



Phase II Environmental Site Assessment

Winnipeg Transit Garage

421 Osborne Street
Winnipeg, Manitoba

Prepared For: City of Winnipeg, Transit
Department

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**Prepared For:
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Prepared by:

WSP Canada Inc. | MMM Group Limited

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1	August 16, 2016	Final

EXECUTIVE SUMMARY

The Winnipeg Transit Department currently owns the property at 421 Osborne Street; consisting of a City of Winnipeg Transit Garage, used to conduct maintenance and repair of transit vehicles, and an employee parking lot. The scope of services completed by MMM Group Limited (MMM), a WSP Global Company included conducting a Phase II Environmental Site Assessment (Phase II ESA) of the surface parking lot located at 421 Osborne Street, of which the legal description is Lots 4 to 12 and partial lots 13 to 16, Block 5, Plan 301; Lots 4 to 8 and partial lots 9 to 11, Block 6, Plan 301; Lots 21 to 22 and partial lots 17 to 20, Block 11, Plan 319; Parcel E, Plan 49761; Lots 17 and 25, Plan 9757, herein referred to as the "North Subject Property" and of vacant land south of Brandon Avenue with legal description of Lots 9 to 11 and Lots 13 to 21, Block 6, Plan 1606, herein referred to as the "South Subject Property", both of which are collectively referred to as the "Site". The on-Site investigation was conducted June 21, 22 and July 4, 11 and 20, 2016.

The objective of the Phase II ESA is to obtain confirmatory soil and groundwater samples to identify residual site impacts, if any, associated with the historic railyard activities, as compared to established soil and groundwater quality standards. This was accomplished through a field confirmatory soil and groundwater sampling program. The field sampling program and results of analysis will also aid in the development of a Remedial Action Plan (RAP), if required, to mitigate potential soil and/or groundwater impacts.

Background

MMM conducted a Phase I Environmental Site Assessment (Phase I ESA) of the Site for the Winnipeg Transit Department (June 2016) in support of due diligence of the Site. The Phase I ESA identified historical land use activities (e.g. railyard and freight maintenance facility) that represent potential and/or actual environmental concerns for the assessed subject property. Based on aerial photographs the site was part of the Canadian National Fort Rouge Rail Yard from the early 1940's through to the late 1960's. Potential contaminants of concern as identified in the Phase I ESA are: polycyclic hydrocarbons (PAHs), volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs) and metals.

Summary of Findings

Field Observations

Upon arrival to the Site the following observations were noted:

- ▶ During the advancement of BH04, the drill hit something at roughly 0.76m depth, possibly a historic foundation, and the borehole location was adjusted <2m to the north.
- ▶ During the installation of the monitoring wells, the boreholes caved in to about 5.79 m. Monitoring wells were installed at this depth.
- ▶ During groundwater measurements, no stratification of free product within the water column was identified.
- ▶ Monitoring wells were observed to have a slow rate of recharge after being purged. MMM field staff purged the wells on July 11, 2016 and returned to sample on July 15, 2016 to discover not enough recovery to collect samples. The wells were allowed to recharge and samples were collected on July 20, 2016.

- ▶ MW09 had low water levels before and after purging, in order to collect the required volume of water to fill the bottles for laboratory analysis, MMM field staff decided to forego physio-chemical *insitu* measurements by YSI to utilize the water volume that would have been within the flow thru cell for the analytical bottles.

Soil stratigraphy and Field Screening

Based on the drilling investigation the soil stratigraphy encountered within the Site generally consisted of silty clay and silt overlain by fill materials including sand, gravel and topsoil. The drill program extended to a maximum depth of 6.0 mbgs.

Elevated VOCs were detected by the Eagle II from one sample collected from BH01, this sample was submitted for laboratory analysis.

Groundwater Elevation and Flow Direction

Depth to groundwater was measured in all wells before sampling. The depth to water in the four monitoring wells on-Site range between 4.23 and 5.15 mbgs.

Hydraulic gradient calculations indicate the general groundwater flow direction on-Site is north-northeast, towards the Red River.

Analytical Results

Analytical soil results did not identify any concentrations of PAH, BTEX, PHC F1 to F4, VOCs or metals that exceeded the applied guidelines.

Analytical groundwater results did not identify any concentrations of PAH, BTEX, PHC F1 to F4, VOCs or metals that exceed the applied guidelines.

Recommendations

Based on the Site characterization and the Phase II ESA, MMM recommends the following:

- ▶ No further investigative action is required.
- ▶ Prior to Site development, a soil management plan should be developed to address relocation of excess soil, this would ensure soil material is not transferred to a land use where environmental guidelines would be exceeded or develop a potential environmental liability.
- ▶ The four monitoring wells (MW02, MW05, MW08 and MW09) should be decommissioned and removed prior to property development to avoid contamination of the groundwater from surface run off sources.

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1.0 INTRODUCTION

The Winnipeg Transit Department currently owns the property at 421 Osborne Street; consisting of a City of Winnipeg Transit Garage, used to conduct maintenance and repair of transit vehicles, and an employee parking lot. The scope of services completed by MMM Group Limited (MMM), a WSP Global Company included conducting a Phase II Environmental Site Assessment (Phase II ESA) of the surface parking lot located at 421 Osborne Street, of which the legal description is Lots 4 to 12 and partial lots 13 to 16, Block 5, Plan 301; Lots 4 to 8 and partial lots 9 to 11, Block 6, Plan 301; Lots 21 to 22 and partial lots 17 to 20, Block 11, Plan 319; Parcel E, Plan 49761; Lots 17 and 25, Plan 9757, herein referred to as the "North Subject Property" and of vacant land south of Brandon Avenue with legal description of Lots 9 to 11 and Lots 13 to 21, Block 6, Plan 1606, herein referred to as the "South Subject Property", both of which are collectively referred to as the "Site". The on-Site investigation was conducted June 21, 22 and July 4, 11 and 20, 2016.

A site location plan (Figure 1) is included in **Appendix A** and selected photographs of the Site are included in **Appendix B**.

1.1 Background

MMM conducted a Phase I Environmental Site Assessment (Phase I ESA) of the Site for the Winnipeg Transit Department (June 2016) in support of due diligence of the Site. The Phase I ESA identified historical land use activities (e.g. railyard and freight maintenance facility) that represent potential and/or actual environmental concerns for the assessed subject property. Based on aerial photographs the site was part of the Canadian National Fort Rouge Rail Yard from the early 1940's through to the late 1960's. Potential contaminants of concern as identified in the Phase I ESA are: polycyclic hydrocarbons (PAHs), volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs) and metals.

2.0 OBJECTIVE

The objective of the Phase II ESA is to obtain confirmatory soil and groundwater samples to identify residual site impacts, if any, associated with the historic railyard activities, as compared to established soil and groundwater quality standards. This was accomplished through a field confirmatory soil and groundwater sampling program. The field sampling program and results of analysis will also aid in the development of a Remedial Action Plan (RAP), if required, to mitigate potential soil and/or groundwater impacts.

3.0 SCOPE OF THE INVESTIGATION

The proposed scope of work is outlined in its entirety in the proposal (Ref.: 5516057-142.710) based on the potential concerns based on historic railyard activities outlined above, and includes:

- ▶ A Health and Safety Program.
- ▶ Preparation of a sampling and analysis plan (SAP) to document the rationale for sampling media, number of samples, sample frequency, sample depth and location, contaminants of concern (COCs) and other information to be obtained during the

intrusive investigation. Appropriate samples will be collected and submitted for PAH, VOCs including benzene, toluene, ethyl-benzene and xylene (BTEX), PHC F1 to F4, metals and particle size analyses.

- ▶ The Quality Assurance and Quality Control (QA/QC) program will include a combination of field duplicates at a frequency of ten percent throughout the field program and laboratory duplicates as may be necessary to confirm that the data quality objectives for the project are met.
- ▶ Advancement of ten boreholes to approximately 6 mbg or auger refusal. Soil samples will be obtained with a direct push, Geoprobe drill; continuous samples will be obtained at approximately 0.75 m intervals. Soil stratigraphy will be logged for each borehole and samples obtained from each appropriate depth and/or by stratigraphy. Soil samples in a continuous sequence from each borehole will be collected in separate glass jars and/or glass vials and/or sealable plastic bags, as appropriate. A maximum of two soil samples, one with the highest vapour concentration and/or visual staining and one from the deepest sampling point will be submitted for analysis to assess vertical and horizontal delineation.
- ▶ Samples will be placed in a cooler with ice packs to maintain a consistent temperature. Samples will be delivered to the laboratory for analysis. Standard chain-of-custody procedures will be included during handling and delivery. Soil samples will be submitted to Maxxam Analytics a CALA certified laboratory in Winnipeg, Manitoba.
- ▶ Four boreholes will be developed into monitoring wells at a depth of 6.0 mbg or auger refusal, for the assessment of groundwater quality and groundwater flow and direction. Three wells are required to confirm direction of groundwater flow, however, because of the potential for local conditions to influence groundwater flow and for localized variability in groundwater condition variability is anticipated.
- ▶ Soil cuttings will be replaced in the borehole as best as possible at the time of drilling, excess soil cuttings will be placed into drums for removal, in an effort to keep the Site as clean as possible after the field investigation.
- ▶ Preparation of a Phase II ESA report documenting the findings and conclusions.

3.1 In-field Deviations From Sampling And Analysis Plan

The following deviations from the original sampling analysis plan were made based on in-field observations:

- ▶ In MW02, MW05, MW08 and MW09 screen was installed at a depth of 5.79 mbg as a result of borehole cave-in instead of the desired depth of 6.0 mbg.
- ▶ MW09 had low water levels before and after purging, in order to collect the required volume of water to fill the bottles for laboratory analysis, MMM field staff decided to forego physio-chemical *insitu* measurements by YSI as prescribed in the sampling and analysis plan to utilize the water volume that would have been within the flow thru cell for the analytical bottles.

4.0 REGULATORY FRAMEWORK

Contaminated site issues in Manitoba are governed by The Contaminated Sites Remediation Act, C.C.S.M c. C205 (CSRA), and its amendment The Contaminated Sites Remediation Amendment Act (MCWS, 1996, amended 2014) and administered by MCWS. Under the CSRA, it is prohibited to discharge any substance(s) to the environment which by their quantity, concentration or characteristics, are harmful to the health of humans or the environment. The intent of the CSRA is to protect human health and the environmental (air, land and water) resources of Manitoba. Where an unlicensed or unpermitted release of material has occurred, the CSRA requires the affected area be remediated to mitigate the risk to human health and/or the environment. Section 3.1 of the CSRA states that the owner or occupier of a site must notify MCWS in writing when they becomes aware of information that indicates that the site has been contaminated at a level that exceeds a standard established or adopted by regulation (CSRR); and provide MCWS with all reports and any other documentation in their possession respecting the contamination at the site.

The CSRA does not contain actual quality guidelines to be used for site investigation and remediation, MCWS adopts the use of the Canadian Council of Ministers of the Environment (CCME) environmental quality guidelines where available. Where CCME guidelines are not available, guidelines from Health Canada and Ontario's Ministry of Environment and Climate Change (MOECC) are referenced. The default environmental quality guidelines used in this Phase II ESA are the following:

Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CSQG), CCME, 1991 to 2015.

Canada-wide Standards for Petroleum Hydrocarbons in Soil – Technical Supplement (PHC CWS), CCME, 2008.

Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act (SGWS), Ontario MOECC, 2011.

The details of the regulations and guidelines identified above are outlined in the following sections, including a description of their application to the Site.

On June 6, 2016 Manitoba Sustainable Development (MSD) announced that the referenced CCME methodology for soil sample collection procedure for analysis of VOC, BTEX and PHC F1 will be changed as of July 1, 2016. Personal communication confirmed with MSD is recommending that projects that anticipate analysis reporting after July 1, 2016 should follow the referenced methodology. Therefore, to ensure compliance with the regulatory changes effective with July 1, 2016, MMM completed the sampling protocols in accordance with the recommended CCME methodology. These modifications are reflected in the scope of work.

4.1 Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CSQG)

The CSQG are derived using toxicological data to determine the threshold level to key receptors and are provided for different levels of land use; agricultural, residential/parkland, commercial, and industrial.

The land use guidelines for the Site should be selected to protect the most sensitive current or proposed future land use at the Site. Land use criteria for determining the appropriate land use based guidelines are provided below:

- ▶ **Agricultural Land Use:** where the primary activity is related to the productive capability of the land and is agricultural in nature.
- ▶ **Residential/Parkland Land Use:** where the primary activity is residential or recreational activity.
- ▶ **Commercial Land Use:** where the full range of allowable uses is commercial and there is free access to all members of the public, including children.
- ▶ **Industrial Land Use:** where the primary activity involves the production, manufacture, or construction of goods. Public access is restricted and children are not permitted continuous access or occupancy.

4.2 Canada-wide Standards for Petroleum Hydrocarbons in Soil (PHC CWS)

The PHC CWS is a remedial standard for PHC impacted soil and subsoil under various land use categories. The standard is grounded in the science of risk assessment and can be applied at any one of three levels or “Tiers”: Tier 1 – generic numerical standards corresponding to four generic land use scenarios; Tier 2 – adjustments to Tier 1 levels based on site-specific conditions; Tier 3 – site-specific risk assessment and/or risk management. The same degree of human health and environmental protection is required at all three tiers; higher tiers require more detailed site-specific data.

PHC describe a mixture of organic compounds found in or derived from geological substances such as oil, bitumen and coal. They are composed predominantly of carbon and hydrogen. For the purposes of the PHC CWS, PHC are subdivided according to specified ranges of equivalent carbon number (ECN):

- ▶ **Fraction 1 (F1)** encompasses the range of ECN from C6 to C10. It represents the volatile fraction of most hydrocarbon mixtures and consists of the aromatic subfraction in the range C>8 to C10, as well as aliphatic subfractions in the ranges of C6 to C8 and C>8 to C10.
- ▶ **Fraction 2 (F2)** encompasses the range of ECN for C>10 to C16. It represents the semi-volatile fraction and comprises aromatic and aliphatic subfractions in the ranges C>10 to C12 and C>12 to C16.
- ▶ **Fraction 3 (F3)** encompasses the range of ECN from C>16 to C34. It includes both aromatics and aliphatics in the C>16 to C21 and C>21 to C34 ranges.
- ▶ **Fraction 4 (F4)** encompasses compounds with ECN of C>34 to C50+. PHC within this range often make up a significant proportion of crude oils and petroleum products, although the fraction is generally considered to be of low mobility (volatility and solubility).

Specific aromatic compounds falling within F1 fraction (i.e. BTEX) are assumed to be managed separately and should be subtracted from the aromatics in this fraction.

4.3 Soil, Groundwater and Sediment Standards for use under Part XV.1 of the Environmental Protection Act (SGWS)

The Ontario Ministry of the Environment and Climate Change SGWS define acceptable contaminant concentrations with respect to land use, based on the effects that the criteria may have on human health and the natural environment. The minimum requirements that need to be met in order to consider a remedial effort complete are outlined in this regulation. Tabulated generic criteria are based on site sensitivity, groundwater use (potable or non-potable), property use (residential, parkland, institutional, commercial, industrial, community and agricultural/other), soil type (coarse or medium/fine textured) and restoration depth (full or stratified restoration).

For these assessment purposes, MMM selected SGWS Table 3: Applicable to sites with non-potable groundwater condition where full depth restoration is intended.

5.0 SITE CHARACTERIZATION

In order to appropriately apply the applicable regulatory criteria, a preliminary site characterization was performed. Details are provided in Table 1.

Table 1. Site Characterization

Site Characteristic	Description
Site Description and Land Use	<p>North Subject Property The north subject property consists of approximately 0.46 ha (1.14 acres) and is zoned as C3 commercial. The ground surface is generally flat; groundcover consists primarily of gravel with some patches of asphalt, concrete and landscaped areas that can be accessed from the south via Brandon Avenue and from the northeast via Osborne Street. The north subject property is currently used as an employee paid parking lot for Winnipeg Transit. It also includes areas of refuse storage of domestic waste and metal for removal and temporary storage of fill materials. The property is used for passage of transit buses accessing the maintenance garages and the Southwest Rapid Transit Corridor. Portions of the property are utilized by other City departments including Winnipeg Police Service and Traffic Services.</p> <p>South Subject Property The south subject property consists of approximately 0.035 ha (0.09 acres) and is zoned as R1-M single-family medium. The ground surface is generally flat; groundcover consists primarily of manicured grass with some areas of concrete. It can be accessed via Brandon Avenue to the north, a public laneway to the east, south and west. The south subject property is currently a vacant, maintained green space.</p> <p>The future land use of both the North and South Subject Property will be designated as C3 Commercial. The North Subject Property to be developed with a building and the South Subject Property to be developed as surface parking lot.</p>
Surrounding Land Use	<p>North: The Southwest Rapid Transit Corridor and rail lines are located north of the Site</p> <p>East: Winnipeg Transit Garage, residential properties and Osborne Street are located east of the North Subject Property; residential properties are located east of the South Subject Property</p> <p>South:</p>

Site Characteristic	Description
	Residential properties are located south of the Site. West: The Southwest Rapid Transit Corridor and rail lines are located west of the Site.
Topography	Both the North and South Subject Properties are generally flat. The Site is located approximately 230 metres above sea level (masl).
Soil and Geology	Soil: The native soil on-site consists of Fort Garry Clay, a soil developed on fine textured sediments. Fort Garry Clay is imperfectly drained in nature and overlies light grey to pale yellow sandy clay calcareous subsoil (Ehrlich et al., 1953).
	Regional Surficial Geology: The native soil on Site was developed on developed on the offshore glaciolacustrine deposits of glacial Lake Agassiz, consisting of clay, silt and minor sand. These deposits can be between 1 and 20 metres in thickness (Matile, 2004).
	Regional Bedrock Geology: According to the Manitoba Geological Survey and Manitoba Energy and Mines the bedrock geology of the area generally consists of the Red River Formation. The Red River Formation is Ordovician in age and comprises dolomite and limestone with a maximum thickness of 179 metres (Nicolas et al., 2010).
Water	Surface: North Subject Property Run off from the North Subject Property follows the contours of the property moving downslope from the centre of the property towards the east and south. Surface water flowing east and south enters catch basins located on the parking lot that drain into the city storm water system. South Subject Property Run off from the South Subject Property follows the contours of the property moving downslope from the centre of the property towards the north and south where it enters catch basins located in the laneways on and Brandon Avenue that drain into the city storm water system.
	Groundwater: Regional surface water and groundwater follow the downgradient flow to the northeast towards the Red River.

5.1 Exposure Pathways and Receptors for the Site

In order to appropriately apply the CSQG and PHC CWS, an exposure pathway and receptor assessment was performed for both human and ecological receptors. **Table 2** and **Table 3** provide a description of the exposure pathway and receptor along with a justification to account for the pathway or receptor to be applicable or not applicable as a governing exposure pathway.

Table 2. Exposure Pathway and Human Receptor Assessment

Exposure Pathway for Human Receptor	Applicability Description of Governing Exposure Pathway
Direct Contact Humans coming into direct contact with contaminated soil via incidental ingestion, dermal contact, or inhalation of airborne soil particles.	North Subject Property Not Applicable: The property is gravel covered and paved parking lot with minimal landscaped and green areas.

Exposure Pathway for Human Receptor	Applicability Description of Governing Exposure Pathway
<p>Applicable to all land uses.</p>	<p>South Subject Property Applicable: The property is a landscaped, green area easily and frequently accessed by the public. Anticipated future land use as a parking lot, would make direct contact not applicable.</p>
<p>Groundwater Ingestion Humans drinking from and showering or bathing in water that is sourced from groundwater. Applicable to all land uses.</p>	<p>Not Applicable: Based on results of the Phase I ESA there are no groundwater wells in the vicinity.</p>
<p>Vapour Inhalation Volatile contaminants being released from soil and/or groundwater and migrating upwards into living or working spaces where humans are exposed via inhalation. Applicable to all land uses.</p>	<p>North Subject Property Applicable: Future development of this area will include a building and currently there is a building (Winnipeg Transit Parking Garage) directly adjacent to this property.</p> <p>South Subject Property Not Applicable: There are no buildings on this property, nor do the development plans include the addition of a structure. However, there are residential properties with residences on properties directly adjacent to this property</p>
<p>Off-site Migration Wind and water erosion transport of contaminated soil from a commercial or industrial site onto an adjacent site with a more sensitive land use could potentially result in contaminate concentrations that exceed the direct contact soil quality guideline applicable to the more sensitive land use. The off-site migration check is completed to ensure that the commercial or industrial guidelines set are protective of this exposure pathway.</p>	<p>Applicable: Aerial photography suggests that areas to the east and south of the Site are residential.</p>

Table 3. Exposure Pathway and Ecological Receptor Assessment

Exposure Pathway for Ecological Receptor	Applicability Description
<p>Direct Soil Contact Plants and soil invertebrates coming into direct contact with contaminants in the soil or shallow groundwater. Ecological soil contact is applicable to all land uses. This pathway may be eliminated below 3 m.</p>	<p>Applicable: Plants and soil invertebrates may come in direct contact with contaminants in the soil and shallow groundwater. Landscaping features are present on site.</p>
<p>Nutrient Energy Cycling Microbial functioning of the soil, including carbon and nitrogen cycling. Applicable to all land uses.</p>	<p>Applicable: Microbial functioning of the soil, including carbon and nitrogen cycling may be affected.</p>
<p>Livestock/Wildlife Soil and Food Ingestion Livestock or wildlife ingesting contaminants via the incidental ingestion of soil and ingesting contaminants that have bioaccumulated from soil to fodder. Applicable to agricultural and natural area land use. May be applicable to urban parks frequented by wildlife.</p>	<p>Not Applicable: Applicable to agricultural and natural area land use only. Site is classified as commercial and residential land use.</p>
<p>Aquatic Life Aquatic life (fish, invertebrates and plants) being exposed to contaminants when groundwater discharges to a surface water body that is capable of supporting an aquatic ecosystem. Applicable to all land uses when a surface water body is located within 500 m from the Site.</p>	<p>Not Applicable: Depending on where on the North Subject Property line the distance is measured, the Site is 494 to 566 metres from the Red River. This site has been determined to be not applicable due to the presence of very fine grained clays which significantly impede water migration and extensive infrastructure including Osborne Street between the Site and the Red River.</p>
<p>Irrigation Crops being exposed to contaminants when groundwater is used for irrigation. Applicable to agricultural land use only.</p>	<p>Not Applicable: Irrigation activities do not take place on the Site, nor does it take place on adjacent properties.</p>
<p>Livestock/Wildlife Watering Livestock or wildlife being exposed to contaminants when groundwater is used for livestock watering or groundwater discharge to surface water body where wildlife may drink. Applicable to agricultural use. May be applicable to urban parks frequented by wildlife.</p>	<p>Not Applicable: Applicable to agricultural land use only. Site is classified as commercial and residential land use.</p>

5.1.1 Site Condition Criteria and Risk Based Justification

CCME CSQG and PHC CWS criteria are selected based on the following risk based governing pathway justification outlined in Table 4.

Table 4. Site Condition Criteria for Risk Based Justification

Site Condition	Governing Pathway Justification
Land use	Commercial Land Use Zoning
Soil Texture	Fine grained, confirmed through site investigation and laboratory analysis
Lifetime incremental cancer risk	SQH _{HH} value based on lifetime incremental cancer risk of 10 ⁻⁵ selected based on Site specific characterization.
Most sensitive receptor	Vapour inhalation

After completing the exposure pathway and receptor assessment and CCME's published spreadsheet model of the CWS PHC (**Appendix C**), the governing exposure pathway, for use with the CSQG for commercial land on fine-grained soil and the Tier 1 PHC CWS for Fractions 1 to F4, is vapour inhalation.

6.0 INVESTIGATION METHOD

MMM field staff were on-Site to conduct Phase II ESA activities of the Site on June 21, 22, July 4, 11 and 20, 2016. The soil and groundwater quality of the Site was investigated at the locations shown on Figure 2 (**Appendix A**) through the advancement of boreholes and the installation of monitoring wells in predetermined locations. Methodologies and protocols are described as follows.

6.1 Environmental Health and Safety

Both private (McCaine Electric) and public (Manitoba Hydro, MTS, Shaw and Fibre) buried utility clearances were completed. The City of Winnipeg provided clearance for underground sewer and water infrastructure. Copies of private and public utility clearances and available drawings are located in **Appendix C**.

6.2 Borehole Drilling

Eight boreholes were drilled using a GeoProbe 7822DT track mounted drill on June 21 and 22 2016 to a maximum depth of 6.0 mbgs to assess potential impacts to the on-Site soil on the North Subject Property. Two boreholes were drilled using a solid stem auger track mounted drill on July 4, 2016 to a maximum depth of 6.0 mbgs to assess potential impacts to the on-Site soil on the South Subject Property. The drilling operations were conducted with equipment supplied and operated by Maple Leaf Drilling Ltd.

Borehole drilling was conducted in accordance with MMM's standard operating procedure (SOP) EM1.101 (2012).

6.3 Soil: Sampling

Soil sampling was completed at each of the investigation boreholes identified in Figure 2, (**Appendix A**), under the oversight of MMM field staff.

A steel knife was used to collect the soil sample by hand; the knife was thoroughly cleaned between each sampling interval. Representative soil samples were collected from the surface to the maximum depth of investigation. Nitrile gloves were worn throughout the sampling program and changed between the collection of each sample.

The recovered soil samples were visually inspected and logged in the field by a MMM Project Scientist indicating colour, odour, texture, soil type and moisture. Borehole locations are identified in Figure 2 (**Appendix A**) and the borehole logs are presented in **Appendix E**.

New regulatory requirements in Manitoba effective as of July 1, 2016 require all soil samples collected for analysis of VOCs including BTEX to be field preserved in methanol immediately after collection. Maxxam Analytics prescribes 3 vials be collected per sample to be analyzed for BTEX/F1 and VOCs along with a single glass jar with zero headspace for moisture analysis. Additional glass jars and/or polyethylene bags may be required depending upon additional analytical requirements dictated by the SAP (i.e. metals and PAHs).

MMM field staff used laboratory supplied plastic cut off syringes to collect and extrude an approximately 5 g core of sample into appropriately labeled 40 ml VOA vials which were prefilled with 10ml of methanol. Based on the SAP requirements glass jars and polyethylene bags were collected for appropriate samples. All soil samples were placed in a cooler and maintained at a temperature below 10°C.

Soil sample collection and handling was conducted in accordance with MMM's SOP, EM1.201 (2012).

6.4 Field Screening Measurements

A portion of each soil sample was placed into a polyethylene bag for headspace analysis. Each soil sample was broken up and screened after collection for VOCs with an RKI Eagle II combustible gas detector with a photoionization Detector (PID). The Eagle II was inspected and calibrated in accordance with the recommended procedures as outlined by the manufacturer, the calibration certificate is included in **Appendix C**.

Select samples were reorganized and placed in a cooler with ice packs to maintain a temperature of approximately 10°C. These samples were then delivered to the Maxxam Analytics for analysis within 48 hours of collection. Standard chain-of-custody procedures were followed during sample handling and delivery.

Field measurements for combustible and organic vapours in soils was conducted in accordance with MMM's SOP, EM1.301 (2012).

6.5 Ground Water: Monitoring Well Installation

Of the ten boreholes drilled, four were completed as groundwater monitoring wells. The wells consist of 50.8 mm diameter PVC well casing with a 3.0 m length of slotted PVC screen, and J style plug with a flush mount cover. Once each borehole was advanced to the desired depth, the screen, well casing and plug were assembled and placed into the borehole. A silica sand filter pack was placed between the screen and the borehole wall and extended to approximately 0.3 m above the screen. The silica sand filter pack provides a permeable zone and prevents fine-grained materials from entering the well screen. Approximately 3 m of pellet form bentonite was placed above the sand pack to create a surface seal. All four wells were completed with flush-mount protective casings. Monitoring well locations are illustrated in Figure 2 (**Appendix A**) and monitoring well logs are located in **Appendix E**.

Monitoring well installation and development was conducted in accordance with MMM's SOPs, EM2.101 (2012) and EM2.102 (2012).

6.6 Ground Water: Field Measurement of Water Quality Parameters

Prior to groundwater purging and sample collection, depth to groundwater and bottom of the well were measured, with a clean Solinst Model 122 Interface Meter, to the lip of the PVC well casing. The water interface meter is used to detect liquids using an infra-red beam and detector. As the probe end is lowered down the well and enters a liquid the beam is refracted away from the detector which activates an audible tone and light. If the liquid is a non-conductive oil/product the signals are steady; whereas a conductive liquid, such as water, will result in an intermittent tone and light signal.

Groundwater was purged and sampled using a low-flow peristaltic pump attached to a flow-through cell. Field water quality indicator parameters (temperature, pH, oxidation-reduction potential, dissolved oxygen, electrical conductivity, total dissolved solids) were measured with a YSI 556 multiprobe system (YSI) calibrated and inspected in accordance with the recommended procedures as outlined by the manufacturer.

The collection of water quality measurements was conducted in accordance with MMM's SOP EM2.301 (2012).

6.7 Ground Water: Sampling

Groundwater samples were collected using Masterflex portable peristaltic pump. On July 11, 2016, all four of the monitoring wells (MW02, MW05, MW08 and MW09) were purged dry and allowed to recharge in order to obtain fresh water samples for analysis, the rate of recharge was monitored and the wells were sampled when an adequate volume of groundwater accumulated within the well.

Samples were placed in clean, laboratory-supplied sample containers that were appropriately pre-labelled and placed in a cooler with ice packs to maintain a temperature of 10°C for preservation. These samples were then delivered to Maxxam immediately after collection for analysis. Standard chain-of-custody procedures were followed during sample handling and delivery.

Groundwater sample collection and handling was conducted in accordance with MMM's SOP, EM2.201 (2012).

6.8 Groundwater Elevation Surveying

An elevation survey of the monitoring wells was completed on July 27, 2016 using a DGPS. The ground surface and top of the monitoring were topographically surveyed to a georeferenced control to sub-centimetre accuracy and documented. Data collected includes; Well ID, GPS Location (UTM), ground surface elevation, top of pile elevation, well depth and depth to groundwater.

6.9 Rationale for Sampling Location Selection

The Site was investigated for soil and groundwater impacts associated with historical railyard activities on the Site. The location of the boreholes/monitoring wells was determined in order to aid in obtaining confirmatory sampling of the entire Site. Figure 2 (**Appendix A**) illustrates the location of the boreholes/monitoring wells. Soil samples from the ten boreholes were collected for analysis of PAHs, VOCs including BTEX, PHC F1-F4, metals and particle size.

Groundwater samples from the four monitoring wells were collected for analysis of PAHs, VOCs including BTEX, PHC F1-F4 and metals.

6.10 Analytical Testing

Collected soil samples were submitted to Maxxam Analytics within 36 hours of collection for the analysis of one or more of the following parameters and methods outlined in Table 5. Groundwater samples were submitted to Maxxam Analytics immediately after collection for the analysis of one or more of the following parameters and methods outlined in Table 5.

Table 5. Maxxam Analytical Parameters and Methods

Analytical Method	Matrix	Analyses	Laboratory Method
EPA6020bRm,6010cR3m	Soil	Boron (Hot water soluble) (1)	BBY7SOP-00001 BBY7SOP-00018
SM 22 3500-Cr B m	Soil	Hexavalent Chromium (2)	AB SOP-00063
SM 22 2510 B	Soil	Conductivity	BBY6SOP-00029
Auto Calc	Soil	Volatile F1-BETEX (1)	BBY WI-00033
CCME PHC-CWS	Soil	CCME Hydrocarbons (F2-F4 in soil) (3)	WINSOP-00056
BC SALM, EPA 6020bR2m	Soil	Elements by ICPMS (total) (1)	BBY7SOP-00017
BC MOE Lab Manual	Soil	Moisture (1)	BBY8SOP-00017
Carter Method 51.2	Soil	Moisture	WIN SOP-00060
EPA 8270d R4 m	Soil	PAH in Soil by GSéMS (SIM) – CCME (1)	BBY8SOP-00022
Auto Calc	Soil	Index of Additive Cancer Risk Calc. (1)	BBY WI-00033
Auto Calc	Soil	Total PAH and B(a)P Calculation (1)	BBY WI-0003
BCMOE BCLM Mar2005 m	Soil	pH (2:1 DI Water Extract) (1)	BBY6SOP-00028
SM 22 4500-H+ B	Soil	pH (Soluble) (1)	BBY6SOP-00025
Carter SSMA 55.4	Soil	PSA Course/Fine (75 micron)	WIN SOP-00039
Carter SSMA-55.4	Soil	Grain Size (Course/Fine)	WIN SOP-00039
Carter 2 nd 15.2.1 m	Soil	Saturated Paste (1)	BBY6SOP-00030
EPA 8260c R3 m	Soil	VOCs, VH, F1,LH in Soil-Field pres.(1,4)	BBY8-SOP-00009
EPA8260C/CCME PHCCWS	Groundwater	BTEX/F1 in Water by HS GC/MS	WINSOP-00054 WINSOP-00055

Analytical Method	Matrix	Analyses	Laboratory Method
Based on SM-2510B	Groundwater	Conductivity in Water by PC titrator	WIN SOP-00063
CCME PHC-CWS	Groundwater	CCME Hydrocarbons (F2-F4 in Water)	WIN SOP-00056
Auto Calc	Groundwater	Hardness Total (calculated as CaCO ₃) (1)	BBY WI-00033
BCMOE BCLM Oct2013 m	Groundwater	Mercury (Total) by CVAf (1)	BBY7SOP-00015
EPA 6020A R1 m	Groundwater	Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	BBY7SOP-00002
BCLM2005,EPA6020bR2M	Groundwater	Elements by CRC ICPMS (total) (1)	BBY7SOP-00003
EPA 8270d R4 m	Groundwater	PAH in Water by GC/MS (SIM) (1)	BBY8SOP-00021
Auto Calc	Groundwater	Total LMW, HMW, Total PAH Calc (1)	BBY WI-00033
SM4500 H+B	Groundwater	pH in Water by PC Titrator (2)	WIN SOP-00063
EPA 8260c R3 m	Groundwater	VOCs, VH, F1, LH in Water by HS GC/MS (1)	BBY8SOP-00009

6.11 Quality Assurance and Quality Control Measures

Quality Control is the process of verifying that work is technically correct and accurate. The following quality assurance and control measures were carried out during the field investigation and reporting:

- ▶ Soil sampling was conducted in accordance with MMM's SOP EM 1.201.
- ▶ The RKI Eagle II used for field screening was calibrated to the manufacturer's recommendations prior to use.
- ▶ Three duplicate soil samples (BH01-SS02, BH06-SS04 and MW09-SS01) were obtained for the field replication of VOCs including BTEX and PHC F1 to F4 analyses; however only BH01-SS02 and MW09-SS01 were submitted for the field replication of metals and PHC analyses.
- ▶ One duplicate groundwater sample (MW05) was obtained for the field replication of VOCs including BTEX, PHC F1 to F4, PAHs and metals.
- ▶ Maxxam Analytics completed a variety of quality assurance/quality control (QA/QC) measures on the samples submitted as part of the sampling program. These QA/QC measures include: sample replicates, matrix spiked laboratory blanks and process blanks. Analytical and quality control data were reviewed and have been validated by Maxxam Analytics. Copies of the Quality Assurance Reports and analytical methods are included with the Certificates of Analysis in **Appendix F**.

7.0 REVIEW AND EVALUATION

7.1 Field Observations

Upon arrival to the Site the following observations were noted:

- ▶ During the advancement of BH04, the drill hit something at roughly 0.76m depth, possibly a historic foundation, and the borehole location was adjusted <2m to the north.
- ▶ During the installation of the monitoring wells, the boreholes caved in to about 5.79 m. Monitoring wells were installed at this depth.
- ▶ During groundwater measurements, no stratification of free product within the water column was identified.
- ▶ Monitoring wells were observed to have a slow rate of recharge after being purged. MMM field staff purged the wells on July 11, 2016 and returned to sample on July 15, 2016 to discover not enough recovery to collect samples. The wells were allowed to recharge and samples were collected on July 20, 2016.
- ▶ MW09 had low water levels before and after purging, in order to collect the required volume of water to fill the bottles for laboratory analysis, MMM field staff decided to forego physio-chemical *insitu* measurements by YSI to utilize the water volume that would have been within the flow thru cell for the analytical bottles.

7.2 Soil Stratigraphy

Based on the drilling investigation the soil stratigraphy encountered within the Site generally consisted of silty clay and silt overlain by fill materials including sand, gravel and topsoil. The drill program extended to a maximum depth of 6.0 mbgs. Particle size analysis can be found in Table 6 (**Appendix D**), borehole logs are available in **Appendix E**.

7.3 Soil Field Screening

Elevated VOCs were detected by the Eagle II from one soil sample (BH01-SS02), this sample was submitted for laboratory analysis. Field screening measurements are presented in the borehole logs located in **Appendix E**.

7.4 Soil Quality

The analytical soil results from the Phase II ESA are provided in Tables 7, 8, 9, 10 and 11 (**Appendix D**). Analytical results did not identify any concentrations of PAH, BTEX, PHC F1 to F4, VOCs or metals that exceeded the applied guidelines.

7.5 Ground Water: Elevations and Flow Direction

Depth to groundwater was measured in all wells before sampling. The depth to water in the four monitoring wells on-Site range between 4.23 and 5.15 mbgs.

Hydraulic gradient calculations indicate the general groundwater flow direction on-Site is north-northeast, towards the Red River as illustrated in Figure 3.

Table 12: Groundwater Monitoring and Surveying Results

Monitoring Well ID	Subsurface PID Vapour Reading July 20, 2016	Top of Riser Elevation (masl)	Depth to Groundwater July 20, 2016 (mbtop)	Elevation of Groundwater DATE (masl)
MW02	0 ppm	232.168	4.23	227.938
MW05	0 ppm	232.213	4.245	227.968
MW08	0 ppm	232.294	4.972	227.322
MW09	0 ppm	231.819	5.15	226.669

Notes: masl = metres above sea level, mbtop = metres below top of pipe (i.e., riser)

7.6 In-field Groundwater Quality Measurements

In-field groundwater quality indicator parameters (temperature, pH, oxidation-reduction potential, dissolved oxygen, electrical conductivity, total dissolved solids) were measured with a YSI with a flow thru cell on July 20, 2016 for MW02, MW05 and MW08 before and after each sample was collected. In-field groundwater quality measurements are presented in Table 13.

Table 13: In-Field Groundwater Quality Measurements

Monitoring Well ID		Temperature (°C)	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	pH	ORP	Total Dissolved Solids (g/L)
MW02	Before Sampling	12.61	4380	15.13	7.10	59.8	2.848
	After Sampling	11	4110	10.36	7.07	37.7	2.671
MW05	Before Sampling	12.11	4387	18.65	7.39	72.3	2.851
	After Sampling	10.25	4303	6.86	7.03	41.5	2.797
MW08	Before Sampling	16.74	4114	15.58	6.69	123.1	2.674
	After Sampling	10.23	4047	6.37	6.85	105.1	2.631

7.7 Groundwater Quality

The analytical groundwater results from the Phase II ESA are provided in Tables 14, 15, 16, 17 and 18 (**Appendix D**). Analytical results did not identify any concentrations of PAH, BTEX, PHC F1 to F4, VOCs or metals that exceeded the applied guidelines.

7.8 Quality Assurance and Quality Control Results

The samples submitted for laboratory analyses were collected in laboratory-supplied sample containers and analyzed within their applicable holding times using approved analytical methods. The certificates of Analysis received from the laboratory indicate that reporting limits were met for the tested parameters. No tested parameter was present in a detectable concentration in the laboratory method blanks and surrogate recoveries were within acceptable ranges. Results of the laboratory matrix spike were within acceptable quality control limits.

MMM field staff submitted four field duplicate samples as follows Tables 7, 8, 9, 10, 11, 14, 15, 16, 17 and 18 (**Appendix D**):

- ▶ DUP01 (soil) was a duplicate of BH01-SS02 and was analyzed for PAH, BTEX, PHC F1 to F4 and metals (Table 7, 8, 9, 10 and 11).
- ▶ DUP02 (soil) was a duplicate of BH06-SS04 was analyzed for BTEX and PHC F1 to F4 (Table 9).
- ▶ DUPA (soil) was a duplicate of MW09-SS01 was analyzed for PAH, BTEX, PHC F1 to F4 and metals (Table 7, 8, 9, 10 and 11).
- ▶ DUP01 (groundwater) was a duplicate of MW05 was analyzed for PAH, BTEX, PHC F1 to F4 and metals (Table 14, 15, 16, 17 and 18).

Some minor deviations and discrepancies between soil samples and their duplicates are to be expected due to the heterogeneous nature of soil.

Based on the review of the results of the quality control data, it is concluded that the analysis of the submitted samples for soil and water accurately represent the site conditions and the results meet the quality objectives of the investigation.

8.0 CONCLUSIONS

MMM conducted a Phase II ESA of the 421 Osborne Street Site on behalf of the Winnipeg Transit Department. The intrusive investigation included the advancement of ten boreholes, four of which were developed into groundwater monitoring wells on June 21, 22 and July 4, 2016. Soil samples were collected for PAH, BTEX, PHC F1-F4, VOC and metals analyses. Laboratory analytical results do not indicate exceedances of the applied guidelines; however, there were results above detection that do not present a risk at this time or with the anticipated development plans for the Site.

Groundwater samples were collected on July 20, 2016 for PAH, BTEX, PHC F1-F4 and metals analyses. Groundwater laboratory results indicate no exceedances to the applied guidelines.

9.0 RECOMMENDATIONS

Based on the Site characterization and the Phase II ESA, MMM recommends the following:

- ▶ No further investigative action is required.
- ▶ Prior to Site development, a soil management plan should be developed to address relocation of excess soil, this would ensure soil material is not transferred to a land use where environmental guidelines would be exceeded or develop a potential environmental liability.
- ▶ The four monitoring wells (MW02, MW05, MW08 and MW09) should be decommissioned and removed prior to property development to avoid contamination of the groundwater from surface run off sources.

10.0 QUALIFICATIONS OF ASSESSORS

Mr. Darren Keam, M.Sc., P.Ag., is a Senior Soil Scientist and Senior Project Manager with the Environmental Management (EM) department at MMM. He has more than 20 years of experience in agriculture and environmental management and more than 15 years in conducting and managing Phase I and II ESA projects. Mr. Keam leads EM opportunities, including Phase I and II ESA planning, site assessments and investigations and data analysis as well as providing senior technical review and quality assurance and quality control review of ESA data and reports. Mr. Keam is a member in good standing with the Manitoba, Saskatchewan and Alberta Institutes of Agrologists.

Ms. Laura Gallagher, M.Sc., GIT, EPT is a Project Scientist with the Environmental Management (EM) department at MMM. Ms. Gallagher holds an undergraduate degree in geological sciences, and a Master's degree specializing in environmental geochemistry. She is currently responsible for site supervision, collection of field data, data analysis and interpretation, preparing technical reports, and providing technical support for Environmental Site Assessments (ESAs) for a variety of public and private clients.

11.0 STANDARD LIMITATIONS

This report has been prepared for use by the Winnipeg Transit Department in accordance with generally accepted environmental investigation practices at the time of the assessment within the scope suggested by Canadian Standard Association's Phase II Environmental Site Assessment document (CSA Z769-00). The Standard Limitations pertaining to the use of this report are presented in (**Appendix G**).

12.0 REFERENCES

Betcher, R.N., Grove, G. and Pupp, C., 1995. Groundwater in Manitoba: Hydrogeology, Quality Concerns, Management, NHRI Contribution No. CS-93017. Canadian Standards Association Standard, Phase II Environmental Site Assessment, 2000, CAN/CSA Z769-00, (Reaffirmed 2008).

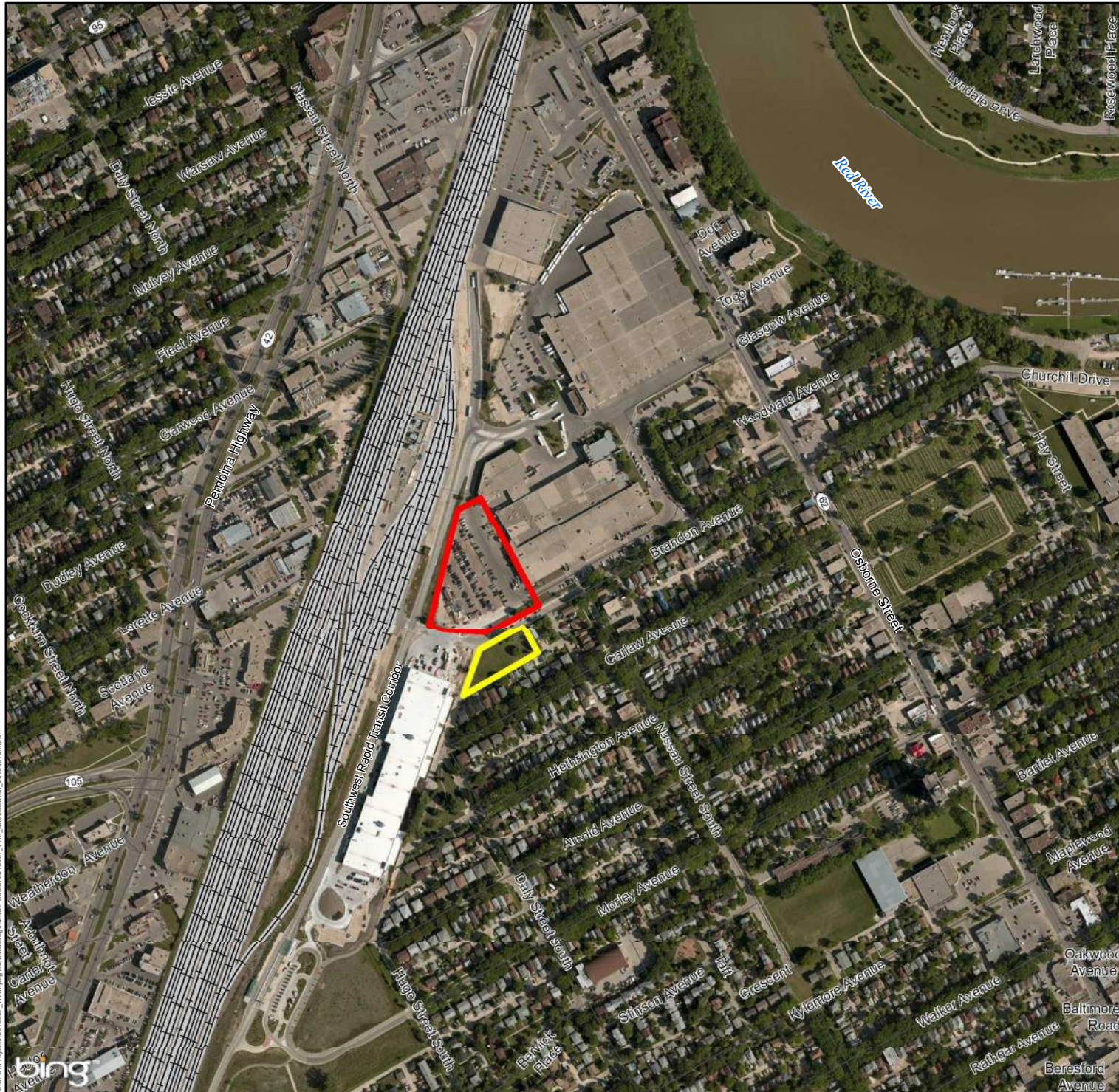
Matile, G.L.D. and Keller, G.R., 2004. Surficial geology of the Winnipeg map sheet (NTS 62H), Manitoba; Manitoba Industry, Economic Development and Mines, Manitoba Geological Survey, Surficial Geology Compilation Map Series, SG-62H, scale 1:250,000.

MMM Group Limited, Standard Operating Procedure: Borehole Drilling, EM 1.101, May 31, 2012.

MMM Group Limited, Standard Operating Procedure: Field Measurements for Combustible and Organic Vapours in Soil, EM 1.301, May 31, 2012.

MMM Group Limited, Standard Operating Procedure: Field Measurements – Water Quality, EM 2.301, May 31, 2012.

MMM Group Limited, Standard Operating Procedure: Groundwater Sample Collection and Handling, EM 2.201, May 31, 2012.



Winnipeg Transit Garage Phase II ESA

Legend

- Northern Subject Property
- Southern Subject Property
- Road
- || Railway Line

Coordinate System: NAD 83, UTM Zone 14N
 Data Source: Bing, MMM, Geogratis
 Date Created: June 06, 2016
 Revision Date: August 10, 2016

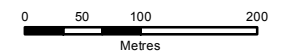
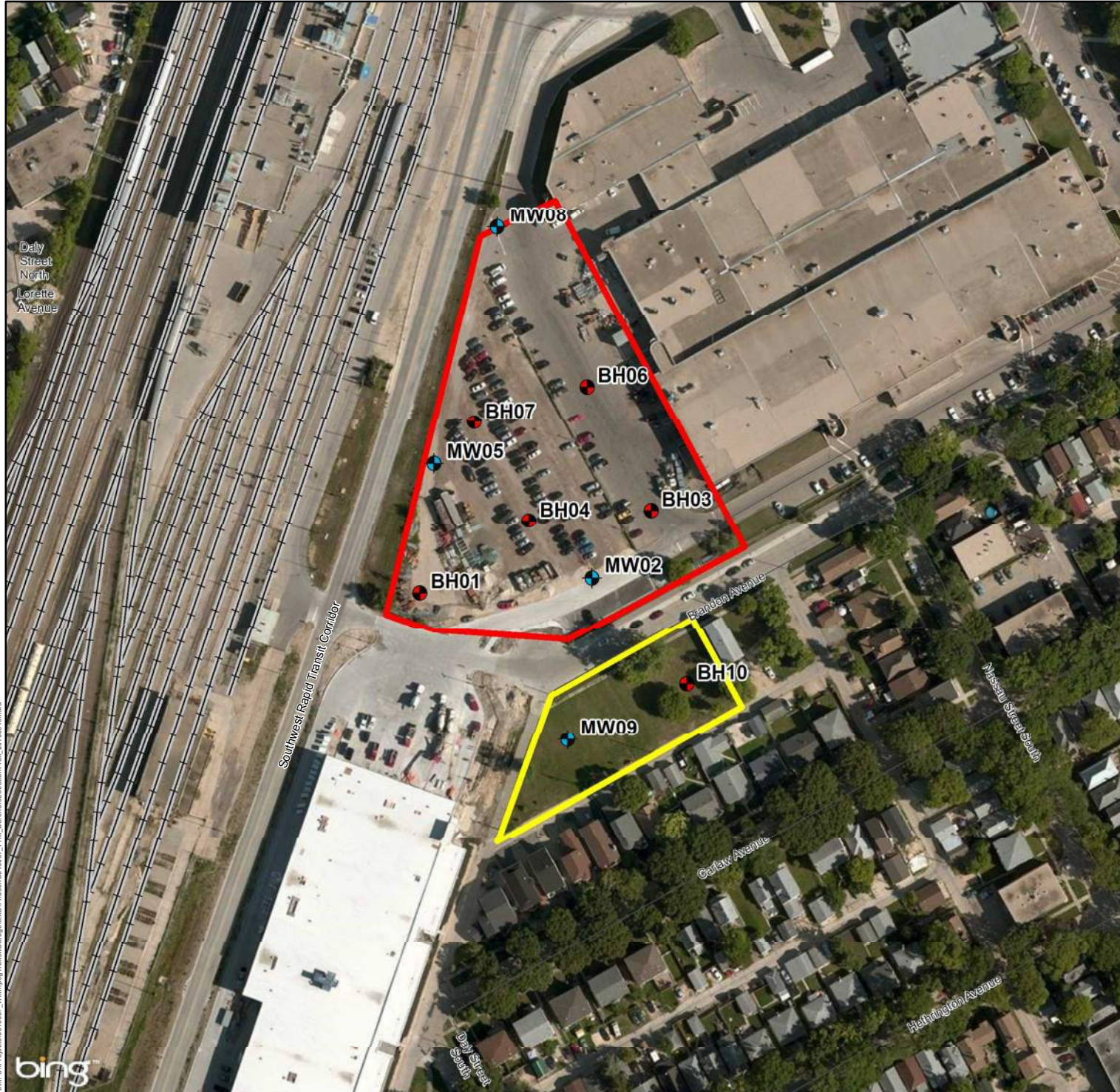


FIGURE 1
421 Osborne Street, Winnipeg
Site Location



Winnipeg Transit Garage Phase II ESA

Legend

- Boreholes
- Monitoring Wells
- Road
- Railway Line
- Northern Subject Property
- Southern Subject Property

Coordinate System: NAD 83, UTM Zone 14N
 Data Source: Bing, MMM, Geogratis
 Date Created: June 06, 2016
 Revision Date: August 10, 2016

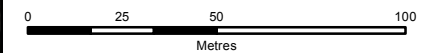
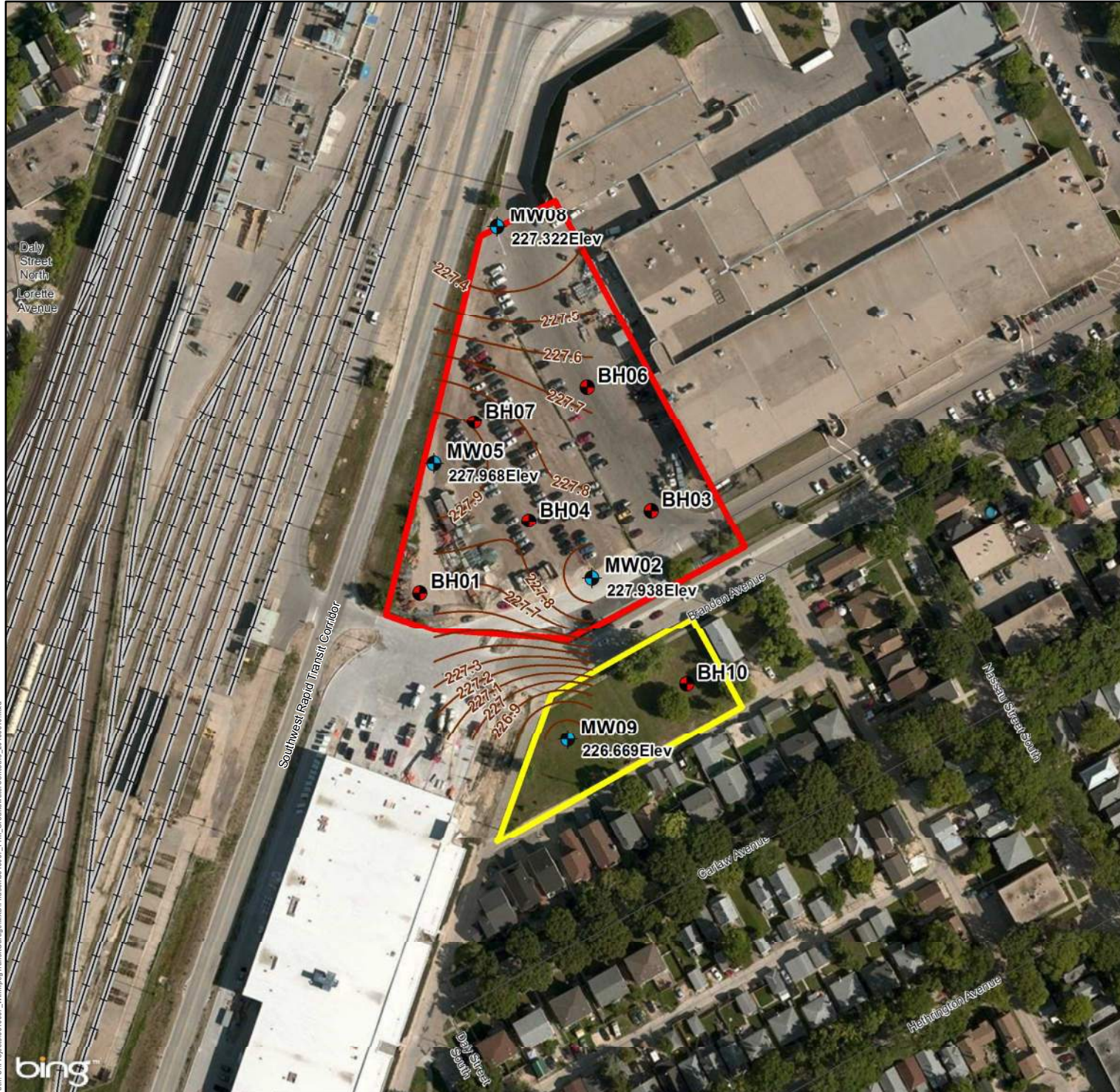


FIGURE 2
421 Osborne Street, Winnipeg
Borehole Location Plan

Path: U:\Projects\516097 - Winnipeg Transit Garage\MMMO\Phase II\Borehole Location Plan_20160810.mxd



Winnipeg Transit Garage Phase II ESA

Legend

- Boreholes
- Monitoring Wells
- Groundwater Contours (0.1 metre interval)
- Road
- Railway Line
- Northern Subject Property
- Southern Subject Property

Coordinate System: NAD 83, UTM Zone 14N
 Data Source: Bing, MMM, Geogratis
 Date Created: June 06, 2016
 Revision Date: August 10, 2016

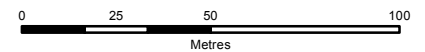


FIGURE 3
421 Osborne Street, Winnipeg
Groundwater Contours

APPENDIX B - PHOTOGRAPHS



Photo 1. Representative photo of Silty clay with gypsum nodule unit found throughout the Site while drilling.



Photo 2. Monitoring well (MW05) installation by Maple Leaf.



Date Taken: June 21 & 22, 2016

Client: Winnipeg Transportation Department

Taken by: LGallagher

Location: 421 Osborne

Project No.: 5516057



Photo 3. Extracting sample core for in-field methanol preservation.



Photo 4. Flush mount well cover, cemented in place in the parking lot at 421 Osborne Street.



Date Taken: June 21 & 22,
2016

Taken by: LGallagher

Project No.: 5516057

Client: Winnipeg
Transportation Department

Location: 421 Osborne



Photo 5. Work area for BH04, construction site sign in place to raise public awareness to safety concerns.



Photo 6. Water sampling process, using a peristaltic pump and flow thru cell.



Date Taken: June 21, 22
and July 20, 2016

Client: Winnipeg
Transportation Department

Taken by: LGallagher

Location: 421 Osborne

Project No.: 5516057

APPENDIX C - SUPPORTING DOCUMENTS

User Name:	MMM Group	Site:	421 Osborne Street
Proponent:	Winnipeg Transportation Department	File #:	5516057
Date:	August 2016	Comment:	

TIER 1 EVALUATION

Sec.

- 2.1.2 What is the land use classification? (Agricultural/Residential/Commercial/Industrial)
 2.1.3 What is the predominant soil type in the zone of contamination? (coarse/fine)
 2.1.3 Is there a fine-grained soil layer which may govern contaminant transport? (Y/N)
 2.1.3 Is there a coarse-grained soil layer which may govern contaminant transport? (Y/N)
 2.1.2 Is groundwater beneath/near the site used (or potentially used) as a potable water source? (Y/N)
 2.1.2 Are there any surface water bodies within 500 m of the site? (Y/N)

Commercial	1	
Fine	2	
Yes	3	Affects potable GW, livestock water guidelines
No	4	
No	5	Protection of groundwater disabled
No	6	Protection of aquatic life disabled

Applicability of Generic Approach (see Section 2.2.2 of the User Guidance)

The following questions indicate whether conditions exist for which the Tier 1 objectives may not apply; they do not affect the calculations.

- Is contamination present within 30 cm of a building foundation? (Y/N)
 Is contamination present within 10 m of a surface water body? (Y/N)
 Are ecological receptors of high sensitivity or socio-economic value present? (Y/N)
 Is the frequency of human/ecological exposure greater than normal? (Y/N)
 Is contamination present in fractured bedrock, or could fractured bedrock govern transport? (Y/N)
 Are there any other conditions for which the generic scenario may not be protective? (Y/N)

Yes	10	Tier 3 evaluation required
No	11	
No	12	
No	13	
No	14	
No	15	

GOVERNING TIER 1 OBJECTIVES

Commercial Land Use

PHC Fraction	Objective	Governing Pathway
Fraction 1	320 mg/kg	Ecological Soil Contact
Fraction 2	260 mg/kg	Ecological Soil Contact
Fraction 3	2500 mg/kg	Ecological Soil Contact
Fraction 4	6600 mg/kg	Ecological Soil Contact

[To Tier 1 Decision](#)**TIER 1 OBJECTIVES BY PATHWAY**
(From Lookup Table)

Pathway	F1	F2	F3	F4
Direct Soil Contact (Human)	19000	10000	23000	RES
Vapour Inhalation	4600	23000	NA	NA
Ecological Soil Contact	320	260	2500	6600
Protection of Potable Groundwater	NA	NA	NA	NA
Protection of Groundwater for FAL	NA	NA	NA	NA
Protection of Groundwater for Livestock	NA	NA	NA	NA
Offsite Migration	NA	NA	19000	RES
Management Level	800	1000	5000	10000
Governing Objective	320	260	2500	6600
Governing Pathway	Ecological Soil Contact	Ecological Soil Contact	Ecological Soil Contact	Ecological Soil Contact



Water and Waste Department • Service des eaux et des déchets

REQUEST FOR UNDERGROUND LOCATES WITHIN PUBLIC RIGHT-OF-WAY

SECTION A

Contractor/Utility Name: MMM Group

Contact Person: Brian Moons

Phone: 204-803-9488

Fax: [Click here to enter text.](#)

Address / Location for Locate:

421 Osborne (I/S of Glasgow@Osborne take a left(W), parking lot on the west)

Date Locate Requested: June 14, 2016

Time: 11:00am

Type of Work: Boreholes

Received By: Lukas Vorrath

Date: June 7, 2016

Time: 12:10pm

SECTION B

WATER & WASTE PLANT TYPE

SIZE

ALIGNMENT

SECTION C

Date & Time Provided

JUNE 14/16

By

B. Moons

Comments:

SERVILES

LOCATED

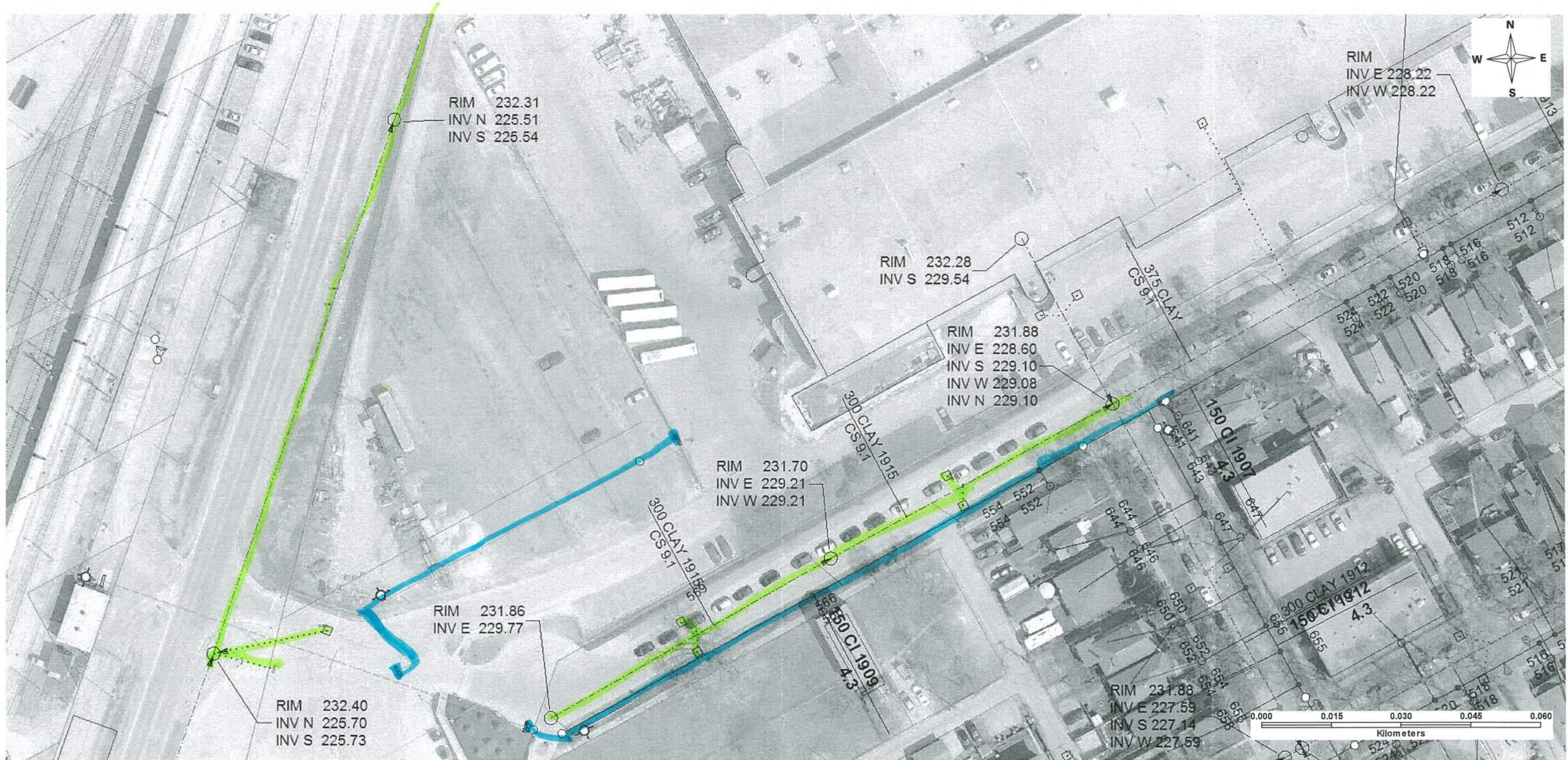
Contractor/Utility Signature _____

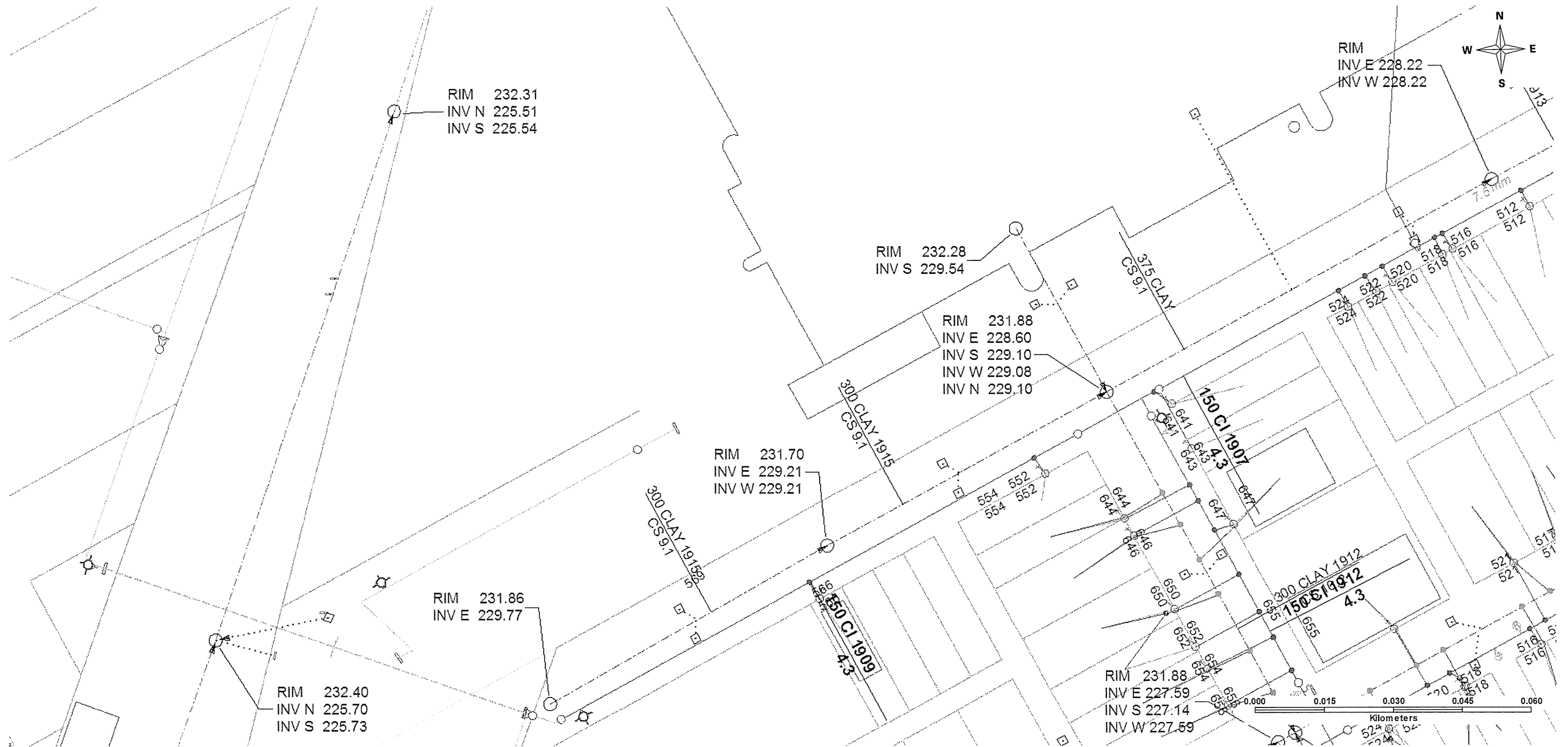
IMPORTANT

YOU ARE REQUIRED TO ARRANGE FOR INSPECTION WITH THE WATER AND WASTE DEPARTMENT'S CONSTRUCTION SERVICES COORDINATOR AT 204-986-4289
A MINIMUM OF SEVEN DAYS PRIOR TO CROSSING OR WORKING ADJACENT TO AQUEDUCTS AND FEEDERMAINS.

CAUTION: DO NOT OPERATE HEAVY OR VIBRATORY EQUIPMENT OVER OR WITHIN 3 METRES OF THE CENTRE LINE OF AN AQUEDUCT OR FEEDERMAIN.

THIS LOCATE DOES NOT IMPLY NOR AUTHORIZE APPROVAL FOR CONSTRUCTION. UNDERGROUND STRUCTURES APPROVAL MAY BE REQUIRED. PLEASE CONTACT THE UNDERGROUND STRUCTURES BRANCH AT 204-986-6401 FOR FURTHER INFORMATION.





Note – this is for information only. There is no guarantee as to the accuracy or completeness of the data.
 For record drawing information, please contact the Underground Structures Branch at 986-6401.

From: PWD-Underground Clearance Bookings <pwdsigcl@winnipeg.ca>
Sent: June-17-16 2:50 PM
To: Moons, Brian
Subject: Traffic Signals Underground Locates – RE: Routine 2016251730

No Traffic Signals equipment in the described work area at 421 OSBORNE ST. S OF BRANDON AVE IN GREEN SPACE. Locate # 20161930.

Thanks,
Ed

From: tickets@clickbeforeyoudigmb.com [tickets@clickbeforeyoudigmb.com]
Sent: Friday, June 17, 2016 1:22 PM
To: PWD-Underground Clearance Bookings
Subject: Routine 2016251730

MANITOBA CLICK BEFORE YOU DIG
NOTICE OF INTENT TO EXCAVATE

Header Code:ROUTINE PROJECT
Ticket No:2016251730

Send to:WPGTS Seq No:0012 Map Ref:

Original Call Date:06/17/2016 Time:13:16:02 Op:140
Transmit Date:06/17/2016 Time:13:22:49
Locate Response Date:06/24/2016 Time:00:00:00
Planned Excavation Date:06/24/2016 Time:00:00:00
Estimate Duration :2 HR

Company:MMM GROUP LIMITED
Contact Name:BRIAN MOONS
Contact Phone:(204)803-9488
Alternate Contact:LAURA GALLAGHER
Altern. Phone:(204)943-3178

Onsite Contact:
Email Address:MoonsB@mmm.ca

City:WINNIPEG, DIVISION NO. 11
Address:
Street:OSBORNE ST
Nearest Intersecting Street:
2nd Intersection:

Lot: Blk: Plan:

Latitude:49.86748250 Longitude:-97.14095500

Additional Site Info:

COPY T/N 2016240599 TO REQUEST LOCATES S OF BRAND ON AVE IN GREEN SPACE. CONTACT CALLER FOR MAP.

421 OSBORNE ST. PLEASE MARK ASAP

Where on the property:

SEE ADDITIONAL INFO

Type of Work:BORE HOLES

Depth:6.00 m Length:Unknown Width:Unknown

Private Commercial:Y Restricted Site Access:Y Vacant Lot:N

Request to Meet Locator:Y Public Property:N Private Residential:N

Site Premarked (staked):N Site Premarked (White paint):N

Work Being Done For:MUNICIPALITY

Project #:

Send to:WPGTS

-MTSWPG

-WPGWS

-MBHYDRO

Legend: -S = Supressed

From: Digshaw - Manitoba <Digshaw-Manitoba@sjrb.ca>
Sent: June-10-16 3:30 PM
To: Moons, Brian
Subject: FW: Commercial - DIGSHAW Locate Request MANAS-6360-0904-8552
Attachments: MANAS-6360-0904-8552-0.pdf; MANAS-6360-0904-8552-1.pdf

Hello,

Re: Shaw Cable locate

You are clear in the work area.
Clearance number is 610234
Thank you,

Mirek Ksiazkiewicz
National Planning Support
Shaw Communications Inc.
36 Scurfield Blvd
Winnipeg, Manitoba R3Y 1S5
T: 204-480-3476 F: 204-480-3582
E: locateswpg@sjrb.ca

This message is confidential and may contain privileged information. We ask that you not use or disclose this message other than with our consent.
If you are not an intended recipient, please immediately notify us and delete this message. Thank-you.

-----Original Message-----

From: digshawman@sjrb.ca [<mailto:digshawman@sjrb.ca>]
Sent: Tuesday, June 07, 2016 9:02 AM
To: Digshaw - Manitoba <Digshaw-Manitoba@sjrb.ca>
Subject: Commercial - DIGSHAW Locate Request MANAS-6360-0904-8552

DIGSHAW Reference Number: MANAS-6360-0904-8552
Company Name: MMM Group
Contact Name: Brian Moons
Contact Phone Number: (204) 803-9488
Alternate Contact Name: Laura Gallagher
Alternate Contact Num: (204) 898-7719
Email Address Copied: MoonsB@mmm.ca
Fax Number:
Emergency: NO
One Call Ticket:
Date of Excavation: 06/20/2016

Preferred Locate Date: 06/17/2016
Time: 10:00 AM
Area: Winnipeg
Province: MB-Manitoba
Address: 421 Osborne Street
Address Type: Commercial
Area of Excavation

Property Address: 421 Osborne Street

Front or Rear of Property Address: Rear (west) of second transit garage

Primary contractor:

Description of site and comments:

Environmental drilling: 10 boreholes and 3 monitoring wells to depth of 6 m. See attached site plans as address covers large area of the site.

From: mts.locates@mtsallstream.com
Sent: June-24-16 2:34 PM
To: Moons, Brian
Subject: Re: Routine 2016251730

Hello,

We have reviewed your request and are able to advise you the location is all clear. MTS cables are not located underground in the location you provided to us. Your confirmation number for this request is:

251730

Any delays in digging after this clearance, or changes to location or nature of work require a new locate. You will be liable for damages caused to MTS facilities if you do not follow these instructions.

If you have any questions or concerns please respond back to this email, with your preferred method of contact and we will respond as soon as possible.

MTS - We're with you.

Michelle

Cable Locate Department

-

Confidentiality Warning: This message is confidential and intended only for the named recipient(s). If you are not the intended recipient, or an agent responsible for delivering it to the intended recipient, or if this message has been sent to you in error, you are hereby notified that any review, use, dissemination, distribution or copying of it or its contents is strictly prohibited. If you have received this message in error, please notify the sender immediately and delete the original message.

On 6/17/16 1:22 PM, tickets@clickbeforeyoudigmb.com wrote:

> MANITOBA CLICK BEFORE YOU DIG
> NOTICE OF INTENT TO EXCAVATE
>
> Header Code:ROUTINE PROJECT
> Ticket No:2016251730
>
>
> Send to:MTSWPG Seq No:0095 Map Ref:
>
> Original Call Date:06/17/2016 Time:13:16:02 Op:140
> Transmit Date:06/17/2016 Time:13:22:49
> Locate Response Date:06/24/2016 Time:00:00:00
> Planned Excavation Date:06/24/2016 Time:00:00:00
> Estimate Duration :2 HR
>

> Company:MMM GROUP LIMITED
> Contact Name:BRIAN MOONS
> Contact Phone:(204)803-9488
> Alternate Contact:LAURA GALLAGHER
> Altern. Phone:(204)943-3178
>
> Onsite Contact:
> Email Address:MoonsB@mmm.ca
>
> City:WINNIPEG, DIVISION NO. 11
> Address:
> Street:OSBORNE ST
> Nearest Intersecting Street:
> 2nd Intersection:
>
> Lot: Blk: Plan:
>
> Latitude:49.86748250 Longitude:-97.14095500
>
> Additional Site Info:
> COPY T/N 2016240599 TO REQUEST LOCATES S OF BRAND
> ON AVE IN GREEN SPACE. CONTACT CALLER FOR MAP.
> 421 OSBORNE ST. PLEASE MARK ASAP
>
> Where on the property:
> SEE ADDITIONAL INFO
>
> Type of Work:BORE HOLES
>
> Depth:6.00 m Length:Unknown Width:Unknown
>
> Private Commercial:Y Restricted Site Access:Y Vacant Lot:N
> Request to Meet Locator:Y Public Property:N Private Residential:N
> Site Premarked (staked):N Site Premarked (White paint):N
>
> Work Being Done For:MUNICIPALITY
> Project #:
>
> Send to:MTSWPG
> -WPGWS -WPGTS -MBHYDRO
>
> Legend: -S = Supressed

Customer: M.M.M. GROUP

Phone: 898-7719

Billing Address: _____

Contact: LAURA G

Client's PO: _____

Job Site & Address: 421 OSBORNE ST.

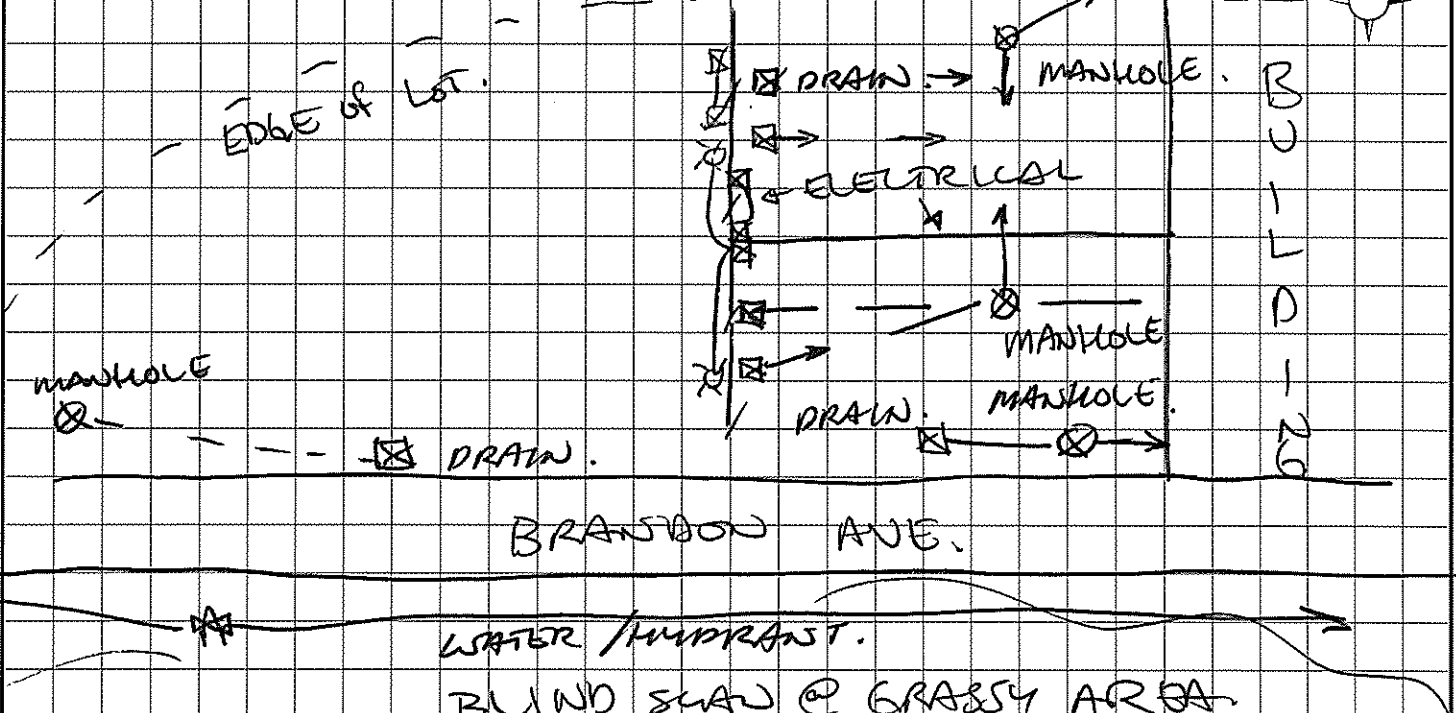
Job Number: _____

Comments: 33KVA ACTIVE LOCATE ELECTRICAL TO PLOT PLUGS & LIMITS. VISUAL LOCATE POINT-TO-POINT MANHOLES.

BLIND SCAN ALL AREAS of Labour WORK @ 60Hz & RADIO.

Date Work Performed	6-17-16			6-20-16											
	Reg Time	Shift Prem	Over Time	Reg Time	Shift Prem	Over Time	Reg Time	Shift Prem	Over Time	Reg Time	Shift Prem	Over Time	Reg Time	Shift Prem	Over Time
Electrician (s)															
<u>T.J. BENDER</u>	<u>1.5</u>			<u>2</u>											

ALL PROPOSED TEST HOLE LOCATIONS APPEAR TO BE CLEAR OF PRIVATELY OWNED UTILITIES.



Disclaimer: Locations are given as accurately as possible, but because of limitations in the equipment used to locate utilities, (hydro, water, sewer) underground conduits containing cables, teck cables or the like, we are unable to guarantee the complete accuracy of the locations and exterior locates. If after (5) five working days, work is not started at the locate, the requestor of this service, must reschedule for another locate. McCain Electric Ltd. assumes no responsibility whatsoever for the cable locations.

Customer's Signature: [Signature]
Print Name: Laura Outbigher

Technician Signature: [Signature]
Print Name: T.J. BENDER

Job Status
 Complete Not Complete

White - Customer Copy Yellow - Office Copy Pink - File Copy

NO INDICATION OF EQUIPMENT @ WEST SIDE OF FENCE w/ PLUGS



EXCAVATION SITE 421 Osborne
 APPLICANT'S NAME Brian COMPANY NAME (if applicable) MMM Group
 APPLICANT'S ADDRESS _____ CITY _____ POSTAL CODE _____ PHONE NO. 803-9488
 _____ STREET _____ CITY _____ POSTAL CODE _____ 943-3178
 APPOINTMENT DATE/TIME June 6/2016 MTS ASSIGNED TICKET NO. _____

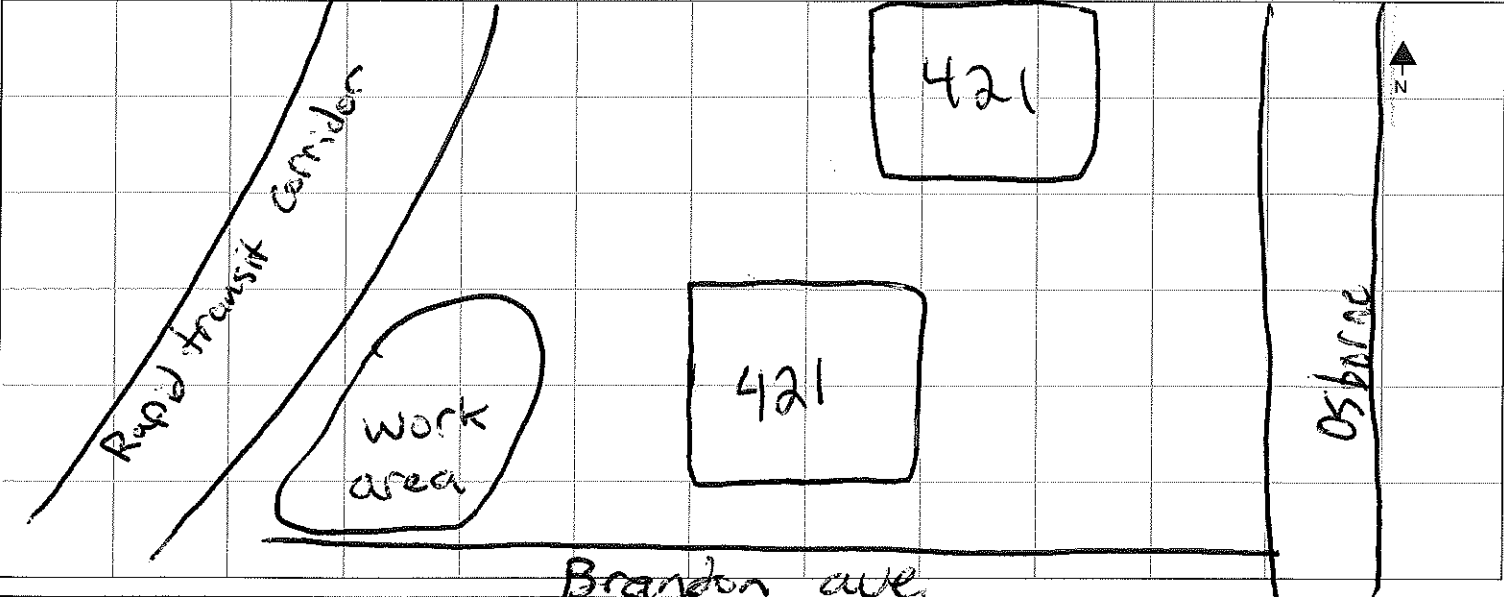
APPLICANT INTENDS TO INSTALL REMOVE OR REPAIR (Check One) THE FOLLOWING: (Locator To Check Applicable Boxes)

GAS WATER TREES CO-AXIAL/TELECOMMUNICATIONS
 ELECTRICAL SEWER FENCE OTHER (Specify) test holes

BURIED CABLE LOCATION DETAILS (To Be Completed By MTS Locator)

1. Were facilities located at excavation site? YES NO (Give Reasons Below)
 2. How was the location of the facilities marked? PAINT STAKED OTHER (Specify Below)
 3. What type of facilities were located? BURIED CABLE ENCASED CONDUIT UNENCASED CONDUIT
 4. What type of cable was located? COPPER DISTRIBUTION FIBRE OPTIC TRUNK FIBRE OPTIC
 POWER TO MTS CABINET FIBRE WATCH REQUIRED - CALL
 5. Was applicant present at time of locate? YES NO (Give Reason Below) _____ FOR APPOINTMENT
 6. Other remarks: Work area clear of MTS

Locator's sketch of site: (NOTE: This sketch is for illustration purposes only. It is not drawn to scale or in reference to the property lines.)



MTS INC. - INSTRUCTIONS TO APPLICANT - PLEASE READ CAREFULLY

1. Locate requests are required at least five (5) working days prior to digging, visit ClickBeforeYouDigMB.com. For emergency locates, call 1-800-940-3447.
2. MTS cannot guarantee precise location or depth of facilities. You must **HAND DIG** within one metre (3.28 feet) of markings for copper, distribution fibre optic and MTS power cables; and within 2.5 meters (8.2 feet) of markings for trunk fibre optic cables.
3. This locate was completed based on information given to MTS's locator at the time of the request or locate. **IF THERE ARE ANY CHANGES TO LOCATION OR NATURE OF WORK, A NEW LOCATE IS REQUIRED.**
4. Because markings made by MTS when locating cable may disappear, or be displaced, any delays in digging require a new locate. **THIS LOCATE, AS WRITTEN, IS VALID FOR 14 DAYS FROM THE DATE SHOWN BELOW, SUBJECT TO ALL MARKINGS BEING VISIBLE AT THE TIME OF EXCAVATION.**
5. You will be liable for damages caused to MTS's facilities if you do not follow these instructions, or abide by the locate.
6. **NOTE FIBRE WATCH REQUIREMENTS - PLEASE CALL THE NUMBER NOTED ABOVE AT LEAST ONE WEEK IN ADVANCE OF EXCAVATION.**
7. Under no circumstance shall MTS or any of its affiliated or associated companies (collectively "MTS"), or any of their employees be held liable for any losses (including down time) suffered by anyone as a result of a location error made by MTS.
8. Applicant is responsible to remove any MTS flags or stakes at locate site once construction is complete.

Above accepted by: _____ Date: 6 6 16
 (Print Name) Month Day Year
 APPLICANT'S SIGNATURE: _____ LOCATOR'S NAME: Colin I.D. NO. _____
 (Print Name)



THIS IS FOR INFORMATION ONLY.

There is no guarantee as to the accuracy or completeness of the data



Crown Utilities Ltd.

Ticket # 27681

Ticket Date: 2016-06-07 08:55:07

Location Clear

Company: MMM Group Ltd

Name: Moons, Brian

Phone: 2049433178

Mobile: 2048039488

Email: moonsb@mmm.ca

Address: 421 Osborne

Property Type: Commercial

Locate Date: 2016-06-20

Appointment Date:

Notes:

Environmental drilling

Location at Winnipeg Transit (421 Osborne Street); see attached PDF file.

DEPTH OF FIBER OPTIC LINE VARIES AND MUST BE DETERMINED BY HAND DIGGING.

HAND DIG WITHIN 1 METRE OF MARKINGS.

THIS CLEARANCE IS BASED ON INFORMATION GIVEN AT THE TIME. ANY CHANGES TO LOCATION OR NATURE OF WORK REQUIRES A NEW CLEARANCE.

STAKES AND MARKINGS ARE PROVIDED ONLY FOR THE WORK SITE SPECIFIED AND VALID FOR TWO WEEKS.



ELECTRIC AND/OR NATURAL GAS FACILITIES LOCATE
DEMANDE DE REPÉRAGE DE CONDUITES
D'ÉLECTRICITÉ ET DE GAZ NATUREL

In case of Emergency, call /
 En cas d'urgence, composez le
 204-480-5900 or / ou le
 1-888 MB HYDRO (1-888-624-9376)
 outside / à l'extérieur de Winnipeg



Address or location of work / Adresse ou site des travaux OSBORNE ST& ,WINNIPEG		Company name (if applicable) / Nom de l'entreprise (s'il y a lieu) MMM GROUP LIMITED	
Name of contact / Nom de la personne-ressource LAURA GALLAGHER	Contact tel. no. / Tél. de la personne-ressource 204-803-9488	Notice given by / Avis signifié par BRIAN MOONS	Email / Courriel gallagherl@mmm.ca

Description of work / Description des travaux
BORE HOLES

Locate valid for 14 Calendar days. If the nature of the work or the work area changes or the marks become displaced or obscured, stop work and obtain a new Locate. / Le Relevé de repérage n'est valide que pour 14 jours civils. Si la nature ou la zone des travaux est modifiée ou si les marques sont déplacées ou obscurcies, vous devez arrêter les travaux et obtenir un nouveau Relevé.

This locate is only valid for the work area indicated (see attached excavation area map). / Le Relevé de repérage n'est valide que pour la zone des travaux indiquée (voir le plan de la zone d'excavation ci-joint).

Excavation constitutes a danger to the electrical cables and natural gas plant indicated below. / Les travaux d'excavation comportent des risques pour les câbles électriques et les installations de gaz naturel indiqués ci-dessous.

High pressure / Haute pression	Gas main / Conduite principale de gaz	Service line / Ligne de desserte	Size / Taille	High voltage > 750 V / Haute tension	Secondary voltage < 750V / Tension secondaire	Overhead line / Ligne aérienne	Under-ground cable / Câble souterrain	Address or location of work / Adresse ou site des travaux
	X		8"					LOCATED IN PARKING LOT
		X	3/4"					LOCATED FOR 566 BRANDON
				X	X		X	LOCATED DIP POLE SW CORNER OF GREEN SPACE

RED markings, flags or marked stakes indicate power utility cables. / **Les marques, les drapeaux ou les piquets ROUGES** indiquent la présence de câbles électriques.

YELLOW markings, flags or marked stakes indicate natural gas lines. / **Les marques, les drapeaux ou les piquets JAUNES** indiquent la présence de conduites de gaz naturel.

Safety watch required when work area is within three metres of primary overhead lines / Une veille de sécurité est exigée quand la zone des travaux est à moins de trois mètres de lignes aériennes primaires	<input type="checkbox"/>	Notify the utility at least 2 business days in advance of excavation to request a Safety Watch / Avertir l'entreprise au moins 2 jours ouvrables avant les travaux d'excavation pour demander une veille de sécurité.
Hand dig when excavating within one metre of (secondary voltage) electric markings / Creusez à la main quand l'excavation est effectuée à moins de un mètre de marques d'installations d'électricité (tension secondaire)	<input type="checkbox"/>	Any excavation of a cable or pipeline may require a Safety Watch. If identified, please contact / Toute excavation d'un câble ou d'une conduite peut exiger une veille de sécurité. Si une veille est indiquée, veuillez communiquer avec :
Safety watch required when excavating within one metre of primary (high voltage) electric marks as identified / Une veille de sécurité est exigée quand l'excavation est effectuée à moins de un mètre de marques d'installations d'électricité primaires (haute tension).	<input checked="" type="checkbox"/>	Electric Safety Watch contact: / Veille de sécurité – installations électriques : CIC Office 204-360-7409
Safety watch required when excavating within three metres of primary (high voltage) electric marks as identified / Une veille de sécurité est exigée quand l'excavation est effectuée à moins de trois mètres de marques d'installations d'électricité primaires (haute tension)	<input type="checkbox"/>	Gas Safety Watch contact: / Veille de sécurité – installations de gaz : Hydro Contact Centre: 204-480-1212
Hand dig when excavating within one metre of gas marks / Creusez à la main quand l'excavation est effectuée à moins de un mètre de marques d'installations de gaz	<input checked="" type="checkbox"/>	Safety Watch May Be Required
Safety watch required when excavating within 3 metres of gas marks as identified / Une veille de sécurité est exigée quand l'excavation est effectuée à moins de trois mètres de marques d'installations de gaz, tel qu'indiqué	<input checked="" type="checkbox"/>	
Contact the Utility for further instructions before working/excavating. / Communiquez avec le service public avant de commencer à travailler ou à creuser pour obtenir des instructions additionnelles	<input type="checkbox"/>	
Contact Manitoba Hydro "Fiber Optic Locating" for further instructions prior to excavating (204-360-3467) / Communiquez avec le service de Manitoba Hydro chargé du repérage des conduites de fibres optiques pour obtenir des renseignements additionnels avant l'excavation (204-360-3476)	<input type="checkbox"/>	CBYD MB Ticket # / N° de fiche CBYD MB: 2016251730 Service Order # / Numéro d'ordre de service: BR12574628

Additional Information / Renseignements additionnels

SAFETY WATCH REQUIRED FOR 219.1 GAS MAIN

Prepared by (print name) / Fait par (nom en caractères d'imprimerie) LOC KEE5	Employee signature / Signature de l'employé(e) Not Required	DATE ADVICE GIVEN / DATE DES CONSEILS 2016-06-23	yyyy mm dd / a. m. j.
---	---	--	-----------------------

TERMS AND CONDITIONS:

Wherever used in this form, "Utility" means Manitoba Hydro and its employees and agents, directors, officers, successors, assigns:

By requesting this Locate, you acknowledge that you are the owner or the authorized agent of the owner of the work location(s) and you agree to the following terms and conditions:

1. This Locate applies only to facilities owned by the Utility.
2. In performing the work, you shall comply with the instructions described in this Locate and with all applicable statutes and regulations including (but not limited to) The Workplace Health and Safety Act, C.C.S.M., c.W210, The Workplace Health and Safety Regulation, M.R. 217/2006, The Gas Pipelines Act, C.C.S.M., c. G50 and the Gas Pipeline Excavations Regulation, M.R. 140/92.
3. You shall provide proper supervision of the work and safety watching services unless otherwise instructed in this Locate. Where safety watch services are to be provided by the Utility, you shall notify the Utility at least 2 days in advance.
4. The Utility shall have no liability or responsibility whatsoever for the work. You are solely responsible for any claims, costs, damages or loss, including property damage, personal injury or death, arising from, caused by or related to the work and you shall indemnify and save the Utility harmless from and against all manner of action, suit, debts, claims, costs, losses or demands, including claims by third parties, that arise as a result of the work.
5. You shall, upon demand, reimburse the Utility for cost, loss or damage incurred or suffered by the Utility as result of the work.

GENERAL INSTRUCTIONS:

1. **Locate Duration:** Work must start within 14 days of the date of this Locate. If not, you must obtain a new Locate.
2. **Locate Area:** This Locate applies only to the work area you have specified. If the nature of the work or the work area changes or the marks become displaced or obscured, stop work and obtain a new Locate.
3. **Post the Locate on site:** Keep a copy of this Locate on the work site for the duration of the Work.
4. **Maintain Markings:** You must maintain all stakes or marks for the duration of the Work. If stakes or marks are obscured or displaced, you must stop work and obtain a new Locate.
5. **Confirm the Location of the Facilities:** The information provided in this Locate is an estimate only. You must determine the exact location and depth of the facilities by hand digging at several locations before excavating with mechanical equipment. **DO NOT ATTEMPT TO LOCATE FACILITIES BY PROBING THE GROUND WITH ANY POINTED TOOL OR OBJECT.** If the actual location is different than the marked location, stop the work and contact the Utility immediately to confirm the location.
6. **Safety Watch:** Where a safety watch is required, the Utility requires a minimum of 2 business days notice.
7. **Backfilling:** When backfilling, ensure that underground facilities remain in place during settling by keeping them supported and by thoroughly tamping the backfill under the facilities.
8. **Damage to Facilities:** Take every precaution to ensure no damage or stress will occur to the facilities. Notify the Utility immediately of any damage or disturbance occurring or observed. **NEVER MOVE THE FACILITIES AS DANGEROUS CONDITIONS MAY RESULT.** Do not backfill until the Utility has inspected the facilities for damage or safety hazards.
9. Review Manitoba Hydro's Safe Excavation & Safety Watch Guidelines at: https://www.hydro.mb.ca/customer_services/permits_and_inspections/pdfs/excavation_guidelines.pdf

These instructions are provided for on-site reference. You are required to follow the requirements set out in all applicable statutes and regulations, copies of which are available from Statutory Publications or online at <http://web2.gov.mb.ca/laws/>. You are also required to comply with the excavation guidelines published by SAFE Work Manitoba at <http://safemanitoba.com>.

CAUTION:

You must notify the Utility immediately of any damage or disturbance to a facility by contacting 204-480-5900 in Winnipeg or 1-888-MB HYDRO (1-888-624-9376). **If a natural gas leak is suspected**, you must also:

- evacuate the work site and immediate area
- keep traffic and pedestrians away
- Notify persons at all nearby premises that may be affected
- Remove or extinguish all sources of ignition

CONDITIONS GÉNÉRALES

Partout où elle est utilisée dans les présentes, l'expression « Service public » fait référence à Manitoba Hydro et à ses employés, agents, dirigeants, administrateurs, successeurs et ayants droit.

En demandant le présent relevé de repérage d'installations (le « Relevé »), vous reconnaissez que vous êtes le propriétaire ou l'agent autorisé du propriétaire du ou des sites des travaux et vous acceptez les conditions générales suivantes :

1. Le Relevé ne s'applique qu'aux installations qui sont la propriété du Service public.
2. Pour l'exécution des travaux, vous devez vous conformer aux instructions précisées sur le présent Relevé, ainsi qu'à toutes les lois et tous les règlements applicables, y compris, sans vous y limiter, la Loi sur la sécurité et l'hygiène du travail (c. W210 de la C.P.L.M.), le Règlement sur la sécurité et la santé au travail (R.M. 217/2006), la Loi sur les gazoducs (c. G50 de la C.P.L.M.) et le Règlement sur les excavations effectuées à proximité des installations de gaz (R.M. 140/92).
3. Vous devez fournir une supervision adéquate des travaux et des services de veille de sécurité, sauf indication contraire sur le présent Relevé. Si des services de veille de sécurité doivent être fournis par le Service public, vous devez donner à ce dernier un préavis d'au moins deux jours ouvrables.
4. Le Service public n'assume aucune responsabilité, quelle qu'elle soit, à l'égard des travaux. Vous êtes entièrement responsable de toute réclamation ou perte et de tous les coûts ou dommages, y compris les dommages matériels, les blessures ou les décès, qui peuvent découler des travaux ou être causés par eux ou être liés à ceux-ci. Vous devez indemniser le Service public de toute action, poursuite, dette, réclamation, perte ou demande et de tout coût, y compris les réclamations soumises par des tierces parties, qui peut résulter des travaux.
5. Sur demande, vous devez rembourser au Service public les coûts, les pertes ou les dommages encourus ou subis par ce dernier qui peuvent résulter des travaux.

INSTRUCTIONS GÉNÉRALES

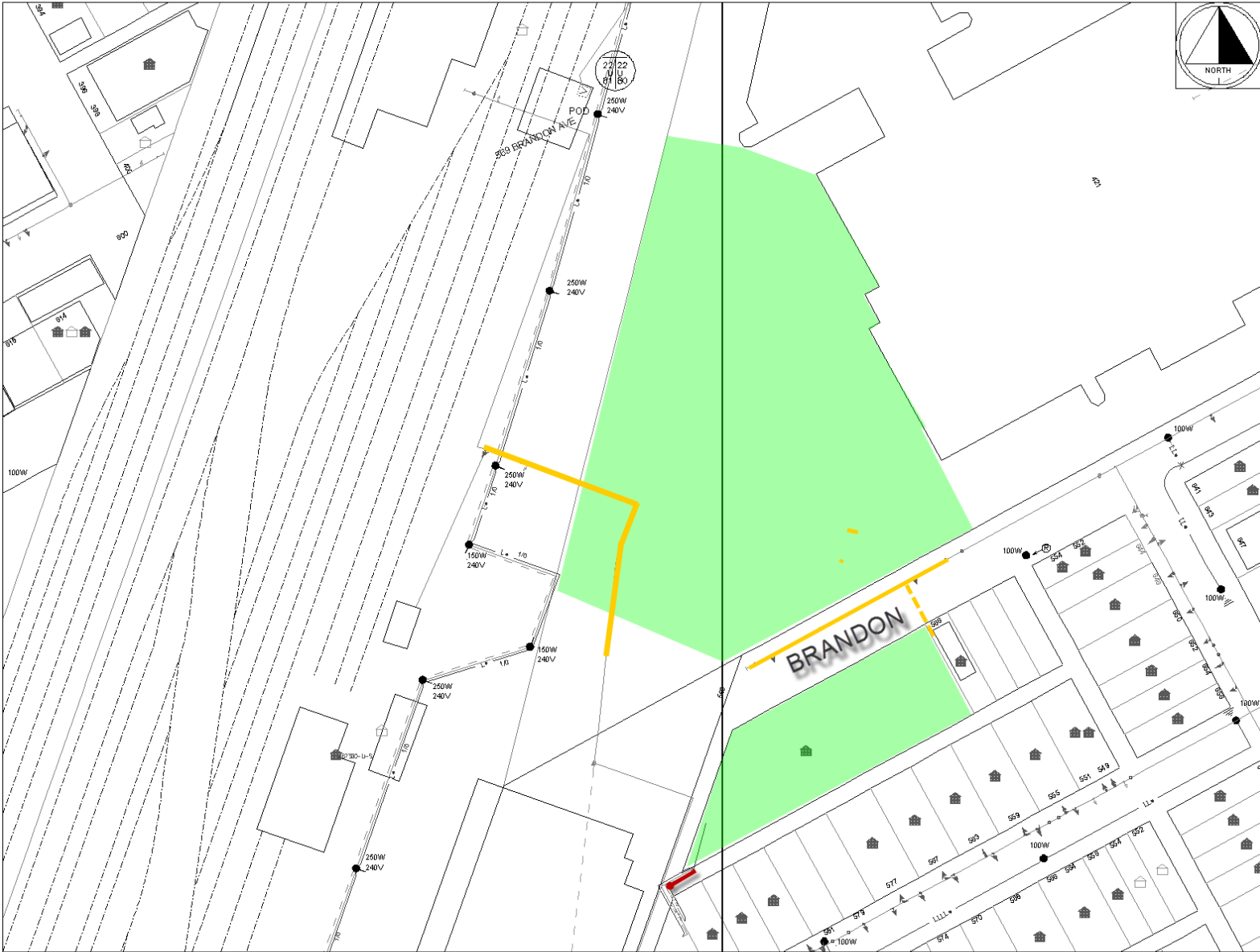
1. **Période de validité du Relevé.** Les travaux doivent débuter dans les 14 jours qui suivent la date du présent Relevé. Sinon vous devez obtenir un nouveau Relevé.
2. **Zone de repérage.** Le présent Relevé ne s'applique qu'à la zone des travaux que vous avez indiquée. Si la nature ou la zone des travaux est modifiée ou si les marques sont déplacées ou obscurcies, vous devez arrêter les travaux et obtenir un nouveau Relevé.
3. **Le Relevé doit être affiché sur le site des travaux.** Vous devez conserver une copie du présent Relevé sur le site des travaux pendant toute la durée des travaux.
4. **Conservation des marques.** Vous devez conserver toutes les marques et tous les piquets pendant toute la durée des travaux. Si les marques ou les piquets sont obscurcis ou déplacés, vous devez arrêter les travaux et obtenir un nouveau Relevé.
5. **Confirmez l'emplacement des installations.** Les renseignements fournis sur le présent Relevé ne sont que des estimations. Vous devez déterminer l'emplacement exact et la profondeur des installations en creusant à la main à divers endroits avant de procéder à une excavation avec un équipement mécanique. **NE TENTEZ PAS DE REPÉRER LES INSTALLATIONS EN SONDANT LE SOL AVEC UN OUTIL OU UN OBJET POINTU.** Si l'emplacement réel est différent de l'emplacement marqué, vous devez arrêter les travaux et communiquer immédiatement avec le Service public pour confirmer l'emplacement.
6. **Veille de sécurité.** Si une veille de sécurité est nécessaire, le Service public exige un préavis de deux jours ouvrables.
7. **Remblayage.** Lorsque vous remblayez une excavation, vous devez vous assurer que les installations souterraines demeurent en place pendant le tassement du sol en les supportant et en compactant entièrement le matériau de remblai sous les installations.
8. **Dommages causés aux installations.** Vous devez prendre toutes les précautions nécessaires pour veiller à ce que les installations ne soient pas endommagées ou ne fassent pas l'objet de contraintes. Vous devez signaler immédiatement au Service public tout dommage ou toute perturbation observé ou causé aux installations. **NE NÉ DÉPLACEZ JAMAIS LES INSTALLATIONS, CAR DES CONDITIONS DANGEREUSES PEUVENT SE PRODUIRE.** Vous ne devez pas remblayer une excavation avant que le Service public ait inspecté les installations pour évaluer les dommages ou les dangers pour la sécurité.
9. Vous devez consulter les lignes directrices de Manitoba Hydro en matière de sécurité des excavations et de veille de sécurité sur la page Web https://www.hydro.mb.ca/customer_services/permits_and_inspections/pdfs/excavation_guidelines.pdf

Les présentes instructions sont offertes à titre de référence sur place. Vous devez satisfaire aux exigences stipulées dans toutes les lois et tous les règlements applicables dont vous pouvez obtenir une copie en vous adressant à la Direction des publications officielles ou en ligne sur le site <http://web2.gov.mb.ca/laws/>. Vous devez aussi vous conformer aux lignes directrices en matière d'excavation publiées par SAUF Manitoba sur le site <http://safemanitoba.com/sauf-manitoba>.

ATTENTION!

Vous devez signaler immédiatement au Service public tout dommage ou toute perturbation causé à une installation en composant le 204 480-5900 à Winnipeg ou le 1 888 MB HYDRO (1 888 624-9376). **Si vous soupçonnez la présence d'une fuite de gaz naturel,**

- évacuer le site des travaux et la zone environnante;
- éloigner les véhicules et les piétons qui circulent dans la zone des travaux;
- informer les personnes dans tous les lieux avoisinants qui peuvent être concernés par la fuite de gaz;
- enlever ou éteindre toutes les sources d'inflammation.



Legend

- Gas Main
- - - Gas Service
- Primary cable(s)
- - - Secondary cable(s) only
- Work Area
- Transformer/DC



103, 4712 - 13 ST NE
Calgary, Alberta
T2E 6P1

RKI EAGLE 2

OAK ENVIRONMENTAL INC. CALIBRATION/TEST CERTIFICATE

SERIAL NUMBER: E2D751

	CALIBRATED TO	READING
LEL VALUE	40%	40%
ISOBUT	100 PPM	100 PPM

CERTIFICATE OF CONFORMITY

This instrument has been calibrated and inspected in accordance with the recommended procedures as outlined by the manufacturer of this product.

Please advise our staff of any difficulties in using this equipment.

Calibrated, inspected, and/or tested by:

Lauren Harrison

December 21, 2015

APPENDIX D – ANALYTICAL DATA TABLES

**Table 6. Particle Size Analysis for Soil Samples
Collected June 21 and 22, 2016**

	UNITS	BH06-SS02	BH06-SS04
Sieve-%Coarse (>0.075mm)	%	8.28	0.01
Grain Size	N/A	FINE	FINE
Sieve-%Fine (<0.075mm)	%	91.72	99.99

Table 7. Physio-Chemical Analytical Results for Soil Samples Collected June 21, 22 and July 4, 2016

	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	BH03-SS05	BH04-SS03	BH04-SS04	MW05-SS03	MW05-SS04
Physical Properties											
Moisture	%	31	36	28	36	27	35	35	35	35	34
Soluble Parameters											
Soluble Conductivity	uS/cm	2330		731		1380		704		3950	
Soluble pH	pH	8.12		7.88		7.98		7.91		7.87	
Saturation %	%	119		114		78.6		124		117	

ND = Not detected

	UNITS	BH06-SS02	BH06-SS04	BH07-SS02	BH07-SS05	MW08-SS02	MW08-SS05	MW09-SS01	BH10-SS01	DUP01 BH01-SS02	DUP02 BH06-SS04	DUP A MW09-SS01
Physical Properties												
Moisture	%	18	33	21	38	19	35	17	21	28	34	17
Soluble Parameters												
Soluble Conductivity	uS/cm	1110		828		814		1210	704	453		1150
Soluble pH	pH	8.54		8.29		8.25		8.31	8.21	8.15		8.29
Saturation %	%	59.6		70.9		62.2		45.0	74.0	104		47.0

ND = Not detected

Table 8. Polycyclic Aromatic Hydrocarbon (PAH) Analytical Results for Soil Samples Collected June 21, 22 and July 4, 2016

	UNITS	BH01-SS02	MW02-SS01	BH03-SS01	BH04-SS03	MW05-SS03	BH06-SS02	BH07-SS02	MW08-SS02	MW09-SS01	BH10-SS01	DUP01	DUP A	Soil Standards for Use Under Part XV.1 of the Environmental Protection Act (Commercial)
		BH01-SS02	MW09-SS01											
Index of Additive Cancer Risk(IARC)	N/A	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.58	
Naphthalene	mg/kg	ND	ND	0.17	ND	ND	ND	ND	ND	ND	ND	ND	0.012	10
2-Methylnaphthalene		ND	ND	0.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	16000
Acenaphthylene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Acenaphthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1300
Fluorene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	350
Phenanthrene		ND	ND	0.081	ND	ND	ND	ND	ND	ND	ND	ND	0.027	40
Anthracene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0047	28
Fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.044	40
Pyrene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.040	250
Benzo(a)anthracene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.023	40
Chrysene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.030	19
Benzo(b&j)fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.039	
Benzo(b)fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.024	19
Benzo(k)fluoranthene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19
Benzo(a)pyrene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.024	1.9
Indeno(1,2,3-cd)pyrene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19
Dibenz(a,h)anthracene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.9
Benzo(g,h,i)perylene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Low Molecular Weight PAH's		ND	ND	0.50	ND	ND	ND	ND	ND	ND	ND	ND	ND	
High Molecular Weight PAH's		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.20	
Total PAH	ND	ND	0.50	ND	ND	ND	ND	ND	ND	ND	ND	0.24		
Benzo[a]pyrene equivalency	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.041	0.059		

ND = Not detected

Referenced Criteria:

Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, in medium and fine textured soils

Table 9. Petroleum Hydrocarbon Analytical Results for Soil Samples Collected June 21, 22 and July 4, 2016

	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	BH03-SS05	BH04-SS03	BH04-SS04	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	CCME Criteria		
														Surface	Subsoil	
Benzene	mg/kg	0.022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8	2.9	
Toluene		0.057	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13000	13000	
Ethylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6500	6700	
Xylenes (Total)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1600	1600	
F1 (C6-C10) - BTEX		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4600*		
F2 (C10-C16 Hydrocarbons)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23000*		
F3 (C16-C34 Hydrocarbons)		ND	33	ND	36	ND	60	35	52	65	46	ND	24			
F4 (C34-C50 Hydrocarbons)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND			
Reached Baseline at C50		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

ND = Not detected

N/A = Not Applicable

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

	UNITS	BH07-SS02	BH07-SS05	MW08-SS02	MW08-SS05	MW09-SS01	MW09-SS05	BH10-SS01	BH10-SS04	DUP01 BH01-SS02	DUP02 BH06-SS04	DUP A MW09-SS01	CCME Criteria		
													Surface	Subsoil	
Benzene	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.034	ND	ND	2.8	2.9	
Toluene		ND	ND	ND	ND	ND	ND	ND	ND	260 (2)	ND	ND	13000	13000	
Ethylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	0.70	ND	ND	6500	6700	
Xylenes (Total)		ND	ND	ND	ND	ND	ND	ND	ND	2.6	ND	ND	1600	1600	
F1 (C6-C10) - BTEX		ND	ND	ND	ND	ND	ND	ND	ND	11	ND	ND	4600*		
F2 (C10-C16 Hydrocarbons)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23000*		
F3 (C16-C34 Hydrocarbons)		ND	29	ND	ND	ND	27	ND	83	22	37	ND			
F4 (C34-C50 Hydrocarbons)		ND	ND	ND	ND	ND	ND	ND	21	ND	ND	ND			
Reached Baseline at C50		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

ND = Not detected

N/A = Not Applicable

(2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Referenced Criteria:

CCME. 2004. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, 10⁵ incremental risk. Inhalation of indoor air check (slab on grade), fine-grained texture, commercial land use.

²a CCME. 2008. Canada-wide Standards for Petroleum Hydrocarbons (PHC) in Soil, Fine-grained soil type and commercial land use, F1 - F4 vapour inhalation based on future development of Site.

Table 10. Volatile Organic Compound (VOC) Analytical Results for Soil Samples Collected June 21, 22 and July 4, 2016

	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	BH03-SS05	BH04-SS03	BH04-SS04	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	BH07-SS02	BH07-SS05	MW08-SS02	MW08-SS05	MW09-SS01	MW09-SS05	BH10-SS01	BH10-SS04	DUP01 BH01-SS02	DUP02 BH06-SS04	DUP A MW09-SS01	Soil Standards for Use Under Part XV.1 of the Environmental Protection Act (Commercial)
Chloromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0075
Bromomethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38
Chloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Trichlorofluoromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1-dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.015
Dichloromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
trans-1,2-dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.1
1,1-dichloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140
cis-1,2-dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.033	ND	2.3
Chloroform		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9
1,1,1-trichloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	34
1,2-dichloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14
Carbon tetrachloride		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.64
Methyl-tert-butylether (MTBE)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	410
1,2-dichloropropane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12
Trichloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.023	ND	3.9
Bromodichloromethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25
cis-1,3-dichloropropene		ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	
trans-1,3-dichloropropene		ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	
1,1,2-trichloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.1
Chlorodibromomethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18
1,2-dibromoethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloroethene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.032	ND	ND	0.45
Chlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30
1,1,1,2-tetrachloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12
Bromoform		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14
Styrene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.7
1,1,2,2-tetrachloroethane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23
1,2-dichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30
1,3-dichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30
1,4-dichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30
1,2,3-trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Hexachlorobutadiene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.4
1,2,4-trichlorobenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30

ND = Not detected
 (1) Detection limit raised due to CCV failed low.

Referenced Criteria:
 Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act
 Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, in medium and fine textured soils

Table 11. Metals Analytical Results for Soil Samples Collected June 21, 22 and July 4, 2016

	UNITS	BH01-SS02	MW02-SS01	BH03-SS01	BH04-SS03	MW05-SS03	BH06-SS02	BH07-SS02	MW08-SS02	MW09-SS01	BH10-SS01	DUP01 BH01-SS02	DUP A MW09-SS01	CCME Soil Quality Guidelines Commercial
Total Aluminum (Al)	mg/kg	24300	21700	19600	24100	20100	5930	9290	9580	6380	22200	22000	7540	
Total Antimony (Sb)		0.40	0.42	5.02	0.44	0.50	0.13	0.36	0.21	0.21	0.26	0.36	0.27	40 ^c
Total Arsenic (As)		7.46	6.81	11.3	8.01	8.38	1.85	3.70	3.17	4.16	4.62	5.65	4.75	26 ^a
Total Barium (Ba)		191	209	1310	205	348	43.6	86.3	83.4	83.6	192	189	98.1	10000 ^b
Total Beryllium (Be)		1.41	1.02	0.78	1.22	1.08	ND	ND	ND	ND	0.76	1.01	ND	8 ^b
Total Bismuth (Bi)		0.29	0.26	0.57	0.28	0.29	ND	0.11	0.11	ND	0.18	0.26	ND	
Soluble (Hot Water) Boron (B)		0.51	0.64	1.35	0.56	0.52	0.23	0.35	0.91	3.32	7.47	0.69	3.95	
Total Cadmium (Cd)		0.620	0.645	0.728	0.685	0.654	0.313	0.444	0.339	0.283	0.589	0.620	0.294	22 ^a
Total Calcium (Ca)		18800	22100	60200	22700	23700	101000	82400	90500	117000	37900	38300	124000	
Total Chromium (Cr)		51.9	44.5	59.3	48.0	39.0	14.5	19.3	21.8	13.6	47.0	48.4	15.2	87 ^a
Hex. Chromium (Cr 6+)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND (1)	ND	1.4 ^a
Total Cobalt (Co)		14.7	14.1	12.8	14.2	11.9	3.53	5.93	5.75	3.46	12.9	13.2	3.86	300 ^c
Total Copper (Cu)		35.0	33.6	243	33.6	33.1	9.25	14.9	14.2	8.68	32.3	33.2	9.76	91 ^a
Total Iron (Fe)		32100	30400	37000	32000	29800	9350	13100	13400	8130	26500	28800	9260	
Total Lead (Pb)		14.7	14.2	1630	21.2	17.2	4.72	6.52	5.83	5.39	11.7	16.8	7.74	600 ^a
Total Lithium (Li)		35.9	33.7	22.1	33.2	28.6	11.6	15.7	17.0	10.6	42.9	36.2	11.4	
Total Magnesium (Mg)		14800	14800	23800	16500	12100	55600	43900	48700	45100	24700	19900	45600	
Total Manganese (Mn)		375	529	562	427	317	204	422	238	196	434	391	212	
Total Mercury (Hg)		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50 ^a
Total Molybdenum (Mo)		1.23	1.53	0.83	1.34	1.35	0.29	0.39	0.35	0.36	0.61	0.98	0.41	40 ^c
Total Nickel (Ni)		40.0	44.6	60.7	40.5	39.8	10.4	17.8	16.3	11.2	38.5	38.6	12.4	89 ^a
Total Phosphorus (P)		460	537	425	476	474	346	421	408	335	532	473	350	
Total Potassium (K)		5170	4450	3910	4820	3890	1030	1650	1870	1370	4440	4850	1610	
Total Selenium (Se)		ND	ND	ND	ND	1.26	ND	ND	ND	ND	ND	ND	ND	2.9 ^a
Total Silver (Ag)		0.150	0.148	0.234	0.142	0.158	0.070	0.094	0.086	0.058	0.109	0.154	0.077	40 ^c
Total Sodium (Na)		340	333	514	368	484	251	354	264	203	631	346	232	
Total Strontium (Sr)		71.4	73.5	107	69.5	67.6	45.3	64.0	46.8	82.7	65.6	96.5	96.3	
Total Thallium (Tl)		0.348	0.360	0.259	0.345	0.307	0.105	0.176	0.165	0.090	0.385	0.347	0.101	3.6 ^a
Total Tin (Sn)		1.00	0.88	39.6	1.04	0.89	0.25	0.34	0.37	0.35	0.82	1.00	0.47	300 ^c
Total Titanium (Ti)		204	303	322	207	138	334	331	406	275	889	328	293	
Total Uranium (U)	1.43	1.49	0.919	1.49	2.07	0.698	0.837	0.804	0.780	1.55	1.58	0.921	2000 ^a	
Total Vanadium (V)	79.9	68.1	61.8	74.7	63.2	21.6	36.2	32.5	28.6	61.9	70.2	32.8	130 ^a	
Total Zinc (Zn)	91.6	90.0	785	91.3	87.4	18.4	31.6	27.4	17.5	79.2	81.1	21.5	360 ^a	
Total Zirconium (Zr)	10.6	11.9	10.2	11.2	13.4	8.25	9.44	8.71	5.71	17.3	14.0	6.03		

RDL = Reportable Detection Limit

ND = Not detected

Referenced Criteria:

^a CCME. Canadian Soil Quality Guidelines for the Protection of Environmental Health (soil contact) for commercial land use.

^b CCME. Canadian Soil Quality Guidelines for the Protection of Human Health (direct contact) for commercial land use.

^c CCME. 1991 Interim Soil Quality Criterion (CCME 1991)

Table 14. Physio-Chemical Analytical Results for Water Samples Collected July 20, 2016

	UNITS	MW02	MW05	MW08	MW09	DUP01 MW05
Calculated Parameters						
Total Hardness (CaCO3)	mg/L	2420	2740	2050	2210	2450
Misc. Inorganics						
Conductivity	uS/cm	3960	4810	3800	4020	4010
pH	pH	7.87	7.71	7.66	7.78	7.70

**Table 15. Polycyclic Aromatic Hydrocarbon (PAH) Analytical Results for Groundwater Samples
Collected July 20, 2016**

	UNITS	MW02	MW05	MW08	MW09	DUP01 MW05	Non-potable Groundwater (all land uses)
Naphthalene	ug/L	ND	ND	ND	ND	ND	6200
2-Methylnaphthalene		ND	ND	ND	ND	ND	13000
Quinoline		ND	ND	ND	ND	ND	
Acenaphthylene		ND	ND	ND	ND	ND	2000
Acenaphthene		ND	ND	ND	ND	ND	1700
Fluorene		ND	ND	ND	ND	ND	290
Phenanthrene		ND	ND	ND	ND	ND	63
Anthracene		ND	ND	ND	ND	ND	12
Acridine		ND	ND	ND	ND	ND	
Fluoranthene		ND	ND	ND	ND	ND	130
Pyrene		ND	ND	ND	ND	ND	40
Benzo(a)anthracene		ND	ND	ND	ND	ND	5
Chrysene		ND	ND	ND	ND	ND	3
Benzo(b&j)fluoranthene		ND	ND	ND	ND	ND	
Benzo(k)fluoranthene		ND	ND	ND	ND	ND	0.4
Benzo(a)pyrene		ND	ND	ND	ND	ND	1.9
Indeno(1,2,3-cd)pyrene		ND	ND	ND	ND	ND	0.27
Dibenz(a,h)anthracene		ND	ND	ND	ND	ND	0.25
Benzo(g,h,i)perylene		ND	ND	ND	ND	ND	0.2
Low Molecular Weight PAH's		ND	ND	ND	ND	ND	
High Molecular Weight PAH's	ND	ND	ND	ND	ND		
Total PAH	ND	ND	ND	ND	ND		

ND = Not detected

Referenced Criteria:

Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, in medium and fine textured soils

**Table 16. Petroleum Hydrocarbon (PHC) Analytical Results for Groundwater Samples
Collected July 20, 2016**

	UNITS	MW02	MW05	MW08	MW09	DUP01 MW05	Non-potable Groundwater (all land uses)
Benzene	ug/L	ND	ND	ND	ND	ND	12000
Toluene		ND	ND	ND	ND	ND	37000
Ethylbenzene		ND	ND	ND	ND	ND	50000
Xylenes (Total)		ND	ND	ND	ND	ND	35000
F1 (C6-C10) - BTEX		ND	ND	ND	ND	ND	
F1 (C6-C10)		ND	ND	ND	ND	ND	
F2 (C10-C16 Hydrocarbons)		ND	ND	ND	ND	ND	
F3 (C16-C34 Hydrocarbons)		ND	ND	ND	ND	ND	
F4 (C34-C50 Hydrocarbons)		ND	ND	ND	ND	ND	

ND = Not detected

Referenced Criteria:

Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, in medium and fine textured soils

Table 17. Volatile Organic Compound (VOC) Analytical Results for Groundwater Samples Collected July 20, 2016

	UNITS	MW02	MW05	MW08	MW09	DUP01 MW05	Non-potable Groundwater (all land uses)
Chloromethane		ND	ND	ND	ND	ND	
Vinyl chloride		ND (1)	ND	ND	ND	ND	1.3
Chloroethane		ND (1)	ND	ND	ND	ND	
Trichlorofluoromethane		ND	ND	ND	ND	ND	
1,1,2Trichloro-1,2,2Trifluoroethane		ND	ND	ND	ND	ND	
Methyl-tert-butylether (MTBE)		ND	ND	ND	ND	ND	50000
Dichlorodifluoromethane		ND (1)	ND	ND	ND	ND	
1,1-dichloroethene		ND	ND	ND	ND	ND	4.1
Dichloromethane		ND	ND	ND	ND	ND	
trans-1,2-dichloroethene		ND	ND	ND	ND	ND	100
1,1-dichloroethane		ND	ND	ND	ND	ND	50000
cis-1,2-dichloroethene		ND	ND	ND	ND	ND	70
Chloroform		ND	ND	ND	ND	ND	2700
1,1,1-trichloroethane		ND	ND	ND	ND	ND	200
1,2-dichloroethane		ND	ND	ND	ND	ND	110
Carbon tetrachloride		ND	ND	ND	ND	ND	100
1,2-dichloropropane		ND	ND	ND	ND	ND	58
cis-1,3-dichloropropene		ND	ND	ND	ND	ND	
trans-1,3-dichloropropene	ug/L	ND	ND	ND	ND	ND	
Bromomethane		ND	ND	ND	ND	ND	16
1,1,2-trichloroethane		ND	ND	ND	ND	ND	50000
Trichloroethene		ND	ND	ND	ND	ND	50
Chlorodibromomethane		ND	ND	ND	ND	ND	50000
1,2-dibromoethane		ND	ND	ND	ND	ND	
Tetrachloroethene		ND	ND	ND	ND	ND	5
Bromodichloromethane		ND	ND	ND	ND	ND	50000
Bromoform		ND	ND	ND	ND	ND	5200
Styrene		ND	ND	ND	ND	ND	5900
1,1,1,2-tetrachloroethane		ND	ND	ND	ND	ND	38
1,1,2,2-tetrachloroethane		ND	ND	ND	ND	ND	140
1,2-dichlorobenzene		ND	ND	ND	ND	ND	7600
1,3-dichlorobenzene		ND	ND	ND	ND	ND	7600
1,4-dichlorobenzene		ND	ND	ND	ND	ND	7600
Chlorobenzene		ND	ND	ND	ND	ND	500
1,2,3-trichlorobenzene		ND	ND	ND	ND	ND	
1,2,4-trichlorobenzene		ND	ND	ND	ND	ND	500
Hexachlorobutadiene		ND	ND	ND	ND	ND	5.4

ND = Not detected

(1) Matrix spike recovery exceeds acceptance criteria (high recovery). As results are non-detect, there is no impact on data quality.

Referenced Criteria:

Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, in medium and fine textured soils

Table 18. Metals Analytical Results for Groundwater Samples Collected July 20, 2016

	UNITS	MW02	MW05	MW08	MW09	DUP01 MW05	Non-potable Groundwater (all land uses)
Total Aluminum (Al)	ug/L	23.7	29.6	42.3	785	13.5	
Total Antimony (Sb)		ND	ND	ND	ND	ND	16000
Total Arsenic (As)		0.56	0.67	0.43	1.33	0.51	480
Total Barium (Ba)		18.7	24.4	18.2	51.6	21.8	23000
Total Beryllium (Be)		ND	ND	ND	ND	ND	53
Total Bismuth (Bi)		ND	ND	ND	ND	ND	
Total Boron (B)		161	143	159	262	132	50000
Total Cadmium (Cd)		0.320	0.103	0.077	0.256	0.097	11
Total Chromium (Cr)		ND	ND	ND	1.8	ND	2000
Total Cobalt (Co)		3.72	3.01	1.24	1.06	1.22	100
Total Copper (Cu)		5.55	7.45	4.72	9.87	7.28	23
Total Iron (Fe)		44	64	68	1290	32	
Total Lead (Pb)		0.36	0.35	0.20	5.63	ND	32
Total Lithium (Li)		587	634	513	587	571	
Total Manganese (Mn)		2300	2630	1290	751	1070	
Total Molybdenum (Mo)		2.9	3.4	3.2	2.0	2.6	7300
Total Mercury (Hg)		ND	ND	ND	ND	ND	0.12
Total Nickel (Ni)		18.8	20.9	14.3	15.5	16.7	1600
Total Selenium (Se)		0.64	0.95	0.54	0.90	1.10	50
Total Silicon (Si)		10700	11600	10900	12800	10900	
Total Silver (Ag)		0.082	0.102	0.022	0.022	0.033	1.2
Total Strontium (Sr)		3100	3590	2630	3370	3190	
Total Thallium (Tl)		ND	ND	ND	ND	ND	400
Total Tin (Sn)		ND	ND	ND	ND	ND	
Total Titanium (Ti)		ND	ND	ND	30.3	ND	
Total Uranium (U)		132	129	104	116	103	
Total Vanadium (V)		ND	ND	ND	ND	ND	200
Total Zinc (Zn)		9.3	12.3	14.8	17.5	9.1	1100
Total Zirconium (Zr)		0.88	0.78	0.59	1.36	0.73	
Total Calcium (Ca)		mg/L	514	508	430	464	459
Total Magnesium (Mg)	277		358	238	255	317	
Total Potassium (K)	10.7		10.7	9.28	11.9	10.3	
Total Sodium (Na)	161		275	166	200	243	
Total Sulphur (S)	691		839	566	703	792	

ND = Not detected

Referenced Criteria:

Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Groundwater Condition, in medium and fine textured soils

APPENDIX E -- BOREHOLE AND MONITORING WELL LOGS

LOG OF BOREHOLE BH01

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street Co-ordinates: 633479.242E, 5525426.1508N
 Date Drilled: June 21, 2016 Logged By: L. Gallagher
 Drill Type: Geoprobe Checked By: D. Kearn
 Drilling Contractor: Maple Leaf

▲ Combustible Gases (ppm)

MMM BH REPORT WINNIPEG TRANSIT BH LOGS.GPJ GINT STD CANADA LAB.GDT 10/8/16

DEPTH (m bgs) (m asl)	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Combustible Gases (ppm)			
				20	40	60	80
-0.51	Fill Gravel and sand fill, moist, no odour, no staining						
	Silty Clay Grey-brown, moist, no odour, no staining	SS01		▲			
		SS02	VOCs including BTEX, PHC F1-F4, PAH and Metals				▲ 307
		SS03		▲			
-4.57	Silty Clay Grey-brown, moist, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining	SS04	VOCs including BTEX	▲			
-6.00	End of borehole at 6.00 m						

LOG OF BOREHOLE BH03

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street Co-ordinates: 633561.792E, 5525455.573N
 Date Drilled: June 21, 2016 Logged By: L. Gallagher
 Drill Type: Geoprobe Checked By: D. Kearn
 Drilling Contractor: Maple Leaf

▲ Combustible Gases (ppm)

DEPTH (m bgs) (m asl)	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Combustible Gases (ppm)			
				20	40	60	80
	Fill Brown, gravel and sand fill, moist, no odour, no staining, unconsolidated						
-0.76	Topsoil Black, moist, no odour, no staining, unconsolidated	SS01	VOCs including BTEX, PHC F1-F4, PAH and Metals				
-1.52	Silt Grey, moist-very moist, no odour, no staining	SS02					
-2.29	Silty Clay Grey-brown, moist, no odour, no staining	SS03					
-3.05	Silty Clay Grey-brown, moist, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining	SS04					
		SS05	VOCs including BTEX				
-6.00	End of borehole at 6.00 m						

LOG OF BOREHOLE BH04

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street Co-ordinates: 633518.189E, 5525451.763N
 Date Drilled: June 21, 2016 Logged By: L. Gallagher
 Drill Type: Geoprobe Checked By: D. Kearn
 Drilling Contractor: Maple Leaf

▲ Combustible Gases (ppm)

MMM BH REPORT WINNIPEG TRANSIT BH LOGS.GPJ GINT STD CANADA LAB.GDT 10/8/16

DEPTH (m bgs) (m asl)	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Combustible Gases (ppm)			
				20	40	60	80
	Fill Sand and gravel fill, moist, unconsolidated, no odour, no staining						
-1.52	Silt Grey, moist-very moist, no odour, no staining	SS01		▲			
-2.79	Silty Clay Brown-grey, moist, no odour, no staining	SS02		▲			
-3.05	Silty Clay Grey-brown, moist, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining	SS03	VOCs including BTEX, PHC F1-F4, PAH and Metals	▲			
		SS04	VOCs including BTEX	▲			
-6.00	End of borehole at 6.00 m						

LOG OF BOREHOLE MW05

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street
 Date Drilled: 21/06/2016
 Drill Type: Geoprobe
 Drilling Contractor: Maple Leaf

- SPT (N) Value
- ▲ Total Organic Volatiles (ppm)

MMM MW REPORT WINNIPEG TRANSIT BH LOGS.GPJ GINT STD CANADA LAB.GDT 10/8/16

DEPTH	SOIL DESCRIPTION	WELL	GROUNDWATER	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Standard Penetration Test N Value			
						20	40	60	80
						Total Organic Volatiles (ppm)			
						400	800	1200	1600
-0.15	Fill Gravel and sand fill, moist, no odour, no staining Silt Grey, moist, no odour, no staining								
-1.91	Silty Clay Grey-brown, moist, no odour, no staining			SS01					
-3.05	Silty Clay Grey-brown, moist, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining			SS02					
-6.00	Silty Clay Grey-brown, moist, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining			SS03	VOCs including BTEX, PHC F1-F4, PAH and Metals				
-6.00	End of borehole at 6.0 m			SS04	VOCs including BTEX				

LOG OF BOREHOLE BH06

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street Co-ordinates: 633538.932E, 5525499.811N
 Date Drilled: June 21, 2016 Logged By: L. Gallagher
 Drill Type: Geoprobe Checked By: D. Kearn
 Drilling Contractor: Maple Leaf

▲ Combustible Gases (ppm)

DEPTH (m bgs) (m asl)	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Combustible Gases (ppm)			
				20	40	60	80
	Fill Brown, gravel and sand fill, moist, no odour, no staining.						
	Topsoil Black, moist, no odour, no staining.	SS01		▲			
	Silty Clay Grey-brown, moist, no odour, no staining	SS02	VOCs including BTEX, PHC F1-F4, PAH, Metals and PSA	▲			
		SS03		▲			
	Silty Clay Grey-brown, moist, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining	SS04	VOCs including BTEX and PSA	▲			
		SS05		▲			
	End of borehole at 6.00 m						

LOG OF BOREHOLE BH07

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street Co-ordinates: 633498.715E, 5525487.111N
 Date Drilled: June 21, 2016 Logged By: L. Gallagher
 Drill Type: Geoprobe Checked By: D. Kearn
 Drilling Contractor: Maple Leaf

▲ Combustible Gases (ppm)

DEPTH (m bgs) (m asl)	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Combustible Gases (ppm)			
				20	40	60	80
	Fill Brown, gravel and sand, moist, unconsolidated, no odour, no staining						
-0.76	Topsoil Black, moist, no odour, no staining	SS01		▲			
-1.52	Silt Brown, moist, no odour, no staining	SS02	VOCs including BTEX, PHC F1-F4, PAH and Metals	▲			
-2.54	Silty Clay Grey-brown, moist, no odour, no staining	SS03		▲			
-4.57	Silty Clay Grey-brown, moist-wet, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining	SS04		▲			
-6.00	Silty Clay Grey-brown, moist-wet, minor nodules of evaporite material (gypsum or anhydrite), no odour, no staining	SS05	VOCs including BTEX	▲			
	End of borehole at 6.00 m						

MMM BH REPORT WINNIPEG TRANSIT BH LOGS.GPJ GINT STD CANADA LAB.GDT 10/8/16

LOG OF BOREHOLE BH10

Project No. 5516057.000
 Project: Winnipeg Transit Garage Expansion
 Location: 421 Osborne Street Co-ordinates: 633574.492E, 5525393.342N
 Date Drilled: July 4, 2016 Logged By: L. Gallagher
 Drill Type: Solid Stem Checked By: D. Kearn
 Drilling Contractor: Maple Leaf

▲ Combustible Gases (ppm)

DEPTH (m bgs) (m asl)	SOIL DESCRIPTION	SOIL SAMPLE NAME	SOIL SAMPLE TEST	Combustible Gases (ppm)			
				20	40	60	80
0.00	Top soil						
-0.76	Silt Grey, moist, no odour, no staining						
-1.02	Silty Clay Grey-brown, moist, no odour, no staining	SS01	VOCs including BTEX, PHC F1-F4, PAH and Metals ▲				
		SS02	▲				
		SS03	▲				
		SS04	VOCs including BTEX ▲				
-6.00	End of borehole at 6.00 m						

MMM BH REPORT WINNIPEG TRANSIT BH LOGS.GPJ GINT STD CANADA LAB.GDT 10/8/16

APPENDIX F -- LABORATORY CERTIFICATES AND CHAIN OF CUSTODY

Your C.O.C. #: C#498321-01-01, C#498321-02-01

Attention: DARREN KEAM

MMM GROUP
SUITE 111
93 LOMBARD AVE
WINNIPEG, MB
CANADA R3B 3B1

Report Date: 2016/06/29

Report #: R2208518

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B650191

Received: 2016/06/22, 12:15

Sample Matrix: Soil
Samples Received: 18

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble) (1)	9	N/A	2016/06/28	BBY7SOP-00001 BBY7SOP-00018	EPA6020bR2m,6010cR3m
Hexavalent Chromium (2)	9	2016/06/29	2016/06/29	AB SOP-00063	SM 22 3500-Cr B m
Conductivity (Soluble) (1)	9	2016/06/24	2016/06/24	BBY6SOP-00029	SM 22 2510 B
Volatile F1-BTEX (1)	18	N/A	2016/06/29	BBY WI-00033	Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (3)	15	2016/06/22	2016/06/23	WINSOP-00056	CCME PHC-CWS
CCME Hydrocarbons (F2-F4 in soil) (3)	3	2016/06/22	2016/06/24	WINSOP-00056	CCME PHC-CWS
Elements by ICPMS (total) (1)	9	2016/06/27	2016/06/27	BBY7SOP-00017,	BC SALM,EPA 6020bR2m
Moisture (1)	18	2016/06/24	2016/06/25	BBY8SOP-00017	BC MOE Lab Manual
Moisture	18	N/A	2016/06/23	WIN SOP-00060	Carter Method 51.2
PAH in Soil by GC/MS (SIM) - CCME (1)	9	2016/06/24	2016/06/28	BBY8SOP-00022	EPA 8270d R4 m
Index of Additive Cancer Risk Calc. (1)	9	N/A	2016/06/29	BBY WI-00033	Auto Calc
Total PAH and B(a)P Calculation (1)	9	N/A	2016/06/29	BBY WI-00033	Auto Calc
pH (2:1 DI Water Extract) (1)	9	2016/06/27	2016/06/27	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble) (1)	9	2016/06/24	2016/06/24	BBY6SOP-00025	SM 22 4500-H+ B
PSA Coarse/Fine (75 micron)	2	N/A	2016/06/23	WIN SOP-00039	Carter SSMA 55.4
Grain Size (Coarse/Fine)	2	N/A	2016/06/27	WIN SOP-00039	Carter SSMA 55.4
Saturated Paste (1)	9	2016/06/24	2016/06/24	BBY6SOP-00030	Carter 2nd 15.2.1 m
VOCs, VH, F1, LH in Soil - Field Pres. (1, 4)	1	N/A	2016/06/28	BBY8-SOP-00009	EPA 8260c R3 m
VOCs, VH, F1, LH in Soil - Field Pres. (1, 4)	17	N/A	2016/06/29	BBY8-SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) This test was performed by Maxxam Vancouver

(2) This test was performed by Maxxam Calgary Environmental

(3) All CCME results met required criteria unless otherwise stated in the report. 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. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

(4) The extraction date for VOC, BTEX, VH, or F1 samples that are field preserved with methanol equals the date sampled, unless otherwise stated.

Your C.O.C. #: C#498321-01-01, C#498321-02-01

Attention: DARREN KEAM

MMM GROUP
SUITE 111
93 LOMBARD AVE
WINNIPEG, MB
CANADA R3B 3B1

Report Date: 2016/06/29
Report #: R2208518
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B650191
Received: 2016/06/22, 12:15

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Amanda Hung, B.Sc., Project Manager
Email: AHung@maxxam.ca
Phone# (204)772-7276 Ext:2215

=====
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.

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		OW6960	OW6961	OW7023	OW7024	OW7025		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	RDL	QC Batch

Calculated Parameters

F1 (C6-C10) - BTEX	mg/kg	ND	ND	ND	ND	ND	10	8307686
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Elements

Soluble (Hot water) Boron (B)	mg/kg	0.51		0.64		1.35	0.10	8313102
Hex. Chromium (Cr 6+)	mg/kg	ND		ND		ND	0.080	8315184

Physical Properties

Soluble (2:1) pH	pH	8.38		8.41		8.10	N/A	8311610
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Soluble Parameters

Soluble Conductivity	uS/cm	2330		731		1380	1.0	8309642
Soluble pH	pH	8.12		7.88		7.98	N/A	8309639
Saturation %	%	119		114		78.6	1.0	8309615

Physical Properties

Moisture	%	31	36	28	36	27	0.3	8307812
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RDL = Reportable Detection Limit

ND = Not detected

N/A = Not Applicable

Maxxam ID		OW7026	OW7027	OW7028	OW7029	OW7030		
Sampling Date		2016/06/21 12:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH03-SS05	BH04-SS03	BH04-SS04	DUP01	DUP02	RDL	QC Batch

Calculated Parameters

F1 (C6-C10) - BTEX	mg/kg	ND	ND	ND	11	ND	10	8307686
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Elements

Soluble (Hot water) Boron (B)	mg/kg		0.56		0.69		0.10	8313102
Hex. Chromium (Cr 6+)	mg/kg		ND		ND (1)		0.080	8315184

Physical Properties

Soluble (2:1) pH	pH		8.18		8.50		N/A	8311610
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Soluble Parameters

Soluble Conductivity	uS/cm		704		453		1.0	8309642
Soluble pH	pH		7.91		8.15		N/A	8309639
Saturation %	%		124		104		1.0	8309615

Physical Properties

Moisture	%	35	35	35	28	34	0.3	8307812
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RDL = Reportable Detection Limit

ND = Not detected

(1) Matrix Spike exceeds acceptance limits for Hexavalent Chromium, due to matrix interference. Reanalysis yields similar results.

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		OW7031	OW7032	OW7033	OW7034	OW7035		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00	2016/06/21 08:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	BH07-SS02	RDL	QC Batch

Calculated Parameters								
F1 (C6-C10) - BTEX	mg/kg	ND	ND	ND	ND	ND	10	8307686

Elements								
Soluble (Hot water) Boron (B)	mg/kg	0.52		0.23		0.35	0.10	8313102
Hex. Chromium (Cr 6+)	mg/kg	ND		ND		ND	0.080	8315184

Physical Properties								
Soluble (2:1) pH	pH	7.97		8.81		8.77	N/A	8311610

Soluble Parameters								
Soluble Conductivity	uS/cm	3950		1110		828	1.0	8309642
Soluble pH	pH	7.87		8.54		8.29	N/A	8309639
Saturation %	%	117		59.6		70.9	1.0	8309615

Physical Properties								
Moisture	%	35	34	18	33	21	0.3	8307812

RDL = Reportable Detection Limit

ND = Not detected

N/A = Not Applicable

Maxxam ID		OW7036	OW7037	OW7038		
Sampling Date		2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	BH07-SS05	MW08-SS02	MW08-SS05	RDL	QC Batch

Calculated Parameters						
F1 (C6-C10) - BTEX	mg/kg	ND	ND	ND	10	8307686

Elements						
Soluble (Hot water) Boron (B)	mg/kg		0.91		0.10	8313102
Hex. Chromium (Cr 6+)	mg/kg		ND		0.080	8315184

Physical Properties						
Soluble (2:1) pH	pH		8.45		N/A	8311610

Soluble Parameters						
Soluble Conductivity	uS/cm		814		1.0	8309642
Soluble pH	pH		8.25		N/A	8309639
Saturation %	%		62.2		1.0	8309615

Physical Properties						
Moisture	%	38	19	35	0.3	8307812

RDL = Reportable Detection Limit

ND = Not detected

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		OW6960	OW6961	OW7023	OW7024	OW7025		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	RDL	QC Batch

Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	20	8307803
F3 (C16-C34 Hydrocarbons)	mg/kg	ND	33	ND	36	ND	20	8307803
F4 (C34-C50 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	20	8307803
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	8307803
Surrogate Recovery (%)								
O-TERPHENYL (sur.)	%	79	80	88	77	88		8307803
RDL = Reportable Detection Limit ND = Not detected N/A = Not Applicable								

Maxxam ID		OW7026	OW7027	OW7028	OW7029	OW7030		
Sampling Date		2016/06/21 12:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH03-SS05	BH04-SS03	BH04-SS04	DUP01	DUP02	RDL	QC Batch

Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	20	8307803
F3 (C16-C34 Hydrocarbons)	mg/kg	60	35	52	22	37	20	8307803
F4 (C34-C50 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	20	8307803
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	8307803
Surrogate Recovery (%)								
O-TERPHENYL (sur.)	%	81	83	83	85	79		8307803
RDL = Reportable Detection Limit ND = Not detected N/A = Not Applicable								

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		OW7031	OW7032	OW7033	OW7034	OW7035		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00	2016/06/21 08:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	BH07-SS02	RDL	QC Batch

Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	20	8307803
F3 (C16-C34 Hydrocarbons)	mg/kg	65	46	ND	24	ND	20	8307803
F4 (C34-C50 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	20	8307803
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	8307803
Surrogate Recovery (%)								
O-TERPHENYL (sur.)	%	81	79	89	80	92		8307803
RDL = Reportable Detection Limit ND = Not detected N/A = Not Applicable								

Maxxam ID		OW7036	OW7037	OW7038		
Sampling Date		2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	BH07-SS05	MW08-SS02	MW08-SS05	RDL	QC Batch

Ext. Pet. Hydrocarbon						
F2 (C10-C16 Hydrocarbons)	mg/kg	ND	ND	ND	20	8307803
F3 (C16-C34 Hydrocarbons)	mg/kg	29	ND	ND	20	8307803
F4 (C34-C50 Hydrocarbons)	mg/kg	ND	ND	ND	20	8307803
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	N/A	8307803
Surrogate Recovery (%)						
O-TERPHENYL (sur.)	%	76	91	84		8307803
RDL = Reportable Detection Limit ND = Not detected N/A = Not Applicable						

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

PHYSICAL TESTING (SOIL)

Maxxam ID		OW6960	OW6961	OW7023	OW7024	OW7025		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	RDL	QC Batch
Physical Properties								
Moisture	%	31	36	28	36	27	0.30	8309445
RDL = Reportable Detection Limit								

Maxxam ID		OW7026		OW7027	OW7028	OW7029		
Sampling Date		2016/06/21 12:00		2016/06/22 08:00	2016/06/22 08:00	2016/06/21 08:00		
COC Number		C#498321-01-01		C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH03-SS05	QC Batch	BH04-SS03	BH04-SS04	DUP01	RDL	QC Batch
Physical Properties								
Moisture	%	35	8309445	35	35	28	0.30	8309842
RDL = Reportable Detection Limit								

Maxxam ID		OW7030	OW7031	OW7032	OW7033	OW7034		
Sampling Date		2016/06/21 12:00	2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	DUP02	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	RDL	QC Batch
Physical Properties								
Moisture	%	34	35	34	18	33	0.30	8309842
RDL = Reportable Detection Limit								

Maxxam ID		OW7035	OW7036	OW7037	OW7038		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	BH07-SS02	BH07-SS05	MW08-SS02	MW08-SS05	RDL	QC Batch
Physical Properties							
Moisture	%	21	38	19	35	0.30	8309842
RDL = Reportable Detection Limit							

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW6960	OW7023	OW7025	OW7027	OW7029		
Sampling Date		2016/06/21 08:00	2016/06/22 08:00	2016/06/21 12:00	2016/06/22 08:00	2016/06/21 08:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	MW02-SS01	BH03-SS01	BH04-SS03	DUP01	RDL	QC Batch
Calculated Parameters								
Index of Additive Cancer Risk(IARC)	N/A	0.31	0.31	0.31	0.31	0.31	0.10	8307688
Polycyclic Aromatics								
Naphthalene	mg/kg	ND	ND	0.17	ND	ND	0.010	8313107
2-Methylnaphthalene	mg/kg	ND	ND	0.25	ND	ND	0.020	8313107
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	0.0050	8313107
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	0.0050	8313107
Fluorene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Phenanthrene	mg/kg	ND	ND	0.081	ND	ND	0.010	8313107
Anthracene	mg/kg	ND	ND	ND	ND	ND	0.0040	8313107
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Pyrene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Chrysene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Benzo(b&j)fluoranthene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	0.020	8313107
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	0.050	8313107
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	0.050	8313107
Benzo(g,h,i)perylene	mg/kg	ND	ND	ND	ND	ND	0.050	8313107
Low Molecular Weight PAH's	mg/kg	ND	ND	0.50	ND	ND	0.050	8307004
High Molecular Weight PAH's	mg/kg	ND	ND	ND	ND	ND	0.050	8307004
Total PAH	mg/kg	ND	ND	0.50	ND	ND	0.050	8307004
Benzo[a]pyrene equivalency	mg/kg	0.041	0.041	0.041	0.041	0.041	0.010	8307004
Surrogate Recovery (%)								
D10-ANTHRACENE (sur.)	%	82	84	74	82	73		8313107
D8-ACENAPHTHYLENE (sur.)	%	75	83	80	82	79		8313107
D8-NAPHTHALENE (sur.)	%	72	83	82	82	84		8313107
TERPHENYL-D14 (sur.)	%	89	97	92	100	97		8313107
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7031	OW7033	OW7035	OW7037		
Sampling Date		2016/06/21 08:00	2016/06/21 12:00	2016/06/21 08:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	MW05-SS03	BH06-SS02	BH07-SS02	MW08-SS02	RDL	QC Batch

Calculated Parameters

Index of Additive Cancer Risk(IARC)	N/A	0.31	0.31	0.31	0.31	0.10	8307688
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Polycyclic Aromatics

	mg/kg	ND	ND	ND	ND		
Naphthalene	mg/kg	ND	ND	ND	ND	0.010	8313107
2-Methylnaphthalene	mg/kg	ND	ND	ND	ND	0.020	8313107
Acenaphthylene	mg/kg	ND	ND	ND	ND	0.0050	8313107
Acenaphthene	mg/kg	ND	ND	ND	ND	0.0050	8313107
Fluorene	mg/kg	ND	ND	ND	ND	0.020	8313107
Phenanthrene	mg/kg	ND	ND	ND	ND	0.010	8313107
Anthracene	mg/kg	ND	ND	ND	ND	0.0040	8313107
Fluoranthene	mg/kg	ND	ND	ND	ND	0.020	8313107
Pyrene	mg/kg	ND	ND	ND	ND	0.020	8313107
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	0.020	8313107
Chrysene	mg/kg	ND	ND	ND	ND	0.020	8313107
Benzo(b&j)fluoranthene	mg/kg	ND	ND	ND	ND	0.020	8313107
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	0.020	8313107
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	0.020	8313107
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	0.020	8313107
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	0.050	8313107
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	0.050	8313107
Benzo(g,h,i)perylene	mg/kg	ND	ND	ND	ND	0.050	8313107
Low Molecular Weight PAH's	mg/kg	ND	ND	ND	ND	0.050	8307004
High Molecular Weight PAH's	mg/kg	ND	ND	ND	ND	0.050	8307004
Total PAH	mg/kg	ND	ND	ND	ND	0.050	8307004
Benzo[a]pyrene equivalency	mg/kg	0.041	0.041	0.041	0.041	0.010	8307004

Surrogate Recovery (%)

	%	52 (1)	78	86	96		
D10-ANTHRACENE (sur.)	%	52 (1)	78	86	96		8313107
D8-ACENAPHTHYLENE (sur.)	%	73	83	87	86		8313107
D8-NAPHTHALENE (sur.)	%	80	84	87	84		8313107
TERPHENYL-D14 (sur.)	%	95	95	98	101		8313107

RDL = Reportable Detection Limit

ND = Not detected

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

CUSTOM PARTICLE SIZE DISTRIBUTION (SOIL)

Maxxam ID		OW7033	OW7034		
Sampling Date		2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01		
	UNITS	BH06-SS02	BH06-SS04	RDL	QC Batch
Particle Size					
Sieve-%Coarse (>0.075mm)	%	8.28	0.01	0.01	8311458
Grain Size	N/A	FINE	FINE		8307728
Sieve-%Fine (<0.075mm)	%	91.72	99.99	0.01	8311458
RDL = Reportable Detection Limit					

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		OW6960	OW7023	OW7025	OW7027	OW7029		
Sampling Date		2016/06/21 08:00	2016/06/22 08:00	2016/06/21 12:00	2016/06/22 08:00	2016/06/21 08:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	MW02-SS01	BH03-SS01	BH04-SS03	DUP01	RDL	QC Batch

Total Metals by ICPMS								
Total Aluminum (Al)	mg/kg	24300	21700	19600	24100	22000	100	8311608
Total Antimony (Sb)	mg/kg	0.40	0.42	5.02	0.44	0.36	0.10	8311608
Total Arsenic (As)	mg/kg	7.46	6.81	11.3	8.01	5.65	0.50	8311608
Total Barium (Ba)	mg/kg	191	209	1310	205	189	0.10	8311608
Total Beryllium (Be)	mg/kg	1.41	1.02	0.78	1.22	1.01	0.40	8311608
Total Bismuth (Bi)	mg/kg	0.29	0.26	0.57	0.28	0.26	0.10	8311608
Total Cadmium (Cd)	mg/kg	0.620	0.645	0.728	0.685	0.620	0.050	8311608
Total Calcium (Ca)	mg/kg	18800	22100	60200	22700	38300	100	8311608
Total Chromium (Cr)	mg/kg	51.9	44.5	59.3	48.0	48.4	1.0	8311608
Total Cobalt (Co)	mg/kg	14.7	14.1	12.8	14.2	13.2	0.30	8311608
Total Copper (Cu)	mg/kg	35.0	33.6	243	33.6	33.2	0.50	8311608
Total Iron (Fe)	mg/kg	32100	30400	37000	32000	28800	100	8311608
Total Lead (Pb)	mg/kg	14.7	14.2	1630	21.2	16.8	0.10	8311608
Total Lithium (Li)	mg/kg	35.9	33.7	22.1	33.2	36.2	5.0	8311608
Total Magnesium (Mg)	mg/kg	14800	14800	23800	16500	19900	100	8311608
Total Manganese (Mn)	mg/kg	375	529	562	427	391	0.20	8311608
Total Mercury (Hg)	mg/kg	ND	ND	ND	ND	ND	0.050	8311608
Total Molybdenum (Mo)	mg/kg	1.23	1.53	0.83	1.34	0.98	0.10	8311608
Total Nickel (Ni)	mg/kg	40.0	44.6	60.7	40.5	38.6	0.80	8311608
Total Phosphorus (P)	mg/kg	460	537	425	476	473	10	8311608
Total Potassium (K)	mg/kg	5170	4450	3910	4820	4850	100	8311608
Total Selenium (Se)	mg/kg	ND	ND	ND	ND	ND	0.50	8311608
Total Silver (Ag)	mg/kg	0.150	0.148	0.234	0.142	0.154	0.050	8311608
Total Sodium (Na)	mg/kg	340	333	514	368	346	100	8311608
Total Strontium (Sr)	mg/kg	71.4	73.5	107	69.5	96.5	0.10	8311608
Total Thallium (Tl)	mg/kg	0.348	0.360	0.259	0.345	0.347	0.050	8311608
Total Tin (Sn)	mg/kg	1.00	0.88	39.6	1.04	1.00	0.10	8311608
Total Titanium (Ti)	mg/kg	204	303	322	207	328	1.0	8311608
Total Uranium (U)	mg/kg	1.43	1.49	0.919	1.49	1.58	0.050	8311608
Total Vanadium (V)	mg/kg	79.9	68.1	61.8	74.7	70.2	2.0	8311608
Total Zinc (Zn)	mg/kg	91.6	90.0	785	91.3	81.1	1.0	8311608
Total Zirconium (Zr)	mg/kg	10.6	11.9	10.2	11.2	14.0	0.50	8311608

RDL = Reportable Detection Limit
ND = Not detected

Maxxam Job #: B650191
 Report Date: 2016/06/29

MMM GROUP

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		OW7031	OW7033	OW7035	OW7037		
Sampling Date		2016/06/21 08:00	2016/06/21 12:00	2016/06/21 08:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	MW05-SS03	BH06-SS02	BH07-SS02	MW08-SS02	RDL	QC Batch
Total Metals by ICPMS							
Total Aluminum (Al)	mg/kg	20100	5930	9290	9580	100	8311608
Total Antimony (Sb)	mg/kg	0.50	0.13	0.36	0.21	0.10	8311608
Total Arsenic (As)	mg/kg	8.38	1.85	3.70	3.17	0.50	8311608
Total Barium (Ba)	mg/kg	348	43.6	86.3	83.4	0.10	8311608
Total Beryllium (Be)	mg/kg	1.08	ND	ND	ND	0.40	8311608
Total Bismuth (Bi)	mg/kg	0.29	ND	0.11	0.11	0.10	8311608
Total Cadmium (Cd)	mg/kg	0.654	0.313	0.444	0.339	0.050	8311608
Total Calcium (Ca)	mg/kg	23700	101000	82400	90500	100	8311608
Total Chromium (Cr)	mg/kg	39.0	14.5	19.3	21.8	1.0	8311608
Total Cobalt (Co)	mg/kg	11.9	3.53	5.93	5.75	0.30	8311608
Total Copper (Cu)	mg/kg	33.1	9.25	14.9	14.2	0.50	8311608
Total Iron (Fe)	mg/kg	29800	9350	13100	13400	100	8311608
Total Lead (Pb)	mg/kg	17.2	4.72	6.52	5.83	0.10	8311608
Total Lithium (Li)	mg/kg	28.6	11.6	15.7	17.0	5.0	8311608
Total Magnesium (Mg)	mg/kg	12100	55600	43900	48700	100	8311608
Total Manganese (Mn)	mg/kg	317	204	422	238	0.20	8311608
Total Mercury (Hg)	mg/kg	ND	ND	ND	ND	0.050	8311608
Total Molybdenum (Mo)	mg/kg	1.35	0.29	0.39	0.35	0.10	8311608
Total Nickel (Ni)	mg/kg	39.8	10.4	17.8	16.3	0.80	8311608
Total Phosphorus (P)	mg/kg	474	346	421	408	10	8311608
Total Potassium (K)	mg/kg	3890	1030	1650	1870	100	8311608
Total Selenium (Se)	mg/kg	1.26	ND	ND	ND	0.50	8311608
Total Silver (Ag)	mg/kg	0.158	0.070	0.094	0.086	0.050	8311608
Total Sodium (Na)	mg/kg	484	251	354	264	100	8311608
Total Strontium (Sr)	mg/kg	67.6	45.3	64.0	46.8	0.10	8311608
Total Thallium (Tl)	mg/kg	0.307	0.105	0.176	0.165	0.050	8311608
Total Tin (Sn)	mg/kg	0.89	0.25	0.34	0.37	0.10	8311608
Total Titanium (Ti)	mg/kg	138	334	331	406	1.0	8311608
Total Uranium (U)	mg/kg	2.07	0.698	0.837	0.804	0.050	8311608
Total Vanadium (V)	mg/kg	63.2	21.6	36.2	32.5	2.0	8311608
Total Zinc (Zn)	mg/kg	87.4	18.4	31.6	27.4	1.0	8311608
Total Zirconium (Zr)	mg/kg	13.4	8.25	9.44	8.71	0.50	8311608
RDL = Reportable Detection Limit							
ND = Not detected							

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW6960	OW6961	OW7023	OW7024	OW7025		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	RDL	QC Batch
Volatiles								
Chloromethane	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
Vinyl chloride	mg/kg	ND	ND	ND	ND	ND	0.060	8313811
Bromomethane	mg/kg	ND	ND	ND	ND	ND	0.30	8313811
Chloroethane	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
Trichlorofluoromethane	mg/kg	ND	ND	ND	ND	ND	0.20	8313811
1,1-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Dichloromethane	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
trans-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,1-dichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
cis-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Chloroform	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
1,1,1-trichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,2-dichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Carbon tetrachloride	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Benzene	mg/kg	0.022	ND	ND	ND	ND	0.0050	8313811
Methyl-tert-butylether (MTBE)	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
1,2-dichloropropane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Trichloroethene	mg/kg	ND	ND	ND	ND	ND	0.0050	8313811
Bromodichloromethane	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
cis-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	0.10	8313811
trans-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	0.10	8313811
1,1,2-trichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Toluene	mg/kg	0.057	ND	ND	ND	ND	0.020	8313811
Chlorodibromomethane	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
1,2-dibromoethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Tetrachloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Chlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,1,1,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	0.010	8313811
m & p-Xylene	mg/kg	ND	ND	ND	ND	ND	0.040	8313811
Bromoform	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
Styrene	mg/kg	ND	ND	ND	ND	ND	0.030	8313811
RDL = Reportable Detection Limit								
ND = Not detected								
(1) Detection limit raised due to CCV failed low.								

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW6960	OW6961	OW7023	OW7024	OW7025		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/22 08:00	2016/06/22 08:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01	C#498321-01-01		
	UNITS	BH01-SS02	BH01-SS04	MW02-SS01	MW02-SS03	BH03-SS01	RDL	QC Batch
o-Xylene	mg/kg	ND	ND	ND	ND	ND	0.040	8313811
Xylenes (Total)	mg/kg	ND	ND	ND	ND	ND	0.040	8313811
1,1,2,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,2-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,3-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,4-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,2,3-trichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Hexachlorobutadiene	mg/kg	ND	ND	ND	ND	ND	0.20	8313811
1,2,4-trichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	109	106	108	109	110		8313811
4-Bromofluorobenzene (sur.)	%	108	103	106	108	102		8313811
D10-ETHYLBENZENE (sur.)	%	101	101	99	102	105		8313811
D4-1,2-Dichloroethane (sur.)	%	83	98	96	95	95		8313811
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7026	OW7027	OW7028		OW7029		
Sampling Date		2016/06/21 12:00	2016/06/22 08:00	2016/06/22 08:00		2016/06/21 08:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01		C#498321-01-01		
	UNITS	BH03-SS05	BH04-SS03	BH04-SS04	RDL	DUP01	RDL	QC Batch

Volatiles								
Chloromethane	mg/kg	ND	ND	ND	0.10	ND	0.10	8313811
Vinyl chloride	mg/kg	ND	ND	ND	0.060	ND	0.060	8313811
Bromomethane	mg/kg	ND	ND	ND	0.30	ND	0.30	8313811
Chloroethane	mg/kg	ND	ND	ND	0.10	ND	0.10	8313811
Trichlorofluoromethane	mg/kg	ND	ND	ND	0.20	ND	0.20	8313811
1,1-dichloroethene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Dichloromethane	mg/kg	ND	ND	ND	0.10	ND	0.10	8313811
trans-1,2-dichloroethene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,1-dichloroethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
cis-1,2-dichloroethene	mg/kg	ND	ND	ND	0.025	0.033	0.025	8313811
Chloroform	mg/kg	ND	ND	ND	0.050	ND	0.050	8313811
1,1,1-trichloroethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,2-dichloroethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Carbon tetrachloride	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Benzene	mg/kg	ND	ND	ND	0.0050	0.034	0.0050	8313811
Methyl-tert-butylether (MTBE)	mg/kg	ND	ND	ND	0.10	ND	0.10	8313811
1,2-dichloropropane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Trichloroethene	mg/kg	ND	ND	ND	0.0050	0.023	0.0050	8313811
Bromodichloromethane	mg/kg	ND	ND	ND	0.050	ND	0.050	8313811
cis-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	0.10	ND (1)	0.10	8313811
trans-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	0.10	ND (1)	0.10	8313811
1,1,2-trichloroethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Toluene	mg/kg	ND	ND	ND	0.020	260 (2)	0.40	8313811
Chlorodibromomethane	mg/kg	ND	ND	ND	0.050	ND	0.050	8313811
1,2-dibromoethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Tetrachloroethene	mg/kg	ND	ND	ND	0.025	0.032	0.025	8313811
Chlorobenzene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,1,1,2-tetrachloroethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Ethylbenzene	mg/kg	ND	ND	ND	0.010	0.70	0.010	8313811
m & p-Xylene	mg/kg	ND	ND	ND	0.040	2.0	0.040	8313811
Bromoform	mg/kg	ND	ND	ND	0.050	ND	0.050	8313811

RDL = Reportable Detection Limit
 ND = Not detected
 (1) Detection limit raised due to CCV failed low.
 (2) Detection limits raised due to dilution to bring analyte within the calibrated range.

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7026	OW7027	OW7028		OW7029		
Sampling Date		2016/06/21 12:00	2016/06/22 08:00	2016/06/22 08:00		2016/06/21 08:00		
COC Number		C#498321-01-01	C#498321-01-01	C#498321-01-01		C#498321-01-01		
	UNITS	BH03-SS05	BH04-SS03	BH04-SS04	RDL	DUP01	RDL	QC Batch
Styrene	mg/kg	ND	ND	ND	0.030	ND	0.030	8313811
o-Xylene	mg/kg	ND	ND	ND	0.040	0.62	0.040	8313811
Xylenes (Total)	mg/kg	ND	ND	ND	0.040	2.6	0.040	8313811
1,1,2,2-tetrachloroethane	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,2-dichlorobenzene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,3-dichlorobenzene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,4-dichlorobenzene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
1,2,3-trichlorobenzene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Hexachlorobutadiene	mg/kg	ND	ND	ND	0.20	ND	0.20	8313811
1,2,4-trichlorobenzene	mg/kg	ND	ND	ND	0.025	ND	0.025	8313811
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	110	110	109		109		8313811
4-Bromofluorobenzene (sur.)	%	110	108	106		107		8313811
D10-ETHYLBENZENE (sur.)	%	104	109	104		102		8313811
D4-1,2-Dichloroethane (sur.)	%	97	98	90		96		8313811
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7030	OW7031	OW7032	OW7033	OW7034		
Sampling Date		2016/06/21 12:00	2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	DUP02	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	RDL	QC Batch

Volatiles								
Chloromethane	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
Vinyl chloride	mg/kg	ND	ND	ND	ND	ND	0.060	8313811
Bromomethane	mg/kg	ND	ND	ND	ND	ND	0.30	8313811
Chloroethane	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
Trichlorofluoromethane	mg/kg	ND	ND	ND	ND	ND	0.20	8313811
1,1-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Dichloromethane	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
trans-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,1-dichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
cis-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Chloroform	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
1,1,1-trichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,2-dichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Carbon tetrachloride	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Benzene	mg/kg	ND	ND	ND	ND	ND	0.0050	8313811
Methyl-tert-butylether (MTBE)	mg/kg	ND	ND	ND	ND	ND	0.10	8313811
1,2-dichloropropane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Trichloroethene	mg/kg	ND	ND	ND	ND	ND	0.0050	8313811
Bromodichloromethane	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
cis-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	0.10	8313811
trans-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	0.10	8313811
1,1,2-trichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Toluene	mg/kg	ND	ND	ND	ND	ND	0.020	8313811
Chlorodibromomethane	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
1,2-dibromoethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Tetrachloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Chlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,1,1,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	0.010	8313811
m & p-Xylene	mg/kg	ND	ND	ND	ND	ND	0.040	8313811
Bromoform	mg/kg	ND	ND	ND	ND	ND	0.050	8313811
Styrene	mg/kg	ND	ND	ND	ND	ND	0.030	8313811

RDL = Reportable Detection Limit
 ND = Not detected
 (1) Detection limit raised due to CCV failed low.

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7030	OW7031	OW7032	OW7033	OW7034		
Sampling Date		2016/06/21 12:00	2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-01-01	C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	DUP02	MW05-SS03	MW05-SS04	BH06-SS02	BH06-SS04	RDL	QC Batch
o-Xylene	mg/kg	ND	ND	ND	ND	ND	0.040	8313811
Xylenes (Total)	mg/kg	ND	ND	ND	ND	ND	0.040	8313811
1,1,2,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,2-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,3-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,4-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
1,2,3-trichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Hexachlorobutadiene	mg/kg	ND	ND	ND	ND	ND	0.20	8313811
1,2,4-trichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8313811
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	110	105	109	109	109		8313811
4-Bromofluorobenzene (sur.)	%	107	105	107	108	108		8313811
D10-ETHYLBENZENE (sur.)	%	107	103	104	102	104		8313811
D4-1,2-Dichloroethane (sur.)	%	96	91	90	99	97		8313811
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7035	OW7036	OW7037	OW7038		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	BH07-SS02	BH07-SS05	MW08-SS02	MW08-SS05	RDL	QC Batch
Volatiles							
Chloromethane	mg/kg	ND	ND	ND	ND	0.10	8313811
Vinyl chloride	mg/kg	ND	ND	ND	ND	0.060	8313811
Bromomethane	mg/kg	ND	ND	ND	ND	0.30	8313811
Chloroethane	mg/kg	ND	ND	ND	ND	0.10	8313811
Trichlorofluoromethane	mg/kg	ND	ND	ND	ND	0.20	8313811
1,1-dichloroethene	mg/kg	ND	ND	ND	ND	0.025	8313811
Dichloromethane	mg/kg	ND	ND	ND	ND	0.10	8313811
trans-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	0.025	8313811
1,1-dichloroethane	mg/kg	ND	ND	ND	ND	0.025	8313811
cis-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	0.025	8313811
Chloroform	mg/kg	ND	ND	ND	ND	0.050	8313811
1,1,1-trichloroethane	mg/kg	ND	ND	ND	ND	0.025	8313811
1,2-dichloroethane	mg/kg	ND	ND	ND	ND	0.025	8313811
Carbon tetrachloride	mg/kg	ND	ND	ND	ND	0.025	8313811
Benzene	mg/kg	ND	ND	ND	ND	0.0050	8313811
Methyl-tert-butylether (MTBE)	mg/kg	ND	ND	ND	ND	0.10	8313811
1,2-dichloropropane	mg/kg	ND	ND	ND	ND	0.025	8313811
Trichloroethene	mg/kg	ND	ND	ND	ND	0.0050	8313811
Bromodichloromethane	mg/kg	ND	ND	ND	ND	0.050	8313811
cis-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	ND (1)	0.10	8313811
trans-1,3-dichloropropene	mg/kg	ND (1)	ND (1)	ND (1)	ND (1)	0.10	8313811
1,1,2-trichloroethane	mg/kg	ND	ND	ND	ND	0.025	8313811
Toluene	mg/kg	ND	ND	ND	ND	0.020	8313811
Chlorodibromomethane	mg/kg	ND	ND	ND	ND	0.050	8313811
1,2-dibromoethane	mg/kg	ND	ND	ND	ND	0.025	8313811
Tetrachloroethene	mg/kg	ND	ND	ND	ND	0.025	8313811
Chlorobenzene	mg/kg	ND	ND	ND	ND	0.025	8313811
1,1,1,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	0.025	8313811
Ethylbenzene	mg/kg	ND	ND	ND	ND	0.010	8313811
m & p-Xylene	mg/kg	ND	ND	ND	ND	0.040	8313811
Bromoform	mg/kg	ND	ND	ND	ND	0.050	8313811
Styrene	mg/kg	ND	ND	ND	ND	0.030	8313811
RDL = Reportable Detection Limit							
ND = Not detected							
(1) Detection limit raised due to CCV failed low.							

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OW7035	OW7036	OW7037	OW7038		
Sampling Date		2016/06/21 08:00	2016/06/21 08:00	2016/06/21 12:00	2016/06/21 12:00		
COC Number		C#498321-02-01	C#498321-02-01	C#498321-02-01	C#498321-02-01		
	UNITS	BH07-SS02	BH07-SS05	MW08-SS02	MW08-SS05	RDL	QC Batch
o-Xylene	mg/kg	ND	ND	ND	ND	0.040	8313811
Xylenes (Total)	mg/kg	ND	ND	ND	ND	0.040	8313811
1,1,2,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	0.025	8313811
1,2-dichlorobenzene	mg/kg	ND	ND	ND	ND	0.025	8313811
1,3-dichlorobenzene	mg/kg	ND	ND	ND	ND	0.025	8313811
1,4-dichlorobenzene	mg/kg	ND	ND	ND	ND	0.025	8313811
1,2,3-trichlorobenzene	mg/kg	ND	ND	ND	ND	0.025	8313811
Hexachlorobutadiene	mg/kg	ND	ND	ND	ND	0.20	8313811
1,2,4-trichlorobenzene	mg/kg	ND	ND	ND	ND	0.025	8313811
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	109	110	110	108		8313811
4-Bromofluorobenzene (sur.)	%	109	108	105	103		8313811
D10-ETHYLBENZENE (sur.)	%	101	104	53	111		8313811
D4-1,2-Dichloroethane (sur.)	%	98	89	100	87		8313811
RDL = Reportable Detection Limit							
ND = Not detected							

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8307803	JCH	Matrix Spike [OW6961-01]	O-TERPHENYL (sur.)	2016/06/23		68	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/06/23		88	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2016/06/23		87	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2016/06/23		79	%	50 - 130
8307803	JCH	Spiked Blank	O-TERPHENYL (sur.)	2016/06/23		76	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/06/23		88	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2016/06/23		86	%	70 - 130
			F4 (C34-C50 Hydrocarbons)	2016/06/23		77	%	70 - 130
8307803	JCH	Method Blank	O-TERPHENYL (sur.)	2016/06/23		79	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/06/23	ND, RDL=20		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2016/06/23	ND, RDL=20		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2016/06/23	ND, RDL=20		mg/kg	
			Reached Baseline at C50	2016/06/23	YES		mg/kg	
8307803	JCH	RPD [OW6960-01]	F2 (C10-C16 Hydrocarbons)	2016/06/24	NC		%	50
			F3 (C16-C34 Hydrocarbons)	2016/06/24	NC		%	50
			F4 (C34-C50 Hydrocarbons)	2016/06/24	NC		%	50
			Reached Baseline at C50	2016/06/24	NC		%	50
8307812	SPR	Method Blank	Moisture	2016/06/23	ND, RDL=0.3		%	
8307812	SPR	RPD [OW7023-01]	Moisture	2016/06/23	4.6		%	20
8309445	CG5	Method Blank	Moisture	2016/06/25	ND, RDL=0.30		%	
8309445	CG5	RPD	Moisture	2016/06/25	4.1		%	20
8309615	JGD	QC Standard	Saturation %	2016/06/24		107	%	75 - 125
8309615	JGD	Method Blank	Saturation %	2016/06/24	ND, RDL=1.0		%	
8309615	JGD	RPD [OW7033-05]	Saturation %	2016/06/24	0.20		%	30
8309639	JGD	QC Standard	Soluble pH	2016/06/24		102	%	97 - 103
8309639	JGD	Spiked Blank	Soluble pH	2016/06/24		101	%	97 - 103
8309639	JGD	RPD [OW7033-05]	Soluble pH	2016/06/24	0.12		%	N/A
8309642	WAY	Spiked Blank	Soluble Conductivity	2016/06/24		95	%	80 - 120
8309642	WAY	Method Blank	Soluble Conductivity	2016/06/24	ND, RDL=1.0		uS/cm	
8309642	WAY	RPD [OW7033-05]	Soluble Conductivity	2016/06/24	0.088		%	35
8309842	CG5	Method Blank	Moisture	2016/06/25	ND, RDL=0.30		%	
8309842	CG5	RPD	Moisture	2016/06/25	8.5		%	20
8311608	DJ	Matrix Spike	Total Antimony (Sb)	2016/06/27		89	%	75 - 125
			Total Arsenic (As)	2016/06/27		93	%	75 - 125
			Total Barium (Ba)	2016/06/27		NC	%	75 - 125
			Total Beryllium (Be)	2016/06/27		101	%	75 - 125
			Total Cadmium (Cd)	2016/06/27		102	%	75 - 125
			Total Chromium (Cr)	2016/06/27		NC	%	75 - 125
			Total Cobalt (Co)	2016/06/27		98	%	75 - 125
			Total Copper (Cu)	2016/06/27		NC	%	75 - 125
			Total Lead (Pb)	2016/06/27		96	%	75 - 125
			Total Lithium (Li)	2016/06/27		96	%	75 - 125
			Total Manganese (Mn)	2016/06/27		NC	%	75 - 125
			Total Mercury (Hg)	2016/06/27		101	%	75 - 125

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QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			Total Molybdenum (Mo)	2016/06/27		98	%	75 - 125
			Total Nickel (Ni)	2016/06/27		93	%	75 - 125
			Total Selenium (Se)	2016/06/27		99	%	75 - 125
			Total Silver (Ag)	2016/06/27		99	%	75 - 125
			Total Strontium (Sr)	2016/06/27		NC	%	75 - 125
			Total Thallium (Tl)	2016/06/27		97	%	75 - 125
			Total Tin (Sn)	2016/06/27		91	%	75 - 125
			Total Titanium (Ti)	2016/06/27		NC	%	75 - 125
			Total Uranium (U)	2016/06/27		95	%	75 - 125
			Total Vanadium (V)	2016/06/27		NC	%	75 - 125
			Total Zinc (Zn)	2016/06/27		NC	%	75 - 125
8311608	DJ	QC Standard	Total Aluminum (Al)	2016/06/27		93	%	70 - 130
			Total Antimony (Sb)	2016/06/27		99	%	70 - 130
			Total Arsenic (As)	2016/06/27		78	%	70 - 130
			Total Barium (Ba)	2016/06/27		94	%	70 - 130
			Total Beryllium (Be)	2016/06/27		108	%	70 - 130
			Total Cadmium (Cd)	2016/06/27		107	%	70 - 130
			Total Calcium (Ca)	2016/06/27		90	%	70 - 130
			Total Chromium (Cr)	2016/06/27		102	%	70 - 130
			Total Cobalt (Co)	2016/06/27		89	%	70 - 130
			Total Copper (Cu)	2016/06/27		89	%	70 - 130
			Total Iron (Fe)	2016/06/27		92	%	70 - 130
			Total Lead (Pb)	2016/06/27		100	%	70 - 130
			Total Lithium (Li)	2016/06/27		102	%	70 - 130
			Total Magnesium (Mg)	2016/06/27		99	%	70 - 130
			Total Manganese (Mn)	2016/06/27		96	%	70 - 130
			Total Mercury (Hg)	2016/06/27		94	%	70 - 130
			Total Molybdenum (Mo)	2016/06/27		125	%	70 - 130
			Total Nickel (Ni)	2016/06/27		97	%	70 - 130
			Total Phosphorus (P)	2016/06/27		86	%	70 - 130
			Total Potassium (K)	2016/06/27		89	%	70 - 130
			Total Silver (Ag)	2016/06/27		110	%	70 - 130
			Total Sodium (Na)	2016/06/27		89	%	70 - 130
			Total Strontium (Sr)	2016/06/27		98	%	70 - 130
			Total Thallium (Tl)	2016/06/27		84	%	70 - 130
			Total Tin (Sn)	2016/06/27		81	%	70 - 130
			Total Uranium (U)	2016/06/27		101	%	70 - 130
			Total Vanadium (V)	2016/06/27		93	%	70 - 130
			Total Zinc (Zn)	2016/06/27		97	%	70 - 130
8311608	DJ	Spiked Blank	Total Antimony (Sb)	2016/06/27		90	%	75 - 125
			Total Arsenic (As)	2016/06/27		94	%	75 - 125
			Total Barium (Ba)	2016/06/27		97	%	75 - 125
			Total Beryllium (Be)	2016/06/27		100	%	75 - 125
			Total Cadmium (Cd)	2016/06/27		102	%	75 - 125
			Total Chromium (Cr)	2016/06/27		96	%	75 - 125
			Total Cobalt (Co)	2016/06/27		98	%	75 - 125
			Total Copper (Cu)	2016/06/27		96	%	75 - 125
			Total Lead (Pb)	2016/06/27		100	%	75 - 125
			Total Lithium (Li)	2016/06/27		96	%	75 - 125
			Total Manganese (Mn)	2016/06/27		96	%	75 - 125
			Total Mercury (Hg)	2016/06/27		101	%	75 - 125
			Total Molybdenum (Mo)	2016/06/27		94	%	75 - 125
			Total Nickel (Ni)	2016/06/27		94	%	75 - 125
			Total Selenium (Se)	2016/06/27		101	%	75 - 125

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			Total Silver (Ag)	2016/06/27		102	%	75 - 125
			Total Strontium (Sr)	2016/06/27		94	%	75 - 125
			Total Thallium (Tl)	2016/06/27		100	%	75 - 125
			Total Tin (Sn)	2016/06/27		88	%	75 - 125
			Total Titanium (Ti)	2016/06/27		92	%	75 - 125
			Total Uranium (U)	2016/06/27		98	%	75 - 125
			Total Vanadium (V)	2016/06/27		93	%	75 - 125
			Total Zinc (Zn)	2016/06/27		102	%	75 - 125
8311608	DJ	Method Blank	Total Aluminum (Al)	2016/06/27	ND, RDL=100		mg/kg	
			Total Antimony (Sb)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Arsenic (As)	2016/06/27	ND, RDL=0.50		mg/kg	
			Total Barium (Ba)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Beryllium (Be)	2016/06/27	ND, RDL=0.40		mg/kg	
			Total Bismuth (Bi)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Cadmium (Cd)	2016/06/27	ND, RDL=0.050		mg/kg	
			Total Calcium (Ca)	2016/06/27	ND, RDL=100		mg/kg	
			Total Chromium (Cr)	2016/06/27	ND, RDL=1.0		mg/kg	
			Total Cobalt (Co)	2016/06/27	ND, RDL=0.30		mg/kg	
			Total Copper (Cu)	2016/06/27	ND, RDL=0.50		mg/kg	
			Total Iron (Fe)	2016/06/27	ND, RDL=100		mg/kg	
			Total Lead (Pb)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Lithium (Li)	2016/06/27	ND, RDL=5.0		mg/kg	
			Total Magnesium (Mg)	2016/06/27	ND, RDL=100		mg/kg	
			Total Manganese (Mn)	2016/06/27	ND, RDL=0.20		mg/kg	
			Total Mercury (Hg)	2016/06/27	ND, RDL=0.050		mg/kg	
			Total Molybdenum (Mo)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Nickel (Ni)	2016/06/27	ND, RDL=0.80		mg/kg	
			Total Phosphorus (P)	2016/06/27	ND, RDL=10		mg/kg	
			Total Potassium (K)	2016/06/27	ND, RDL=100		mg/kg	
			Total Selenium (Se)	2016/06/27	ND, RDL=0.50		mg/kg	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Silver (Ag)	2016/06/27	ND, RDL=0.050		mg/kg	
			Total Sodium (Na)	2016/06/27	ND, RDL=100		mg/kg	
			Total Strontium (Sr)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Thallium (Tl)	2016/06/27	ND, RDL=0.050		mg/kg	
			Total Tin (Sn)	2016/06/27	ND, RDL=0.10		mg/kg	
			Total Titanium (Ti)	2016/06/27	ND, RDL=1.0		mg/kg	
			Total Uranium (U)	2016/06/27	ND, RDL=0.050		mg/kg	
			Total Vanadium (V)	2016/06/27	ND, RDL=2.0		mg/kg	
			Total Zinc (Zn)	2016/06/27	ND, RDL=1.0		mg/kg	
			Total Zirconium (Zr)	2016/06/27	ND, RDL=0.50		mg/kg	
8311608	DJ	RPD	Total Aluminum (Al)	2016/06/27	0.73		%	35
			Total Antimony (Sb)	2016/06/27	NC		%	30
			Total Arsenic (As)	2016/06/27	NC		%	30
			Total Barium (Ba)	2016/06/27	0.88		%	35
			Total Beryllium (Be)	2016/06/27	NC		%	30
			Total Bismuth (Bi)	2016/06/27	NC		%	30
			Total Cadmium (Cd)	2016/06/27	NC		%	30
			Total Calcium (Ca)	2016/06/27	0.75		%	30
			Total Chromium (Cr)	2016/06/27	3.7		%	30
			Total Cobalt (Co)	2016/06/27	0.57		%	30
			Total Copper (Cu)	2016/06/27	0.75		%	30
			Total Iron (Fe)	2016/06/27	0.18		%	30
			Total Lead (Pb)	2016/06/27	1.3		%	35
			Total Lithium (Li)	2016/06/27	NC		%	30
			Total Magnesium (Mg)	2016/06/27	2.1		%	30
			Total Manganese (Mn)	2016/06/27	0.37		%	30
			Total Mercury (Hg)	2016/06/27	NC		%	35
			Total Molybdenum (Mo)	2016/06/27	NC		%	35
			Total Nickel (Ni)	2016/06/27	4.2		%	30
			Total Phosphorus (P)	2016/06/27	3.0		%	30
			Total Potassium (K)	2016/06/27	0.79		%	35
			Total Selenium (Se)	2016/06/27	NC		%	30
			Total Silver (Ag)	2016/06/27	NC		%	35
			Total Sodium (Na)	2016/06/27	NC		%	35
			Total Strontium (Sr)	2016/06/27	2.0		%	35
			Total Thallium (Tl)	2016/06/27	NC		%	30
			Total Tin (Sn)	2016/06/27	NC		%	35
			Total Titanium (Ti)	2016/06/27	0.92		%	35
			Total Uranium (U)	2016/06/27	NC		%	30
			Total Vanadium (V)	2016/06/27	2.9		%	30
			Total Zinc (Zn)	2016/06/27	5.8		%	30
			Total Zirconium (Zr)	2016/06/27	NC		%	30
8311610	BCO	Spiked Blank	Soluble (2:1) pH	2016/06/27		101	%	97 - 103

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8311610	BCO	RPD	Soluble (2:1) pH	2016/06/27	1.6		%	N/A
8313102	DJ	Matrix Spike [OW7037-04]	Soluble (Hot water) Boron (B)	2016/06/28		NC	%	75 - 125
8313102	DJ	Spiked Blank	Soluble (Hot water) Boron (B)	2016/06/28		99	%	75 - 125
8313102	DJ	Method Blank	Soluble (Hot water) Boron (B)	2016/06/28	ND, RDL=0.10		mg/kg	
8313102	DJ	RPD [OW7037-04]	Soluble (Hot water) Boron (B)	2016/06/28	1.4		%	35
8313107	LS2	Matrix Spike [OW7037-03]	D10-ANTHRACENE (sur.)	2016/06/28		88	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/06/28		85	%	50 - 130
			D8-NAPHTHALENE (sur.)	2016/06/28		86	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/06/28		90	%	60 - 130
			Naphthalene	2016/06/28		83	%	50 - 130
			2-Methylnaphthalene	2016/06/28		83	%	50 - 130
			Acenaphthylene	2016/06/28		82	%	50 - 130
			Acenaphthene	2016/06/28		85	%	50 - 130
			Fluorene	2016/06/28		81	%	50 - 130
			Phenanthrene	2016/06/28		81	%	60 - 130
			Anthracene	2016/06/28		85	%	60 - 130
			Fluoranthene	2016/06/28		85	%	60 - 130
			Pyrene	2016/06/28		84	%	60 - 130
			Benzo(a)anthracene	2016/06/28		82	%	60 - 130
			Chrysene	2016/06/28		87	%	60 - 130
			Benzo(b&j)fluoranthene	2016/06/28		84	%	60 - 130
			Benzo(b)fluoranthene	2016/06/28		82	%	60 - 130
			Benzo(k)fluoranthene	2016/06/28		92	%	60 - 130
			Benzo(a)pyrene	2016/06/28		84	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2016/06/28		84	%	60 - 130
			Dibenz(a,h)anthracene	2016/06/28		83	%	60 - 130
			Benzo(g,h,i)perylene	2016/06/28		82	%	60 - 130
8313107	LS2	Spiked Blank	D10-ANTHRACENE (sur.)	2016/06/28		85	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/06/28		83	%	50 - 130
			D8-NAPHTHALENE (sur.)	2016/06/28		81	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/06/28		88	%	60 - 130
			Naphthalene	2016/06/28		80	%	50 - 130
			2-Methylnaphthalene	2016/06/28		82	%	50 - 130
			Acenaphthylene	2016/06/28		82	%	50 - 130
			Acenaphthene	2016/06/28		82	%	50 - 130
			Fluorene	2016/06/28		80	%	50 - 130
			Phenanthrene	2016/06/28		81	%	60 - 130
			Anthracene	2016/06/28		84	%	60 - 130
			Fluoranthene	2016/06/28		83	%	60 - 130
			Pyrene	2016/06/28		83	%	60 - 130
			Benzo(a)anthracene	2016/06/28		78	%	60 - 130
			Chrysene	2016/06/28		83	%	60 - 130
			Benzo(b&j)fluoranthene	2016/06/28		88	%	60 - 130
			Benzo(b)fluoranthene	2016/06/28		88	%	60 - 130
			Benzo(k)fluoranthene	2016/06/28		80	%	60 - 130
			Benzo(a)pyrene	2016/06/28		80	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2016/06/28		76	%	60 - 130
			Dibenz(a,h)anthracene	2016/06/28		77	%	60 - 130
			Benzo(g,h,i)perylene	2016/06/28		75	%	60 - 130
8313107	LS2	Method Blank	D10-ANTHRACENE (sur.)	2016/06/28		98	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/06/28		90	%	50 - 130

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			D8-NAPHTHALENE (sur.)	2016/06/28		88	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/06/28		101	%	60 - 130
			Naphthalene	2016/06/28	ND, RDL=0.010		mg/kg	
			2-Methylnaphthalene	2016/06/28	ND, RDL=0.020		mg/kg	
			Acenaphthylene	2016/06/28	ND, RDL=0.0050		mg/kg	
			Acenaphthene	2016/06/28	ND, RDL=0.0050		mg/kg	
			Fluorene	2016/06/28	ND, RDL=0.020		mg/kg	
			Phenanthrene	2016/06/28	ND, RDL=0.010		mg/kg	
			Anthracene	2016/06/28	ND, RDL=0.0040		mg/kg	
			Fluoranthene	2016/06/28	ND, RDL=0.020		mg/kg	
			Pyrene	2016/06/28	ND, RDL=0.020		mg/kg	
			Benzo(a)anthracene	2016/06/28	ND, RDL=0.020		mg/kg	
			Chrysene	2016/06/28	ND, RDL=0.020		mg/kg	
			Benzo(b&j)fluoranthene	2016/06/28	ND, RDL=0.020		mg/kg	
			Benzo(b)fluoranthene	2016/06/28	ND, RDL=0.020		mg/kg	
			Benzo(k)fluoranthene	2016/06/28	ND, RDL=0.020		mg/kg	
			Benzo(a)pyrene	2016/06/28	ND, RDL=0.020		mg/kg	
			Indeno(1,2,3-cd)pyrene	2016/06/28	ND, RDL=0.050		mg/kg	
			Dibenz(a,h)anthracene	2016/06/28	ND, RDL=0.050		mg/kg	
			Benzo(g,h,i)perylene	2016/06/28	ND, RDL=0.050		mg/kg	
8313107	LS2	RPD [OW7037-03]	Naphthalene	2016/06/28	NC		%	50
			2-Methylnaphthalene	2016/06/28	NC		%	50
			Acenaphthylene	2016/06/28	NC		%	50
			Acenaphthene	2016/06/28	NC		%	50
			Fluorene	2016/06/28	NC		%	50
			Phenanthrene	2016/06/28	NC		%	50
			Anthracene	2016/06/28	NC		%	50
			Fluoranthene	2016/06/28	NC		%	50
			Pyrene	2016/06/28	NC		%	50
			Benzo(a)anthracene	2016/06/28	NC		%	50
			Chrysene	2016/06/28	NC		%	50
			Benzo(b&j)fluoranthene	2016/06/28	NC		%	50
			Benzo(b)fluoranthene	2016/06/28	NC		%	20
			Benzo(k)fluoranthene	2016/06/28	NC		%	50

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8313811	JL4	Matrix Spike [OW6960-02]	Benzo(a)pyrene	2016/06/28	NC		%	50
			Indeno(1,2,3-cd)pyrene	2016/06/28	NC		%	50
			Dibenz(a,h)anthracene	2016/06/28	NC		%	50
			Benzo(g,h,i)perylene	2016/06/28	NC		%	50
			1,4-Difluorobenzene (sur.)	2016/06/28		101	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/06/28		102	%	70 - 130
			D10-ETHYLBENZENE (sur.)	2016/06/28		94	%	50 - 130
			D4-1,2-Dichloroethane (sur.)	2016/06/28		97	%	70 - 130
			Chloromethane	2016/06/28		63	%	50 - 150
			Vinyl chloride	2016/06/28		82	%	50 - 150
			Bromomethane	2016/06/28		96	%	50 - 150
			Chloroethane	2016/06/28		80	%	50 - 150
			Trichlorofluoromethane	2016/06/28		92	%	50 - 150
			1,1-dichloroethene	2016/06/28		92	%	60 - 140
			Dichloromethane	2016/06/28		104	%	60 - 140
			trans-1,2-dichloroethene	2016/06/28		92	%	60 - 140
			1,1-dichloroethane	2016/06/28		89	%	60 - 140
			cis-1,2-dichloroethene	2016/06/28		97	%	60 - 140
			Chloroform	2016/06/28		96	%	60 - 140
			1,1,1-trichloroethane	2016/06/28		85	%	60 - 140
			1,2-dichloroethane	2016/06/28		96	%	60 - 140
			Carbon tetrachloride	2016/06/28		66	%	60 - 140
			Benzene	2016/06/28		92	%	60 - 140
			1,2-dichloropropane	2016/06/28		91	%	60 - 140
			Trichloroethene	2016/06/28		94	%	60 - 140
			Bromodichloromethane	2016/06/28		77	%	60 - 140
			cis-1,3-dichloropropene	2016/06/28		99	%	60 - 140
			trans-1,3-dichloropropene	2016/06/28		95	%	60 - 140
			1,1,2-trichloroethane	2016/06/28		99	%	60 - 140
			Toluene	2016/06/28		97	%	60 - 140
			Chlorodibromomethane	2016/06/28		69	%	60 - 140
			1,2-dibromoethane	2016/06/28		90	%	60 - 140
			Tetrachloroethene	2016/06/28		98	%	60 - 140
Chlorobenzene	2016/06/28		90	%	60 - 140			
1,1,1,2-tetrachloroethane	2016/06/28		62	%	60 - 140			
Ethylbenzene	2016/06/28		95	%	60 - 140			
m & p-Xylene	2016/06/28		93	%	60 - 140			
Bromoform	2016/06/28		63	%	60 - 140			
Styrene	2016/06/28		98	%	60 - 140			
o-Xylene	2016/06/28		94	%	60 - 140			
1,1,2,2-tetrachloroethane	2016/06/28		98	%	60 - 140			
1,2-dichlorobenzene	2016/06/28		98	%	60 - 140			
1,3-dichlorobenzene	2016/06/28		96	%	60 - 140			
1,4-dichlorobenzene	2016/06/28		95	%	60 - 140			
1,2,3-trichlorobenzene	2016/06/28		106	%	60 - 140			
Hexachlorobutadiene	2016/06/28		101	%	50 - 150			
1,2,4-trichlorobenzene	2016/06/28		108	%	60 - 140			
8313811	JL4	Spiked Blank	1,4-Difluorobenzene (sur.)	2016/06/28		101	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/06/28		102	%	70 - 130
			D10-ETHYLBENZENE (sur.)	2016/06/28		79	%	50 - 130
			D4-1,2-Dichloroethane (sur.)	2016/06/28		95	%	70 - 130
			Chloromethane	2016/06/28		63	%	50 - 150
Vinyl chloride	2016/06/28		81	%	50 - 150			

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Bromomethane	2016/06/28		92	%	50 - 150
			Chloroethane	2016/06/28		73	%	50 - 150
			Trichlorofluoromethane	2016/06/28		88	%	50 - 150
			1,1-dichloroethene	2016/06/28		84	%	60 - 140
			Dichloromethane	2016/06/28		94	%	60 - 140
			trans-1,2-dichloroethene	2016/06/28		83	%	60 - 140
			1,1-dichloroethane	2016/06/28		80	%	60 - 140
			cis-1,2-dichloroethene	2016/06/28		86	%	60 - 140
			Chloroform	2016/06/28		85	%	60 - 140
			1,1,1-trichloroethane	2016/06/28		78	%	60 - 140
			1,2-dichloroethane	2016/06/28		81	%	60 - 140
			Carbon tetrachloride	2016/06/28		65	%	60 - 140
			Benzene	2016/06/28		82	%	60 - 140
			1,2-dichloropropane	2016/06/28		86	%	60 - 140
			Trichloroethene	2016/06/28		83	%	60 - 140
			Bromodichloromethane	2016/06/28		74	%	60 - 140
			cis-1,3-dichloropropene	2016/06/28		90	%	60 - 140
			trans-1,3-dichloropropene	2016/06/28		82	%	60 - 140
			1,1,2-trichloroethane	2016/06/28		87	%	60 - 140
			Toluene	2016/06/28		83	%	60 - 140
			Chlorodibromomethane	2016/06/28		67	%	60 - 140
			1,2-dibromoethane	2016/06/28		77	%	60 - 140
			Tetrachloroethene	2016/06/28		87	%	60 - 140
			Chlorobenzene	2016/06/28		81	%	60 - 140
			1,1,1,2-tetrachloroethane	2016/06/28		57 (1)	%	60 - 140
			Ethylbenzene	2016/06/28		85	%	60 - 140
			m & p-Xylene	2016/06/28		83	%	60 - 140
			Bromoform	2016/06/28		61	%	60 - 140
			Styrene	2016/06/28		86	%	60 - 140
			o-Xylene	2016/06/28		84	%	60 - 140
			1,1,2,2-tetrachloroethane	2016/06/28		85	%	60 - 140
			1,2-dichlorobenzene	2016/06/28		87	%	60 - 140
			1,3-dichlorobenzene	2016/06/28		85	%	60 - 140
			1,4-dichlorobenzene	2016/06/28		84	%	60 - 140
			1,2,3-trichlorobenzene	2016/06/28		94	%	60 - 140
			Hexachlorobutadiene	2016/06/28		92	%	50 - 150
			1,2,4-trichlorobenzene	2016/06/28		95	%	60 - 140
8313811	JL4	Method Blank	1,4-Difluorobenzene (sur.)	2016/06/28		106	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/06/28		106	%	70 - 130
			D10-ETHYLBENZENE (sur.)	2016/06/28		95	%	50 - 130
			D4-1,2-Dichloroethane (sur.)	2016/06/28		87	%	70 - 130
			Chloromethane	2016/06/28	ND, RDL=0.10		mg/kg	
			Vinyl chloride	2016/06/28	ND, RDL=0.060		mg/kg	
			Bromomethane	2016/06/28	ND, RDL=0.30		mg/kg	
			Chloroethane	2016/06/28	ND, RDL=0.10		mg/kg	
			Trichlorofluoromethane	2016/06/28	ND, RDL=0.20		mg/kg	
			1,1-dichloroethene	2016/06/28	ND, RDL=0.025		mg/kg	

Maxxam Job #: B650191
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MMM GROUP

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dichloromethane	2016/06/28	ND, RDL=0.10		mg/kg	
			trans-1,2-dichloroethene	2016/06/28	ND, RDL=0.025		mg/kg	
			1,1-dichloroethane	2016/06/28	ND, RDL=0.025		mg/kg	
			cis-1,2-dichloroethene	2016/06/28	ND, RDL=0.025		mg/kg	
			Chloroform	2016/06/28	ND, RDL=0.050		mg/kg	
			1,1,1-trichloroethane	2016/06/28	ND, RDL=0.025		mg/kg	
			1,2-dichloroethane	2016/06/28	ND, RDL=0.025		mg/kg	
			Carbon tetrachloride	2016/06/28	ND, RDL=0.025		mg/kg	
			Benzene	2016/06/28	ND, RDL=0.0050		mg/kg	
			Methyl-tert-butylether (MTBE)	2016/06/28	ND, RDL=0.10		mg/kg	
			1,2-dichloropropane	2016/06/28	ND, RDL=0.025		mg/kg	
			Trichloroethene	2016/06/28	ND, RDL=0.0050		mg/kg	
			Bromodichloromethane	2016/06/28	ND, RDL=0.050		mg/kg	
			cis-1,3-dichloropropene	2016/06/28	ND, RDL=0.10 (2)		mg/kg	
			trans-1,3-dichloropropene	2016/06/28	ND, RDL=0.10 (2)		mg/kg	
			1,1,2-trichloroethane	2016/06/28	ND, RDL=0.025		mg/kg	
			Toluene	2016/06/28	ND, RDL=0.020		mg/kg	
			Chlorodibromomethane	2016/06/28	ND, RDL=0.050		mg/kg	
			1,2-dibromoethane	2016/06/28	ND, RDL=0.025		mg/kg	
			Tetrachloroethene	2016/06/28	ND, RDL=0.025		mg/kg	
			Chlorobenzene	2016/06/28	ND, RDL=0.025		mg/kg	
			1,1,1,2-tetrachloroethane	2016/06/28	ND, RDL=0.025		mg/kg	
			Ethylbenzene	2016/06/28	ND, RDL=0.010		mg/kg	
			m & p-Xylene	2016/06/28	ND, RDL=0.040		mg/kg	
			Bromoform	2016/06/28	ND, RDL=0.050		mg/kg	

Maxxam Job #: B650191
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MMM GROUP

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2016/06/28	ND, RDL=0.030		mg/kg	
			o-Xylene	2016/06/28	ND, RDL=0.040		mg/kg	
			Xylenes (Total)	2016/06/28	ND, RDL=0.040		mg/kg	
			1,1,2,2-tetrachloroethane	2016/06/28	ND, RDL=0.025		mg/kg	
			1,2-dichlorobenzene	2016/06/28	ND, RDL=0.025		mg/kg	
			1,3-dichlorobenzene	2016/06/28	ND, RDL=0.025		mg/kg	
			1,4-dichlorobenzene	2016/06/28	ND, RDL=0.025		mg/kg	
			1,2,3-trichlorobenzene	2016/06/28	ND, RDL=0.025		mg/kg	
			Hexachlorobutadiene	2016/06/28	ND, RDL=0.20		mg/kg	
			1,2,4-trichlorobenzene	2016/06/28	ND, RDL=0.025		mg/kg	
8313811	JL4	RPD [OW6960-02]	Chloromethane	2016/06/29	NC		%	40
			Vinyl chloride	2016/06/29	NC		%	40
			Bromomethane	2016/06/29	NC		%	40
			Chloroethane	2016/06/29	NC		%	40
			Trichlorofluoromethane	2016/06/29	NC		%	40
			1,1-dichloroethene	2016/06/29	NC		%	40
			Dichloromethane	2016/06/29	NC		%	40
			trans-1,2-dichloroethene	2016/06/29	NC		%	40
			1,1-dichloroethane	2016/06/29	NC		%	40
			cis-1,2-dichloroethene	2016/06/29	NC		%	40
			Chloroform	2016/06/29	NC		%	40
			1,1,1-trichloroethane	2016/06/29	NC		%	40
			1,2-dichloroethane	2016/06/29	NC		%	40
			Carbon tetrachloride	2016/06/29	NC		%	40
			Benzene	2016/06/29	NC		%	40
			Methyl-tert-butylether (MTBE)	2016/06/29	NC		%	40
			1,2-dichloropropane	2016/06/29	NC		%	40
			Trichloroethene	2016/06/29	NC		%	40
			Bromodichloromethane	2016/06/29	NC		%	40
			cis-1,3-dichloropropene	2016/06/29	NC		%	40
			trans-1,3-dichloropropene	2016/06/29	NC		%	40
			1,1,2-trichloroethane	2016/06/29	NC		%	40
			Toluene	2016/06/29	NC		%	40
			Chlorodibromomethane	2016/06/29	NC		%	40
			1,2-dibromoethane	2016/06/29	NC		%	40
			Tetrachloroethene	2016/06/29	NC		%	40
			Chlorobenzene	2016/06/29	NC		%	40
			1,1,1,2-tetrachloroethane	2016/06/29	NC		%	40
			Ethylbenzene	2016/06/29	NC		%	40
			m & p-Xylene	2016/06/29	NC		%	40
			Bromoform	2016/06/29	NC		%	40
			Styrene	2016/06/29	NC		%	40
			o-Xylene	2016/06/29	NC		%	40

Maxxam Job #: B650191
Report Date: 2016/06/29

MMM GROUP

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Xylenes (Total)	2016/06/29	NC		%	40
			1,1,2,2-tetrachloroethane	2016/06/29	NC		%	40
			1,2-dichlorobenzene	2016/06/29	NC		%	40
			1,3-dichlorobenzene	2016/06/29	NC		%	40
			1,4-dichlorobenzene	2016/06/29	NC		%	40
			1,2,3-trichlorobenzene	2016/06/29	NC		%	40
			Hexachlorobutadiene	2016/06/29	NC		%	40
			1,2,4-trichlorobenzene	2016/06/29	NC		%	40
8315184	KP9	Matrix Spike [OW7029-06]	Hex. Chromium (Cr 6+)	2016/06/29		56 (1)	%	75 - 125
8315184	KP9	Spiked Blank	Hex. Chromium (Cr 6+)	2016/06/29		106	%	80 - 120
8315184	KP9	Method Blank	Hex. Chromium (Cr 6+)	2016/06/29	ND, RDL=0.080		mg/kg	
8315184	KP9	RPD [OW7029-06]	Hex. Chromium (Cr 6+)	2016/06/29	NC		%	35

N/A = Not Applicable

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 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) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Detection limit raised due to CCV failed low.

Maxxam Job #: B650191
Report Date: 2016/06/29

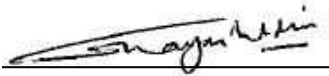
MMM GROUP

VALIDATION SIGNATURE PAGE

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

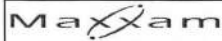


Andy Lu, Ph.D., P.Chem., Scientific Specialist



Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

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.



Maxxam Analytics International Corporation o/a Maxxam Analytics
 D-675 Berry Street, Winnipeg, Manitoba Canada R3H 1A7 Tel:(204) 772-7276 Toll-Free:800-563-6266 Fax:(204) 772-7276 www.maxxam.ca

Chain Of Custody Record

INVOICE TO:		Report Information			Project Information			Laboratory Use Only	
Company Name	#9190 MMM GROUP	Company Name	DARREN KEAM		Quotation #			Maxxam Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name			P.O. #			B650191	
Address	SUITE 111 93 LOMBARD AVE WINNIPEG MB R3B 3B1	Address			Project #			Chain Of Custody Record	Project Manager
Phone	(204) 272-2656	Phone	(204) 943-3178		Project Name				Amanda Hung
Email	accountspayable@mmm.ca	Email	keamd@mmm.ca, edd@mmm.ca		Site #			C#498321-01-01	
					Sampled By				

Regulatory Criteria	Special Instructions	Analysis Requested	Turnaround Time (TAT) Required
		Regulated Drinking Water ? (Y/N) Metals Field Filtered ? (Y/N) Field Preserved BTEX/F1, F2-F4 in Soil CCME PAH in Soil by GC-MS VOCs in Soil - Field Pres. CSR/CCME Metals in Soil Hexavalent Chromium Boron (Hot Water Soluble) pH (Soluble) Conductivity (Soluble) PSA Coarse/Fine (75 micron)	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. <input checked="" type="checkbox"/> Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number _____ (call lab for #)

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Field Preserved BTEX/F1, F2-F4 in Soil	CCME PAH in Soil by GC-MS	VOCs in Soil - Field Pres.	CSR/CCME Metals in Soil	Hexavalent Chromium	Boron (Hot Water Soluble)	pH (Soluble)	Conductivity (Soluble)	PSA Coarse/Fine (75 micron)	# of Bottles	Comments
OW1601960	BH01-SS02	Jun 20	AM	soil			X	X	X	X	X	X	X	X		8	
OW6961	BH01-SS04	"	"	"			X		X							4	
OW7023	MW02-SS01	June 22	AM				X	X	X	X	X	X	X	X		8	
24	MW02-SS03	"	"				X		X							4	
25	BH03-SS01	Jun 21	PM				X	X	X	X	X	X	X	X		8	
26	BH03-SS05	"	"				X		X							4	
27	BH04-SS03	Jun 22	AM				X	X	X	X	X	X	X	X		8	
28	BH04-SS04	"	"				X		X							4	
29	DUP01	Jun 21	AM				X	X	X	X	X	X	X	X		8	
30	DUP02	"	PM				X		X							4	

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only
Laura Gallagher	16/06/22	12:15	Laura Coupland	16/06/22	12:15		Time Sensitive <input type="checkbox"/> Temperature (°C) in Receipt: 9.4, 10.3, 10.0 Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input type="checkbox"/> No ice present.

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.



Maxxam Analytics International Corporation o/a Maxxam Analytics
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Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#9190 MMM GROUP	Company Name	DARREN KEAM	Quotation #		Maxxam Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	DARREN KEAM	P.O. #		B650191	498321
Address	SUITE 111 93 LOMBARD AVE WINNIPEG MB R3B 3B1	Address		Project #		Chain Of Custody Record	Project Manager
Phone	(204) 272-2656	Phone	(204) 943-3178	Project Name			Amanda Hung
Fax		Fax		Site #			
Email	accountspayable@mmm.ca	Email	keamd@mmm.ca, edd@mmm.ca	Sampled By		C#498321-02-01	

Regulatory Criteria	Special Instructions	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Field Preserved BTEX/F1, F2, F4 in Soil	CCME PAH in Soil by GC-MS	VOCs in Soil - Field Pres.	CSR/CCME Metals in Soil	Hexavalent Chromium	Boron (Hot Water Soluble)	pH (Soluble)	Conductivity (Soluble)	PSA Coarse/Fine (75 micron)	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: _____ Time Required: _____ Rush Confirmation Number _____ (call lab for #)

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form

Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Field Preserved BTEX/F1, F2, F4 in Soil	CCME PAH in Soil by GC-MS	VOCs in Soil - Field Pres.	CSR/CCME Metals in Soil	Hexavalent Chromium	Boron (Hot Water Soluble)	pH (Soluble)	Conductivity (Soluble)	PSA Coarse/Fine (75 micron)	# of Bottles	Comments
1 DW7031	MW05-SS03	Jun 21	AM	Soil			X	X	X	X	X	X	X	X		8	
2 32	MW05-SS04	AM	AM				X		X							4	
3 33	BH06-SS02		PM				X	X	X	X	X	X	X	X		9	
4 34	BH06-SS04		PM				X		X						X	5	
5 35	BH07-SS02		AM				X	X	X	X	X	X	X	X		8	
6 36	BH07-SS05		AM				X		X							4	
7 37	MW08-SS02	PM	PM				X	X	X	X	X	X	X	X		8	
8 ▼ 38	MW08-SS05	PM ▼	PM	▼			X		X							4	
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	Lab Use Only		
Laura Gallagher		16/06/22	12:15	Laura Coupland		16/06/22	12:15		Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
									<input type="checkbox"/>	9.4, 10.3, 10.0	<input type="checkbox"/> Yes <input type="checkbox"/> No

* 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.

ice present. White: Maxxam Yellow: Client

Site#: WINNIPEG TRANSIT
Your C.O.C. #: N008616

Attention: LAURA GALLAGHER

MMM GROUP
SUITE 111
93 LOMBARD AVE
WINNIPEG, MB
CANADA R3B 3B1

Report Date: 2016/07/13
Report #: R2214960
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B653936

Received: 2016/07/04, 12:35

Sample Matrix: Soil
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Boron (Hot Water Soluble) (1)	3	N/A	2016/07/08	BBY7SOP-00001 BBY7SOP-00018	EPA6020bR2m,6010cR3m
Hexavalent Chromium (2)	3	2016/07/08	2016/07/08	AB SOP-00063	SM 22 3500-Cr B m
Conductivity (Soluble) (1)	3	2016/07/11	2016/07/12	BBY6SOP-00029	SM 22 2510 B
Volatile F1-BTEX (1)	3	N/A	2016/07/12	BBY WI-00033	Auto Calc
Volatile F1-BTEX (1)	2	N/A	2016/07/13	BBY WI-00033	Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	5	2016/07/09	2016/07/11	BBY8SOP-00030	CCME PHC-CWS
Elements by ICPMS (total) (1)	3	2016/07/09	2016/07/11	BBY7SOP-00017,	BC SALM,EPA 6020bR2m
Moisture (2)	3	N/A	2016/07/08	AB SOP-00002	CCME PHC-CWS m
Moisture (1)	2	2016/07/13	2016/07/13	BBY8SOP-00017	BC MOE Lab Manual
PAH in Soil by GC/MS (SIM) - CCME (1)	3	2016/07/09	2016/07/12	BBY8SOP-00022	EPA 8270d R4 m
Index of Additive Cancer Risk Calc. (1)	3	N/A	2016/07/12	BBY WI-00033	Auto Calc
Total PAH and B(a)P Calculation (1)	3	N/A	2016/07/12	BBY WI-00033	Auto Calc
pH (2:1 DI Water Extract) (1)	3	2016/07/09	2016/07/11	BBY6SOP-00028	BCMOE BCLM Mar2005 m
pH (Soluble) (1)	3	2016/07/11	2016/07/12	BBY6SOP-00025	SM 22 4500-H+ B
Saturated Paste (1)	3	2016/07/11	2016/07/12	BBY6SOP-00030	Carter 2nd 15.2.1 m
VOCs, VH, F1, LH in Soil - Field Pres. (1, 4)	3	N/A	2016/07/11	BBY8-SOP-00009	EPA 8260c R3 m
VOCs, VH, F1, LH in Soil - Field Pres. (1, 4)	2	N/A	2016/07/12	BBY8-SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) This test was performed by Maxxam Vancouver

(2) This test was performed by Maxxam Calgary Environmental

(3) All CCME results met required criteria unless otherwise stated in the report. 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. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

(4) The extraction date for VOC, BTEX, VH, or F1 samples that are field preserved with methanol equals the date sampled, unless otherwise stated.

Site#: WINNIPEG TRANSIT
Your C.O.C. #: N008616

Attention:LAURA GALLAGHER

MMM GROUP
SUITE 111
93 LOMBARD AVE
WINNIPEG, MB
CANADA R3B 3B1

Report Date: 2016/07/13
Report #: R2214960
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B653936
Received: 2016/07/04, 12:35

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Amanda Hung, B.Sc., Project Manager
Email: AHung@maxxam.ca
Phone# (204)772-7276 Ext:2215

=====
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.

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

RESULTS OF CHEMICAL ANALYSES OF SOIL

Maxxam ID		OY7508	OY7509	OY7510	OY7511	OY7512		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616	N008616	N008616	N008616		
	UNITS	DUP A	MW09-SS01	MW09-SS05	BH10-SS01	BH10-SS04	RDL	QC Batch
Calculated Parameters								
F1 (C6-C10) - BTEX	mg/kg	ND	ND	ND	ND	ND	10	8318848
Elements								
Soluble (Hot water) Boron (B)	mg/kg	3.95	3.32		7.47		0.10	8323891
Hex. Chromium (Cr 6+)	mg/kg	ND	ND		ND		0.080	8323822
Physical Properties								
Soluble (2:1) pH	pH	8.77	8.77		8.60		N/A	8324622
Soluble Parameters								
Soluble Conductivity	uS/cm	1150	1210		704		1.0	8326415
Soluble pH	pH	8.29	8.31		8.21		N/A	8326408
Saturation %	%	47.0	45.0		74.0		1.0	8326399
Physical Properties								
Moisture	%	17	17		21		0.30	8322953
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		OY7508	OY7509	OY7510	OY7511	OY7512		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616	N008616	N008616	N008616		
	UNITS	DUP A	MW09-SS01	MW09-SS05	BH10-SS01	BH10-SS04	RDL	QC Batch
Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/kg	ND	ND	ND	ND	ND	10	8325588
F3 (C16-C34 Hydrocarbons)	mg/kg	ND	ND	27	ND	83	10	8325588
F4 (C34-C50 Hydrocarbons)	mg/kg	ND	ND	ND	ND	21	10	8325588
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	N/A	8325588
Surrogate Recovery (%)								
O-TERPHENYL (sur.)	%	105	112	104	107	93		8325588
RDL = Reportable Detection Limit ND = Not detected N/A = Not Applicable								

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

PHYSICAL TESTING (SOIL)

Maxxam ID		OY7510	OY7512		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616		
	UNITS	MW09-SS05	BH10-SS04	RDL	QC Batch
Physical Properties					
Moisture	%	33	31	0.30	8327841
RDL = Reportable Detection Limit					

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OY7508	OY7509	OY7511		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616	N008616		
	UNITS	DUP A	MW09-SS01	BH10-SS01	RDL	QC Batch
Calculated Parameters						
Index of Additive Cancer Risk(IARC)	N/A	0.58	0.31	0.31	0.10	8318180
Polycyclic Aromatics						
Naphthalene	mg/kg	0.012	ND	ND	0.010	8326580
2-Methylnaphthalene	mg/kg	ND	ND	ND	0.020	8326580
Acenaphthylene	mg/kg	ND	ND	ND	0.0050	8326580
Acenaphthene	mg/kg	ND	ND	ND	0.0050	8326580
Fluorene	mg/kg	ND	ND	ND	0.020	8326580
Phenanthrene	mg/kg	0.027	ND	ND	0.010	8326580
Anthracene	mg/kg	0.0047	ND	ND	0.0040	8326580
Fluoranthene	mg/kg	0.044	ND	ND	0.020	8326580
Pyrene	mg/kg	0.040	ND	ND	0.020	8326580
Benzo(a)anthracene	mg/kg	0.023	ND	ND	0.020	8326580
Chrysene	mg/kg	0.030	ND	ND	0.020	8326580
Benzo(b&j)fluoranthene	mg/kg	0.039	ND	ND	0.020	8326580
Benzo(b)fluoranthene	mg/kg	0.024	ND	ND	0.020	8326580
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	0.020	8326580
Benzo(a)pyrene	mg/kg	0.024	ND	ND	0.020	8326580
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	0.050	8326580
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	0.050	8326580
Benzo(g,h,i)perylene	mg/kg	ND	ND	ND	0.050	8326580
Low Molecular Weight PAH's	mg/kg	ND	ND	ND	0.050	8318158
High Molecular Weight PAH's	mg/kg	0.20	ND	ND	0.050	8318158
Total PAH	mg/kg	0.24	ND	ND	0.050	8318158
Benzo[a]pyrene equivalency	mg/kg	0.059	0.041	0.041	0.010	8318158
Surrogate Recovery (%)						
D10-ANTHRACENE (sur.)	%	86	87	88		8326580
D8-ACENAPHTHYLENE (sur.)	%	82	83	83		8326580
D8-NAPHTHALENE (sur.)	%	80	80	79		8326580
TERPHENYL-D14 (sur.)	%	91	92	93		8326580
RDL = Reportable Detection Limit ND = Not detected						

Maxxam Job #: B653936
 Report Date: 2016/07/13

MMM GROUP
 Sampler Initials: LG

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		OY7508	OY7509	OY7511		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616	N008616		
	UNITS	DUP A	MW09-SS01	BH10-SS01	RDL	QC Batch
Total Metals by ICPMS						
Total Aluminum (Al)	mg/kg	7540	6380	22200	100	8324620
Total Antimony (Sb)	mg/kg	0.27	0.21	0.26	0.10	8324620
Total Arsenic (As)	mg/kg	4.75	4.16	4.62	0.50	8324620
Total Barium (Ba)	mg/kg	98.1	83.6	192	0.10	8324620
Total Beryllium (Be)	mg/kg	ND	ND	0.76	0.40	8324620
Total Bismuth (Bi)	mg/kg	ND	ND	0.18	0.10	8324620
Total Cadmium (Cd)	mg/kg	0.294	0.283	0.589	0.050	8324620
Total Calcium (Ca)	mg/kg	124000	117000	37900	100	8324620
Total Chromium (Cr)	mg/kg	15.2	13.6	47.0	1.0	8324620
Total Cobalt (Co)	mg/kg	3.86	3.46	12.9	0.30	8324620
Total Copper (Cu)	mg/kg	9.76	8.68	32.3	0.50	8324620
Total Iron (Fe)	mg/kg	9260	8130	26500	100	8324620
Total Lead (Pb)	mg/kg	7.74	5.39	11.7	0.10	8324620
Total Lithium (Li)	mg/kg	11.4	10.6	42.9	5.0	8324620
Total Magnesium (Mg)	mg/kg	45600	45100	24700	100	8324620
Total Manganese (Mn)	mg/kg	212	196	434	0.20	8324620
Total Mercury (Hg)	mg/kg	ND	ND	ND	0.050	8324620
Total Molybdenum (Mo)	mg/kg	0.41	0.36	0.61	0.10	8324620
Total Nickel (Ni)	mg/kg	12.4	11.2	38.5	0.80	8324620
Total Phosphorus (P)	mg/kg	350	335	532	10	8324620
Total Potassium (K)	mg/kg	1610	1370	4440	100	8324620
Total Selenium (Se)	mg/kg	ND	ND	ND	0.50	8324620
Total Silver (Ag)	mg/kg	0.077	0.058	0.109	0.050	8324620
Total Sodium (Na)	mg/kg	232	203	631	100	8324620
Total Strontium (Sr)	mg/kg	96.3	82.7	65.6	0.10	8324620
Total Thallium (Tl)	mg/kg	0.101	0.090	0.385	0.050	8324620
Total Tin (Sn)	mg/kg	0.47	0.35	0.82	0.10	8324620
Total Titanium (Ti)	mg/kg	293	275	889	1.0	8324620
Total Uranium (U)	mg/kg	0.921	0.780	1.55	0.050	8324620
Total Vanadium (V)	mg/kg	32.8	28.6	61.9	2.0	8324620
Total Zinc (Zn)	mg/kg	21.5	17.5	79.2	1.0	8324620
Total Zirconium (Zr)	mg/kg	6.03	5.71	17.3	0.50	8324620
RDL = Reportable Detection Limit						
ND = Not detected						

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OY7508	OY7509	OY7510	OY7511	OY7512		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616	N008616	N008616	N008616		
	UNITS	DUP A	MW09-SS01	MW09-SS05	BH10-SS01	BH10-SS04	RDL	QC Batch
Volatiles								
Chloromethane	mg/kg	ND	ND	ND	ND	ND	0.10	8325960
Vinyl chloride	mg/kg	ND	ND	ND	ND	ND	0.060	8325960
Bromomethane	mg/kg	ND	ND	ND	ND	ND	0.30	8325960
Chloroethane	mg/kg	ND	ND	ND	ND	ND	0.10	8325960
Trichlorofluoromethane	mg/kg	ND	ND	ND	ND	ND	0.20	8325960
1,1-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Dichloromethane	mg/kg	ND	ND	ND	ND	ND	0.10	8325960
trans-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,1-dichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
cis-1,2-dichloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Chloroform	mg/kg	ND	ND	ND	ND	ND	0.050	8325960
1,1,1-trichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,2-dichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Carbon tetrachloride	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Benzene	mg/kg	ND	ND	ND	ND	ND	0.0050	8325960
Methyl-tert-butylether (MTBE)	mg/kg	ND	ND	ND	ND	ND	0.10	8325960
1,2-dichloropropane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Trichloroethene	mg/kg	ND	ND	ND	ND	ND	0.0050	8325960
Bromodichloromethane	mg/kg	ND	ND	ND	ND	ND	0.050	8325960
cis-1,3-dichloropropene	mg/kg	ND	ND	ND	ND	ND	0.050	8325960
trans-1,3-dichloropropene	mg/kg	ND	ND	ND	ND	ND	0.050	8325960
1,1,2-trichloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Toluene	mg/kg	ND	ND	ND	ND	ND	0.020	8325960
Chlorodibromomethane	mg/kg	ND	ND	ND	ND	ND	0.050	8325960
1,2-dibromoethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Tetrachloroethene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Chlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,1,1,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Ethylbenzene	mg/kg	ND	ND	ND	ND	ND	0.010	8325960
m & p-Xylene	mg/kg	ND	ND	ND	ND	ND	0.040	8325960
Bromoform	mg/kg	ND	ND	ND	ND	ND	0.050	8325960
Styrene	mg/kg	ND	ND	ND	ND	ND	0.030	8325960
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

VOLATILE ORGANICS BY GC-MS (SOIL)

Maxxam ID		OY7508	OY7509	OY7510	OY7511	OY7512		
Sampling Date		2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00	2016/07/04 08:00		
COC Number		N008616	N008616	N008616	N008616	N008616		
	UNITS	DUP A	MW09-SS01	MW09-SS05	BH10-SS01	BH10-SS04	RDL	QC Batch
o-Xylene	mg/kg	ND	ND	ND	ND	ND	0.040	8325960
Xylenes (Total)	mg/kg	ND	ND	ND	ND	ND	0.040	8325960
1,1,2,2-tetrachloroethane	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,2-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,3-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,4-dichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
1,2,3-trichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
Hexachlorobutadiene	mg/kg	ND	ND	ND	ND	ND	0.20	8325960
1,2,4-trichlorobenzene	mg/kg	ND	ND	ND	ND	ND	0.025	8325960
F1 (C6-C10)	mg/kg	ND	ND	ND	ND	ND	10	8325960
Surrogate Recovery (%)								
1,4-Difluorobenzene (sur.)	%	107	106	106	107	107		8325960
4-Bromofluorobenzene (sur.)	%	118	114	116	120	119		8325960
D10-ETHYLBENZENE (sur.)	%	120	128	128	129	130		8325960
D4-1,2-Dichloroethane (sur.)	%	107	99	109	109	109		8325960
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

GENERAL COMMENTS

Results relate only to the items tested.

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8322953	SRB	Method Blank	Moisture	2016/07/08	ND, RDL=0.30		%	
8322953	SRB	RPD [OY7511-07]	Moisture	2016/07/08	3.3		%	20
8322953	SRB	RPD	Moisture	2016/07/08	1.1		%	20
8323822	KP9	Matrix Spike [OY7511-07]	Hex. Chromium (Cr 6+)	2016/07/08		95	%	75 - 125
8323822	KP9	Spiked Blank	Hex. Chromium (Cr 6+)	2016/07/08		103	%	80 - 120
8323822	KP9	Method Blank	Hex. Chromium (Cr 6+)	2016/07/08	ND, RDL=0.080		mg/kg	
8323822	KP9	RPD [OY7511-07]	Hex. Chromium (Cr 6+)	2016/07/08	NC		%	35
8323891	DJ	Matrix Spike [OY7508-05]	Soluble (Hot water) Boron (B)	2016/07/08		NC	%	75 - 125
8323891	DJ	Spiked Blank	Soluble (Hot water) Boron (B)	2016/07/08		105	%	75 - 125
8323891	DJ	Method Blank	Soluble (Hot water) Boron (B)	2016/07/08	ND, RDL=0.10		mg/kg	
8323891	DJ	RPD [OY7508-05]	Soluble (Hot water) Boron (B)	2016/07/08	1.2		%	35
8324620	JC8	Matrix Spike	Total Antimony (Sb)	2016/07/11		92	%	75 - 125
			Total Arsenic (As)	2016/07/11		96	%	75 - 125
			Total Barium (Ba)	2016/07/11		NC	%	75 - 125
			Total Beryllium (Be)	2016/07/11		99	%	75 - 125
			Total Cadmium (Cd)	2016/07/11		103	%	75 - 125
			Total Chromium (Cr)	2016/07/11		NC	%	75 - 125
			Total Cobalt (Co)	2016/07/11		96	%	75 - 125
			Total Copper (Cu)	2016/07/11		98	%	75 - 125
			Total Lead (Pb)	2016/07/11		96	%	75 - 125
			Total Lithium (Li)	2016/07/11		95	%	75 - 125
			Total Manganese (Mn)	2016/07/11		NC	%	75 - 125
			Total Mercury (Hg)	2016/07/11		99	%	75 - 125
			Total Molybdenum (Mo)	2016/07/11		95	%	75 - 125
			Total Nickel (Ni)	2016/07/11		NC	%	75 - 125
			Total Selenium (Se)	2016/07/11		103	%	75 - 125
			Total Silver (Ag)	2016/07/11		96	%	75 - 125
			Total Strontium (Sr)	2016/07/11		90	%	75 - 125
			Total Thallium (Tl)	2016/07/11		95	%	75 - 125
			Total Tin (Sn)	2016/07/11		89	%	75 - 125
			Total Titanium (Ti)	2016/07/11		NC	%	75 - 125
			Total Uranium (U)	2016/07/11		96	%	75 - 125
			Total Vanadium (V)	2016/07/11		NC	%	75 - 125
			Total Zinc (Zn)	2016/07/11		NC	%	75 - 125
8324620	JC8	QC Standard	Total Aluminum (Al)	2016/07/11		99	%	70 - 130
			Total Antimony (Sb)	2016/07/11		173 (1)	%	70 - 130
			Total Arsenic (As)	2016/07/11		93	%	70 - 130
			Total Barium (Ba)	2016/07/11		97	%	70 - 130
			Total Beryllium (Be)	2016/07/11		111	%	70 - 130
			Total Cadmium (Cd)	2016/07/11		129	%	70 - 130
			Total Calcium (Ca)	2016/07/11		98	%	70 - 130
			Total Chromium (Cr)	2016/07/11		105	%	70 - 130
			Total Cobalt (Co)	2016/07/11		98	%	70 - 130
			Total Copper (Cu)	2016/07/11		103	%	70 - 130
			Total Iron (Fe)	2016/07/11		97	%	70 - 130
			Total Lead (Pb)	2016/07/11		116	%	70 - 130
			Total Lithium (Li)	2016/07/11		94	%	70 - 130
			Total Magnesium (Mg)	2016/07/11		97	%	70 - 130
			Total Manganese (Mn)	2016/07/11		101	%	70 - 130
			Total Mercury (Hg)	2016/07/11		100	%	70 - 130
			Total Molybdenum (Mo)	2016/07/11		127	%	70 - 130

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2016/07/11		107	%	70 - 130
			Total Phosphorus (P)	2016/07/11		95	%	70 - 130
			Total Potassium (K)	2016/07/11		91	%	70 - 130
			Total Silver (Ag)	2016/07/11		85	%	70 - 130
			Total Sodium (Na)	2016/07/11		90	%	70 - 130
			Total Strontium (Sr)	2016/07/11		99	%	70 - 130
			Total Thallium (Tl)	2016/07/11		85	%	70 - 130
			Total Tin (Sn)	2016/07/11		91	%	70 - 130
			Total Uranium (U)	2016/07/11		99	%	70 - 130
			Total Vanadium (V)	2016/07/11		100	%	70 - 130
			Total Zinc (Zn)	2016/07/11		109	%	70 - 130
8324620	JC8	Spiked Blank	Total Antimony (Sb)	2016/07/11		90	%	75 - 125
			Total Arsenic (As)	2016/07/11		95	%	75 - 125
			Total Barium (Ba)	2016/07/11		92	%	75 - 125
			Total Beryllium (Be)	2016/07/11		92	%	75 - 125
			Total Cadmium (Cd)	2016/07/11		99	%	75 - 125
			Total Chromium (Cr)	2016/07/11		93	%	75 - 125
			Total Cobalt (Co)	2016/07/11		95	%	75 - 125
			Total Copper (Cu)	2016/07/11		96	%	75 - 125
			Total Lead (Pb)	2016/07/11		94	%	75 - 125
			Total Lithium (Li)	2016/07/11		93	%	75 - 125
			Total Manganese (Mn)	2016/07/11		93	%	75 - 125
			Total Mercury (Hg)	2016/07/11		97	%	75 - 125
			Total Molybdenum (Mo)	2016/07/11		87	%	75 - 125
			Total Nickel (Ni)	2016/07/11		94	%	75 - 125
			Total Selenium (Se)	2016/07/11		105	%	75 - 125
			Total Silver (Ag)	2016/07/11		96	%	75 - 125
			Total Strontium (Sr)	2016/07/11		91	%	75 - 125
			Total Thallium (Tl)	2016/07/11		95	%	75 - 125
			Total Tin (Sn)	2016/07/11		79	%	75 - 125
			Total Titanium (Ti)	2016/07/11		90	%	75 - 125
			Total Uranium (U)	2016/07/11		91	%	75 - 125
			Total Vanadium (V)	2016/07/11		95	%	75 - 125
			Total Zinc (Zn)	2016/07/11		105	%	75 - 125
8324620	JC8	Method Blank	Total Aluminum (Al)	2016/07/11	ND, RDL=100		mg/kg	
			Total Antimony (Sb)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Arsenic (As)	2016/07/11	ND, RDL=0.50		mg/kg	
			Total Barium (Ba)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Beryllium (Be)	2016/07/11	ND, RDL=0.40		mg/kg	
			Total Bismuth (Bi)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Cadmium (Cd)	2016/07/11	ND, RDL=0.050		mg/kg	
			Total Calcium (Ca)	2016/07/11	ND, RDL=100		mg/kg	
			Total Chromium (Cr)	2016/07/11	ND, RDL=1.0		mg/kg	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cobalt (Co)	2016/07/11	ND, RDL=0.30		mg/kg	
			Total Copper (Cu)	2016/07/11	ND, RDL=0.50		mg/kg	
			Total Iron (Fe)	2016/07/11	ND, RDL=100		mg/kg	
			Total Lead (Pb)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Lithium (Li)	2016/07/11	ND, RDL=5.0		mg/kg	
			Total Magnesium (Mg)	2016/07/11	ND, RDL=100		mg/kg	
			Total Manganese (Mn)	2016/07/11	0.39, RDL=0.20		mg/kg	
			Total Mercury (Hg)	2016/07/11	ND, RDL=0.050		mg/kg	
			Total Molybdenum (Mo)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Nickel (Ni)	2016/07/11	ND, RDL=0.80		mg/kg	
			Total Phosphorus (P)	2016/07/11	ND, RDL=10		mg/kg	
			Total Potassium (K)	2016/07/11	ND, RDL=100		mg/kg	
			Total Selenium (Se)	2016/07/11	ND, RDL=0.50		mg/kg	
			Total Silver (Ag)	2016/07/11	ND, RDL=0.050		mg/kg	
			Total Sodium (Na)	2016/07/11	ND, RDL=100		mg/kg	
			Total Strontium (Sr)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Thallium (Tl)	2016/07/11	ND, RDL=0.050		mg/kg	
			Total Tin (Sn)	2016/07/11	ND, RDL=0.10		mg/kg	
			Total Titanium (Ti)	2016/07/11	ND, RDL=1.0		mg/kg	
			Total Uranium (U)	2016/07/11	ND, RDL=0.050		mg/kg	
			Total Vanadium (V)	2016/07/11	ND, RDL=2.0		mg/kg	
			Total Zinc (Zn)	2016/07/11	ND, RDL=1.0		mg/kg	
			Total Zirconium (Zr)	2016/07/11	ND, RDL=0.50		mg/kg	
8324620	JC8	RPD	Total Aluminum (Al)	2016/07/11	9.5		%	35
			Total Antimony (Sb)	2016/07/11	NC		%	30
			Total Arsenic (As)	2016/07/11	NC		%	30
			Total Barium (Ba)	2016/07/11	5.4		%	35
			Total Beryllium (Be)	2016/07/11	NC		%	30

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Bismuth (Bi)	2016/07/11	NC		%	30
			Total Cadmium (Cd)	2016/07/11	NC		%	30
			Total Calcium (Ca)	2016/07/11	14		%	30
			Total Chromium (Cr)	2016/07/11	23		%	30
			Total Cobalt (Co)	2016/07/11	5.5		%	30
			Total Copper (Cu)	2016/07/11	6.6		%	30
			Total Iron (Fe)	2016/07/11	9.5		%	30
			Total Lead (Pb)	2016/07/11	5.4		%	35
			Total Lithium (Li)	2016/07/11	NC		%	30
			Total Magnesium (Mg)	2016/07/11	3.9		%	30
			Total Manganese (Mn)	2016/07/11	8.9		%	30
			Total Mercury (Hg)	2016/07/11	NC		%	35
			Total Molybdenum (Mo)	2016/07/11	NC		%	35
			Total Nickel (Ni)	2016/07/11	6.9		%	30
			Total Phosphorus (P)	2016/07/11	2.5		%	30
			Total Potassium (K)	2016/07/11	NC		%	35
			Total Selenium (Se)	2016/07/11	NC		%	30
			Total Silver (Ag)	2016/07/11	NC		%	35
			Total Sodium (Na)	2016/07/11	NC		%	35
			Total Strontium (Sr)	2016/07/11	15		%	35
			Total Thallium (Tl)	2016/07/11	NC		%	30
			Total Tin (Sn)	2016/07/11	NC		%	35
			Total Titanium (Ti)	2016/07/11	24		%	35
			Total Uranium (U)	2016/07/11	NC		%	30
			Total Vanadium (V)	2016/07/11	16		%	30
			Total Zinc (Zn)	2016/07/11	6.4		%	30
			Total Zirconium (Zr)	2016/07/11	21		%	30
8324622	BCO	Spiked Blank	Soluble (2:1) pH	2016/07/11		101	%	97 - 103
8324622	BCO	RPD	Soluble (2:1) pH	2016/07/11	0.74		%	N/A
8325588	IT1	Matrix Spike	O-TERPHENYL (sur.)	2016/07/12		80	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/07/12		113	%	50 - 130
			F3 (C16-C34 Hydrocarbons)	2016/07/12		114	%	50 - 130
			F4 (C34-C50 Hydrocarbons)	2016/07/12		103	%	70 - 130
8325588	IT1	Spiked Blank	O-TERPHENYL (sur.)	2016/07/11		73	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/07/11		100	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2016/07/11		105	%	70 - 130
			F4 (C34-C50 Hydrocarbons)	2016/07/11		93	%	70 - 130
8325588	IT1	Method Blank	O-TERPHENYL (sur.)	2016/07/11		105	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/07/11	ND, RDL=10		mg/kg	
			F3 (C16-C34 Hydrocarbons)	2016/07/11	ND, RDL=10		mg/kg	
			F4 (C34-C50 Hydrocarbons)	2016/07/11	ND, RDL=10		mg/kg	
			Reached Baseline at C50	2016/07/11	YES		mg/kg	
8325588	IT1	RPD	F2 (C10-C16 Hydrocarbons)	2016/07/12	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2016/07/12	8.9		%	40
			F4 (C34-C50 Hydrocarbons)	2016/07/12	16		%	40
			Reached Baseline at C50	2016/07/12	NC		%	50
8325960	KPA	Matrix Spike [OY7512-02]	1,4-Difluorobenzene (sur.)	2016/07/11		96	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/07/11		101	%	70 - 130
			D10-ETHYLBENZENE (sur.)	2016/07/11		105	%	50 - 130
			D4-1,2-Dichloroethane (sur.)	2016/07/11		115	%	70 - 130
			Chloromethane	2016/07/11		79	%	50 - 150

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Vinyl chloride	2016/07/11		98	%	50 - 150
			Bromomethane	2016/07/11		107	%	50 - 150
			Chloroethane	2016/07/11		102	%	50 - 150
			Trichlorofluoromethane	2016/07/11		100	%	50 - 150
			1,1-dichloroethene	2016/07/11		99	%	60 - 140
			Dichloromethane	2016/07/11		120	%	60 - 140
			trans-1,2-dichloroethene	2016/07/11		103	%	60 - 140
			1,1-dichloroethane	2016/07/11		104	%	60 - 140
			cis-1,2-dichloroethene	2016/07/11		111	%	60 - 140
			Chloroform	2016/07/11		111	%	60 - 140
			1,1,1-trichloroethane	2016/07/11		109	%	60 - 140
			1,2-dichloroethane	2016/07/11		99	%	60 - 140
			Carbon tetrachloride	2016/07/11		108	%	60 - 140
			Benzene	2016/07/11		109	%	60 - 140
			1,2-dichloropropane	2016/07/11		108	%	60 - 140
			Trichloroethene	2016/07/11		102	%	60 - 140
			Bromodichloromethane	2016/07/11		107	%	60 - 140
			cis-1,3-dichloropropene	2016/07/11		108	%	60 - 140
			trans-1,3-dichloropropene	2016/07/11		103	%	60 - 140
			1,1,2-trichloroethane	2016/07/11		113	%	60 - 140
			Toluene	2016/07/11		106	%	60 - 140
			Chlorodibromomethane	2016/07/11		114	%	60 - 140
			1,2-dibromoethane	2016/07/11		115	%	60 - 140
			Tetrachloroethene	2016/07/11		107	%	60 - 140
			Chlorobenzene	2016/07/11		107	%	60 - 140
			1,1,1,2-tetrachloroethane	2016/07/11		105	%	60 - 140
			Ethylbenzene	2016/07/11		109	%	60 - 140
			m & p-Xylene	2016/07/11		109	%	60 - 140
			Bromoform	2016/07/11		109	%	60 - 140
			Styrene	2016/07/11		113	%	60 - 140
			o-Xylene	2016/07/11		108	%	60 - 140
			1,1,2,2-tetrachloroethane	2016/07/11		112	%	60 - 140
			1,2-dichlorobenzene	2016/07/11		108	%	60 - 140
			1,3-dichlorobenzene	2016/07/11		106	%	60 - 140
			1,4-dichlorobenzene	2016/07/11		104	%	60 - 140
			1,2,3-trichlorobenzene	2016/07/11		111	%	60 - 140
			Hexachlorobutadiene	2016/07/11		110	%	50 - 150
			1,2,4-trichlorobenzene	2016/07/11		112	%	60 - 140
8325960	KPA	Spiked Blank	1,4-Difluorobenzene (sur.)	2016/07/11		96	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/07/11		100	%	70 - 130
			D10-ETHYLBENZENE (sur.)	2016/07/11		94	%	50 - 130
			D4-1,2-Dichloroethane (sur.)	2016/07/11		128	%	70 - 130
			Chloromethane	2016/07/11		87	%	50 - 150
			Vinyl chloride	2016/07/11		106	%	50 - 150
			Bromomethane	2016/07/11		99	%	50 - 150
			Chloroethane	2016/07/11		89	%	50 - 150
			Trichlorofluoromethane	2016/07/11		105	%	50 - 150
			1,1-dichloroethene	2016/07/11		99	%	60 - 140
			Dichloromethane	2016/07/11		113	%	60 - 140
			trans-1,2-dichloroethene	2016/07/11		97	%	60 - 140
			1,1-dichloroethane	2016/07/11		98	%	60 - 140
			cis-1,2-dichloroethene	2016/07/11		104	%	60 - 140
			Chloroform	2016/07/11		102	%	60 - 140
			1,1,1-trichloroethane	2016/07/11		104	%	60 - 140

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QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			1,2-dichloroethane	2016/07/11		100	%	60 - 140
			Carbon tetrachloride	2016/07/11		98	%	60 - 140
			Benzene	2016/07/11		101	%	60 - 140
			1,2-dichloropropane	2016/07/11		93	%	60 - 140
			Trichloroethene	2016/07/11		93	%	60 - 140
			Bromodichloromethane	2016/07/11		97	%	60 - 140
			cis-1,3-dichloropropene	2016/07/11		110	%	60 - 140
			trans-1,3-dichloropropene	2016/07/11		109	%	60 - 140
			1,1,2-trichloroethane	2016/07/11		101	%	60 - 140
			Toluene	2016/07/11		98	%	60 - 140
			Chlorodibromomethane	2016/07/11		100	%	60 - 140
			1,2-dibromoethane	2016/07/11		102	%	60 - 140
			Tetrachloroethene	2016/07/11		98	%	60 - 140
			Chlorobenzene	2016/07/11		95	%	60 - 140
			1,1,1,2-tetrachloroethane	2016/07/11		94	%	60 - 140
			Ethylbenzene	2016/07/11		99	%	60 - 140
			m & p-Xylene	2016/07/11		97	%	60 - 140
			Bromoform	2016/07/11		93	%	60 - 140
			Styrene	2016/07/11		102	%	60 - 140
			o-Xylene	2016/07/11		98	%	60 - 140
			1,1,2,2-tetrachloroethane	2016/07/11		92	%	60 - 140
			1,2-dichlorobenzene	2016/07/11		92	%	60 - 140
			1,3-dichlorobenzene	2016/07/11		92	%	60 - 140
			1,4-dichlorobenzene	2016/07/11		89	%	60 - 140
			1,2,3-trichlorobenzene	2016/07/11		87	%	60 - 140
			Hexachlorobutadiene	2016/07/11		93	%	50 - 150
			1,2,4-trichlorobenzene	2016/07/11		92	%	60 - 140
			F1 (C6-C10)	2016/07/11		89	%	60 - 140
8325960	KPA	Method Blank	1,4-Difluorobenzene (sur.)	2016/07/11		106	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/07/11		114	%	70 - 130
			D10-ETHYLBENZENE (sur.)	2016/07/11		120	%	50 - 130
			D4-1,2-Dichloroethane (sur.)	2016/07/11		96	%	70 - 130
			Chloromethane	2016/07/11	ND, RDL=0.10			mg/kg
			Vinyl chloride	2016/07/11	ND, RDL=0.060			mg/kg
			Bromomethane	2016/07/11	ND, RDL=0.30			mg/kg
			Chloroethane	2016/07/11	ND, RDL=0.10			mg/kg
			Trichlorofluoromethane	2016/07/11	ND, RDL=0.20			mg/kg
			1,1-dichloroethene	2016/07/11	ND, RDL=0.025			mg/kg
			Dichloromethane	2016/07/11	ND, RDL=0.10			mg/kg
			trans-1,2-dichloroethene	2016/07/11	ND, RDL=0.025			mg/kg
			1,1-dichloroethane	2016/07/11	ND, RDL=0.025			mg/kg
			cis-1,2-dichloroethene	2016/07/11	ND, RDL=0.025			mg/kg

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chloroform	2016/07/11	ND, RDL=0.050		mg/kg	
			1,1,1-trichloroethane	2016/07/11	ND, RDL=0.025		mg/kg	
			1,2-dichloroethane	2016/07/11	ND, RDL=0.025		mg/kg	
			Carbon tetrachloride	2016/07/11	ND, RDL=0.025		mg/kg	
			Benzene	2016/07/11	ND, RDL=0.0050		mg/kg	
			Methyl-tert-butylether (MTBE)	2016/07/11	ND, RDL=0.10		mg/kg	
			1,2-dichloropropane	2016/07/11	ND, RDL=0.025		mg/kg	
			Trichloroethene	2016/07/11	ND, RDL=0.0050		mg/kg	
			Bromodichloromethane	2016/07/11	ND, RDL=0.050		mg/kg	
			cis-1,3-dichloropropene	2016/07/11	ND, RDL=0.050		mg/kg	
			trans-1,3-dichloropropene	2016/07/11	ND, RDL=0.050		mg/kg	
			1,1,2-trichloroethane	2016/07/11	ND, RDL=0.025		mg/kg	
			Toluene	2016/07/11	ND, RDL=0.020		mg/kg	
			Chlorodibromomethane	2016/07/11	ND, RDL=0.050		mg/kg	
			1,2-dibromoethane	2016/07/11	ND, RDL=0.025		mg/kg	
			Tetrachloroethene	2016/07/11	ND, RDL=0.025		mg/kg	
			Chlorobenzene	2016/07/11	ND, RDL=0.025		mg/kg	
			1,1,1,2-tetrachloroethane	2016/07/11	ND, RDL=0.025		mg/kg	
			Ethylbenzene	2016/07/11	ND, RDL=0.010		mg/kg	
			m & p-Xylene	2016/07/11	ND, RDL=0.040		mg/kg	
			Bromoform	2016/07/11	ND, RDL=0.050		mg/kg	
			Styrene	2016/07/11	ND, RDL=0.030		mg/kg	
			o-Xylene	2016/07/11	ND, RDL=0.040		mg/kg	
			Xylenes (Total)	2016/07/11	ND, RDL=0.040		mg/kg	
			1,1,2,2-tetrachloroethane	2016/07/11	ND, RDL=0.025		mg/kg	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-dichlorobenzene	2016/07/11	ND, RDL=0.025		mg/kg	
			1,3-dichlorobenzene	2016/07/11	ND, RDL=0.025		mg/kg	
			1,4-dichlorobenzene	2016/07/11	ND, RDL=0.025		mg/kg	
			1,2,3-trichlorobenzene	2016/07/11	ND, RDL=0.025		mg/kg	
			Hexachlorobutadiene	2016/07/11	ND, RDL=0.20		mg/kg	
			1,2,4-trichlorobenzene	2016/07/11	ND, RDL=0.025		mg/kg	
			F1 (C6-C10)	2016/07/11	ND, RDL=10		mg/kg	
8325960	KPA	RPD [OY7512-02]	Chloromethane	2016/07/12	NC		%	40
			Vinyl chloride	2016/07/12	NC		%	40
			Bromomethane	2016/07/12	NC		%	40
			Chloroethane	2016/07/12	NC		%	40
			Trichlorofluoromethane	2016/07/12	NC		%	40
			1,1-dichloroethene	2016/07/12	NC		%	40
			Dichloromethane	2016/07/12	NC		%	40
			trans-1,2-dichloroethene	2016/07/12	NC		%	40
			1,1-dichloroethane	2016/07/12	NC		%	40
			cis-1,2-dichloroethene	2016/07/12	NC		%	40
			Chloroform	2016/07/12	NC		%	40
			1,1,1-trichloroethane	2016/07/12	NC		%	40
			1,2-dichloroethane	2016/07/12	NC		%	40
			Carbon tetrachloride	2016/07/12	NC		%	40
			Benzene	2016/07/12	NC		%	40
			Methyl-tert-butylether (MTBE)	2016/07/12	NC		%	40
			1,2-dichloropropane	2016/07/12	NC		%	40
			Trichloroethene	2016/07/12	NC		%	40
			Bromodichloromethane	2016/07/12	NC		%	40
			cis-1,3-dichloropropene	2016/07/12	NC		%	40
			trans-1,3-dichloropropene	2016/07/12	NC		%	40
			1,1,2-trichloroethane	2016/07/12	NC		%	40
			Toluene	2016/07/12	NC		%	40
			Chlorodibromomethane	2016/07/12	NC		%	40
			1,2-dibromoethane	2016/07/12	NC		%	40
			Tetrachloroethene	2016/07/12	NC		%	40
			Chlorobenzene	2016/07/12	NC		%	40
			1,1,1,2-tetrachloroethane	2016/07/12	NC		%	40
			Ethylbenzene	2016/07/12	NC		%	40
			m & p-Xylene	2016/07/12	NC		%	40
			Bromoform	2016/07/12	NC		%	40
			Styrene	2016/07/12	NC		%	40
			o-Xylene	2016/07/12	NC		%	40
			Xylenes (Total)	2016/07/12	NC		%	40
			1,1,2,2-tetrachloroethane	2016/07/12	NC		%	40
			1,2-dichlorobenzene	2016/07/12	NC		%	40
			1,3-dichlorobenzene	2016/07/12	NC		%	40
			1,4-dichlorobenzene	2016/07/12	NC		%	40
			1,2,3-trichlorobenzene	2016/07/12	NC		%	40
			Hexachlorobutadiene	2016/07/12	NC		%	40

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			1,2,4-trichlorobenzene	2016/07/12	NC		%	40
			F1 (C6-C10)	2016/07/12	NC		%	40
8326399	JGD	QC Standard	Saturation %	2016/07/12		104	%	75 - 125
8326399	JGD	Method Blank	Saturation %	2016/07/12	ND, RDL=1.0		%	
8326399	JGD	RPD	Saturation %	2016/07/12	0.045		%	30
8326408	JGD	QC Standard	Soluble pH	2016/07/12		103	%	97 - 103
8326408	JGD	Spiked Blank	Soluble pH	2016/07/12		99	%	97 - 103
8326415	WAY	Spiked Blank	Soluble Conductivity	2016/07/12		92	%	80 - 120
8326415	WAY	Method Blank	Soluble Conductivity	2016/07/12	ND, RDL=1.0		uS/cm	
8326415	WAY	RPD	Soluble Conductivity	2016/07/12	0.35		%	35
8326580	LS2	Matrix Spike	D10-ANTHRACENE (sur.)	2016/07/12		81	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/07/12		82	%	50 - 130
			D8-NAPHTHALENE (sur.)	2016/07/12		83	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/07/12		86	%	60 - 130
			Naphthalene	2016/07/12		74	%	50 - 130
			2-Methylnaphthalene	2016/07/12		77	%	50 - 130
			Acenaphthylene	2016/07/12		75	%	50 - 130
			Acenaphthene	2016/07/12		81	%	50 - 130
			Fluorene	2016/07/12		75	%	50 - 130
			Phenanthrene	2016/07/12		74	%	60 - 130
			Anthracene	2016/07/12		73	%	60 - 130
			Fluoranthene	2016/07/12		74	%	60 - 130
			Pyrene	2016/07/12		74	%	60 - 130
			Benzo(a)anthracene	2016/07/12		71	%	60 - 130
			Chrysene	2016/07/12		74	%	60 - 130
			Benzo(b&j)fluoranthene	2016/07/12		75	%	60 - 130
			Benzo(b)fluoranthene	2016/07/12		71	%	60 - 130
			Benzo(k)fluoranthene	2016/07/12		73	%	60 - 130
			Benzo(a)pyrene	2016/07/12		73	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2016/07/12		79	%	60 - 130
			Dibenz(a,h)anthracene	2016/07/12		78	%	60 - 130
			Benzo(g,h,i)perylene	2016/07/12		77	%	60 - 130
8326580	LS2	Spiked Blank	D10-ANTHRACENE (sur.)	2016/07/12		85	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/07/12		81	%	50 - 130
			D8-NAPHTHALENE (sur.)	2016/07/12		79	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/07/12		85	%	60 - 130
			Naphthalene	2016/07/12		76	%	50 - 130
			2-Methylnaphthalene	2016/07/12		79	%	50 - 130
			Acenaphthylene	2016/07/12		79	%	50 - 130
			Acenaphthene	2016/07/12		84	%	50 - 130
			Fluorene	2016/07/12		79	%	50 - 130
			Phenanthrene	2016/07/12		77	%	60 - 130
			Anthracene	2016/07/12		84	%	60 - 130
			Fluoranthene	2016/07/12		82	%	60 - 130
			Pyrene	2016/07/12		81	%	60 - 130
			Benzo(a)anthracene	2016/07/12		72	%	60 - 130
			Chrysene	2016/07/12		75	%	60 - 130
			Benzo(b&j)fluoranthene	2016/07/12		79	%	60 - 130
			Benzo(b)fluoranthene	2016/07/12		76	%	60 - 130
			Benzo(k)fluoranthene	2016/07/12		74	%	60 - 130
			Benzo(a)pyrene	2016/07/12		75	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2016/07/12		77	%	60 - 130

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits	
8326580	LS2	Method Blank	Dibenz(a,h)anthracene	2016/07/12		77	%	60 - 130	
			Benzo(g,h,i)perylene	2016/07/12		74	%	60 - 130	
			D10-ANTHRACENE (sur.)	2016/07/12		89	%	60 - 130	
			D8-ACENAPHTHYLENE (sur.)	2016/07/12		84	%	50 - 130	
			D8-NAPHTHALENE (sur.)	2016/07/12		82	%	50 - 130	
			TERPHENYL-D14 (sur.)	2016/07/12		93	%	60 - 130	
			Naphthalene	2016/07/12	ND, RDL=0.010		mg/kg		
			2-Methylnaphthalene	2016/07/12	ND, RDL=0.020		mg/kg		
			Acenaphthylene	2016/07/12	ND, RDL=0.0050		mg/kg		
			Acenaphthene	2016/07/12	ND, RDL=0.0050		mg/kg		
			Fluorene	2016/07/12	ND, RDL=0.020		mg/kg		
			Phenanthrene	2016/07/12	ND, RDL=0.010		mg/kg		
			Anthracene	2016/07/12	ND, RDL=0.0040		mg/kg		
			Fluoranthene	2016/07/12	ND, RDL=0.020		mg/kg		
			Pyrene	2016/07/12	ND, RDL=0.020		mg/kg		
			Benzo(a)anthracene	2016/07/12	ND, RDL=0.020		mg/kg		
			Chrysene	2016/07/12	ND, RDL=0.020		mg/kg		
			Benzo(b&j)fluoranthene	2016/07/12	ND, RDL=0.020		mg/kg		
			Benzo(b)fluoranthene	2016/07/12	ND, RDL=0.020		mg/kg		
			Benzo(k)fluoranthene	2016/07/12	ND, RDL=0.020		mg/kg		
			Benzo(a)pyrene	2016/07/12	ND, RDL=0.020		mg/kg		
Indeno(1,2,3-cd)pyrene	2016/07/12	ND, RDL=0.050		mg/kg					
Dibenz(a,h)anthracene	2016/07/12	ND, RDL=0.050		mg/kg					
Benzo(g,h,i)perylene	2016/07/12	ND, RDL=0.050		mg/kg					
8326580	LS2	RPD	Naphthalene	2016/07/12	NC		%	50	
			2-Methylnaphthalene	2016/07/12	NC		%	50	
			Acenaphthylene	2016/07/12	NC		%	50	
			Acenaphthene	2016/07/12	NC		%	50	
			Fluorene	2016/07/12	NC		%	50	
			Phenanthrene	2016/07/12	NC		%	50	
			Anthracene	2016/07/12	NC		%	50	
			Fluoranthene	2016/07/12	NC		%	50	
			Pyrene	2016/07/12	NC		%	50	
Benzo(a)anthracene	2016/07/12	NC		%	50				

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Chrysene	2016/07/12	NC		%	50
			Benzo(b&j)fluoranthene	2016/07/12	NC		%	50
			Benzo(b)fluoranthene	2016/07/12	NC		%	20
			Benzo(k)fluoranthene	2016/07/12	NC		%	50
			Benzo(a)pyrene	2016/07/12	NC		%	50
			Indeno(1,2,3-cd)pyrene	2016/07/12	NC		%	50
			Dibenz(a,h)anthracene	2016/07/12	NC		%	50
			Benzo(g,h,i)perylene	2016/07/12	NC		%	50

N/A = Not Applicable

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 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).

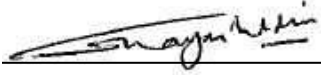
(1) Reference Material exceeds acceptance criteria for Sb. 10% of analytes failure in multielement scan is allowed.

Maxxam Job #: B653936
Report Date: 2016/07/13

MMM GROUP
Sampler Initials: LG

VALIDATION SIGNATURE PAGE

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



Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics



Rob Reinert, B.Sc., Scientific Specialist



Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

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INVOICE INFORMATION		REPORT INFORMATION (if different from invoice)		PROJECT INFORMATION		MAXXAM JOB NUMBER	
Company Name: #9190 MMM Group		Company Name:		Quotation #:		8653936	
Contact Name: Accounts Payable		Contact Name: Laura Gallagher		P.O. #:		CHAIN OF CUSTODY #	
Address: 111-93 Lombard Ave. WPG MB R3B 3B1		Address:		Project #:		N 008616	
Phone: 204-272-2656 Fax:		Phone: 204-895-7719 Fax:		Project Name: winnipeg Transit			
Email: agallagher@mmm.ca		Email: GallagherL@mmm.ca		Location:			
				Sampled By: L Gallagher			

REGULATORY REQUIREMENTS SERVICE REQUESTED:				ANALYSIS REQUESTED (Please be specific)										TURNAROUND TIME (TAT) REQUIRED				
<input type="checkbox"/> CCME <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> Other:				<input type="checkbox"/> Total <input type="checkbox"/> Fecal <input type="checkbox"/> E. coli <input type="checkbox"/> MF <input type="checkbox"/> MPN <input type="checkbox"/> QT Dissolved Metals: <input type="checkbox"/> Field Filtered? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N <input type="checkbox"/> Field Acidified? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N <input type="checkbox"/> Field Acidified? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> N Total Metal: <input type="checkbox"/> BTEX / F1 <input type="checkbox"/> F2 - F4 <input type="checkbox"/> PCB Biochemical Oxygen Demand: <input type="checkbox"/> Field P. BTEX F1, F2-F4 Field P. PAH in Soil: GCMS VOC's field pres. Arsenic metals Hexav. Chromium Boron hot water sol. pH sol. Conductivity										PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS. Regular (Standard) TAT: <input checked="" type="checkbox"/> 5 to 7 Working Days Rush TAT: <input type="checkbox"/> 1 day <input type="checkbox"/> 2 days <input type="checkbox"/> 3 days DATE Required: _____ <small>TATs for certain tests are > 5 days. Please contact your Project Manager for details</small>				
SPECIAL INSTRUCTIONS:				Drinking Water? (Y/N)														
SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM.																		
Lab Use	Sample Identification	Date Sampled	Time Sampled	Matrix (GW, SW, Soil etc.)	Drinking Water? (Y/N)										# of Cont.	COMMENTS		
1	077508 DupA	Jul 4	AM	Soil	Y											8		
2	09 MW09-SS01																8	
3	10 MW09-SS05																4	
4	11 BH10-SS01																8	
5	12 BH10-SS04																4	
6																		
7																		
8																		
9																		
10																		
11																		
12																		

RELINQUISHED BY (Signature/Print)		RECEIVED BY (Signature/Print)		Date		Time		RECEIVED ON ICE		Laboratory Use Only	
Laura Gallagher		Laura Coupland		2016/07/04		12:35		Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		Temperature (°C) on Receipt 22.8, 22.9, 22.9 ice present.	

*MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
CoC-1028 - WINFCD-00161/1 Maxxam International Corporation o/a Maxxam White: Maxxam Yellow: Client Copy

Your C.O.C. #: C#498320-01-01

Attention: DARREN KEAM

MMM GROUP
SUITE 111
93 LOMBARD AVE
WINNIPEG, MB
CANADA R3B 3B1

Report Date: 2016/07/27

Report #: R2224098

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B659773

Received: 2016/07/20, 16:45

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
BTEX/F1 in Water by HS GC/MS	5	N/A	2016/07/22	WINSOP-00054 WINSOP-00055	EPA8260C/CCME PHCCWS
Conductivity in Water by PC Titrator	5	N/A	2016/07/25	WIN SOP-00063	Based on SM-2510B
CCME Hydrocarbons (F2-F4 in water)	5	2016/07/22	2016/07/22	WINSOP-00056	CCME PHC-CWS
Hardness Total (calculated as CaCO3) (1)	5	N/A	2016/07/27	BBY WI-00033	Auto Calc
Mercury (Total) by CVAf (1)	5	2016/07/26	2016/07/26	BBY7SOP-00015	BCMOE BCLM Oct2013 m
Na, K, Ca, Mg, S by CRC ICPMS (total) (1)	5	2016/07/21	2016/07/27	BBY7SOP-00002	EPA 6020A R1 m
Elements by CRC ICPMS (total) (1)	5	2016/07/25	2016/07/26	BBY7SOP-00003,	BCLM2005,EPA6020bR2m
PAH in Water by GC/MS (SIM) (1)	1	2016/07/26	2016/07/26	BBY8SOP-00021	EPA 8270d R4 m
PAH in Water by GC/MS (SIM) (1)	4	2016/07/26	2016/07/27	BBY8SOP-00021	EPA 8270d R4 m
Total LMW, HMW, Total PAH Calc (1)	5	N/A	2016/07/27	BBY WI-00033	Auto Calc
pH in Water by PC Titrator (2)	5	N/A	2016/07/25	WIN SOP-00063	SM4500 H+B
VOCs, VH, F1, LH in Water by HS GC/MS (1)	5	2016/07/26	2016/07/26	BBY8SOP-00009	EPA 8260c R3 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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

(1) This test was performed by Maxxam Vancouver

(2) The APHA Standard Method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the APHA Standard Method holding time.

Encryption Key

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

Amanda Hung, B.Sc., Project Manager

Email: AHung@maxxam.ca

Phone# (204)772-7276 Ext:2215

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.

Maxxam Job #: B659773
Report Date: 2016/07/27

MMM GROUP

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO3)	mg/L	2450	2420	2740	2050	2210	0.50	8336330
Misc. Inorganics								
Conductivity	uS/cm	4010	3960	4810	3800	4020	1.0	8338283
pH	pH	7.70	7.87	7.71	7.66	7.78		8338192
Polycyclic Aromatics								
Low Molecular Weight PAH's	ug/L	ND	ND	ND	ND	ND	0.24	8336340
High Molecular Weight PAH's	ug/L	ND	ND	ND	ND	ND	0.050	8336340
Total PAH	ug/L	ND	ND	ND	ND	ND	0.24	8336340
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B659773
Report Date: 2016/07/27

MMM GROUP

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch
Ext. Pet. Hydrocarbon								
F2 (C10-C16 Hydrocarbons)	mg/L	ND	ND	ND	ND	ND	0.15	8338090
F3 (C16-C34 Hydrocarbons)	mg/L	ND	ND	ND	ND	ND	0.15	8338090
F4 (C34-C50 Hydrocarbons)	mg/L	ND	ND	ND	ND	ND	0.15	8338090
Surrogate Recovery (%)								
O-TERPHENYL (sur.)	%	86	91	98	97	98		8338090
RDL = Reportable Detection Limit								
ND = Not detected								

Maxxam Job #: B659773
Report Date: 2016/07/27

MMM GROUP

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch

Polycyclic Aromatics								
Naphthalene	ug/L	ND	ND	ND	ND	ND	0.10	8341130
2-Methylnaphthalene	ug/L	ND	ND	ND	ND	ND	0.10	8341130
Quinoline	ug/L	ND	ND	ND	ND	ND	0.24	8341130
Acenaphthylene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Acenaphthene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Fluorene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Phenanthrene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Anthracene	ug/L	ND	ND	ND	ND	ND	0.010	8341130
Acridine	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Fluoranthene	ug/L	ND	ND	ND	ND	ND	0.020	8341130
Pyrene	ug/L	ND	ND	ND	ND	ND	0.020	8341130
Benzo(a)anthracene	ug/L	ND	ND	ND	ND	ND	0.010	8341130
Chrysene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Benzo(b&j)fluoranthene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Benzo(k)fluoranthene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Benzo(a)pyrene	ug/L	ND	ND	ND	ND	ND	0.0090	8341130
Indeno(1,2,3-cd)pyrene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Dibenz(a,h)anthracene	ug/L	ND	ND	ND	ND	ND	0.050	8341130
Benzo(g,h,i)perylene	ug/L	ND	ND	ND	ND	ND	0.050	8341130

Surrogate Recovery (%)								
D10-ANTHRACENE (sur.)	%	98	95	101	98	99		8341130
D8-ACENAPHTHYLENE (sur.)	%	107	106	111	107	110		8341130
D8-NAPHTHALENE (sur.)	%	122	121	129	122	126		8341130
D9-Acridine	%	93	93	97	95	96		8341130
TERPHENYL-D14 (sur.)	%	52 (1)	54 (1)	48 (2)	62	51 (1)		8341130

RDL = Reportable Detection Limit
 ND = Not detected
 (1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.
 (2) Surrogate recovery exceeds acceptance criteria due to matrix interference.

Maxxam Job #: B659773
Report Date: 2016/07/27

MMM GROUP

MERCURY BY COLD VAPOR (WATER)

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch
Elements								
Total Mercury (Hg)	ug/L	ND	ND	ND	ND	ND	0.010	8340887
RDL = Reportable Detection Limit ND = Not detected								

Maxxam Job #: B659773
Report Date: 2016/07/27

MMM GROUP

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch
Total Metals by ICPMS								
Total Aluminum (Al)	ug/L	13.5	23.7	29.6	42.3	785	3.0	8340002
Total Antimony (Sb)	ug/L	ND	ND	ND	ND	ND	0.50	8340002
Total Arsenic (As)	ug/L	0.51	0.56	0.67	0.43	1.33	0.10	8340002
Total Barium (Ba)	ug/L	21.8	18.7	24.4	18.2	51.6	1.0	8340002
Total Beryllium (Be)	ug/L	ND	ND	ND	ND	ND	0.10	8340002
Total Bismuth (Bi)	ug/L	ND	ND	ND	ND	ND	1.0	8340002
Total Boron (B)	ug/L	132	161	143	159	262	50	8340002
Total Cadmium (Cd)	ug/L	0.097	0.320	0.103	0.077	0.256	0.010	8340002
Total Chromium (Cr)	ug/L	ND	ND	ND	ND	1.8	1.0	8340002
Total Cobalt (Co)	ug/L	1.22	3.72	3.01	1.24	1.06	0.50	8340002
Total Copper (Cu)	ug/L	7.28	5.55	7.45	4.72	9.87	0.50	8340002
Total Iron (Fe)	ug/L	32	44	64	68	1290	10	8340002
Total Lead (Pb)	ug/L	ND	0.36	0.35	0.20	5.63	0.20	8340002
Total Lithium (Li)	ug/L	571	587	634	513	587	5.0	8340002
Total Manganese (Mn)	ug/L	1070	2300	2630	1290	751	1.0	8340002
Total Molybdenum (Mo)	ug/L	2.6	2.9	3.4	3.2	2.0	1.0	8340002
Total Nickel (Ni)	ug/L	16.7	18.8	20.9	14.3	15.5	1.0	8340002
Total Selenium (Se)	ug/L	1.10	0.64	0.95	0.54	0.90	0.10	8340002
Total Silicon (Si)	ug/L	10900	10700	11600	10900	12800	100	8340002
Total Silver (Ag)	ug/L	0.033	0.082	0.102	0.022	0.022	0.020	8340002
Total Strontium (Sr)	ug/L	3190	3100	3590	2630	3370	1.0	8340002
Total Thallium (Tl)	ug/L	ND	ND	ND	ND	ND	0.050	8340002
Total Tin (Sn)	ug/L	ND	ND	ND	ND	ND	5.0	8340002
Total Titanium (Ti)	ug/L	ND	ND	ND	ND	30.3	5.0	8340002
Total Uranium (U)	ug/L	103	132	129	104	116	0.10	8340002
Total Vanadium (V)	ug/L	ND	ND	ND	ND	ND	5.0	8340002
Total Zinc (Zn)	ug/L	9.1	9.3	12.3	14.8	17.5	5.0	8340002
Total Zirconium (Zr)	ug/L	0.73	0.88	0.78	0.59	1.36	0.50	8340002
Total Calcium (Ca)	mg/L	459	514	508	430	464	0.050	8336331
Total Magnesium (Mg)	mg/L	317	277	358	238	255	0.050	8336331
Total Potassium (K)	mg/L	10.3	10.7	10.7	9.28	11.9	0.050	8336331
Total Sodium (Na)	mg/L	243	161	275	166	200	0.050	8336331
Total Sulphur (S)	mg/L	792	691	839	566	703	3.0	8336331
RDL = Reportable Detection Limit								
ND = Not detected								

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MMM GROUP

VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch

Volatiles								
Benzene	ug/L	ND	ND	ND	ND	ND	0.40	8337511
Chloromethane	ug/L	ND	ND	ND	ND	ND	1.0	8341547
Toluene	ug/L	ND	ND	ND	ND	ND	0.40	8337511
Vinyl chloride	ug/L	ND	ND (1)	ND	ND	ND	0.50	8341547
Ethylbenzene	ug/L	ND	ND	ND	ND	ND	0.40	8337511
Chloroethane	ug/L	ND	ND (1)	ND	ND	ND	1.0	8341547
o-Xylene	ug/L	ND	ND	ND	ND	ND	0.40	8337511
m & p-Xylene	ug/L	ND	ND	ND	ND	ND	0.80	8337511
Trichlorofluoromethane	ug/L	ND	ND	ND	ND	ND	4.0	8341547
Xylenes (Total)	ug/L	ND	ND	ND	ND	ND	0.80	8337511
1,1,2Trichloro-1,2,2Trifluoroethane	ug/L	ND	ND	ND	ND	ND	2.0	8341547
Methyl-tert-butylether (MTBE)	ug/L	ND	ND	ND	ND	ND	4.0	8337511
Dichlorodifluoromethane	ug/L	ND	ND (1)	ND	ND	ND	2.0	8341547
F1 (C6-C10) - BTEX	ug/L	ND	ND	ND	ND	ND	300	8337511
1,1-dichloroethene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Dichloromethane	ug/L	ND	ND	ND	ND	ND	2.0	8341547
F1 (C6-C10)	ug/L	ND	ND	ND	ND	ND	300	8337511
trans-1,2-dichloroethene	ug/L	ND	ND	ND	ND	ND	1.0	8341547
1,1-dichloroethane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
cis-1,2-dichloroethene	ug/L	ND	ND	ND	ND	ND	1.0	8341547
Chloroform	ug/L	ND	ND	ND	ND	ND	1.0	8341547
1,1,1-trichloroethane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,2-dichloroethane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Carbon tetrachloride	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,2-dichloropropane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
cis-1,3-dichloropropene	ug/L	ND	ND	ND	ND	ND	1.0	8341547
trans-1,3-dichloropropene	ug/L	ND	ND	ND	ND	ND	1.0	8341547
Bromomethane	ug/L	ND	ND	ND	ND	ND	1.0	8341547
1,1,2-trichloroethane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Trichloroethene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Chlorodibromomethane	ug/L	ND	ND	ND	ND	ND	1.0	8341547
1,2-dibromoethane	ug/L	ND	ND	ND	ND	ND	0.20	8341547

RDL = Reportable Detection Limit

ND = Not detected

(1) Matrix spike recovery exceeds acceptance criteria (high recovery). As results are non-detect, there is no impact on data quality.

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VOLATILE ORGANICS BY GC-MS (WATER)

Maxxam ID		PB6700	PB6701	PB6702	PB6704	PB6705		
Sampling Date		2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00	2016/07/20 12:00		
COC Number		C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01	C#498320-01-01		
	UNITS	DUP01	MW02	MW05	MW08	MW09	RDL	QC Batch
Tetrachloroethene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Bromodichloromethane	ug/L	ND	ND	ND	ND	ND	1.0	8341547
Bromoform	ug/L	ND	ND	ND	ND	ND	1.0	8341547
Styrene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,1,1,2-tetrachloroethane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,1,2,2-tetrachloroethane	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,2-dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,3-dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,4-dichlorobenzene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Chlorobenzene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
1,2,3-trichlorobenzene	ug/L	ND	ND	ND	ND	ND	2.0	8341547
1,2,4-trichlorobenzene	ug/L	ND	ND	ND	ND	ND	2.0	8341547
Hexachlorobutadiene	ug/L	ND	ND	ND	ND	ND	0.50	8341547
Surrogate Recovery (%)								
4-Bromofluorobenzene (sur.)	%	99	99	99	97	100		8337511
D4-1,2-Dichloroethane (sur.)	%	96	95	97	95	99		8337511
D8-TOLUENE (sur.)	%	99	98	97	98	98		8337511
1,4-Difluorobenzene (sur.)	%	105	104	105	105	105		8341547
4-Bromofluorobenzene (sur.)	%	106	103	100	106	108		8341547
D4-1,2-Dichloroethane (sur.)	%	109	121	111	107	108		8341547
RDL = Reportable Detection Limit								
ND = Not detected								

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GENERAL COMMENTS

Results relate only to the items tested.

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MMM GROUP

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits			
8337511	JWI	Matrix Spike	4-Bromofluorobenzene (sur.)	2016/07/22		99	%	60 - 140			
			D4-1,2-Dichloroethane (sur.)	2016/07/22		92	%	60 - 140			
			D8-TOLUENE (sur.)	2016/07/22		100	%	60 - 140			
			Benzene	2016/07/22		97	%	70 - 130			
			Toluene	2016/07/22		97	%	70 - 130			
			Ethylbenzene	2016/07/22		101	%	70 - 130			
			o-Xylene	2016/07/22		103	%	70 - 130			
			m & p-Xylene	2016/07/22		102	%	70 - 130			
			Methyl-tert-butylether (MTBE)	2016/07/22		95	%	70 - 130			
			F1 (C6-C10)	2016/07/22		103	%	70 - 130			
8337511	JWI	Spiked Blank	4-Bromofluorobenzene (sur.)	2016/07/22		99	%	60 - 140			
			D4-1,2-Dichloroethane (sur.)	2016/07/22		98	%	60 - 140			
			D8-TOLUENE (sur.)	2016/07/22		97	%	60 - 140			
			Benzene	2016/07/22		97	%	70 - 130			
			Toluene	2016/07/22		95	%	70 - 130			
			Ethylbenzene	2016/07/22		97	%	70 - 130			
			o-Xylene	2016/07/22		102	%	70 - 130			
			m & p-Xylene	2016/07/22		99	%	70 - 130			
			Methyl-tert-butylether (MTBE)	2016/07/22		98	%	70 - 130			
			F1 (C6-C10)	2016/07/22		97	%	70 - 130			
8337511	JWI	Method Blank	4-Bromofluorobenzene (sur.)	2016/07/22		99	%	60 - 140			
			D4-1,2-Dichloroethane (sur.)	2016/07/22		94	%	60 - 140			
			D8-TOLUENE (sur.)	2016/07/22		98	%	60 - 140			
			Benzene	2016/07/22	ND, RDL=0.40		ug/L				
			Toluene	2016/07/22	ND, RDL=0.40		ug/L				
			Ethylbenzene	2016/07/22	ND, RDL=0.40		ug/L				
			o-Xylene	2016/07/22	ND, RDL=0.40		ug/L				
			m & p-Xylene	2016/07/22	ND, RDL=0.80		ug/L				
			Xylenes (Total)	2016/07/22	ND, RDL=0.80		ug/L				
			Methyl-tert-butylether (MTBE)	2016/07/22	ND, RDL=4.0		ug/L				
			F1 (C6-C10) - BTEX	2016/07/22	ND, RDL=300		ug/L				
			F1 (C6-C10)	2016/07/22	ND, RDL=300		ug/L				
			8337511	JWI	RPD	Benzene	2016/07/22	NC		%	40
						Toluene	2016/07/22	NC		%	40
Ethylbenzene	2016/07/22	NC					%	40			
o-Xylene	2016/07/22	NC					%	40			
m & p-Xylene	2016/07/22	NC					%	40			
Xylenes (Total)	2016/07/22	NC					%	40			
Methyl-tert-butylether (MTBE)	2016/07/22	NC					%	40			
F1 (C6-C10) - BTEX	2016/07/22	NC					%	40			
F1 (C6-C10)	2016/07/22	NC					%	40			
8338090	JCH	Matrix Spike	O-TERPHENYL (sur.)	2016/07/22		84	%	50 - 130			
			F2 (C10-C16 Hydrocarbons)	2016/07/22		87	%	50 - 130			
			F3 (C16-C34 Hydrocarbons)	2016/07/22		112	%	50 - 130			

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8338090	JCH	Spiked Blank	F4 (C34-C50 Hydrocarbons)	2016/07/22		86	%	50 - 130
			O-TERPHENYL (sur.)	2016/07/22		91	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/07/22		94	%	70 - 130
			F3 (C16-C34 Hydrocarbons)	2016/07/22		111	%	70 - 130
8338090	JCH	Method Blank	F4 (C34-C50 Hydrocarbons)	2016/07/22		90	%	70 - 130
			O-TERPHENYL (sur.)	2016/07/22		97	%	50 - 130
			F2 (C10-C16 Hydrocarbons)	2016/07/22	ND, RDL=0.15		mg/L	
			F3 (C16-C34 Hydrocarbons)	2016/07/22	ND, RDL=0.15		mg/L	
8338090	JCH	RPD	F4 (C34-C50 Hydrocarbons)	2016/07/22	ND, RDL=0.15		mg/L	
			F2 (C10-C16 Hydrocarbons)	2016/07/22	NC		%	40
			F3 (C16-C34 Hydrocarbons)	2016/07/22	NC		%	40
8338283	KMP	Spiked Blank	F4 (C34-C50 Hydrocarbons)	2016/07/22	NC		%	40
8338283	KMP	RPD	Conductivity	2016/07/25	0	101	%	90 - 110
8338283	KMP	Method Blank	Conductivity	2016/07/25	NC		%	20
			Conductivity	2016/07/25	ND, RDL=1.0		uS/cm	
8338283	KMP	RPD [PB6700-01]	Conductivity	2016/07/25	0		%	20
8340002	GS2	Matrix Spike [PB6704-06]	Total Aluminum (Al)	2016/07/26		106	%	80 - 120
			Total Antimony (Sb)	2016/07/26		99	%	80 - 120
			Total Arsenic (As)	2016/07/26		106	%	80 - 120
			Total Barium (Ba)	2016/07/26		NC	%	80 - 120
			Total Beryllium (Be)	2016/07/26		95	%	80 - 120
			Total Bismuth (Bi)	2016/07/26		96	%	80 - 120
			Total Boron (B)	2016/07/26		NC	%	80 - 120
			Total Cadmium (Cd)	2016/07/26		96	%	80 - 120
			Total Chromium (Cr)	2016/07/26		98	%	80 - 120
			Total Cobalt (Co)	2016/07/26		95	%	80 - 120
			Total Copper (Cu)	2016/07/26		91	%	80 - 120
			Total Iron (Fe)	2016/07/26		NC	%	80 - 120
			Total Lead (Pb)	2016/07/26		97	%	80 - 120
			Total Lithium (Li)	2016/07/26		NC	%	80 - 120
			Total Manganese (Mn)	2016/07/26		NC	%	80 - 120
			Total Molybdenum (Mo)	2016/07/26		NC	%	80 - 120
			Total Nickel (Ni)	2016/07/26		NC	%	80 - 120
			Total Selenium (Se)	2016/07/26		102	%	80 - 120
			Total Silver (Ag)	2016/07/26		100	%	80 - 120
			Total Strontium (Sr)	2016/07/26		NC	%	80 - 120
			Total Thallium (Tl)	2016/07/26		97	%	80 - 120
			Total Tin (Sn)	2016/07/26		NC	%	80 - 120
			Total Titanium (Ti)	2016/07/26		104	%	80 - 120
Total Uranium (U)	2016/07/26		NC	%	80 - 120			
Total Vanadium (V)	2016/07/26		107	%	80 - 120			
Total Zinc (Zn)	2016/07/26		NC	%	80 - 120			
8340002	GS2	Spiked Blank	Total Aluminum (Al)	2016/07/26		107	%	80 - 120
			Total Antimony (Sb)	2016/07/26		98	%	80 - 120
			Total Arsenic (As)	2016/07/26		103	%	80 - 120
			Total Barium (Ba)	2016/07/26		96	%	80 - 120
			Total Beryllium (Be)	2016/07/26		103	%	80 - 120
			Total Bismuth (Bi)	2016/07/26		94	%	80 - 120
			Total Boron (B)	2016/07/26		109	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Cadmium (Cd)	2016/07/26		101	%	80 - 120
			Total Chromium (Cr)	2016/07/26		96	%	80 - 120
			Total Cobalt (Co)	2016/07/26		99	%	80 - 120
			Total Copper (Cu)	2016/07/26		100	%	80 - 120
			Total Iron (Fe)	2016/07/26		100	%	80 - 120
			Total Lead (Pb)	2016/07/26		90	%	80 - 120
			Total Lithium (Li)	2016/07/26		90	%	80 - 120
			Total Manganese (Mn)	2016/07/26		96	%	80 - 120
			Total Molybdenum (Mo)	2016/07/26		87	%	80 - 120
			Total Nickel (Ni)	2016/07/26		97	%	80 - 120
			Total Selenium (Se)	2016/07/26		106	%	80 - 120
			Total Silver (Ag)	2016/07/26		104	%	80 - 120
			Total Strontium (Sr)	2016/07/26		94	%	80 - 120
			Total Thallium (Tl)	2016/07/26		97	%	80 - 120
			Total Tin (Sn)	2016/07/26		91	%	80 - 120
			Total Titanium (Ti)	2016/07/26		109	%	80 - 120
			Total Uranium (U)	2016/07/26		89	%	80 - 120
			Total Vanadium (V)	2016/07/26		102	%	80 - 120
			Total Zinc (Zn)	2016/07/26		121 (1)	%	80 - 120
8340002	GS2	Method Blank	Total Aluminum (Al)	2016/07/26	3.5, RDL=3.0		ug/L	
			Total Antimony (Sb)	2016/07/26	ND, RDL=0.50		ug/L	
			Total Arsenic (As)	2016/07/26	ND, RDL=0.10		ug/L	
			Total Barium (Ba)	2016/07/26	ND, RDL=1.0		ug/L	
			Total Beryllium (Be)	2016/07/26	ND, RDL=0.10		ug/L	
			Total Bismuth (Bi)	2016/07/26	ND, RDL=1.0		ug/L	
			Total Boron (B)	2016/07/26	ND, RDL=50		ug/L	
			Total Cadmium (Cd)	2016/07/26	ND, RDL=0.010		ug/L	
			Total Chromium (Cr)	2016/07/26	ND, RDL=1.0		ug/L	
			Total Cobalt (Co)	2016/07/26	ND, RDL=0.50		ug/L	
			Total Copper (Cu)	2016/07/26	0.86, RDL=0.50		ug/L	
			Total Iron (Fe)	2016/07/26	ND, RDL=10		ug/L	
			Total Lead (Pb)	2016/07/26	ND, RDL=0.20		ug/L	
			Total Lithium (Li)	2016/07/26	ND, RDL=5.0		ug/L	
			Total Manganese (Mn)	2016/07/26	ND, RDL=1.0		ug/L	
			Total Molybdenum (Mo)	2016/07/26	ND, RDL=1.0		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Nickel (Ni)	2016/07/26	ND, RDL=1.0		ug/L	
			Total Selenium (Se)	2016/07/26	ND, RDL=0.10		ug/L	
			Total Silicon (Si)	2016/07/26	ND, RDL=100		ug/L	
			Total Silver (Ag)	2016/07/26	ND, RDL=0.020		ug/L	
			Total Strontium (Sr)	2016/07/26	ND, RDL=1.0		ug/L	
			Total Thallium (Tl)	2016/07/26	ND, RDL=0.050		ug/L	
			Total Tin (Sn)	2016/07/26	ND, RDL=5.0		ug/L	
			Total Titanium (Ti)	2016/07/26	ND, RDL=5.0		ug/L	
			Total Uranium (U)	2016/07/26	ND, RDL=0.10		ug/L	
			Total Vanadium (V)	2016/07/26	ND, RDL=5.0		ug/L	
			Total Zinc (Zn)	2016/07/26	ND, RDL=5.0		ug/L	
			Total Zirconium (Zr)	2016/07/26	ND, RDL=0.50		ug/L	
8340002	GS2	RPD [PB6704-06]	Total Aluminum (Al)	2016/07/26	9.0		%	20
			Total Antimony (Sb)	2016/07/26	NC		%	20
			Total Arsenic (As)	2016/07/26	NC		%	20
			Total Barium (Ba)	2016/07/26	4.1		%	20
			Total Beryllium (Be)	2016/07/26	NC		%	20
			Total Bismuth (Bi)	2016/07/26	NC		%	20
			Total Boron (B)	2016/07/26	NC		%	20
			Total Cadmium (Cd)	2016/07/26	3.2		%	20
			Total Chromium (Cr)	2016/07/26	NC		%	20
			Total Cobalt (Co)	2016/07/26	NC		%	20
			Total Copper (Cu)	2016/07/26	7.6		%	20
			Total Iron (Fe)	2016/07/26	4.1		%	20
			Total Lead (Pb)	2016/07/26	NC		%	20
			Total Lithium (Li)	2016/07/26	1.8		%	20
			Total Manganese (Mn)	2016/07/26	1.3		%	20
			Total Molybdenum (Mo)	2016/07/26	NC		%	20
			Total Nickel (Ni)	2016/07/26	3.3		%	20
			Total Selenium (Se)	2016/07/26	5.8		%	20
			Total Silicon (Si)	2016/07/26	0.62		%	20
			Total Silver (Ag)	2016/07/26	NC		%	20
			Total Strontium (Sr)	2016/07/26	1.6		%	20
			Total Thallium (Tl)	2016/07/26	NC		%	20
			Total Tin (Sn)	2016/07/26	NC		%	20
			Total Titanium (Ti)	2016/07/26	NC		%	20
			Total Uranium (U)	2016/07/26	0.81		%	20
			Total Vanadium (V)	2016/07/26	NC		%	20
			Total Zinc (Zn)	2016/07/26	NC		%	20
			Total Zirconium (Zr)	2016/07/26	NC		%	20
8340887	EL2	Matrix Spike	Total Mercury (Hg)	2016/07/26		110	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8340887	EL2	Spiked Blank	Total Mercury (Hg)	2016/07/26		99	%	80 - 120
8340887	EL2	Method Blank	Total Mercury (Hg)	2016/07/26	ND, RDL=0.010		ug/L	
8340887	EL2	RPD	Total Mercury (Hg)	2016/07/26	NC		%	20
8341130	LS2	Matrix Spike	D10-ANTHRACENE (sur.)	2016/07/26		113	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/07/26		111	%	50 - 130
			D8-NAPHTHALENE (sur.)	2016/07/26		102	%	50 - 130
			D9-Acridine	2016/07/26		102	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/07/26		88	%	60 - 130
			Naphthalene	2016/07/26		NC	%	50 - 130
			2-Methylnaphthalene	2016/07/26		NC	%	50 - 130
			Quinoline	2016/07/26		NC	%	50 - 130
			Acenaphthylene	2016/07/26		106	%	50 - 130
			Acenaphthene	2016/07/26		NC	%	50 - 130
			Fluorene	2016/07/26		NC	%	50 - 130
			Phenanthrene	2016/07/26		NC	%	60 - 130
			Anthracene	2016/07/26		116	%	60 - 130
			Acridine	2016/07/26		105	%	50 - 130
			Fluoranthene	2016/07/26		112	%	60 - 130
			Pyrene	2016/07/26		110	%	60 - 130
			Benzo(a)anthracene	2016/07/26		117	%	60 - 130
			Chrysene	2016/07/26		118	%	60 - 130
			Benzo(b&j)fluoranthene	2016/07/26		105	%	60 - 130
			Benzo(k)fluoranthene	2016/07/26		108	%	60 - 130
			Benzo(a)pyrene	2016/07/26		99	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2016/07/26		88	%	60 - 130
			Dibenz(a,h)anthracene	2016/07/26		82	%	60 - 130
			Benzo(g,h,i)perylene	2016/07/26		83	%	60 - 130
8341130	LS2	Spiked Blank	D10-ANTHRACENE (sur.)	2016/07/26		110	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/07/26		108	%	50 - 130
			D8-NAPHTHALENE (sur.)	2016/07/26		113	%	50 - 130
			D9-Acridine	2016/07/26		99	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/07/26		111	%	60 - 130
			Naphthalene	2016/07/26		107	%	50 - 130
			2-Methylnaphthalene	2016/07/26		108	%	50 - 130
			Quinoline	2016/07/26		109	%	50 - 130
			Acenaphthylene	2016/07/26		102	%	50 - 130
			Acenaphthene	2016/07/26		107	%	50 - 130
			Fluorene	2016/07/26		105	%	50 - 130
			Phenanthrene	2016/07/26		102	%	60 - 130
			Anthracene	2016/07/26		107	%	60 - 130
			Acridine	2016/07/26		95	%	50 - 130
			Fluoranthene	2016/07/26		106	%	60 - 130
			Pyrene	2016/07/26		107	%	60 - 130
			Benzo(a)anthracene	2016/07/26		109	%	60 - 130
			Chrysene	2016/07/26		114	%	60 - 130
			Benzo(b&j)fluoranthene	2016/07/26		110	%	60 - 130
			Benzo(k)fluoranthene	2016/07/26		111	%	60 - 130
			Benzo(a)pyrene	2016/07/26		108	%	60 - 130
			Indeno(1,2,3-cd)pyrene	2016/07/26		108	%	60 - 130
			Dibenz(a,h)anthracene	2016/07/26		106	%	60 - 130
			Benzo(g,h,i)perylene	2016/07/26		105	%	60 - 130
8341130	LS2	Method Blank	D10-ANTHRACENE (sur.)	2016/07/26		121	%	60 - 130
			D8-ACENAPHTHYLENE (sur.)	2016/07/26		116	%	50 - 130

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D8-NAPHTHALENE (sur.)	2016/07/26		130	%	50 - 130
			D9-Acridine	2016/07/26		103	%	50 - 130
			TERPHENYL-D14 (sur.)	2016/07/26		121	%	60 - 130
			Naphthalene	2016/07/26	ND, RDL=0.10		ug/L	
			2-Methylnaphthalene	2016/07/26	ND, RDL=0.10		ug/L	
			Quinoline	2016/07/26	ND, RDL=0.24		ug/L	
			Acenaphthylene	2016/07/26	ND, RDL=0.050		ug/L	
			Acenaphthene	2016/07/26	ND, RDL=0.050		ug/L	
			Fluorene	2016/07/26	ND, RDL=0.050		ug/L	
			Phenanthrene	2016/07/26	ND, RDL=0.050		ug/L	
			Anthracene	2016/07/26	ND, RDL=0.010		ug/L	
			Acridine	2016/07/26	ND, RDL=0.050		ug/L	
			Fluoranthene	2016/07/26	ND, RDL=0.020		ug/L	
			Pyrene	2016/07/26	ND, RDL=0.020		ug/L	
			Benzo(a)anthracene	2016/07/26	ND, RDL=0.010		ug/L	
			Chrysene	2016/07/26	ND, RDL=0.050		ug/L	
			Benzo(b&j)fluoranthene	2016/07/26	ND, RDL=0.050		ug/L	
			Benzo(k)fluoranthene	2016/07/26	ND, RDL=0.050		ug/L	
			Benzo(a)pyrene	2016/07/26	ND, RDL=0.0090		ug/L	
			Indeno(1,2,3-cd)pyrene	2016/07/26	ND, RDL=0.050		ug/L	
			Dibenz(a,h)anthracene	2016/07/26	ND, RDL=0.050		ug/L	
			Benzo(g,h,i)perylene	2016/07/26	ND, RDL=0.050		ug/L	
8341130	LS2	RPD	Naphthalene	2016/07/26	NC		%	40
			2-Methylnaphthalene	2016/07/26	NC		%	40
			Quinoline	2016/07/26	NC		%	40
			Acenaphthylene	2016/07/26	NC		%	40
			Acenaphthene	2016/07/26	NC		%	40
			Fluorene	2016/07/26	NC		%	40
			Phenanthrene	2016/07/26	NC		%	40
			Anthracene	2016/07/26	NC		%	40
			Acridine	2016/07/26	NC		%	40
			Fluoranthene	2016/07/26	NC		%	40
			Pyrene	2016/07/26	NC		%	40

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(a)anthracene	2016/07/26	NC		%	40
			Chrysene	2016/07/26	NC		%	40
			Benzo(b&j)fluoranthene	2016/07/26	NC		%	40
			Benzo(k)fluoranthene	2016/07/26	NC		%	40
			Benzo(a)pyrene	2016/07/26	NC		%	40
			Indeno(1,2,3-cd)pyrene	2016/07/26	NC		%	40
			Dibenz(a,h)anthracene	2016/07/26	NC		%	40
			Benzo(g,h,i)perylene	2016/07/26	NC		%	40
8341547	KL	Matrix Spike [PB6701-05]	1,4-Difluorobenzene (sur.)	2016/07/26		90	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/07/26		110	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2016/07/26		123	%	70 - 130
			Chloromethane	2016/07/26		131	%	60 - 140
			Vinyl chloride	2016/07/26		152 (2)	%	60 - 140
			Chloroethane	2016/07/26		150 (2)	%	60 - 140
			Trichlorofluoromethane	2016/07/26		144 (2)	%	60 - 140
			Dichlorodifluoromethane	2016/07/26		163 (2)	%	60 - 140
			1,1-dichloroethene	2016/07/26		123	%	70 - 130
			Dichloromethane	2016/07/26		133 (2)	%	70 - 130
			trans-1,2-dichloroethene	2016/07/26		125	%	70 - 130
			1,1-dichloroethane	2016/07/26		121	%	70 - 130
			cis-1,2-dichloroethene	2016/07/26		124	%	70 - 130
			Chloroform	2016/07/26		124	%	70 - 130
			1,1,1-trichloroethane	2016/07/26		125	%	70 - 130
			1,2-dichloroethane	2016/07/26		125	%	70 - 130
			Carbon tetrachloride	2016/07/26		127	%	70 - 130
			1,2-dichloropropane	2016/07/26		119	%	70 - 130
			cis-1,3-dichloropropene	2016/07/26		115	%	70 - 130
			trans-1,3-dichloropropene	2016/07/26		114	%	70 - 130
			Bromomethane	2016/07/26		136	%	60 - 140
			1,1,2-trichloroethane	2016/07/26		120	%	70 - 130
			Trichloroethene	2016/07/26		118	%	70 - 130
			Chlorodibromomethane	2016/07/26		121	%	70 - 130
			1,2-dibromoethane	2016/07/26		121	%	70 - 130
			Tetrachloroethene	2016/07/26		123	%	70 - 130
			Bromodichloromethane	2016/07/26		119	%	70 - 130
			Bromoform	2016/07/26		118	%	70 - 130
			Styrene	2016/07/26		127	%	70 - 130
			1,1,1,2-tetrachloroethane	2016/07/26		122	%	70 - 130
			1,1,2,2-tetrachloroethane	2016/07/26		125	%	70 - 130
			1,2-dichlorobenzene	2016/07/26		128	%	70 - 130
			1,3-dichlorobenzene	2016/07/26		129	%	70 - 130
			1,4-dichlorobenzene	2016/07/26		127	%	70 - 130
			Chlorobenzene	2016/07/26		121	%	70 - 130
			1,2,3-trichlorobenzene	2016/07/26		122	%	70 - 130
			1,2,4-trichlorobenzene	2016/07/26		118	%	70 - 130
			Hexachlorobutadiene	2016/07/26		124	%	70 - 130
8341547	KL	Spiked Blank	1,4-Difluorobenzene (sur.)	2016/07/26		90	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/07/26		110	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2016/07/26		122	%	70 - 130
			Chloromethane	2016/07/26		126	%	60 - 140
			Vinyl chloride	2016/07/26		147 (2)	%	60 - 140
			Chloroethane	2016/07/26		114	%	60 - 140
			Trichlorofluoromethane	2016/07/26		140	%	60 - 140
			Dichlorodifluoromethane	2016/07/26		164 (3)	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC			Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
Batch	Init	QC Type						
			1,1-dichloroethene	2016/07/26		121	%	70 - 130
			Dichloromethane	2016/07/26		131 (2)	%	70 - 130
			trans-1,2-dichloroethene	2016/07/26		122	%	70 - 130
			1,1-dichloroethane	2016/07/26		118	%	70 - 130
			cis-1,2-dichloroethene	2016/07/26		123	%	70 - 130
			Chloroform	2016/07/26		122	%	70 - 130
			1,1,1-trichloroethane	2016/07/26		124	%	70 - 130
			1,2-dichloroethane	2016/07/26		121	%	70 - 130
			Carbon tetrachloride	2016/07/26		123	%	70 - 130
			1,2-dichloropropane	2016/07/26		118	%	70 - 130
			cis-1,3-dichloropropene	2016/07/26		114	%	70 - 130
			trans-1,3-dichloropropene	2016/07/26		112	%	70 - 130
			Bromomethane	2016/07/26		130	%	60 - 140
			1,1,2-trichloroethane	2016/07/26		120	%	70 - 130
			Trichloroethene	2016/07/26		116	%	70 - 130
			Chlorodibromomethane	2016/07/26		119	%	70 - 130
			1,2-dibromoethane	2016/07/26		119	%	70 - 130
			Tetrachloroethene	2016/07/26		121	%	70 - 130
			Bromodichloromethane	2016/07/26		116	%	70 - 130
			Bromoform	2016/07/26		112	%	70 - 130
			Styrene	2016/07/26		124	%	70 - 130
			1,1,1,2-tetrachloroethane	2016/07/26		120	%	70 - 130
			1,1,2,2-tetrachloroethane	2016/07/26		115	%	70 - 130
			1,2-dichlorobenzene	2016/07/26		121	%	70 - 130
			1,3-dichlorobenzene	2016/07/26		124	%	70 - 130
			1,4-dichlorobenzene	2016/07/26		119	%	70 - 130
			Chlorobenzene	2016/07/26		120	%	70 - 130
			1,2,3-trichlorobenzene	2016/07/26		103	%	70 - 130
			1,2,4-trichlorobenzene	2016/07/26		104	%	70 - 130
			Hexachlorobutadiene	2016/07/26		114	%	70 - 130
8341547	KL	Method Blank	1,4-Difluorobenzene (sur.)	2016/07/26		105	%	70 - 130
			4-Bromofluorobenzene (sur.)	2016/07/26		110	%	70 - 130
			D4-1,2-Dichloroethane (sur.)	2016/07/26		111	%	70 - 130
			Chloromethane	2016/07/26	ND, RDL=1.0			ug/L
			Vinyl chloride	2016/07/26	ND, RDL=0.50			ug/L
			Chloroethane	2016/07/26	ND, RDL=1.0			ug/L
			Trichlorofluoromethane	2016/07/26	ND, RDL=4.0			ug/L
			1,1,2Trichloro-1,2,2Trifluoroethane	2016/07/26	ND, RDL=2.0			ug/L
			Dichlorodifluoromethane	2016/07/26	ND, RDL=2.0			ug/L
			1,1-dichloroethene	2016/07/26	ND, RDL=0.50			ug/L
			Dichloromethane	2016/07/26	ND, RDL=2.0			ug/L
			trans-1,2-dichloroethene	2016/07/26	ND, RDL=1.0			ug/L
			1,1-dichloroethane	2016/07/26	ND, RDL=0.50			ug/L

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,2-dichloroethene	2016/07/26	ND, RDL=1.0		ug/L	
			Chloroform	2016/07/26	ND, RDL=1.0		ug/L	
			1,1,1-trichloroethane	2016/07/26	ND, RDL=0.50		ug/L	
			1,2-dichloroethane	2016/07/26	ND, RDL=0.50		ug/L	
			Carbon tetrachloride	2016/07/26	ND, RDL=0.50		ug/L	
			1,2-dichloropropane	2016/07/26	ND, RDL=0.50		ug/L	
			cis-1,3-dichloropropene	2016/07/26	ND, RDL=1.0		ug/L	
			trans-1,3-dichloropropene	2016/07/26	ND, RDL=1.0		ug/L	
			Bromomethane	2016/07/26	ND, RDL=1.0		ug/L	
			1,1,2-trichloroethane	2016/07/26	ND, RDL=0.50		ug/L	
			Trichloroethene	2016/07/26	ND, RDL=0.50		ug/L	
			Chlorodibromomethane	2016/07/26	ND, RDL=1.0		ug/L	
			1,2-dibromoethane	2016/07/26	ND, RDL=0.20		ug/L	
			Tetrachloroethene	2016/07/26	ND, RDL=0.50		ug/L	
			Bromodichloromethane	2016/07/26	ND, RDL=1.0		ug/L	
			Bromoform	2016/07/26	ND, RDL=1.0		ug/L	
			Styrene	2016/07/26	ND, RDL=0.50		ug/L	
			1,1,1,2-tetrachloroethane	2016/07/26	ND, RDL=0.50		ug/L	
			1,1,2,2-tetrachloroethane	2016/07/26	ND, RDL=0.50		ug/L	
			1,2-dichlorobenzene	2016/07/26	ND, RDL=0.50		ug/L	
			1,3-dichlorobenzene	2016/07/26	ND, RDL=0.50		ug/L	
			1,4-dichlorobenzene	2016/07/26	ND, RDL=0.50		ug/L	
			Chlorobenzene	2016/07/26	ND, RDL=0.50		ug/L	
			1,2,3-trichlorobenzene	2016/07/26	ND, RDL=2.0		ug/L	
			1,2,4-trichlorobenzene	2016/07/26	ND, RDL=2.0		ug/L	

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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Hexachlorobutadiene	2016/07/26	ND, RDL=0.50		ug/L	
8341547	KL	RPD [PB6700-05]	Chloromethane	2016/07/26	NC		%	30
			Vinyl chloride	2016/07/26	NC		%	30
			Chloroethane	2016/07/26	NC		%	30
			Trichlorofluoromethane	2016/07/26	NC		%	30
			1,1,2Trichloro-1,2,2Trifluoroethane	2016/07/26	NC		%	30
			Dichlorodifluoromethane	2016/07/26	NC		%	30
			1,1-dichloroethene	2016/07/26	NC		%	30
			Dichloromethane	2016/07/26	NC		%	30
			trans-1,2-dichloroethene	2016/07/26	NC		%	30
			1,1-dichloroethane	2016/07/26	NC		%	30
			cis-1,2-dichloroethene	2016/07/26	NC		%	30
			Chloroform	2016/07/26	NC		%	30
			1,1,1-trichloroethane	2016/07/26	NC		%	30
			1,2-dichloroethane	2016/07/26	NC		%	30
			Carbon tetrachloride	2016/07/26	NC		%	30
			1,2-dichloropropane	2016/07/26	NC		%	30
			cis-1,3-dichloropropene	2016/07/26	NC		%	30
			trans-1,3-dichloropropene	2016/07/26	NC		%	30
			Bromomethane	2016/07/26	NC		%	30
			1,1,2-trichloroethane	2016/07/26	NC		%	30
			Trichloroethene	2016/07/26	NC		%	30
			Chlorodibromomethane	2016/07/26	NC		%	30
			1,2-dibromoethane	2016/07/26	NC		%	30
			Tetrachloroethene	2016/07/26	NC		%	30
			Bromodichloromethane	2016/07/26	NC		%	30
			Bromoform	2016/07/26	NC		%	30
			Styrene	2016/07/26	NC		%	30
			1,1,1,2-tetrachloroethane	2016/07/26	NC		%	30
			1,1,2,2-tetrachloroethane	2016/07/26	NC		%	30
			1,2-dichlorobenzene	2016/07/26	NC		%	30
			1,3-dichlorobenzene	2016/07/26	NC		%	30
			1,4-dichlorobenzene	2016/07/26	NC		%	30
			Chlorobenzene	2016/07/26	NC		%	30
			1,2,3-trichlorobenzene	2016/07/26	NC		%	30
			1,2,4-trichlorobenzene	2016/07/26	NC		%	30

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QA/QC				Date				
Batch	Init	QC Type	Parameter	Analyzed	Value	Recovery	UNITS	QC Limits
			Hexachlorobutadiene	2016/07/26	NC		%	30
<p>Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.</p> <p>Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.</p> <p>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.</p> <p>Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.</p> <p>Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.</p> <p>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).</p> <p>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).</p> <p>(1) Blank Spike outside acceptance criteria (10% of analytes failure allowed).</p> <p>(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.</p> <p>(3) Spike recovery exceeds acceptance criteria (high recovery). As results are non-detect, there is no impact on data quality.</p>								

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VALIDATION SIGNATURE PAGE

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



Andy Lu, Ph.D., P.Chem., Scientific Specialist

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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Chain Of Custody Record

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#9190 MMM GROUP	Company Name	MMM GROUP	Quotation #	B60348	Maxxam Job #	Bottle Order #:
Contact Name	ACCOUNTS PAYABLE	Contact Name	DARREN KEAM	P.O. #			
Address	SUITE 111 93 LOMBARD AVE WINNIPEG MB R3B 3B1	Address	Gallagher1@mmm.ca	Project #			
Phone	(204) 272-2656	Phone	(204) 943-3178	Project Name		Chain Of Custody Record	Project Manager
Email	accountspayable@mmm.ca	Email	keamd@mmm.ca, edd@mmm.ca	Site #			Amanda Hung

Regulatory Criteria	Special Instructions	Analysis Requested	Turnaround Time (TAT) Required
		Regulated Drinking Water? (Y/N) <input type="checkbox"/> Metals Field Filtered? (Y/N) <input type="checkbox"/> BTEX/F1-F4 in Water <input type="checkbox"/> VOCs in Water by HS GC/MS <input type="checkbox"/> CCME PAH in Water by GC-MS <input type="checkbox"/> CCME Dissolved Metals in Water incl Dissolved Hg <input type="checkbox"/> pH in Water by PC Titrator <input type="checkbox"/> Conductivity in Water by PC Titrator <input type="checkbox"/>	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. <input checked="" type="checkbox"/>

Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form
 Samples must be kept cool (< 10°C) from time of sampling until delivery to maxxam

Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water? (Y/N)	Metals Field Filtered? (Y/N)	BTEX/F1-F4 in Water	VOCs in Water by HS GC/MS	CCME PAH in Water by GC-MS	CCME Dissolved Metals in Water incl Dissolved Hg	pH in Water by PC Titrator	Conductivity in Water by PC Titrator	# of Bottles	Comments
1 PB6700	DUP01	Jul 20 11	pm	water			X	X	X	X	X	X	11	
2 PB6701	MW02	↓	↓	↓			↓	↓	↓	↓	↓	↓	11	
3 PB6702	MW05	↓	↓	↓			↓	↓	↓	↓	↓	↓	11	
4 PB6704	MW08	↓	↓	↓			↓	↓	↓	↓	↓	↓	11	
5 PB6705	MW09	↓	↓	↓			↓	↓	↓	↓	↓	↓	11	
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	Lab Use Only
Laura Gallagher	Jul 20 11	4:44	Ami Robinson	16/07/20	1645		Time Sensitive <input type="checkbox"/> Temperature (°C) on Receipt: 15.1, 20.4, 21.4 Custody Seal Intact on Cooler? <input type="checkbox"/> Yes <input type="checkbox"/> No ice present

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.

APPENDIX G – STANDARD LIMITATIONS FOR PHASE II ESAS

STANDARD LIMITATIONS

PHASE II ENVIRONMENTAL SITE ASSESSMENT (PHASE II ESA)

These Standard Limitations form part of the Report to which they are appended and any use of the Report is subject to them.

1. EXCLUSIVE USE BY CLIENT

This Report was prepared for the exclusive use of the client identified as the intended recipient. Any use of the report by any other party without the written consent of MMM Group Limited is the sole responsibility of such party. MMM Group Limited accepts no responsibility for damages that may be suffered by any third party as a result of decisions made or actions taken based on this Report.

2. SCOPE, TERMS AND CONDITIONS OF CONTRACT

The observations and investigations (hereinafter referred to as the "Work") upon which this Report is based were carried out in accordance with the scope, terms and conditions of the contract or the proposal pursuant to which the Work was commissioned. The conclusions presented in the Report are based solely upon the scope of services described in the contract or the proposal and governed by the time and budgetary constraints imposed by them.

3. STANDARD OF CARE

The Phase II ESA was carried out in accordance with generally accepted environmental study and/or professional practices, industry standards and applicable environmental regulations. No other warranties are either expressed or implied with respect to the professional services provided under the terms of the contract or proposal and represented in this Report.

4. SCOPE OF THE PHASE II ESA

A Phase II ESA is conducted to obtain information about environmental conditions in the land or water on, in or under the subject property. This Report has been prepared based on information obtained at discrete borehole, test pit, monitoring well, or other (e.g., surface water) sampling locations. The conditions reported herein were those encountered at the subject property at the time the Work was performed and as present at the discrete sampling locations. Conditions

between sampling locations may be different than those encountered at the sampling locations and MMM Group Limited is not responsible for such differences.

5. REASONABLE CONCLUSIONS

The conclusions of the Phase II ESA regarding the environmental conditions at the subject property are based on the investigations conducted during the Work and information from other sources as may be indicated in the Report. The accuracy of information from other sources was not verified unless specifically noted in the Report, nor was it determined if the reviewed information constituted all information that exists and pertains to the subject property.

The conclusions made are based on reasonable and professional interpretation of the information considered. If additional information concerning environmental conditions of relevance to this Report is obtained during future work at the subject property, MMM Group Limited should be notified in order that we may determine if modifications to the conclusions presented in this Report are necessary.

6. REPORT AS A COMPLETE DOCUMENT

This Report must be read as a whole and sections taken out of context may be misleading. If discrepancies exist between the preliminary (draft) and final versions of the Report, the final version of the Report shall take precedence.

7. LIMITATION OF LIABILITY

MMM Group Limited's liability with respect to the Phase II ESA is limited to re-performing, without cost, any part of the Work that is unacceptable solely as a result of failure to comply with industry standards. MMM Group Limited's maximum liability is limited in accordance with terms in the original contract, provided that notice of claim is made within regulated timelines as of the date of delivery of the Report.