DILLON CONSULTING

TOWN OF TECUMSEH

Groundwater and Methane Investigation

Tecumseh Hamlet Secondary Planning Area

August 2023 – 20-2559

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Executive Summary

Dillon Consulting Limited (Dillon) was retained by the Town of Tecumseh (Town) (the "Client") to conduct a groundwater and methane investigation for lands within the Tecumseh Hamlet Secondary Planning Area (Hamlet SPA) which are adjacent to a former Ministry of Transportation, Ontario (MTO) waste disposal site. The locations of the investigation, Tecumseh Hamlet SPA and MTO waste disposal site are shown on Figure 1.

The objectives of the groundwater and methane investigation were:

- To determine the potential for migration of potentially impacted groundwater and methane gas from the former MTO waste disposal site to the developable lands within the Hamlet SPA, and
- To obtain the information necessary to recommend setback limits from the former MTO waste disposal site to proposed roadways, storm, sanitary and watermain services and residential land use in the Hamlet SPA.

Dillon understands that this groundwater and methane investigation is a preliminary investigation to assist in the planning processes and does not fulfil the requirements of the *D-4 Land Use On or Near Landfill and Dumps* (D-4 Guideline).

The investigation consisted of completing a borehole drilling program, installation of monitoring wells and gas probes, soil grain size analysis, groundwater sampling and analysis, data compilation, interpretation and reporting.

The following is a summary of the findings of this investigation:

- There is no evidence of methane gas migration from the former MTO waste disposal site to the developable lands. Given this finding and that the waste at the MTO property was deposited many years ago, it is concluded that there is negligible potential for landfill gas to migrate onto the development lands.
- The former MTO waste disposal site appears to be influencing groundwater quality in the developable lands directly adjacent to the identified refuse. However, the parameter concentrations in groundwater are not a concern to human health and safety and as such are not considered to be groundwater quality impacts.
- Although no significant impacts were identified from landfill gas or in groundwater quality the following setbacks from the former waste disposal site are recommended:
    - A 10 m setback for the storm water pond. As a best practice it is also recommended that an engineered liner be installed in parts of the storm water pond within 30 m of the former MTO waste disposal site to prevent groundwater from infiltrating the storm water pond;

- A 10 m set back is recommended for trunk sanitary sewer and watermain and other proposed buried utilities. As a best practice, it is recommended that clay cut offs are installed in utility trenches within 30 m of the former MTO waste disposal site to prevent groundwater from infiltrating the utility trenches and acting as a preferential pathway; and
- Residences are a sensitive land use, as such a 30 m setback from the former MTO waste disposal site is recommended.

1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by the Town of Tecumseh (Town) (the "Client") to conduct a groundwater and methane investigation for lands within the Tecumseh Hamlet Secondary Planning Area (Hamlet SPA) which are adjacent to a former Ministry of Transportation, Ontario (MTO) waste disposal site. The locations of the investigation, Tecumseh Hamlet SPA and MTO waste disposal site are shown on Figure 1.

The objectives of the groundwater and methane investigation were:

- To determine the potential for migration of potentially impacted groundwater and methane gas from the former MTO waste disposal site to the developable lands within the Hamlet SPA, and
- To obtain the information necessary to recommend setback limits from the former MTO waste disposal site to proposed roadways, storm, sanitary and watermain services and residential land use in the Hamlet SPA.

Dillon understands that this groundwater and methane investigation is a preliminary investigation to assist in the planning processes and does not fulfil the requirements of the *D-4 Land Use On or Near Landfill and Dumps* (D-4 Guideline).

1.1 Background

Dillon was retained by the Town of Tecumseh to complete a preliminary servicing assessment (Phase 1) for the Tecumseh Hamlet Secondary Planning Area (Hamlet SPA) in Southwestern Ontario. The results from Phase 1 are aimed to update the proposed roadway layout for the Hamlet SPA and servicing strategy, including stormwater management (SWM) facility locations prior to resuming the integrated Secondary Planning and Class Environmental Assessment process (Phase 2). Phase 1 will allow for the Town to confirm the overall approach to servicing of the future lands and identify elements that are critical to the development.

Based on the review of the Hamlet SPA, it was identified that a former MTO waste disposal site is located within the Hamlet SPA, south of the EC Row Expressway and west of Shawnee Street in Tecumseh, Ontario (ARN: 374457000046900, PIN: 752420205) (Figure 1).

The report titled *Geotechnical Investigation Hwy #2 Bypass/Shawnee Road Subdivision, Sandwich South Township, Essex County, Gartner Lee Associates Limited, 1979* indicated that the former MTO disposal site includes a former borrow pit which was filled with garbage, foundry sands and fill to a depth of up to approximately 4 m. Refuse was found in the northern area of the waste disposal site, with foundry sands deposited overtop of the refuse and the remainder of the waste disposal site, and fill was used to cap the area. The report also indicated methane gas was detected in qualities greater than the lower explosive limit (5% by volume) in areas of refuse. The approximate area of the refuse as documented in the previous report is displayed on Figure 2.

Based on this information, the potential for migration of potentially impacted groundwater and methane gas which may impact the developable lands to the west of the former MTO waste disposal site in the Hamlet SPA is required to be assessed. This investigation addresses this requirement and recommends setbacks requirements to proposed storm, sanitary and watermain services and residential land use in the Hamlet SPA.

1.2 Initial Disclaimer and Limiting Conditions

This report was prepared by Dillon for the sole benefit of the Town of Tecumseh. The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party (i.e., a party other than our Client) makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 Objectives and Scope

The objectives of the groundwater and methane investigation were:

- To determine the potential for migration of potentially impacted groundwater and methane gas from the former MTO waste disposal site to the developable lands within the Hamlet SPA, and
- To obtain the information necessary to recommend setback limits from the former MTO waste disposal site to proposed roadways, storm, sanitary and watermain services and residential land use in the Hamlet SPA.

Dillon understands that this groundwater and methane investigation is a preliminary investigation to assist in the planning processes and does not fulfil the requirements of the D-4 Guideline.

The groundwater and methane investigation scope of work included:

- Advancement of three boreholes to a depth of 3.0 m and completion as gas probes, and advancement of five boreholes to a depth of 4.6 m and completion as monitoring wells;
- Log soil stratigraphy in the boreholes to identify potential refuse or foundry sand;
- Submission of four soil samples for grain size analysis to the laboratory;
- Development of the five newly installed monitoring wells and collection of groundwater samples for analysis of the parameters listed under the Comprehensive List for Groundwater and Leachate in Schedule 5 of the Landfill standards: A guideline on the regulatory and approval requirements for new or expanding landfilling sites, Ministry of the Environment, Conservation and Parks, January 2012;
- Conduct an elevation survey for groundwater monitoring wells to obtain reference point elevations for calculation of groundwater elevations and flow direction;
- Comparison of groundwater quality data to the Ontario Drinking Water Standards, Objectives and Guidelines, and
- Data compilation, interpretation and reporting.

3.0 Site Description

3.1 General Location

The Hamlet SPA is located between the EC Row Expressway and Country Road 42 in the areas of Lesperance Road and Banwell Road in Tecumseh, Ontario. The focus of this investigation was lands in the northern area of the Hamlet SPA, located adjacent west of the former MTO waste disposal site (ARN: 374457000046900). The location of the investigation, Hamlet SPA and former MTO waste disposal site are presented on Figure 1.

The investigation area is located on the boundary of an agricultural field and a forested area. No buildings or structures were present in the investigation area. The property owner indicated that drainage tiles were present within the investigation area, however no other utilities were identified. The investigation area is owned by 2034053 Ontario Ltd. and is used for agricultural field crops.

3.2 Topography, Physiography, Geology and Hydrogeology

The topography, physiography, geology and hydrogeology for the region are presented in Table 1 below.

Table 1: Summary of Topography, Hydrology and Geology

Topic	Source(s)	Description
Elevation	Elevation survey completed by Dillon Toporama Topographic Map https://atlas.gc.ca/toporama/en/index.html	The investigation area ranges in elevation from approximately 182 to 183 meters above sea level (masl).
Topography	Elevation survey completed by Dillon Site Reconnaissance Observations Toporama Topographic Map https://atlas.gc.ca/toporama/en/index.html	Topography at the investigation area is relatively flat and slopes to the north.
Physiography	Chapman, L.J. and Putnam, D.F., The Physiography of Southern Ontario, Third Edition, Ontario Geological Survey, Special Volume 2, 1984	The region is located within the physiographic region of Southern Ontario known as St. Clair Clay Plains.
Surficial Geology	Soil Map of Essex County, Soil Survey Report No. 11 Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV, 2010	Soils in the region consists of Brookston Clay. Surficial geology in the region is interpreted to consist of fine-textured glaciolacustrine deposits including silt and clay, with minor sand and gravel.
Bedrock Geology	1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release---Data 126-Revision 1, 2011	Bedrock geology in the region is interpreted to consist of Middle Devonian aged limestone, dolostone and shale of the Dundee Formation. Depth to bedrock is inferred to be approximately 20 to 30 metres below ground surface (mbgs).
Hydrogeology	Toporama Topographic Map https://atlas.gc.ca/toporama/en/index.html	Based on topography of the area, regional groundwater flow is interpreted to be generally towards the north towards Lake St. Clair.

4.0 Methodology

4.1 Utility Locates

Dillon contacted Ontario One Call to arrange buried utility clearances for public sanitary, storm, water, water, telephone, natural gas, cable and electrical services in the investigation area. No buried utilities were identified at the site by Ontario One Call.

Landshark Group was retained to complete private locates in the investigation area. No buried utilities were identified in the investigation area by the private locator.

4.2 Borehole Drilling

Dillon retained Landshark Group to drill the boreholes and install the gas probes and groundwater monitoring wells. The boreholes were drilled on September 8, 2022, using a track-mounted direct push drilling rig (Geoprobe 7822DT). Soil cores were collected using 38 mm outside diameter, 1.5 m long, plastic sample sleeves. No drilling fluids or lubricants were used. Sample sleeves generated during the investigation were taken off-site by the driller for disposal. The gas probe and monitoring well locations are displayed on Figure 2.

Soil stratigraphy was continuously logged and soil cores were classified using ASTM Standard D2488 - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) as guidance. Borehole logs were prepared documenting the encountered soil conditions, with descriptions indicating soil type, texture, colour, structure, consistency, plasticity, moisture content and other observations (such as sample recovery, weathering features, staining and odours). Borehole logs are presented in *Appendix A.*

Grain size samples were collected into sample containers supplied by the laboratory for subsequent analysis. The soil samples were labelled and stored in a cooler after collection, and during shipment to the laboratory.

4.3 Gas Probe Installation

Gas probes were installed at three of the borehole locations to monitor for methane gas. The gas probe locations are displayed on Figure 2.

Each newly installed gas probe was constructed of 32 mm diameter, Schedule 40, polyvinyl chloride (PVC) pipe. A 1.5 m long, 0.25 mm slot, PVC screen was placed to target above the water table. The materials were not removed from the protective plastic wrapping until required. The PVC screen and riser piping were flush-threaded and contained O-rings to provide watertight joints. Silica sand was placed around each screen. A bentonite seal was then placed above the silica sand that extended to surface. Each new monitoring well was secured in place with an aboveground monument casing with concrete at ground surface.

4.4 Groundwater Monitoring Well Installation

Monitoring wells were installed at five of the borehole locations to assess groundwater quality and flow direction. The monitoring well locations are displayed on Figure 2.

Each newly installed monitoring well was constructed of 51 mm diameter, Schedule 40, polyvinyl chloride (PVC) pipe. A 3.66 m long, 0.25 mm slot, PVC well screen was placed to intercept the water table. The well materials were not removed from the protective plastic wrapping until required. The PVC screen and riser piping were flush-threaded and contained O-rings to provide watertight joints. Silica sand was placed around each well screen and extended between approximately 0.3 m above each screen. A bentonite seal was then placed above the silica sand that extended surface. Each new monitoring well was secured in place with an aboveground monument casing with concrete at ground surface.

4.5 Elevation Survey

A survey of monitoring well locations and elevations using a Trimble R10 GNSS GPS receiver and a Trimble S7 total station was completed on September 14, 2022. Surveyed elevations of monitoring wells are provided in Table 1.

4.6 Methane Monitoring

The gas probes and monitoring wells were monitored for methane on five occasions throughout the investigation. Methane was measured using a RKI Eagle 2 portable gas meter. To collect the measurements, the gas probes and monitoring wells were opened, the tubing attached to the meter was immediately inserted into the pipe and a seal was created around the tubing and the pipe. The readings on the meter were allowed to stabilize and the highest methane reading was recorded from the meter.

4.7 Groundwater Level Measurement, Development, Purging and Sampling

Depth to groundwater was measured and recorded upon arrival to each monitoring well using an electronic oil-water interphase meter. Readings were measured to the nearest 0.01 m. These measurements were used in conjunction with data collected during an elevation survey to calculate groundwater elevations and interpret flow direction.

The new monitoring wells were developed and purged to remove fine-grained material from the vicinity of the well screen and filter-pack, and to remove stagnant water from the well casing before sampling. Development was conducted using a dedicated inertial foot valve and 16 mm low-density polyethylene (LDPE) tubing. Due to very slow recovery of the monitoring wells, monitoring wells were purged dry one to two times prior to sampling. MW22-102 remained dry throughout the investigation. Observations of the physical appearance of the purge water were noted. Groundwater levels were allowed to recover for several weeks before returning to the site to collect groundwater samples.

Groundwater samples were recovered using a peristaltic pump fitted with 10 mm diameter silicon pump head tubing and dedicated 4 mm ID by 6 mm OD LDPE tubing at each well. Field water quality parameters (i.e., temperature, pH, conductivity, oxidation-reduction potential, dissolved oxygen and turbidity) were observed prior to sampling. Low flow sampling was completed, and groundwater samples were collected after field parameters stabilized, or prior to the well going dry. The groundwater samples were collected into pre-preserved sample containers supplied by the laboratory for subsequent analysis. Groundwater samples for metals analysis were filtered in the field using disposable 0.45 micron filters. The groundwater samples were labelled and stored in a cooler after collection, and during shipment to the laboratory.

4.8 Sample Handling, Custody and Analysis

Samples for laboratory analysis were packed carefully into sample coolers containing ice to prevent damage to the sample containers and to maintain laboratory-suggested temperatures between 4°C and 10°C. A chain-of-custody form was completed and included in each sample cooler. Samples were dropped off at the laboratory depot for shipment to the laboratory for analysis.

Paracel Laboratories Ltd. (Paracel) of Ottawa, Ontario, analyzed the groundwater samples and subcontracted the soil grain size analysis to ALS Canada Ltd. (ALS) of Hamilton, Ontario. Parcel and ALS are accredited by the Canadian Association of Laboratory Accreditation (CALA) for the requested analysis.

4.9 Quality Assurance and Quality Control

Quality assurance and quality control (QA/QC) procedures were implemented in the field and laboratory to demonstrate that the data generated were of a level of quality suitable for their intended purposes. Field QA/QC procedures included use of new sampling equipment and/or appropriate equipment cleaning procedures and adherence to published standards for field methodology.

Field instruments (i.e., RKI Eagle 2, water quality meter) were calibrated and checked in accordance with the operating manual.

Soil grain size and groundwater samples were labeled prior to submission for analytical testing with sample identification relevant to the location they were collected and/or by the method of collection. In addition to sample identifications, sample labels also included the date and time of collection, the consultant's name (Dillon) and Dillon's project number. Immediately following collection, samples were stored in coolers on ice and documented on the Chain of Custody forms. Chain of Custody forms completed by Dillon following each individual Certificate of Analysis are included in *Appendix B*.

Field duplicate samples were collected at a minimum rate of 10% (one in ten samples) for groundwater. Each duplicate sample was assigned a 'false' identification which was recorded in the field notes connecting the duplicate with the original sample.

Where concentrations were measured at values 5x the reportable detection limit (RDL) or higher, the field duplicate concentrations were compared to the parent sample concentrations for relative percent difference (RPD) using the following equation:

$$\mathbf{RPD}\ (\%) = \frac{(\mathbf{C1} - \mathbf{C2})}{(\mathbf{C1} + \mathbf{C2})/\mathbf{2}} \mathbf{X\ 100}$$

Where: C1 = sample concentration
C2 = duplicate concentration

Laboratory QA/QC procedures included following internal protocols and analysis of a laboratory blank sample and laboratory reference standards. The data received from the laboratory were compiled and input into spreadsheets. After checking the spreadsheet entries, the compiled data was reviewed to confirm satisfactory quality. Sample chain-of-custody, holding times, dilution factors, surrogate recoveries, replicate analyses, analytical quantitation limits and blank analyses were reviewed, and compared to applicable quality control acceptance criteria. The results of the QA/QC program are detailed in Section 5.6

5.0 Results

5.1 Borehole Drilling

Eight boreholes were drilled to maximum depths ranging from 3.0 to 4.6. Three of the boreholes (GP22-101 through GP22-103) were installed as gas probes. Five of the boreholes were installed as monitoring wells (MW22-101 through MW22-105). The locations of each borehole/monitoring well are presented in Figure 2.

The soil profile observed during the drilling investigation generally consisted of a layer of topsoil underlain by silty clay. Sandy clay was observed between the topsoil and silty clay in select boreholes. Bedrock was not encountered at the maximum drilled depth of 4.6 mbgs.

Gas probes were installed above the inferred water table. Monitoring wells were installed across the inferred water table elevation.

Stratigraphic descriptions and gas probe and monitoring well construction details are presented on the borehole logs in *Appendix A.*

5.2 Methane Monitoring Results

The three gas probes and five monitoring wells were monitored for methane on five occasions throughout the investigation (September 26, 2022, October 18, 2022, March 23, 2023, May 15, 2023 and June 22, 2023). Methane gas was not detected in the three gas probes or the five monitoring wells throughout the course of the investigation. Table 5 summarizes the methane measurements for the gas probes and monitoring wells.

5.3 Groundwater Level Monitoring Results

Groundwater level measurements were made at each monitoring well location prior to sampling. Groundwater level measurements were collected using an oil-water interface probe. Table 2 summarizes the monitoring well elevations, groundwater level measurements, and the calculated groundwater elevations for monitoring wells.

Monitoring wells in the investigation area were observed to have slow recovery. Five weeks after the installation of the monitoring wells, the five monitoring wells were observed dry. In March 2023, six months after installation, two of the monitoring wells were observed dry. Upon sampling in June 2023, nine months after installation, one of the monitoring wells continued to be dry and could not be sampled. Due to slow recovery, static water level conditions may have not been achieved due to time constraints of the investigation. Therefore, actual static groundwater elevations may differ from what was observed during the investigation.

Based on the groundwater elevations at the time of sampling, the gradient appeared higher in the north and lower in the south, suggesting local groundwater flow may have a southward component. However, monitoring wells were not placed in a triangular pattern, but rather in a linear pattern to investigate

potential impacts from former MTO waste disposal site, and as such the east-west component to groundwater flow could not be determined.

Drainage tiles are known to be present in the investigation area which may affect local groundwater flow. Additionally, the Robinet Drain and Gouin Drain are located south of the investigation area which may influence local groundwater flow (see Figure 3).

Overall, local groundwater flow direction in the investigation area could not be determined at this time. Regional groundwater flow is inferred to be generally north towards Lake St. Clair.

5.4 Soil Grain Size Results

Grain size sieve and hydrometer testing was completed on four soil samples from boreholes within the investigation area. Soil texture within the investigation area was determined to be medium and fine textured. The results of the sieve and hydrometer testing are presented in Table 3. Particle size distribution curves are presented in *Appendix B*.

Based on the documented properties of silty clay soil, the results of the grain size analysis, and supported by the slow rate of recovery observed in groundwater monitoring wells, the hydraulic conductivity of the native silty clay in the investigation area was estimated to be between $1x10^{-6}$ to $1x10^{-9}$ cm/s.

5.5 Groundwater Comparison Standards

The groundwater samples were analyzed for parameters listed in the under the Comprehensive List for Groundwater and Leachate in Schedule 5 of the *Landfill standards: A guideline on the regulatory and approval requirements for new or expanding landfilling sites, Ministry of the Environment, Conservation and Parks, January 2012* to identify potential impacts from the refuse identified on the former MTO waste disposal site.

The groundwater analytical results were compared against Aesthetic Objectives (AO), Operational Guidelines (OG), Maximum Acceptable Concentrations (MAC) and Interim Maximum Acceptable Concentrations (IMAC) Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG) in the *Technical Support for Ontario Drinking Water Standards, Objectives and Guidelines, Government of Ontario, Revised June 2006*.

5.6 Groundwater Results

Five groundwater samples and one field duplicate sample were collected from the monitoring wells installed in the investigation area and were submitted for the analysis of the parameters listed under the Comprehensive List for Groundwater and Leachate in Schedule 5 of the *Landfill standards: A guidelines on the regulatory and approval requirements for new or expanding landfilling sites, Ministry of the Environment, Conservation and Parks, January 2012.*

The groundwater samples met the applicable AO, OG, MAC and IMAC ODWSOG for the parameters analyzed with the following exceptions:

- The concentrations of dissolved organic carbon (DOC) at MW22-DUP (field duplicate of MW22-103) (5.1 mg/L) and MW22-104 (5.2 mg/L) exceeded the AO of 5 mg/L.
- The concentrations of total dissolved solids (TDS) MW22-101 (668 mg/L), MW22-103 (658 mg/L), MW22-104 (1,270 mg/L) and MW22-105 (1,140 mg/L) exceeded the AO of 500 mg/L.

Groundwater results and comparison criteria are presented in Table 4. Laboratory certificates of analysis are presented in *Appendix B*.

5.7 QA/QC Results

One field duplicate sample was collected during the groundwater sampling program and submitted for select parameters. The analytical results of the field duplicate sample collected are presented in Table 4. RPD calculations between MW22-103 and its field duplicate MW22-DUP were within the industry accepted value of 30% for groundwater.

The laboratory noted that the laboratory duplicate RPD for calcium slightly exceeded the limit, however the remaining batch QA/QC was acceptable, as such this is not inferred to affect the interpretation of the results. The remaining quality control data provided by the laboratory (laboratory surrogate recoveries, spike, blank and lab duplicate samples) met the applicable quality control acceptance criteria. Information related to laboratory quality control data can be found in the applicable laboratory certificates of analysis presented in *Appendix B*.

Overall, the data collected during the investigations met QA/QC acceptance requirements and are of sufficient quality for their intended use.

6.0 Discussion

6.1 Groundwater

Monitoring wells MW22-104 and MW22-105 are located in the northern part of the investigation area adjacent to the refuse on the former MTO waste disposal site. MW22-103 is located in the mid-northern part of the investigation area slightly southwest of the refuse. MW22-101 is located in the southern part of the investigation area further south of the refuse and is considered representative of background conditions based on its distance from the refuse.

The guidelines for DOC and TDS are aesthetic objectives (AO) established for parameters that may impair the taste, odour or colour of water, however, groundwater in this region is not potable as such these elevated concentrations are not a concern to human health and safety.

Volatile organic compounds analyzed (benzene, toluene, dichloromethane, vinyl chloride and 1, 4-dichlorbenzene) were not detected in groundwater during the investigation, as such volatilization is not concern to human health and safety.

Chloride and sulphate are indicator parameters for leachate. Chloride and sulphate met the applicable ODWSOG, however it is noted that concentrations at monitoring wells adjacent to the refuse were higher compared to wells further south of the refuse. Indicating that the refuse does appear to be influencing groundwater in the developable lands in the Hamlet SPA to an extent, however, the parameter concentrations in groundwater are not a concern to human health and safety.

6.2 Methane Gas

Methane was not detected during the monitoring events. Therefore, there is no evidence of methane gas migration from the former MTO waste disposal site to the developable lands. Given this finding and that the waste at the MTO property was deposited many years ago, it is concluded that there is negligible potential for landfill gas to migrate onto the developable lands.

6.3 Setbacks

The former MTO waste disposal site is a non-operating site. It is unknown exactly when refuse was last brought to the site, however based on the report *Geotechnical Investigation Hwy #2 Bypass/Shawnee Road Subdivision, Sandwich South Township, Essex County, Gartner Lee Associates Limited, 1979*, it was prior to 1979. As such, it has not been operating for greater than 25 years.

Based on the guidance document *D-4 Land Use on or Near Landfills and Dumps,* sensitive land uses for landfills include residences, and compatible land uses for landfills include utilities and above ground transportation routes excepted major highways.

The former MTO waste disposal site is not proposed to be developed at this time. The Town may consider redeveloping this area as parkland in the future, however, additional studies would be required beyond this investigation to support this.

Based on the results of the investigation, there is no evidence of methane gas migration from the former MTO waste disposal site to the developable lands. Based on the results of the investigation, the former MTO waste disposal site appears to be influencing groundwater in the developable lands directly adjacent to the identified refuse to an extent. However, the parameter concentrations in groundwater are not a concern to human health and safety.

A storm water pond is proposed to be located in the northern area of the Hamlet SPA, adjacent west of the former MTO waste disposal site (see Figure 3). A storm water pond is considered a compatible land use. It is recommended that the storm water pond have a 10 m set back from the former MTO waste disposal site. As a best practice it is also recommended that an engineered liner be installed in parts of the storm water pond within 30 m of the former MTO waste disposal site to prevent groundwater from infiltrating the storm water pond.

A trunk sanitary sewer and water main is proposed to traverse the Hamlet SPA north to south adjacent west of the former MTO waste disposal site (see Figure 3). Utilities are considered a compatible land use. It is recommended that the trunk sanitary sewer and watermain and other proposed buried utilities, have a 10 m set back from the former MTO waste disposal site. As a best practice it is recommended that clay cut offs are installed in utility trenches within 30 m of the former MTO waste disposal site to prevent groundwater from infiltrating the utility trenches and acting as a preferential pathway.

Residential development is proposed further west and southwest of the former MTO waste disposal site (see Figure 3). Residences are a sensitive land use, as such a 30 m setback from the former MTO waste disposal site is recommended.

7.0 Summary of Findings

The following is a summary of the findings of this investigation:

- There is no evidence of methane gas migration from the former MTO waste disposal site to the developable lands. Given this finding and that the waste at the MTO property was deposited many years ago, it is concluded that there is negligible potential for landfill gas to migrate onto the development lands.
- The former MTO waste disposal site appears to be influencing groundwater quality in the developable lands directly adjacent to the identified refuse. However, the parameter concentrations in groundwater are not a concern to human health and safety and as such are not considered to be groundwater quality impacts.
- Although no significant impacts were identified from landfill gas or in groundwater quality the following setbacks from the former waste disposal site are recommended:
    - A 10 m set back for the storm water pond. As a best practice it is also recommended that an engineered liner be installed in parts of the storm water pond within 30 m of the former MTO waste disposal site to prevent groundwater from infiltrating the storm water pond;
    - A 10 m set back is recommended for trunk sanitary sewer and watermain and other proposed buried utilities. As a best practice, it is recommended that clay cut offs are installed in utility trenches within 30 m of the former MTO waste disposal site to prevent groundwater from infiltrating the utility trenches and acting as a preferential pathway; and
    - Residences are a sensitive land use, as such a 30 m setback from the former MTO waste disposal site is recommended.

8.0 Disclaimer and Limiting Conditions

This report was prepared exclusively for the purposes, project and site location(s) outlined in the report. The report is based on information provided to or obtained by Dillon Consulting Limited ("Dillon") as indicated in the report and applies solely to site conditions existing at the time of the site investigation(s). Although a reasonable investigation was conducted by Dillon, Dillon's investigation was by no means exhaustive and cannot be construed as a certification of the absence of any contaminants from the site(s). Rather, Dillon's report represents a reasonable review of available information within an agreed work scope, schedule and budget. It is therefore possible that currently unrecognized contamination or potentially hazardous materials may exist at the site(s), and that the levels of contamination or hazardous materials may vary across the site(s). Further review and updating of the report may be required as local and site conditions, and the regulatory and planning frameworks, change over time.

This report was prepared by Dillon for the sole benefit of our Client, the Town of Tecumseh. The material in it reflects Dillon's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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Windsor, Ontario

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Environmental Scientist

Rob Kell, P. Eng., P.Geo.
Hydrogeologist

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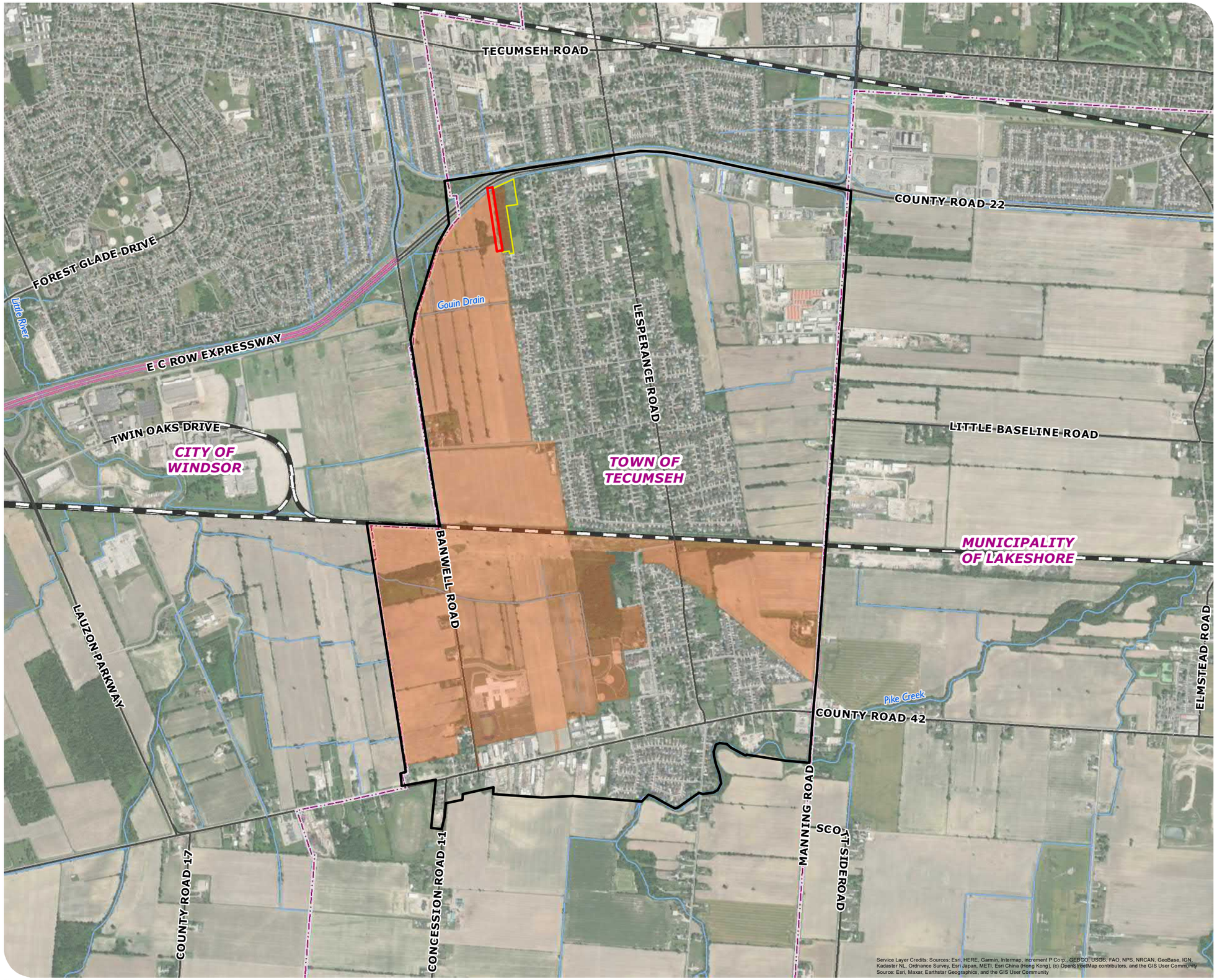
Figures



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TOWN OF TECUMSEH

GROUNDWATER AND METHANE INVESTIGATION

PROJECT LOCATION

FIGURE 1

- Settlement Area Boundary (Tecumseh Hamlet)
- Tecumseh Hamlet SPA
- Investigation Area
- Former MTO Waste Disposal Site
- Freeway
- Major Road
- Local Road
- Railway
- Watercourse
- Waterbody
- Municipal Boundary

SCALE 1:20,000

0 250 500 1,000 m

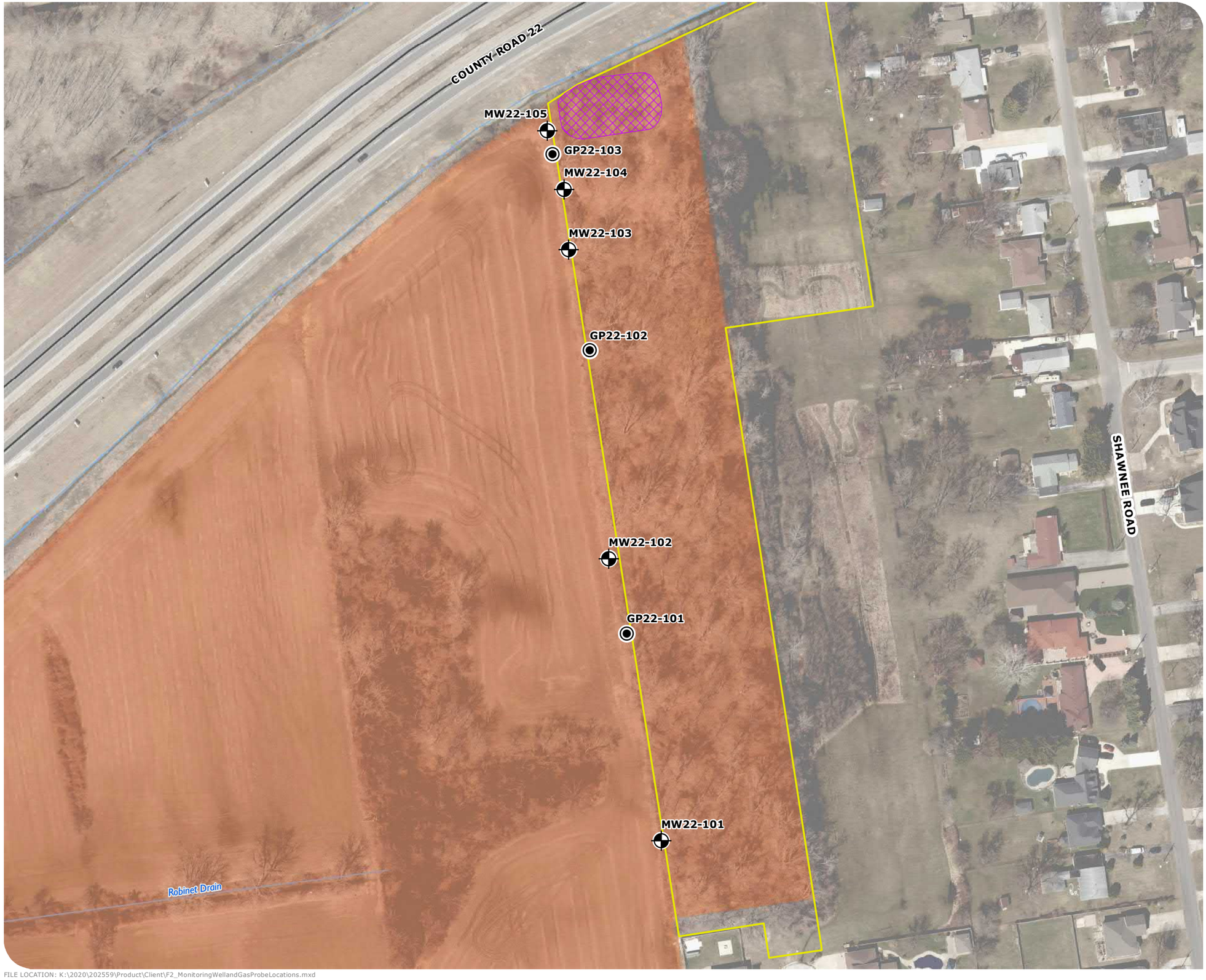
N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: RR
MAP CHECKED BY: MA
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

DILLON CONSULTING

PROJECT: 20-2559
STATUS: FINAL
DATE: 2023-08-15



TOWN OF TECUMSEH

GROUNDWATER AND METHANE INVESTIGATION

MONITORING WELL AND GAS PROBE LOCATIONS

FIGURE 2

- Tecumseh Hamlet SPA
- Major Road
- Watercourse
- Former MTO Waste Disposal Site
- Approximate Refuse Area (Gartner Lee Associates Limited, 1979)
- Monitoring Well Location
- Gas Probe Location

SCALE 1:1,500

0 15 30 60 m

N W E S

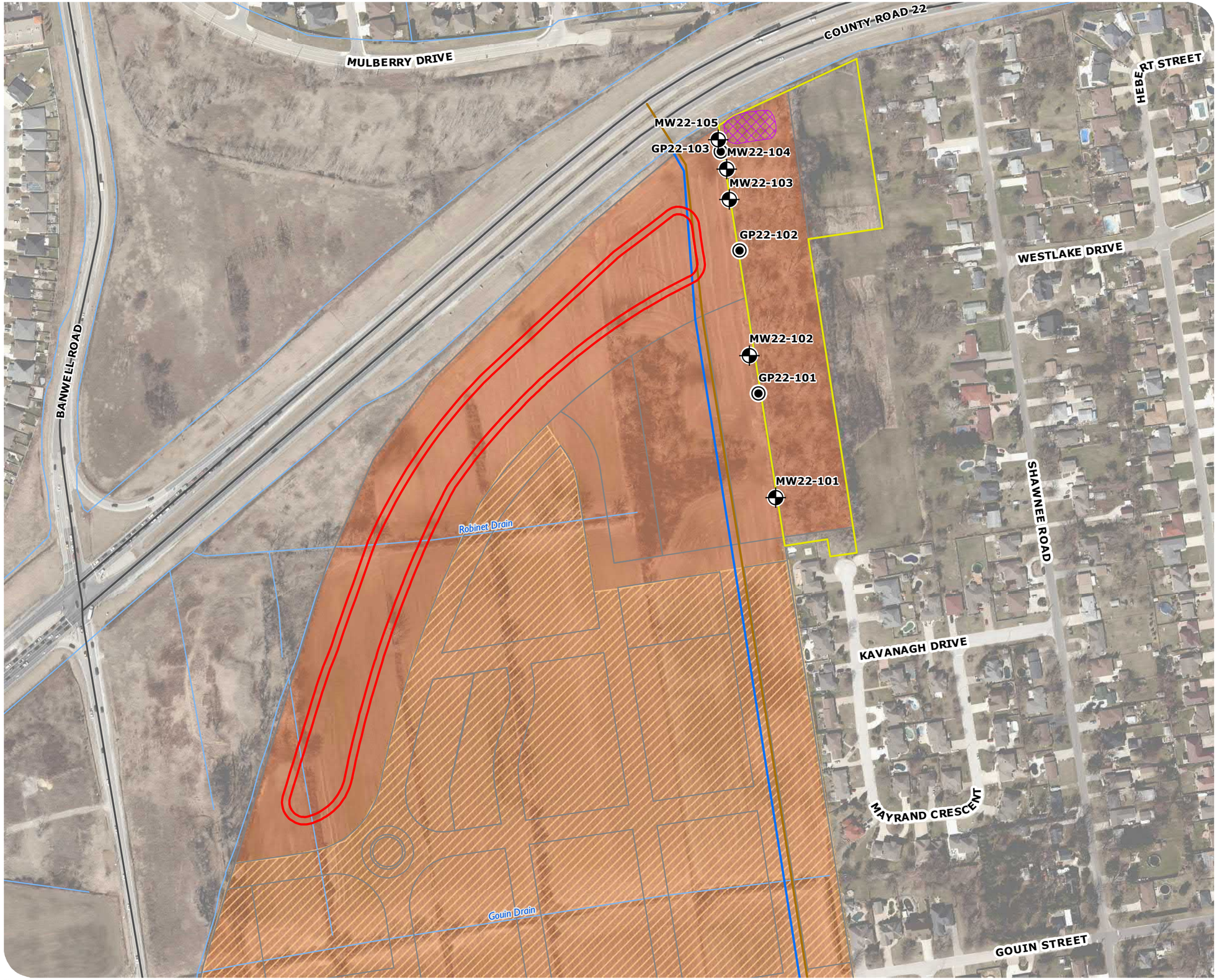
MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, ESSEX COUNTY OPEN DATA

MAP CREATED BY: RR
MAP CHECKED BY: MA
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

DILLON CONSULTING

PROJECT: 20-2559
STATUS: FINAL
DATE: 2023-08-15

FILE LOCATION: K:\2020\202559\Product\Client\F2_MonitoringWellandGasProbeLocations.mxd



TOWN OF TECUMSEH

GROUNDWATER AND METHANE INVESTIGATION

PROPOSED DEVELOPMENT

FIGURE 3

- Tecumseh Hamlet SPA
- Proposed Residenital Development Area
- Proposed Storm Water Pond
- Proposed Trunk Watermain
- Proposed Trunk Sewer
- Proposed Roadways
- Major Road
- Watercourse
- Former MTO Waste Disposal Site
- Approximate Refuse Area (Gartner Lee Associates Limited, 1979)
- Monitoring Well Location
- Gas Probe Location

SCALE 1:3,000

0 25 50 100 m

N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF, ESSEX COUNTY OPEN DATA

MAP CREATED BY: RR
MAP CHECKED BY: MA
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

DILLON CONSULTING

PROJECT: 20-2559
STATUS: FINAL
DATE: 2023-08-24

FILE LOCATION: K:\2020\202559\Product\Client\F3_ProposedDevelopment.mxd

Tables

Table 1: Gas Probe and Monitoring Well Installation Details
Groundwater and Methane Investigation
Tecumseh Hamlet Secondary Planning Area

Monitoring Well	Type	Northing (m)	Easting (m)	Installation Date	Ground Surface Elevation (masl)	Top of Pipe Elevation (masl)	Well Depth (mbgs)	Height of Riser (mags)	Screened Interval		Screen Length (m)	Well Diameter (mm)
									Top (mbgs)	Bottom (mbgs)		
GP22-101	Stick Up	4685152.37	344016.60	08-Sep-22	182.64	183.76	1.82	1.12	0.30	1.82	1.52	32
GP22-102	Stick Up	4685268.30	344001.22	08-Sep-22	183.38	184.53	1.82	1.15	0.30	1.82	1.52	32
GP22-103	Stick Up	4685348.65	343985.94	08-Sep-22	183.39	184.57	1.82	1.18	0.30	1.82	1.52	32
MW22-101	Stick Up	4685067.81	344030.70	08-Sep-22	182.39	183.31	4.57	0.92	0.91	4.57	3.66	51
MW22-102	Stick Up	4685183.07	344009.01	08-Sep-22	182.96	184.24	4.57	1.28	0.91	4.57	3.66	51
MW22-103	Stick Up	4685309.53	343992.71	08-Sep-22	183.53	184.52	4.57	0.99	0.91	4.57	3.66	51
MW22-104	Stick Up	4685333.90	343990.78	08-Sep-22	183.17	184.15	4.57	0.98	0.91	4.57	3.66	51
MW22-105	Stick Up	4685358.41	343983.86	08-Sep-22	183.34	184.49	4.57	1.15	0.91	4.57	3.66	51

Notes:

masl	Metres above sea level
mbgs	Metres below ground surface
mags	Metres above ground surface

Table 2: Groundwater Levels and Product
Groundwater and Methane Investigation
Tecumseh Hamlet Secondary Planning Area

Monitoring Well	Monitoring Date	Top of Pipe Elevation (masl)	Ground Surface Elevation (masl)	Water Depth (mbtop)	Groundwater Elevation (masl)	Water Depth (mbgs)	LNAPL/DNAPL
MW22-101	26-Sep-22	183.31	182.39	DRY	DRY	DRY	nd
	18-Oct-22	183.31	182.39	DRY	DRY	DRY	nd
	23-Mar-23	183.31	182.39	1.6	181.7	0.7	nd
	15-May-23	183.31	182.39	1.2	182.1	0.3	nd
	22-Jun-23	183.31	182.39	2.3	181.0	1.3	nd
MW22-102	26-Sep-22	184.24	182.96	DRY	DRY	DRY	nd
	18-Oct-22	184.24	182.96	DRY	DRY	DRY	nd
	23-Mar-23	184.24	182.96	DRY	DRY	DRY	nd
	15-May-23	184.24	182.96	DRY	DRY	DRY	nd
	22-Jun-23	184.24	182.96	DRY	DRY	DRY	nd
MW22-103	26-Sep-22	184.52	183.53	DRY	DRY	DRY	nd
	18-Oct-22	184.52	183.53	DRY	DRY	DRY	nd
	23-Mar-23	184.52	183.53	1.4	183.2	0.4	nd
	15-May-23	184.52	183.53	1.9	182.6	0.9	nd
	22-Jun-23	184.52	183.53	3.2	181.3	2.2	nd
MW22-104	26-Sep-22	184.15	183.17	DRY	DRY	DRY	nd
	18-Oct-22	184.15	183.17	DRY	DRY	DRY	nd
	23-Mar-23	184.15	183.17	1.9	182.3	0.9	nd
	15-May-23	184.15	183.17	1.5	182.6	0.5	nd
	22-Jun-23	184.15	183.17	2.7	181.5	1.7	nd
MW22-105	26-Sep-22	184.49	183.34	DRY	DRY	DRY	nd
	18-Oct-22	184.49	183.34	DRY	DRY	DRY	nd
	23-Mar-23	184.49	183.34	5.3	179.2	4.2	nd
	15-May-23	184.49	183.34	2.0	182.5	0.8	nd
	22-Jun-23	184.49	183.34	2.8	181.7	1.6	nd

Notes:

masl	Metres above sea level
mbtop	Metres below top of pipe
mbgs	Metres below ground surface
LNAPL	Light non-aqueous phase liquid
DNAPL	Dense non-aqueous phase liquid
nd	No detection

Table 3: Soil Grain Size Results
Groundwater and Methane Investigation
Tecumseh Hamlet Secondary Planning Area

		Borehole ID	MW21-101	MW22-102	MW22-103	GP22-103
		Sample ID	Grain Size 9	Grain Size 3	Grain Size 6	Grain Size 7
		Depth (mbgs)	3.9-4.2	4.1-4.6	1.9-2.2	1.2-2.2
		Date Sampled	08-Sep-2022	08-Sep-2022	08-Sep-2022	08-Sep-2022
Particle Size	Limit of Reporting	Units				
Passing (0.002mm)	1.0	%	35.8	28.0	28.9	25.5
Passing (0.004mm)	1.0	%	43.4	34.6	39.4	33.0
Passing (0.005mm)	1.0	%	45.9	37.0	43.5	35.8
Passing (0.020mm)	1.0	%	61.5	53.3	80.2	54.1
Passing (0.0312mm)	1.0	%	65.4	58.8	86.2	60.0
Passing (0.05mm)	1.0	%	68.4	62.8	88.7	65.3
Passing (0.063mm)	1.0	%	70.6	64.8	90.1	68.0
Passing (0.075mm)	1.0	%	72.6	66.6	91.5	70.5
Passing (0.125mm)	1.0	%	77.3	73.3	93.3	75.3
Passing (0.149mm)	1.0	%	79.5	76.5	94.1	77.6
Passing (0.250mm)	1.0	%	85.8	85.7	96.4	84.3
Passing (0.420mm)	1.0	%	90.1	91.6	97.8	89.1
Passing (0.50mm)	1.0	%	90.8	92.3	98.0	89.8
Passing (0.841mm)	1.0	%	93.4	94.9	98.7	92.4
Passing (1.0mm)	1.0	%	93.8	95.2	98.8	92.9
Passing (4.75mm)	1.0	%	98.7	99.2	100	99.1
Passing (9.5mm)	1.0	%	100	100	100	100
Passing (19mm)	1.0	%	100	100	100	100
Passing (25.4mm)	1.0	%	100	100	100	100
Passing (38.1mm)	1.0	%	100	100	100	100
Passing (50.8mm)	1.0	%	100	100	100	100
Passing (76.2mm)	1.0	%	100	100	100	100
Soil Texture	-	-	Fine/Medium Texture	Fine/Medium Texture	Fine/Medium Texture	Fine/Medium Texture

Table 4: Groundwater Analytical Results
Groundwater and Methane Investigation
Tecumseh Hamlet Secondary Planning Area

					Location Code	MW22-101	MW22-103		RPD (%)	MW22-104	MW22-105	Trip Blank
					Field ID	MW22-101	MW22-103	MW22-DUP		MW22-104	MW22-105	Trip Blank
					Sample Type	Normal	Normal	Field_D		Normal	Normal	Trip_B
					Date	22 Jun 2023	22 Jun 2023	22 Jun 2023		22 Jun 2023	22 Jun 2023	13 Jun 2023
Parameter	Unit	RDL	ODWSOG Aesthetic Objectives	ODWSOG Operational Guidelines	ODWSOG MAC/IMAC							
General Chemistry												
Alkalinity (total)	mg/L	5	-	30-500	-	396	354	358	1	406	436	-
Ammonia as N	mg/L	0.01	-	-	-	<0.01	<0.01	<0.01	NC	0.01	<0.01	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1	-	-	-	<0.1	0.3	0.3	NC	0.3	0.2	-
Nitrate (as N)	mg/L	0.1	-	-	10	0.3	1.1	1.1	0	0.3	0.5	-
Nitrite (as N)	mg/L	0.05	-	-	1	<0.05	<0.05	<0.05	NC	<0.05	<0.05	-
Phosphorus, total	mg/L	0.01	-	-	-	0.02	0.07	0.07	NC	0.02	0.02	-
Chemical Oxygen Demand (COD)	mg/L	10	-	-	-	<10	14	12	NC	15	10	-
Electrical Conductivity (Lab)	µS/cm	5	-	-	-	1,160	1,120	1,120	0	1,940	1,720	-
Chloride	mg/L	1	250	-	-	61	66	67	2	166	118	-
Dissolved Organic Carbon (DOC)	mg/L	0.5	5	-	-	2.3	5.0	5.1	2	5.2	4.2	-
pH (Lab)	pH Units	0.1	-	6.5-8.5	-	7.7	7.7	7.7	0	7.6	7.6	-
Sulphate	mg/L	1	500	-	-	162	165	165	0	474	399	-
Total Dissolved Solids (TDS)	mg/L	10	500	-	-	668	658	658	NC	1,270	1,140	-
Metals												
Arsenic	mg/L	0.01	-	-	0.025[I]	<0.01	<0.01	<0.01	NC	<0.01	<0.01	-
Barium	mg/L	0.01	-	-	1	0.051	0.059	0.059	0	0.041	0.041	-
Boron	mg/L	0.05	-	-	5[I]	0.397	0.182	0.18	NC	0.218	0.287	-
Cadmium	mg/L	0.001	-	-	0.005	<0.001	<0.001	<0.001	NC	<0.001	<0.001	-
Calcium	mg/L	0.2	-	-	-	109	118	117	1	206	171	-
Chromium (Total, III+VI)	mg/L	0.05	-	-	0.05	<0.05	<0.05	<0.05	NC	<0.05	<0.05	-
Copper	mg/L	0.005	1	-	-	<0.005	<0.005	<0.005	NC	<0.005	<0.005	-
Iron	mg/L	0.2	0.3	-	-	<0.2	<0.2	<0.2	NC	<0.2	<0.2	-
Lead	mg/L	0.001	-	-	0.01	0.002	<0.001	<0.001	NC	<0.001	<0.001	-
Magnesium	mg/L	0.2	-	-	-	62.9	76.5	77.7	2	125	127	-
Manganese	mg/L	0.05	0.05	-	-	<0.05	<0.05	<0.05	NC	<0.05	<0.05	-
Mercury	mg/L	0.0001	-	-	0.001	<0.0001	<0.0001	<0.0001	NC	<0.0001	<0.0001	-
Potassium	mg/L	0.2	-	-	-	3.99	4.38	4.34	1	5.91	5.7	-
Sodium	mg/L	0.2	200	-	-	56.5	35.1	36.1	3	104	61.2	-
Zinc	mg/L	0.02	5	-	-	<0.02	<0.02	<0.02	NC	<0.02	<0.02	-
Volatile Organic Compounds (VOCs)												
Benzene	mg/L	0.0005	-	-	0.005	<0.0005	<0.0005	<0.0005	NC	<0.0005	<0.0005	<0.0005
Toluene	mg/L	0.0005	0.024	-	-	<0.0005	<0.0005	<0.0005	NC	<0.0005	<0.0005	<0.0005
Dichloromethane	mg/L	0.005	-	-	0.05	<0.0050	<0.0050	<0.0050	NC	<0.0050	<0.0050	<0.0050
Vinyl chloride	mg/L	0.0005	-	-	0.002	<0.0005	<0.0005	<0.0005	NC	<0.0005	<0.0005	<0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.001	-	0.005	<0.0005	<0.0005	<0.0005	NC	<0.0005	<0.0005	<0.0005
Phenolics												
Phenolics	mg/L	0.001	-	-	-	<0.001	<0.001	<0.001	NC	<0.001	<0.001	-

Notes:

I	Indicates "Interim" Maximum Acceptable Concentration
NC	Not calculable. RPDs not calculated where results are less than 5x the RDL
RDL	Reportable detection limit
RPD	Relative percent difference
mg/L	Milligrams per litre
µS/cm	Micro Siemens per centimetre
ODWSOG Aesthetic Objectives	Aesthetic Objectives in Ontario Drinking Water Standards, Objectives and Guidelines, Revised June 2006
ODWSOG Operational Guidelines	Operational Guidelines in Ontario Drinking Water Standards, Objectives and Guidelines, Revised June 2006
ODWSOG MAC/IMAC	Maximum Acceptable Concentrations/Interim Maximum Acceptable Concentrations in Ontario Drinking Water Standards, Objectives and Guideline
100	Exceeds ODWSOG Aesthetic Objectives
100	Exceeds ODWSOG Operational Guidelines
100	ODWSOG MAC/IMAC

Table 5: Methane Results
Groundwater and Methane Investigation
Tecumseh Hamlet Secondary Planning Area

MW Location	Type	Date	Methane (% Gas)	Methane (% LEL)
GP22-101	Gas Probe	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
GP22-102	Gas Probe	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
GP22-103	Gas Probe	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
MW22-101	Monitoring Well	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
MW22-102	Monitoring Well	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
MW22-103	Monitoring Well	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
MW22-104	Monitoring Well	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0
MW22-105	Monitoring Well	26-Sep-22	0.0	0.0
		18-Oct-22	0.0	0.0
		23-Mar-23	0.0	0.0
		15-May-23	0.0	0.0
		22-Jun-23	0.0	0.0

Notes:
LEL Lower explosive limit

Appendix A

Borehole Logs

Borehole ID: GP22-101

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT) - Dual Tube
Date Started: Sept 8, 2022 Date Completed: Sept 8, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Sample Vapour PID/OVM	Sample Rec %	Sample Blows/6"	Borehole Completion Detail	Elev. (m asl)
	TOPSOIL Brown, loose, dry, rootlets, some gravel								Bentonite	
	SILTY CLAY Brown, grey mottling, DPL, brittle, some sandy topsoil (up to 1.52 mbgs), trace gravel			0.28			83		Well Sand Well Screen	182
1										
2	Very stiff with some fine sand at 2.00 to 3.04 mbgs						100		Screw on drive point Backfilled with bentonite	181
3	End of borehole at 3.04m bgs (10.0 ft) **Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At plastic limit 4) Gas probe installed			3.04						180 179

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

LITHOLOGY SYMBOLS: Organics, Clay

Casing (m asl): 183.76
Grade Elevation (m asl) : 182.64

Borehole ID: GP22-102

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT) - Dual Tube
Date Started: Sept 8, 2022 Date Completed: Sept 8, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Sample Vapour PID/OVM	Sample Rec %	Sample Blows/6"	Borehole Completion Detail	Elev. (m asl)
	GRAVEL Coarse to fine, dry, loose, rootlets, fine sand			0.1					Bentonite	
	TOPSOIL Brown, sandy, rootlets and brances, dry, loose									183
	SANDY CLAY Brown, dry, loose, brittle, few roots			0.36					Well Sand	
							87			
	SILTY CLAY Brown and grey, brittle, DPL, trace gravel			0.8					Well Screen	
1										182
	SILTY CLAY Dark brown, orange and dark grey mottling, DPL, trace gravel, dusting of light brown sand on sides of core			1.52						
				1.6						
	SAND Light brown/yellow, fine-grained, homogeneous			1.8					Screw on drive point	
	SILTY CLAY Dark brown, orange and dark grey mottling, DPL, trace gravel, dusting of light brown sand on sides of core									
2							88			181
									Backfilled with bentonite	
3										
	End of borehole at 3.04m bgs (10.0 ft)			3.04						180

Notes:
1) mbgs = metres below ground surface
2) DPL = Drier than plastic limit
3) APL = At plastic limit
4) Gas probe installed

LITHOLOGY SYMBOLS: Gravel, Organics, Sandy Clay, Clay, Sand

Casing (m asl): 184.53
Grade Elevation (m asl) : 183.38

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

Borehole ID: GP22-103

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT) - Dual Tube
Date Started: Sept 8, 2022 Date Completed: Sept 8, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Vapour PID/OVM	Rec %	Blows/6"	Borehole Completion Detail	Elev. (m asl)
	TOPSOIL Dark brown, loose, dry, roots								Bentonite	
	SILTY CLAY/TOPSOIL/SAND Brown, orange mottling, loose, dry, brittle, trace gravel, roots			0.3					Well Sand	183
	SILTY CLAY Dark grey, orange mottling, DPL, brittle, roots, some cobbles/gravel			0.7			79		Well Screen	
1										
	Brown, trace fine sand, trace grey mottling at 1.52 to 3.04 mbgs				Grain Size 7 (Grain Size)					182
2										
							100			181
									Backfilled with bentonite	
3										
	End of borehole at 3.04m bgs (10.0 ft) **Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At plastic limit 3) Gas probe installed			3.04						180

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

LITHOLOGY SYMBOLS: Organics, Clay

Casing (m asl): 184.57
Grade Elevation (m asl) : 183.39

Borehole ID: MW22-101

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT)
Date Started: Sept 9, 2022 Date Completed: Sept 9, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample: Sample Analysis	Sample: Vapour PID/OVM	Sample: Rec %	Sample: Blows/6"	Borehole Completion Detail	Elev. (m asl)
1	**SILTY CLAY** Brown with orange and grey mottling, brittle, DPL, trace gravel, trace roots (at 0 to 0.35 mbgs)						61		Bentonite; Well Sand; Jun. 22, 2023	182
2	Clay is slightly darker and stiff at 1.52 to 3.04 mbgs; some orange mottling to trace at 2.70 mbgs.						100		Well Screen	181
3	Very stiff at 3.04 mbgs									180
4	Grey at 3.80 mbgs APL at 3.95 mbgs				Grain Size 9 (Grain Size)		100			179
5	End of borehole at 4.57m bgs (15.0 ft) **Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At plastic limit 4) Groundwater well installed			4.6					Screw on drive point	178 177

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

LITHOLOGY SYMBOLS: Clay

Water Level (No Measureable Product)

Casing (m asl): 183.31
Grade Elevation (m asl) : 182.39

Borehole ID: MW22-102

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT)
Date Started: Sept 8, 2022 Date Completed: Sept 8, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Sample Vapour PID/OVM	Sample Rec %	Sample Blows/6"	Borehole Completion Detail	Elev. (m asl)
	TOPSOIL Brown, sandy, loose, dry, trace rootlets and clay									
	SANDY CLAY Brown, DPL, brittle			0.17					Bentonite	
	SILTY CLAY Brown, DPL, brittle, grey mottling, trace gravel			0.6			61		Well Sand	
1										182
	trace grey mottlin at 1.52 to 1.90 mbgs									
2	Stiff at 1.90 mbgs						100		Well Screen	181
3	Some orange mottling at 3.04 to 3.60 mbgs									180
	SILTY CLAY Grey, APL, some gravel and cobbles, firm to stiff			3.6			100			
4					Grain Size 3 (Grain Size)					179
	End of borehole at 4.57m bgs (15.0 ft)			4.6					Screw on drive point	
5	**Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At plastic limit 4) Groundwater well installed 5) Well dry on June 22, 2023									178

LITHOLOGY SYMBOLS: Organics; Sandy Clay; Clay

Casing (m asl): 184.24
Grade Elevation (m asl) : 182.96

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

Borehole ID: MW22-103

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT)
Date Started: Sept 8, 2022 Date Completed: Sept 8, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Vapour PID/OVM	Rec %	Blows/6"	Borehole Completion Detail	Elev. (m asl)
	TOPSOIL Dark brown, sandy, dry loose, roots, some cobbles								Bentonite	
	SILTY CLAY Brown, some brown and orange mottline, DPL, brittle to stiff, trace gravel			0.39			67		Well Sand	183
1										
2	Light brown with orange mottling, some fine sand				Grain Size 6 (Grain Size)		100		Jun. 22, 2023 Well Screen	182
3	**SILTY CLAY** Grey, trace orange mottling, APL, stiff, trace gravel			3.04						181
							100			180
4										
	End of borehole at 4.57m bgs (15.0 ft) **Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At plastic limit 4) Groundwater well installed			4.6					Screw on drive point	179
5										

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-10

LITHOLOGY SYMBOLS: Organics, Clay

Water Level (No Measureable Product)

Casing (m asl): 184.52
Grade Elevation (m asl) : 183.53

Borehole ID: MW22-104

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT)
Date Started: Sept 9, 2022 Date Completed: Sept 9, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Sample Vapour PID/OVM	Sample Rec %	Sample Blows/6"	Borehole Completion Detail	Elev. (m asl)
	TOPSOIL Dark brown, dry, brittle, roots								Bentonite	183
	SILTY CLAY Brown, grey and orange mottling, DPL, stiff to brittle, trace gravel			0.36			70		Well Sand	
1										182
	Brown to light brown with orange and grey mottling at 1.52 to 3.04 mbgs								Jun. 22, 2023	
2							100		Well Screen	181
3	Dark brown with orange mottling (3.04 to 3.20 mbgs) to grey (3.20 to 4.60 mbgs), stiff									180
							100			
4										179
	End of borehole at 4.57m bgs (15.0 ft) **Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At plastic limit 4) Groundwater well installed			4.6					Screw on drive point	
5										178

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

LITHOLOGY SYMBOLS: Organics, Clay

Water Level (No Measureable Product)

Casing (m asl): 184.15
Grade Elevation (m asl) : 183.17

Borehole ID: MW22-105

DILLON CONSULTING

Client: Lakefront Heights Inc
Project No.: 21-2104
Drilling Co.: Landshark Drilling
Observer: M.Antaya

Project: Riverside Sportsman Club - Phase Two ESA/Excess Soils
Location : 10835 Riverside Drive East, Windsor, ON
Drilling Method: Direct Push (Geoprobe 7822DT)
Date Started: Sept 9, 2022 Date Completed: Sept 9, 2022

Depth Scale (m)	Stratigraphic Description	Letter Symbol	Stratigraphy	Depth (m)	Sample Analysis	Sample Vapour PID/OVM	Sample Rec %	Sample Blows/6"	Borehole Completion Detail	Elev. (m asl)
	TOPSOIL Dark brown, roots, dry, loose			0.16					Bentonite	183
	SILTY CLAY Dark brown to light brown, orange and grey mottling, DPL, brittle, trace cobbles/gravel, trace roots						67		Well Sand	
1										182
	Brown into dark brown at 1.52 to 3.20 mbgs								Jun. 22, 2023	
2							100		Well Screen	181
3	Grey/orange and stiff at 3.20 mbgs									180
	Grey, some orange mottling at 3.83 mbgs to 4.60 mbgs						100			
4										179
	End of borehole at 4.57m bgs (15.0 ft) **Notes:** 1) mbgs = metres below ground surface 2) DPL = Drier than plastic limit 3) APL = At Plastic Limit 4) Groundwater well installed			4.6					Screw on drive point	
5										178

DILLON MW MOD 20-2559 - TECUMSEH HAMLET.GPJ 23-8-9

LITHOLOGY SYMBOLS: Organics, Clay

Water Level (No Measureable Product)

Casing (m asl): 184.49
Grade Elevation (m asl) : 183.34

Appendix B

Laboratory Certificates of Analysis

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

1780 North Talbot Rd, Unit 2
Windsor, ON, N9A 6J3
1-800-749-1947
www.paracellabs.com

Subcontracted Analysis

Dillon Consulting Ltd (Windsor)
3200 Dezial Dr. Suite 608
Windsor, ON N8W 5K8
Attn: Taryn Azzopardi

Paracel Report No. **2242038**
Client Project(s): **Tec Hamlet 20-2559**
Client PO:
Reference: **#22-490 Tecumseh Hamlet**
CoC Number:

Order Date: 22-Sep-22
Report Date: 26-Oct-22

Sample(s) from this project were subcontracted for the listed parameters. A copy of the subcontractor's report is attached

Paracel ID	Client ID	Analysis
2242038-01	Grain Size 7	Grain Size - Sieve & Hydrometer
2242038-02	Grain Size 6	Grain Size - Sieve & Hydrometer
2242038-03	Grain Size 3	Grain Size - Sieve & Hydrometer
2242038-04	Grain Size 9	Grain Size - Sieve & Hydrometer

ALS Canada Ltd.

CERTIFICATE OF ANALYSIS

Work Order	: **SK2205827**	Page	: 1 of 5
Client	: **Paracel Laboratories Ltd**	Laboratory	: Saskatoon - Environmental
Contact	: Donna Bloom	Account Manager	: Kimberley Head
Address	: 351 Nash Road North, Unit 9B Hamilton ON Canada L8H 7P4	Address	: 819 58 Street East Saskatoon SK Canada S7K 6X5
Telephone	: ----	Telephone	: +1 306 668 8370
Project	: 2242038	Date Samples Received	: 14-Oct-2022 12:35
PO	: 2242038	Date Analysis Commenced	: 14-Oct-2022
C-O-C number	: ----	Issue Date	: 26-Oct-2022 15:51
Sampler	: Client		
Site	: ----		
Quote number	: ----		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Hedy Lai	Team Leader - Inorganics	Sask Soils, Saskatoon, Saskatchewan

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.
Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

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

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	No Unit
%	percent

>: greater than.
<: less than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

SK2205827-001

Sub-Matrix:**Soil**
(Matrix: **Soil/Solid**)

Client sample ID: Grain Size 7
Client sampling date / time: 08-Sep-2022 15:00

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Particle Size								
grain size curve	----	See Attached	-	-	E185	-	26-Oct-2022	-
passing (0.0312 mm)	----	60.0	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (4.75 mm)	----	99.1	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.020 mm)	----	54.1	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (1.0 mm)	----	92.9	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (9.5 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.005 mm)	----	35.8	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.841 mm)	----	92.4	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (19 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.004 mm)	----	33.0	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.50 mm)	----	89.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (25.4 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.002 mm)	----	25.5	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.420 mm)	----	89.1	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (38.1 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.250 mm)	----	84.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (50.8 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.149 mm)	----	77.6	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (76.2 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.125 mm)	----	75.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.075 mm)	----	70.5	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.063 mm)	----	68.0	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.05 mm)	----	65.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898

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

Analytical Results

SK2205827-002

Sub-Matrix:**Soil**
(Matrix: **Soil/Solid**)

Client sample ID: Grain Size 6
Client sampling date / time: 08-Sep-2022 15:20

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Particle Size								
grain size curve	----	See Attached	-	-	E185	-	26-Oct-2022	-
passing (0.0312 mm)	----	86.2	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (4.75 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.020 mm)	----	80.2	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (1.0 mm)	----	98.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (9.5 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.005 mm)	----	43.5	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.841 mm)	----	98.7	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (19 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.004 mm)	----	39.4	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899

Analytical Results

SK2205827-002

Sub-Matrix:**Soil**
(Matrix: **Soil/Solid**)

Client sample ID: Grain Size 6
Client sampling date / time: 08-Sep-2022 15:20

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Particle Size								
passing (0.50 mm)	----	98.0	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (25.4 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.002 mm)	----	28.9	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.420 mm)	----	97.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (38.1 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.250 mm)	----	96.4	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (50.8 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.149 mm)	----	94.1	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (76.2 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.125 mm)	----	93.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.075 mm)	----	91.5	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.063 mm)	----	90.1	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.05 mm)	----	88.7	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898

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

Analytical Results

SK2205827-003

Sub-Matrix:**Soil**
(Matrix: **Soil/Solid**)

Client sample ID: Grain Size 3
Client sampling date / time: 08-Sep-2022 15:35

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Particle Size								
grain size curve	----	See Attached	-	-	E185	-	26-Oct-2022	-
passing (0.0312 mm)	----	58.8	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (4.75 mm)	----	99.2	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.020 mm)	----	53.3	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (1.0 mm)	----	95.2	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (9.5 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.005 mm)	----	37.0	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.841 mm)	----	94.9	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (19 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.004 mm)	----	34.6	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.50 mm)	----	92.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (25.4 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.002 mm)	----	28.0	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.420 mm)	----	91.6	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (38.1 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.250 mm)	----	85.7	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (50.8 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.149 mm)	----	76.5	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (76.2 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.125 mm)	----	73.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.075 mm)	----	66.6	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.063 mm)	----	64.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898

Analytical Results

SK2205827-003

Sub-Matrix:**Soil**
(Matrix: **Soil/Solid**)

Client sample ID: Grain Size 3
Client sampling date / time: 08-Sep-2022 15:35

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Particle Size								
passing (0.05 mm)	----	62.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898

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

Analytical Results

SK2205827-004

Sub-Matrix:**Soil**
(Matrix: **Soil/Solid**)

Client sample ID: Grain Size 9
Client sampling date / time: 08-Sep-2022 15:35

Analyte	CAS Number	Result	LOR	Unit	Method	Prep Date	Analysis Date	QCLot
Particle Size								
grain size curve	----	See Attached	-	-	E185	-	26-Oct-2022	-
passing (0.0312 mm)	----	65.4	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (4.75 mm)	----	98.7	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.020 mm)	----	61.5	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (1.0 mm)	----	93.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (9.5 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.005 mm)	----	45.9	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.841 mm)	----	93.4	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (19 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.004 mm)	----	43.4	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.50 mm)	----	90.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (25.4 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.002 mm)	----	35.8	1.0	%	E183	14-Oct-2022	14-Oct-2022	696899
passing (0.420 mm)	----	90.1	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (38.1 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.250 mm)	----	85.8	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (50.8 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.149 mm)	----	79.5	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (76.2 mm)	----	100	1.0	%	E181	14-Oct-2022	14-Oct-2022	696897
passing (0.125 mm)	----	77.3	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.075 mm)	----	72.6	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.063 mm)	----	70.6	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898
passing (0.05 mm)	----	68.4	1.0	%	E182	14-Oct-2022	14-Oct-2022	696898

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

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **SK2205827**	Page	: 1 of 7
Client	: **Paracel Laboratories Ltd**	Laboratory	: Saskatoon - Environmental
Contact	: Donna Bloom	Account Manager	: Kimberley Head
Address	: 351 Nash Road North, Unit 9B Hamilton ON Canada L8H 7P4	Address	: 819 58 Street East Saskatoon, Saskatchewan Canada S7K 6X5
Telephone	: ----	Telephone	: +1 306 668 8370
Project	: 2242038	Date Samples Received	: 14-Oct-2022 12:35
PO	: 2242038	Issue Date	: 26-Oct-2022 15:56
C-O-C number	: ----		
Sampler	: Client		
Site	: ----		
Quote number	: ----		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Workorder Comments

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

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Particle Size : Grain Size Report (Attachment) Hydrometer/Sieve Method										
Glass soil jar/Teflon lined cap										
Grain Size 3	E185	08-Sep-2022	----	----	----		26-Oct-2022	----	----	
Particle Size : Grain Size Report (Attachment) Hydrometer/Sieve Method										
Glass soil jar/Teflon lined cap										
Grain Size 6	E185	08-Sep-2022	----	----	----		26-Oct-2022	----	----	
Particle Size : Grain Size Report (Attachment) Hydrometer/Sieve Method										
Glass soil jar/Teflon lined cap										
Grain Size 7	E185	08-Sep-2022	----	----	----		26-Oct-2022	----	----	
Particle Size : Grain Size Report (Attachment) Hydrometer/Sieve Method										
Glass soil jar/Teflon lined cap										
Grain Size 9	E185	08-Sep-2022	----	----	----		26-Oct-2022	----	----	
Particle Size : Particle Size Analysis - Hydrometer										
Glass soil jar/Teflon lined cap										
Grain Size 3	E183	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Hydrometer										
Glass soil jar/Teflon lined cap										
Grain Size 6	E183	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Hydrometer										
Glass soil jar/Teflon lined cap										
Grain Size 7	E183	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Particle Size : Particle Size Analysis - Hydrometer										
Glass soil jar/Teflon lined cap Grain Size 9	E183	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve <2mm										
Glass soil jar/Teflon lined cap Grain Size 3	E182	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve <2mm										
Glass soil jar/Teflon lined cap Grain Size 6	E182	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve <2mm										
Glass soil jar/Teflon lined cap Grain Size 7	E182	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve <2mm										
Glass soil jar/Teflon lined cap Grain Size 9	E182	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve >2mm										
Glass soil jar/Teflon lined cap Grain Size 3	E181	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve >2mm										
Glass soil jar/Teflon lined cap Grain Size 6	E181	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve >2mm										
Glass soil jar/Teflon lined cap Grain Size 7	E181	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓
Particle Size : Particle Size Analysis - Sieve >2mm										
Glass soil jar/Teflon lined cap Grain Size 9	E181	08-Sep-2022	14-Oct-2022	----	----		14-Oct-2022	365 days	36 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Particle Size Analysis - Hydrometer	E183	696899	1	6	16.6	5.0	✓
Particle Size Analysis - Sieve <2mm	E182	696898	1	6	16.6	5.0	✓
Laboratory Control Samples (LCS)							
Particle Size Analysis - Hydrometer	E183	696899	1	6	16.6	5.0	✓
Particle Size Analysis - Sieve <2mm	E182	696898	1	6	16.6	5.0	✓
Particle Size Analysis - Sieve >2mm	E181	696897	1	6	16.6	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Particle Size Analysis - Sieve >2mm	E181 Saskatoon - Environmental	Soil/Solid	ASTM D6913-17 (mod)	Soil samples are disaggregated and sieved through a 2mm sieve. Material retained on the sieve is then further sieved through a series of sieves. The amount passing through the sieves is measured gravimetrically.
Particle Size Analysis - Sieve <2mm	E182 Saskatoon - Environmental	Soil/Solid	ASTM D6913-17 (mod)	Soil samples are disaggregated and sieved through a 2mm sieve. Material passed through the sieve is then further disaggregated using calgon solution and passed through a series of sieves. The amount passing through the sieves is measured gravimetrically.
Particle Size Analysis - Hydrometer	E183 Saskatoon - Environmental	Soil/Solid	ASTM D7928-21 (mod)	Soil material is separated from coarse material (>2mm). A specimen is then disaggregated through mixing with Calgon solution. The material is then suspended in solution wherein regular hydrometer readings are taken at specific time intervals. The principles of Stokes' Law are applied to determine the amount of material remaining in solution as well as the maximum particle size remaining in solution at the specified time.
Grain Size Report (Attachment) Hydrometer/Sieve Method	E185 Saskatoon - Environmental	Soil/Solid	ASTM D6913/D7928	A grain size curve is a graphical representation of the particle sizing of a sample representing the percent passing against the effective particle size.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dry and Grind in Soil/Solid <60°C	EPP442 Saskatoon - Environmental	Soil/Solid	Soil Sampling and Methods of Analysis, Carter 2008	After removal of any coarse fragments and reservation of wet subsamples a portion of homogenized sample is set in a tray and dried at less than 60°C until dry. The sample is then particle size reduced with an automated crusher or mortar and pestle, typically to <2 mm. Further size reduction may be needed for particular tests.

ALS Canada Ltd.

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QUALITY CONTROL REPORT

Work Order	: **SK2205827**	Page	: 1 of 5
Client	: Paracel Laboratories Ltd	Laboratory	: Saskatoon - Environmental
Contact	: Donna Bloom	Account Manager	: Kimberley Head
Address	: 351 Nash Road North, Unit 9B Hamilton ON Canada L8H 7P4	Address	: 819 58 Street East Saskatoon, Saskatchewan Canada S7K 6X5
Telephone	:	Telephone	: +1 306 668 8370
Project	: 2242038	Date Samples Received	: 14-Oct-2022 12:35
PO	: 2242038	Date Analysis Commenced	: 14-Oct-2022
C-O-C number	: ----	Issue Date	: 26-Oct-2022 15:51
Sampler	: Client ----		
Site	: ----		
Quote number	: ----		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives

Signatories

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

Signatories	*Position*	*Laboratory Department*
Hedy Lai	Team Leader - Inorganics	Saskatoon Sask Soils, Saskatoon, Saskatchewan

General Comments

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

Key :

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

Workorder Comments

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Particle Size (QC Lot: 696898)											
SK2205827-001	Grain Size 7	passing (0.05 mm)	----	E182	1.0	%	65.3	66.1	1.22%	15%	----
		passing (0.063 mm)	----	E182	1.0	%	68.0	68.3	0.406%	15%	----
		passing (0.075 mm)	----	E182	1.0	%	70.5	70.3	0.300%	15%	----
		passing (0.125 mm)	----	E182	1.0	%	75.3	75.2	0.110%	15%	----
		passing (0.149 mm)	----	E182	1.0	%	77.6	77.6	0.0279%	15%	----
		passing (0.250 mm)	----	E182	1.0	%	84.3	84.2	0.0540%	15%	----
		passing (0.420 mm)	----	E182	1.0	%	89.1	89.0	0.0562%	15%	----
		passing (0.50 mm)	----	E182	1.0	%	89.8	89.7	0.0762%	15%	----
		passing (0.841 mm)	----	E182	1.0	%	92.4	92.3	0.164%	15%	----
		passing (1.0 mm)	----	E182	1.0	%	92.9	92.7	0.144%	15%	----
Particle Size (QC Lot: 696899)											
SK2205827-001	Grain Size 7	passing (0.002 mm)	----	E183	1.0	%	25.5	25.8	0.885%	20%	----
		passing (0.004 mm)	----	E183	1.0	%	33.0	33.2	0.438%	20%	----
		passing (0.005 mm)	----	E183	1.0	%	35.8	35.4	1.19%	20%	----
		passing (0.020 mm)	----	E183	1.0	%	54.1	55.4	2.48%	20%	----
		passing (0.0312 mm)	----	E183	1.0	%	60.0	61.3	2.10%	20%	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

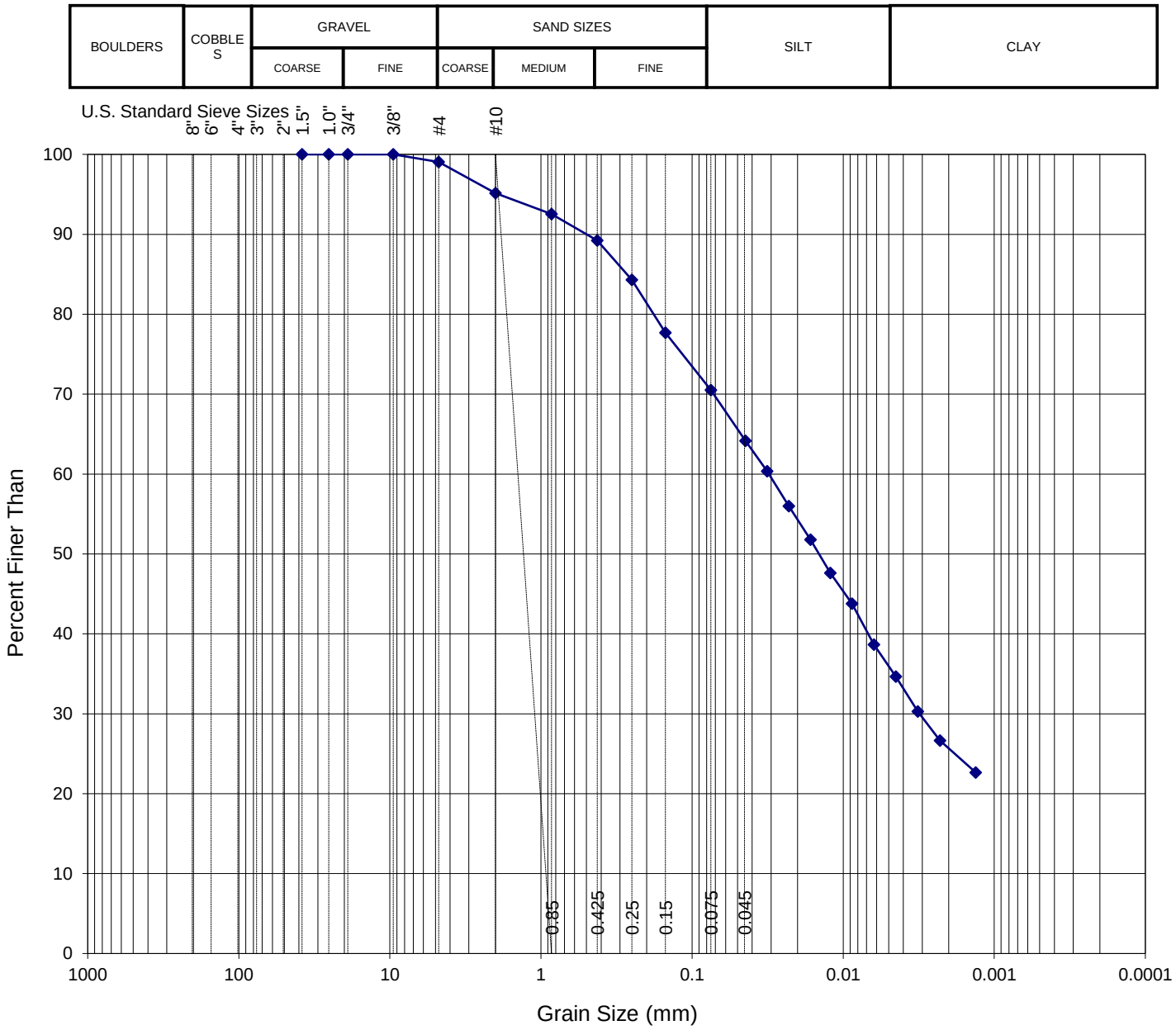
					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Particle Size (QCLot: 696897)									
	RM	passing (19 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (25.4 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (38.1 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (4.75 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (50.8 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (76.2 mm)	----	E181	100 %	100	90.0	110	----
	RM	passing (9.5 mm)	----	E181	100 %	100	90.0	110	----
Particle Size (QCLot: 696898)									
	RM	passing (0.05 mm)	----	E182	49.81 %	99.6	90.0	110	----
	RM	passing (0.063 mm)	----	E182	54.27 %	98.2	90.8	109	----
	RM	passing (0.075 mm)	----	E182	58.38 %	97.1	91.4	109	----
	RM	passing (0.125 mm)	----	E182	68.06 %	96.6	92.7	107	----
	RM	passing (0.149 mm)	----	E182	72.71 %	96.4	93.1	107	----
	RM	passing (0.250 mm)	----	E182	85.38 %	98.0	94.1	106	----
	RM	passing (0.420 mm)	----	E182	92.78 %	99.4	94.6	105	----
	RM	passing (0.50 mm)	----	E182	93.78 %	99.4	94.7	105	----
	RM	passing (0.841 mm)	----	E182	97.34 %	99.5	94.9	105	----
	RM	passing (1.0 mm)	----	E182	97.77 %	99.6	94.9	105	----
Particle Size (QCLot: 696899)									
	RM	passing (0.002 mm)	----	E183	21.14 %	100	76.0	124	----
	RM	passing (0.004 mm)	----	E183	24.64 %	101	80.0	120	----
	RM	passing (0.005 mm)	----	E183	25.91 %	100	82.0	118	----
	RM	passing (0.020 mm)	----	E183	37.12 %	103	87.0	113	----
	RM	passing (0.0312 mm)	----	E183	42.58 %	103	88.0	112	----

ALS Laboratory Group

819-58th Street, Saskatoon,SK

PARTICLE SIZE DISTRIBUTION CURVE

Client Name:	SK2205827001
Project Number:	
Client Sample ID	Grain Size 7
Lab Sample ID	SK2205827001
Date Sample Received	00-Jan-00
Test Completion Date:	25-Oct-22
Analyst:	SIH



METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispesion period: 1 minute cm/s

DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular
Hardness: Hard

SUMMARY OF RESULTS

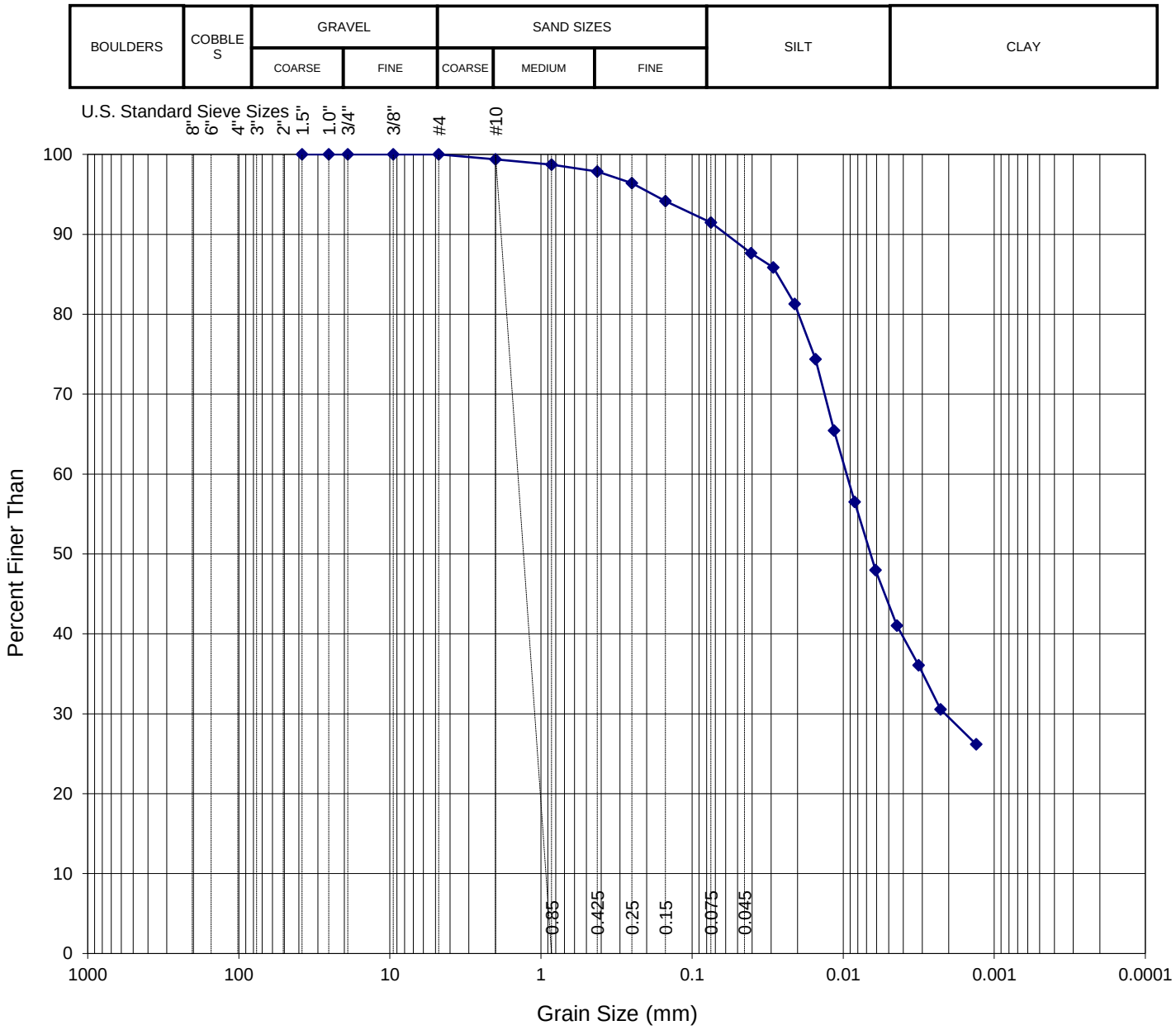
GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	3.91	2.0 - 4.75
% MEDIUM SAND :	5.92	0.425 - 2.0
% FINE SAND :	18.73	0.075 - 0.425
% SILT :	34.52	0.075 - 0.005
% CLAY :	35.98	< 0.005

ALS Laboratory Group

819-58th Street, Saskatoon,SK

PARTICLE SIZE DISTRIBUTION CURVE

Client Name:	SK2205827002
Project Number:	
Client Sample ID	Grain Size 6
Lab Sample ID	SK2205827002
Date Sample Received	00-Jan-00
Test Completion Date:	25-Oct-22
Analyst:	SIH



METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispesion period: 1 minute cm/s

DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	<1	2.0 - 4.75
% MEDIUM SAND :	1.54	0.425 - 2.0
% FINE SAND :	6.37	0.075 - 0.425
% SILT :	47.74	0.075 - 0.005
% CLAY :	43.74	< 0.005

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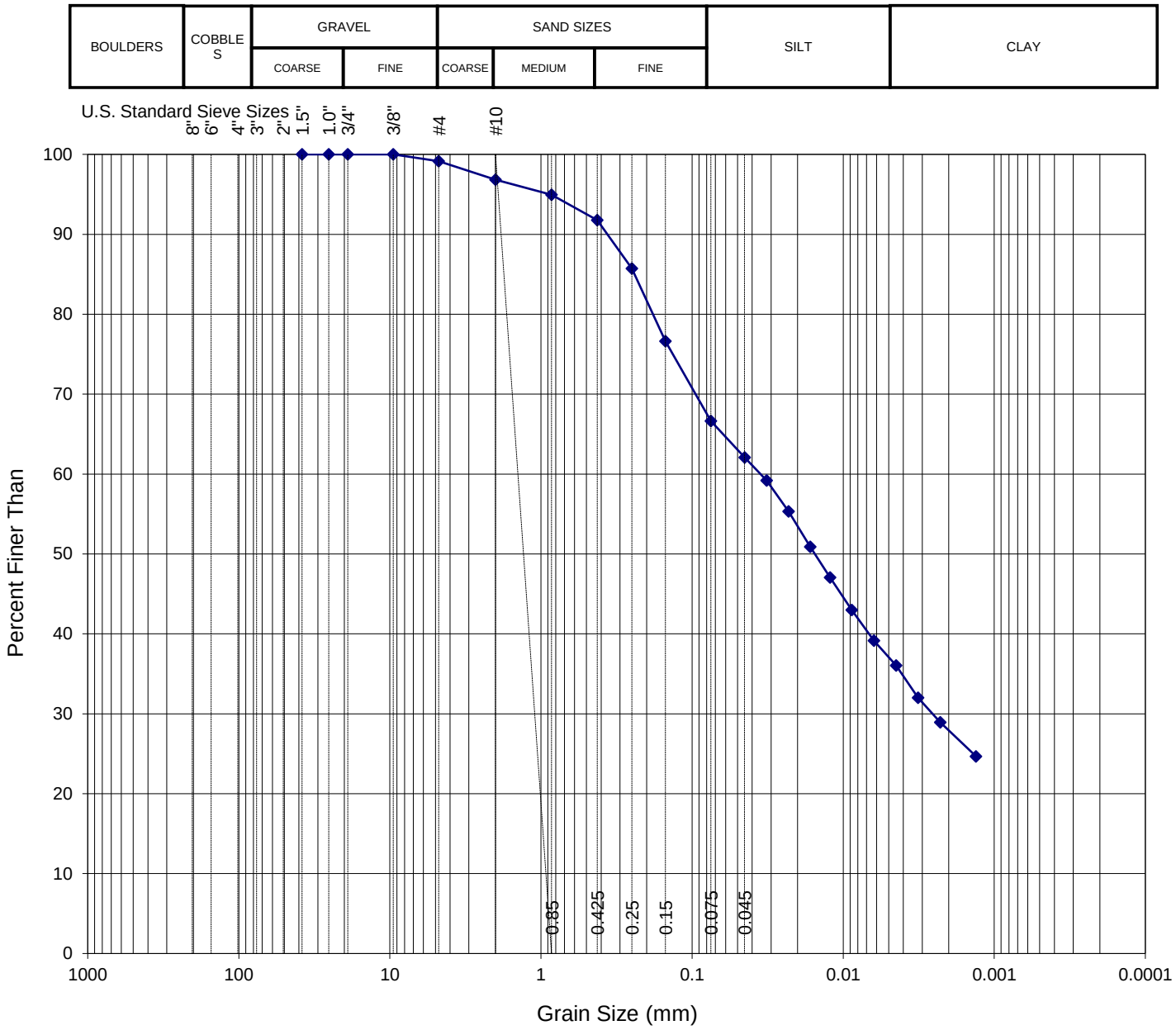
PARTICLE SIZE DISTRIBUTION CURVE

Client Name:	SK2205827003
Project Number:	
Client Sample ID	Grain Size 3
Lab Sample ID	SK2205827003
Date Sample Received	00-Jan-00
Test Completion Date:	25-Oct-22
Analyst:	SIH



METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispesion period: 1 minute cm/s

DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

SUMMARY OF RESULTS

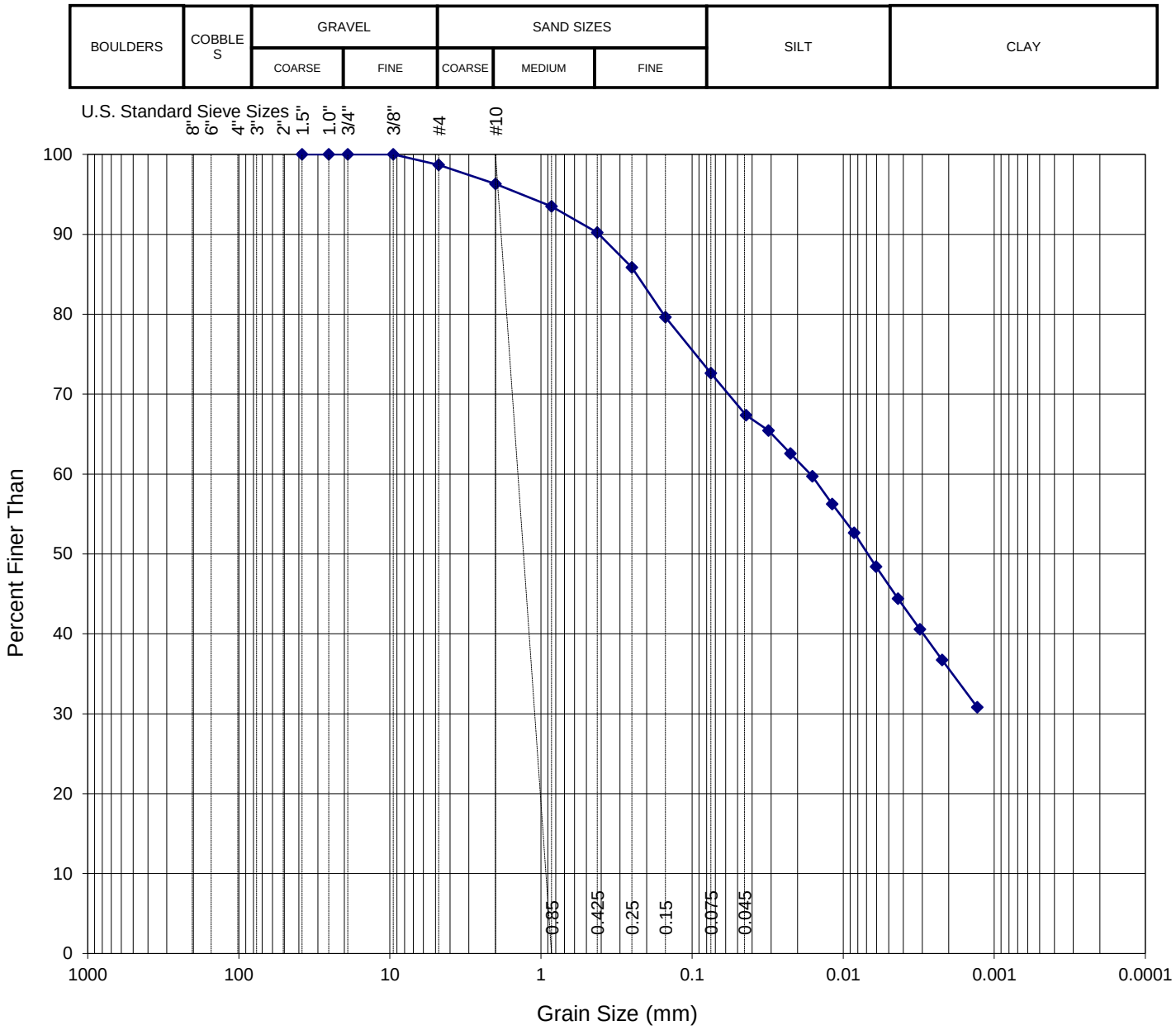
GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	<1	> 4.75
% COARSE SAND :	2.30	2.0 - 4.75
% MEDIUM SAND :	5.07	0.425 - 2.0
% FINE SAND :	25.14	0.075 - 0.425
% SILT :	29.53	0.075 - 0.005
% CLAY :	37.09	< 0.005

ALS Laboratory Group

819-58th Street, Saskatoon,SK

PARTICLE SIZE DISTRIBUTION CURVE

Client Name:	SK2205827004
Project Number:	
Client Sample ID	Grain Size 9
Lab Sample ID	SK2205827004
Date Sample Received	00-Jan-00
Test Completion Date:	25-Oct-22
Analyst:	SIH



METHOD DESCRIPTION

Method Reference: ASTM D6913 & D7928

Dispersion method: Mechanical

Dispesion period: 1 minute cm/s

DESCRIPTION OF SAND AND GRAVEL PARTICLES

Shape: Angular

Hardness: Hard

SUMMARY OF RESULTS

GRAIN SIZE	WT %	DIA. RANGE (mm)
% GRAVEL :	1.33	> 4.75
% COARSE SAND :	2.38	2.0 - 4.75
% MEDIUM SAND :	6.07	0.425 - 2.0
% FINE SAND :	17.59	0.075 - 0.425
% SILT :	26.52	0.075 - 0.005
% CLAY :	46.11	< 0.005

Chain of Custody (COC) / Analytical Request Form

ALS www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number

Environmental Division Saskatoon

Work Order Reference SK2205827

Telephone : +1 306 668 8370

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact y
Company:	PARACEL LABORATORIES	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if recei
Contact:	DONNA BLOOM ; DALE ROBERTSON	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐ — EMERGENCY: 1 E / San / (Lat
Phone:	(613) 731 9577	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	2319 ST. LAURENT BLVD SUITE 300	Email 1 or Fax dbloom@paracellabs.com	Date and Time Required for all E&P TATs:
City/Province:	OTTAWA ONTARIO	Email 2 drobertson@paracellabs.com	For tests that can not be performed according to the service
Postal Code:	K1G 4J8	Email 3 mfoto@paracellabs.com	Ana
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax dbloom@paracellabs.com	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	2242038	Major/Minor Code:	Routing Code:
PO / AFE:	2242038	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Grain Size Sieve	+ Hydrometer	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	Grain Size 7	08/09/22		Soil	1	X	X		
	Grain Size 6	08/09/22		Soil	1	X	X		
	Grain Size 3	08/09/22		Soil	1	X	X		
	Grain Size 9	08/09/22		Soil	1	X	X		

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

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
2.8							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
K. Jakobsen	OCT.12/22	1500	JB13	14 Oct 22	10:35	JB13	14 Oct 22	10:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 2018 FRONT

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

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

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Certificate of Analysis

Dillon Consulting Ltd (Windsor)
3200 Dezial Dr. Suite 608
Windsor, ON N8W 5K8
Attn: Taryn Azzopardi

Client PO:
Project: 202559
Custody:

Report Date: 28-Jun-2023
Order Date: 22-Jun-2023

Order #: 2325404

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

Paracel ID	Client ID
2325404-01	MW22-101
2325404-02	MW22-103
2325404-03	MW22-104
2325404-04	MW22-105
2325404-05	MW22-DUP
2325404-06	Trip Blank

Approved By:

Dale Robertson, BSc
Laboratory Director

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	26-Jun-23	26-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	27-Jun-23	27-Jun-23
Anions	EPA 300.1 - IC	26-Jun-23	26-Jun-23
Chemical Oxygen Demand	EPA 410.1 - Digestion, Colourimetric	26-Jun-23	27-Jun-23
Conductivity	EPA 9050A- probe @25 °C	26-Jun-23	26-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	23-Jun-23	28-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	23-Jun-23	26-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	26-Jun-23	26-Jun-23
MOE Landfill VOCs	EPA 624 - P&T GC-MS	27-Jun-23	28-Jun-23
pH	EPA 150.1 - pH probe @25 °C	26-Jun-23	26-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	26-Jun-23	26-Jun-23
Phosphorus, total, water	EPA 365.4 - Auto Colour, digestion	26-Jun-23	26-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	26-Jun-23	27-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	26-Jun-23	26-Jun-23

PARACEL LABORATORIES LTD.

Order #: 2325404

Certificate of Analysis

Report Date: 28-Jun-2023

Client: Dillon Consulting Ltd (Windsor)

Order Date: 22-Jun-2023

Client PO:

Project Description: 202559

	Client ID:	MW22-101	MW22-103	MW22-104	MW22-105	-	-
	Sample Date:	22-Jun-23 09:25	22-Jun-23 10:55	22-Jun-23 12:35	22-Jun-23 13:40		
	Sample ID:	2325404-01	2325404-02	2325404-03	2325404-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
General Inorganics							
Alkalinity, total	5 mg/L	396	354	406	436	-	-
Ammonia as N	0.01 mg/L	<0.01	<0.01	0.01	<0.01	-	-
Chemical Oxygen Demand	10 mg/L	<10	14	15	10	-	-
Dissolved Organic Carbon	0.5 mg/L	2.3	5.0	5.2	4.2	-	-
Conductivity	5 uS/cm	1160	1120	1940	1720	-	-
pH	0.1 pH Units	7.7	7.7	7.6	7.6	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	<0.001	<0.001	-	-
Phosphorus, total	0.01 mg/L	0.02	0.07	0.02	0.02	-	-
Total Dissolved Solids	10 mg/L	668	658	1270	1140	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	<0.1	0.3	0.3	0.2	-	-
Anions							
Chloride	1 mg/L	61	66	166	118	-	-
Nitrate as N	0.1 mg/L	0.3	1.1	0.3	0.5	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05	-	-
Sulphate	1 mg/L	162	165	474	399	-	-
Metals							
Arsenic	10 ug/L	<10	<10	<10	<10	-	-
Barium	10 ug/L	51	59	41	41	-	-
Boron	50 ug/L	397	182	218	287	-	-
Cadmium	1 ug/L	<1	<1	<1	<1	-	-
Calcium	200 ug/L	109000	118000	206000	171000	-	-
Chromium	50 ug/L	<50	<50	<50	<50	-	-
Copper	5 ug/L	<5	<5	<5	<5	-	-
Iron	200 ug/L	<200	<200	<200	<200	-	-
Lead	1 ug/L	2	<1	<1	<1	-	-

Certificate of Analysis

Report Date: 28-Jun-2023

Client: **Dillon Consulting Ltd (Windsor)**

Order Date: 22-Jun-2023

Client PO:

Project Description: 202559

	Client ID:	MW22-101	MW22-103	MW22-104	MW22-105	-	-
	Sample Date:	22-Jun-23 09:25	22-Jun-23 10:55	22-Jun-23 12:35	22-Jun-23 13:40		
	Sample ID:	2325404-01	2325404-02	2325404-03	2325404-04		
	Matrix:	Ground Water	Ground Water	Ground Water	Ground Water		
	MDL/Units						
Metals							
Magnesium	200 ug/L	62900	76500	125000	127000	-	-
Manganese	50 ug/L	<50	<50	<50	<50	-	-
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1	-	-
Potassium	200 ug/L	3990	4380	5910	5700	-	-
Sodium	200 ug/L	56500	35100	104000	61200	-	-
Zinc	20 ug/L	<20	<20	<20	<20	-	-
Volatiles							
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Methylene Chloride	5 ug/L	<5.0	<5.0	<5.0	<5.0	-	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	<0.5	-	-

Certificate of Analysis

Report Date: 28-Jun-2023

Client: **Dillon Consulting Ltd (Windsor)**

Order Date: 22-Jun-2023

Client PO:

Project Description: 202559

	Client ID:	MW22-DUP	Trip Blank			-	-
	Sample Date:	22-Jun-23 12:00	13-Jun-23 00:00				
	Sample ID:	2325404-05	2325404-06				
	Matrix:	Ground Water	Water				
	MDL/Units						
General Inorganics							
Alkalinity, total	5 mg/L	358	-	-	-	-	-
Ammonia as N	0.01 mg/L	<0.01	-	-	-	-	-
Chemical Oxygen Demand	10 mg/L	12	-	-	-	-	-
Dissolved Organic Carbon	0.5 mg/L	5.1	-	-	-	-	-
Conductivity	5 uS/cm	1120	-	-	-	-	-
pH	0.1 pH Units	7.7	-	-	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-	-	-
Phosphorus, total	0.01 mg/L	0.07	-	-	-	-	-
Total Dissolved Solids	10 mg/L	658	-	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.3	-	-	-	-	-
Anions							
Chloride	1 mg/L	67	-	-	-	-	-
Nitrate as N	0.1 mg/L	1.1	-	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-	-	-
Sulphate	1 mg/L	165	-	-	-	-	-
Metals							
Arsenic	10 ug/L	<10	-	-	-	-	-
Barium	10 ug/L	59	-	-	-	-	-
Boron	50 ug/L	180	-	-	-	-	-
Cadmium	1 ug/L	<1	-	-	-	-	-
Calcium	200 ug/L	117000	-	-	-	-	-
Chromium	50 ug/L	<50	-	-	-	-	-
Copper	5 ug/L	<5	-	-	-	-	-
Iron	200 ug/L	<200	-	-	-	-	-
Lead	1 ug/L	<1	-	-	-	-	-

Certificate of Analysis

Report Date: 28-Jun-2023

Client: **Dillon Consulting Ltd (Windsor)**

Order Date: 22-Jun-2023

Client PO:

Project Description: 202559

	Client ID:	MW22-DUP	Trip Blank			-	-
	Sample Date:	22-Jun-23 12:00	13-Jun-23 00:00				
	Sample ID:	2325404-05	2325404-06				
	Matrix:	Ground Water	Water				
	MDL/Units						
Metals							
Magnesium	200 ug/L	77700	-	-	-	-	-
Manganese	50 ug/L	<50	-	-	-	-	-
Mercury	0.1 ug/L	<0.1	-	-	-	-	-
Potassium	200 ug/L	4340	-	-	-	-	-
Sodium	200 ug/L	36100	-	-	-	-	-
Zinc	20 ug/L	<20	-	-	-	-	-
Volatiles							
Benzene	0.5 ug/L	<0.5	<0.5	-	-	-	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	-	-	-	-
Methylene Chloride	5 ug/L	<5.0	<5.0	-	-	-	-
Toluene	0.5 ug/L	<0.5	<0.5	-	-	-	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Chemical Oxygen Demand	ND	10	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Phosphorus, total	ND	0.01	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Metals								
Arsenic	ND	10	ug/L					
Barium	ND	10	ug/L					
Boron	ND	50	ug/L					
Cadmium	ND	1	ug/L					
Calcium	ND	200	ug/L					
Chromium	ND	50	ug/L					
Copper	ND	5	ug/L					
Iron	ND	200	ug/L					
Lead	ND	1	ug/L					
Magnesium	ND	200	ug/L					
Mercury	ND	0.1	ug/L					
Manganese	ND	50	ug/L					
Potassium	ND	200	ug/L					
Sodium	ND	200	ug/L					
Zinc	ND	20	ug/L					
Volatiles								
Benzene	ND	0.5	ug/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
1,4-Dichlorobenzene	ND	0.5	ug/L					
Methylene Chloride	ND	5.0	ug/L					
Toluene	ND	0.5	ug/L					
Vinyl chloride	ND	0.5	ug/L					
Surrogate: 4-Bromofluorobenzene	*81.8*		*%*	*102*	*50-140*			
Surrogate: Dibromofluoromethane	*91.3*		*%*	*114*	*50-140*			
Surrogate: Toluene-d8	*82.3*		*%*	*103*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	288	1	mg/L	288			0.1	20	
Nitrate as N	0.14	0.1	mg/L	0.13			2.2	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Sulphate	53.8	1	mg/L	53.1			1.2	10	
General Inorganics									
Alkalinity, total	396	5	mg/L	396			0.2	14	
Ammonia as N	0.026	0.01	mg/L	0.023			9.1	18	
Chemical Oxygen Demand	ND	10	mg/L	ND			NC	12	
Dissolved Organic Carbon	1.2	0.5	mg/L	1.3			5.6	37	
Conductivity	1210	5	uS/cm	1160			4.1	5	
pH	7.7	0.1	pH Units	7.7			0.0	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Phosphorus, total	ND	0.01	mg/L	ND			NC	15	
Total Dissolved Solids	806	10	mg/L	810			0.5	10	
Total Kjeldahl Nitrogen	ND	0.1	mg/L	ND			NC	16	
Metals									
Arsenic	ND	10	ug/L	ND			NC	20	
Barium	910	10	ug/L	953			4.6	20	
Boron	263	50	ug/L	328			NC	20	
Cadmium	ND	1	ug/L	ND			NC	20	
Calcium	68300	200	ug/L	85300			22.2	20	QR-05
Chromium	ND	50	ug/L	ND			NC	20	
Copper	9.2	5	ug/L	11.4			NC	20	
Iron	649	200	ug/L	808			NC	20	
Lead	1.2	1	ug/L	1.4			14.6	20	
Mercury	ND	0.1	ug/L	ND			NC	20	
Manganese	ND	50	ug/L	ND			NC	20	
Potassium	19500	200	ug/L	20300			3.8	20	
Sodium	449000	200	ug/L	493000			9.3	20	
Volatiles									

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Benzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*82.9*		*%*		*104*	*50-140*			
Surrogate: Dibromofluoromethane	*89.8*		*%*		*112*	*50-140*			
Surrogate: Toluene-d8	*82.0*		*%*		*103*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	299	1	mg/L	288	108	70-124			
Nitrate as N	1.16	0.1	mg/L	0.13	103	77-126			
Nitrite as N	0.901	0.05	mg/L	ND	90.1	82-115			
Sulphate	62.4	1	mg/L	53.1	92.6	74-126			
General Inorganics									
Ammonia as N	1.01	0.01	mg/L	0.023	98.8	81-124			
Chemical Oxygen Demand	203	10	mg/L	ND	102	85-111			
Dissolved Organic Carbon	12.0	0.5	mg/L	1.3	108	60-133			
Phenolics	0.026	0.001	mg/L	ND	106	67-133			
Phosphorus, total	0.982	0.01	mg/L	ND	98.2	80-120			
Total Dissolved Solids	96.0	10	mg/L	ND	96.0	75-125			
Total Kjeldahl Nitrogen	1.02	0.1	mg/L	ND	102	81-126			
Metals									
Arsenic	54.8	10	ug/L	ND	109	80-120			
Barium	152	10	ug/L	95.3	114	80-120			
Boron	86.3	50	ug/L	ND	107	80-120			
Cadmium	55.7	1	ug/L	ND	111	80-120			
Calcium	18100	200	ug/L	8530	95.5	80-120			
Copper	57.4	5	ug/L	ND	112	80-120			
Iron	2710	200	ug/L	ND	105	80-120			
Lead	52.0	1	ug/L	ND	104	80-120			
Magnesium	15600	200	ug/L	4110	115	80-120			
Mercury	2.71	0.1	ug/L	ND	90.3	70-130			
Manganese	60.3	50	ug/L	ND	118	80-120			
Potassium	13100	200	ug/L	2030	111	80-120			
Sodium	59100	200	ug/L	49300	98.2	80-120			
Zinc	53.7	20	ug/L	ND	100	80-120			
Volatiles									
Benzene	31.7	0.5	ug/L	ND	79.2	60-130			
1,4-Dichlorobenzene	41.1	0.5	ug/L	ND	103	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methylene Chloride	41.4	5.0	ug/L	ND	103	60-130			
Toluene	42.8	0.5	ug/L	ND	107	60-130			
Vinyl chloride	48.6	0.5	ug/L	ND	122	50-140			
m,p-Xylenes	88.0	0.5	ug/L	ND	110	60-130			
o-Xylene	43.4	0.5	ug/L	ND	109	60-130			
Surrogate: 4-Bromofluorobenzene	*87.2*		*%*		*109*	*50-140*			
Surrogate: Dibromofluoromethane	*93.3*		*%*		*117*	*50-140*			
Surrogate: Toluene-d8	*77.3*		*%*		*96.6*	*50-140*			

Qualifier Notes:

QC Qualifiers:

QR-05 Duplicate RPDs higher than normally accepted. Remaining batch QA\QC was acceptable. May be sample effect.

Sample Data Revisions:

None

Work Order Revisions / Comments:

The Sample Date for lab provided Trip QC samples is based on the date of preparation at the lab.

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.

NC: Not Calculated

PARACEL LABORATORIES LTD. | TF RE RE

Paracel ID: 2325404

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2325404	

Client Name: Dillon Consulting Ltd.
Contact Name: Taryn Azzopardi
Address: 3200 Deziel Dr. Suite 608, Windsor, ON N8W 5K8
Telephone: 226-345-6754

Project Ref: 202559
Quote #: 224910
PO #:
E-mail: tazzopardi@dillon.ca + foote@dillon.ca

Page 1 of 1

Turnaround Time
☐ 1 day ☐ 3 day
☐ 2 day ☒ Regular
Date Required:

☐ REG 153/04 ☐ REG 406/19

☐ Table 1 ☐ Res/Park ☐ Med/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/Other
☐ Table
For RSC: ☐ Yes ☐ No

Other Regulation
☒ REG 558 ☐ PWQO
☐ CCME ☐ MISA
☐ SU - Sani ☐ SU - Storm
Mun:
☐ Other: REG 232

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Required Analysis

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	MOE Landfill SVOCs; Clm #1, Comp. GW				
1	MW22-101	GW		10	22/06/23	9:25								X				
2	MW22-103	GW		10		10:55								X				
3	MW22-104	GW		10		12:35								X				
4	MW22-105	GW		10		13:40								X				
5	MW22-DUP	GW		10		12:00								X				
6	Trip Blank	–		1	13/06/23	–		X										
7																		
8																		
9																		
10																		

Comments:

Method of Delivery: Walk in

Relinquished By (Sign): Tonya Foote	Received By Driver/Depot: K. Jakobsen	Received at Lab:	Verified By:
Relinquished By (Print): Tonya Foote	Date/Time: June 22/23 14:45	Date/Time: Jun 23 2023 1:03	Date/Time: Jun 23 2023 1:54
Date/Time: 22/06/23 14:55	Temperature: 27.1 °C	Temperature: 5.9, 2.8	pH Verified: ☑ By: