**CUSO INTERNATIONAL**
**44 Eccles Street**
**Ottawa, Ontario**
**K1R 6S4**

# Phase II Environmental Site Assessment
**44 Eccles Street**
**Ottawa, Ontario**

**KB1024**

**December 2017**

**CM3 Environmental Inc.**
*5710 Akins Road, Ottawa, Ontario, K2S 1B8*

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# 1 INTRODUCTION

CM3 Environmental Inc. (CM3) was retained by CUSO International (CUSO) to carry out a limited Phase II Environmental Site Assessment (ESA) for the property located at 44 Eccles Street Ottawa, Ontario ("site" or "subject property"). The purpose of the limited Phase II ESA was to assess the presence of potential soil and groundwater impacts at the site related to historic and current site use. The Phase II was completed for due diligence purposes prior to marketing the property and not in support of the filing of a record of site condition (RSC).

## 1.1 Site Location

The subject property is located on the south side of Eccles Street, Ottawa, Ontario, approximately 20 m east of Booth Street. The civic address for the subject property is 44 Eccles Street Ottawa, Ontario. The legal description is PLAN 4908 LOTS 14 AND 15 PT; LOTS 5 AND 6. CUSO is the current owner of the subject property. The site location is provided as **Figure 1**.

## 1.2 Site Description

The subject property is rectangular in shape and has a total area of 0.26 hectares (0.64 acres) and has one commercial building that is used as office space. The on-site building is a three storey, north facing building with a finished basement. The north part of the property adjacent to Eccles Street is landscaped with grass and the south part of the property is an asphalt parking lot. There is one entrance to the parking lot on the east side of the building and the exit from the parking lot is on the west side of the building. A small storage shed is located at the south property boundary.

The property fronts north onto Eccles Street and is located south of Somerset and east of Booth Street. The property is bordered to the south by an automotive garage on the south east and commercial (medical) buildings with parking lots on the south west. The area to the north across Eccles Street is a combination of residential and commercial buildings. The properties to the immediate west and east of the site are residential properties along Booth Street and LeBreton Street North. A site plan is provided as **Figure 2**.

## 1.3 Historic and Current Land Use

The subject property appears to have been developed prior to 1900 and was used as a residential home with parking up to 1936 when the property was developed as a school. The property and building were used as a school until 2006, when the school was sold for use as commercial offices.

# 2 BACKGROUND

## 2.1 Physical Setting

### *2.1.1 Topography and Drainage*

The subject property is relatively flat with an elevation of approximately 69 m above sea level (m asl). The parking lot is approximately 0.75-1.0 m (estimated) higher than the adjacent properties to the east, south and west. Drainage at the majority of the site appears to be as overland flow, likely controlled by the grade of the asphalt. One catch basin was located in the paved parking area to the south of the building, discharging to the City of Ottawa municipal storm/combined sewer.

### *2.1.2 Site Geology*

The surficial geology of the subject property was interpreted from the Ontario Geological Survey, 2010, Surficial Geology of Southern Ontario (Miscellaneous Releases). The surficial geology at the subject property consists of bedrock with a thin veneer of clay, silt, sand, gravel and diamicton.

The bedrock geology of the subject property was interpreted from the Ontario Geological Survey, 2011, Bedrock Geology of Ontario (Miscellaneous Releases). The bedrock at the site consists of limestone, dolomite, sandstone, and locally shale of the Ottawa Group; Simcoe Group; Shadow Lake Formation.

### *2.1.3 Site Hydrogeology*

The local and regional groundwater flow directions were inferred based on the topography at the subject property and surrounding area and the presence of local water bodies. The local groundwater flow was inferred to be west. Regional flow was inferred to be north towards the Rideau River and Ottawa River.

## 2.2 Previous Environmental Investigations

This Phase II ESA was completed as part of a Phase I/II for 44 Eccles Street Ottawa, Ontario. The Phase I ESA was completed in September 2016 and identified seven areas of potential environmental concern (APEC). The findings of the Phase I ESA were used in the development of the scope of work for the Phase II ESA. The APECs and contaminants of potential concern (COCs) were:

| APEC | Location | Cause of Concern | COC |
|---|---|---|---|
| 1 | South of building | Former UST on-site and remediation to 2004 MOE Standards may not be in compliance with current Ontario Ministry of Environment and Climate Change (MOECC) Standards | BTEX, PHCs F1-F4 |
| 2 | 347 Booth Street | Former Auto Body facility | VOCs, metals |

| APEC | Location | Cause of Concern | COC |
|---|---|---|---|
| 3 | 70 LeBreton Street North | Existing Automotive Garage | BTEX, PHCs F1-F4, PAHs |
| 4 | 297 Booth Street<br>304 Booth Street<br>313 Booth Street | Existing Automotive Garage<br>Former Automotive Garage<br>Laundries | BTEX, PHCs F1-F4, PAHs, VOCs |
| 5 | 770 Somerset Street<br>716 Somerset Street | Former Gasoline Service Station<br>Dry Cleaners | BTEX, PHCs F1-F4, PAHs, VOCs |
| 6 | 777, 787, 789 and 791 Somerset Street | Various former Laundries | VOCs |
| 7 | 52-1/2 LeBreton Street North | Former Glazier and Leaded Glass | Metals |

BTEX - Benzene, toluene, ethylbenzene, xylenes
PHCs F1-F4 - Petroleum hydrocarbons F1 to F4 fractions
PAHs - Polycyclic aromatic hydrocarbons

The locations of the general APECs are provided on **Figure 2**. CM3 also recommended a Designated Substance Survey of the main on-site building

## 3 APPLICABLE SITE CONDITION STANDARDS

The results of the soil and groundwater analyses were compared to the Ontario Ministry of Environment and Climate Control (MOECC) *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,* April 15, 2011 (under Ontario Regulation 153/04). The following site conditions were used in the selection of the appropriate site condition standards (SCS):

- No environmentally sensitive areas were located on site or in the immediate vicinity;
- The site was considered a shallow soil property (i.e. bedrock less than 2 metres below grade);
- The site was not located within 30 m of a water body;
- Groundwater was not used as a potable water source in the area; and
- The site and surrounding properties were considered general mixed use zone property use.

The Table 7 Generic Site Condition Standards for Shallow Soils in a Non-Potable Groundwater Condition with coarse soils and residential land use were selected for evaluation of the analytical results, based on the above.

## 4 SCOPE OF THE INVESTIGATION

The purpose of this limited Phase II ESA was to assess the presence of potential soil and groundwater impacts on the site associated with current and past on-site activities and/or from activities on adjacent properties. The phase II ESA was completed to confirm or refute the presence of the contaminants of concern at the APECs identified in the Phase I ESA. Delineation of the impacts, if present, was not included in the scope of work due to budgetary restraints. The Phase II was completed for due diligence purposes prior to marketing the property. The Phase II was not completed in support of the filing of a record of site condition (RSC). The limited Phase

II ESA was completed following the requirements of the Canadian Standards Association (CSA) Standard Z769-00 (R2008) and in general accordance with Ontario Regulation (O. Reg.) 153/04. The Phase II Investigation was completed between August 21 and September 21, 2017 and included the following scope of work:

- The preparation of a site specific health and safety plan;
- A preliminary site visit to assess property access and to confirm or identify the proposed borehole/monitoring well locations;
- The determination of the locations of all underground utilities by a third party utility locator;
- The advancement of 12 boreholes (10 completed as monitoring wells);
- The continuous collection of soil samples during the drilling and on-site field screening of all soil samples for vapours with a combustible gas meter;
- The selection of a minimum of one soil sample from each borehole for laboratory analysis of contaminants of concern;
- The measurement of the depth to liquid phase hydrocarbons (LPH) and groundwater in all accessible monitoring wells;
- The collection of groundwater samples from all accessible monitoring wells for laboratory analysis of contaminants of concern; and
- The completion of an elevation and location survey for all boreholes/monitoring wells.

## 5 INVESTIGATION METHODOLOGY

### 5.1 Borehole Drilling

A total of twelve boreholes (MW1, MW2, MW3, BH4, BH5 and MW6 through MW12) were completed by OGS Drilling Ltd. (OGS) of Almonte, Ontario, under supervision of CM3 personnel. All boreholes were advanced using a truck mounted CME55 drill rig or portable drilling equipment. Boreholes were advanced from grade to bedrock using either a hollow stem auger (CME 55) or electric jackhammer and spilt spoons (portable). Boreholes were advanced into bedrock using a down-hole air hammer (CME 55) or electric coring equipment (portable).

Boreholes MW1, MW3, BH4, BH5, MW7, MW8 and MW11 were advanced at APEC 1 in the location of the former UST and surrounding the limits of the 2006 remedial excavation. Boreholes MW2 and MW6 were advanced at the north property limit to address APEC 4, APEC 5 and APEC 6. Borehole MW9 was advanced to the east of the building adjacent APEC 7. Boreholes MW10 and MW12 were advanced at the south property limit adjacent APEC 2 and APEC 3. The borehole locations are provided on **Figure 3**.

### 5.2 Soil Sampling

Soil samples were collected continuously from grade to refusal at bedrock at each borehole using 60 cm long, 5.1 cm diameter split spoon samplers. Soil samples were logged at the time of drilling for grain size, colour, moisture content, and visual or olfactory evidence of impacts. Each soil sample was split for combustible vapour analysis and possible laboratory analysis upon recovery from the split spoon, as described below. The drilling and sampling equipment was washed and

rinsed between each sample interval and borehole location to prevent cross-contamination. Excess drill cuttings were stored on site in 200 L drums, pending off-site disposal.

Immediately upon recovery, each sample was split into the appropriate laboratory supplied sample containers (jars) for possible analysis and a polyethylene bag for relative combustible vapour analysis. The jarred samples were placed into an iced chilled cooler pending submission to the laboratory for analysis. The bagged samples were used for field screening of relative combustible vapours.

### 5.3 Field Screening

The bagged soil samples were allowed to equilibrate to ambient temperature prior to combustible vapour measurements. The vapour concentrations were measured and recorded from the bag sample headspace using an RKI Eagle combustible vapour meter calibrated to hexane and operated in methane elimination mode. The intake probe of the vapour meter was inserted into the plastic bag and the highest vapour reading from each sample was recorded.

### 5.4 Monitoring Well Installation

Boreholes MW1, MW2, MW3 and MW6 through MW12 were completed as monitoring wells. Monitoring well construction consisted of either 32 mm or 50 mm outside diameter, flush-threaded schedule 40 PVC well screens and risers. At each borehole, a 10-slot well screen was placed and sealed below the top of bedrock. A silica sand pack was placed around the outside of the well screen in the annular space of the borehole to a minimum of 0.3 m above the screened interval. A bentonite seal was placed above the sand pack to approximately 0.3 m bg. All monitoring wells were capped with lockable j-plugs, and finished below grade in flush-mounted manhole protective casings set in concrete.

### 5.5 LPH and Water Level Measurement

The depth to liquid phase hydrocarbons (LPH) and groundwater was measured monitoring wells MW1, MW2, MW3, MW6 through MW9, MW11 and MW12 on October 24, 2017 and monitoring wells MW1 through MW11 on November 28, 2017. A Solinst® electronic oil/water interface meter was used to measure the depth to LPH (if present) at water at each well. The depths were measured to the nearest millimetre from the highest point of the well riser. The interface probe was cleaned and rinsed with distilled water between each well to prevent cross contamination.

### 5.6 Groundwater Sampling

Groundwater samples were collected from monitoring wells MW1, MW2, MW3, MW6, MW7, MW8, MW9, MW11 and MW12 on October 24, 2017. Monitoring well MW10 was not accessible on October 24, 2017 and was sampled on November 28, 2017. Prior to sampling, each well was purged to remove stagnant water from within the well bore and surrounding annulus to obtain samples that were representative of formation groundwater. Groundwater purging and sampling was conducted using dedicated 5/8” O.D. LDPE tubing and foot valves, installed at each well. Purge water was stored on site in 200 L drums, pending off-site disposal. Groundwater samples

were collected in laboratory supplied sample containers, directly from the outlet of the LDPE tubing. Following collection, the samples were placed into an iced chilled cooler pending submission to the laboratory for analysis.

### 5.7 Site Survey

The locations of all boreholes/monitoring wells were referenced to existing site buildings and structures. The ground surface and monitoring well top of pipe elevations were referenced to an arbitrary site benchmark (top of well casing at monitoring well MW12) of 100 m above reference level (m arl) using a TopCon AT-B4 automatic level. The ground surface and top of pipe elevations are included in the borehole logs (**Appendix A**).

## 6 RESULTS AND EVALUATION

### 6.1 Site Geology

The site stratigraphy was determined based on the borehole drilling. In general, the stratigraphy consisted of topsoil or asphalt at grade, underlain by fill comprised of sand and gravel or silt, sand and gravel. The fill was present to bedrock, at 1.22-2.44 m bg. Bedrock logging was not completed. Variations in the local stratigraphy are likely due to importation of fill or re-working of native soils during the development of the site and the importation of fill during site reinstatement following the 2006 UST removal and remedial activities. The stratigraphy is provided on the borehole logs (**Appendix A**).

### 6.2 Site Hydrogeology

#### *6.2.1 Groundwater Elevations and Flow*

The depth to LPH and water was measured in all accessible monitoring wells on October 24, 2017 and November 28, 2017 (**Table 1**). LPH was not detected in any of the wells during the October monitoring event. The October water levels were between 95.86 m arl and 98.54 m arl. The average groundwater elevation was 97.99 m arl (2.25 m bg). The interpreted groundwater flow direction was south-southeast, based on the October 24, 2017 water levels. The water levels measured at monitoring wells MW7 and MW11 were inconsistent with the water elevations at the rest of the site and were not used in the interpretation of the November groundwater flow direction.

The November monitoring event showed an LPH thickness of 0.5 cm in monitoring well MW9. The November water levels were between 98.25 m arl and 99.53 m arl, at an average of 98.63 m arl (1.60 m bg). The November water levels were consistent with and less than 0.20 m higher than the October levels with the exception of wells MW6, MW8 and MW11 that showed water levels 1.0-1.8 m higher than the October levels. The November water levels also showed less variation across the site. The interpreted net groundwater flow was northeast to southwest based on the November water levels (**Figure 4**). Deviations in the net groundwater flow to the west-northwest were inferred near monitoring wells MW9, MW11 and MW8, close to the east property boundary. Additional groundwater level monitoring is required to confirm the interpreted flow direction.

The groundwater elevation and flow at the site may be influenced by the presence of underground utilities (i.e. storm sewer, gas lines) on the site and at Eccles Street and the east property boundary. Groundwater elevations and flow may be further affected by the variable thickness, distribution and types of fill used in the development of the subject property and the backfilling of the remedial excavation.

### 6.3 Soil Field Screening

A total of 39 soil samples were collected from the boreholes MW1, MW2, MW3, BH4, BH5 and MW6 through MW12 for field screening and combustible vapour analysis. Vapour concentrations of 0 parts per million (ppm) were measured in all soil samples from boreholes MW2, BH5, MW6, MW7, MW8 and MW12. Vapour concentrations of 75 ppm or less were present in soil samples from boreholes MW1, MW3, MW9, MW10 and MW11. In general, the vapour concentrations in the above boreholes were greater in samples collected at or near the overburden-bedrock contact. Borehole BH4 showed elevated vapour concentrations of 10% (~1100 ppm) and 30% (~3300 ppm) of the lower explosive limit (LEL), respectively, in samples from 0.1-0.61 m bg and 0.61-1.22 m bg. The soil combustible vapour concentrations and field observations are included on the borehole logs (**Appendix A**).

### 6.4 Soil Quality

A total of 12 soil samples from eight borehole locations were submitted for laboratory analysis of BTEX, PHCs F1-F4 fractions, VOCs, metals and/or PAHs. Soil samples from borehole MW2 and MW6 (completed adjacent APECs 4, 5 and 6) were not submitted for analysis. The soil sample analytical results are summarized in **Table 2**. The borehole soil sample locations and soil quality are provided on **Figure 5**. The soil sample laboratory reports are provided in **Appendix B**.

*APEC 1 – Former UST and Remedial Excavation*

Boreholes MW1, MW3, BH4, BH5, MW7, MW8 and MW11 were advanced at APEC 1. A total of five soil samples (MW1 SA4, MW3-SA1, MW7 SA3, MW8 SA3, and MW11 SA3) were analysed for BTEX and PHCs F1-F4 fractions. Sample MW1 SA1 was analysed for metals. Parameters at concentrations above the MOECC Table 7 SCS were present the following samples:

- MW1 SA1 (0.0-0.61 m bg): thallium;
- MW1 SA4 (1.83-2.13 m bg): PHCs F2 and F3 fractions;
- MW3-SA1 (0.0-0.61 m bg): PHCs F2and F3 fractions;
- MW8 SA3 (1.22-1.68 m bg): PHCs F3 fraction; and
- MW11 SA3 (1.22-1.83 m bg): PHCs F2 and F3 fractions.

BTEX and all other PHCs fractions and metals were either not detected or were present at concentrations below the MOECC Table 7 SCS.

*APEC 2 – Former Auto Body Facility*

Borehole MW12 was completed at the southwest corner of the subject property to address APEC 2. Soil sample MW12 SA3 was analysed for metals and sample MW12 SA4 was analysed for BTEX and PHCs F1-F4 fractions. Parameters at concentrations above the MOECC Table 7 SCS were present the following samples:

- MW12 SA3 (1.22-1.83 m bg): lead; and
- MW12 SA4 (1.83-2.44 m bg): PHCs F3 fraction.

All other metals and BTEX/PHCs fractions were either not detected or were present at concentrations below the MOECC Table 7 SCS.

*APEC 3 – Existing Automotive Garage*

Borehole MW10 was completed at the south property boundary of the subject property to address APEC 3. Soil sample MW10 SA1 was analysed for metals and sample MW10 SA3 was analysed for BTEX, PHCs F1-F4 fractions and VOCs. Parameters at concentrations above the MOECC Table 7 SCS were present the following samples:

- MW10 SA3 (1.22-1.83 m bg): PHCs F3 fraction.

All other PHCs fractions, BTEX and VOCs were either not detected or were present at concentrations below the MOECC Table 7 SCS.

*APEC 7 – Former Glazier and Leaded Glass*

Borehole MW9 was completed on the east side of the building to address APEC 7. Soil sample MW9 SA1 was analysed for metals and sample MW9 SA2 was analysed for BTEX, PHCs F1-F4 fractions, VOCs and PAHs. Several metals were detected in sample MW9 SA1 at concentrations below the MOECC Table 7 SCS. Sample MW9 SA2 showed the presence of PHCs F2 and F3 fractions, fluoranthene and pyrene at concentrations below the SCS. VOCs (including BTEX) were not detected in sample MW9 SA2.

### 6.5 Groundwater Quality

Groundwater samples collected from monitoring wells MW1, MW2, MW3, MW6 through MW9 MW11 and MW12 on October 24, 2017 were submitted for analysis of BTEX, PHCs F1-F4 fractions, VOCs, metals and/or PAHs. Monitoring well MW10 was sampled on November 28, 2017 for analysis of PHCs F1-F4 fractions, VOCs (including BTEX) and metals. The groundwater sample analytical results are summarized in **Table 3**. The monitoring well locations and groundwater quality are provided on **Figure 6**. The groundwater sample laboratory reports are provided in **Appendix B**.

*APEC 1 – Former UST and Remedial Excavation*

Monitoring wells MW1, MW3, BH4, BH5, MW7, MW8 and MW11 were advanced at APEC 1 and were sampled for BTEX and PHCs F10F4 fractions. Parameters at concentrations above the MOECC Table 7 SCS were present the following sample:

- MW3: PHCs F2 and F3 fractions.

BTEX and PHCs fractions were not detected in any of the other samples.

*APEC 2 – Former Auto Body Facility*

Monitoring well MW12 was completed at APEC 2 and was sampled for BTEX, PHCs F1-F4 fractions, VOCs and metals. Several metals were detected in sample MW12 at concentrations below the MOECC Table 7 SCS. BTEX, PHCs fractions and VOCs were not detected in sample MW12.

*APEC 3 – Existing Automotive Garage*

Monitoring well MW10 was completed at the south property adjacent APEC 3 and was sampled for PHCs F1-F4 fractions, VOCs (including BTEX) and metals. Several metals were detected in sample MW10 at concentrations below the MOECC Table 7 SCS. BTEX, PHCs fractions and VOCs were not detected in sample MW10.

*APECs 4, 5 and 6 – Former/Existing Automotive Garage, Former Gasoline Service Station and Various Former/Existing Laundries and Dry Cleaners*

Monitoring wells MW2 and MW6 were advanced adjacent the north property boundary to address APECs 4, 5 and 6. Monitoring well MW2 was sampled for BTEX, PHCs F1-F4 fractions and VOCs. Monitoring well MW6 was sampled for BTEX, VOCs and PAHs. Parameters at concentrations above the MOECC Table 7 SCS were present the following sample:

- MW6: PAHs acenaphthylene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, indeno[1,2,3-cd]pyrene and pyrene.

BTEX, PHCs fractions and VOCs were not detected in sample MW2 and VOCs (including BTEX) were either not detected or were present at concentrations below MOECC Table 7 SCS in sample MW6.

*APEC 7 – Former Glazier and Leaded Glass*

Monitoring well MW9 was completed on the east side of the building adjacent APEC 7 and was sampled for .BTEX, PHCs F1-F4 fractions, VOCs, metals and PAHs. Parameters at concentrations above the MOECC Table 7 SCS were present sample MW9:

- MW9: PHCs F1, F2, F3 fractions, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, indeno[1,2,3-cd]pyrene and naphthalene.

All other PHCs fractions and PAHs were either not detected or were present at concentrations below the MOECC Table 7 SCS. However, the laboratory method detection limit (MDL) for PHCs F4 fraction for sample MW9 was elevated due to dilution because of high target analyte concentration. The elevated MDL was above the applicable SCS. VOCs (including BTEX) and metals were either not detected or were present at concentrations below MOECC Table 7 SCS in sample MW9.

## 7 SUMMARY AND CONCLUSIONS

CM3 Environmental Inc. was retained by CUSO International to carry out a limited Phase II Environmental Site Assessment for the property located at 44 Eccles Street Ottawa, Ontario. The purpose of the limited Phase II ESA was to assess the presence of potential soil and groundwater impacts at the site related to historic and current site use. The Phase II was completed for due diligence purposes prior to marketing the property and not in support of the filing of a record of site condition (RSC). The limited Phase II ESA focussed on on-site areas of potential environmental concern identified during previous site assessments. Delineation of impacts, if present, was not included in the scope of work. The limited Phase II ESA included the advancement of 12 boreholes (10 completed as monitoring wells) to assess the soil and groundwater conditions at the site. The results of the limited Phase II ESA are summarized as follows:

### Site Characterization

- The soil at the site consisted of fill including sand and gravel or silt, sand and gravel. The fill was present to bedrock, at 1.22-2.44 m bg. Bedrock logging was not completed;
- The average groundwater elevation was 97.99 m arl (2.25 m bg) on October 24, 2017 and 98.63 m arl (1.60 m bg) on November 28, 2017;
- The inferred groundwater flow direction at the site was northeast to southwest based on the November 28, 2017 water levels; and
- A hydrocarbon odour and sheen were present at monitoring well MW9 during the October monitoring event and 0.5 cm of LPH was present at MW9 during the November monitoring event. LPH was not present in any other wells during either monitoring event.

### Soil Impacts

- PHCs concentrations above MOECC Table 7 SCS were present at four borehole locations at APEC 1, one borehole at APEC 2 and one borehole at APEC 3;
- Metals concentrations above MOECC Table 7 SCS were present at one borehole at APEC 1 and one borehole at APEC 2;
- Concentrations of all analysed parameters detected in one soil sample from APEC 7 were below the MOECC Table 7 SCS.

**Groundwater Impacts**

- PHCs concentrations above MOECC Table 7 SCS were present in one of five monitoring wells at APEC 1 and at the monitoring well adjacent APEC 7;
- PAHs concentrations above MOECC Table 7 SCS were present in the one monitoring well completed at APECs 5 and 6 and the monitoring well completed at APEC 7; and
- Concentrations of all analysed parameters detected in the groundwater sample from the wells at APEC 2 and APEC 3 were below the MOECC Table 7 SCS.

PHCs impacts (i.e. concentrations above applicable SCS) in soil were identified at APEC 1 (former UST and remedial excavation), APEC 2 (Former Auto Body Facility) and APEC 3 (Existing Automotive Garage), primarily in the F2 and F3 fractions. PHCs F4 fraction was also detected in several of the soil samples from the above APECs. The presence of PHCs F2-F4 fractions with the absence of BTEX and F1 fraction suggest that the soil petroleum hydrocarbon impacts are weathered and are likely related to the former UST. The PHCs impacts to soil south of the UST excavation (APECs 2 and 3) may be residual soil contamination that met previous MOECC SCS at the extents of the remedial excavation.

Groundwater sampling identified PHCs impacted groundwater at APEC 1, to the southwest of the former UST. The presence of PHCs impacted groundwater at APEC 1 is likely due to the former UST. PHCs and PAHs impacts to groundwater were identified to the east of the building adjacent APEC 7. The impacted groundwater adjacent APEC 7 may be due to on-site contamination related to the former UST and/or an off-site source. PAHs impacts to groundwater were also identified at the northeast property boundary (APECs 5 and 6). The groundwater impacts at the north property boundary may be a result on-site migration from off-site sources. The potential for on-site migration of contamination at the northeast-east of the subject property is supported by the interpreted net groundwater flow direction of northeast to southwest.

Metals were detected in soil samples collected from all APECs at the subject property. The presence of metals in soil is likely due to the use of imported fill during the development or upgrading of the site or site infrastructure. The borehole soil logging identified the presence of debris (pieces of brick) in samples from boreholes completed in the area of the remedial excavation. The presence of metals in all analysed groundwater samples is likely due to the presence of metals in the soil at the site and/or on-site migration from off-site sources.

The Phase II ESA did not fully delineate the extents of soil and groundwater contamination at the site. Supplemental boreholes and soil sampling would be required to delineate the extents of PHCs, metals and PAHs impacted soil at the site. Additional monitoring wells (screened in the overburden and bedrock) and sampling would be required to characterize the groundwater conditions at the site and flow direction; determine the extents of impacted groundwater; and to assess the potential for on-site and/or off-site migration of contaminants. A scope of work for the supplemental will be provided under separate cover.

# 8 CLOSURE

This report has been prepared and the work referred to in this report has been undertaken by CM3 Environmental Inc. for CUSO International. It is intended for the sole and exclusive use of CUSO International, their affiliated companies and partners and their respective insurers, agents, employees and advisors. Any use, reliance on, or decision made by any person other than CUSO International based on this report is the sole responsibility of such other person. CM3 Environmental Inc. and CUSO International make no representation or warranty to any other person with regard to this report and the work referred to in this report, and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by CM3 Environmental Inc. with respect to this report and any conclusions or recommendations made in this report reflect CM3 Environmental Inc.'s judgement based on the site conditions observed at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. This report has been prepared for specific application to this site and it is based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site, substances addressed by the investigation may exist in areas of the site not investigated and concentrations of substances addressed which are different than those reported may exist in areas other than the location from which samples were taken.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by CUSO International, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of CM3 Environmental Inc. Nothing in this report is intended to constitute or provide a legal opinion.

We trust that the above is satisfactory for your purposes at this time. Please feel free to contact the undersigned if you have any questions.

Yours sincerely,

**CM3 Environmental Inc.**

Karl Bilyj, P.Geo., QP
Geoscientist

Bruce Cochrane, P.Geo. QP, EP
Principal

# FIGURES

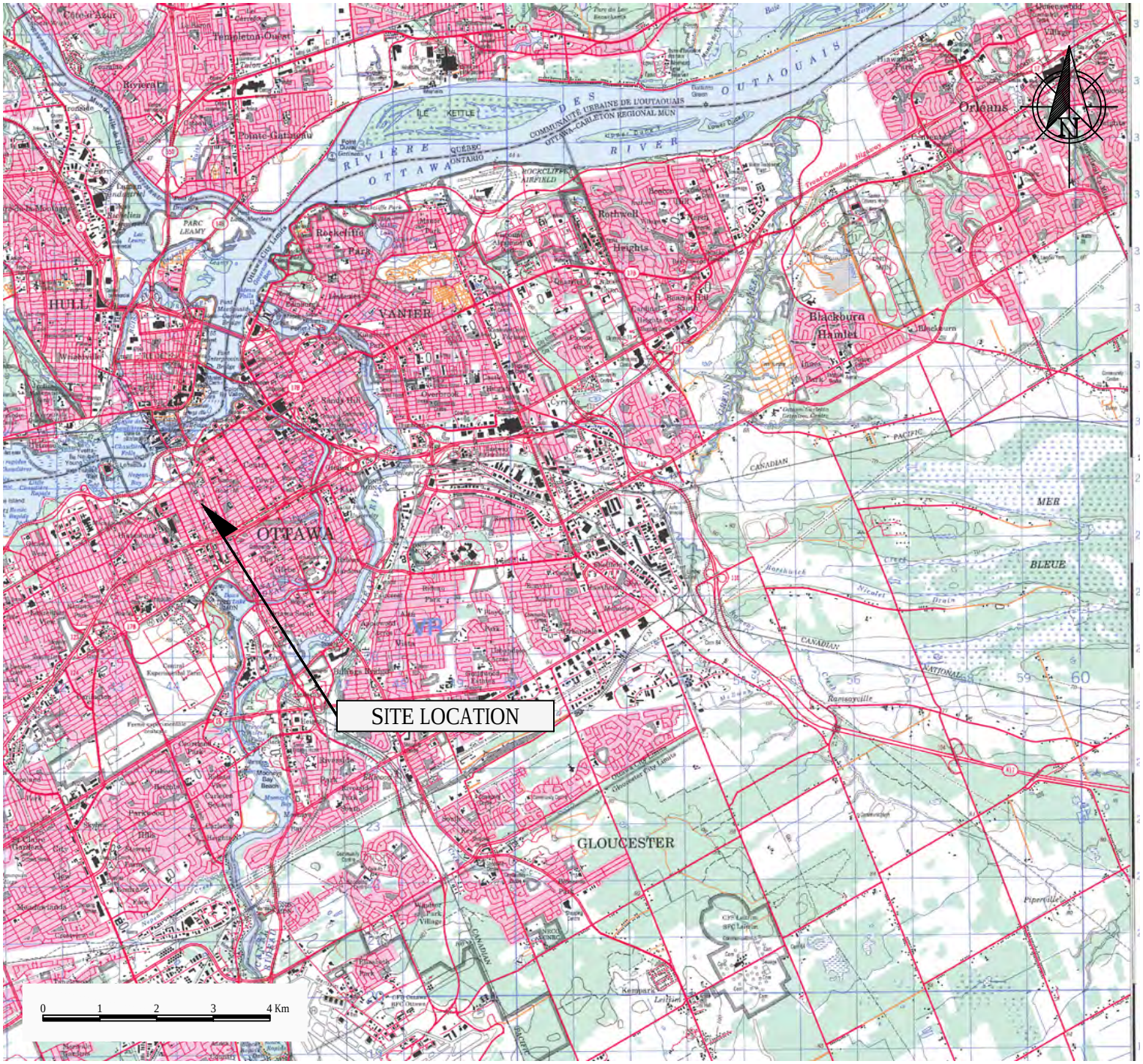
**Phase II Environmental Site Assessment**

**44 Eccles Street**

**Ottawa, Ontario**

**CUSO International**

**KB1024**



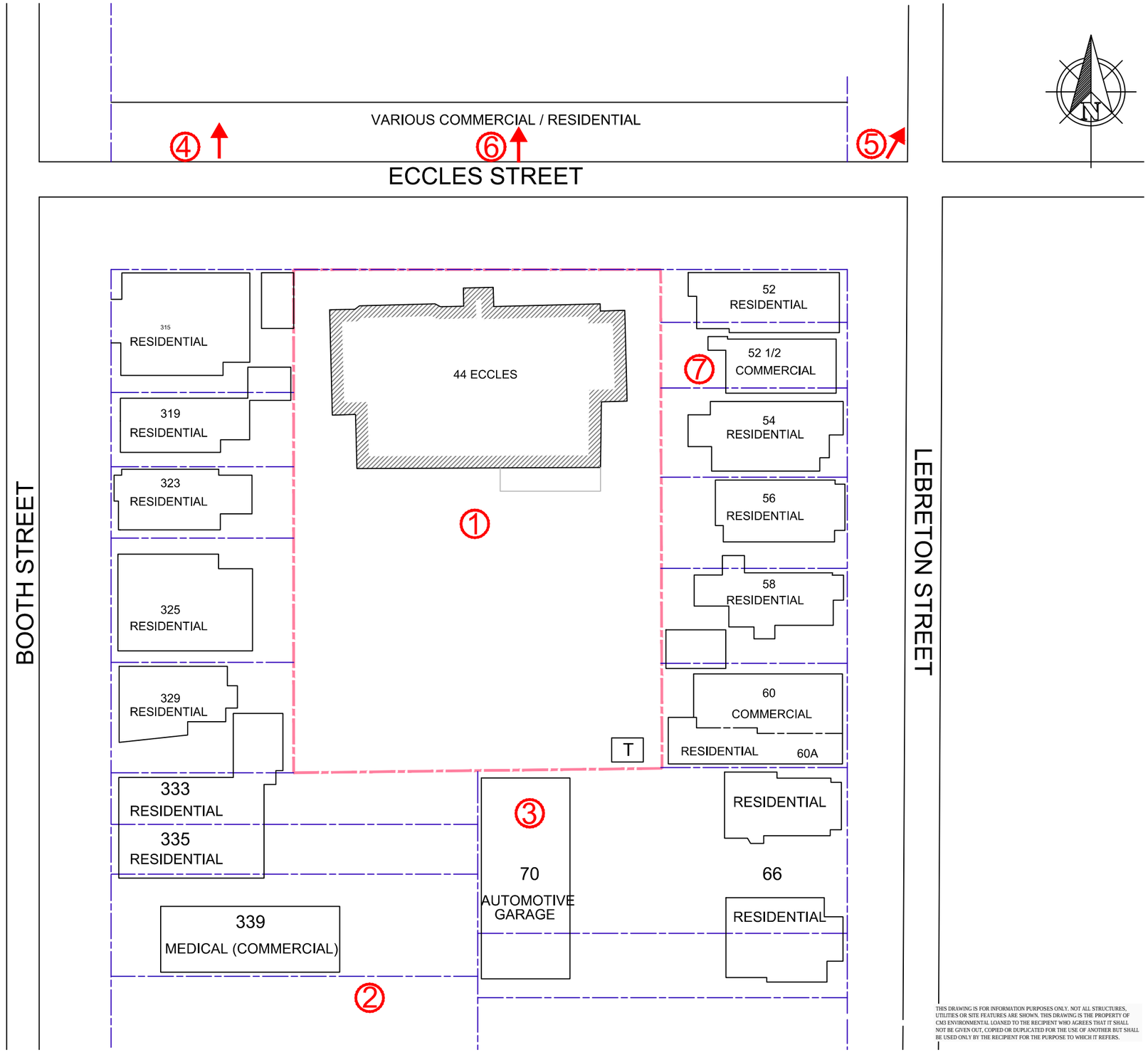

CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8

CUSO INTERNATIONAL

PHASE II ENVIRONMENTAL SITE ASSESSMENT
44 ECCLES STREET
OTTAWA, ON

SITE LOCATION

| Project: | Drawn By: |
|---|---|
| KB1024 | MWM |
| Date: | Reviewed By: |
| DEC 2017 | KB |
| Scale: | Figure: |
| AS SHOWN | 1 |




**LEGEND**

- PROPERTY BOUNDARY (APPROX.)
- SUBJECT PROPERTY

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

1. FORMER UST ON-SITE
2. FORMER AUTO BODY SHOP OFF-SITE
3. EXISTING AUTOMOTIVE GARAGE OFF-SITE
4. EXISTING & FORMER AUTOMOTIVE (297 BOOTH)
5. FORMER GAS STATION (770 SOMERSET)
6. FORMER DRY CLEANERS (777, 789 SOMERSET)
7. GLAZIER & LEADED GLASS (52 ½ LEBRETON)

T TRANSFORMER

Scale 1:500

0 5 10 15 20

(Approx. When plotted 11x17)

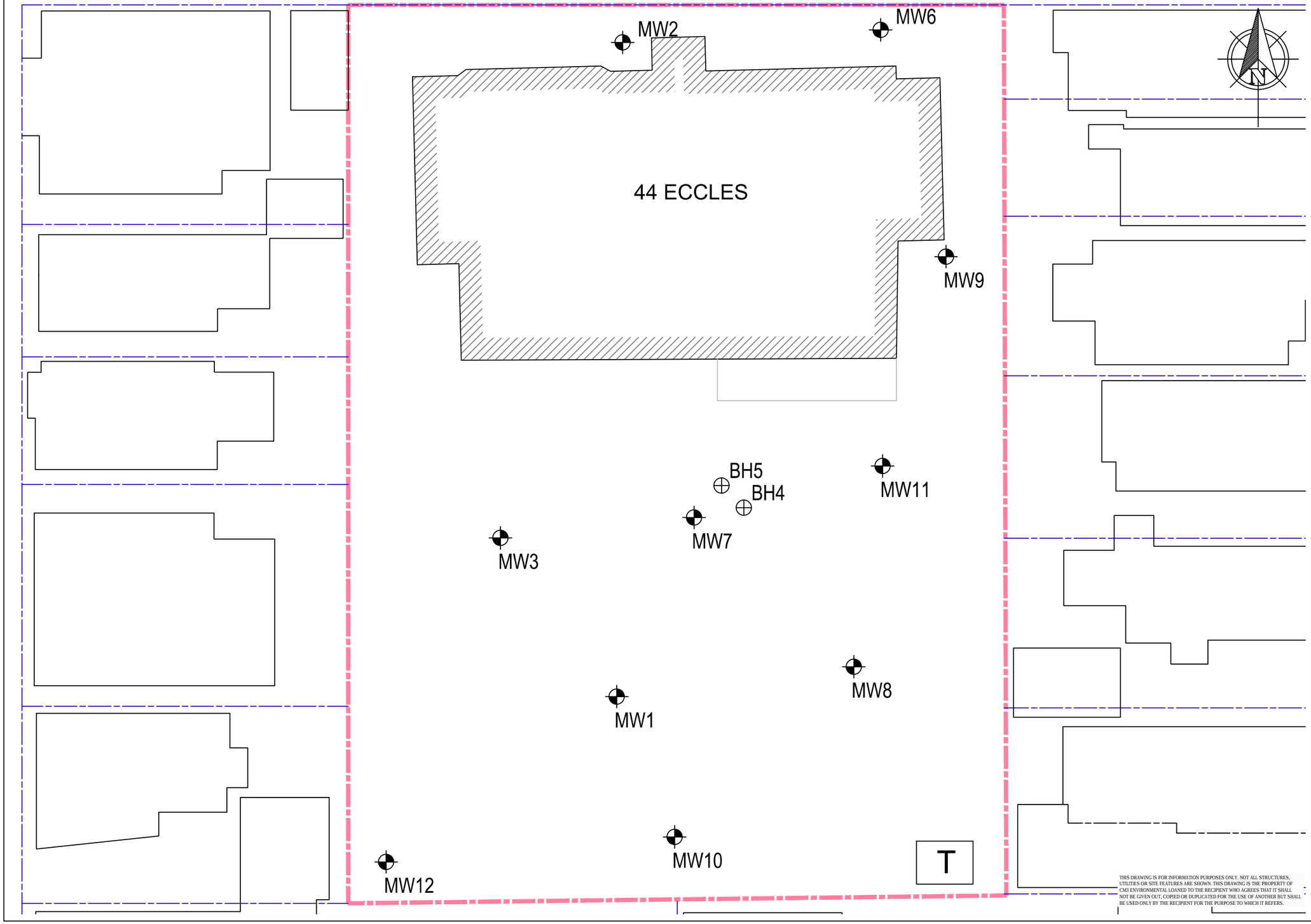

CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8


CUSO INTERNATIONAL

PHASE II ENVIRONMENTAL SITE ASSESSMENT
44 ECCLES STREET
OTTAWA, ON

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

| Project: | Drawn By: |
|---|---|
| KB1024 | MWM |
| Date: | Reviewed By: |
| DEC 2017 | KB |
| Scale: | Figure: |
| 1:500 | 2 |




**LEGEND**

- PROPERTY BOUNDARY (APPROX.)
- SUBJECT PROPERTY
- BOREHOLE
- MONITORING WELL
- T TRANSFORMER

Scale 1:250

0 2 4 6 8

(Approx. When plotted 11x17)

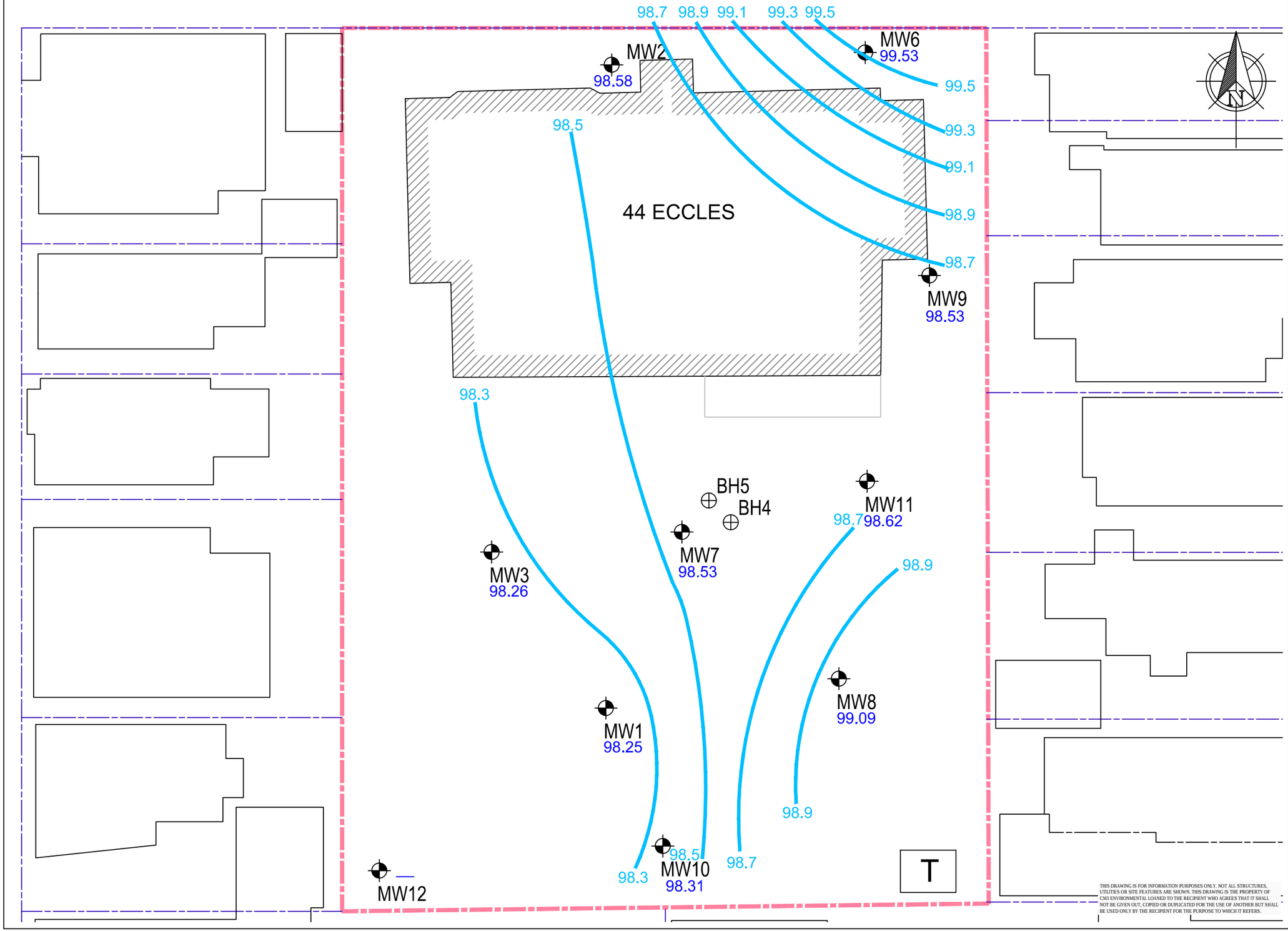
CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8

CUSO INTERNATIONAL

PHASE II ENVIRONMENTAL SITE ASSESSMENT
44 ECCLES STREET
OTTAWA, ON

BOREHOLE & MONITORING WELL LOCATIONS

| | |
|---|---|
| Project: KB1024 | Drawn By: MWM |
| Date: DEC 2017 | Reviewed By: KB |
| Scale: 1:250 | Figure: 3 |




LEGEND

- PROPERTY BOUNDARY (APPROX.)
- SUBJECT PROPERTY
- BOREHOLE
- MONITORING WELL
- T TRANSFORMER
- 94.66 GROUNDWATER ELEVATION (m.a.r.l)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- INFERRED GROUNDWATER FLOW DIRECTION
- (98.48) ELEVATION NOT USED FOR CONTOUR

Scale 1:250

0 2 4 6 8

(Approx. When plotted 11x17)

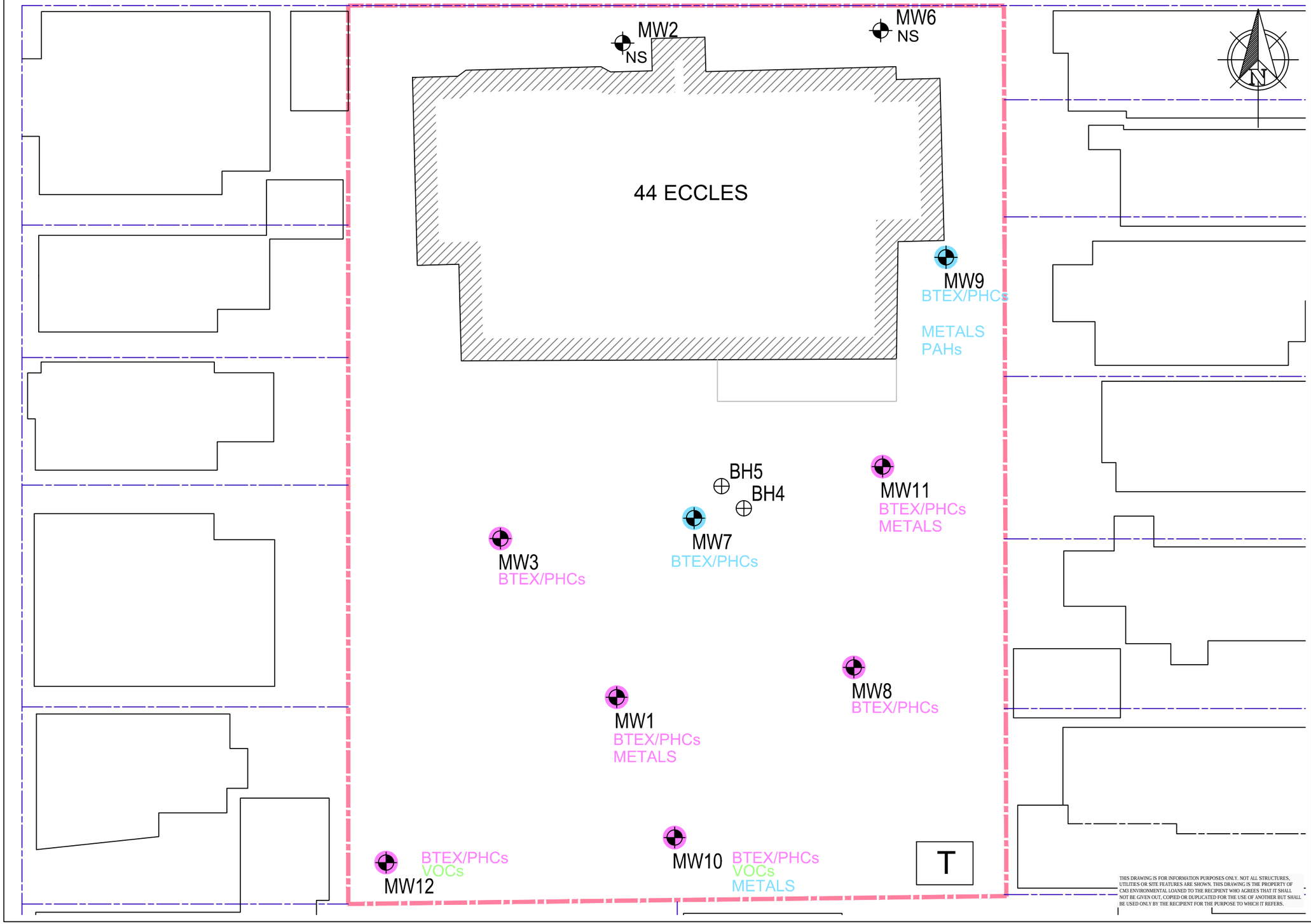

CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8


CUSO INTERNATIONAL

PHASE II ENVIRONMENTAL SITE ASSESSMENT
44 ECCLES STREET
OTTAWA, ON

GROUNDWATER ELEVATIONS
NOVEMBER 28, 2017

| | |
|---|---|
| Project: KB1024 | Drawn By: MWM |
| Date: DEC 2017 | Reviewed By: KB |
| Scale: 1:250 | Figure: 4 |




LEGEND

- PROPERTY BOUNDARY (APPROX.)
- SUBJECT PROPERTY
- BOREHOLE
- MONITORING WELL
- T — TRANSFORMER
- ANALYZED PARAMETERS NOT DETECTED
- SOIL SAMPLE CONCENTRATIONS < MOECC TABLE 7 SCS
- SOIL SAMPLE CONCENTRATIONS > MOECC TABLE 7 SCS
- NS — SOIL SAMPLED NOT ANALYZED

REFER TO TABLE 2 FOR FULL SOIL RESULTS

Scale 1:250

0 2 4 6 8

(Approx. When plotted 11x17)

cm3 environmental

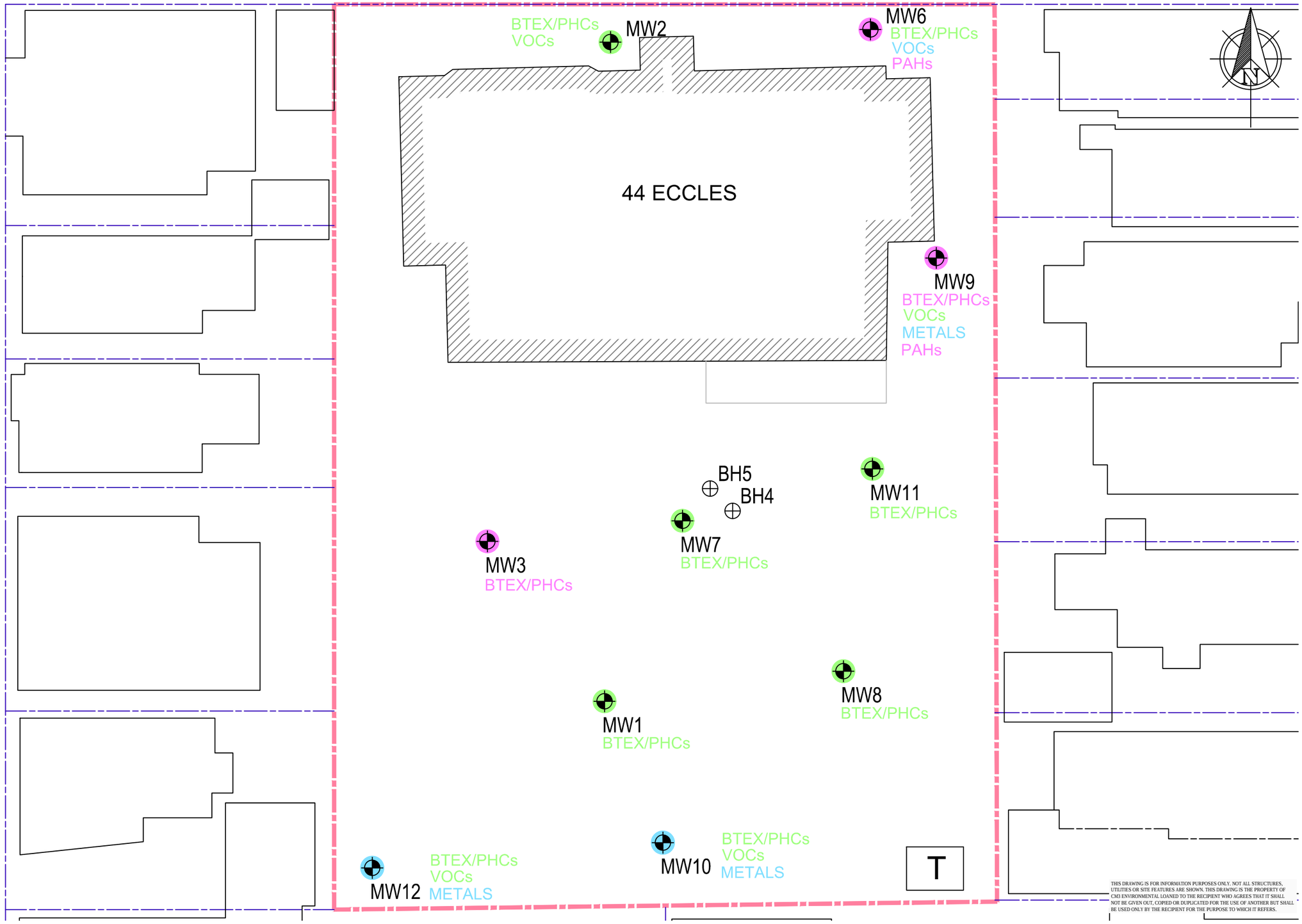
CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8

CUSO INTERNATIONAL

PHASE II ENVIRONMENTAL SITE ASSESSMENT
44 ECCLES STREET
OTTAWA, ON

SOIL QUALITY

| | |
|---|---|
| Project: KB1024 | Drawn By: MWM |
| Date: DEC 2017 | Reviewed By: KB |
| Scale: 1:250 | Figure: 5 |




**LEGEND**

- **PROPERTY BOUNDARY** (APPROX.)
- SUBJECT PROPERTY
- BOREHOLE
- MONITORING WELL
- T TRANSFORMER
- ANALYZED PARAMETERS NOT DETECTED
- GROUNDWATER CONCENTRATIONS < MOECC TABLE 7 SCS
- GROUNDWATER CONCENTRATIONS > MOECC TABLE 7 SCS

REFER TO TABLE 3 FOR FULL GROUNWATER RESULTS

Scale 1:250

0 2 4 6 8

(Approx. When plonted 11x17)

cm3 environmental

CM3 ENVIRONMENTAL
5710 AKINS ROAD, OTTAWA, ON
K2S 1B8

CUSO International
Volunteers for the World

CUSO INTERNATIONAL

PHASE II ENVIRONMENTAL SITE ASSESSMENT
44 ECCLES STREET
OTTAWA, ON

GROUNDWATER QUALITY

| | |
|---|---|
| Project: KB1024 | Drawn By: MWM |
| Date: DEC 2017 | Reviewed By: KB |
| Scale: 1:250 | Figure: 6 |

# TABLES

**Phase II Environmental Site Assessment**

**44 Eccles Street**

**Ottawa, Ontario**

**CUSO International**

**KB1024**

**Table 1:**
**Groundwater Level Measurements**
**44 Eccles Street Ottawa, Ontario**
**KB1024**

| Well ID | Date | TOC (marl) | Grade (marl) | Depth to | | Elevation | | LPH Thickness (m) | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | | | LPH (mbtoc) | GW (mbtoc) | LPH (marl) | GW (marl) | | |
| **MW1** | 24-Oct-17 | 99.789 | 99.861 | - | 1.630 | -- | 98.159 | --- | |
| **MW1** | 28-Nov-17 | 99.789 | 99.861 | - | 1.535 | -- | 98.254 | | |
| **MW2** | 24-Oct-17 | 101.101 | 101.180 | - | 2.617 | -- | 98.484 | --- | |
| **MW2** | 28-Nov-17 | 101.101 | 101.180 | - | 2.523 | -- | 98.578 | | |
| **MW3** | 24-Oct-17 | 99.694 | 99.740 | - | 1.568 | -- | 98.126 | --- | |
| **MW3** | 28-Nov-17 | 99.694 | 99.740 | - | 1.434 | -- | 98.260 | | |
| **MW6** | 24-Oct-17 | 101.288 | 101.404 | - | 2.752 | -- | 98.536 | --- | |
| **MW6** | 28-Nov-17 | 101.288 | 101.404 | - | 1.755 | -- | 99.533 | | |
| **MW7** | 24-Oct-17 | 99.544 | 99.632 | - | 1.066 | -- | 98.478 | --- | |
| **MW7** | 28-Nov-17 | 99.544 | 99.632 | - | 1.019 | -- | 98.525 | | |
| **MW8** | 24-Oct-17 | 99.721 | 99.860 | - | 1.963 | -- | 97.758 | --- | |
| **MW8** | 28-Nov-17 | 99.721 | 99.860 | - | 0.630 | -- | 99.091 | | |
| **MW9** | 24-Oct-17 | 100.434 | 100.524 | - | 1.999 | -- | 98.435 | --- | hydrocarbon odour |
| **MW9** | 28-Nov-17 | 100.434 | 100.524 | 1.900 | 1.905 | 98.534 | 98.529 | 0.005 | |
| **MW10** | 28-Nov-17 | 99.987 | 100.059 | - | 1.680 | -- | 98.307 | | |
| **MW11** | 24-Oct-17 | 99.827 | 99.882 | - | 3.964 | -- | 95.863 | --- | |
| **MW11** | 28-Nov-17 | 99.827 | 99.882 | - | 1.205 | -- | 98.622 | --- | |
| **MW12** | 24-Oct-17 | 100.000 | 100.051 | - | 1.930 | -- | 98.070 | --- | |

**Notes:**
TOC - top of casing
marl - metres above arbitrary reference level
mbtoc - metres below top of casing
LPH - liquid phase hydrocarbons
GW - groundwater
NM - not measured
NV / -- - no value/LPH not present

**Table 2:**
**Summary of Soil Analytical Results**
**44 Eccles Street Ottawa, Ontario**
**KB1024**

| Parameter<br>depth (m)><br>location><br>sample date> | MDL | MOECC Table 7 SCS | MW1 SA1<br>0.0-0.61<br>APEC 1<br>2-Oct-17 | MW1 SA4<br>1.83-2.13<br>APEC 1<br>2-Oct-17 | MW3-SA1<br>0.0-0.61<br>APEC 1<br>2-Oct-17 | MW7 SA3<br>1.22-1.83<br>APEC 1<br>3-Oct-17 | MW8 SA3<br>1.22-1.68<br>APEC 1<br>3-Oct-17 | MW11 SA3<br>1.22-1.83<br>APEC 1<br>4-Oct-17 | MW12 SA3<br>1.22-1.83<br>APEC 2<br>4-Oct-17 | MW12 SA4<br>1.83-2.44<br>APEC 2<br>4-Oct-17 | MW10 SA1<br>0.0-0.61<br>APEC 3<br>4-Oct-17 | MW10 SA3<br>1.22-1.83<br>APEC 3<br>4-Oct-17 | MW9 SA1<br>0.0-0.61<br>APEC 7<br>4-Oct-17 | MW9 SA2<br>0.61-1.22<br>APEC 7<br>4-Oct-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***BTEX*** | | | | | | | | | | | | | | |
| Benzene | 0.02 | 0.21 | N/A | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) | ND (0.02) | N/A | ND (0.02) | N/A | ND (0.02) | N/A | ND (0.02) |
| Ethylbenzene | 0.05 | 2.0 | N/A | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Toluene | 0.05 | 2.3 | N/A | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| m/p-Xylene | 0.05 | NV | N/A | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| o-Xylene | 0.05 | NV | N/A | 0.07 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Xylenes, total | 0.05 | 3.1 | N/A | 0.07 | ND (0.05) | ND (0.05) | ND (0.05) | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| ***Hydrocarbons*** | | | | | | | | | | | | | | |
| F1 PHCs (C6-C10) | 7 | 55 | N/A | 11 | ND (7) | ND (7) | ND (7) | ND (7) | N/A | ND (7) | N/A | ND (7) | N/A | ND (7) |
| F2 PHCs (C10-C16) | 4 | 98 | N/A | ***636*** | ***421*** | 24 | ND (40) | ***135*** | N/A | ND (40) | N/A | 11 | N/A | ND (4) |
| F3 PHCs (C16-C34) | 8 | 300 | N/A | ***830*** | ***1170*** | 259 | ***359*** | ***308*** | N/A | ***369*** | N/A | ***366*** | N/A | 9 |
| F4 PHCs (C34-C50) | 6 | 2800 | N/A | ND (60) | 840 | 314 | 570 | 237 | N/A | 719 | N/A | 433 | N/A | 23 |
| F4G PHCs (gravimetric) | 50 | 2800 | N/A | N/A | N/A | 368 | N/A | N/A | N/A | N/A | N/A | 401 | N/A | N/A |
| ***Volatiles*** | | | | | | | | | | | | | | |
| Acetone | 0.5 | 16 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.50) | N/A | ND (0.50) | N/A | ND (0.50) |
| Bromodichloromethane | 0.05 | 13 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Bromoform | 0.05 | 0.27 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Bromomethane | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Carbon Tetrachloride | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Chlorobenzene | 0.05 | 2.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Chloroform | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Dibromochloromethane | 0.05 | 9.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Dichlorodifluoromethane | 0.05 | 16 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,2-Dichlorobenzene | 0.05 | 3.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,3-Dichlorobenzene | 0.05 | 4.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,4-Dichlorobenzene | 0.05 | 0.083 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,1-Dichloroethane | 0.05 | 3.5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,2-Dichloroethane | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,1-Dichloroethylene | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| cis-1,2-Dichloroethylene | 0.05 | 3.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| trans-1,2-Dichloroethylene | 0.05 | 0.084 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,2-Dichloropropane | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| cis-1,3-Dichloropropylene | 0.05 | NV | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| trans-1,3-Dichloropropylene | 0.05 | NV | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,3-Dichloropropene, total | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Ethylene dibromide (dibromoethane, 1,2-) | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Hexane | 0.05 | 2.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Methyl Ethyl Ketone (2-Butanone) | 0.5 | 16 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.50) | N/A | ND (0.50) | N/A | ND (0.50) |
| Methyl Isobutyl Ketone | 0.5 | 1.7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.50) | N/A | ND (0.50) | N/A | ND (0.50) |
| Methyl tert-butyl ether | 0.05 | 0.75 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Methylene Chloride | 0.05 | 0.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Styrene | 0.05 | 0.7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,1,1,2-Tetrachloroethane | 0.05 | 0.058 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,1,2,2-Tetrachloroethane | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Tetrachloroethylene | 0.05 | 0.28 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,1,1-Trichloroethane | 0.05 | 0.38 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| 1,1,2-Trichloroethane | 0.05 | 0.05 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Trichloroethylene | 0.05 | 0.061 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Trichlorofluoromethane | 0.05 | 4.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.05) | N/A | ND (0.05) | N/A | ND (0.05) |
| Vinyl Chloride | 0.02 | 0.02 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) | N/A | ND (0.02) | N/A | ND (0.02) |

**Table 2:**
**Summary of Soil Analytical Results**
**44 Eccles Street Ottawa, Ontario**
**KB1024**

| Parameter<br>depth (m)><br>location><br>sample date> | MDL | MOECC Table 7 SCS | MW1 SA1<br>0.0-0.61<br>APEC 1<br>2-Oct-17 | MW1 SA4<br>1.83-2.13<br>APEC 1<br>2-Oct-17 | MW3-SA1<br>0.0-0.61<br>APEC 1<br>2-Oct-17 | MW7 SA3<br>1.22-1.83<br>APEC 1<br>3-Oct-17 | MW8 SA3<br>1.22-1.68<br>APEC 1<br>3-Oct-17 | MW11 SA3<br>1.22-1.83<br>APEC 1<br>4-Oct-17 | MW12 SA3<br>1.22-1.83<br>APEC 2<br>4-Oct-17 | MW12 SA4<br>1.83-2.44<br>APEC 2<br>4-Oct-17 | MW10 SA1<br>0.0-0.61<br>APEC 3<br>4-Oct-17 | MW10 SA3<br>1.22-1.83<br>APEC 3<br>4-Oct-17 | MW9 SA1<br>0.0-0.61<br>APEC 7<br>4-Oct-17 | MW9 SA2<br>0.61-1.22<br>APEC 7<br>4-Oct-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Metals*** | | | | | | | | | | | | | | |
| Antimony | 1.0 | 7.5 | ND (1.0) | N/A | N/A | N/A | N/A | N/A | 2 | N/A | ND (1.0) | N/A | ND (1.0) | N/A |
| Arsenic | 1.0 | 18 | 3.7 | N/A | N/A | N/A | N/A | N/A | 12.2 | N/A | 2.1 | N/A | 3.4 | N/A |
| Barium | 1.0 | 390 | 67.8 | N/A | N/A | N/A | N/A | N/A | 258 | N/A | 47.1 | N/A | 53.6 | N/A |
| Beryllium | 1.0 | 4.0 | ND (1.0) | N/A | N/A | N/A | N/A | N/A | ND (1.0) | N/A | ND (1.0) | N/A | ND (1.0) | N/A |
| Boron | 1.0 | 120 | 9.7 | N/A | N/A | N/A | N/A | N/A | 10.8 | N/A | 3.7 | N/A | 4.9 | N/A |
| Cadmium | 0.5 | 1.2 | ND (0.5) | N/A | N/A | N/A | N/A | N/A | ND (0.5) | N/A | ND (0.5) | N/A | ND (0.5) | N/A |
| Chromium | 1.0 | 160 | 11.2 | N/A | N/A | N/A | N/A | N/A | 18.1 | N/A | 18.4 | N/A | 15.6 | N/A |
| Cobalt | 1.0 | 22 | 3.5 | N/A | N/A | N/A | N/A | N/A | 7 | N/A | 4.6 | N/A | 10.2 | N/A |
| Copper | 1.0 | 140 | 9.5 | N/A | N/A | N/A | N/A | N/A | 49.8 | N/A | 13.5 | N/A | 11.2 | N/A |
| Lead | 1.0 | 120 | 35.8 | N/A | N/A | N/A | N/A | N/A | ***521*** | N/A | 29.1 | N/A | 27.9 | N/A |
| Molybdenum | 1.0 | 6.9 | ND (1.0) | N/A | N/A | N/A | N/A | N/A | 1.3 | N/A | ND (1.0) | N/A | 2 | N/A |
| Nickel | 1.0 | 100 | 9.7 | N/A | N/A | N/A | N/A | N/A | 16 | N/A | 10.4 | N/A | 19.3 | N/A |
| Selenium | 1.0 | 2.4 | ND (1.0) | N/A | N/A | N/A | N/A | N/A | ND (1.0) | N/A | ND (1.0) | N/A | ND (1.0) | N/A |
| Silver | 0.5 | 20 | ND (0.5) | N/A | N/A | N/A | N/A | N/A | ND (0.5) | N/A | ND (0.5) | N/A | 0.6 | N/A |
| Thallium | 1.0 | 1.0 | ***1.6*** | N/A | N/A | N/A | N/A | N/A | ND (1.0) | N/A | ND (1.0) | N/A | ND (1.0) | N/A |
| Uranium | 1.0 | 23 | ND (1.0) | N/A | N/A | N/A | N/A | N/A | ND (1.0) | N/A | ND (1.0) | N/A | ND (1.0) | N/A |
| Vanadium | 1.0 | 86 | 17.7 | N/A | N/A | N/A | N/A | N/A | 25.2 | N/A | 20.6 | N/A | 14 | N/A |
| Zinc | 1.0 | 340 | 35 | N/A | N/A | N/A | N/A | N/A | 121 | N/A | 52.6 | N/A | 22.8 | N/A |
| ***Semi-Volatiles (PAHs)*** | | | | | | | | | | | | | | |
| Acenaphthene | 0.02 | 7.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Acenaphthylene | 0.02 | 0.15 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Anthracene | 0.02 | 0.67 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Benzo[a]anthracene | 0.02 | 0.5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Benzo[a]pyrene | 0.02 | 0.3 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Benzo[b]fluoranthene | 0.02 | 0.78 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Benzo[g,h,i]perylene | 0.02 | 6.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Benzo[k]fluoranthene | 0.02 | 0.78 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Chrysene | 0.02 | 7.0 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Dibenzo[a,h]anthracene | 0.02 | 0.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Fluoranthene | 0.02 | 0.69 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.03 |
| Fluorene | 0.02 | 62 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Indeno[1,2,3-cd]pyrene | 0.02 | 0.38 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| 1-Methylnaphthalene | 0.02 | 0.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| 2-Methylnaphthalene | 0.02 | 0.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Methylnaphthalene (1&2) | 0.04 | 0.99 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.04) |
| Naphthalene | 0.01 | 0.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.01) |
| Phenanthrene | 0.02 | 6.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ND (0.02) |
| Pyrene | 0.02 | 78 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.03 |

**Notes:**

ppm - All concentrations provided in parts per million (micrograms per gram - µg/g)
"ND" - Less than detection limits indicated
NV - No standard listed
"-" - Not Analyzed
MDL - Laboratory reportable detection limit
MOECC Table 7 SCS - Ontario Ministry of Environment and Climate Change (MOECC) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA (April 15, 2011) MOECC Table 7 SCS residential property use, coarse grained soil
***Bold / Italics*** - Concentration exceeds MOECC Table 7 SCS
Underline - MDL above applicable Table 7 SCS (refer to laboratory report)

**Table 3:**
**Summary of Groundwater Analytical Results**
**44 Eccles Street Ottawa, Ontario**
**KB1024**

| Parameter / location> / sample date> | MDL | MOECC Table 7 SCS | MW1 APEC 1 24-Oct-17 | MW3 APEC 1 24-Oct-17 | MW7 APEC 1 24-Oct-17 | MW8 APEC 1 24-Oct-17 | MW11 APEC 1 24-Oct-17 | MW12 APEC 2 24-Oct-17 | MW10 APEC 3 28-Nov-17 | MW2 APEC 4,5,6 24-Oct-17 | MW6 APEC 4,5,6 24-Oct-17 | MW9 APEC 7 24-Oct-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***BTEX*** | | | | | | | | | | | | |
| Benzene | 0.5 | 0.5 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Ethylbenzene | 0.5 | 54 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | 27.2 |
| Toluene | 0.5 | 320 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| m/p-Xylene | 0.5 | NV | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | 20.2 |
| o-Xylene | 0.5 | NV | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Xylenes, total | 0.5 | 72 | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | 20.2 |
| ***Hydrocarbons*** | | | | | | | | | | | | |
| F1 PHCs (C6-C10) | 25 | 420 | ND (25) | ND (25) | ND (25) | ND (25) | ND (25) | ND (25) | ND (25) | ND (25) | N/A | ***1810*** |
| F2 PHCs (C10-C16) | 100 | 150 | ND (100) | ***802*** | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | N/A | ***72500*** |
| F3 PHCs (C16-C34) | 100 | 500 | ND (100) | ***877*** | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | N/A | ***1520*** |
| F4 PHCs (C34-C50) | 100 | 500 | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | ND (100) | N/A | ND (1000)[1] |
| ***Volatiles*** | | | | | | | | | | | | |
| Acetone | 5 | 100000 | N/A | N/A | N/A | N/A | N/A | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Bromodichloromethane | 0.5 | 67000 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Bromoform | 0.5 | 5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Bromomethane | 0.5 | 0.89 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Carbon Tetrachloride | 0.2 | 0.2 | N/A | N/A | N/A | N/A | N/A | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) |
| Chlorobenzene | 0.5 | 140 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Chloroform | 0.5 | 2 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | 1.8 | ND (0.5) |
| Dibromochloromethane | 0.5 | 65000 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Dichlorodifluoromethane | 1 | 3500 | N/A | N/A | N/A | N/A | N/A | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| 1,2-Dichlorobenzene | 0.5 | 150 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,3-Dichlorobenzene | 0.5 | 7600 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,4-Dichlorobenzene | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1-Dichloroethane | 0.5 | 11 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,2-Dichloroethane | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1-Dichloroethylene | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| cis-1,2-Dichloroethylene | 0.5 | 1.6 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| trans-1,2-Dichloroethylene | 0.5 | 1.6 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,2-Dichloropropane | 0.5 | 0.58 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| cis-1,3-Dichloropropylene | 0.5 | NV | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| trans-1,3-Dichloropropylene | 0.5 | NV | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,3-Dichloropropene, total | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Ethylene dibromide (dibromoethane, 1,2-) | 0.2 | 0.2 | N/A | N/A | N/A | N/A | N/A | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) | ND (0.2) |
| Hexane | 1 | 5 | N/A | N/A | N/A | N/A | N/A | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Methyl Ethyl Ketone (2-Butanone) | 5 | 21000 | N/A | N/A | N/A | N/A | N/A | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Methyl Isobutyl Ketone | 5 | 5200 | N/A | N/A | N/A | N/A | N/A | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Methyl tert-butyl ether | 2 | 15 | N/A | N/A | N/A | N/A | N/A | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) | ND (2.0) |
| Methylene Chloride | 5 | 26 | N/A | N/A | N/A | N/A | N/A | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) | ND (5.0) |
| Styrene | 0.5 | 43 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,1,2-Tetrachloroethane | 0.5 | 1.1 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,2,2-Tetrachloroethane | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Tetrachloroethylene | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,1-Trichloroethane | 0.5 | 23 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| 1,1,2-Trichloroethane | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Trichloroethylene | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |
| Trichlorofluoromethane | 1 | 2000 | N/A | N/A | N/A | N/A | N/A | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) | ND (1.0) |
| Vinyl Chloride | 0.5 | 0.5 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) | ND (0.5) |

**Table 3:**
**Summary of Groundwater Analytical Results**
**44 Eccles Street Ottawa, Ontario**
**KB1024**

| Parameter / location> / sample date> | MDL | MOECC Table 7 SCS | MW1 APEC 1 24-Oct-17 | MW3 APEC 1 24-Oct-17 | MW7 APEC 1 24-Oct-17 | MW8 APEC 1 24-Oct-17 | MW11 APEC 1 24-Oct-17 | MW12 APEC 2 24-Oct-17 | MW10 APEC 3 28-Nov-17 | MW2 APEC 4,5,6 24-Oct-17 | MW6 APEC 4,5,6 24-Oct-17 | MW9 APEC 7 24-Oct-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Metals*** | | | | | | | | | | | | |
| Antimony | 0.5 | 16000 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | N/A | N/A | ND (0.5) |
| Arsenic | 1 | 1500 | N/A | N/A | N/A | N/A | N/A | 7 | ND (1) | N/A | N/A | ND (1) |
| Barium | 1 | 23000 | N/A | N/A | N/A | N/A | N/A | 726 | 726 | N/A | N/A | 901 |
| Beryllium | 0.5 | 53 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | N/A | N/A | ND (0.5) |
| Boron | 10 | 36000 | N/A | N/A | N/A | N/A | N/A | 138 | 394 | N/A | N/A | 139 |
| Cadmium | 0.1 | 2.1 | N/A | N/A | N/A | N/A | N/A | ND (0.1) | ND (0.1) | N/A | N/A | ND (0.1) |
| Chromium | 1 | 640 | N/A | N/A | N/A | N/A | N/A | ND (1) | ND (1) | N/A | N/A | ND (1) |
| Cobalt | 0.5 | 52 | N/A | N/A | N/A | N/A | N/A | 3.4 | 0.5 | N/A | N/A | 3.3 |
| Copper | 0.5 | 69 | N/A | N/A | N/A | N/A | N/A | ND (0.5) | ND (0.5) | N/A | N/A | ND (0.5) |
| Lead | 0.1 | 20 | N/A | N/A | N/A | N/A | N/A | 0.2 | ND (0.1) | N/A | N/A | ND (0.1) |
| Molybdenum | 0.5 | 7300 | N/A | N/A | N/A | N/A | N/A | 3.1 | 0.5 | N/A | N/A | 0.6 |
| Nickel | 1 | 390 | N/A | N/A | N/A | N/A | N/A | 2 | 1 | N/A | N/A | 3 |
| Selenium | 1 | 50 | N/A | N/A | N/A | N/A | N/A | ND (1) | ND (1) | N/A | N/A | ND (1) |
| Silver | 0.1 | 1.2 | N/A | N/A | N/A | N/A | N/A | ND (0.1) | ND (0.1) | N/A | N/A | ND (0.1) |
| Sodium | 200 | 1800000 | N/A | N/A | N/A | N/A | N/A | 1270000 | 1090000 | N/A | N/A | 936000 |
| Thallium | 0.1 | 400 | N/A | N/A | N/A | N/A | N/A | ND (0.1) | ND (0.1) | N/A | N/A | 0.1 |
| Uranium | 0.1 | 330 | N/A | N/A | N/A | N/A | N/A | 1.9 | 1.5 | N/A | N/A | 4.1 |
| Vanadium | 0.5 | 200 | N/A | N/A | N/A | N/A | N/A | 4.5 | ND (0.5) | N/A | N/A | ND (0.5) |
| Zinc | 5 | 890 | N/A | N/A | N/A | N/A | N/A | 7 | ND (5) | N/A | N/A | 11 |
| ***Semi-Volatiles (PAHs)*** | | | | | | | | | | | | |
| Acenaphthene | 0.05 | 17 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.99 | 10.9 |
| Acenaphthylene | 0.05 | 1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***1.22*** | ND (0.25) |
| Anthracene | 0.01 | 1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***2.85*** | 0.56 |
| Benzo[a]anthracene | 0.01 | 1.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***4.96*** | 0.74 |
| Benzo[a]pyrene | 0.01 | 0.81 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***6.94*** | ***0.92*** |
| Benzo[b]fluoranthene | 0.05 | 0.75 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***5.04*** | 0.72 |
| Benzo[g,h,i]perylene | 0.05 | 0.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***3.79*** | ***0.55*** |
| Benzo[k]fluoranthene | 0.05 | 0.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***2.65*** | 0.36 |
| Chrysene | 0.05 | 0.7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***6.21*** | ***0.98*** |
| Dibenzo[a,h]anthracene | 0.05 | 0.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***1.12*** | ND (0.25) |
| Fluoranthene | 0.01 | 44 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 11.1 | 2.22 |
| Fluorene | 0.05 | 290 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.95 | 8.12 |
| Indeno[1,2,3-cd]pyrene | 0.05 | 0.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***3.13*** | ***0.45*** |
| 1-Methylnaphthalene | 0.05 | 1500 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.36 | 478 |
| 2-Methylnaphthalene | 0.05 | 1500 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.43 | 503 |
| Methylnaphthalene (1&2) | 0.1 | 1500 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.79 | 981 |
| Naphthalene | 0.05 | 7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 0.5 | ***90.1*** |
| Phenanthrene | 0.05 | 380 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 9.28 | 5.75 |
| Pyrene | 0.01 | 5.7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | ***10.1*** | 1.84 |

**Notes:**

ppb - All concentrations provided in parts per billion (micrograms per litre - µg/L)
ND - Less than detection limits indicated (refer to laboratory report)
NV - No standard listed
N/A - Not analyzed
MDL - Laboratory reportable detection limit
1 - Detection limit raised due to matrix interference
MOECC Table 7 SCS - Ontario Ministry of Environment and Climate Change (MOECC) Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the EPA (April 15, 2011) MOECC Table 7 SCS all types of property use, coarse grained soil
***Bold / Italics*** - Concentration exceeds MOECC Table 7 SCS
Underline - MDL above applicable Table 7 SCS (refer to laboratory report)

# APPENDIX A

## BOREHOLE LOGS

**Phase II Environmental Site Assessment**

**44 Eccles Street**

**Ottawa, Ontario**

**CUSO International**

**KB1024**

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW1
SURFACE ELEVATION: 99.86 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | 1 10 100 1000 10000 | | | | 100 |
| 0 | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SILT, SAND and GRAVEL**<br>silt sand, gravel, pieces of brick (fill), dark brown, moist | 0 | | | | |
| 1 | | SA2 | | | | 0 | | | | 99 |
| | | SA3 | | | | 5 | | ▼ | GW = 98.23 m (10/24/2017) | |
| 2 | | SA4 | | | **SAND**<br>fine to medium sand, trace gravel, hydrocarbon odour, grey, wet | 75 | | | | 98 |
| | | | | | **BEDROCK** | | | | | |
| 3 | | | | | | | | | | 97 |
| 4 | | | | | | | | | 50 mm 010 slot PVC pipe | 96 |
| 5 | | | | | | | | | | 95 |
| | | | | | | | | | | 94 |
| | | | | | End of borehole at 5.92 m<br><br>Well Completion Details:<br>Screened interval from 2.87 m to 5.92 m below surface<br>Elevation at top of pipe (TOP) = 99.79 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 2 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW2
SURFACE ELEVATION: 101.18 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | |
| 0 | | | | | **TOPSOIL** | | | | | 101 |
| | | SA1 | | | **SILT, SAND and GRAVEL**<br>silt sand, gravel, dark brown, moist | | | | | |
| 1 | | SA2 | | | | | | | | 100 |
| | | SA3 | | | | | | | | |
| | | SA4 | | | | | | | | |
| 2 | | | | | **BEDROCK** | | | | | 99 |
| | | | | | | | | ▼ | GW = 98.56 m (10/24/2017) | |
| 3 | | | | | | | | | | 98 |
| | | | | | | | | | 32 mm 010 slot PVC pipe | |
| 4 | | | | | | | | | | 97 |
| 5 | | | | | | | | | | 96 |
| | | | | | End of borehole at 5.64 m<br><br>Well Completion Details:<br>Screened interval from 1.98 m to 5.64 m below surface<br>Elevation at top of pipe (TOP) = 101.10 m | | | | | |

DRILLING METHOD: Split Spoon/Core
BOREHOLE DIAMETER: 0.05 m (OD)

DRILL DATE: 2017 October 2 LOGGED BY: SP

Notes: SPLIT SPOON

CM³ JOB NO: KB1024

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

# BOREHOLE LOG

BOREHOLE NO: MW3
SURFACE ELEVATION: 99.74 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | 100 |
| 0 | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SILT, SAND and GRAVEL**<br>silt sand, gravel,, dark brown, moist | | | | | |
| | | SA2 | | | | 55 | | | | 99 |
| 1 | | | | | | | | | | |
| | | SA3 | | | **SAND**<br>fine to medium sand, trace gravel, hydrocarbon odour, grey, wet | 75 | | ▼ | GW = 98.17 m (10/24/2017) | |
| | | SA4 | | | | 30 | | | | 98 |
| 2 | | | | | **BEDROCK** | | | | | |
| | | | | | | | | | | 97 |
| 3 | | | | | | | | | | |
| | | | | | | | | | | 96 |
| 4 | | | | | | | | | 50 mm 010 slot PVC pipe | |
| | | | | | | | | | | 95 |
| 5 | | | | | | | | | | |
| | | | | | End of borehole at 5.61 m<br><br>Well Completion Details:<br>Screened interval from 2.56 m to 5.61 m below surface<br>Elevation at top of pipe (TOP) = 99.69 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 2 LOGGED BY: SP

Notes: SPLIT SPOON

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

# BOREHOLE LOG

BOREHOLE NO: BH4
SURFACE ELEVATION: 99.71 m

CM³ JOB NO: KB1024

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | BOREHOLE COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel, pieces of brick (fill), dark brown, moist | 1100 | | | | |
| 1 | | SA2 | | | | 3300 | | | | 99 |
| | | SA3 | | | | 0 | | | | |
| | | | | | End of borehole at 1.52 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 2 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: BH5
SURFACE ELEVATION: 99.68 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | BOREHOLE COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel, pieces of brick (fill), dark brown, moist | | | | | 99 |
| 1 | | SA2 | | | | | | | | |
| | | SA3 | | | | | | | | |
| | | | | | End of borehole at 1.63 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 2 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW6
SURFACE ELEVATION: 101.40 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | |
| 0 | | | | | **TOPSOIL** | | | | | |
| | | | | | **SILT, SAND and GRAVEL** | | | | | |
| | | SA1 | | | silt sand, gravel, dark brown, moist | 0 | | | | 101 |
| 1 | | SA2 | | | | 0 | | | | |
| | | | | | **BEDROCK** | | | | | 100 |
| 2 | | | | | | | | | | |
| | | | | | | | | | | 99 |
| | | | | | | | | ▼ | GW = 98.65 m (10/24/2017) | |
| 3 | | | | | | | | | | |
| | | | | | | | | | 32 mm 010 slot PVC pipe | 98 |
| 4 | | | | | | | | | | |
| | | | | | | | | | | 97 |
| 5 | | | | | | | | | | |
| | | | | | End of borehole at 5.18 m | | | | | |
| | | | | | Well Completion Details:<br>Screened interval from 2.13 m to 5.18 m below surface<br>Elevation at top of pipe (TOP) = 101.29 m | | | | | |

DRILLING METHOD: Split Spoon/Core
BOREHOLE DIAMETER: 0.05 m (OD)

DRILL DATE: 2017 October 2 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW7
SURFACE ELEVATION: 99.63 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | 100 |
| 0 | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel, brown, dry | | | | | 99 |
| 1 | | SA2 | | | | | | ▼ | GW = 98.57 m<br>(10/24/2017) | |
| | | SA3 | | | **SILT, SAND and GRAVEL**<br>silt sand, gravel (fill), slight hydrocarbon odour | | | | | 98 |
| 2 | | | | | **BEDROCK** | | | | | |
| | | | | | | | | | | 97 |
| 3 | | | | | | | | | | |
| | | | | | | | | | | 96 |
| 4 | | | | | | | | | 50 mm 010 slot<br>PVC pipe | |
| | | | | | | | | | | 95 |
| 5 | | | | | | | | | | |
| | | | | | | | | | | 94 |
| | | | | | End of borehole at 5.84 m<br><br>Well Completion Details:<br>Screened interval from 2.79 m to 5.84 m below surface<br>Elevation at top of pipe (TOP) = 99.54 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 3 LOGGED BY: SP

Notes: SPLIT SPOON

CM³ JOB NO: KB1024

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

# BOREHOLE LOG

BOREHOLE NO: MW8
SURFACE ELEVATION: 99.86 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | 100 |
| 0 | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel, brown, dry | 0 | | | | |
| | | SA2 | | | | 0 | | | | 99 |
| 1 | | | | | **SILT, SAND and GRAVEL**<br>silt, fine to medium sand, gravel (fill), grey, moist | | | | | |
| | | SA3 | | | | 0 | | | | |
| | | | | | **BEDROCK** | | | | | |
| 2 | | | | | | | | ▼ | GW = 97.90 m (10/24/2017) | 98 |
| 3 | | | | | | | | | | 97 |
| 4 | | | | | | | | | | 96 |
| | | | | | | | | | 50 mm 010 slot PVC pipe | |
| 5 | | | | | | | | | | 95 |
| | | | | | | | | | | 94 |
| | | | | | End of borehole at 5.99 m<br><br>Well Completion Details:<br>Screened interval from 2.94 m to 5.99 m below surface<br>Elevation at top of pipe (TOP) = 99.72 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 3 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW9
SURFACE ELEVATION: 100.52 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | |
| 0 | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel | 60 | | | | |
| | | | | | **SILT, SAND and GRAVEL**<br>silt, sand, gravel, brown, moist | 10 | | | | 100 |
| 1 | | SA2 | | | | | | | | |
| | | | | | **BEDROCK** | | | | | 99 |
| 2 | | | | | | | | ▼ | GW = 98.53 m<br>(10/24/2017) | |
| | | | | | | | | | | 98 |
| 3 | | | | | | | | | | |
| | | | | | | | | | 32 mm 010 slot<br>PVC pipe | 97 |
| 4 | | | | | | | | | | |
| | | | | | | | | | | 96 |
| 5 | | | | | End of borehole at 5.13 m<br><br>Well Completion Details:<br>Screened interval from 2.08 m to 5.13 m below surface<br>Elevation at top of pipe (TOP) = 100.43 m | | | | | |

DRILLING METHOD: Split Spoon/Core
BOREHOLE DIAMETER: 0.05 m (OD)

DRILL DATE: 2017 October 4 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW10
SURFACE ELEVATION: 100.06 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | |
| 0 | | | | | **ASPHALT** | | | | | 100 |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel, brown, dry | | | | | |
| | | | | | **SILT, SAND and GRAVEL**<br>silt, sand, gravel, dark brown, moist | 0 | | | | |
| 1 | | SA2 | | | | | | | | 99 |
| | | SA3 | | | | 0 | | | GW = 98.38 m<br>(11/28/2017) | |
| 2 | | SA4 | | | | 55 | | | | 98 |
| | | | | | **BEDROCK** | | | | | |
| 3 | | | | | | | | | | 97 |
| 4 | | | | | | | | | 50 mm 010 slot<br>PVC pipe | 96 |
| 5 | | | | | | | | | | 95 |
| | | | | | End of borehole at 5.94 m<br><br>Well Completion Details:<br>Screened interval from 2.89 m to 5.94 m below surface<br>Elevation at top of pipe (TOP) = 99.99 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 4 LOGGED BY: SP

Notes: SPLIT SPOON

CM³ JOB NO: KB1024

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

# BOREHOLE LOG

BOREHOLE NO: MW11
SURFACE ELEVATION: 99.88 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | 100 |
| 0 | | | | | **ASPHALT** | | | | | |
| | | SA1 | | | **SILT, SAND and GRAVEL**<br>silt, sand, gravel, pieces of broken rock, dark brown, moist | 0 | | | | |
| 1 | | SA2 | | | | 20 | | | | 99 |
| | | SA3 | | | | 0 | | | | |
| 2 | | | | | **BEDROCK** | | | ▼ | GW = 97.95 m (10/24/2017) | 98 |
| 3 | | | | | | | | | | 97 |
| 4 | | | | | | | | | 50 mm 010 slot PVC pipe | 96 |
| 5 | | | | | | | | | | 95 |
| | | | | | | | | | | 94 |
| | | | | | End of borehole at 5.94 m<br><br>Well Completion Details:<br>Screened interval from 2.89 m to 5.94 m below surface<br>Elevation at top of pipe (TOP) = 99.83 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 4 LOGGED BY: SP

Notes: SPLIT SPOON

# BOREHOLE LOG

CLIENT: **CUSO International**
PROJECT: **Phase II ESA**
**44 Eclles Street**
**Ottawa, ON**

CM³ JOB NO: KB1024

BOREHOLE NO: MW12
SURFACE ELEVATION: 100.05 m

| DEPTH (m) | SAMPLE TYPE | SAMPLE ID | SPT COUNT | SOIL TYPE | SOIL DESCRIPTION | FIELD TEST DATA: ORGANIC VAPOUR LEVEL (ppmv) 1 10 100 1000 10000 | WELL COMPLETION | WATER LEVEL | WELL COMPLETION NOTES | ELEVATION (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ground Surface | | | | | |
| 0 | | | | | **ASPHALT** | | | | | 100 |
| | | SA1 | | | **SAND and GRAVEL**<br>sand, gravel, brown, dry | | | | | |
| | | | | | **SILT, SAND and GRAVEL**<br>silt, sand, gravel, pieces of brick and concrete, dark brown, moist | | | | | |
| 1 | | SA2 | | | | | | | | 99 |
| | | SA3 | | | | | | | | |
| 2 | | SA4 | | | | | | ▼ | GW = 98.12 m (10/24/2017) | 98 |
| | | | | | **BEDROCK** | | | | | |
| 3 | | | | | | | | | | 97 |
| 4 | | | | | | | | | 50 mm 010 slot PVC pipe | 96 |
| 5 | | | | | | | | | | 95 |
| | | | | | End of borehole at 5.84 m<br><br>Well Completion Details:<br>Screened interval from 2.79 m to 5.84 m below surface<br>Elevation at top of pipe (TOP) = 100.00 m | | | | | |

DRILLING METHOD: HSA/Air Hammer
BOREHOLE DIAMETER: 0.15 m (OD)

DRILL DATE: 2017 October 4 LOGGED BY: SP

Notes: SPLIT SPOON

# APPENDIX B

## LABORATORY REPORTS

**Phase II Environmental Site Assessment**

**44 Eccles Street**

**Ottawa, Ontario**

**CUSO International**

**KB1024**

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# Certificate of Analysis

**CM3 Environmental Inc.**

5710 Akins Road
Ottawa, ON K2S 1B8
Attn: Karl Bilyj

Client PO: Eccles
Project: KB1024
Custody: 40023/40024

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017

**Order #: 1740372**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 1740372-01 | MW1 SA1 |
| 1740372-02 | MW1 SA4 |
| 1740372-03 | MW3-SA1 |
| 1740372-04 | MW7 SA3 |
| 1740372-05 | MW8 SA3 |
| 1740372-06 | MW9 SA1 |
| 1740372-07 | MW9 SA2 |
| 1740372-08 | MW10 SA1 |
| 1740372-09 | MW10 SA3 |
| 1740372-10 | MW11 SA3 |
| 1740372-11 | MW12 SA3 |
| 1740372-12 | MW12 SA4 |

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| BTEX by P&T GC-MS | EPA 8260 - P&T GC-MS | 9-Oct-17 | 10-Oct-17 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 9-Oct-17 | 11-Oct-17 |
| PHC F4G (gravimetric) | CWS Tier 1 - Extraction Gravimetric | 12-Oct-17 | 12-Oct-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 5-Oct-17 | 6-Oct-17 |
| REG 153: Metals by ICP/OES, soil | based on MOE E3470, ICP-OES | 7-Oct-17 | 7-Oct-17 |
| REG 153: PAHs by GC-MS | EPA 8270 - GC-MS, extraction | 5-Oct-17 | 11-Oct-17 |
| REG 153: VOCs by P&T GC/MS | EPA 8260 - P&T GC-MS | 9-Oct-17 | 11-Oct-17 |
| Solids, % | Gravimetric, calculation | 11-Oct-17 | 11-Oct-17 |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

| | Client ID: | MW1 SA1 | MW1 SA4 | MW3-SA1 | MW7 SA3 |
|---|---|---|---|---|---|
| | Sample Date: | 02-Oct-17 | 02-Oct-17 | 02-Oct-17 | 03-Oct-17 |
| | Sample ID: | 1740372-01 | 1740372-02 | 1740372-03 | 1740372-04 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 90.9 | 84.3 | 81.6 | 92.3 |
| **Metals** | | | | | |
| Antimony | 1.0 ug/g dry | <1.0 | - | - | - |
| Arsenic | 1.0 ug/g dry | 3.7 | - | - | - |
| Barium | 1.0 ug/g dry | 67.8 | - | - | - |
| Beryllium | 1.0 ug/g dry | <1.0 | - | - | - |
| Boron | 1.0 ug/g dry | 9.7 | - | - | - |
| Cadmium | 0.5 ug/g dry | <0.5 | - | - | - |
| Chromium | 1.0 ug/g dry | 11.2 | - | - | - |
| Cobalt | 1.0 ug/g dry | 3.5 | - | - | - |
| Copper | 1.0 ug/g dry | 9.5 | - | - | - |
| Lead | 1.0 ug/g dry | 35.8 | - | - | - |
| Molybdenum | 1.0 ug/g dry | <1.0 | - | - | - |
| Nickel | 1.0 ug/g dry | 9.7 | - | - | - |
| Selenium | 1.0 ug/g dry | <1.0 | - | - | - |
| Silver | 0.5 ug/g dry | <0.5 | - | - | - |
| Thallium | 1.0 ug/g dry | 1.6 | - | - | - |
| Uranium | 1.0 ug/g dry | <1.0 | - | - | - |
| Vanadium | 1.0 ug/g dry | 17.7 | - | - | - |
| Zinc | 1.0 ug/g dry | 35.0 | - | - | - |
| **Volatiles** | | | | | |
| Benzene | 0.02 ug/g dry | - | <0.02 | <0.02 | <0.02 |
| Ethylbenzene | 0.05 ug/g dry | - | <0.05 | <0.05 | <0.05 |
| Toluene | 0.05 ug/g dry | - | <0.05 | <0.05 | <0.05 |
| m,p-Xylenes | 0.05 ug/g dry | - | <0.05 | <0.05 | <0.05 |
| o-Xylene | 0.05 ug/g dry | - | 0.07 | <0.05 | <0.05 |
| Xylenes, total | 0.05 ug/g dry | - | 0.07 | <0.05 | <0.05 |
| Toluene-d8 | Surrogate | - | 86.8% | 89.0% | 96.6% |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 7 ug/g dry | - | 11 | <7 | <7 |
| F2 PHCs (C10-C16) | 4 ug/g dry | - | 636 | 421 | 24 |
| F3 PHCs (C16-C34) | 8 ug/g dry | - | 830 | 1170 | 259 |
| F4 PHCs (C34-C50) | 6 ug/g dry | - | <60 [1] | 840 | 314 [3] |
| F4G PHCs (gravimetric) | 50 ug/g dry | - | - | - | 368 |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

| | Client ID: | MW8 SA3 | MW9 SA1 | MW9 SA2 | MW10 SA1 |
|---|---|---|---|---|---|
| | Sample Date: | 03-Oct-17 | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 |
| | Sample ID: | 1740372-05 | 1740372-06 | 1740372-07 | 1740372-08 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 74.2 | 92.8 | 86.2 | 83.3 |
| **Metals** | | | | | |
| Antimony | 1.0 ug/g dry | - | <1.0 | - | <1.0 |
| Arsenic | 1.0 ug/g dry | - | 3.4 | - | 2.1 |
| Barium | 1.0 ug/g dry | - | 53.6 | - | 47.1 |
| Beryllium | 1.0 ug/g dry | - | <1.0 | - | <1.0 |
| Boron | 1.0 ug/g dry | - | 4.9 | - | 3.7 |
| Cadmium | 0.5 ug/g dry | - | <0.5 | - | <0.5 |
| Chromium | 1.0 ug/g dry | - | 15.6 | - | 18.4 |
| Cobalt | 1.0 ug/g dry | - | 10.2 | - | 4.6 |
| Copper | 1.0 ug/g dry | - | 11.2 | - | 13.5 |
| Lead | 1.0 ug/g dry | - | 27.9 | - | 29.1 |
| Molybdenum | 1.0 ug/g dry | - | 2.0 | - | <1.0 |
| Nickel | 1.0 ug/g dry | - | 19.3 | - | 10.4 |
| Selenium | 1.0 ug/g dry | - | <1.0 | - | <1.0 |
| Silver | 0.5 ug/g dry | - | 0.6 | - | <0.5 |
| Thallium | 1.0 ug/g dry | - | <1.0 | - | <1.0 |
| Uranium | 1.0 ug/g dry | - | <1.0 | - | <1.0 |
| Vanadium | 1.0 ug/g dry | - | 14.0 | - | 20.6 |
| Zinc | 1.0 ug/g dry | - | 22.8 | - | 52.6 |
| **Volatiles** | | | | | |
| Acetone | 0.50 ug/g dry | - | - | <0.50 | - |
| Benzene | 0.02 ug/g dry | - | - | <0.02 | - |
| Bromodichloromethane | 0.05 ug/g dry | - | - | <0.05 | - |
| Bromoform | 0.05 ug/g dry | - | - | <0.05 | - |
| Bromomethane | 0.05 ug/g dry | - | - | <0.05 | - |
| Carbon Tetrachloride | 0.05 ug/g dry | - | - | <0.05 | - |
| Chlorobenzene | 0.05 ug/g dry | - | - | <0.05 | - |
| Chloroform | 0.05 ug/g dry | - | - | <0.05 | - |
| Dibromochloromethane | 0.05 ug/g dry | - | - | <0.05 | - |
| Dichlorodifluoromethane | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,2-Dichlorobenzene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,3-Dichlorobenzene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,4-Dichlorobenzene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,1-Dichloroethane | 0.05 ug/g dry | - | - | <0.05 | - |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

| | Client ID: | MW8 SA3 | MW9 SA1 | MW9 SA2 | MW10 SA1 |
|---|---|---|---|---|---|
| | Sample Date: | 03-Oct-17 | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 |
| | Sample ID: | 1740372-05 | 1740372-06 | 1740372-07 | 1740372-08 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| 1,2-Dichloroethane | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,1-Dichloroethylene | 0.05 ug/g dry | - | - | <0.05 | - |
| cis-1,2-Dichloroethylene | 0.05 ug/g dry | - | - | <0.05 | - |
| trans-1,2-Dichloroethylene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,2-Dichloropropane | 0.05 ug/g dry | - | - | <0.05 | - |
| cis-1,3-Dichloropropylene | 0.05 ug/g dry | - | - | <0.05 | - |
| trans-1,3-Dichloropropylene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,3-Dichloropropene, total | 0.05 ug/g dry | - | - | <0.05 | - |
| Ethylbenzene | 0.05 ug/g dry | - | - | <0.05 | - |
| Ethylene dibromide (dibromoethar | 0.05 ug/g dry | - | - | <0.05 | - |
| Hexane | 0.05 ug/g dry | - | - | <0.05 | - |
| Methyl Ethyl Ketone (2-Butanone) | 0.50 ug/g dry | - | - | <0.50 | - |
| Methyl Isobutyl Ketone | 0.50 ug/g dry | - | - | <0.50 | - |
| Methyl tert-butyl ether | 0.05 ug/g dry | - | - | <0.05 | - |
| Methylene Chloride | 0.05 ug/g dry | - | - | <0.05 | - |
| Styrene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,1,1,2-Tetrachloroethane | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,1,2,2-Tetrachloroethane | 0.05 ug/g dry | - | - | <0.05 | - |
| Tetrachloroethylene | 0.05 ug/g dry | - | - | <0.05 | - |
| Toluene | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,1,1-Trichloroethane | 0.05 ug/g dry | - | - | <0.05 | - |
| 1,1,2-Trichloroethane | 0.05 ug/g dry | - | - | <0.05 | - |
| Trichloroethylene | 0.05 ug/g dry | - | - | <0.05 | - |
| Trichlorofluoromethane | 0.05 ug/g dry | - | - | <0.05 | - |
| Vinyl chloride | 0.02 ug/g dry | - | - | <0.02 | - |
| m,p-Xylenes | 0.05 ug/g dry | - | - | <0.05 | - |
| o-Xylene | 0.05 ug/g dry | - | - | <0.05 | - |
| Xylenes, total | 0.05 ug/g dry | - | - | <0.05 | - |
| 4-Bromofluorobenzene | Surrogate | - | - | 118% | - |
| Dibromofluoromethane | Surrogate | - | - | 115% | - |
| Toluene-d8 | Surrogate | - | - | 104% | - |
| Benzene | 0.02 ug/g dry | <0.02 | - | - | - |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | - | - | - |
| Toluene | 0.05 ug/g dry | <0.05 | - | - | - |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | - | - | - |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

| | Client ID: | MW8 SA3 | MW9 SA1 | MW9 SA2 | MW10 SA1 |
|---|---|---|---|---|---|
| | Sample Date: | 03-Oct-17 | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 |
| | Sample ID: | 1740372-05 | 1740372-06 | 1740372-07 | 1740372-08 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| o-Xylene | 0.05 ug/g dry | <0.05 | - | - | - |
| Xylenes, total | 0.05 ug/g dry | <0.05 | - | - | - |
| Toluene-d8 | Surrogate | 98.9% | - | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | - | <7 | - |
| F2 PHCs (C10-C16) | 4 ug/g dry | <40 [1] | - | <4 | - |
| F3 PHCs (C16-C34) | 8 ug/g dry | 359 | - | 9 | - |
| F4 PHCs (C34-C50) | 6 ug/g dry | 570 | - | 23 | - |
| **Semi-Volatiles** | | | | | |
| Acenaphthene | 0.02 ug/g dry | - | - | <0.02 | - |
| Acenaphthylene | 0.02 ug/g dry | - | - | <0.02 | - |
| Anthracene | 0.02 ug/g dry | - | - | <0.02 | - |
| Benzo [a] anthracene | 0.02 ug/g dry | - | - | <0.02 | - |
| Benzo [a] pyrene | 0.02 ug/g dry | - | - | <0.02 | - |
| Benzo [b] fluoranthene | 0.02 ug/g dry | - | - | <0.02 | - |
| Benzo [g,h,i] perylene | 0.02 ug/g dry | - | - | <0.02 | - |
| Benzo [k] fluoranthene | 0.02 ug/g dry | - | - | <0.02 | - |
| Chrysene | 0.02 ug/g dry | - | - | <0.02 | - |
| Dibenzo [a,h] anthracene | 0.02 ug/g dry | - | - | <0.02 | - |
| Fluoranthene | 0.02 ug/g dry | - | - | 0.03 | - |
| Fluorene | 0.02 ug/g dry | - | - | <0.02 | - |
| Indeno [1,2,3-cd] pyrene | 0.02 ug/g dry | - | - | <0.02 | - |
| 1-Methylnaphthalene | 0.02 ug/g dry | - | - | <0.02 | - |
| 2-Methylnaphthalene | 0.02 ug/g dry | - | - | <0.02 | - |
| Methylnaphthalene (1&2) | 0.04 ug/g dry | - | - | <0.04 | - |
| Naphthalene | 0.01 ug/g dry | - | - | <0.01 | - |
| Phenanthrene | 0.02 ug/g dry | - | - | <0.02 | - |
| Pyrene | 0.02 ug/g dry | - | - | 0.03 | - |
| 2-Fluorobiphenyl | Surrogate | - | - | 80.3% | - |
| Terphenyl-d14 | Surrogate | - | - | 66.4% | - |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

| | Client ID: | MW10 SA3 | MW11 SA3 | MW12 SA3 | MW12 SA4 |
|---|---|---|---|---|---|
| | Sample Date: | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 |
| | Sample ID: | 1740372-09 | 1740372-10 | 1740372-11 | 1740372-12 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| **Physical Characteristics** | | | | | |
| % Solids | 0.1 % by Wt. | 84.7 | 95.9 | 81.7 | 76.1 |
| **Metals** | | | | | |
| Antimony | 1.0 ug/g dry | - | - | 2.0 | - |
| Arsenic | 1.0 ug/g dry | - | - | 12.2 | - |
| Barium | 1.0 ug/g dry | - | - | 258 | - |
| Beryllium | 1.0 ug/g dry | - | - | <1.0 | - |
| Boron | 1.0 ug/g dry | - | - | 10.8 | - |
| Cadmium | 0.5 ug/g dry | - | - | <0.5 | - |
| Chromium | 1.0 ug/g dry | - | - | 18.1 | - |
| Cobalt | 1.0 ug/g dry | - | - | 7.0 | - |
| Copper | 1.0 ug/g dry | - | - | 49.8 | - |
| Lead | 1.0 ug/g dry | - | - | 521 | - |
| Molybdenum | 1.0 ug/g dry | - | - | 1.3 | - |
| Nickel | 1.0 ug/g dry | - | - | 16.0 | - |
| Selenium | 1.0 ug/g dry | - | - | <1.0 | - |
| Silver | 0.5 ug/g dry | - | - | <0.5 | - |
| Thallium | 1.0 ug/g dry | - | - | <1.0 | - |
| Uranium | 1.0 ug/g dry | - | - | <1.0 | - |
| Vanadium | 1.0 ug/g dry | - | - | 25.2 | - |
| Zinc | 1.0 ug/g dry | - | - | 121 | - |
| **Volatiles** | | | | | |
| Acetone | 0.50 ug/g dry | <0.50 | - | - | <0.50 |
| Benzene | 0.02 ug/g dry | <0.02 | - | - | <0.02 |
| Bromodichloromethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Bromoform | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Bromomethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Carbon Tetrachloride | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Chlorobenzene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Chloroform | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Dibromochloromethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Dichlorodifluoromethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,2-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,3-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,4-Dichlorobenzene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,1-Dichloroethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: Eccles**

Report Date: 12-Oct-2017
Order Date: 4-Oct-2017
**Project Description: KB1024**

| | Client ID: | MW10 SA3 | MW11 SA3 | MW12 SA3 | MW12 SA4 |
|---|---|---|---|---|---|
| | Sample Date: | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 |
| | Sample ID: | 1740372-09 | 1740372-10 | 1740372-11 | 1740372-12 |
| | MDL/Units | Soil | Soil | Soil | Soil |
| 1,2-Dichloroethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,1-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| cis-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| trans-1,2-Dichloroethylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,2-Dichloropropane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| cis-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| trans-1,3-Dichloropropylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,3-Dichloropropene, total | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Ethylbenzene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Ethylene dibromide (dibromoethar | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Hexane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Methyl Ethyl Ketone (2-Butanone) | 0.50 ug/g dry | <0.50 | - | - | <0.50 |
| Methyl Isobutyl Ketone | 0.50 ug/g dry | <0.50 | - | - | <0.50 |
| Methyl tert-butyl ether | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Methylene Chloride | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Styrene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,1,1,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,1,2,2-Tetrachloroethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Tetrachloroethylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Toluene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,1,1-Trichloroethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 1,1,2-Trichloroethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Trichloroethylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Trichlorofluoromethane | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Vinyl chloride | 0.02 ug/g dry | <0.02 | - | - | <0.02 |
| m,p-Xylenes | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| o-Xylene | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| Xylenes, total | 0.05 ug/g dry | <0.05 | - | - | <0.05 |
| 4-Bromofluorobenzene | Surrogate | 120% | - | - | 105% |
| Dibromofluoromethane | Surrogate | 118% | - | - | 110% |
| Toluene-d8 | Surrogate | 101% | - | - | 98.5% |
| Benzene | 0.02 ug/g dry | - | <0.02 | - | - |
| Ethylbenzene | 0.05 ug/g dry | - | <0.05 | - | - |
| Toluene | 0.05 ug/g dry | - | <0.05 | - | - |
| m,p-Xylenes | 0.05 ug/g dry | - | <0.05 | - | - |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles**

Report Date: 12-Oct-2017

Order Date: 4-Oct-2017

**Project Description: KB1024**

| | **Client ID:** | MW10 SA3 | MW11 SA3 | MW12 SA3 | MW12 SA4 |
|---|---|---|---|---|---|
| | **Sample Date:** | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 | 04-Oct-17 |
| | **Sample ID:** | 1740372-09 | 1740372-10 | 1740372-11 | 1740372-12 |
| | **MDL/Units** | Soil | Soil | Soil | Soil |
| o-Xylene | 0.05 ug/g dry | - | <0.05 | - | - |
| Xylenes, total | 0.05 ug/g dry | - | <0.05 | - | - |
| Toluene-d8 | Surrogate | - | 97.6% | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 7 ug/g dry | <7 | <7 | - | <7 |
| F2 PHCs (C10-C16) | 4 ug/g dry | 11 | 135 | - | <40 [1] |
| F3 PHCs (C16-C34) | 8 ug/g dry | 366 | 308 | - | 369 |
| F4 PHCs (C34-C50) | 6 ug/g dry | 433 [3] | 237 | - | 719 |
| F4G PHCs (gravimetric) | 50 ug/g dry | 401 | - | - | - |

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g | | | | | | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g | | | | | | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g | | | | | | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g | | | | | | |
| F4G PHCs (gravimetric) | ND | 50 | ug/g | | | | | | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 1.0 | ug/g | | | | | | |
| Arsenic | ND | 1.0 | ug/g | | | | | | |
| Barium | ND | 1.0 | ug/g | | | | | | |
| Beryllium | ND | 1.0 | ug/g | | | | | | |
| Boron | ND | 1.0 | ug/g | | | | | | |
| Cadmium | ND | 0.5 | ug/g | | | | | | |
| Chromium | ND | 1.0 | ug/g | | | | | | |
| Cobalt | ND | 1.0 | ug/g | | | | | | |
| Copper | ND | 1.0 | ug/g | | | | | | |
| Lead | ND | 1.0 | ug/g | | | | | | |
| Molybdenum | ND | 1.0 | ug/g | | | | | | |
| Nickel | ND | 1.0 | ug/g | | | | | | |
| Selenium | ND | 1.0 | ug/g | | | | | | |
| Silver | ND | 0.5 | ug/g | | | | | | |
| Thallium | ND | 1.0 | ug/g | | | | | | |
| Uranium | ND | 1.0 | ug/g | | | | | | |
| Vanadium | ND | 1.0 | ug/g | | | | | | |
| Zinc | ND | 1.0 | ug/g | | | | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g | | | | | | |
| Acenaphthylene | ND | 0.02 | ug/g | | | | | | |
| Anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] anthracene | ND | 0.02 | ug/g | | | | | | |
| Benzo [a] pyrene | ND | 0.02 | ug/g | | | | | | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g | | | | | | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Chrysene | ND | 0.02 | ug/g | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g | | | | | | |
| Fluoranthene | ND | 0.02 | ug/g | | | | | | |
| Fluorene | ND | 0.02 | ug/g | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g | | | | | | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.04 | ug/g | | | | | | |
| Naphthalene | ND | 0.01 | ug/g | | | | | | |
| Phenanthrene | ND | 0.02 | ug/g | | | | | | |
| Pyrene | ND | 0.02 | ug/g | | | | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.993* | | *ug/g* | | *74.5* | *50-140* | | | |
| *Surrogate: Terphenyl-d14* | *1.21* | | *ug/g* | | *90.9* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g | | | | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Bromodichloromethane | ND | 0.05 | ug/g | | | | | | |
| Bromoform | ND | 0.05 | ug/g | | | | | | |
| Bromomethane | ND | 0.05 | ug/g | | | | | | |
| Carbon Tetrachloride | ND | 0.05 | ug/g | | | | | | |
| Chlorobenzene | ND | 0.05 | ug/g | | | | | | |
| Chloroform | ND | 0.05 | ug/g | | | | | | |
| Dibromochloromethane | ND | 0.05 | ug/g | | | | | | |
| Dichlorodifluoromethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g | | | | | | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.05 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Ethylene dibromide (dibromoethane | ND | 0.05 | ug/g | | | | | | |
| Hexane | ND | 0.05 | ug/g | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g | | | | | | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g | | | | | | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g | | | | | | |
| Methylene Chloride | ND | 0.05 | ug/g | | | | | | |
| Styrene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g | | | | | | |
| Tetrachloroethylene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g | | | | | | |
| Trichloroethylene | ND | 0.05 | ug/g | | | | | | |
| Trichlorofluoromethane | ND | 0.05 | ug/g | | | | | | |
| Vinyl chloride | ND | 0.02 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *9.93* | | *ug/g* | | *124* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *8.65* | | *ug/g* | | *108* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *7.16* | | *ug/g* | | *89.5* | *50-140* | | | |
| Benzene | ND | 0.02 | ug/g | | | | | | |
| Ethylbenzene | ND | 0.05 | ug/g | | | | | | |
| Toluene | ND | 0.05 | ug/g | | | | | | |
| m,p-Xylenes | ND | 0.05 | ug/g | | | | | | |
| o-Xylene | ND | 0.05 | ug/g | | | | | | |
| Xylenes, total | ND | 0.05 | ug/g | | | | | | |
| *Surrogate: Toluene-d8* | *7.16* | | *ug/g* | | *89.5* | *50-140* | | | |

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 7 | ug/g dry | ND | | | | 40 | |
| F2 PHCs (C10-C16) | ND | 4 | ug/g dry | ND | | | | 30 | |
| F3 PHCs (C16-C34) | ND | 8 | ug/g dry | ND | | | | 30 | |
| F4 PHCs (C34-C50) | ND | 6 | ug/g dry | ND | | | | 30 | |
| **Metals** | | | | | | | | | |
| Antimony | 1.21 | 1.0 | ug/g dry | 1.59 | | | 27.2 | 30 | |
| Arsenic | 3.98 | 1.0 | ug/g dry | 3.93 | | | 1.1 | 30 | |
| Barium | 110 | 1.0 | ug/g dry | 111 | | | 0.6 | 30 | |
| Beryllium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Boron | 6.48 | 1.0 | ug/g dry | 6.42 | | | 1.0 | 30 | |
| Cadmium | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Chromium | 16.3 | 1.0 | ug/g dry | 16.4 | | | 0.2 | 30 | |
| Cobalt | 7.72 | 1.0 | ug/g dry | 7.82 | | | 1.3 | 30 | |
| Copper | 17.0 | 1.0 | ug/g dry | 16.7 | | | 1.8 | 30 | |
| Lead | 10.2 | 1.0 | ug/g dry | 9.60 | | | 6.4 | 30 | |
| Molybdenum | 1.03 | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Nickel | 16.5 | 1.0 | ug/g dry | 16.6 | | | 0.6 | 30 | |
| Selenium | ND | 1.0 | ug/g dry | ND | | | 0.0 | 30 | |
| Silver | ND | 0.5 | ug/g dry | ND | | | 0.0 | 30 | |
| Thallium | ND | 1.0 | ug/g dry | 1.23 | | | 0.0 | 30 | |
| Uranium | ND | 1.0 | ug/g dry | ND | | | | 30 | |
| Vanadium | 27.2 | 1.0 | ug/g dry | 26.9 | | | 1.3 | 30 | |
| Zinc | 24.3 | 1.0 | ug/g dry | 25.3 | | | 4.1 | 30 | |
| **Physical Characteristics** | | | | | | | | | |
| % Solids | 79.6 | 0.1 | % by Wt. | 79.3 | | | 0.4 | 25 | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Acenaphthylene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Anthracene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [a] anthracene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [a] pyrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [b] fluoranthene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [g,h,i] perylene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Benzo [k] fluoranthene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Chrysene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Dibenzo [a,h] anthracene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Fluoranthene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Fluorene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Indeno [1,2,3-cd] pyrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| 1-Methylnaphthalene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| 2-Methylnaphthalene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Naphthalene | ND | 0.01 | ug/g dry | ND | | | | 40 | |
| Phenanthrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| Pyrene | ND | 0.02 | ug/g dry | ND | | | | 40 | |
| *Surrogate: 2-Fluorobiphenyl* | *1.12* | | *ug/g dry* | | *75.7* | *50-140* | | | |
| *Surrogate: Terphenyl-d14* | *1.30* | | *ug/g dry* | | *87.4* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Benzene | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| Bromodichloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromoform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Bromomethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Carbon Tetrachloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Chloroform | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Dibromochloromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Dichlorodifluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,3-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,4-Dichlorobenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,2-Dichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,2-Dichloropropane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| cis-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| trans-1,3-Dichloropropylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylbenzene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Ethylene dibromide (dibromoethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Hexane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl Isobutyl Ketone | ND | 0.50 | ug/g dry | ND | | | | 50 | |
| Methyl tert-butyl ether | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Methylene Chloride | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Styrene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Tetrachloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Toluene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,1-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| 1,1,2-Trichloroethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichloroethylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Trichlorofluoromethane | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| Vinyl chloride | ND | 0.02 | ug/g dry | ND | | | | 50 | |
| m,p-Xylenes | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| o-Xylene | ND | 0.05 | ug/g dry | ND | | | | 50 | |
| *Surrogate: 4-Bromofluorobenzene* | *9.99* | | *ug/g dry* | | *113* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *8.33* | | *ug/g dry* | | *94.6* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *8.32* | | *ug/g dry* | | *94.5* | *50-140* | | | |
| Benzene | ND | 0.02 | ug/g dry | | | | | 50 | |
| Ethylbenzene | ND | 0.05 | ug/g dry | | | | | 50 | |
| Toluene | ND | 0.05 | ug/g dry | | | | | 50 | |
| m,p-Xylenes | ND | 0.05 | ug/g dry | | | | | 50 | |
| o-Xylene | ND | 0.05 | ug/g dry | | | | | 50 | |
| *Surrogate: Toluene-d8* | *8.32* | | *ug/g dry* | | *94.5* | *50-140* | | | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | 204 | 7 | ug/g | | 102 | 80-120 | | | |
| F2 PHCs (C10-C16) | 100 | 4 | ug/g | ND | 97.7 | 60-140 | | | |
| F3 PHCs (C16-C34) | 280 | 8 | ug/g | ND | 133 | 60-140 | | | |
| F4 PHCs (C34-C50) | 188 | 6 | ug/g | ND | 134 | 60-140 | | | |
| F4G PHCs (gravimetric) | 810 | 50 | ug/g | | 81.0 | 80-120 | | | |
| **Metals** | | | | | | | | | |
| Antimony | 247 | | ug/L | 31.7 | 86.1 | 70-130 | | | |
| Arsenic | 333 | | ug/L | 78.7 | 102 | 70-130 | | | |
| Barium | 2360 | | ug/L | 2220 | 57.0 | 70-130 | | | QM-07 |
| Beryllium | 251 | | ug/L | ND | 100 | 70-130 | | | |
| Boron | 380 | | ug/L | 128 | 101 | 70-130 | | | |
| Cadmium | 248 | | ug/L | 1.07 | 98.9 | 70-130 | | | |
| Chromium | 558 | | ug/L | 327 | 92.2 | 70-130 | | | |
| Cobalt | 386 | | ug/L | 156 | 91.8 | 70-130 | | | |
| Copper | 574 | | ug/L | 333 | 96.2 | 70-130 | | | |
| Lead | 414 | | ug/L | 192 | 88.7 | 70-130 | | | |
| Molybdenum | 252 | | ug/L | 18.3 | 93.4 | 70-130 | | | |
| Nickel | 564 | | ug/L | 331 | 93.1 | 70-130 | | | |
| Selenium | 256 | | ug/L | ND | 103 | 70-130 | | | |
| Silver | 238 | | ug/L | 5.83 | 93.1 | 70-130 | | | |
| Thallium | 215 | | ug/L | 24.7 | 76.1 | 70-130 | | | |
| Uranium | 281 | | ug/L | ND | 113 | 70-130 | | | |
| Vanadium | 781 | | ug/L | 537 | 97.2 | 70-130 | | | |
| Zinc | 717 | | ug/L | 505 | 84.6 | 70-130 | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | 0.161 | 0.02 | ug/g | ND | 86.6 | 50-140 | | | |
| Acenaphthylene | 0.135 | 0.02 | ug/g | ND | 72.6 | 50-140 | | | |
| Anthracene | 0.172 | 0.02 | ug/g | ND | 92.6 | 50-140 | | | |
| Benzo [a] anthracene | 0.134 | 0.02 | ug/g | ND | 72.4 | 50-140 | | | |
| Benzo [a] pyrene | 0.155 | 0.02 | ug/g | ND | 83.4 | 50-140 | | | |
| Benzo [b] fluoranthene | 0.197 | 0.02 | ug/g | ND | 106 | 50-140 | | | |
| Benzo [g,h,i] perylene | 0.176 | 0.02 | ug/g | ND | 94.6 | 50-140 | | | |
| Benzo [k] fluoranthene | 0.173 | 0.02 | ug/g | ND | 93.1 | 50-140 | | | |
| Chrysene | 0.164 | 0.02 | ug/g | ND | 88.1 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 0.168 | 0.02 | ug/g | ND | 90.5 | 50-140 | | | |
| Fluoranthene | 0.154 | 0.02 | ug/g | ND | 83.1 | 50-140 | | | |
| Fluorene | 0.144 | 0.02 | ug/g | ND | 77.5 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 0.178 | 0.02 | ug/g | ND | 96.0 | 50-140 | | | |
| 1-Methylnaphthalene | 0.103 | 0.02 | ug/g | ND | 55.7 | 50-140 | | | |
| 2-Methylnaphthalene | 0.116 | 0.02 | ug/g | ND | 62.7 | 50-140 | | | |
| Naphthalene | 0.133 | 0.01 | ug/g | ND | 71.6 | 50-140 | | | |
| Phenanthrene | 0.155 | 0.02 | ug/g | ND | 83.6 | 50-140 | | | |
| Pyrene | 0.166 | 0.02 | ug/g | ND | 89.4 | 50-140 | | | |
| *Surrogate: 2-Fluorobiphenyl* | *0.925* | | *ug/g* | | *62.2* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | 7.12 | 0.50 | ug/g | | 71.2 | 50-140 | | | |
| Benzene | 4.92 | 0.02 | ug/g | | 123 | 60-130 | | | |
| Bromodichloromethane | 4.89 | 0.05 | ug/g | | 122 | 60-130 | | | |
| Bromoform | 4.32 | 0.05 | ug/g | | 108 | 60-130 | | | |
| Bromomethane | 3.36 | 0.05 | ug/g | | 84.1 | 50-140 | | | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Carbon Tetrachloride | 4.10 | 0.05 | ug/g | | 103 | 60-130 | | | |
| Chlorobenzene | 4.18 | 0.05 | ug/g | | 104 | 60-130 | | | |
| Chloroform | 4.97 | 0.05 | ug/g | | 124 | 60-130 | | | |
| Dibromochloromethane | 4.47 | 0.05 | ug/g | | 112 | 60-130 | | | |
| Dichlorodifluoromethane | 3.20 | 0.05 | ug/g | | 80.1 | 50-140 | | | |
| 1,2-Dichlorobenzene | 3.99 | 0.05 | ug/g | | 99.8 | 60-130 | | | |
| 1,3-Dichlorobenzene | 3.44 | 0.05 | ug/g | | 86.0 | 60-130 | | | |
| 1,4-Dichlorobenzene | 3.12 | 0.05 | ug/g | | 78.0 | 60-130 | | | |
| 1,1-Dichloroethane | 5.01 | 0.05 | ug/g | | 125 | 60-130 | | | |
| 1,2-Dichloroethane | 4.33 | 0.05 | ug/g | | 108 | 60-130 | | | |
| 1,1-Dichloroethylene | 4.42 | 0.05 | ug/g | | 110 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 4.30 | 0.05 | ug/g | | 107 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 4.14 | 0.05 | ug/g | | 104 | 60-130 | | | |
| 1,2-Dichloropropane | 4.93 | 0.05 | ug/g | | 123 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 5.17 | 0.05 | ug/g | | 129 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 4.21 | 0.05 | ug/g | | 105 | 60-130 | | | |
| Ethylbenzene | 4.05 | 0.05 | ug/g | | 101 | 60-130 | | | |
| Ethylene dibromide (dibromoethane | 4.03 | 0.05 | ug/g | | 101 | 60-130 | | | |
| Hexane | 3.09 | 0.05 | ug/g | | 77.3 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 13.1 | 0.50 | ug/g | | 131 | 50-140 | | | |
| Methyl Isobutyl Ketone | 13.1 | 0.50 | ug/g | | 131 | 50-140 | | | |
| Methyl tert-butyl ether | 11.4 | 0.05 | ug/g | | 114 | 50-140 | | | |
| Methylene Chloride | 4.79 | 0.05 | ug/g | | 120 | 60-130 | | | |
| Styrene | 3.40 | 0.05 | ug/g | | 84.9 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 4.35 | 0.05 | ug/g | | 109 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 5.06 | 0.05 | ug/g | | 126 | 60-130 | | | |
| Tetrachloroethylene | 3.35 | 0.05 | ug/g | | 83.9 | 60-130 | | | |
| Toluene | 4.66 | 0.05 | ug/g | | 116 | 60-130 | | | |
| 1,1,1-Trichloroethane | 4.21 | 0.05 | ug/g | | 105 | 60-130 | | | |
| 1,1,2-Trichloroethane | 4.97 | 0.05 | ug/g | | 124 | 60-130 | | | |
| Trichloroethylene | 4.10 | 0.05 | ug/g | | 102 | 60-130 | | | |
| Trichlorofluoromethane | 2.70 | 0.05 | ug/g | | 67.6 | 50-140 | | | |
| Vinyl chloride | 2.82 | 0.02 | ug/g | | 70.5 | 50-140 | | | |
| m,p-Xylenes | 8.75 | 0.05 | ug/g | | 109 | 60-130 | | | |
| o-Xylene | 4.39 | 0.05 | ug/g | | 110 | 60-130 | | | |
| Benzene | 4.92 | 0.02 | ug/g | | 123 | 60-130 | | | |
| Ethylbenzene | 4.05 | 0.05 | ug/g | | 101 | 60-130 | | | |
| Toluene | 4.66 | 0.05 | ug/g | | 116 | 60-130 | | | |
| m,p-Xylenes | 8.75 | 0.05 | ug/g | | 109 | 60-130 | | | |
| o-Xylene | 4.39 | 0.05 | ug/g | | 110 | 60-130 | | | |

## Qualifier Notes:

***Login Qualifiers :***

Container(s) - Bottle and COC sample ID don't match - jar&vial read SA4
*Applies to samples: MW3-SA1*

***Sample Qualifiers :***

1 : Elevated detection limit due to dilution required because of high target analyte concentration.

3 : GC-FID signal did not return to baseline by C50

***QC Qualifiers :***

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

## Sample Data Revisions

None

## Work Order Revisions / Comments:

None

## Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

*CCME PHC additional information:*

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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# Certificate of Analysis

**CM3 Environmental Inc.**

5710 Akins Road
Ottawa, ON K2S 1B8
Attn: Karl Bilyj

Client PO: Eccles St.
Project: KB1024
Custody: 40442

Report Date: 31-Oct-2017
Order Date: 24-Oct-2017

Revised Report

**Order #: 1743230**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 1743230-01 | MW1 |
| 1743230-02 | MW2 |
| 1743230-03 | MW3 |
| 1743230-04 | MW6 |
| 1743230-05 | MW7 |
| 1743230-06 | MW8 |
| 1743230-07 | MW9 |
| 1743230-08 | MW11 |
| 1743230-09 | MW12 |

Approved By:

Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| BTEX by P&T GC-MS | EPA 624 - P&T GC-MS | 26-Oct-17 | 26-Oct-17 |
| Metals, ICP-MS | EPA 200.8 - ICP-MS | 26-Oct-17 | 26-Oct-17 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 25-Oct-17 | 26-Oct-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 25-Oct-17 | 26-Oct-17 |
| REG 153: PAHs by GC-MS | EPA 625 - GC-MS, extraction | 30-Oct-17 | 30-Oct-17 |
| REG 153: VOCs by P&T GC/MS | EPA 624 - P&T GC-MS | 25-Oct-17 | 25-Oct-17 |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

| | Client ID: | MW1 | MW2 | MW3 | MW6 |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 |
| | Sample ID: | 1743230-01 | 1743230-02 | 1743230-03 | 1743230-04 |
| | MDL/Units | Water | Water | Water | Water |
| **Volatiles** | | | | | |
| Acetone | 5.0 ug/L | - | <5.0 | - | <5.0 |
| Benzene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Bromodichloromethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Bromoform | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Bromomethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Carbon Tetrachloride | 0.2 ug/L | - | <0.2 | - | <0.2 |
| Chlorobenzene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Chloroform | 0.5 ug/L | - | <0.5 | - | 1.8 |
| Dibromochloromethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Dichlorodifluoromethane | 1.0 ug/L | - | <1.0 | - | <1.0 |
| 1,2-Dichlorobenzene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,3-Dichlorobenzene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,4-Dichlorobenzene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,1-Dichloroethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,2-Dichloroethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,1-Dichloroethylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| cis-1,2-Dichloroethylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| trans-1,2-Dichloroethylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,2-Dichloropropane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| cis-1,3-Dichloropropylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| trans-1,3-Dichloropropylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,3-Dichloropropene, total | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Ethylbenzene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Ethylene dibromide (dibromoethane, 1 | 0.2 ug/L | - | <0.2 | - | <0.2 |
| Hexane | 1.0 ug/L | - | <1.0 | - | <1.0 |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | - | <5.0 | - | <5.0 |
| Methyl Isobutyl Ketone | 5.0 ug/L | - | <5.0 | - | <5.0 |
| Methyl tert-butyl ether | 2.0 ug/L | - | <2.0 | - | <2.0 |
| Methylene Chloride | 5.0 ug/L | - | <5.0 | - | <5.0 |
| Styrene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Tetrachloroethylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Toluene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 1,1,1-Trichloroethane | 0.5 ug/L | - | <0.5 | - | <0.5 |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

| | Client ID: | MW1 | MW2 | MW3 | MW6 |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 |
| | Sample ID: | 1743230-01 | 1743230-02 | 1743230-03 | 1743230-04 |
| | MDL/Units | Water | Water | Water | Water |
| 1,1,2-Trichloroethane | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Trichloroethylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Trichlorofluoromethane | 1.0 ug/L | - | <1.0 | - | <1.0 |
| Vinyl chloride | 0.5 ug/L | - | <0.5 | - | <0.5 |
| m,p-Xylenes | 0.5 ug/L | - | <0.5 | - | <0.5 |
| o-Xylene | 0.5 ug/L | - | <0.5 | - | <0.5 |
| Xylenes, total | 0.5 ug/L | - | <0.5 | - | <0.5 |
| 4-Bromofluorobenzene | Surrogate | - | 122% | - | 122% |
| Dibromofluoromethane | Surrogate | - | 100% | - | 105% |
| Toluene-d8 | Surrogate | - | 95.7% | - | 96.3% |
| Benzene | 0.5 ug/L | <0.5 | - | <0.5 | - |
| Ethylbenzene | 0.5 ug/L | <0.5 | - | <0.5 | - |
| Toluene | 0.5 ug/L | <0.5 | - | <0.5 | - |
| m,p-Xylenes | 0.5 ug/L | <0.5 | - | <0.5 | - |
| o-Xylene | 0.5 ug/L | <0.5 | - | <0.5 | - |
| Xylenes, total | 0.5 ug/L | <0.5 | - | <0.5 | - |
| Toluene-d8 | Surrogate | 96.6% | - | 98.4% | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 25 ug/L | <25 | <25 | <25 | - |
| F2 PHCs (C10-C16) | 100 ug/L | <100 | <100 | 802 | - |
| F3 PHCs (C16-C34) | 100 ug/L | <100 | <100 | 877 | - |
| F4 PHCs (C34-C50) | 100 ug/L | <100 | <100 | <100 | - |
| **Semi-Volatiles** | | | | | |
| Acenaphthene | 0.05 ug/L | - | - | - | 0.99 |
| Acenaphthylene | 0.05 ug/L | - | - | - | 1.22 |
| Anthracene | 0.01 ug/L | - | - | - | 2.85 |
| Benzo [a] anthracene | 0.01 ug/L | - | - | - | 4.96 |
| Benzo [a] pyrene | 0.01 ug/L | - | - | - | 6.94 |
| Benzo [b] fluoranthene | 0.05 ug/L | - | - | - | 5.04 |
| Benzo [g,h,i] perylene | 0.05 ug/L | - | - | - | 3.79 |
| Benzo [k] fluoranthene | 0.05 ug/L | - | - | - | 2.65 |
| Chrysene | 0.05 ug/L | - | - | - | 6.21 |
| Dibenzo [a,h] anthracene | 0.05 ug/L | - | - | - | 1.12 |
| Fluoranthene | 0.01 ug/L | - | - | - | 11.1 |
| Fluorene | 0.05 ug/L | - | - | - | 0.95 |
| Indeno [1,2,3-cd] pyrene | 0.05 ug/L | - | - | - | 3.13 |
| 1-Methylnaphthalene | 0.05 ug/L | - | - | - | 0.36 |

Certificate of Analysis

Report Date: 31-Oct-2017

**Client: CM3 Environmental Inc.**

Order Date: 24-Oct-2017

**Client PO: Eccles St.**

**Project Description: KB1024**

| | **Client ID:** | MW1 | MW2 | MW3 | MW6 |
|---|---|---|---|---|---|
| | **Sample Date:** | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 |
| | **Sample ID:** | 1743230-01 | 1743230-02 | 1743230-03 | 1743230-04 |
| | **MDL/Units** | Water | Water | Water | Water |
| 2-Methylnaphthalene | 0.05 ug/L | - | - | - | 0.43 |
| Methylnaphthalene (1&2) | 0.10 ug/L | - | - | - | 0.79 |
| Naphthalene | 0.05 ug/L | - | - | - | 0.50 |
| Phenanthrene | 0.05 ug/L | - | - | - | 9.28 |
| Pyrene | 0.01 ug/L | - | - | - | 10.1 |
| 2-Fluorobiphenyl | Surrogate | - | - | - | 97.8% |
| Terphenyl-d14 | Surrogate | - | - | - | 99.3% |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

| | Client ID: | MW7 | MW8 | MW9 | MW11 |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 |
| | Sample ID: | 1743230-05 | 1743230-06 | 1743230-07 | 1743230-08 |
| | MDL/Units | Water | Water | Water | Water |
| **Metals** | | | | | |
| Antimony | 0.5 ug/L | - | - | <0.5 | - |
| Arsenic | 1 ug/L | - | - | <1 | - |
| Barium | 1 ug/L | - | - | 901 | - |
| Beryllium | 0.5 ug/L | - | - | <0.5 | - |
| Boron | 10 ug/L | - | - | 139 | - |
| Cadmium | 0.1 ug/L | - | - | <0.1 | - |
| Chromium | 1 ug/L | - | - | <1 | - |
| Cobalt | 0.5 ug/L | - | - | 3.3 | - |
| Copper | 0.5 ug/L | - | - | <0.5 | - |
| Lead | 0.1 ug/L | - | - | <0.1 | - |
| Molybdenum | 0.5 ug/L | - | - | 0.6 | - |
| Nickel | 1 ug/L | - | - | 3 | - |
| Selenium | 1 ug/L | - | - | <1 | - |
| Silver | 0.1 ug/L | - | - | <0.1 | - |
| Sodium | 200 ug/L | - | - | 936000 | - |
| Thallium | 0.1 ug/L | - | - | 0.1 | - |
| Uranium | 0.1 ug/L | - | - | 4.1 | - |
| Vanadium | 0.5 ug/L | - | - | <0.5 | - |
| Zinc | 5 ug/L | - | - | 11 | - |
| **Volatiles** | | | | | |
| Acetone | 5.0 ug/L | - | - | <5.0 | - |
| Benzene | 0.5 ug/L | - | - | <0.5 | - |
| Bromodichloromethane | 0.5 ug/L | - | - | <0.5 | - |
| Bromoform | 0.5 ug/L | - | - | <0.5 | - |
| Bromomethane | 0.5 ug/L | - | - | <0.5 | - |
| Carbon Tetrachloride | 0.2 ug/L | - | - | <0.2 | - |
| Chlorobenzene | 0.5 ug/L | - | - | <0.5 | - |
| Chloroform | 0.5 ug/L | - | - | <0.5 | - |
| Dibromochloromethane | 0.5 ug/L | - | - | <0.5 | - |
| Dichlorodifluoromethane | 1.0 ug/L | - | - | <1.0 | - |
| 1,2-Dichlorobenzene | 0.5 ug/L | - | - | <0.5 | - |
| 1,3-Dichlorobenzene | 0.5 ug/L | - | - | <0.5 | - |
| 1,4-Dichlorobenzene | 0.5 ug/L | - | - | <0.5 | - |
| 1,1-Dichloroethane | 0.5 ug/L | - | - | <0.5 | - |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

| | Client ID: | MW7 | MW8 | MW9 | MW11 |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 |
| | Sample ID: | 1743230-05 | 1743230-06 | 1743230-07 | 1743230-08 |
| | MDL/Units | Water | Water | Water | Water |
| 1,2-Dichloroethane | 0.5 ug/L | - | - | <0.5 | - |
| 1,1-Dichloroethylene | 0.5 ug/L | - | - | <0.5 | - |
| cis-1,2-Dichloroethylene | 0.5 ug/L | - | - | <0.5 | - |
| trans-1,2-Dichloroethylene | 0.5 ug/L | - | - | <0.5 | - |
| 1,2-Dichloropropane | 0.5 ug/L | - | - | <0.5 | - |
| cis-1,3-Dichloropropylene | 0.5 ug/L | - | - | <0.5 | - |
| trans-1,3-Dichloropropylene | 0.5 ug/L | - | - | <0.5 | - |
| 1,3-Dichloropropene, total | 0.5 ug/L | - | - | <0.5 | - |
| Ethylbenzene | 0.5 ug/L | - | - | 27.2 | - |
| Ethylene dibromide (dibromoethane, 1 | 0.2 ug/L | - | - | <0.2 | - |
| Hexane | 1.0 ug/L | - | - | <1.0 | - |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | - | - | <5.0 | - |
| Methyl Isobutyl Ketone | 5.0 ug/L | - | - | <5.0 | - |
| Methyl tert-butyl ether | 2.0 ug/L | - | - | <2.0 | - |
| Methylene Chloride | 5.0 ug/L | - | - | <5.0 | - |
| Styrene | 0.5 ug/L | - | - | <0.5 | - |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | - | - | <0.5 | - |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | - | - | <0.5 | - |
| Tetrachloroethylene | 0.5 ug/L | - | - | <0.5 | - |
| Toluene | 0.5 ug/L | - | - | <0.5 | - |
| 1,1,1-Trichloroethane | 0.5 ug/L | - | - | <0.5 | - |
| 1,1,2-Trichloroethane | 0.5 ug/L | - | - | <0.5 | - |
| Trichloroethylene | 0.5 ug/L | - | - | <0.5 | - |
| Trichlorofluoromethane | 1.0 ug/L | - | - | <1.0 | - |
| Vinyl chloride | 0.5 ug/L | - | - | <0.5 | - |
| m,p-Xylenes | 0.5 ug/L | - | - | 20.2 | - |
| o-Xylene | 0.5 ug/L | - | - | <0.5 | - |
| Xylenes, total | 0.5 ug/L | - | - | 20.2 | - |
| 4-Bromofluorobenzene | Surrogate | - | - | 109% | - |
| Dibromofluoromethane | Surrogate | - | - | 101% | - |
| Toluene-d8 | Surrogate | - | - | 90.0% | - |
| Benzene | 0.5 ug/L | <0.5 | <0.5 | - | <0.5 |
| Ethylbenzene | 0.5 ug/L | <0.5 | <0.5 | - | <0.5 |
| Toluene | 0.5 ug/L | <0.5 | <0.5 | - | <0.5 |
| m,p-Xylenes | 0.5 ug/L | <0.5 | <0.5 | - | <0.5 |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

| | Client ID: | MW7 | MW8 | MW9 | MW11 |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 | 24-Oct-17 |
| | Sample ID: | 1743230-05 | 1743230-06 | 1743230-07 | 1743230-08 |
| | MDL/Units | Water | Water | Water | Water |
| o-Xylene | 0.5 ug/L | <0.5 | <0.5 | - | <0.5 |
| Xylenes, total | 0.5 ug/L | <0.5 | <0.5 | - | <0.5 |
| Toluene-d8 | Surrogate | 95.0% | 94.8% | - | 96.2% |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 25 ug/L | <25 | <25 | 1810 | <25 |
| F2 PHCs (C10-C16) | 100 ug/L | <100 | <100 | 72500 | <100 |
| F3 PHCs (C16-C34) | 100 ug/L | <100 | <100 | 1520 | <100 |
| F4 PHCs (C34-C50) | 100 ug/L | <100 | <100 | <1000 [1] | <100 |
| **Semi-Volatiles** | | | | | |
| Acenaphthene | 0.05 ug/L | - | - | 10.9 | - |
| Acenaphthylene | 0.05 ug/L | - | - | <0.25 [1] | - |
| Anthracene | 0.01 ug/L | - | - | 0.56 | - |
| Benzo [a] anthracene | 0.01 ug/L | - | - | 0.74 | - |
| Benzo [a] pyrene | 0.01 ug/L | - | - | 0.92 | - |
| Benzo [b] fluoranthene | 0.05 ug/L | - | - | 0.72 | - |
| Benzo [g,h,i] perylene | 0.05 ug/L | - | - | 0.55 | - |
| Benzo [k] fluoranthene | 0.05 ug/L | - | - | 0.36 | - |
| Chrysene | 0.05 ug/L | - | - | 0.98 | - |
| Dibenzo [a,h] anthracene | 0.05 ug/L | - | - | <0.25 [1] | - |
| Fluoranthene | 0.01 ug/L | - | - | 2.22 | - |
| Fluorene | 0.05 ug/L | - | - | 8.12 | - |
| Indeno [1,2,3-cd] pyrene | 0.05 ug/L | - | - | 0.45 | - |
| 1-Methylnaphthalene | 0.05 ug/L | - | - | 478 | - |
| 2-Methylnaphthalene | 0.05 ug/L | - | - | 503 | - |
| Methylnaphthalene (1&2) | 0.10 ug/L | - | - | 981 | - |
| Naphthalene | 0.05 ug/L | - | - | 90.1 | - |
| Phenanthrene | 0.05 ug/L | - | - | 5.75 | - |
| Pyrene | 0.01 ug/L | - | - | 1.84 | - |
| 2-Fluorobiphenyl | Surrogate | - | - | 108% | - |
| Terphenyl-d14 | Surrogate | - | - | 84.0% | - |

Certificate of Analysis

**Client: CM3 Environmental Inc.**

**Client PO: Eccles St.**

Report Date: 31-Oct-2017

Order Date: 24-Oct-2017

**Project Description: KB1024**

| | Client ID: | MW12 | - | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | - | - | - |
| | Sample ID: | 1743230-09 | - | - | - |
| | MDL/Units | Water | - | - | - |
| **Metals** | | | | | |
| Antimony | 0.5 ug/L | <0.5 | - | - | - |
| Arsenic | 1 ug/L | 7 | - | - | - |
| Barium | 1 ug/L | 726 | - | - | - |
| Beryllium | 0.5 ug/L | <0.5 | - | - | - |
| Boron | 10 ug/L | 138 | - | - | - |
| Cadmium | 0.1 ug/L | <0.1 | - | - | - |
| Chromium | 1 ug/L | <1 | - | - | - |
| Cobalt | 0.5 ug/L | 3.4 | - | - | - |
| Copper | 0.5 ug/L | <0.5 | - | - | - |
| Lead | 0.1 ug/L | 0.2 | - | - | - |
| Molybdenum | 0.5 ug/L | 3.1 | - | - | - |
| Nickel | 1 ug/L | 2 | - | - | - |
| Selenium | 1 ug/L | <1 | - | - | - |
| Silver | 0.1 ug/L | <0.1 | - | - | - |
| Sodium | 200 ug/L | 1270000 | - | - | - |
| Thallium | 0.1 ug/L | <0.1 | - | - | - |
| Uranium | 0.1 ug/L | 1.9 | - | - | - |
| Vanadium | 0.5 ug/L | 4.5 | - | - | - |
| Zinc | 5 ug/L | 7 | - | - | - |
| **Volatiles** | | | | | |
| Acetone | 5.0 ug/L | <5.0 | - | - | - |
| Benzene | 0.5 ug/L | <0.5 | - | - | - |
| Bromodichloromethane | 0.5 ug/L | <0.5 | - | - | - |
| Bromoform | 0.5 ug/L | <0.5 | - | - | - |
| Bromomethane | 0.5 ug/L | <0.5 | - | - | - |
| Carbon Tetrachloride | 0.2 ug/L | <0.2 | - | - | - |
| Chlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| Chloroform | 0.5 ug/L | <0.5 | - | - | - |
| Dibromochloromethane | 0.5 ug/L | <0.5 | - | - | - |
| Dichlorodifluoromethane | 1.0 ug/L | <1.0 | - | - | - |
| 1,2-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,3-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,4-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1-Dichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,2-Dichloroethane | 0.5 ug/L | <0.5 | - | - | - |

| | Client ID: | MW12 | - | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 24-Oct-17 | - | - | - |
| | Sample ID: | 1743230-09 | - | - | - |
| | MDL/Units | Water | - | - | - |
| 1,1-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| cis-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| trans-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| 1,2-Dichloropropane | 0.5 ug/L | <0.5 | - | - | - |
| cis-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | - | - | - |
| trans-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | - | - | - |
| 1,3-Dichloropropene, total | 0.5 ug/L | <0.5 | - | - | - |
| Ethylbenzene | 0.5 ug/L | <0.5 | - | - | - |
| Ethylene dibromide (dibromoethane, 1 | 0.2 ug/L | <0.2 | - | - | - |
| Hexane | 1.0 ug/L | <1.0 | - | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | <5.0 | - | - | - |
| Methyl Isobutyl Ketone | 5.0 ug/L | <5.0 | - | - | - |
| Methyl tert-butyl ether | 2.0 ug/L | <2.0 | - | - | - |
| Methylene Chloride | 5.0 ug/L | <5.0 | - | - | - |
| Styrene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | <0.5 | - | - | - |
| Tetrachloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| Toluene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,1-Trichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,2-Trichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| Trichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| Trichlorofluoromethane | 1.0 ug/L | <1.0 | - | - | - |
| Vinyl chloride | 0.5 ug/L | <0.5 | - | - | - |
| m,p-Xylenes | 0.5 ug/L | <0.5 | - | - | - |
| o-Xylene | 0.5 ug/L | <0.5 | - | - | - |
| Xylenes, total | 0.5 ug/L | <0.5 | - | - | - |
| 4-Bromofluorobenzene | Surrogate | 116% | - | - | - |
| Dibromofluoromethane | Surrogate | 100% | - | - | - |
| Toluene-d8 | Surrogate | 95.4% | - | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 25 ug/L | <25 | - | - | - |
| F2 PHCs (C10-C16) | 100 ug/L | <100 | - | - | - |
| F3 PHCs (C16-C34) | 100 ug/L | <100 | - | - | - |
| F4 PHCs (C34-C50) | 100 ug/L | <100 | - | - | - |

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | | | | | | |
| F2 PHCs (C10-C16) | ND | 100 | ug/L | | | | | | |
| F3 PHCs (C16-C34) | ND | 100 | ug/L | | | | | | |
| F4 PHCs (C34-C50) | ND | 100 | ug/L | | | | | | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 0.5 | ug/L | | | | | | |
| Arsenic | ND | 1 | ug/L | | | | | | |
| Barium | ND | 1 | ug/L | | | | | | |
| Beryllium | ND | 0.5 | ug/L | | | | | | |
| Boron | ND | 10 | ug/L | | | | | | |
| Cadmium | ND | 0.1 | ug/L | | | | | | |
| Chromium | ND | 1 | ug/L | | | | | | |
| Cobalt | ND | 0.5 | ug/L | | | | | | |
| Copper | ND | 0.5 | ug/L | | | | | | |
| Lead | ND | 0.1 | ug/L | | | | | | |
| Molybdenum | ND | 0.5 | ug/L | | | | | | |
| Nickel | ND | 1 | ug/L | | | | | | |
| Selenium | ND | 1 | ug/L | | | | | | |
| Silver | ND | 0.1 | ug/L | | | | | | |
| Sodium | ND | 200 | ug/L | | | | | | |
| Thallium | ND | 0.1 | ug/L | | | | | | |
| Uranium | ND | 0.1 | ug/L | | | | | | |
| Vanadium | ND | 0.5 | ug/L | | | | | | |
| Zinc | ND | 5 | ug/L | | | | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | ND | 0.05 | ug/L | | | | | | |
| Acenaphthylene | ND | 0.05 | ug/L | | | | | | |
| Anthracene | ND | 0.01 | ug/L | | | | | | |
| Benzo [a] anthracene | ND | 0.01 | ug/L | | | | | | |
| Benzo [a] pyrene | ND | 0.01 | ug/L | | | | | | |
| Benzo [b] fluoranthene | ND | 0.05 | ug/L | | | | | | |
| Benzo [g,h,i] perylene | ND | 0.05 | ug/L | | | | | | |
| Benzo [k] fluoranthene | ND | 0.05 | ug/L | | | | | | |
| Chrysene | ND | 0.05 | ug/L | | | | | | |
| Dibenzo [a,h] anthracene | ND | 0.05 | ug/L | | | | | | |
| Fluoranthene | ND | 0.01 | ug/L | | | | | | |
| Fluorene | ND | 0.05 | ug/L | | | | | | |
| Indeno [1,2,3-cd] pyrene | ND | 0.05 | ug/L | | | | | | |
| 1-Methylnaphthalene | ND | 0.05 | ug/L | | | | | | |
| 2-Methylnaphthalene | ND | 0.05 | ug/L | | | | | | |
| Methylnaphthalene (1&2) | ND | 0.10 | ug/L | | | | | | |
| Naphthalene | ND | 0.05 | ug/L | | | | | | |
| Phenanthrene | ND | 0.05 | ug/L | | | | | | |
| Pyrene | ND | 0.01 | ug/L | | | | | | |
| *Surrogate: 2-Fluorobiphenyl* | *18.0* | | *ug/L* | | *90.1* | *50-140* | | | |
| *Surrogate: Terphenyl-d14* | *22.5* | | *ug/L* | | *113* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | | | | | | |
| Benzene | ND | 0.5 | ug/L | | | | | | |
| Bromodichloromethane | ND | 0.5 | ug/L | | | | | | |
| Bromoform | ND | 0.5 | ug/L | | | | | | |
| Bromomethane | ND | 0.5 | ug/L | | | | | | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | | | | | | |
| Chlorobenzene | ND | 0.5 | ug/L | | | | | | |
| Chloroform | ND | 0.5 | ug/L | | | | | | |
| Dibromochloromethane | ND | 0.5 | ug/L | | | | | | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.5 | ug/L | | | | | | |
| Ethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Ethylene dibromide (dibromoethane, 1,2 | ND | 0.2 | ug/L | | | | | | |
| Hexane | ND | 1.0 | ug/L | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | | | | | | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | | | | | | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | | | | | | |
| Methylene Chloride | ND | 5.0 | ug/L | | | | | | |
| Styrene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| Tetrachloroethylene | ND | 0.5 | ug/L | | | | | | |
| Toluene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| Trichloroethylene | ND | 0.5 | ug/L | | | | | | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | | | | | | |
| Vinyl chloride | ND | 0.5 | ug/L | | | | | | |
| m,p-Xylenes | ND | 0.5 | ug/L | | | | | | |
| o-Xylene | ND | 0.5 | ug/L | | | | | | |
| Xylenes, total | ND | 0.5 | ug/L | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *96.1* | | *ug/L* | | *120* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *79.4* | | *ug/L* | | *99.3* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *77.1* | | *ug/L* | | *96.4* | *50-140* | | | |
| Benzene | ND | 0.5 | ug/L | | | | | | |
| Ethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Toluene | ND | 0.5 | ug/L | | | | | | |
| m,p-Xylenes | ND | 0.5 | ug/L | | | | | | |
| o-Xylene | ND | 0.5 | ug/L | | | | | | |
| Xylenes, total | ND | 0.5 | ug/L | | | | | | |
| *Surrogate: Toluene-d8* | *77.1* | | *ug/L* | | *96.4* | *50-140* | | | |

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | ND | | | | 30 | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Arsenic | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Barium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Beryllium | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Boron | ND | 10 | ug/L | ND | | | 0.0 | 20 | |
| Cadmium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Chromium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Cobalt | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Copper | ND | 0.5 | ug/L | ND | | | | 20 | |
| Lead | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Molybdenum | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Nickel | ND | 1 | ug/L | ND | | | | 20 | |
| Selenium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Silver | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Sodium | ND | 200 | ug/L | 1160 | | | 0.0 | 20 | |
| Thallium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Uranium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Vanadium | ND | 0.5 | ug/L | ND | | | | 20 | |
| Zinc | ND | 5 | ug/L | ND | | | | 20 | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Benzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromodichloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromoform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromomethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | ND | | | | 30 | |
| Chlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Chloroform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dibromochloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylbenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylene dibromide (dibromoethane, 1,2 | ND | 0.2 | ug/L | ND | | | | 30 | |
| Hexane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | ND | | | | 30 | |
| Methylene Chloride | ND | 5.0 | ug/L | ND | | | | 30 | |
| Styrene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Tetrachloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Toluene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Trichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Vinyl chloride | ND | 0.5 | ug/L | ND | | | | 30 | |
| m,p-Xylenes | ND | 0.5 | ug/L | ND | | | | 30 | |
| o-Xylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| *Surrogate: 4-Bromofluorobenzene* | *97.6* | | *ug/L* | | *122* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *82.0* | | *ug/L* | | *103* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *75.9* | | *ug/L* | | *94.9* | *50-140* | | | |
| Benzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylbenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Toluene | ND | 0.5 | ug/L | ND | | | | 30 | |
| m,p-Xylenes | ND | 0.5 | ug/L | ND | | | | 30 | |
| o-Xylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| *Surrogate: Toluene-d8* | *75.9* | | *ug/L* | | *94.9* | *50-140* | | | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | 2020 | 25 | ug/L | | 101 | 68-117 | | | |
| F2 PHCs (C10-C16) | 1530 | 100 | ug/L | | 84.9 | 60-140 | | | |
| F3 PHCs (C16-C34) | 2990 | 100 | ug/L | | 80.5 | 60-140 | | | |
| F4 PHCs (C34-C50) | 2740 | 100 | ug/L | | 111 | 60-140 | | | |
| **Metals** | | | | | | | | | |
| Antimony | 39.8 | | ug/L | ND | 79.5 | 80-120 | | | QM-07 |
| Arsenic | 46.7 | | ug/L | ND | 93.3 | 80-120 | | | |
| Barium | 45.1 | | ug/L | ND | 90.1 | 80-120 | | | |
| Beryllium | 48.5 | | ug/L | ND | 97.0 | 80-120 | | | |
| Boron | 46 | | ug/L | ND | 80.1 | 80-120 | | | |
| Cadmium | 45.5 | | ug/L | ND | 90.9 | 80-120 | | | |
| Chromium | 45.8 | | ug/L | ND | 91.5 | 80-120 | | | |
| Cobalt | 45.0 | | ug/L | ND | 90.1 | 80-120 | | | |
| Copper | 44.3 | | ug/L | ND | 88.6 | 80-120 | | | |
| Lead | 44.9 | | ug/L | ND | 89.7 | 80-120 | | | |
| Molybdenum | 40.6 | | ug/L | ND | 80.8 | 80-120 | | | |
| Nickel | 45.0 | | ug/L | ND | 90.0 | 80-120 | | | |
| Selenium | 46.9 | | ug/L | ND | 93.6 | 80-120 | | | |
| Silver | 43.8 | | ug/L | ND | 87.6 | 80-120 | | | |
| Sodium | 873 | | ug/L | ND | 85.7 | 80-120 | | | |
| Thallium | 45.6 | | ug/L | ND | 91.2 | 80-120 | | | |
| Uranium | 44.9 | | ug/L | ND | 89.9 | 80-120 | | | |
| Vanadium | 45.9 | | ug/L | ND | 91.8 | 80-120 | | | |
| Zinc | 47 | | ug/L | ND | 93.6 | 80-120 | | | |
| **Semi-Volatiles** | | | | | | | | | |
| Acenaphthene | 5.65 | 0.05 | ug/L | | 113 | 50-140 | | | |
| Acenaphthylene | 4.85 | 0.05 | ug/L | | 97.0 | 50-140 | | | |
| Anthracene | 5.53 | 0.01 | ug/L | | 111 | 50-140 | | | |
| Benzo [a] anthracene | 5.64 | 0.01 | ug/L | | 113 | 50-140 | | | |
| Benzo [a] pyrene | 6.35 | 0.01 | ug/L | | 127 | 50-140 | | | |
| Benzo [b] fluoranthene | 6.53 | 0.05 | ug/L | | 131 | 50-140 | | | |
| Benzo [g,h,i] perylene | 5.79 | 0.05 | ug/L | | 116 | 50-140 | | | |
| Benzo [k] fluoranthene | 5.32 | 0.05 | ug/L | | 106 | 50-140 | | | |
| Chrysene | 6.17 | 0.05 | ug/L | | 123 | 50-140 | | | |
| Dibenzo [a,h] anthracene | 6.11 | 0.05 | ug/L | | 122 | 50-140 | | | |
| Fluoranthene | 5.98 | 0.01 | ug/L | | 120 | 50-140 | | | |
| Fluorene | 5.89 | 0.05 | ug/L | | 118 | 50-140 | | | |
| Indeno [1,2,3-cd] pyrene | 6.05 | 0.05 | ug/L | | 121 | 50-140 | | | |
| 1-Methylnaphthalene | 5.60 | 0.05 | ug/L | | 112 | 50-140 | | | |
| 2-Methylnaphthalene | 5.94 | 0.05 | ug/L | | 119 | 50-140 | | | |
| Naphthalene | 5.55 | 0.05 | ug/L | | 111 | 50-140 | | | |
| Phenanthrene | 6.09 | 0.05 | ug/L | | 122 | 50-140 | | | |
| Pyrene | 5.47 | 0.01 | ug/L | | 109 | 50-140 | | | |
| *Surrogate: 2-Fluorobiphenyl* | *20.3* | | *ug/L* | | *102* | *50-140* | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | 67.8 | 5.0 | ug/L | | 67.8 | 50-140 | | | |
| Benzene | 31.2 | 0.5 | ug/L | | 78.1 | 60-130 | | | |
| Bromodichloromethane | 27.0 | 0.5 | ug/L | | 67.5 | 60-130 | | | |
| Bromoform | 37.2 | 0.5 | ug/L | | 93.0 | 60-130 | | | |
| Bromomethane | 31.1 | 0.5 | ug/L | | 77.8 | 50-140 | | | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Carbon Tetrachloride | 26.6 | 0.2 | ug/L | | 66.6 | 60-130 | | | |
| Chlorobenzene | 36.0 | 0.5 | ug/L | | 90.1 | 60-130 | | | |
| Chloroform | 31.6 | 0.5 | ug/L | | 79.0 | 60-130 | | | |
| Dibromochloromethane | 35.0 | 0.5 | ug/L | | 87.6 | 60-130 | | | |
| Dichlorodifluoromethane | 29.4 | 1.0 | ug/L | | 73.4 | 50-140 | | | |
| 1,2-Dichlorobenzene | 46.5 | 0.5 | ug/L | | 116 | 60-130 | | | |
| 1,3-Dichlorobenzene | 42.4 | 0.5 | ug/L | | 106 | 60-130 | | | |
| 1,4-Dichlorobenzene | 45.7 | 0.5 | ug/L | | 114 | 60-130 | | | |
| 1,1-Dichloroethane | 30.7 | 0.5 | ug/L | | 76.8 | 60-130 | | | |
| 1,2-Dichloroethane | 30.3 | 0.5 | ug/L | | 75.7 | 60-130 | | | |
| 1,1-Dichloroethylene | 33.3 | 0.5 | ug/L | | 83.4 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 33.5 | 0.5 | ug/L | | 83.7 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 32.6 | 0.5 | ug/L | | 81.6 | 60-130 | | | |
| 1,2-Dichloropropane | 26.2 | 0.5 | ug/L | | 65.6 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 29.5 | 0.5 | ug/L | | 73.7 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 27.4 | 0.5 | ug/L | | 68.4 | 60-130 | | | |
| Ethylbenzene | 35.0 | 0.5 | ug/L | | 87.4 | 60-130 | | | |
| Ethylene dibromide (dibromoethane, 1,2- | 35.5 | 0.2 | ug/L | | 88.7 | 60-130 | | | |
| Hexane | 32.4 | 1.0 | ug/L | | 81.0 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 65.9 | 5.0 | ug/L | | 65.9 | 50-140 | | | |
| Methyl Isobutyl Ketone | 66.1 | 5.0 | ug/L | | 66.1 | 50-140 | | | |
| Methyl tert-butyl ether | 60.2 | 2.0 | ug/L | | 60.2 | 50-140 | | | |
| Methylene Chloride | 36.2 | 5.0 | ug/L | | 90.6 | 60-130 | | | |
| Styrene | 36.7 | 0.5 | ug/L | | 91.8 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 34.2 | 0.5 | ug/L | | 85.6 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 30.2 | 0.5 | ug/L | | 75.4 | 60-130 | | | |
| Tetrachloroethylene | 38.5 | 0.5 | ug/L | | 96.3 | 60-130 | | | |
| Toluene | 32.4 | 0.5 | ug/L | | 81.1 | 60-130 | | | |
| 1,1,1-Trichloroethane | 28.2 | 0.5 | ug/L | | 70.5 | 60-130 | | | |
| 1,1,2-Trichloroethane | 28.4 | 0.5 | ug/L | | 71.0 | 60-130 | | | |
| Trichloroethylene | 29.0 | 0.5 | ug/L | | 72.6 | 60-130 | | | |
| Trichlorofluoromethane | 28.9 | 1.0 | ug/L | | 72.2 | 60-130 | | | |
| Vinyl chloride | 31.5 | 0.5 | ug/L | | 78.7 | 50-140 | | | |
| m,p-Xylenes | 73.0 | 0.5 | ug/L | | 91.3 | 60-130 | | | |
| o-Xylene | 33.5 | 0.5 | ug/L | | 83.8 | 60-130 | | | |
| Benzene | 31.2 | 0.5 | ug/L | | 78.1 | 60-130 | | | |
| Ethylbenzene | 35.0 | 0.5 | ug/L | | 87.4 | 60-130 | | | |
| Toluene | 32.4 | 0.5 | ug/L | | 81.1 | 60-130 | | | |
| m,p-Xylenes | 73.0 | 0.5 | ug/L | | 91.3 | 60-130 | | | |
| o-Xylene | 33.5 | 0.5 | ug/L | | 83.8 | 60-130 | | | |

**Qualifier Notes:**

***Login Qualifiers :***

Sample - Insufficient volume -
*Applies to samples: MW6*

Sample - Not submitted in the correct container -
*Applies to samples: MW6*

***Sample Qualifiers :***

1 : Elevated detection limit due to dilution required because of high target analyte concentration.

***QC Qualifiers :***

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

**Sample Data Revisions**

None

**Work Order Revisions / Comments:**

Revision 1 This report includes an updated project reference.

**Other Report Notes:**

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

*CCME PHC additional information:*

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.

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# Certificate of Analysis

**CM3 Environmental Inc.**

5710 Akins Road
Ottawa, ON K2S 1B8
Attn: Karl Bilyj

Client PO: 44 Eccles St
Project: KB1024
Custody: 39315

Report Date: 4-Dec-2017
Order Date: 28-Nov-2017

**Order #: 1748177**

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

| Paracel ID | Client ID |
|---|---|
| 1748177-01 | MW10 |

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: 44 Eccles St**

Report Date: 04-Dec-2017
Order Date: 28-Nov-2017
**Project Description: KB1024**

## Analysis Summary Table

| Analysis | Method Reference/Description | Extraction Date | Analysis Date |
|---|---|---|---|
| Metals, ICP-MS | EPA 200.8 - ICP-MS | 30-Nov-17 | 30-Nov-17 |
| PHC F1 | CWS Tier 1 - P&T GC-FID | 1-Dec-17 | 3-Dec-17 |
| PHCs F2 to F4 | CWS Tier 1 - GC-FID, extraction | 28-Nov-17 | 30-Nov-17 |
| REG 153: VOCs by P&T GC/MS | EPA 624 - P&T GC-MS | 1-Dec-17 | 3-Dec-17 |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: 44 Eccles St**

Report Date: 04-Dec-2017
Order Date: 28-Nov-2017
**Project Description: KB1024**

| | Client ID: | MW10 | - | - | - |
|---|---|---|---|---|---|
| | Sample Date: | 28-Nov-17 | - | - | - |
| | Sample ID: | 1748177-01 | - | - | - |
| | MDL/Units | Water | - | - | - |
| **Metals** | | | | | |
| Antimony | 0.5 ug/L | <0.5 | - | - | - |
| Arsenic | 1 ug/L | <1 | - | - | - |
| Barium | 1 ug/L | 726 | - | - | - |
| Beryllium | 0.5 ug/L | <0.5 | - | - | - |
| Boron | 10 ug/L | 394 | - | - | - |
| Cadmium | 0.1 ug/L | <0.1 | - | - | - |
| Chromium | 1 ug/L | <1 | - | - | - |
| Cobalt | 0.5 ug/L | 0.5 | - | - | - |
| Copper | 0.5 ug/L | <0.5 | - | - | - |
| Lead | 0.1 ug/L | <0.1 | - | - | - |
| Molybdenum | 0.5 ug/L | 0.5 | - | - | - |
| Nickel | 1 ug/L | 1 | - | - | - |
| Selenium | 1 ug/L | <1 | - | - | - |
| Silver | 0.1 ug/L | <0.1 | - | - | - |
| Sodium | 200 ug/L | 1090000 | - | - | - |
| Thallium | 0.1 ug/L | <0.1 | - | - | - |
| Uranium | 0.1 ug/L | 1.5 | - | - | - |
| Vanadium | 0.5 ug/L | <0.5 | - | - | - |
| Zinc | 5 ug/L | <5 | - | - | - |
| **Volatiles** | | | | | |
| Acetone | 5.0 ug/L | <5.0 | - | - | - |
| Benzene | 0.5 ug/L | <0.5 | - | - | - |
| Bromodichloromethane | 0.5 ug/L | <0.5 | - | - | - |
| Bromoform | 0.5 ug/L | <0.5 | - | - | - |
| Bromomethane | 0.5 ug/L | <0.5 | - | - | - |
| Carbon Tetrachloride | 0.2 ug/L | <0.2 | - | - | - |
| Chlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| Chloroform | 0.5 ug/L | <0.5 | - | - | - |
| Dibromochloromethane | 0.5 ug/L | <0.5 | - | - | - |
| Dichlorodifluoromethane | 1.0 ug/L | <1.0 | - | - | - |
| 1,2-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,3-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,4-Dichlorobenzene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1-Dichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,2-Dichloroethane | 0.5 ug/L | <0.5 | - | - | - |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: 44 Eccles St**

Report Date: 04-Dec-2017
Order Date: 28-Nov-2017
**Project Description: KB1024**

| | **Client ID:** | MW10 | - | - | - |
|---|---|---|---|---|---|
| | **Sample Date:** | 28-Nov-17 | - | - | - |
| | **Sample ID:** | 1748177-01 | - | - | - |
| | **MDL/Units** | Water | - | - | - |
| 1,1-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| cis-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| trans-1,2-Dichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| 1,2-Dichloropropane | 0.5 ug/L | <0.5 | - | - | - |
| cis-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | - | - | - |
| trans-1,3-Dichloropropylene | 0.5 ug/L | <0.5 | - | - | - |
| 1,3-Dichloropropene, total | 0.5 ug/L | <0.5 | - | - | - |
| Ethylbenzene | 0.5 ug/L | <0.5 | - | - | - |
| Ethylene dibromide (dibromoethar | 0.2 ug/L | <0.2 | - | - | - |
| Hexane | 1.0 ug/L | <1.0 | - | - | - |
| Methyl Ethyl Ketone (2-Butanone) | 5.0 ug/L | <5.0 | - | - | - |
| Methyl Isobutyl Ketone | 5.0 ug/L | <5.0 | - | - | - |
| Methyl tert-butyl ether | 2.0 ug/L | <2.0 | - | - | - |
| Methylene Chloride | 5.0 ug/L | <5.0 | - | - | - |
| Styrene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,1,2-Tetrachloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,2,2-Tetrachloroethane | 0.5 ug/L | <0.5 | - | - | - |
| Tetrachloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| Toluene | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,1-Trichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| 1,1,2-Trichloroethane | 0.5 ug/L | <0.5 | - | - | - |
| Trichloroethylene | 0.5 ug/L | <0.5 | - | - | - |
| Trichlorofluoromethane | 1.0 ug/L | <1.0 | - | - | - |
| Vinyl chloride | 0.5 ug/L | <0.5 | - | - | - |
| m,p-Xylenes | 0.5 ug/L | <0.5 | - | - | - |
| o-Xylene | 0.5 ug/L | <0.5 | - | - | - |
| Xylenes, total | 0.5 ug/L | <0.5 | - | - | - |
| 4-Bromofluorobenzene | Surrogate | 103% | - | - | - |
| Dibromofluoromethane | Surrogate | 111% | - | - | - |
| Toluene-d8 | Surrogate | 89.1% | - | - | - |
| **Hydrocarbons** | | | | | |
| F1 PHCs (C6-C10) | 25 ug/L | <25 | - | - | - |
| F2 PHCs (C10-C16) | 100 ug/L | <100 | - | - | - |
| F3 PHCs (C16-C34) | 100 ug/L | <100 | - | - | - |
| F4 PHCs (C34-C50) | 100 ug/L | <100 | - | - | - |

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | | | | | | |
| F2 PHCs (C10-C16) | ND | 100 | ug/L | | | | | | |
| F3 PHCs (C16-C34) | ND | 100 | ug/L | | | | | | |
| F4 PHCs (C34-C50) | ND | 100 | ug/L | | | | | | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 0.5 | ug/L | | | | | | |
| Arsenic | ND | 1 | ug/L | | | | | | |
| Barium | ND | 1 | ug/L | | | | | | |
| Beryllium | ND | 0.5 | ug/L | | | | | | |
| Boron | ND | 10 | ug/L | | | | | | |
| Cadmium | ND | 0.1 | ug/L | | | | | | |
| Chromium | ND | 1 | ug/L | | | | | | |
| Cobalt | ND | 0.5 | ug/L | | | | | | |
| Copper | ND | 0.5 | ug/L | | | | | | |
| Lead | ND | 0.1 | ug/L | | | | | | |
| Molybdenum | ND | 0.5 | ug/L | | | | | | |
| Nickel | ND | 1 | ug/L | | | | | | |
| Selenium | ND | 1 | ug/L | | | | | | |
| Silver | ND | 0.1 | ug/L | | | | | | |
| Sodium | ND | 200 | ug/L | | | | | | |
| Thallium | ND | 0.1 | ug/L | | | | | | |
| Uranium | ND | 0.1 | ug/L | | | | | | |
| Vanadium | ND | 0.5 | ug/L | | | | | | |
| Zinc | ND | 5 | ug/L | | | | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | | | | | | |
| Benzene | ND | 0.5 | ug/L | | | | | | |
| Bromodichloromethane | ND | 0.5 | ug/L | | | | | | |
| Bromoform | ND | 0.5 | ug/L | | | | | | |
| Bromomethane | ND | 0.5 | ug/L | | | | | | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | | | | | | |
| Chlorobenzene | ND | 0.5 | ug/L | | | | | | |
| Chloroform | ND | 0.5 | ug/L | | | | | | |
| Dibromochloromethane | ND | 0.5 | ug/L | | | | | | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | | | | | | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | | | | | | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | | | | | | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | | | | | | |
| 1,3-Dichloropropene, total | ND | 0.5 | ug/L | | | | | | |
| Ethylbenzene | ND | 0.5 | ug/L | | | | | | |
| Ethylene dibromide (dibromoethane, | ND | 0.2 | ug/L | | | | | | |
| Hexane | ND | 1.0 | ug/L | | | | | | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | | | | | | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | | | | | | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | | | | | | |
| Methylene Chloride | ND | 5.0 | ug/L | | | | | | |
| Styrene | ND | 0.5 | ug/L | | | | | | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | | | | | | |
| Tetrachloroethylene | ND | 0.5 | ug/L | | | | | | |
| Toluene | ND | 0.5 | ug/L | | | | | | |

## *Method Quality Control: Blank*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | | | | | | |
| Trichloroethylene | ND | 0.5 | ug/L | | | | | | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | | | | | | |
| Vinyl chloride | ND | 0.5 | ug/L | | | | | | |
| m,p-Xylenes | ND | 0.5 | ug/L | | | | | | |
| o-Xylene | ND | 0.5 | ug/L | | | | | | |
| Xylenes, total | ND | 0.5 | ug/L | | | | | | |
| *Surrogate: 4-Bromofluorobenzene* | *77.5* | | *ug/L* | | *96.9* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *88.1* | | *ug/L* | | *110* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *74.3* | | *ug/L* | | *92.9* | *50-140* | | | |

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | ND | 25 | ug/L | ND | | | | 30 | |
| **Metals** | | | | | | | | | |
| Antimony | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Arsenic | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Barium | 80.8 | 1 | ug/L | 82.1 | | | 1.6 | 20 | |
| Beryllium | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Boron | 32 | 10 | ug/L | 34 | | | 6.3 | 20 | |
| Cadmium | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Chromium | ND | 1 | ug/L | ND | | | 0.0 | 20 | |
| Cobalt | ND | 0.5 | ug/L | ND | | | 0.0 | 20 | |
| Copper | 0.93 | 0.5 | ug/L | 0.97 | | | 3.9 | 20 | |
| Lead | 0.34 | 0.1 | ug/L | 0.32 | | | 4.4 | 20 | |
| Molybdenum | 7.56 | 0.5 | ug/L | 7.40 | | | 2.2 | 20 | |
| Nickel | 2.2 | 1 | ug/L | 2.2 | | | 0.4 | 20 | |
| Selenium | 1.2 | 1 | ug/L | 1.3 | | | 11.8 | 20 | |
| Silver | ND | 0.1 | ug/L | ND | | | 0.0 | 20 | |
| Sodium | 278000 | 200 | ug/L | 294000 | | | 5.7 | 20 | |
| Thallium | 0.14 | 0.1 | ug/L | 0.13 | | | 6.9 | 20 | |
| Uranium | 3.5 | 0.1 | ug/L | 3.3 | | | 4.9 | 20 | |
| Vanadium | 1.67 | 0.5 | ug/L | 1.61 | | | 3.7 | 20 | |
| Zinc | 6 | 5 | ug/L | 6 | | | 0.7 | 20 | |
| **Volatiles** | | | | | | | | | |
| Acetone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Benzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromodichloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromoform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Bromomethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Carbon Tetrachloride | ND | 0.2 | ug/L | ND | | | | 30 | |
| Chlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Chloroform | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dibromochloromethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Dichlorodifluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| 1,2-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,3-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,4-Dichlorobenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,2-Dichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,2-Dichloropropane | ND | 0.5 | ug/L | ND | | | | 30 | |
| cis-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| trans-1,3-Dichloropropylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylbenzene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Ethylene dibromide (dibromoethane, | ND | 0.2 | ug/L | ND | | | | 30 | |
| Hexane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Methyl Ethyl Ketone (2-Butanone) | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl Isobutyl Ketone | ND | 5.0 | ug/L | ND | | | | 30 | |
| Methyl tert-butyl ether | ND | 2.0 | ug/L | ND | | | | 30 | |
| Methylene Chloride | ND | 5.0 | ug/L | ND | | | | 30 | |
| Styrene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| Tetrachloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Toluene | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,1-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |
| 1,1,2-Trichloroethane | ND | 0.5 | ug/L | ND | | | | 30 | |

Certificate of Analysis
**Client: CM3 Environmental Inc.**
**Client PO: 44 Eccles St**

Report Date: 04-Dec-2017
Order Date: 28-Nov-2017
**Project Description: KB1024**

## *Method Quality Control: Duplicate*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Trichloroethylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| Trichlorofluoromethane | ND | 1.0 | ug/L | ND | | | | 30 | |
| Vinyl chloride | ND | 0.5 | ug/L | ND | | | | 30 | |
| m,p-Xylenes | ND | 0.5 | ug/L | ND | | | | 30 | |
| o-Xylene | ND | 0.5 | ug/L | ND | | | | 30 | |
| *Surrogate: 4-Bromofluorobenzene* | *82.8* | | *ug/L* | | *104* | *50-140* | | | |
| *Surrogate: Dibromofluoromethane* | *86.6* | | *ug/L* | | *108* | *50-140* | | | |
| *Surrogate: Toluene-d8* | *70.2* | | *ug/L* | | *87.8* | *50-140* | | | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| **Hydrocarbons** | | | | | | | | | |
| F1 PHCs (C6-C10) | 1660 | 25 | ug/L | | 83.0 | 68-117 | | | |
| F2 PHCs (C10-C16) | 1630 | 100 | ug/L | | 90.8 | 60-140 | | | |
| F3 PHCs (C16-C34) | 4100 | 100 | ug/L | | 110 | 60-140 | | | |
| F4 PHCs (C34-C50) | 2740 | 100 | ug/L | | 110 | 60-140 | | | |
| **Metals** | | | | | | | | | |
| Antimony | 37.9 | | ug/L | ND | 75.0 | 80-120 | | | QM-07 |
| Arsenic | 51.0 | | ug/L | ND | 101 | 80-120 | | | |
| Barium | 122 | | ug/L | 82.1 | 80.0 | 80-120 | | | |
| Beryllium | 47.4 | | ug/L | ND | 94.6 | 80-120 | | | |
| Boron | 76 | | ug/L | 34 | 84.9 | 80-120 | | | |
| Cadmium | 41.2 | | ug/L | ND | 82.3 | 80-120 | | | |
| Chromium | 45.5 | | ug/L | ND | 90.7 | 80-120 | | | |
| Cobalt | 42.8 | | ug/L | ND | 85.0 | 80-120 | | | |
| Copper | 44.3 | | ug/L | 0.97 | 86.6 | 80-120 | | | |
| Lead | 42.2 | | ug/L | 0.32 | 83.7 | 80-120 | | | |
| Molybdenum | 48.3 | | ug/L | 7.40 | 81.8 | 80-120 | | | |
| Nickel | 45.8 | | ug/L | 2.2 | 87.1 | 80-120 | | | |
| Selenium | 52.0 | | ug/L | 1.3 | 101 | 80-120 | | | |
| Silver | 45.5 | | ug/L | | 91.0 | 80-120 | | | |
| Sodium | 896 | | ug/L | | 89.6 | 80-120 | | | |
| Thallium | 43.3 | | ug/L | 0.13 | 86.3 | 80-120 | | | |
| Uranium | 48.6 | | ug/L | 3.3 | 90.6 | 80-120 | | | |
| Vanadium | 48.7 | | ug/L | 1.61 | 94.1 | 80-120 | | | |
| Zinc | 51 | | ug/L | 6 | 88.7 | 80-120 | | | |
| **Volatiles** | | | | | | | | | |
| Acetone | 68.2 | 5.0 | ug/L | | 68.2 | 50-140 | | | |
| Benzene | 42.0 | 0.5 | ug/L | | 105 | 60-130 | | | |
| Bromodichloromethane | 48.7 | 0.5 | ug/L | | 122 | 60-130 | | | |
| Bromoform | 50.4 | 0.5 | ug/L | | 126 | 60-130 | | | |
| Bromomethane | 44.2 | 0.5 | ug/L | | 111 | 50-140 | | | |
| Carbon Tetrachloride | 51.4 | 0.2 | ug/L | | 128 | 60-130 | | | |
| Chlorobenzene | 47.1 | 0.5 | ug/L | | 118 | 60-130 | | | |
| Chloroform | 43.0 | 0.5 | ug/L | | 108 | 60-130 | | | |
| Dibromochloromethane | 39.2 | 0.5 | ug/L | | 98.0 | 60-130 | | | |
| Dichlorodifluoromethane | 34.5 | 1.0 | ug/L | | 86.3 | 50-140 | | | |
| 1,2-Dichlorobenzene | 43.9 | 0.5 | ug/L | | 110 | 60-130 | | | |
| 1,3-Dichlorobenzene | 44.2 | 0.5 | ug/L | | 110 | 60-130 | | | |
| 1,4-Dichlorobenzene | 44.9 | 0.5 | ug/L | | 112 | 60-130 | | | |
| 1,1-Dichloroethane | 45.0 | 0.5 | ug/L | | 113 | 60-130 | | | |
| 1,2-Dichloroethane | 41.2 | 0.5 | ug/L | | 103 | 60-130 | | | |
| 1,1-Dichloroethylene | 45.4 | 0.5 | ug/L | | 114 | 60-130 | | | |
| cis-1,2-Dichloroethylene | 41.1 | 0.5 | ug/L | | 103 | 60-130 | | | |
| trans-1,2-Dichloroethylene | 47.7 | 0.5 | ug/L | | 119 | 60-130 | | | |
| 1,2-Dichloropropane | 46.2 | 0.5 | ug/L | | 116 | 60-130 | | | |
| cis-1,3-Dichloropropylene | 50.6 | 0.5 | ug/L | | 127 | 60-130 | | | |
| trans-1,3-Dichloropropylene | 49.8 | 0.5 | ug/L | | 124 | 60-130 | | | |
| Ethylbenzene | 48.9 | 0.5 | ug/L | | 122 | 60-130 | | | |
| Ethylene dibromide (dibromoethane, | 51.2 | 0.2 | ug/L | | 128 | 60-130 | | | |
| Hexane | 34.8 | 1.0 | ug/L | | 86.9 | 60-130 | | | |
| Methyl Ethyl Ketone (2-Butanone) | 70.2 | 5.0 | ug/L | | 70.2 | 50-140 | | | |
| Methyl Isobutyl Ketone | 99.3 | 5.0 | ug/L | | 99.3 | 50-140 | | | |

## *Method Quality Control: Spike*

| Analyte | Result | Reporting Limit | Units | Source Result | %REC | %REC Limit | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Methyl tert-butyl ether | 137 | 2.0 | ug/L | | 137 | 50-140 | | | |
| Methylene Chloride | 39.0 | 5.0 | ug/L | | 97.4 | 60-130 | | | |
| Styrene | 49.9 | 0.5 | ug/L | | 125 | 60-130 | | | |
| 1,1,1,2-Tetrachloroethane | 47.3 | 0.5 | ug/L | | 118 | 60-130 | | | |
| 1,1,2,2-Tetrachloroethane | 44.7 | 0.5 | ug/L | | 112 | 60-130 | | | |
| Tetrachloroethylene | 44.9 | 0.5 | ug/L | | 112 | 60-130 | | | |
| Toluene | 44.5 | 0.5 | ug/L | | 111 | 60-130 | | | |
| 1,1,1-Trichloroethane | 50.6 | 0.5 | ug/L | | 126 | 60-130 | | | |
| 1,1,2-Trichloroethane | 47.7 | 0.5 | ug/L | | 119 | 60-130 | | | |
| Trichloroethylene | 48.1 | 0.5 | ug/L | | 120 | 60-130 | | | |
| Trichlorofluoromethane | 48.3 | 1.0 | ug/L | | 121 | 60-130 | | | |
| Vinyl chloride | 39.1 | 0.5 | ug/L | | 97.8 | 50-140 | | | |
| m,p-Xylenes | 91.5 | 0.5 | ug/L | | 114 | 60-130 | | | |
| o-Xylene | 51.0 | 0.5 | ug/L | | 128 | 60-130 | | | |
| *Surrogate: 4-Bromofluorobenzene* | *58.9* | | *ug/L* | | *73.6* | *50-140* | | | |

## Qualifier Notes:

***QC Qualifiers :***

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

## Sample Data Revisions

None

## Work Order Revisions / Comments:

None

## Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

*CCME PHC additional information:*

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.