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

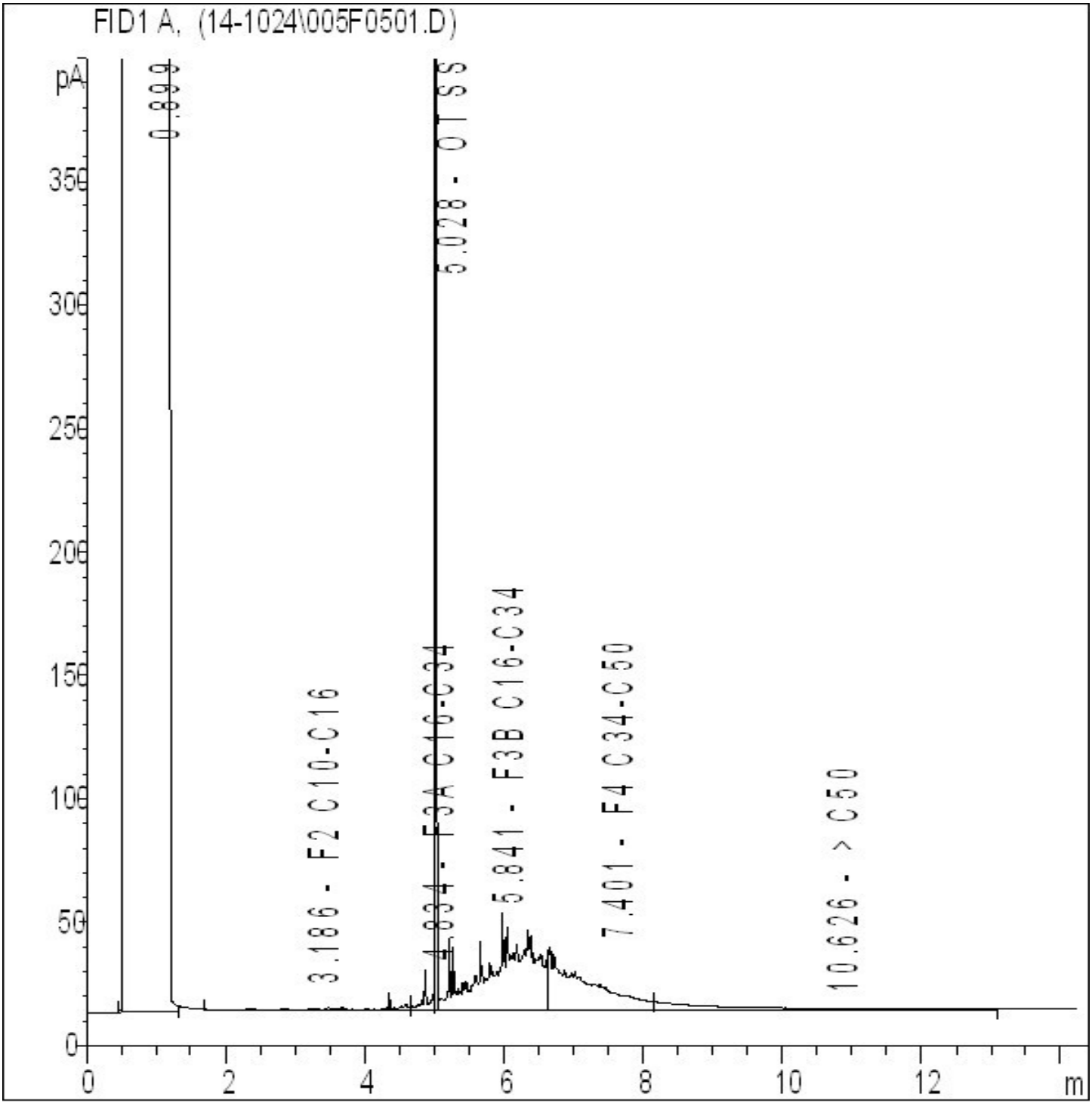


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0209

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP2-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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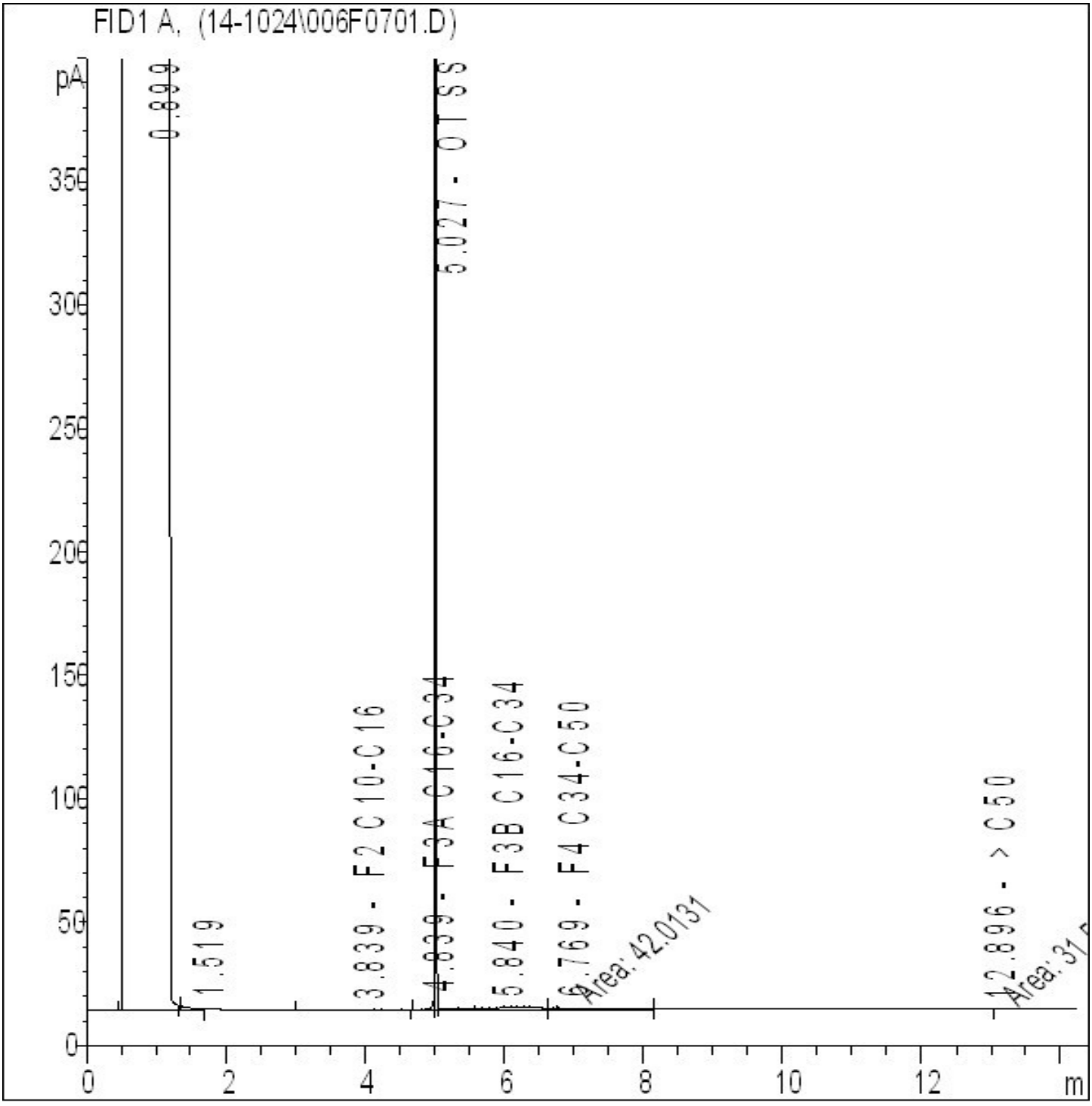
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YD0211

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: DUP2

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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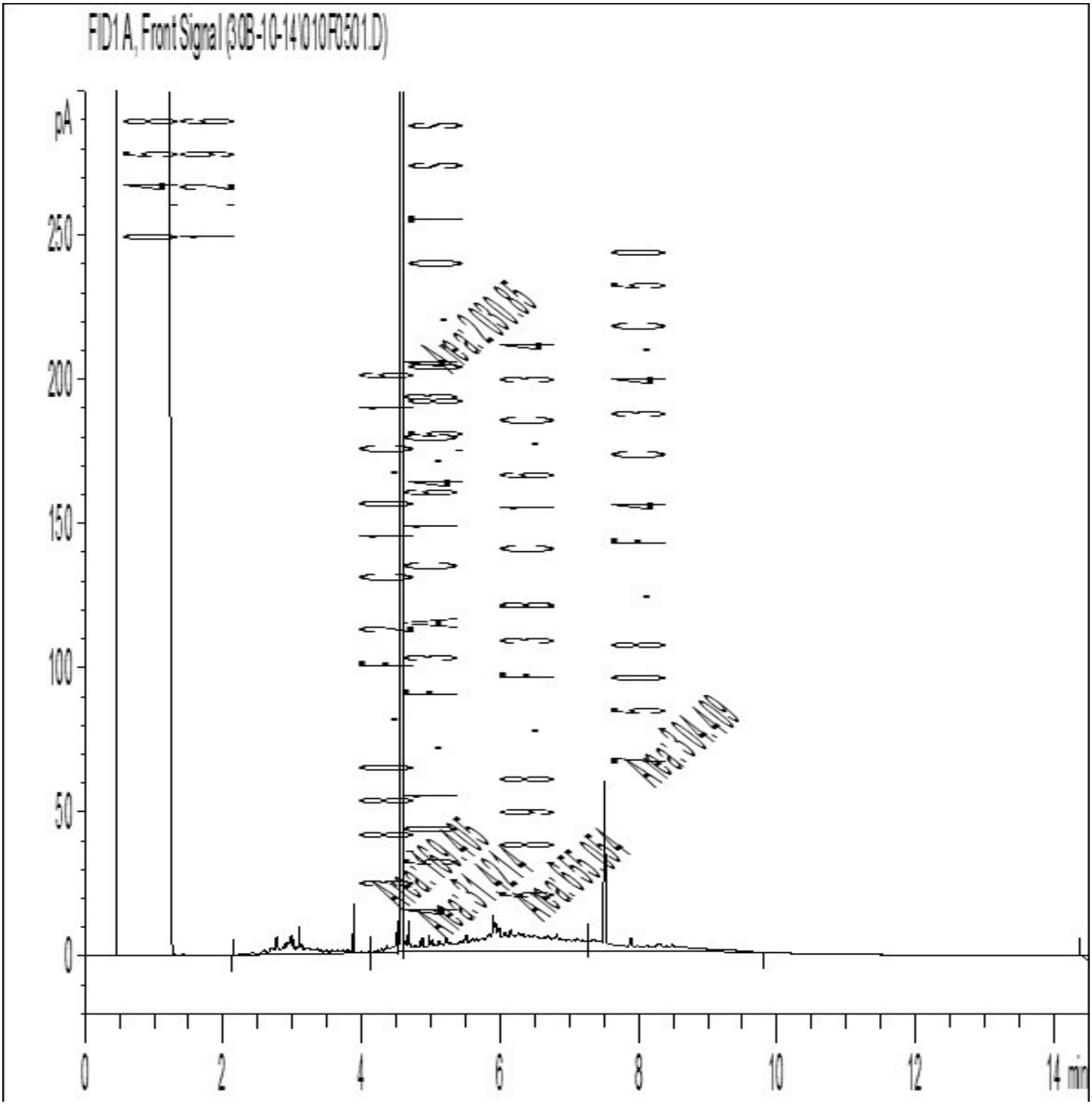
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0738

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP3A-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

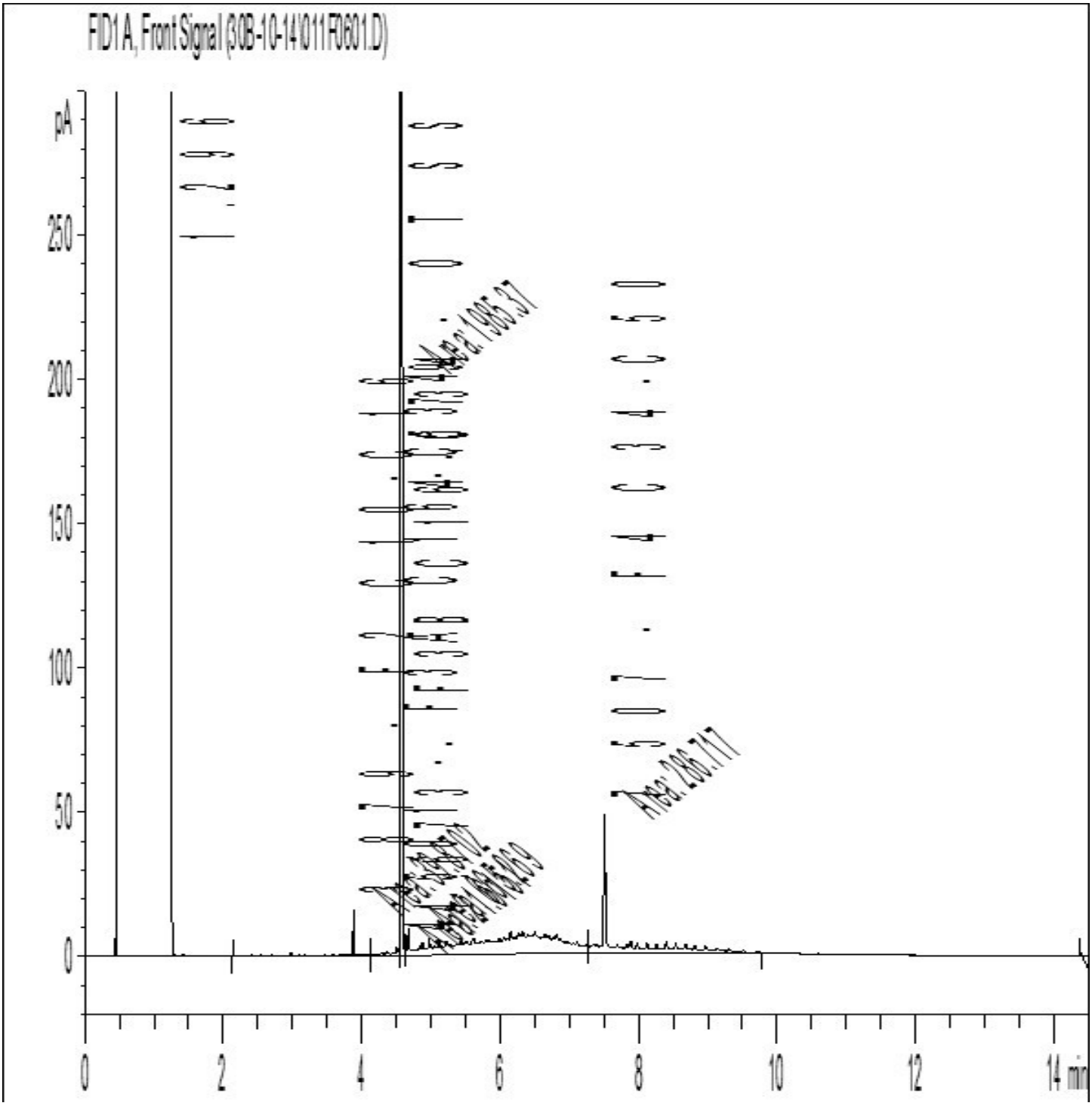


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0739

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP6-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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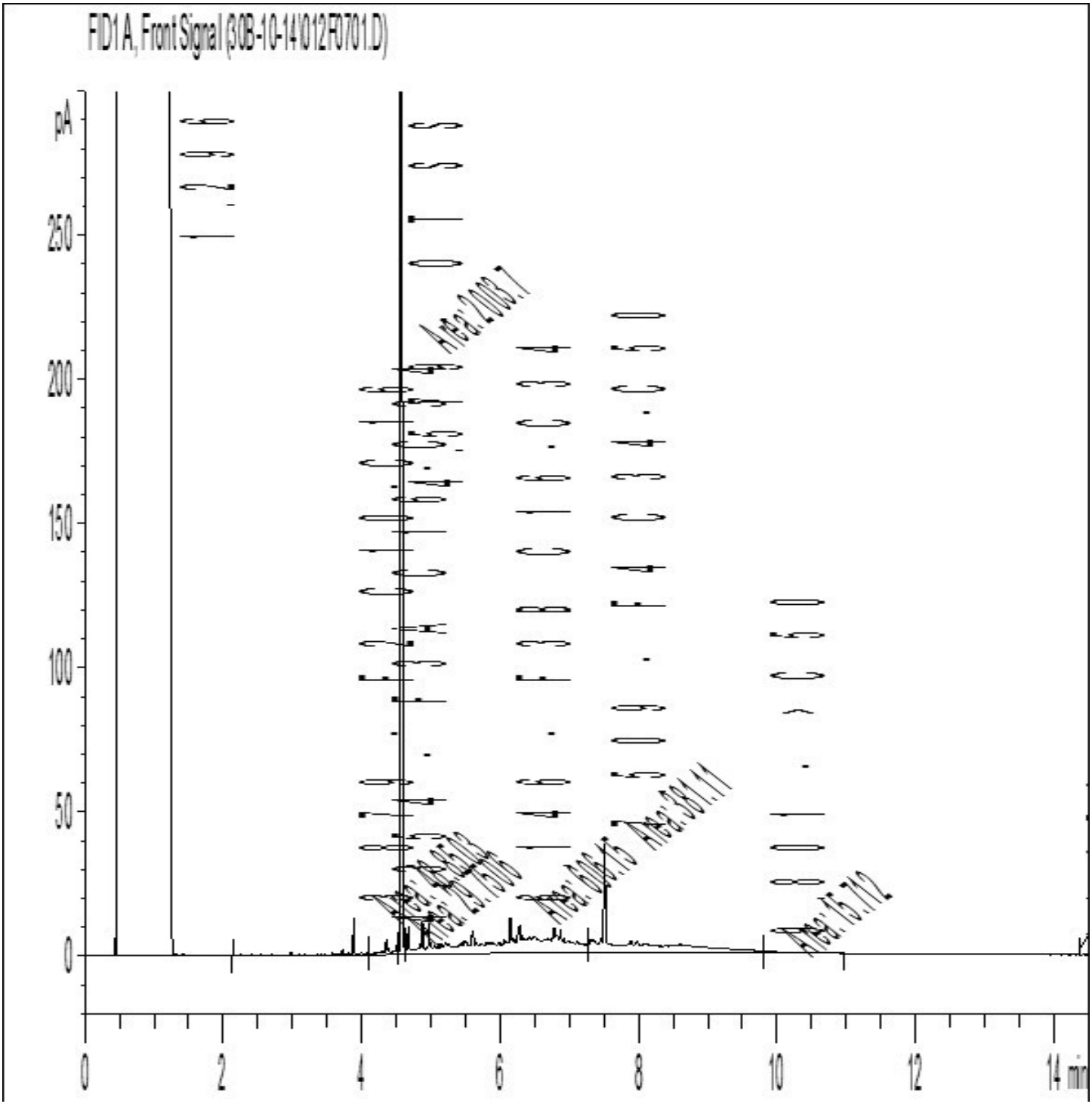
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0740

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP1-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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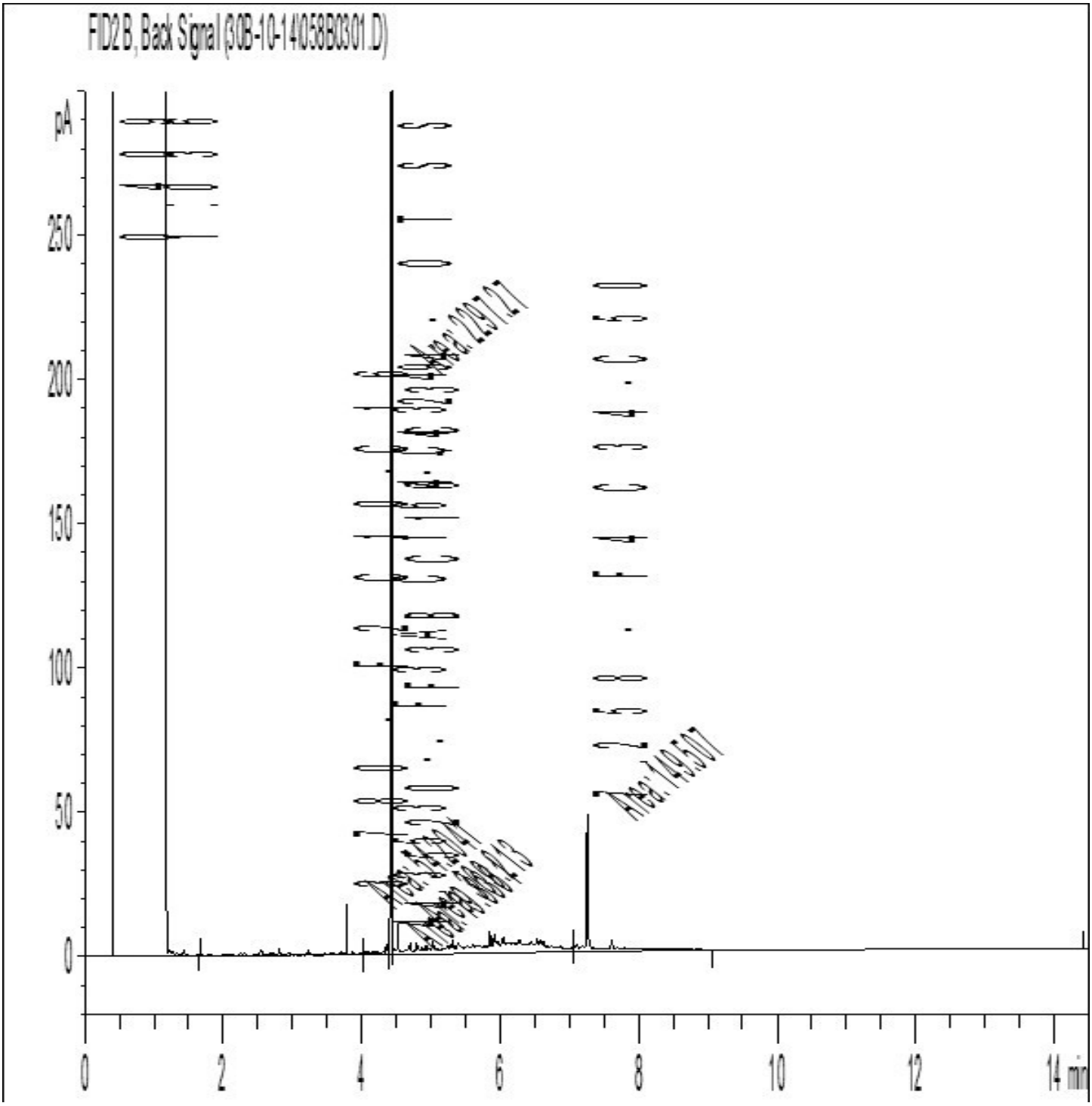
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0741

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP3-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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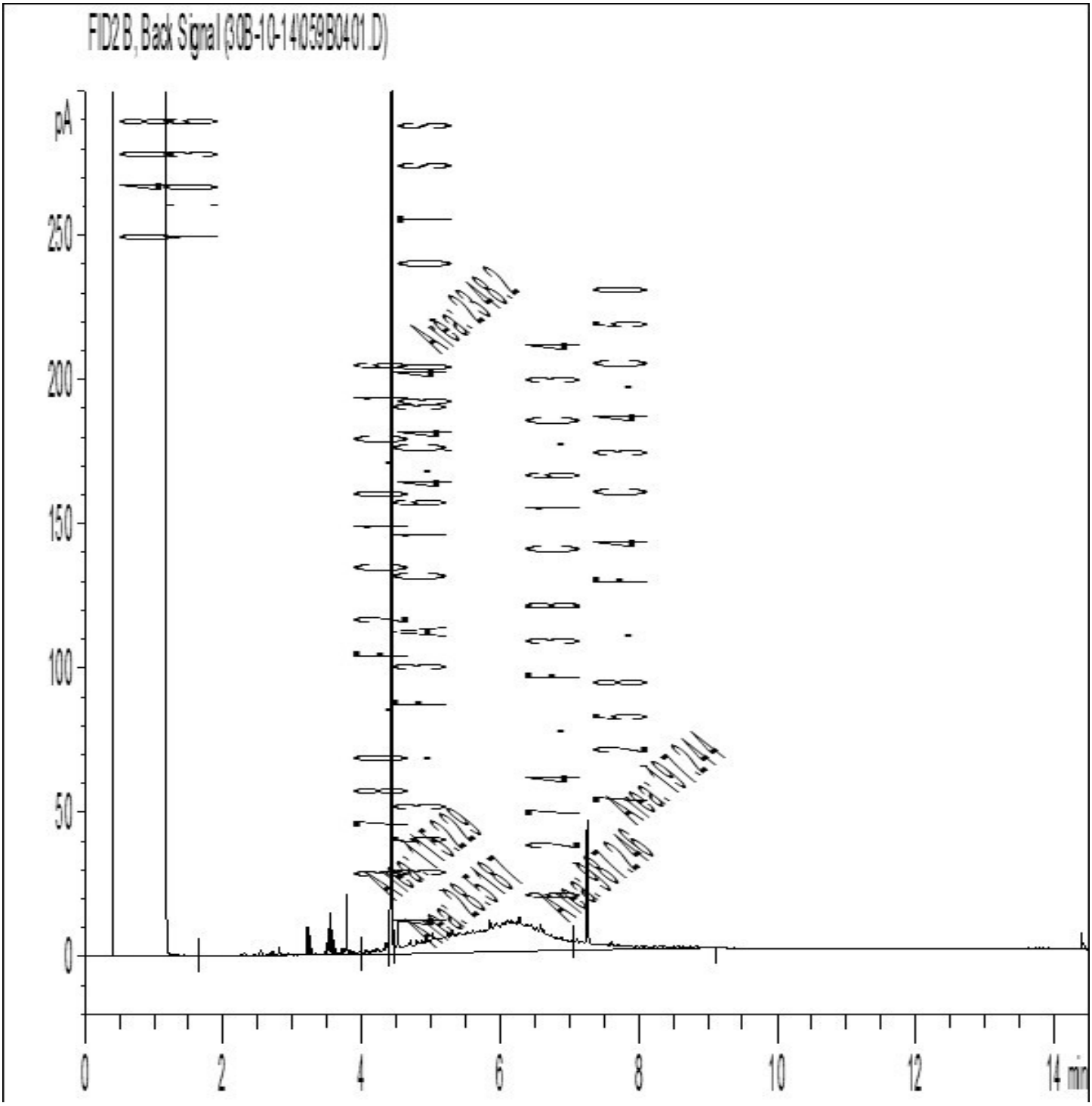
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0742

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP4-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



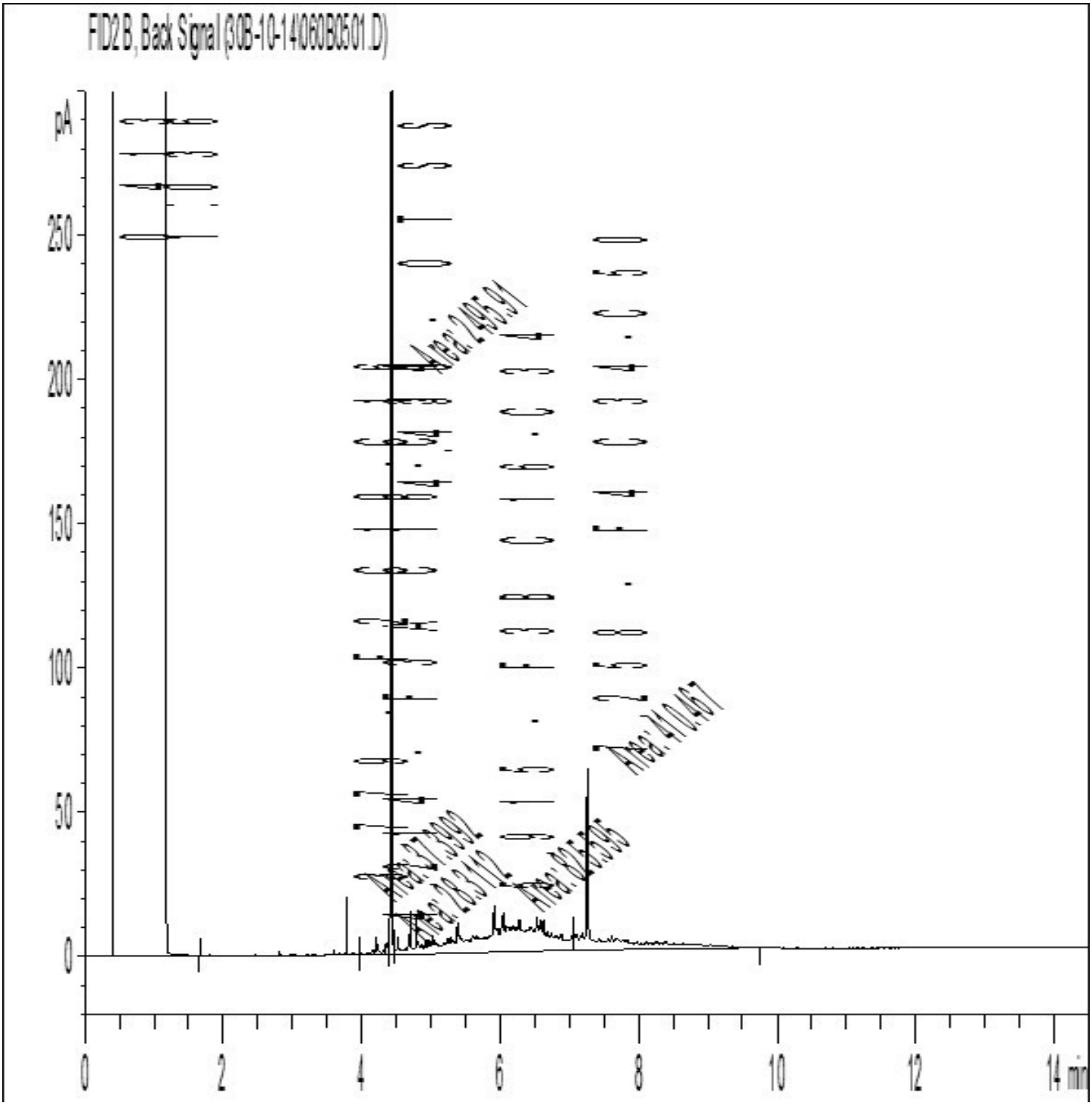
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Success Through Science®

Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0743

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP5-1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

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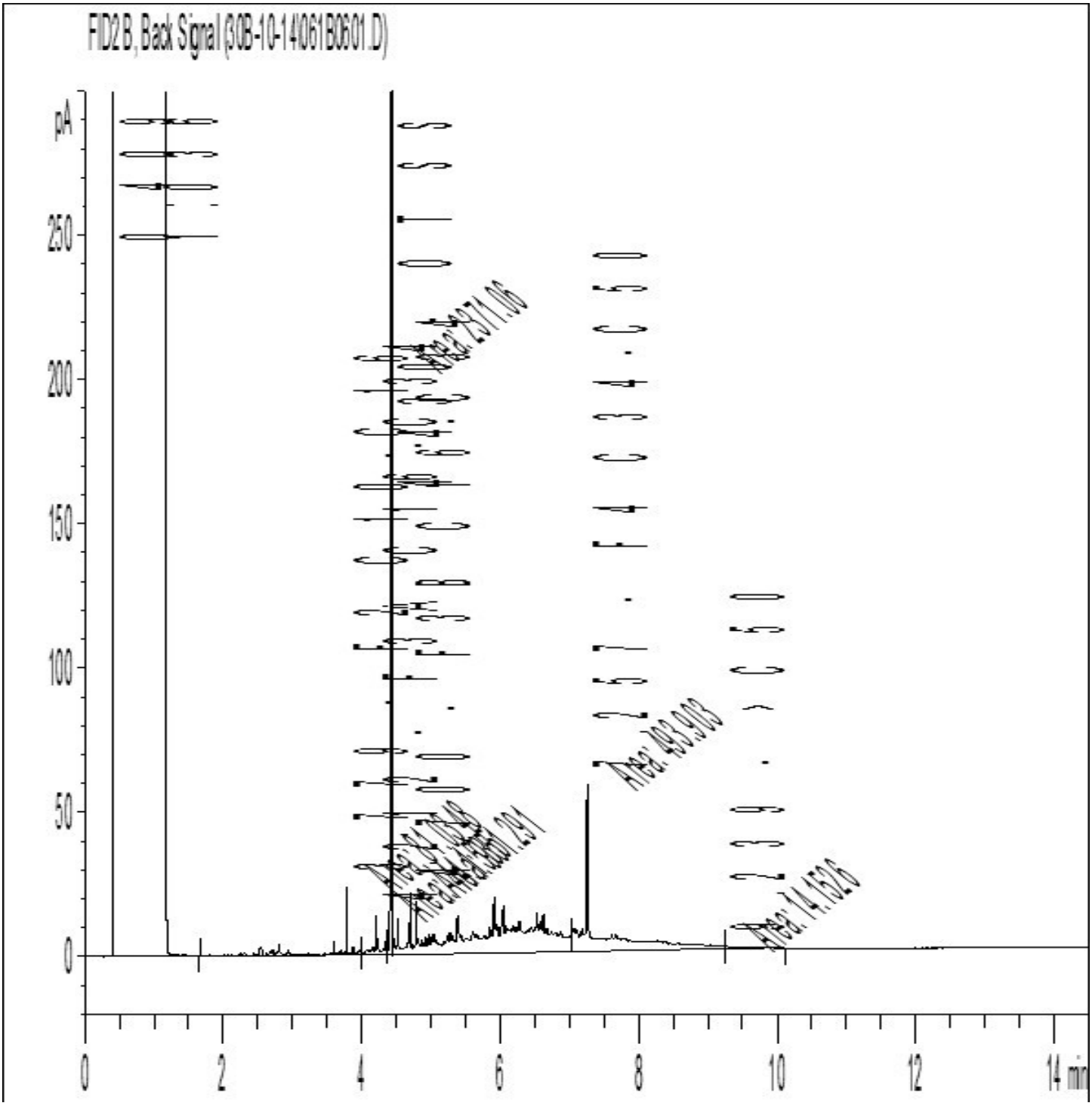
Report Date: 2014/11/06
Maxxam Job #: B4J8671
Maxxam Sample: YF0744

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TP2-3

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION
Your C.O.C. #: 490622-01-01

Attention: Andrea Ferguson Jones
MMM Group Limited
100 Commerce Valley Dr West
Thornhill, ON
CANADA L3T 0A1

Report Date: 2014/10/31
Report #: R3207214
Version: 4

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B4J8671
Received: 2014/10/23, 15:50

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
CCME F1 Hydrocarbons/BTEX in Leachate	1	2014/10/27	2014/10/27	CAM SOP-00315	CCME PHC-CWS m
CCME F2-F4 Hydrocarbons in Leachate	1	2014/10/25	2014/10/26	CAM SOP-00316	CCME PHC-CWS m
Mercury (TCLP Leachable) (mg/L)	1	N/A	2014/10/27	CAM SOP-00453	EPA 7470
Total Metals in TCLP Leachate by ICPMS	1	2014/10/24	2014/10/27	CAM SOP-00447	EPA 6020 m
Polychlorinated Biphenyl in Leachate	1	2014/10/25	2014/10/27	CAM SOP-00309	EPA 8082 m
TCLP - % Solids	1	2014/10/23	2014/10/24	CAM SOP-00401	EPA 1311 m
TCLP - Extraction Fluid	1	N/A	2014/10/24	CAM SOP-00401	EPA 1311 m
TCLP - Initial and final pH	1	N/A	2014/10/24	CAM SOP-00401	EPA 1311 m
TCLP Zero Headspace Extraction	1	2014/10/24	2014/10/24	CAM SOP-00430	EPA 1311 m
VOCs in ZHE Leachates	1	2014/10/24	2014/10/27	CAM SOP 00226	EPA 8260 m

Remarks:

Maxxam Analytics has performed all analytical testing herein in accordance with ISO 17025 and the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act. All methodologies comply with this document and are validated for use in the laboratory. The methods and techniques employed in this analysis conform to the performance criteria (detection limits, accuracy and precision) as outlined in the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act.

The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following the 'Alberta Environment Draft Addenda to the CWS-PHC, Appendix 6, Validation of Alternate Methods'. Documentation is available upon request. Maxxam has made the following improvements to the CWS-PHC reference benchmark method: (i) Headspace for F1; and, (ii) Mechanical extraction for F2-F4. Note: F4G cannot be added to the C6 to C50 hydrocarbons. The extraction date for samples field preserved with methanol for F1 and Volatile Organic Compounds is considered to be the date sampled.

Maxxam Analytics is accredited for all specific parameters as required by Ontario Regulation 153/04. Maxxam Analytics is limited in liability to the actual cost of analysis unless otherwise agreed in writing. There is no other warranty expressed or

Your Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION
Your C.O.C. #: 490622-01-01

Attention: Andrea Ferguson Jones
MMM Group Limited
100 Commerce Valley Dr West
Thornhill, ON
CANADA L3T 0A1

Report Date: 2014/10/31
Report #: R3207214
Version: 4

CERTIFICATE OF ANALYSIS

implied. Samples will be retained at Maxxam Analytics for three weeks from receipt of data or as per contract.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

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

Jolanta Goralczyk, Project Manager
Email: JGoralczyk@maxxam.ca
Phone# (905) 817-5751

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 2

Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

RESULTS OF ANALYSES OF SOIL

Maxxam ID			YD0213		
Sampling Date			2014/10/23		
COC Number			490622-01-01		
	Units	**Criteria**	**TCLP**	**RDL**	**QC Batch**
Charge/Prep Analysis					
Amount Extracted (Wet Weight) (g)	N/A	-	25	N/A	3798058
Inorganics					
Final pH	pH	-	6.05		3797776
Initial pH	pH	-	8.51		3797776
TCLP - % Solids	%	-	100	0.2	3797772
TCLP Extraction Fluid	N/A	-	FLUID 1		3797775
Metals					
Leachable Mercury (Hg)	mg/L	**0.1**	<0.0010	0.0010	3797754

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 347/90 Schedule 4 Leachate Quality Criteria (as amended by Reg 558/00)

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		YD0213		
Sampling Date		2014/10/23		
COC Number		490622-01-01		
	Units	**TCLP**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons				
Leachable (ZHE) Benzene	ug/L	<0.8	0.8	3800575
Leachable (ZHE) Toluene	ug/L	4.9	0.8	3800575
Leachable (ZHE) Ethylbenzene	ug/L	<0.8	0.8	3800575
Leachable (ZHE) o-Xylene	ug/L	1.7	0.8	3800575
Leachable (ZHE) p+m-Xylene	ug/L	4	2	3800575
Leachable (ZHE) Total Xylenes	ug/L	6	2	3800575
Leachable (ZHE) F1 (C6-C10)	ug/L	<1000	1000	3800575
Leachable (ZHE) F1 (C6-C10) - BTEX	ug/L	<1000	1000	3800575
Surrogate Recovery (%)				
Leachable (ZHE) 1,4-Difluorobenzene	%	101		3800575
Leachable (ZHE) 4-Bromofluorobenzene	%	97		3800575
Leachable (ZHE) D10-Ethylbenzene	%	104		3800575
Leachable (ZHE) D4-1,2-Dichloroethane	%	95		3800575

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			YD0213		
Sampling Date			2014/10/23		
COC Number			490622-01-01		
	Units	**Criteria**	**TCLP**	**RDL**	**QC Batch**
Metals					
Leachable Arsenic (As)	mg/L	**2.5**	<0.20	0.20	3798111
Leachable Barium (Ba)	mg/L	**100**	0.53	0.20	3798111
Leachable Boron (B)	mg/L	**500**	0.17	0.10	3798111
Leachable Cadmium (Cd)	mg/L	**0.5**	<0.050	0.050	3798111
Leachable Chromium (Cr)	mg/L	**5**	<0.10	0.10	3798111
Leachable Lead (Pb)	mg/L	**5**	<0.10	0.10	3798111
Leachable Selenium (Se)	mg/L	**1**	<0.10	0.10	3798111
Leachable Silver (Ag)	mg/L	**5**	<0.010	0.010	3798111
Leachable Uranium (U)	mg/L	**10**	<0.010	0.010	3798111

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 347/90 Schedule 4 Leachate Quality Criteria (as amended by Reg 558/00)

Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID			YD0213		
Sampling Date			2014/10/23		
COC Number			490622-01-01		
	Units	**Criteria**	**TCLP**	**RDL**	**QC Batch**
Volatile Organics					
Leachable Benzene	mg/L	**0.5**	<0.020	0.020	3798475
Leachable Carbon Tetrachloride	mg/L	**0.5**	<0.020	0.020	3798475
Leachable Chlorobenzene	mg/L	**8**	<0.020	0.020	3798475
Leachable Chloroform	mg/L	**10**	<0.020	0.020	3798475
Leachable 1,2-Dichlorobenzene	mg/L	**20**	<0.050	0.050	3798475
Leachable 1,4-Dichlorobenzene	mg/L	**0.5**	<0.050	0.050	3798475
Leachable 1,2-Dichloroethane	mg/L	**0.5**	<0.050	0.050	3798475
Leachable 1,1-Dichloroethylene	mg/L	**1.4**	<0.020	0.020	3798475
Leachable Methylene Chloride(Dichloromethane)	mg/L	**5**	<0.20	0.20	3798475
Leachable Methyl Ethyl Ketone (2-Butanone)	mg/L	**200**	<1.0	1.0	3798475
Leachable Tetrachloroethylene	mg/L	**3**	<0.020	0.020	3798475
Leachable Trichloroethylene	mg/L	**5**	<0.020	0.020	3798475
Leachable Vinyl Chloride	mg/L	**0.2**	<0.020	0.020	3798475
Surrogate Recovery (%)					
Leachable 4-Bromofluorobenzene	%	-	92		3798475
Leachable D4-1,2-Dichloroethane	%	-	110		3798475
Leachable D8-Toluene	%	-	82		3798475

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 347/90 Schedule 4 Leachate Quality Criteria (as amended by Reg 558/00)

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Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		YD0213		
Sampling Date		2014/10/23		
COC Number		490622-01-01		
	Units	**TCLP**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons				
Leachable F2 (C10-C16 Hydrocarbons)	ug/L	350	100	3799279
Leachable F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	3799279
Leachable F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	3799279
Leachable Reached Baseline at C50	ug/L	Yes	N/A	3799279
Surrogate Recovery (%)				
Leachable o-Terphenyl	%	94		3799279

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID			YD0213		
Sampling Date			2014/10/23		
COC Number			490622-01-01		
	Units	**Criteria**	**TCLP**	**RDL**	**QC Batch**
PCBs					
Leachable Total PCB	ug/L	**300**	<3	3	3799269
Surrogate Recovery (%)					
Leachable Decachlorobiphenyl	%	-	94		3799269

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: Ontario Reg. 347/90 Schedule 4 Leachate Quality Criteria (as amended by Reg 558/00)

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Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Test Summary

Maxxam ID YD0213
Sample ID TCLP
Matrix Soil

Collected 2014/10/23
Shipped
Received 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
CCME F1 Hydrocarbons/BTEX in Leachate	HSGC/MSFD	3800575	2014/10/27	2014/10/27	Mamdouh Salib
CCME F2-F4 Hydrocarbons in Leachate	GC/FID	3799279	2014/10/25	2014/10/26	Zhiyue (Frank) Zhu
Mercury (TCLP Leachable) (mg/L)	CVAA	3797754	N/A	2014/10/27	Magdalena Carlos
Total Metals in TCLP Leachate by ICPMS	ICP1/MS	3798111	2014/10/24	2014/10/27	Arefa Dabhad
Polychlorinated Biphenyl in Leachate	GC/ECD	3799269	2014/10/25	2014/10/27	Joy Zhang
TCLP - % Solids	BAL	3797772	2014/10/23	2014/10/24	Jian (Ken) Wang
TCLP - Extraction Fluid		3797775	N/A	2014/10/24	Jian (Ken) Wang
TCLP - Initial and final pH	PH	3797776	N/A	2014/10/24	Jian (Ken) Wang
TCLP Zero Headspace Extraction		3798058	2014/10/24	2014/10/24	Walt Wang
VOCs in ZHE Leachates	GC/MS	3798475	2014/10/27	2014/10/27	Manpreet Sarao

Maxxam ID YD0213 Dup
Sample ID TCLP
Matrix Soil

Collected 2014/10/23
Shipped
Received 2014/10/23

Test Description	Instrumentation	Batch	Extracted	Analyzed	Analyst
CCME F1 Hydrocarbons/BTEX in Leachate	HSGC/MSFD	3800575	2014/10/27	2014/10/27	Mamdouh Salib
TCLP Zero Headspace Extraction		3798058	2014/10/24	2014/10/24	Walt Wang

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B4J8671
Report Date: 2014/10/31

MMM Group Limited
Client Project #: 10-12108-001-002
Site Location: GUELPH DRUM INVESTIGATION

Package 1	5.3°C
Package 2	8.0°C

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

GENERAL COMMENTS

Results have been split onto separate reports as per client request.

F1-BTEX Analysis:
The BTEX results used for the F1-BTEX calculation were obtained from Headspace-GC analysis.

ABN Analysis: Due to the sample matrix, some sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3797754	MC	Matrix Spike	Leachable Mercury (Hg)	2014/10/27		112	%	80 - 120
		Leachate Blank	Leachable Mercury (Hg)	2014/10/27	<0.0010		mg/L	
		Spiked Blank	Leachable Mercury (Hg)	2014/10/27		104	%	80 - 120
		Method Blank	Leachable Mercury (Hg)	2014/10/27	<0.0010		mg/L	
		RPD	Leachable Mercury (Hg)	2014/10/27	NC		%	25
3798111	ADA	Matrix Spike	Leachable Arsenic (As)	2014/10/27		97	%	75 - 125
			Leachable Barium (Ba)	2014/10/27		103	%	75 - 125
			Leachable Boron (B)	2014/10/27		106	%	75 - 125
			Leachable Cadmium (Cd)	2014/10/27		99	%	75 - 125
			Leachable Chromium (Cr)	2014/10/27		93	%	75 - 125
			Leachable Lead (Pb)	2014/10/27		90	%	75 - 125
			Leachable Selenium (Se)	2014/10/27		96	%	75 - 125
			Leachable Silver (Ag)	2014/10/27		96	%	75 - 125
			Leachable Uranium (U)	2014/10/27		90	%	75 - 125
		Leachate Blank	Leachable Arsenic (As)	2014/10/27	<0.20		mg/L	
			Leachable Barium (Ba)	2014/10/27	<0.20		mg/L	
			Leachable Boron (B)	2014/10/27	<0.10		mg/L	
			Leachable Cadmium (Cd)	2014/10/27	<0.050		mg/L	
			Leachable Chromium (Cr)	2014/10/27	<0.10		mg/L	
			Leachable Lead (Pb)	2014/10/27	<0.10		mg/L	
			Leachable Selenium (Se)	2014/10/27	<0.10		mg/L	
			Leachable Silver (Ag)	2014/10/27	<0.010		mg/L	
			Leachable Uranium (U)	2014/10/27	<0.010		mg/L	
		Spiked Blank	Leachable Arsenic (As)	2014/10/27		97	%	75 - 125
			Leachable Barium (Ba)	2014/10/27		101	%	75 - 125
			Leachable Boron (B)	2014/10/27		109	%	75 - 125
			Leachable Cadmium (Cd)	2014/10/27		100	%	75 - 125
			Leachable Chromium (Cr)	2014/10/27		97	%	75 - 125
			Leachable Lead (Pb)	2014/10/27		94	%	75 - 125
			Leachable Selenium (Se)	2014/10/27		97	%	75 - 125
			Leachable Silver (Ag)	2014/10/27		96	%	75 - 125
			Leachable Uranium (U)	2014/10/27		92	%	75 - 125
		RPD	Leachable Arsenic (As)	2014/10/27	NC		%	35
			Leachable Barium (Ba)	2014/10/27	NC		%	35
			Leachable Boron (B)	2014/10/27	NC		%	35
			Leachable Cadmium (Cd)	2014/10/27	NC		%	35
			Leachable Chromium (Cr)	2014/10/27	NC		%	35
			Leachable Lead (Pb)	2014/10/27	NC		%	35
			Leachable Selenium (Se)	2014/10/27	NC		%	35
			Leachable Silver (Ag)	2014/10/27	NC		%	35
			Leachable Uranium (U)	2014/10/27	NC		%	35
3798475	MS4	Matrix Spike	Leachable 4-Bromofluorobenzene	2014/10/27		96	%	70 - 130
			Leachable D4-1,2-Dichloroethane	2014/10/27		111	%	70 - 130
			Leachable D8-Toluene	2014/10/27		102	%	70 - 130
			Leachable Benzene	2014/10/27		103	%	70 - 130
			Leachable Carbon Tetrachloride	2014/10/27		107	%	70 - 130
			Leachable Chlorobenzene	2014/10/27		102	%	70 - 130
			Leachable Chloroform	2014/10/27		110	%	70 - 130
			Leachable 1,2-Dichlorobenzene	2014/10/27		106	%	70 - 130
			Leachable 1,4-Dichlorobenzene	2014/10/27		101	%	70 - 130
			Leachable 1,2-Dichloroethane	2014/10/27		111	%	70 - 130
			Leachable 1,1-Dichloroethylene	2014/10/27		118	%	70 - 130
			Leachable Methylene Chloride(Dichlorometha	2014/10/27		105	%	70 - 130
			Leachable Methyl Ethyl Ketone (2-Butanone)	2014/10/27		100	%	60 - 140
			Leachable Tetrachloroethylene	2014/10/27		108	%	70 - 130

MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3798475	MS4	Matrix Spike	Leachable Trichloroethylene	2014/10/27		103	%	70 - 130
			Leachable Vinyl Chloride	2014/10/27		115	%	70 - 130
		Spiked Blank	Leachable 4-Bromofluorobenzene	2014/10/27		96	%	70 - 130
			Leachable D4-1,2-Dichloroethane	2014/10/27		111	%	70 - 130
			Leachable D8-Toluene	2014/10/27		103	%	70 - 130
			Leachable Benzene	2014/10/27		103	%	70 - 130
			Leachable Carbon Tetrachloride	2014/10/27		105	%	70 - 130
			Leachable Chlorobenzene	2014/10/27		101	%	70 - 130
			Leachable Chloroform	2014/10/27		107	%	70 - 130
			Leachable 1,2-Dichlorobenzene	2014/10/27		105	%	70 - 130
			Leachable 1,4-Dichlorobenzene	2014/10/27		100	%	70 - 130
			Leachable 1,2-Dichloroethane	2014/10/27		111	%	70 - 130
			Leachable 1,1-Dichloroethylene	2014/10/27		118	%	70 - 130
			Leachable Methylene Chloride(Dichlorometha	2014/10/27		105	%	70 - 130
			Leachable Methyl Ethyl Ketone (2-Butanone)	2014/10/27		122	%	60 - 140
			Leachable Tetrachloroethylene	2014/10/27		108	%	70 - 130
			Leachable Trichloroethylene	2014/10/27		103	%	70 - 130
			Leachable Vinyl Chloride	2014/10/27		109	%	70 - 130
		Method Blank	Leachable 4-Bromofluorobenzene	2014/10/27		93	%	70 - 130
			Leachable D4-1,2-Dichloroethane	2014/10/27		109	%	70 - 130
			Leachable D8-Toluene	2014/10/27		83	%	70 - 130
			Leachable Benzene	2014/10/27	<0.020		mg/L	
			Leachable Carbon Tetrachloride	2014/10/27	<0.020		mg/L	
			Leachable Chlorobenzene	2014/10/27	<0.020		mg/L	
			Leachable Chloroform	2014/10/27	<0.020		mg/L	
			Leachable 1,2-Dichlorobenzene	2014/10/27	<0.050		mg/L	
			Leachable 1,4-Dichlorobenzene	2014/10/27	<0.050		mg/L	
			Leachable 1,2-Dichloroethane	2014/10/27	<0.050		mg/L	
			Leachable 1,1-Dichloroethylene	2014/10/27	<0.020		mg/L	
			Leachable Methylene Chloride(Dichlorometha	2014/10/27	<0.20		mg/L	
			Leachable Methyl Ethyl Ketone (2-Butanone)	2014/10/27	<1.0		mg/L	
			Leachable Tetrachloroethylene	2014/10/27	<0.020		mg/L	
			Leachable Trichloroethylene	2014/10/27	<0.020		mg/L	
			Leachable Vinyl Chloride	2014/10/27	<0.020		mg/L	
		RPD	Leachable Benzene	2014/10/27	NC		%	30
			Leachable Carbon Tetrachloride	2014/10/27	NC		%	30
			Leachable Chlorobenzene	2014/10/27	NC		%	30
			Leachable Chloroform	2014/10/27	NC		%	30
			Leachable 1,2-Dichlorobenzene	2014/10/27	NC		%	30
			Leachable 1,4-Dichlorobenzene	2014/10/27	NC		%	30
			Leachable 1,2-Dichloroethane	2014/10/27	NC		%	30
			Leachable 1,1-Dichloroethylene	2014/10/27	NC		%	30
			Leachable Methylene Chloride(Dichlorometha	2014/10/27	NC		%	30
			Leachable Methyl Ethyl Ketone (2-Butanone)	2014/10/27	NC		%	30
			Leachable Tetrachloroethylene	2014/10/27	NC		%	30
			Leachable Trichloroethylene	2014/10/27	NC		%	30
			Leachable Vinyl Chloride	2014/10/27	NC		%	30
3799269	JZ	Matrix Spike	Leachable Decachlorobiphenyl	2014/10/27		95	%	60 - 130
			Leachable Total PCB	2014/10/27		93	%	30 - 130
		Spiked Blank	Leachable Decachlorobiphenyl	2014/10/27		100	%	60 - 130
			Leachable Total PCB	2014/10/27		98	%	30 - 130
		Method Blank	Leachable Decachlorobiphenyl	2014/10/27		99	%	60 - 130
			Leachable Total PCB	2014/10/27	<3		ug/L	
		RPD	Leachable Total PCB	2014/10/27	NC		%	40
3799279	ZZ	Matrix Spike	Leachable o-Terphenyl	2014/10/26		99	%	60 - 130

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MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3799279	ZZ	Matrix Spike	Leachable F2 (C10-C16 Hydrocarbons)	2014/10/26		111	%	50 - 130
			Leachable F3 (C16-C34 Hydrocarbons)	2014/10/26		106	%	50 - 130
			Leachable F4 (C34-C50 Hydrocarbons)	2014/10/26		109	%	50 - 130
		Leachate Blank	Leachable o-Terphenyl	2014/10/25		96	%	60 - 130
			Leachable F2 (C10-C16 Hydrocarbons)	2014/10/25	<100		ug/L	
			Leachable F3 (C16-C34 Hydrocarbons)	2014/10/25	<200		ug/L	
			Leachable F4 (C34-C50 Hydrocarbons)	2014/10/25	<200		ug/L	
		Spiked Blank	Leachable o-Terphenyl	2014/10/26		95	%	60 - 130
			Leachable F2 (C10-C16 Hydrocarbons)	2014/10/26		112	%	60 - 130
			Leachable F3 (C16-C34 Hydrocarbons)	2014/10/26		107	%	60 - 130
			Leachable F4 (C34-C50 Hydrocarbons)	2014/10/26		109	%	60 - 130
		Method Blank	Leachable o-Terphenyl	2014/10/25		94	%	60 - 130
			Leachable F2 (C10-C16 Hydrocarbons)	2014/10/25	<100		ug/L	
			Leachable F3 (C16-C34 Hydrocarbons)	2014/10/25	<200		ug/L	
			Leachable F4 (C34-C50 Hydrocarbons)	2014/10/25	<200		ug/L	
			Leachable Reached Baseline at C50	2014/10/25	YES		ug/L	
		RPD	Leachable F2 (C10-C16 Hydrocarbons)	2014/10/26	NC		%	40
			Leachable F3 (C16-C34 Hydrocarbons)	2014/10/26	NC		%	40
			Leachable F4 (C34-C50 Hydrocarbons)	2014/10/26	NC		%	40
			Leachable Reached Baseline at C50	2014/10/26	NC		%	40
3800575	MSB	Matrix Spike [YD0213-03]	Leachable (ZHE) 1,4-Difluorobenzene	2014/10/27		101	%	60 - 140
			Leachable (ZHE) 4-Bromofluorobenzene	2014/10/27		99	%	60 - 140
			Leachable (ZHE) D10-Ethylbenzene	2014/10/27		97	%	30 - 130
			Leachable (ZHE) D4-1,2-Dichloroethane	2014/10/27		92	%	60 - 140
			Leachable (ZHE) Benzene	2014/10/27		108	%	70 - 130
			Leachable (ZHE) Toluene	2014/10/27		109	%	70 - 130
			Leachable (ZHE) Ethylbenzene	2014/10/27		117	%	70 - 130
			Leachable (ZHE) o-Xylene	2014/10/27		113	%	70 - 130
			Leachable (ZHE) p+m-Xylene	2014/10/27		109	%	70 - 130
			Leachable (ZHE) F1 (C6-C10)	2014/10/27		91	%	70 - 130
		Leachate Blank	Leachable (ZHE) 1,4-Difluorobenzene	2014/10/27		100	%	60 - 140
			Leachable (ZHE) 4-Bromofluorobenzene	2014/10/27		94	%	60 - 140
			Leachable (ZHE) D10-Ethylbenzene	2014/10/27		101	%	30 - 130
			Leachable (ZHE) D4-1,2-Dichloroethane	2014/10/27		89	%	60 - 140
			Leachable (ZHE) Benzene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) Toluene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) Ethylbenzene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) o-Xylene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) p+m-Xylene	2014/10/27	<2		ug/L	
			Leachable (ZHE) Total Xylenes	2014/10/27	<2		ug/L	
			Leachable (ZHE) F1 (C6-C10)	2014/10/27	<1000		ug/L	
			Leachable (ZHE) F1 (C6-C10) - BTEX	2014/10/27	<1000		ug/L	
		Spiked Blank	Leachable (ZHE) 1,4-Difluorobenzene	2014/10/27		100	%	60 - 140
			Leachable (ZHE) 4-Bromofluorobenzene	2014/10/27		95	%	60 - 140
			Leachable (ZHE) D10-Ethylbenzene	2014/10/27		102	%	30 - 130
			Leachable (ZHE) D4-1,2-Dichloroethane	2014/10/27		97	%	60 - 140
			Leachable (ZHE) Benzene	2014/10/27		109	%	70 - 130
			Leachable (ZHE) Toluene	2014/10/27		103	%	70 - 130
			Leachable (ZHE) Ethylbenzene	2014/10/27		112	%	70 - 130
			Leachable (ZHE) o-Xylene	2014/10/27		111	%	70 - 130
			Leachable (ZHE) p+m-Xylene	2014/10/27		107	%	70 - 130
			Leachable (ZHE) F1 (C6-C10)	2014/10/27		98	%	70 - 130
		Method Blank	Leachable (ZHE) 1,4-Difluorobenzene	2014/10/27		99	%	60 - 140
			Leachable (ZHE) 4-Bromofluorobenzene	2014/10/27		93	%	60 - 140

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MMM Group Limited
Attention: Andrea Ferguson Jones
Client Project #: 10-12108-001-002
P.O. #:
Site Location: GUELPH DRUM INVESTIGATION

Quality Assurance Report (Continued)

Maxxam Job Number: MB4J8671

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
3800575	MSB	Method Blank	Leachable (ZHE) D10-Ethylbenzene	2014/10/27		95	%	30 - 130
			Leachable (ZHE) D4-1,2-Dichloroethane	2014/10/27		91	%	60 - 140
			Leachable (ZHE) Benzene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) Toluene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) Ethylbenzene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) o-Xylene	2014/10/27	<0.8		ug/L	
			Leachable (ZHE) p+m-Xylene	2014/10/27	<2		ug/L	
			Leachable (ZHE) Total Xylenes	2014/10/27	<2		ug/L	
			Leachable (ZHE) F1 (C6-C10)	2014/10/27	<1000		ug/L	
			Leachable (ZHE) F1 (C6-C10) - BTEX	2014/10/27	<1000		ug/L	
		RPD [YD0213-03]	Leachable (ZHE) Benzene	2014/10/27	NC		%	40
			Leachable (ZHE) Toluene	2014/10/27	3.1		%	40
			Leachable (ZHE) Ethylbenzene	2014/10/27	NC		%	40
			Leachable (ZHE) o-Xylene	2014/10/27	NC		%	40
			Leachable (ZHE) p+m-Xylene	2014/10/27	NC		%	40
			Leachable (ZHE) Total Xylenes	2014/10/27	NC		%	40
			Leachable (ZHE) F1 (C6-C10)	2014/10/27	NC		%	40
			Leachable (ZHE) F1 (C6-C10) - BTEX	2014/10/27	NC		%	40

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

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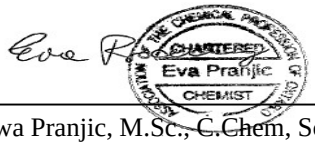
Validation Signature Page

Maxxam Job #: B4J8671

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



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Medhat Riskallah, Manager, Hydrocarbon Department

==========

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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RUSH

Maxxam Analytics
Canada L5N 2L8 Tel:(905) 817-5700 Toll-Free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

23-Oct-14 15:50
Jolanta Goralczyk
B4J8671
MAF ENV-598

Page 1 of 1

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#22101 MMM Group Limited	Company Name:	MMM Group	Quotation #:	B47123
Attention:	Accounts Payable	Attention:	Andrea Ferguson Jones	P.O. #:	
Address:	100 Commerce Valley Dr West Thornhill ON L3T 0A1	Address:	Ferguson_Jones A@ mmm. ca	Project:	10-12108-001-002
Tel:	(905) 882-1100 Fax: (905) 882-0055	Tel:	Fax:	Project Name:	Guelph dam Investigation
Email:	accountspayable@mmm.ca	Email:	EDD@ mmm. ca	Site #:	
				Sampled By:	R. Needhot

C#490622-01-01

Quote Order #: 90622

Project Manager: Jolanta Goralczyk

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☐ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☒ Ind/Comm ☐ Coarse	☐ Reg 558. ☐ Storm Sewer Bylaw	
☐ Table 3 ☐ Agri/Other ☐ For RSC	☐ MISA Municipality _____	
☐ Table ___	☐ PWQO	
	☐ Other _____	

Include Criteria on Certificate of Analysis (Y/N)? _____

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: 3 day TAT Time Required: ___ ☒
Rush Confirmation Number: JG2014102104 *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 Semivolatiles Package (Soil)	O.Reg 153 Volatile Organics (Soil)	O.Reg 153 Metals Package (Soil)	O.Reg 153 PCBs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Water)	O.Reg 153 Volatile Organics (Water)	O.Reg 153 Semivolatiles Package (Water)	O.Reg 153 Metals Package (Water)	O.Reg 153 PCBs (Water)	# of Bottles	Comments
1		TP3A-1	Oct 23,14	pm	Soil		X	X	X	X	X							
2		TP9-1	Oct 23,14	pm	Soil		X	X	X	X	X							
3		TP6-1	Oct 23,14	pm	Soil		X	X	X	X	X							
4		TP1-1	Oct 22,14	pm	Soil		X	X	X	X	X							
5		TP3-1	Oct 22,14	pm	Soil		X	X	X	X	X							
6		TP4-3	Oct 22,14	pm	Soil		X	X	X	X	X							
7		TP4-1	Oct 22,14	pm	Soil		X	X	X	X	X							
8		TP5-1	Oct 23,14	am	Soil		X	X	X	X	X							
9		TP2-3	Oct 22	pm	Soil		X	X	X	X	X							
10		DUP 1	Oct 23	am	Soil					X								

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
R. Needhot	14/10/23	19:50	Khue Hoang Greval	2014/10/23	15:50	

Laboratory Use Only				
Time Sensitive	Temperature (°C) on Receipt	Custody Seal	Yes	No
	5/5/6	Present		✓
		Intact		✓

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxam Yellow: Client

5/10/19

Maxxam Analytics International Corporation o/a Maxxam Analytics
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-Free:800-563-6266 Fax:(905) 817-5777 www.maxxam.ca

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#22101 MMM Group Limited	Company Name:	MMM Group	Quotation #:	B47123	Maxxam Job #: B4J8671 MAF	Bottle Order #: 490622
Attention:	Accounts Payable	Attention:	Andrea Ferguson Jones	P.O. #:			
Address:	100 Commerce Valley Dr West Thornhill ON L3T 0A1	Address:		Project:	10-12108-001-002	COC #: C#490622-03-01	Project Manager: Jolanta Goralczyk
Tel:	(905) 882-1100 Fax: (905) 882-0055	Tel:	FergusonJonesA@mmm.ca Fax:	Project Name:	Guelph Dram Investigation		
Email:	accountspayable@mmm.ca	Email:	EDD @ mmm.ca	Site #:			
				Sampled By:	D. Neerhof		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE MAXXAM DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☐ Res/Park ☐ Medium/Fine
- ☐ Table 2 ☒ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558. ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☐ PWQO
- ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☐
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: 5 day Time Required: ___ ☒
Rush Confirmation Number: JG2014102104 (call lab for #)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	O.Reg 153 Petroleum Hydrocarbons (Soil)	O.Reg 153 Semivolatiles Package (Soil)	O.Reg 153 Volatile Organics (Soil)	O.Reg 153 Metals Package (Soil)	O.Reg 153 PCBs (Soil)	O.Reg 153 Petroleum Hydrocarbons (Water)	O.Reg 153 Volatile Organics (Water) TCLP MEALS	O.Reg 153 Semivolatiles Package (Water) TCLP VOC	O.Reg 153 Metals Package (Water) TCLP PCB	O.Reg 153 PCBs (Water) TCLP PHC	# of Bottles	Comments
1		Dup 2	Oct 23,14	pm	Soil		X		X								4	
2		Dup 3	Oct 23,14	pm	Soil			X			X						2	
3																		
4		TCLP	Oct 23,14	pm	Soil								X	X	X	X	6	
5																		
6																		
7																		
8																		
9																		
10																		

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
Dan Neerhof	14/10/23	15:50	Harman Grewal	2014/10/23	15:50		Time Sensitive	Temperature (°C) on Receipt 5/5/16	Custody Seal	Yes	No
				2014/10/23					Present		JJ
									Intact		JJ

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM

White: Maxxam Yellow: Client

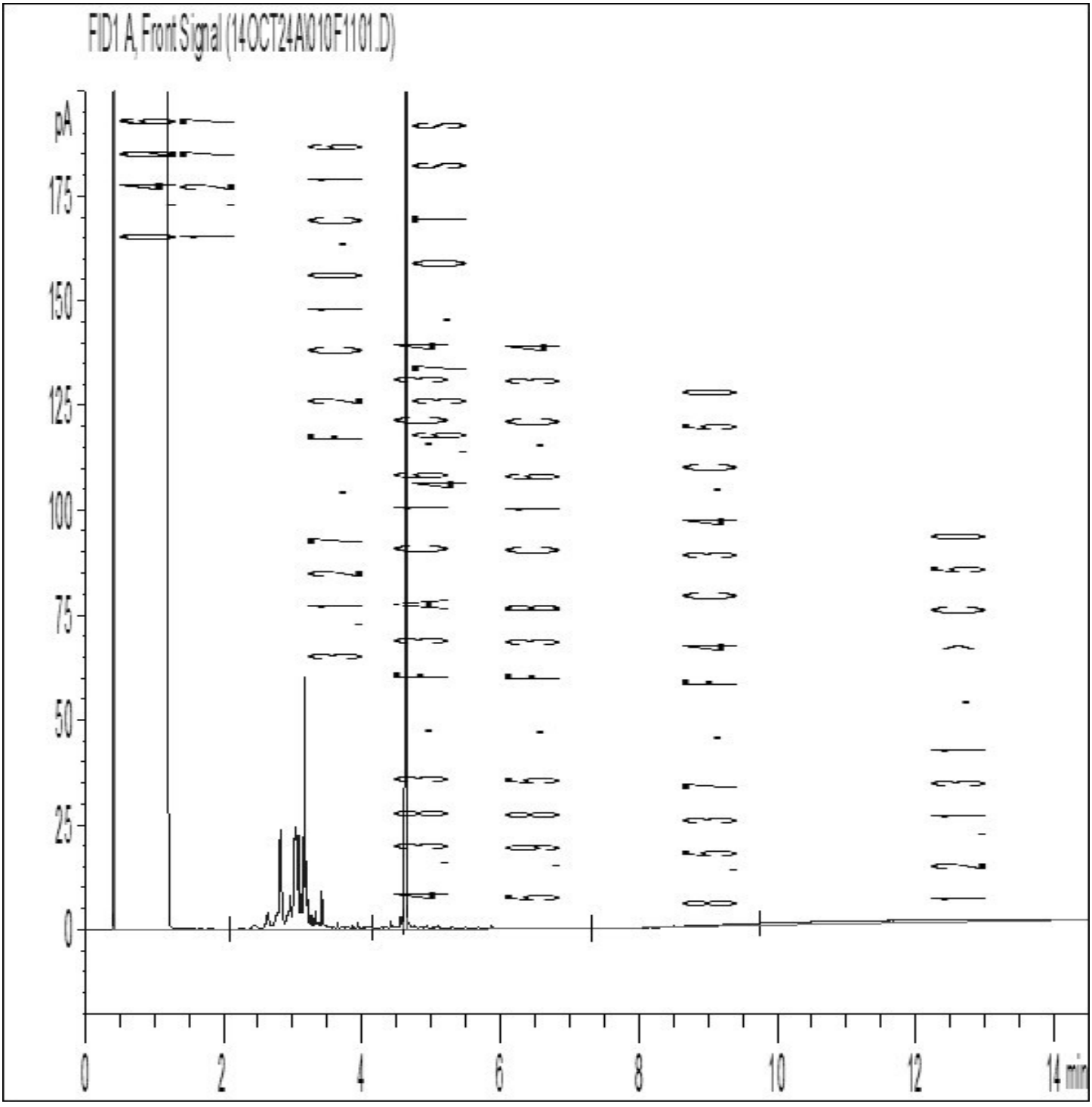
5/10/14

Success Through Science®

Report Date: 2014/10/31
Maxxam Job #: B4J8671
Maxxam Sample: YD0213

MMM Group Limited
Client Project #: 10-12108-001-002
Project name: GUELPH DRUM INVESTIGATION
Client ID: TCLP

CCME F2-F4 Hydrocarbons in Leachate Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.