Cedar Creek Road, Ayr

Preliminary Hydrogeologic Investigation Report

Project Location:
Cedar Creek Road, Ayr, ON

Prepared for:
Royal Truck and Trailer Sales Ltd.
73 Stafford Drive
Brampton, ON L6W 1L3

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

February 12, 2025

MTE File No.: 55566-100

Engineers, Scientists, Surveyors.

Contents

Figures

Tables

Appendices

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) was retained by Royal Truck and Trailer Sales Ltd. (Royal Truck) to conduct a Preliminary Hydrogeologic Investigation in support of a Site Plan Application on Cedar Creek Road in Ayr, Ontario (herein referred to as the 'Site'). **Figure 1** illustrates the Site location. MTE understands that the proposed Site Plan Application includes one slab-on-grade dry use industrial building, a stormwater management pond and gravel parking. The Site will be privately serviced for water supply, wastewater, and stormwater.

The objective of this preliminary investigation is to identify any barriers to successful development related to the following issues:

- The suitability of the Site for an on-Site septic system under the requirements of the MOEE Procedure D-5-4 Individual On-Site Sewage Systems.
- The siting and testing of a potable water supply well with water of acceptable quality and quantity.
- The suitability of the Site for the proposed stormwater management solution from a hydrogeological perspective.
- Long-term or construction dewatering needs.

This report should be read in conjunction with the following report, prepared concurrently by MTE:

- 3027 Cedar Creek Road, Ayr, ON, Geotechnical Investigation Report, MTE Consultants, August 2024.

1.1 Scope and Methodology

In order to meet the objectives of this investigation, the following scope of work was implemented.

1.1.1 Background Review

- Topography, physiography, geological and hydrogeological mapping on file with the Township of Puslinch, City of Guelph, Grand River Conservation Authority (GRCA), the Ontario Geological Survey (OGS), and the Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF).
- Available nearby well records on file with the Ministry of the Environment, Conservation and Parks (MECP).

1.1.2 Field Investigation

- Development of four monitoring wells installed during the concurrent geotechnical investigation in 2024.
- Installation of three mini-piezometers and two staff gauges within the on-site wetlands.
- Collection of stabilized water levels from newly constructed monitoring wells and mini-piezometers.
- Collection of groundwater samples for analysis of general chemistry parameters including nitrate.
- Installation of electronic data loggers to monitor groundwater levels on a continuous basis in selected newly constructed monitoring wells and mini piezometers.

1.1.3 Preliminary Analysis and Reporting

Summarize findings in a letter report to be reviewed and signed by a Professional Geoscientist or Engineer licensed to practice in Ontario. The report will address the following items:

- The topography, physiography, and geology of the subsurface soils.
- A hydrogeologic characterization of the Site including groundwater levels, gradients, flow direction, and hydraulic conductivity.
- The seasonal high water table in order to assess groundwater separation distances (this will be considered preliminary and will be updated based on on-going groundwater monitoring).
- Assess the suitability of the soil conditions and identify limiting factors (bedrock, water-table proximity) on the property for sewage effluent disposal for purpose of sewage system design.
- Estimate the nitrate-nitrogen loadings from subsurface sewage effluent disposal for the proposed development.
- Provide preliminary comments on the ability of the local aquifer to support a potable water supply well to service the Site.

1.1.4 Ongoing Monitoring and Report Update

This Preliminary Hydrogeological Investigation Report is based on data collected at the time of the field investigation and includes water levels that represent a limited duration of time. To support both Draft Plan of Subdivision Application and final design, an addendum to this report will be prepared that will include a longer monitoring time period, which will also evaluate the seasonal high groundwater level based on continuous water level monitoring in monitoring wells installed at the Site.

2.0 SITE DESCRIPTION

The Site is approximately 53 acres (21.3 hectares) in size, with frontage on Cedar Creek Road. The Site features are shown on **Figure 2**.

The Site is not located in any Wellhead Water Quantity Protection Area or surface water quality protection zone.

A Preliminary Concept Plan for the proposed development is provided in **Appendix A**. The plan includes a proposed 10,000m^2 dry-use building, a Stormwater Management Facility (SWM) and associated surface parking.

3.0 STUDY AREA DESCRIPTION

The Study Area is defined as lands within 500m of the Site boundary, illustrated on **Figure 1**. The Site is bounded by Cedar Creek Road to the north and Highway 401 to the south, with agricultural lands beyond, agricultural lands to the west, and commercial developments to the east.

There are several private wells within 500m of the Site. Based on a well record review a total of 13 water well records (WWR) were found. Out of the 13 WWR:

- 11 were classified as domestic, industrial, or livestock use; and
- Two were classified as unknown.

Abandoned, not used, test holes, observation wells or monitoring wells have been excluded from further discussion as they are not considered to be water users. 11 potential water users were identified through the MECP's WWIS database within an approximate 500m radius of the Site.

4.0 FIELD PROGRAM

4.1 Borehole Advancement and Monitoring Well Construction

In conjunction with the Geotechnical investigation, boreholes were advanced and monitoring wells installed across the Site. On July 22 to 25, 2024, London Soil Test (LST) used a track-mounted D-50 Dietrich drill rig to advance boreholes and install monitoring wells BH101-24, BH102-24, MW103-24, BH104-24 to BH109-24, MW110-24, BH111-24, BH112-24, MW113-24, BH114-24, and MW115-24. The monitoring wells were installed in accordance with Ontario Regulation 903 (as amended).

The monitoring wells at the Site were surveyed by MTE to a geodetic benchmark. Borehole and monitoring well locations are illustrated on **Figure 2**. Borehole logs are provided in **Appendix B**.

4.2 Monitoring Well Development

The monitoring wells were developed on July 31, 2024 using Waterra^{TM} Surge Blocks to remove any accumulated sediments from the bottom of the well and to remove fine grained materials from the well screen and sand pack. Monitoring well development was deemed complete once a minimum of three well volumes of water was removed, and the water was observed to be silt-free. Monitoring well development was completed prior to the installation of the data loggers.

4.3 Mini-piezometer Installation

Three mini-piezometers were installed on the Site by MTE on August 7, 2024 within the on-Site wetlands. The mini-piezometers were constructed of ¾ inch stainless steel riser pipe and equipped with a one-foot stainless steel drive screen. The mini-piezometers were advanced to approximately 3m bgs using a manual drop hammer.

Mini-piezometer logs and well construction installation details are provided in **Appendix B**. Mini-piezometer locations are illustrated on **Figure 2**.

4.4 Groundwater Levels

Manual groundwater and surface water levels were collected from the monitoring wells and mini-piezometer locations by MTE field staff on three occasions between July 31 and August 14, 2024 to establish the depth elevation of the water table and allow for the interpretation of shallow groundwater flow directions. Manually measured groundwater levels and elevations within the monitoring wells are presented in **Table 1**. In addition, data loggers were installed in three of the monitoring wells (MW103-24, MW110-24 and MW115-24), two mini-piezometers (MP101-24 and MP102-24) and associated surface water staff gauges (SG101-24 and SG102-24). Data loggers measure the pressure of water (in cm) above the logger, which can then be compensated for atmospheric pressure to determine a groundwater and surface water levels. The continuous hourly groundwater level information collected by the data loggers allows for an assessment of seasonal groundwater trends and responses to precipitation events.

4.5 Groundwater and Surface Water Quality

The monitoring wells, mini-piezometers and the on-Site wetland were sampled on July 31 and August 14, 2024 and submitted to ALS Environmental Laboratories (ALS) in Waterloo, Ontario for analysis of general chemistry parameters including nitrate. Prior to collecting groundwater samples, the monitoring wells were purged to obtain a groundwater sample representative of the surrounding formation. Groundwater samples were collected after approximately three well volumes had been removed.

5.0 REGIONAL GEOLOGY AND HYDROGEOLOGY

5.1 Physiography

The Site is located within the broad physiographic region known as the Waterloo Hills. One of the chief landforms of the Waterloo Hills, namely kame moraines are mapped at the Site. The physiographic landforms are presented on **Figure 3** (Chapman and Putnam, 1984).

5.2 Quaternary Geology

Quaternary geology mapping (**Figure 4**) indicates that the surficial geology beneath the majority of the Site is mapped as glaciofluvial outwash deposits, consisting of sand and gravel. The surficial geology beneath the northern portion of the Site is mapped as sand deposits, while the southern portion is mapped as gravel deposits. (*Ontario Geologic Survey*, 2010).

5.3 Paleozoic Geology

Paleozoic bedrock geology mapping illustrates the Site is located above the Salina Formation. The Salina formation includes limestone, dolostone, shale and sandstone (OGS, 2024).

Based on OGS mapping, the bedrock surface is expected to be encountered at depths of approximately 84m below ground surface (bgs).

5.4 Regional Groundwater Flow

Regional shallow groundwater elevations, provided by the GRCA (2009), indicate that the regional shallow groundwater elevations in the vicinity of the Site are approximately 307m amsl, as shown on **Figure 5**. The regional shallow groundwater flow direction is indicated as southwesterly towards Eden Creek, located approximately 750m west of the Site.

6.0 LOCAL HYDROGEOLOGIC SETTING

Boreholes and monitoring wells installed for this investigation as well as others for previous investigations were used to interpret local hydrostratigraphic units.

The stratigraphy consists of a surficial layer of topsoil above sand with intermixed silt and sand seams. Bedrock was not encountered in the boreholes to the depths explored (up to 14.2 m bgl).

6.1 Groundwater Elevations and Flow Direction

Groundwater flow mapping was created for the Site using the August 14, 2024 groundwater levels. Shallow groundwater elevation contours and flow patterns are illustrated in **Figure 6**. The local scale water table at the Site is interpreted to slope from the northeast to the southwest ranging from a high of 307.7m amsl to a low of 305.2m amsl on August 14, 2024.

6.2 Hydraulic Conductivity

Hydraulic conductivity values were estimated based on particle distribution analysis conducted on samples taken from boreholes during the concurrent geotechnical investigation. Hydraulic conductivity estimates were also calculated for the saturated soils beyond select well screens using single well hydraulic response tests (SWRTs). Hydraulic conductivity is estimated to range from $6.0x10^{-6}$ m/sec to $3.5x10^{-4}$ m/sec (SWRTs) and $1.4x10^{-5}$ m/sec to $1.5x10^{-4}$ m/sec (grain size), with geometric means of $3.5x10^{-5}$ m/sec and $4.1x10^{-5}$ m/sec, respectively, which is consistent with average published values for sands and silty sands (Freeze and Cherry, 1979). **Table 2** attached summarizes the hydraulic conductivity estimates from both methods. A copy of the particle size distribution analyses and the hydraulic conductivity estimate calculations are provided in **Appendix C**.

One representative test (SWRT) from each well was analyzed in AquiferTest Pro software. AquiferTest data sheets are presented in **Appendix D**.

6.3 Average Linear Groundwater Velocity

The horizontal hydraulic gradient, based on the August 14, 2024 groundwater elevations, is calculated to be 0.01 m/m.

The average linear groundwater velocity can be calculated using Darcy's Law, as follows:

$$q = (Ki)/n_e$$

Where:

- q = average linear groundwater velocity (m/s)
- K = hydraulic conductivity (3.5×10^{-5} m/s (geometric mean))
- i = horizontal hydraulic gradient (0.01 m/m)
- n_e = effective sediment porosity (0.30 based on published values for sands)

Using the above values, the average linear groundwater velocity at the Site is estimated to be approximately 37 m/year.

6.4 Groundwater Quality

The results of the background groundwater quality sampling are presented in **Table 3**. These results will be used as a benchmark by which to monitor for future development impacts. Of particular interest is the background nitrate concentrations which ranged from 0.042 mg/L at MW115-24 to 8.78 mg/L at MW110-24. The average nitrate concentration at the Site was estimated to be 3.8 mg/L. Given the historical and current agricultural use of the Site, elevated nitrate concentrations were expected and are interpreted to decline over much of the Site as farming activities have ceased. Laboratory Certificates of Analysis (COAs) are provided in **Appendix E**.

6.5 Surface Water Quality

Surface water samples were collected from mini-piezometers (MP101-24 and MP102-24) and the on-site wetland adjacent to MP101-24, to document background surface water chemistry at the Site. The results of the analyses are summarized in **Table 4**. Elevated phosphorus values were observed ranging from 1.20 mg/L at the standing water near MP101-24 to 62.2 mg/L at MP102-24. Given the historical and current agricultural use of the Site, elevated phosphorus concentrations were expected and are interpreted to decline as farming activities cease. Laboratory Certificates of Analysis (COAs) are provided in **Appendix E**.

6.6 Estimated Infiltration Rates

Preliminary infiltration rates were estimated based on the particle distribution analysis. The lowest infiltration rate beneath an infiltrating stormwater facility occurs when the sediments are fully saturated (STEP, 2020). Thus the infiltration rate can be approximated using the saturated hydraulic conductivity as presented in Section 6.2. These estimates are presented in the table below.

Summary of Estimated Infiltration Rates

Location	Estimated Steady State Infiltration Rate (mm/hr)
MW103-24	198
BH109-24	133
MW110-24 (1.5m)	50
MW110-24 (9.1m)	540
MW113-24	173
MW115-24	79

A safety factor of approximately two to three should be applied during the design phase based on the following criteria:

Lower Safety Factor (closer to 2)	Higher Safety Factor (closer to 3)
Catchment <100 m^2	Catchment >100 m^2
Permeameter or Percolation Test on Site	Double Ring infiltrometer on Site, or particle distribution analysis is used
Loamy or Sandy Soil Texture	Clayey Soil Texture
No variation in geologic formation, soil texture or bulk density within 1.5 meters below the proposed bottom of the practice.	Variation in geologic formation, soil texture or bulk density within 1.5 meters below the proposed bottom of the practice.
No nearby sensitive receptors	Sensitive receptors in near proximity (e.g. septic systems, building foundations).

These estimates should be refined prior to final design using field methods such as a Guelph Permeameter.

7.0 PRELIMINARY DESIGN CONSIDERATIONS

7.1 Source Water Protection

The Site is not located in a Wellhead Water Quantity Protection Area or surface water quality protection zone.

7.2 Dewatering

The shallowest depth to water measured by MTE in the monitoring wells to date is 1.73m bgs (307.8m amsl). Given that the current concept plan for the Site includes slab-on-grade construction, it is not anticipated that dewatering of groundwater will be required for the construction of buildings. Localized short term dewatering may be required for the installation of site stormwater services and should be assessed at the time of servicing. Groundwater levels at the Site will continue to be monitored to confirm this assessment.

7.3 Stormwater

The infiltration rate estimated from the samples taken in MW110-24 within the proposed SWM facility range from 50 to 540mm/hr. The log from MW110-24 indicates that the sands sampled in MW110-24, with the 540mm/hr rate extend from approximately 6.1 m bgs to depths of at least 11.1m bgs (the investigation depth). This sand unit with groundwater is expected to be sufficient to receive the infiltrating stormwater without significant mounding of the water table. In-situ infiltration rates should be refined prior to final design using field methods such as a Guelph Permeameter.

7.4 Wastewater

The Site will be serviced by an individual onsite wastewater system. The estimated design flow rate is 9,500 L/day. Since the design flow rate is less than 10,000 L/day, the onsite wastewater system is not considered to be large subsurface sewage disposal systems (LSSDSs) and will be subject to the MOEE Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment (Guideline D-5-4).

MTE has completed the Nitrate-N impact assessment for the Site under the assumption that the Site has not been designated under Notice 3/87; and therefore is not subject to Guideline B-7: Incorporation of the Reasonable Use Concept into MOEE Groundwater Management (Guideline B-7).

In addition, MTE has completed the Nitrate-N impact assessment for the Site utilizing the Site Plan dated April 2024, provided in **Appendix A**. Changes to the Draft Plan of Subdivision may alter the findings of the Nitrate-N impact assessment.

7.4.1 Nitrate Dilution Assessment

The effluent discharged from the proposed individual wastewater treatment system will be directed to an individual septic system. The effluent from the proposed wastewater system will be designed to have a Nitrate-N concentration in the treated effluent of 40mg/L prior to discharge to the disposal bed, based on 5% impervious development.

The estimated concentration for Nitrate-N at the down-gradient property boundary was determined using the following equation; details of the calculations are included in **Appendix F**.

$$C_{PB} = \frac{(SEF * C_{SEF}) + (GR * C_{BAC})}{SEF + GR}$$

Where:

	Description	Value	Rationale/Source
C_{PB}	Nitrate concentration at a property boundary (mg/L as N)		
SEF	Sewage Effluent Flow	1,733,750 L/yr	Based on typical flow (50% of design flow).
C_{SEF}	Nitrate concentration in sewage effluent	40 (mg/L as N)	Effluent concentration from septic system.
GR	Groundwater recharge rate (L/yr)	42,600 L/yr	Site area (21.3ha) multiplied by groundwater infiltration (0.2m/yr), upper end of range for silty sand (MECP, 1995).
C_{BAC}	Background Nitrate concentration in groundwater	3.8 (mg/L as N)	Average concentration from site wells.

Average typical daily sewage flow for the development is estimated at 50% the design flow (9,500 L/day), resulting in 4,750 L/day. This value was used in the above nitrate assessment calculation. In order to get the Nitrate-N concentration in groundwater at the down-gradient property boundary (C_{PB}) to be less than the Ontario Drinking Water Quality Standards (ODWQS) of 10 mg/L, tertiary treatment is not required to reduce the effluent Nitrate-N concentration to 10mg/L or less. The down-gradient Nitrate-N concentration is predicted to be 7.9mg/L at a Nitrate-N effluent concentration of 40mg/L. Calculations for conventional treatment for design and typical flow are provided in **Appendix F**.

7.5 Phosphorus Impact Assessment

Phosphorus is a nutrient that is found in sewage is a concern for surface water. In the natural environment, it readily attaches to soil particles. Phosphorus exists in both organic, and inorganic forms. To model the transport and fate of phosphorus, the Quick Domenico analytical solution developed by the Pennsylvania Department of Environmental Protection (DEP, 2014) was used. This is a spreadsheet model that provides an intuitive interface and analytical solution to the 1987 Domenico solute transport equation. The analysis was completed for the following three scenarios:

- *Scenario 1* assumes a total phosphorus concentration of 1.20 mg/L at the wetland to assess the distance required for a total phosphorus concentration of 12 mg/L in the treated effluent to achieve this result. This total phosphorus concentration was selected as it was the background total phosphorus concentration from the August 2024 sampling.
- *Scenario 2* assumes a total phosphorus concentration of <0.03 mg/L (PWQO limit) at the wetland to assess the distance required for a total phosphorus concentration of 12 mg/L in the treated effluent to achieve this result.

The model is intended for use primarily with organic chemicals, but in some circumstances can be successfully implemented for inorganic chemicals. The full list of assumptions and limitations for this analytical solution can be read in the User's Manual supplied by the DEP. A list of the four main assumptions of this analytical solution to the Domenico (1987) equation follows:

- The aquifer consists of a porous media that is homogeneous and isotropic;
- The groundwater flow field is homogeneous and unidirectional;
- Groundwater flow is in steady state; and
- Contaminant source remains constant with time.

Because the dominant form of phosphorus in the sewage effluent is predicted to be inorganic, the following model parameters were defined to have a value of zero, per the User's Manual supplied by the Pennsylvania Department of Environmental Protection (DEP):

- Lambda (day^{-1}) = 0.

Initial values for the parameters in the model were defined according to the User's Manual (DEP, 2014).

The following parameters and their corresponding values were treated as constants:

- Source Concentration (mg/L): 12 – Upper limit 6-12 mg/L from MECP Chapter 22;
- Source Width (ft): 20 – approximate width of septic bed;
- Source Thickness (ft): 5 – approximate thickness of septic bed;
- Time (days): 10950 – system life span 30 years (Robertson et al., 1998, 2008);

- Hydraulic Gradient (ft/ft): 0.01 – calculated from groundwater contours on Figure 6;
- Porosity (dec. fraction): 0.3 – standard for silty sand;
- Soil Bulk Density (g/cm^3): 1.81 – MECP 2011;
- a_y (ft): 0.1*a_x – dispersion in y direction suggested to be 10% of x direction (DEP, 2014);
- a_z (ft): 0.0001 – dispersion in z direction suggested to be 0.0001 (DEP, 2014);
- Lambda (day^{-1}): 0 – degradation through first order decay is zero for inorganics;
- K_{OC} (L/hg): 780 – organic carbon partition coefficient (Robertson et al., 1998, 2008, 2019); and
- f_{OC}: 0.005 – fraction of organic carbon (Robertson et al., 1998, 2008, 2019).

The following parameter was treated as variable and was allowed to range up or down one order of magnitude from the initial value, to account for heterogeneity within the substance. The parameter and the initial value is listed below:

- Hydraulic Conductivity (ft/day): 9.9 – geomean of conductivity measured in on-Site monitoring wells.

The model results for the two scenarios are attached in **Appendix F**.

The following summarizes the modelling results:

- To achieve a total phosphorus concentration of 1.2 mg/L (Scenario 2) at the receiving surface water with a total phosphorus concentration in the treated effluent of 12 mg/L, would require the disposal bed to be located approximately 180 ft (55m) from the receiving wetland.
- To achieve a total phosphorus concentration or <0.03 mg/L (Scenario 3) at the receiving surface water with a total phosphorus concentration in the treated effluent of 12 mg/L, would require the disposal bed to be located approximately 375 ft (114m) from the receiving wetland.

It should be noted that the exact location of the proposed disposal bed was unknown at the time of this assessment and an assumed distance was used for the above calculations. Once the exact location of the bed has been determined, these calculations should be revisited.

As with all models they become more accurate when coupled with real would data. As no real-world data is currently available for the proposed wastewater system, the model could not be calibrated and the results should be seen as analytical estimates only. Once the proposed system has been implemented and data is provided MTE will recalibrate the model, if requested.

7.6 Potable Water Supply

The proposed development will be serviced with an individual private onsite well. Based on previous work conducted in the vicinity of the Site and MECP well records, it is anticipated that a potable supply well at the Site could be installed in the deep overburden within a regional sand aquifer at depths of approximately 30 to 40m.

Review of MECP well records, within 500m of the Site, report a specific capacity of the regional sand aquifer between 1.8L/min/m and 97.3L/min/m, with an average specific capacity of 28L/min per m of drawdown. The specific capacity was estimated by taking the pumping rate divided by the observed drawdown, as reported on the MECP well records.

If the total water demand for the development will be greater than 50,000 L/day, a PTTW from the MECP will be required. In addition, the new potable drinking water supplies will require treatment and regular testing. Detailed design of the potable water supply system including supply well drilling, testing, and assessment of well capacity and treatment needs will be initiated as part of the final design.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on this hydrogeologic investigation, MTE offers the following findings:

- The stratigraphy consists of surficial layer of topsoil above sand with some silt. Bedrock was not encountered in the boreholes to the depths explored.
- The shallow local scale groundwater flow direction beneath the Site is interpreted to be southwesterly at elevations of 307.7 to 305.2m amsl.
- Background nitrate concentrations in groundwater range from 0.042 at MW115-24 to 8.78 mg/L at MW110-24. The average nitrate concentration at the Site is estimated at 3.8 mg/L.
- Estimates of the horizontal hydraulic gradient of the groundwater table beneath the Site is approximately 0.01 m/m, based on August 2024 levels.
- Hydraulic conductivity of the water table zone based on SWRTs is estimated to range from $6.0x10^{-6}$ m/sec to $3.5x10^{-4}$ m/sec with a geometric mean of $3.5x10^{-5}$ m/sec.
- Preliminary estimates of the infiltration rate of the sands in the vicinity of the SWM is 540 mm/hr. Significant mounding of the water table beneath infiltration infrastructure is not expected.
- Water supply wells of sufficient quantity and quality are expected to be available in the deep regional sand aquifer beneath the Site at depths between approximately 30 to 40m bgs.
- Based on the plan for slab-on-grade construction, dewatering is not anticipated to be required for construction of the building at the Site, although localized short-term dewatering may be required for the installation of site services.
- The effluent from the proposed individual wastewater system is expected to be designed to have a nitrate concentration in the treated effluent of 40mg/L prior to discharge to the disposal bed, based on a typical flow rate of 4,750 L/day.
- The predicted resulting nitrate concentration in groundwater at the property boundary is 7.9mg/L.
- The predicted distance to achieve a total phosphorus concentration of 1.2mg/L at the on-Site wetland is 55m.
- The predicted distance to achieve a total phosphorus concentration of <0.03mg/L at the on-Site wetland is 114m.

Recommendations

- Continuous groundwater monitoring should be ongoing and utilized during the Site plan approval process, as well as during final design.
- The preliminary infiltration estimates presented herein should be refined prior to final design using field methods such as a Guelph Permeameter.

- Detailed design of the potable water supply system should be completed including supply well drilling, testing, and assessment of well yield and water quality.
- During the development application process, existing on-site groundwater monitoring wells should be maintained.
- Preliminary Total Phosphorus calculations are based on conceptual estimates and should be revisited when site plan designs have been updated.
- Upon monitoring well decommissioning, monitoring wells will need to be decommissioned in accordance with Ontario Regulation 903 (as amended).
- If, upon final confirmation of building and servicing design, it is anticipated that the water table may be intercepted during construction activities, a dewatering assessment will be required.
- If, upon final confirmation of building and servicing design, it is anticipated that effluent design flows exceed those used in the above calculations, the nitrate assessment will need to be re-evaluated.

9.0 LIMITATIONS

Services performed by **MTE Consultants Inc.** (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Environmental Engineering & Consulting profession. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of MTE and the Client. The assignment was carried out in accordance with the Scope of Work described in Section 1.1 as reviewed with and agreed to by the Client. MTE makes no representation that the present report has dealt with all of the important environmental issues, except as provided in the Scope of Work. This report is not intended to be exhaustive in scope or to imply a risk-free facility. As such, this report may not deal with all issues potentially applicable to the Site and may omit aspects which are or may be of interest to the reader.

In addition, it should be recognized that a soil sample or groundwater level measurement represents one discrete portion of the Site at the time it is collected, and that the findings of this report are based on conditions as they existed during the time period of the investigation.

Any use which another party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by another party as a result of decisions made or actions taken, based upon this report. Others with interest in the Site should undertake their own investigations and studies to determine how or if the condition affects them or their plans.

It should be recognized that the passage of time may affect the views, conclusions and recommendations (if any) provided in this report because environmental conditions of a property can change, along with regulatory requirements. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may determine whether it affects the contents of this report.

All of which is respectfully submitted,

MTE Consultants Inc.

Kyle Reed, P.Geo.
Hydrogeologist
519-743-6500 ext. 1380
kreed@mte85.com

Peter A. Gray, P.Geo., QP_{ESA}, FGC
VP., Senior Hydrogeologist
519-743-6500 ext. 1306
pgray@mte85.com

KNR: smk
M:\55566\100\Reports\Hydrogeology\55566-100_2025-02-12_rpt_Initial Hydrogeologic Investigation - Cedar Creek Road, Ayr.docx

10.0 REFERENCES

Armstrong, D.K. and Carter, T.R. (2010). *The subsurface Paleozoic stratigraphy of southern Ontario:* Ontario Geological Survey, Special Volume 7, 301 p.

Chapman, L. J., and Putman, D.F. (1984); *The Physiography of Southern Ontario, Third Edition.* Ontario Geological Survey, Special Volume 2, 270p.

Domenico, P.A., 1987, *An analytical model for multidimensional transport of a decaying contaminant species,* Journal of Hydrology, 91, 49-58.

Freeze, R.A. and Cherry, J.A. (1979). *Groundwater;* Prentice-Hall Inc. Englewood Cliffs, New Jersey;

Ministry of the Environment and Climate Change (1995) Hydrogeological Technical Information Requirements for Land Development Applications.

Ministry of the Environment and Climate Change (1996) D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment.

Ministry of the Environment and Climate Change (1996) D-5-5 Private Wells: Water Supply Assessment.

Ministry of the Environment and Climate Change Source Protection Information Atlas:

https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-US

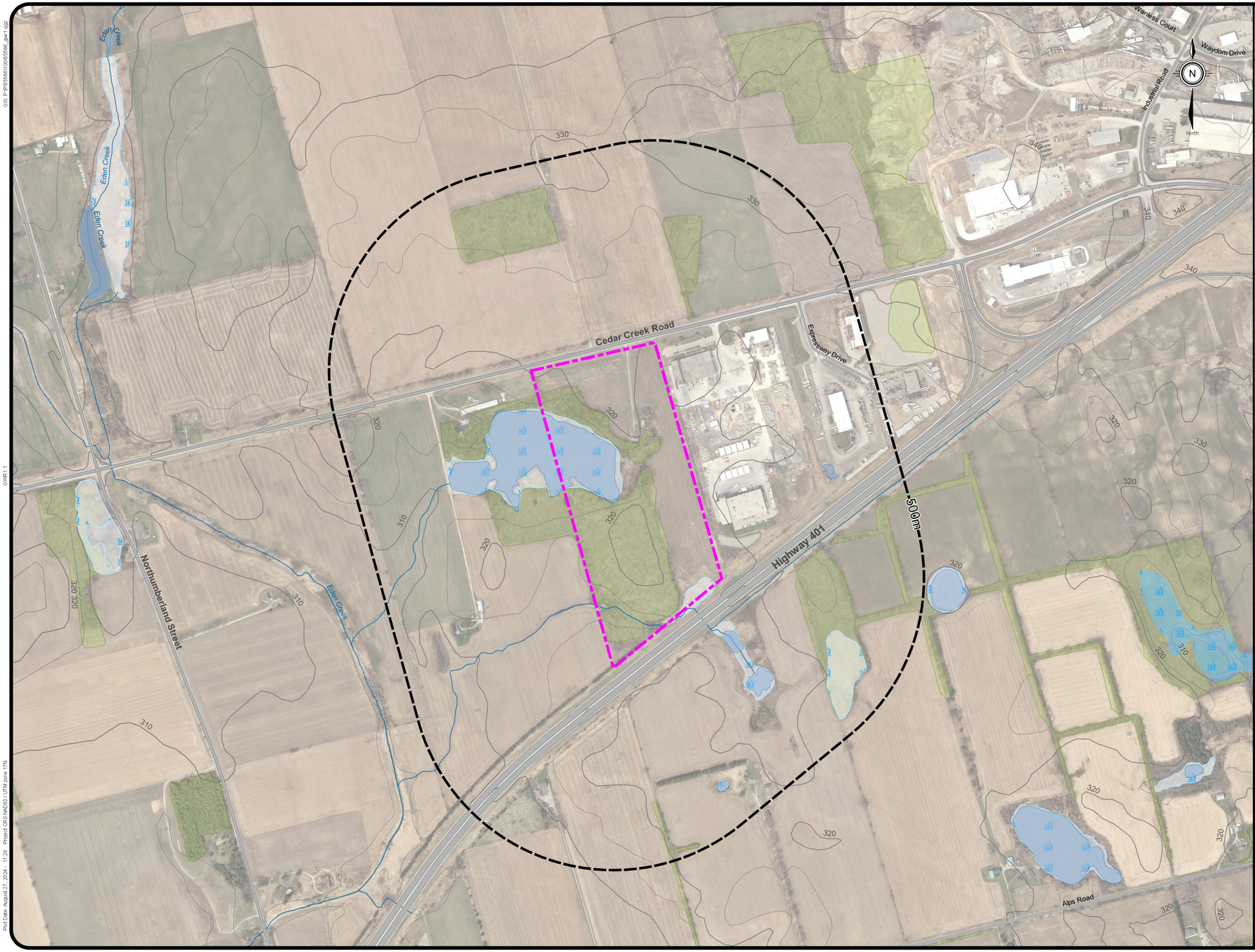
MTE Consultants. 2024. 3027 Cedar Creek Road, Ayr, ON, Geotechnical Investigation Report, MTE Consultants, August 2024.

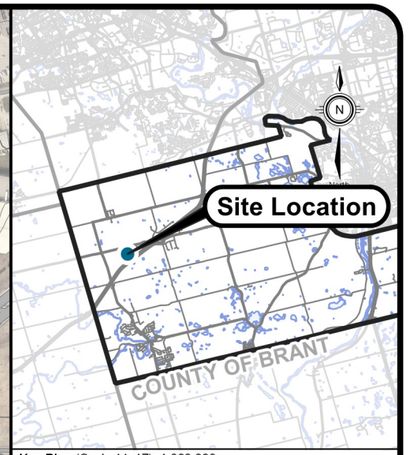
Ontario Geologic Survey. (2010). 1:50 000 Scale Surficial Geology of Southern Ontario.

Pennsylvania Department of Environmental Protection (DEP), 2014. *User's Manual for the Quick Domenico Groundwater Fate-and-Transport Model*, Pennsylvania.

Sustainable Technologies Evaluation Program (STEP). (2020). Design Infiltration Rate. Retrieved from Low Impact Development Stormwater Planning and Design Guide: https://wiki.sustainabletechnologies.ca/wiki/Design_infiltration_rate

Figures





Key Plan (Scale 11x17): 1:300,000

Legend

- Site Boundary
- 500m Study Area
- Waterbody
- Watercourse
- Provincally Significant Wetland
- Unevaluated Wetland
- 5m Contours
- Wooded Area

References

Contains information licensed under the Open Government License Ontario.

First Base Solutions

Notes

This figure is schematic only and to be read in conjuction with accompanying text.

All locations are Approximate

0 100 200 300 400 m

MTE

Engineers,Scientists, Surveyors

Project

3027 Cedar Creek Road Civil Works

3027 Cedar Creek Road, Ayr

Title

Site Location Map

Drawn: KNR	Scale (11x17): 1:9,000	Figure: **1**
Checked: PAG	Project No.: 55566-100	
Date: August 2024	Rev No.: 0	

G:\5_P\P\55566\100\55566_gwr1.qgz
GWR1 1
Plot Date: August 27, 2024 - 11:28 Project CRS:NAD83 / UTM zone 17N

GIS_P:\P65566\100\55566_gwr1.qgz

GVMR1.2

Plot Date: August 27, 2024 - 11:44 Project CRS: NAD83 / UTM zone 17N

Cedar Creek Road

BH101-24
BH104-24
MW103-24
BH107-24
BH106-24
BH102-24
BH109-24
BH108-24
BH105-24
MW110-24
BH112-24
MP103-24
BH111-24
MW113-24
MP101-24
BH114-24
320
MW115-24
MP102-24
Highway 401
N

Legend

- Site Boundary
- Waterbody
- Watercourse
- Unevaluated Wetland
- 5m Contours
- Wooded Area

Monitoring Locations

- Monitoring Well
- Minipiezometer
- Borehole

References

Contains information licensed under the Open Government License Ontario.

First Base Solutions

Notes

This figure is schematic only and to be read in conjuction with accompanying text.

All locations are Approximate

0 30 60 90 120 m

MTE

Engineers,Scientists, Surveyors

Project

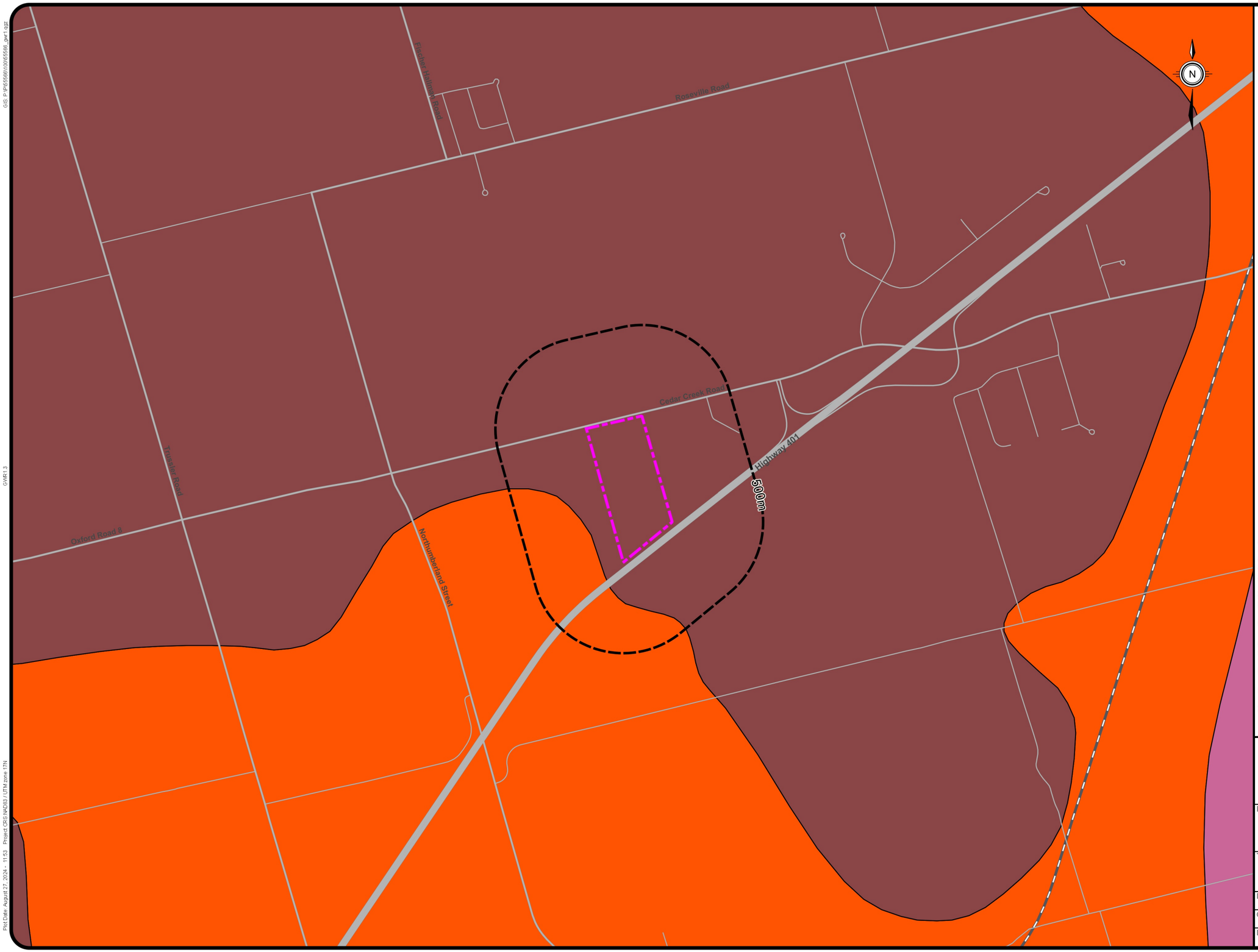
3027 Cedar Creek Road Civil Works

3027 Cedar Creek Road, Ayr

Title

Site Layout and Sampling Locations

Drawn: KNR	Scale (11x17): 1:2,500	Figure: **2**
Checked: PAG	Project No.: 55566-100	
Date: 2024- 08-27	Rev No.: 0	



Legend

- Site Boundary
- 500m Study Area
- Road
- Rail Line

Physiogrpahic Landforms

- 2. Till Moraines
- 3. Spillways
- 4. Kame Moraines

References

Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

Contains information licensed under the Open Government License Ontario.

First Base Solutions

Notes

This figure is schematic only and to be read in conjuction with accompanying text.

All locations are Approximate

0 200 400 600 800 m

MTE

Engineers,Scientists, Surveyors

Project

3027 Cedar Creek Road Civil Works

3027 Cedar Creek Road, Ayr

Title

Physiographic Landforms

Drawn: KNR	Scale (11x17): 1:20,000	Figure: **3**
Checked: PAG	Project No.: 55566-100	
Date: 2024- 08-27	Rev No.: 0	

GIS_P:\P55566\100\55566_gwr1.qgz
GWR1.3
Plot Date: August 27, 2024 - 11:53 Project CRS:NAD83 / UTM zone 17N

GIS_P:\P65566\100\55566_qwr1.qgz

GVMR14

Plot Date: August 27, 2024 - 12:03 Project CRS: NAD83 / UTM zone 17N

Roseville Road

Fischer Hallman Road

Cedar Creek Road

Trussler Road

Oxford Road 8

Northumberland Street

Highway 401

500m

N

Legend

- Site Boundary
- 500m Study Area
- Road
- Rail Line

Quaternary Geology

- 20. Organic Deposits: peat, muck, marl
- 19. Modern alluvial deposits: clay, silt, sand, gravel, may contain organic remains
- 8. Fine-textured glaciolacustrine deposits: silt and clay, minor sand and gravel
- 8a. Massive to well laminated
- 7. Glaciofluvial deposits: river deposits and delta topset facies
- 7a. Sandy deposits
- 7b. Gravelly deposits
- 6. Ice-contact stratified deposit: sand and gravel, minor silt, clay and till
- 5. Till:
- 5b. Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain

References

Contains information licensed under the Open Government License Ontario.

First Base Solutions

Ontario Geological Survey 2010. Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release-128 - Revised.

Notes

This figure is schematic only and to be read in conjuction with accompanying text.

All locations are Approximate

0 200 400 600 800 m

MTE

Engineers,Scientists, Surveyors

Project

3027 Cedar Creek Road Civil Works

3027 Cedar Creek Road, Ayr

Title

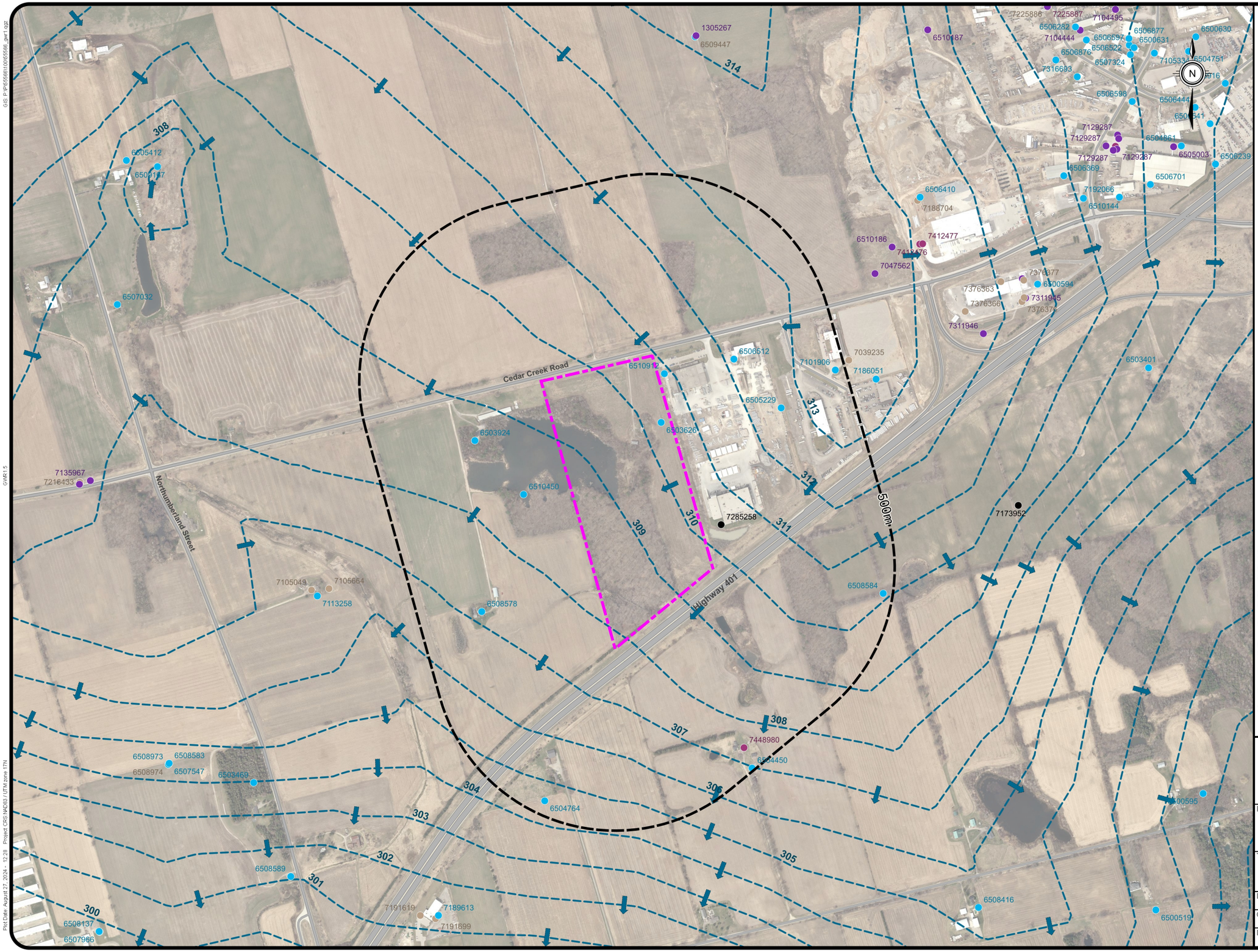
Quaternary Geology

Drawn: KNR	Scale (11x17): 1:20,000	Figure: **4**
Checked: PAG	Project No.: 55566-100	
Date: 2024- 08-27	Rev No.: 0	

GIS_P:\P65566\100\65566_gw1.qgz

GVMR1.5

Plot Date: August 27, 2024 - 12:28 Project CRS: NAD83 / UTM zone 17N



Legend

- Site Boundary
- 500m Study Area

MECP Well Records

- abandoned
- monitoring well or test hole
- no information provided
- water supply
- no final status
- Groundwater Contours (1m Interval)
- Groundwater Flow Direction (Inferred)

References

Contains information licensed under the Open Government Licence – Ontario.

Contains information licensed under the Open Government License Ontario.

First Base Solutions

Notes

This figure is schematic only and to be read in conjuction with accompanying text.

All locations are Approximate

0 100 200 300 400 m

MTE

Engineers,Scientists, Surveyors

Project

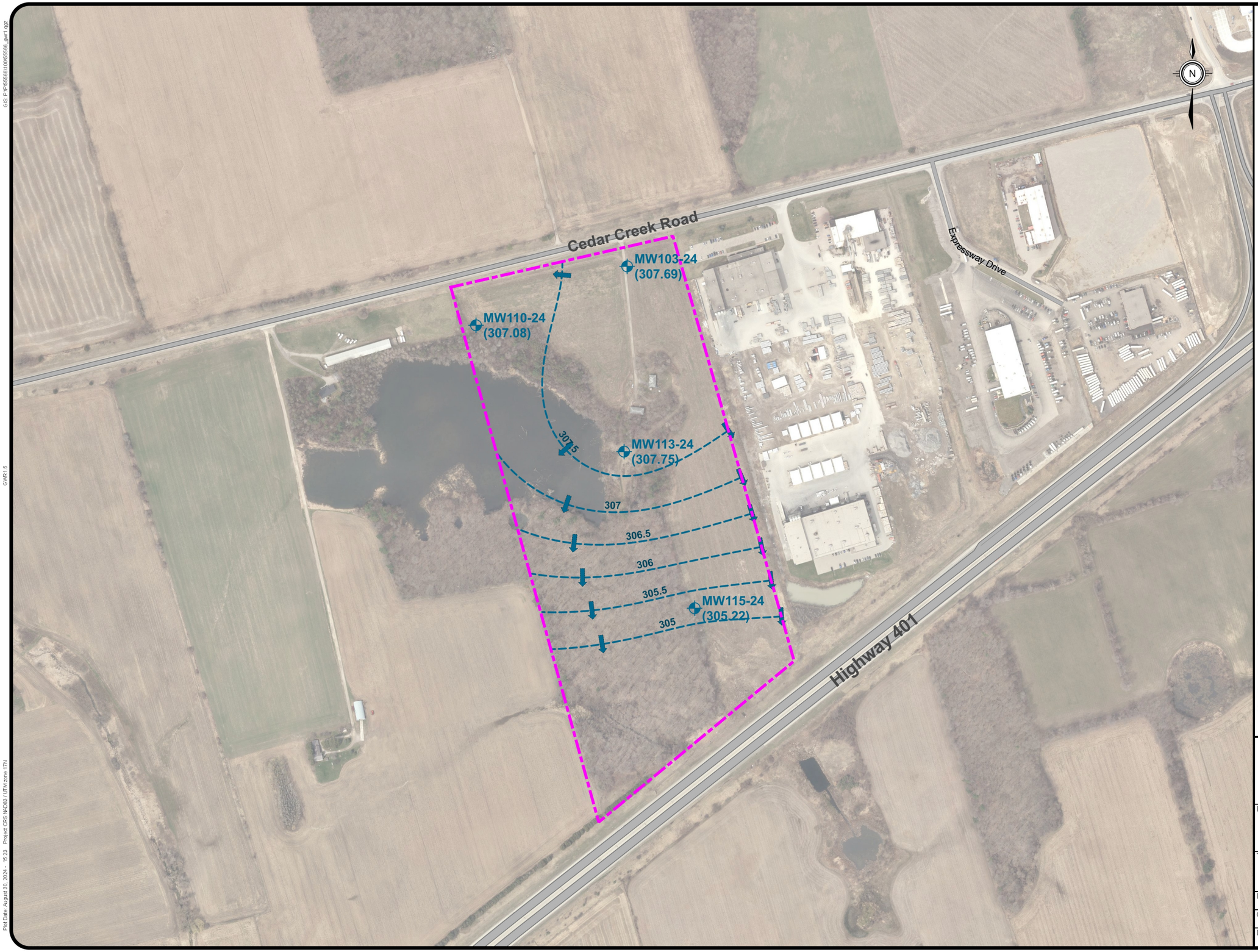
3027 Cedar Creek Road Civil Works

3027 Cedar Creek Road, Ayr

Title

Regional Groundwater Flow Map

Drawn: KNR	Scale (11x17): 1:10,000	Figure: **5**
Checked: PAG	Project No.: 55566-100	
Date: 2024- 08-27	Rev No.: 0	



Legend

- Site Boundary
- Groundwater Contours (0.5m Interval)
- Groundwater Flow Direction (Interpreted)
- Monitoring Well (Groundwater Elevation (mAMSL))

References

Contains information licensed under the Open Government License Ontario.

First Base Solutions

Notes

This figure is schematic only and to be read in conjuction with accompanying text.

All locations are Approximate

0 60 120 180 240 m

MTE

Engineers,Scientists, Surveyors

Project
3027 Cedar Creek Road Civil Works
3027 Cedar Creek Road, Ayr

Title
Interpreted Local Groundwater Flow Map

Drawn: KNR	Scale (11x17): 1:5,000	Figure: 6
Checked: PAG	Project No.: 55566-100	
Date: 2024- 08-30	Rev No.: 0	

GIS_P:\P\55566\100\55566_gwr1.qgz
GWR1.6
Plot Date: August 30, 2024 - 15:23 Project CRS: NAD83 / UTM zone 17N

Tables

Table 1: Manual Groundwater Measurements

Manual Groundwater Measurements (m btoc)

Date	MW103-24	MW110-24	MW113-24	MW115-24	MP101-24	MP102-24	MP103-24	SG101-24	SG102-24	SG103-24
2024-07-31	11.03	8.28	2.50	8.25	-	-	-	-	-	-
2024-08-07	11.01	8.28	2.55	8.25	-	-	-	-	-	-
2024-08-14	11.00	8.28	2.59	8.33	1.12	1.90	1.36	1.17	dry	1.36

Notes: *m btoc = metres below top of casing*

Manual Groundwater Elevations (m amsl)

Date	MW103-24	MW110-24	MW113-24	MW115-24	MP101-24	MP102-24	MP103-24	SG101-24	SG102-24	SG103-24
TOC Elevation	318.69	315.36	310.34	313.55	309.88	313.39	309.15	309.88	313.39	309.15
2024-07-31	307.66	307.08	307.84	305.30	-	-	-	-	-	-
2024-08-07	307.68	307.08	307.79	305.30	-	-	-	-	-	-
2024-08-14	307.69	307.08	307.75	305.22	308.76	311.49	307.79	308.71	dry	307.79

Notes: *m amsl = metres above sea level*

Table 2: Hydraulic Conductivity Summary (m/sec)

In-Situ Hydraulic Conductivity						
Monitoring Well	**Ground Surface Elevation**	**Screened Interval (m bgs/ m amsl)**	**Soil Description**	**Hydraulic Conductivity (m/sec)**	**Method**	**Calculation**
MW110-24	314.66	9.2 - 10.7 305.5 - 304.0	SAND, trace Silt, Clay and Gravel	3.5×10^{-4}	Rising Head	Bouwer & Rice
MW113-24	309.57	6.2 - 7.7 303.4 - 301.9	SAND, trace Silt, Gravel and Clay	6.0×10^{-6}	Rising Head	Bouwer & Rice
MW115-24	312.87	12.2 - 13.7 300.7 - 299.2	SAND, some Silt, trace Clay	2.0×10^{-5}	Recovery	Bouwer & Rice

Particle Size Distribution						
Monitoring Well / Borehole Name	**Ground Surface Elevation**	**Sample Identification and Depth (m bgs)**	**Screened Interval (m bgs/ m amsl)**	**Soil Description**	**Hydraulic Conductivity Range (m/sec)**	**Formula**
MW103-24	317.79	SS-12 12.2 - 22.6	12.2 - 13.7 305.6 - 304.1	SAND, trace Silt and Clay	5.5×10^{-5}	Kozeny-Carmen
BH109-24	317.70	SS-5 3.0 - 3.5	NA	SAND, trace Silt and Clay	3.7×10^{-5}	Kozeny-Carmen
MW110-24	314.66	SS-3 1.5 - 2.0	9.2 - 10.7 305.5 - 304.0	SAND, some Silt, trace Clay	1.4×10^{-5}	Kozeny-Carmen
		SS-10 9.1 - 9.6		SAND, trace Silt, Clay, and Gravel	1.5×10^{-4}	Kozeny-Carmen
MW113-24	309.57	SS-8 6.1 - 6.6	6.2 - 7.7 303.4 - 301.9	SAND, trace Silt, Gravel, and Clay	4.8×10^{-5}	Kozeny-Carmen
MW115-24	312.87	SS-12 12.2 - 12.6	12.2 - 13.7 300.7 - 299.2	SAND, some Silt, trace Clay	2.2×10^{-5}	Kozeny-Carmen

Table 3: Groundwater Analytical Results

Sample ID						MW103-24	MW110-24	MW113-24	MW115-24
Date Sampled						31-Jul-2024	31-Jul-2024	31-Jul-2024	31-Jul-2024
Time Sampled						10:15	14:45	13:25	11:40
ALS Sample ID						WT2421973-001	WT2421973-004	WT2421973-003	WT2421973-002
Parameter	Lowest Detection Limit	ODWS Guidelines	ODWS Standards	PWQO	Units				
Physical Tests (Water)									
Colour, Apparent	2.0	5.0	NA	NA	CU	1730	6760	339	21200
Conductivity	3.0	NA	NA	NA	umhos/cm	1420	649	633	521
Hardness (as CaCO3)	0.50	80-100	NA	NA	mg/L	660	340	313	291
pH	0.10	6.5-8.5	NA	6.5-8.5	pH units	7.53	7.75	8.09	7.94
Total Dissolved Solids	20	500	NA	NA	mg/L	928	395	352	333
Turbidity	0.10	5	NA	NA	NTU	482	3010	76.1	>4000
Anions and Nutrients (Water)									
Alkalinity, Total (as CaCO3)	10	30-500	NA	NA	mg/L	400	432	288	564
Ammonia, Total (as N)	0.010	NA	NA	NA	mg/L	0.238	0.0531	0.56	0.255
Chloride (Cl)	0.50	250	NA	NA	mg/L	246	34.1	26.0	4.12
Fluoride (F)	0.020	NA	1.5	NA	mg/L	<0.100	0.035	0.06	0.101
Nitrate (as N)	0.020	NA	10	NA	mg/L	5.08	8.78	1.45	0.042
Nitrite (as N)	0.010	NA	1	NA	mg/L	<0.050	<0.010	0.042	<0.010
Orthophosphate-Dissolved (as P)	0.0030	NA	NA	NA	mg/L	<0.0010	<0.0010	<0.0010	0.0012
Phosphorus, Total	0.0020	NA	NA	0.01	mg/L	0.545	1.53	0.0826	5.34
Sulfate (SO4)	0.30	500	NA	NA	mg/L	54.2	18.1	10.4	45.1
Dissolved Metals (Water)									
Aluminum (Al)-Dissolved	0.0050	0.1	NA	0.075	mg/L	0.0031	0.0022	0.0026	0.0022
Antimony (Sb)-Dissolved	0.00010	NA	0.006	0.02	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic (As)-Dissolved	0.00010	NA	0.010	0.1	mg/L	0.00011	0.00016	0.00052	0.00406
Barium (Ba)-Dissolved	0.00010	NA	1.0	NA	mg/L	0.0693	0.0327	0.03530	0.129
Beryllium (Be)-Dissolved	0.00010	NA	NA	0.011	mg/L	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)-Dissolved	0.000050	NA	NA	NA	mg/L	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved	0.010	NA	5.0	NA	mg/L	0.016	0.016	0.013	0.01
Cadmium (Cd)-Dissolved	0.000005	NA	0.005	0.0002	mg/L	0.0000221	0.0000123	0.0000062	<0.0000050
Calcium (Ca)-Dissolved	0.050	NA	NA	NA	mg/L	186	97.4	87.8	69.6
Cesium-Dissolved	0.000	NA	NA	NA	mg/L	<0.000010	<0.000010	<0.000010	<0.000010
Chromium (Cr)-Dissolved	0.00050	NA	0.05	NA	mg/L	0.00066	0.00052	<0.00050	<0.00050
Cobalt (Co)-Dissolved	0.00010	NA	NA	0.0009	mg/L	0.00096	0.00016	0.00167	0.0002
Copper (Cu)-Dissolved	0.00020	1	NA	0.005	mg/L	0.00217	0.00149	0.00086	0.00062
Iron (Fe)-Dissolved	0.010	0.3	NA	0.3	mg/L	0.027	0.011	0.122	0.416
Lead (Pb)-Dissolved	0.00005	NA	0.01	0.025	mg/L	<0.000050	<0.000050	<0.000050	<0.000050
Lithium-Dissolved	0.00100	NA	NA	NA	mg/L	0.0015	0.0011	<0.0010	0.0036
Magnesium (Mg)-Dissolved	0.005	NA	NA	NA	mg/L	47.4	23.4	22.7	28.4
Manganese (Mn)-Dissolved	0.00050	0.05	NA	NA	mg/L	0.0232	0.00252	1.20	0.0497
Molybdenum (Mo)-Dissolved	0.000050	NA	NA	0.04	mg/L	0.00049	0.000242	0.000816	0.000543
Nickel (Ni)-Dissolved	0.00050	NA	NA	0.025	mg/L	0.00538	0.00096	0.0008	<0.00050
Phosphorus (P)-Dissolved	0.050	NA	NA	0.01	mg/L	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	0.050	NA	NA	NA	mg/L	1.84	0.895	1.45	1.11
Rubidium-Dissolved	0.000	NA	NA	NA	mg/L	0.00118	0.00029	0.00092	0.00058
Selenium (Se)-Dissolved	0.000050	NA	0.05	0.10	mg/L	0.000156	0.000367	0.000068	<0.000050
Silicon (Si)-Dissolved	0.050	NA	NA	NA	mg/L	6.08	4.95	4.28	9.76
Silver (Ag)-Dissolved	0.000050	NA	NA	0.0001	mg/L	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	0.50	200	20	NA	mg/L	**39.1**	12.7	12.1	5.12
Strontium (Sr)-Dissolved	0.010	NA	NA	NA	mg/L	0.275	0.132	0.144	0.142
Sulfur-Dissolved	0.500	NA	NA	NA	mg/L	19.70	6.74	4.24	15.5
Tellurium-Dissolved	0.000	NA	NA	NA	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Dissolved	0.000010	NA	NA	0.0003	mg/L	0.000016	<0.000010	<0.000010	<0.000010
Thorium-Dissolved	0.000100	NA	NA	NA	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Dissolved	0.00010	NA	NA	NA	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	0.00030	NA	NA	NA	mg/L	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten (W)-Dissolved	0.00010	NA	NA	0.03	mg/L	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Dissolved	0.000010	NA	0.02	0.005	mg/L	0.000328	0.000263	0.00109	0.000292
Vanadium (V)-Dissolved	0.00050	NA	NA	0.006	mg/L	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Dissolved	0.0010	5	NA	0.03	mg/L	0.0124	0.0054	0.004	0.0024
Zirconium (Zr)-Dissolved	0.00030	NA	NA	0.004	mg/L	<0.00030	<0.00030	<0.00030	<0.00030

ODWS Guidelines	Ontario Drinking Water Standards - Aesthetic and Operational Guidelines
ODWS Standards	Ontario Drinking Water Standards - Schedule 1 (Microbiological) and 2 Chemical Standards (Jan.2018)
PWQO	Provincial Water Quality Objectives (Hardness > 100 mg/L)
RED	Exceeds ODWS Guidelines
BOLD	Exceeds ODWS Standards
	Exceeds PWQO

Table 4: Surface Water Analytical Results

Sample ID				MP101-24	MP102-24	POND
Date Sampled				14-Aug-2024	14-Aug-2024	14-Aug-2024
Time Sampled				10:00	10:40	10:05
ALS Sample ID				WT2423402-001	WT2423402-002	WT2423402-003
Parameter	Lowest Detection Limit	PWQO	Units			
Physical Tests (Water)						
Colour, Apparent	2.0	NA	CU	16900	164000	140
Conductivity	3.0	NA	umhos/cm	1070	1740	658
Hardness (as CaCO3)	0.50	NA	mg/L	399	410	206
pH	0.10	6.5-8.5	pH units	7.78	7.35	7.71
Total Dissolved Solids	20	NA	mg/L	657	1250	379
Turbidity	0.10	NA	NTU	>4000	>4000	19.8
Anions and Nutrients (Water)						
Alkalinity, Total (as CaCO3)	10	NA	mg/L	524	8400	165
Ammonia, Total (as N)	0.010	NA	mg/L	1.42	0.311	1.78
Chloride (Cl)	0.50	NA	mg/L	169	443	105
Fluoride (F)	0.020	NA	mg/L	0.101	0.122	0.052
Nitrate (as N)	0.020	NA	mg/L	<0.100	<0.100	<0.020
Nitrite (as N)	0.010	NA	mg/L	<0.050	<0.050	0.01
Orthophosphate-Dissolved (as P)	0.0030	NA	mg/L	0.0011	0.0038	0.0241
Phosphorus, Total	0.0020	0.01	mg/L	5.90	62.2	1.20
Sulfate (SO4)	0.30	NA	mg/L	14.10	18.3	0.72
Total Metals (Water)						
Aluminum (Al)-Total	0.0030	0.075	mg/L	409	2430	0.39
Antimony (Sb)-Total	0.00010	0.020	mg/L	<0.020	0.025	<0.0010
Arsenic (As)-Total	0.00010	0.100	mg/L	0.027	0.532	0.00142
Barium (Ba)-Total	0.00010	NA	mg/L	0.570	10.0	0.0362
Beryllium (Be)-Total	0.00002	0.011	mg/L	<0.020	0.103	<0.000200
Bismuth (Bi)-Total	0.000050	NA	mg/L	<0.010	0.016	<0.000500
Boron (B)-Total	0.010	NA	mg/L	<2.0	3.0	<0.100
Cadmium (Cd)-Total	0.000005	0.0002	mg/L	0.0047	0.0352	<0.000050
Calcium (Ca)-Total	0.050	NA	mg/L	250	40800	50.5
Cesium-Total	0.00001	NA	mg/L	-	-	<0.00010
Chromium (Cr)-Total	0.00050	NA	mg/L	1.78	10.4	<0.00500
Cobalt (Co)-Total	0.00010	0.0009	mg/L	<0.10	1.36	<0.00100
Copper (Cu)-Total	0.00050	0.005	mg/L	1.17	4.17	<0.0050
Iron (Fe)-Total	0.010	0.3	mg/L	75	4580	3.35
Lead (Pb)-Total	0.00005	0.025	mg/L	0.112	2.15	0.00101
Lithium-Total	0.0010	NA	mg/L	<0.20	2.31	<0.010
Magnesium (Mg)-Total	0.005	NA	mg/L	73	15600	19.3
Manganese (Mn)-Total	0.00010	NA	mg/L	1.75	167	0.324
Molybdenum (Mo)-Total	0.000050	0.04	mg/L	0.038	0.230	<0.00050
Nickel (Ni)-Total	0.00050	0.025	mg/L	0.6	5.76	<0.00500
Phosphorus (P)-Total	0.050	0.010	mg/L	<10	240	3.4
Potassium (K)-Total	0.050	NA	mg/L	18	360	4.8
Rubidium-Total	0.00020	NA	mg/L	-	-	0.00647
Selenium (Se)-Total	0.000050	0.10	mg/L	<0.010	0.016	<0.00050
Silicon (Si)-Total	0.100	NA	mg/L	-	-	1.91
Silver (Ag)-Total	0.000010	0.0001	mg/L	<0.010	<0.010	<0.00010
Sodium (Na)-Total	0.05	NA	mg/L	75	384	60.1
Strontium (Sr)-Total	0.00020	NA	mg/L	0.368	41.1	0.0912
Sulfur-Total	0.50	NA	mg/L	<100	<100	<5.00
Tellurium-Total	0.00020	NA	mg/L	-	-	<0.0020
Thallium (Tl)-Total	0.000010	0.0003	mg/L	0.0026	0.0155	<0.00010

Table 4: Surface Water Analytical Results

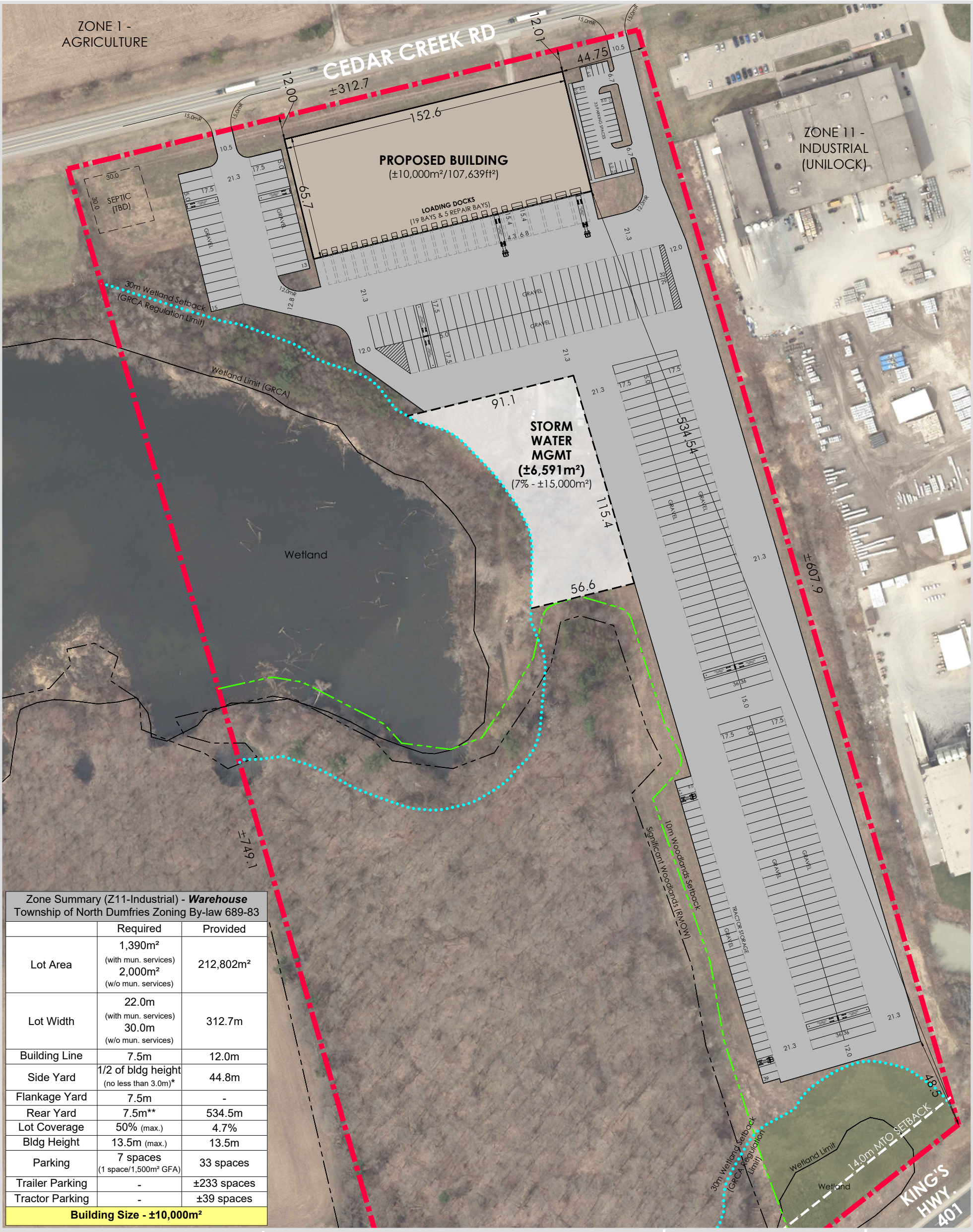
Sample ID				MP101-24	MP102-24	POND
Date Sampled				14-Aug-2024	14-Aug-2024	14-Aug-2024
Time Sampled				10:00	10:40	10:05
ALS Sample ID				WT2423402-001	WT2423402-002	WT2423402-003
Thorium-Total	0.000100	NA	mg/L	-	-	<0.0010
Tin (Sn)-Total	0.00010	NA	mg/L	0.026	0.098	<0.0010
Titanium (Ti)-Total	0.00030	NA	mg/L	2.16	101	0.0123
Tungsten (W)-Total	0.00010	0.03	mg/L	<0.18	<0.18	<0.0010
Uranium (U)-Total	0.000010	0.005	mg/L	0.0377	0.147	0.000138
Vanadium (V)-Total	0.00050	0.006	mg/L	0.21	7.23	<0.0050
Zinc (Zn)-Total	0.0030	0.03	mg/L	77.3	134	<0.030
Zirconium (Zr)-Total	0.00020	0.004	mg/L	0.1	2.54	<0.0020
Dissolved Metals (Water)						
Aluminum (Al)-Dissolved	0.0050	0.075	mg/L	0.0075	<0.010	-
Antimony (Sb)-Dissolved	0.00010	0.020	mg/L	0.0004	<0.0010	-
Arsenic (As)-Dissolved	0.00010	0.100	mg/L	0.00053	<0.0010	-
Barium (Ba)-Dissolved	0.00010	NA	mg/L	0.0449	0.108	-
Beryllium (Be)-Dissolved	0.00010	0.011	mg/L	<0.000020	<0.00020	-
Bismuth (Bi)-Dissolved	0.000050	NA	mg/L	<0.000050	<0.00050	-
Boron (B)-Dissolved	0.010	NA	mg/L	0.33	0.446	-
Cadmium (Cd)-Dissolved	0.000005	0.0002	mg/L	0.000008	0.0000655	-
Calcium (Ca)-Dissolved	0.050	NA	mg/L	99.7	120	-
Cesium-Dissolved	0.000	NA	mg/L	<0.000010	<0.00010	-
Chromium (Cr)-Dissolved	0.00050	NA	mg/L	<0.00050	<0.0050	-
Cobalt (Co)-Dissolved	0.00010	0.0009	mg/L	0.0004	0.00409	-
Copper (Cu)-Dissolved	0.00020	0.005	mg/L	0.00937	<0.00200	-
Iron (Fe)-Dissolved	0.010	0.3	mg/L	0.634	<0.10	-
Lead (Pb)-Dissolved	0.00005	0.025	mg/L	0.00009	<0.00050	-
Lithium-Dissolved	0.00100	NA	mg/L	0.001	<0.010	-
Magnesium (Mg)-Dissolved	0.005	NA	mg/L	36.4	26.8	-
Manganese (Mn)-Dissolved	0.00050	NA	mg/L	0.214	3.04	-
Molybdenum (Mo)-Dissolved	0.000050	0.04	mg/L	0.00145	0.00185	-
Nickel (Ni)-Dissolved	0.00050	0.025	mg/L	0.00477	0.00801	-
Phosphorus (P)-Dissolved	0.050	0.010	mg/L	<0.050	<0.50	-
Potassium (K)-Dissolved	0.050	NA	mg/L	4.84	2.81	-
Rubidium-Dissolved	0.00020	NA	mg/L	0.00124	<0.00200	-
Selenium (Se)-Dissolved	0.000050	0.10	mg/L	<0.000050	<0.00050	-
Silicon (Si)-Dissolved	0.050	NA	mg/L	5.13	4.44	-
Silver (Ag)-Dissolved	0.000050	0.0001	mg/L	<0.000010	<0.00010	-
Sodium (Na)-Dissolved	0.50	NA	mg/L	67.8	308	-
Strontium (Sr)-Dissolved	0.010	NA	mg/L	0.158	0.233	-
Sulfur-Dissolved	0.500	NA	mg/L	5.49	10.7	-
Tellurium-Dissolved	0.0002	NA	mg/L	<0.00020	<0.0020	-
Thallium (Tl)-Dissolved	0.000010	0.0003	mg/L	0.000015	<0.00010	-
Thorium-Dissolved	0.000100	NA	mg/L	<0.00010	<0.0010	-
Tin (Sn)-Dissolved	0.00010	NA	mg/L	<0.00010	<0.0010	-
Titanium (Ti)-Dissolved	0.00030	NA	mg/L	<0.00040	<0.0030	-
Tungsten (W)-Dissolved	0.00010	0.03	mg/L	0.00026	<0.0010	-
Uranium (U)-Dissolved	0.000010	0.005	mg/L	0.000168	0.000266	-
Vanadium (V)-Dissolved	0.00050	0.006	mg/L	<0.00050	<0.0050	-
Zinc (Zn)-Dissolved	0.0010	0.03	mg/L	2.94	2.65	-
Zirconium (Zr)-Dissolved	0.00030	0.004	mg/L	<0.00020	<0.0020	-

PWQO Provincial Water Quality Objectives (Hardness > 100 mg/L)

Exceeds PWQO

Appendix A

Site Concept Plan



Zone Summary (Z11-Industrial) - ***Warehouse*** Township of North Dumfries Zoning By-law 689-83		
	Required	Provided
Lot Area	1,390m² (with mun. services) 2,000m² (w/o mun. services)	212,802m²
Lot Width	22.0m (with mun. services) 30.0m (w/o mun. services)	312.7m
Building Line	7.5m	12.0m
Side Yard	1/2 of bldg height (no less than 3.0m)*	44.8m
Flankage Yard	7.5m	-
Rear Yard	7.5m**	534.5m
Lot Coverage	50% (max.)	4.7%
Bldg Height	13.5m (max.)	13.5m
Parking	7 spaces (1 space/1,500m² GFA)	33 spaces
Trailer Parking	-	±233 spaces
Tractor Parking	-	±39 spaces
Building Size - ±10,000m²		

Concept Plan

FOR DISCUSSION PURPOSES ONLY

3027 Cedar Creek Rd
Township of North Dumfries

LEGEND

- Subject Lands (±21.3ha)
- Wetland Limit
- 30m Wetland Setback
- Significant Woodlands
- 10m Woodlands Setback

* Side Yard - On any yard that abuts a Zone 2, 2a, 3, 4, 4a or 5, the min. side yard shall be 7.5m

** Rear Yard -
a) Where abuts a railway or right-of-way and/or an Ontario Hydro right-of-way, no rear yard is required.
b) In any case where a side or rear yard abuts a Zone 2, 2a, 3, 4, 4a or 5, no bldg, structure, outdoor storage or parking area shall be permitted within 4.5m of the side or rear lot lines

Sources:
Aerial - Region of Waterloo (2022)
Wetland - GRCA (Mar. 27, 2024)
Significant Woodlands - Region of Waterloo (May 23, 2023)

Date: November 2024

Scale: 1:2,000

File: 2467A

Drawn: CAC

north

K:\2467A-3027 Cedar Creek Rd-Ayr\CP\ConceptPlan_8Nov2024.dwg

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON, N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Appendix B

Borehole Logs

ID No.: BH101-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/23/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
0 / 0	Ground Surface	316.7					
	FILL (TOPSOIL) dark brown sandy silt, moist (230mm)	0.0	1	SS	5		6
2 /	**SAND** loose brown sand, trace to some silt, trace gravel, moist	315.9 / 0.8	2	SS	11		5
4 /	compact		3	SS	12		21
6 / 2	wet silty sand seam	314.9 / 1.8					3
8 /	**GRAVELLY SAND** compact gravelly sand, some silt, with cobbles, damp to moist	314.4 / 2.3	4	SS	26		8
10 /			5	SS	25		6
12 / 4		312.9	6	SS	28		18
14 /	**SAND** compact to dense brown sand, trace to some gravel, trace silt, damp to moist	3.8	7	SS	25		6
16 /							
18 /							
20 / 6			8	SS	30		5
22 /	Drilling Terminated	310.1 / 6.6					
24 /							
26 / 8							

Groundwater Observations and Standpipe Details: Cuttings; Bentonite; Dry Cave

Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID No.: BH102-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/23/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone – Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	316.1						
		FILL (TOPSOIL) dark brown sandy silt, moist (130mm)	0.0	1	SS	6		10	
2 /		**SAND** loose brown sand, trace silt and gravel, moist	315.3						
		SILT AND SAND compact to dense brown silt and sand, some gravel, with cobbles, moist	0.8	2	SS	21		11	
4 /				3	SS	30		13	
6 / 2			313.8						
8 /		**SILTY SAND** compact brown silty sand, trace gravel, moist	2.3	4	SS	21		11	
			313.1						
10 /		**SAND** compact to dense brown sand, trace to some gravel, trace silt, damp	3.0	5	SS	26		4	
12 /				6	SS	24		4	
14 / 4				7	SS	21		3	
16 /				8	SS	41			
18 /			309.5						
20 / 6		Drilling Terminated	6.6						
22 /									
24 /									
26 / 8									

Cuttings

Bentonite

Dry Cave

Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

ID No.: MW103-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

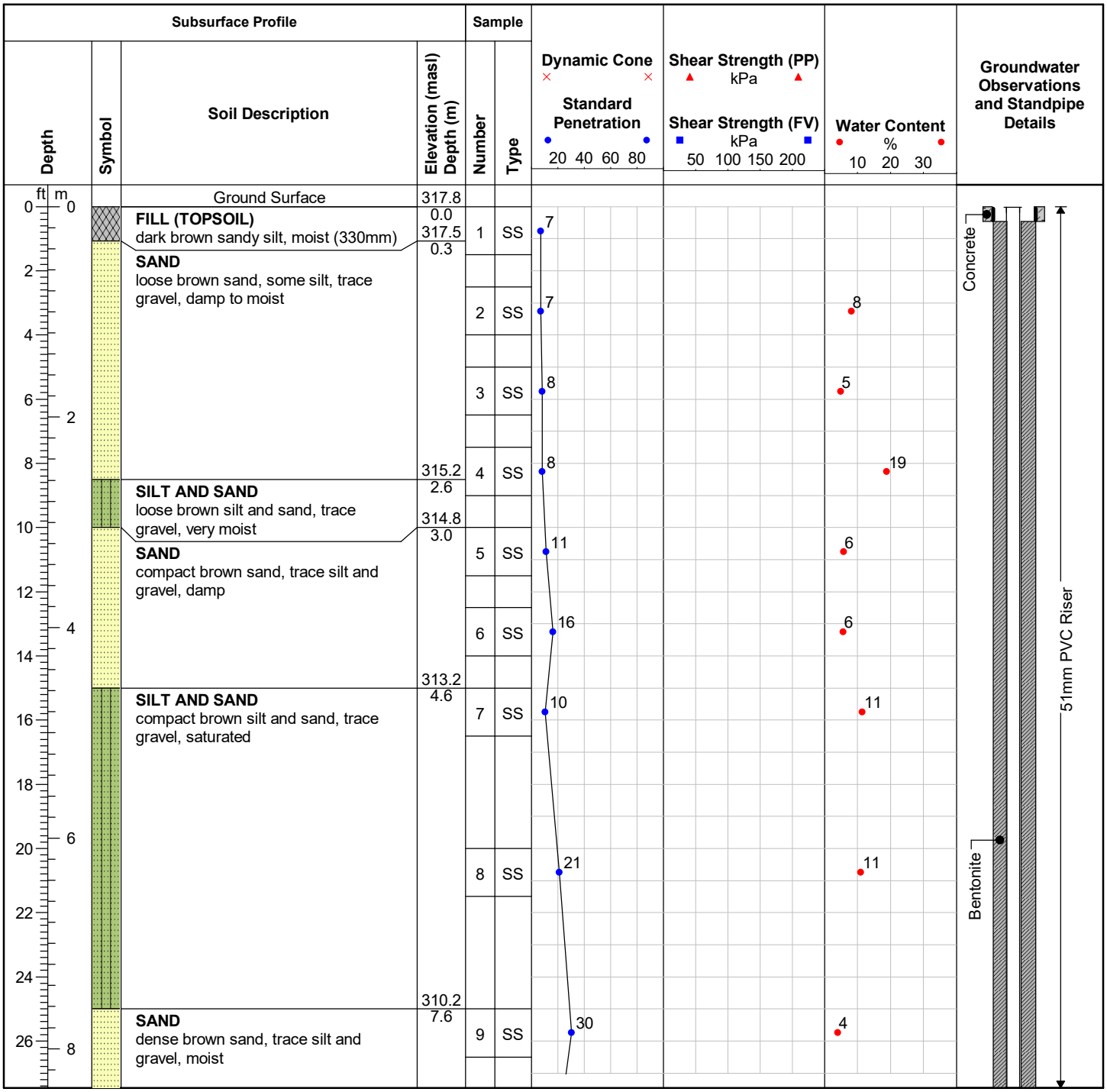
Date Completed: 7/23/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing



Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

Sheet: 1 of 2

Notes:
Water encountered at 4.6 and 9.1mbgs (Elevation 313.2 and 308.6masl) during drilling.
Water measured at 10.4mbgs (Elevation

ID No.: MW103-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

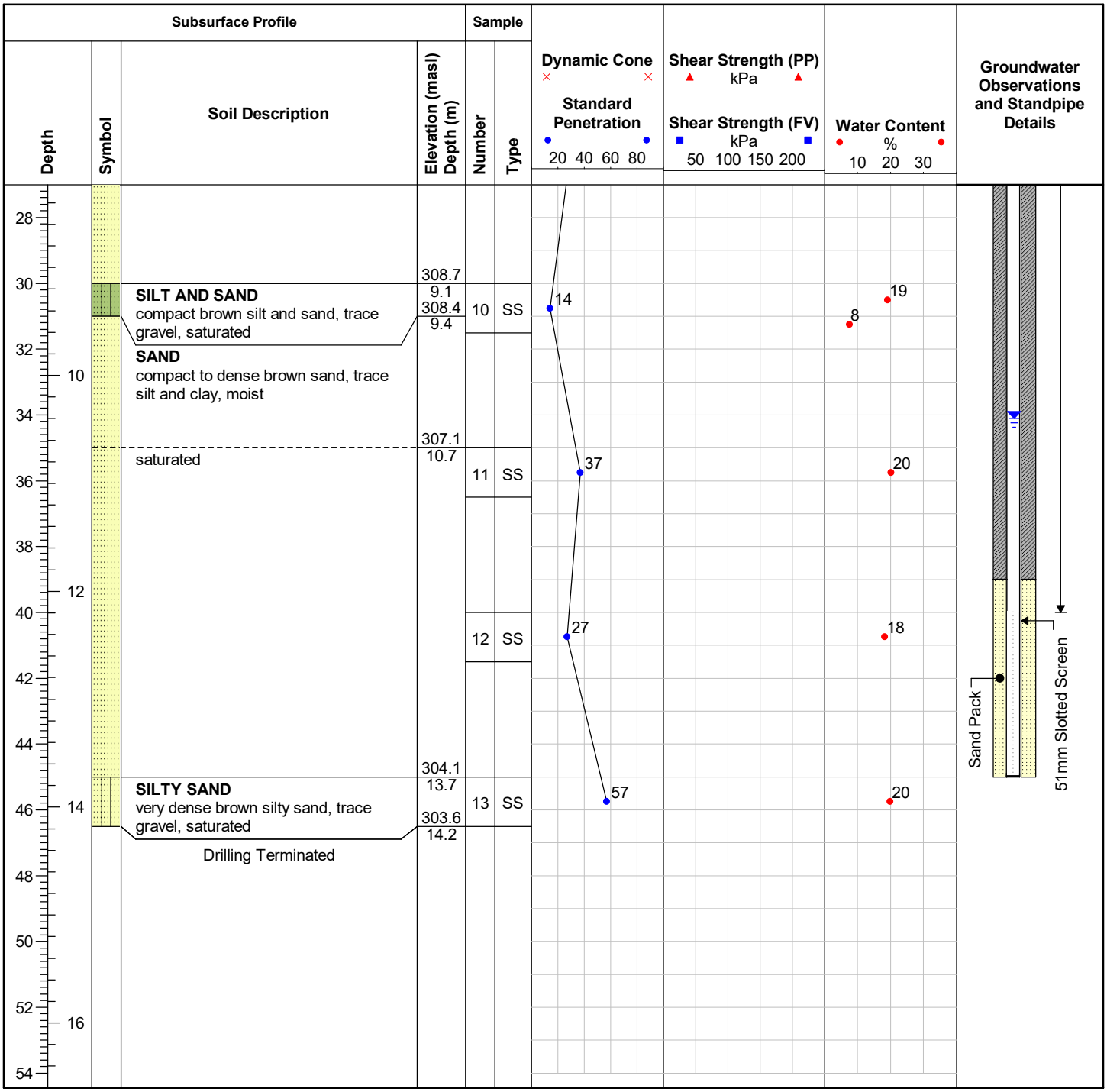
Date Completed: 7/23/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing



Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

Sheet: 2 of 2

Notes:
Water encountered at 4.6 and 9.1mbgs (Elevation 313.2 and 308.6masl) during drilling.
Water measured at 10.4mbgs (Elevation

ID No.: BH104-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

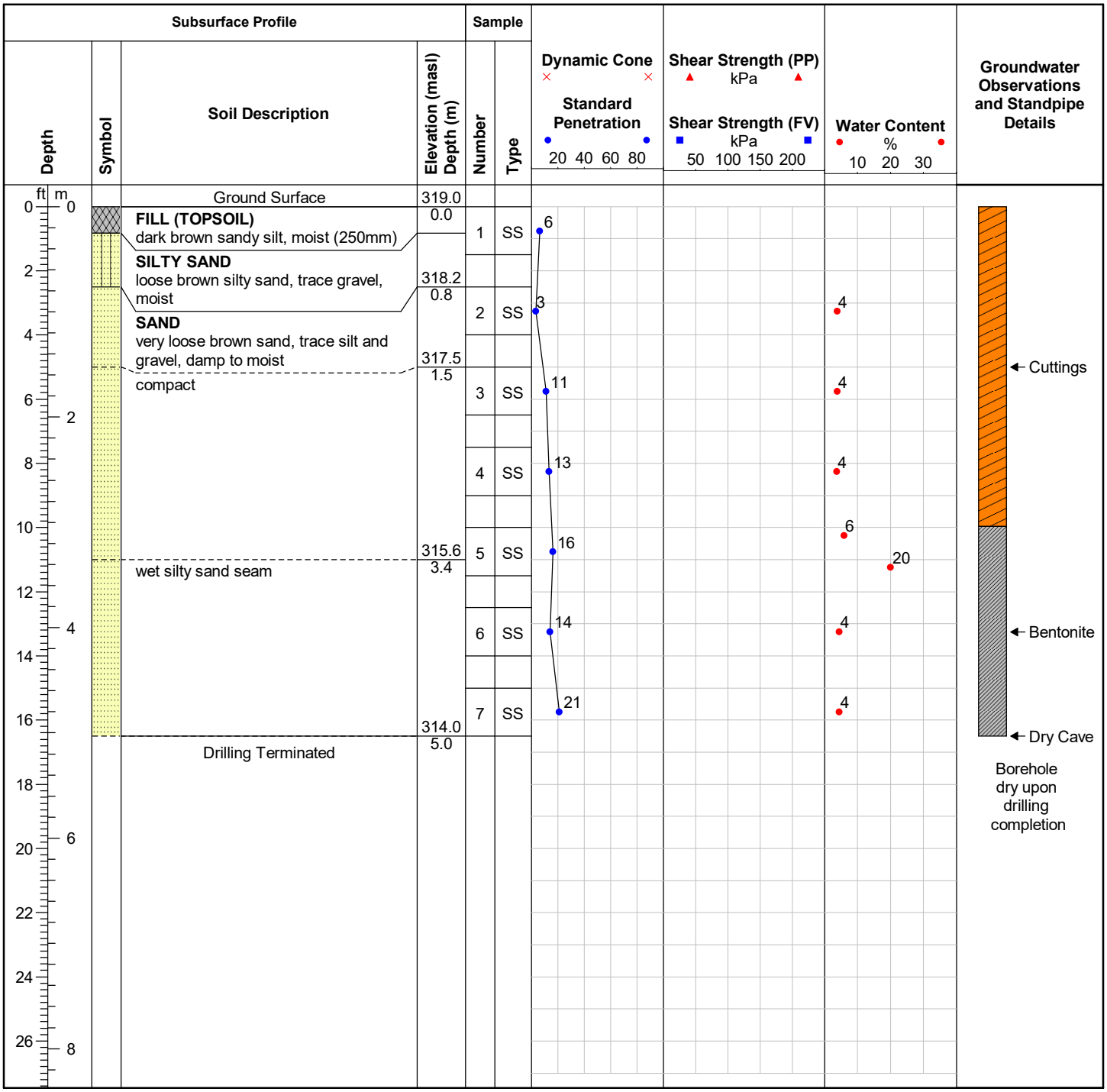
Date Completed: 7/23/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A



Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID No.: BH105-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/22/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0	Ground Surface	317.3		
	FILL (TOPSOIL) dark brown sandy silt, moist (360mm)	0.0 / 316.9	1	SS
	FILL loose brown silty sand, trace gravel, moist	0.4 / 316.4	2	SS
	SAND loose brown sand, trace silt and gravel, moist	0.9 / 315.8	3	SS
	SILTY SAND loose brown silty sand, trace gravel, very moist	1.5 / 315.5	4	SS
	SAND loose brown sand, trace to some silt and gravel, moist to wet	1.8 / 314.3	5	SS
	compact to dense	3.0	6	SS
			7	SS
	Drilling Terminated	312.3 / 5.0		

Dynamic Cone – Standard Penetration: 5, 4, 5, 9, 13, 26, 34

Shear Strength (PP) kPa / Shear Strength (FV) kPa

Water Content %: 13, 8, 21, 8, 6, 5, 12, 7, 11

Groundwater Observations and Standpipe Details: Cuttings; Bentonite; Dry Cave

Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

ID No.: BH106-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/25/2024

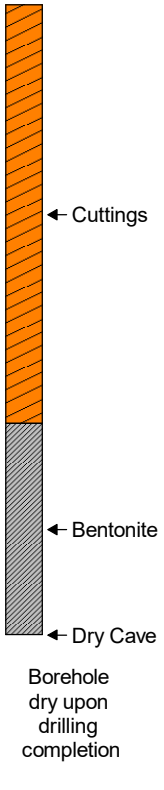
Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	319.0						
		TOPSOIL (FILL) dark brown sandy silt, moist (250mm)	0.0	1	SS	5			
2 /		**FILL** loose to very loose brown silty sand, trace gravel, with topsoil, moist		2	SS	2		12	
4 /			317.5						
		SAND compact brown sand, trace silt and gravel, moist	1.5	3	SS	13		5	
6 / 2				4	SS	11		6	
8 /									
10 /				5	SS	16		4	
12 /			315.0						
		wet sand and silt seam	4.0	6	SS	16		8	
14 / 4			314.4					17	
		SILTY SAND compact brown silty sand, trace gravel, wet	4.6	7	SS	19		19	
16 /			314.0					2	
		SAND compact brown sand, trace silt and gravel, damp	5.0						
18 /		Drilling Terminated							
20 / 6									
22 /									
24 /									
26 / 8									



Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID No.: BH107-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/24/2024

Drilling Contractor: London Soil Test Ltd.

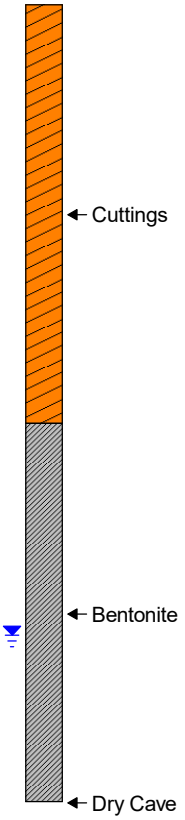
Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone – Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
0 / 0	Ground Surface	318.6					
	FILL (TOPSOIL) dark brown sandy silt, moist (410mm)	0.0 / 318.2	1	SS	4		
2 /	**SILTY SAND** loose brown silty sand, trace gravel, moist	0.4 / 317.8					
	SAND very loose brown sand, trace silt and gravel, damp	0.8	2	SS	3		3
4 /			3	SS	3		5
6 / 2							
8 /	compact	316.3 / 2.3	4	SS	13		3
10 /			5	SS	24		3
12 /		314.8					
4 /	with cobbles	3.8	6	SS	18		3
14 /		314.0					
	SILT AND SAND compact brown silt and sand, saturated	4.6	7	SS	15		6 / 20
16 /	**SAND** compact brown sand, trace silt and gravel, damp to moist						
18 /							
20 / 6			8	SS	23		8
22 /	Drilling Terminated	312.0 / 6.6					
24 /							
26 / 8							

Groundwater Observations and Standpipe Details



Water encountered at 4.6mbgs during drilling

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID No.: BH108-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/24/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone – Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	317.9						
		FILL (TOPSOIL) dark brown sandy silt, moist (250mm)	0.0	1	SS	5		9	
2 /		**SAND** loose brown sand, trace to some silt, trace gravel, moist	317.1						
		compact	0.8	2	SS	10		3	
4 /									
6 / 2				3	SS	15		6	
8 /				4	SS	13		5	
10 /									
12 /				5	SS	16		4	
		SILT AND SAND compact brown silt and sand, some gravel, with cobbles, moist to wet	313.8 4.1	6	SS	19		11	
14 / 4			313.2					11	
16 /		**SAND** compact brown sand, trace to some silt and gravel, moist	4.7	7	SS	17		8	
18 /									
20 / 6				8	SS	39		6	
22 /		Drilling Terminated	311.3 6.6						
24 /									
26 / 8									

Cuttings

Bentonite

Dry Cave

Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

ID No.: BH109-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/25/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	317.7						
		FILL (TOPSOIL) dark brown sandy silt, moist (150mm)	0.0	1	SS	6			
		SAND loose brown sand, trace silt and clay, damp to moist	316.9						
2		compact	0.8	2	SS	11		4	
4				3	SS	11		4	
6 / 2			315.4						
8		loose	2.3	4	SS	6		5	
10		compact	314.7 3.0	5	SS	17		6	
12									
14 / 4		**SAND AND SILT** compact brown sand and silt, trace gravel, with cobbles, moist to very moist	313.6 4.1	6	SS	14		7 5	
16				7	SS	18		11	
18									
20 / 6			311.6						
		SAND compact brown sand, trace to some graveel, trace silt, damp	6.1 311.1	8	SS	29		2	
22		Drilling Terminated	6.6						
24									
26 / 8									

Groundwater Observations and Standpipe Details: Cuttings; Bentonite; Dry Cave

Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

ID No.: MW110-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/24/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
	Ground Surface	314.7					
0 / 0	**FILL (TOPSOIL)** dark brown sandy silt, moist	0.0	1	SS	6		
2 / 0.8	**SAND** loose brown sand, some silt, trace clay, moist	313.9	2	SS	10		4
4	compact		3	SS	12		7
6 / 2			4	SS	11		10
8			5	SS	11		16
10							
12 / 4	with cobbles	310.9 / 3.8	6	SS	26		7
14		310.1					
16 / 4.6	**SANDY SILT TILL** compact brown sandy silt, trace clay and gravel, moist		7	SS	25		12
18							
20 / 6		308.6					
20 / 6.1	**SAND** compact brown sand, trace silt, clay, and gravel, damp		8	SS	22		5
22							
24		307.1					
26 / 8	grey/brown, saturated	7.6	9	SS	11		14

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 51mm PVC Riser

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

Sheet: 1 of 2

Notes:
Water encountered at 7.6mbgs (Elevation 307.1masl) during drilling.
Water measured at 7.6mbgs (Elevation 307.1masl) on July 31, 2024.

ID No.: MW110-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/24/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
10				10	SS	10		18	Sand Pack; 51mm Slotted Screen
				11	SS	10		22	
			303.6 / 11.1						
		Drilling Terminated							

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

Sheet: 2 of 2

Notes:
Water encountered at 7.6mbgs (Elevation 307.1masl) during drilling.
Water measured at 7.6mbgs (Elevation 307.1masl) on July 31, 2024.

ID No.: BH111-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/24/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	317.1						
		FILL (TOPSOIL) dark brown sandy silt, moist (280mm)	0.0	1	SS	6			
		SAND loose brown sand, some silt, trace gravel, moist	316.3 / 0.8	2	SS	11		15	
		SILTY SAND very loose brown silty sand, trace gravel, moist	315.6 / 1.5	3	SS	11		8	
		GRAVELLY SAND compact brown gravelly sand, some silt, with cobbles, moist		4	SS	6		4	
			313.9 / 3.2	5	SS	17		4 5	
		SAND compact brown sand, trace to some silt, trace gravel, moist		6	SS	14		12 15	
		SILTY SAND compact brown silty sand, trace gravel, wet	313.0 / 4.1						
		Drilling Terminated							

Bentonite

Dry Cave

Borehole dry upon drilling completion

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

ID No.: BH112-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/22/2024

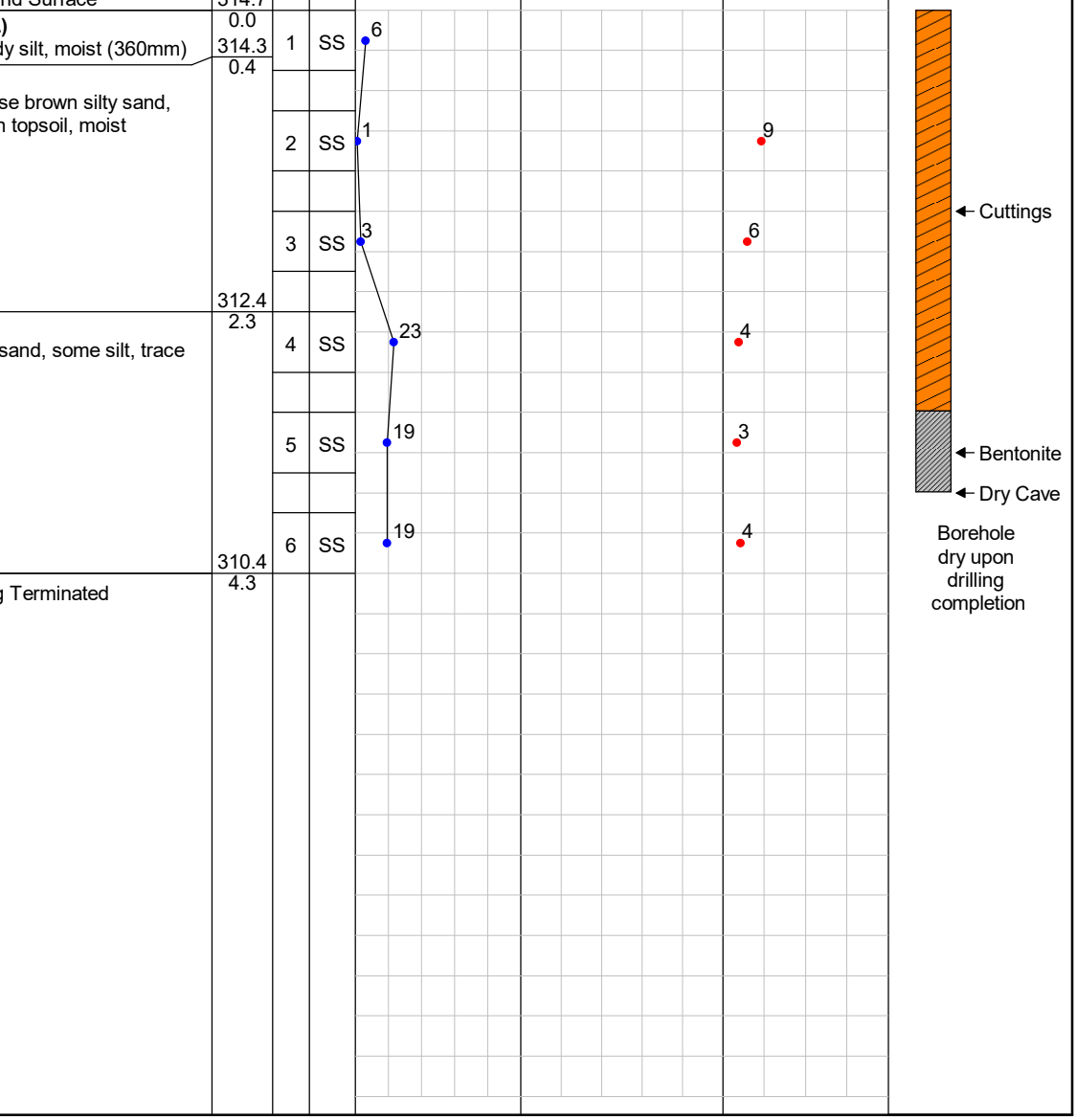
Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
0 / 0		Ground Surface	314.7		
0 / 0		**FILL (TOPSOIL)** dark brown sandy silt, moist (360mm)	0.0 314.3	1	SS
2 / 0		**FILL** loose to very loose brown silty sand, trace gravel, with topsoil, moist	0.4	2	SS
4 / 0				3	SS
6 / 2			312.4		
8 / 2		**SAND** compact brown sand, some silt, trace gravel, moist	2.3	4	SS
10 / 2				5	SS
12 / 4				6	SS
14 / 4			310.4		
14 / 4		Drilling Terminated	4.3		
16 / 4					
18 / 4					
20 / 6					
22 / 6					
24 / 6					
26 / 8					



Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID No.: MW113-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/24/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
0 / 0	Ground Surface	309.6					
	FILL (TOPSOIL) dark brown sandy silt, some gravel, moist (150mm)	0.0	1	SS	18		
2	**SILT AND SAND** compact brown silt and sand, some gravel, moist to wet	308.8 / 0.8	2	SS	4		15
4	loose to very loose, brown/grey, with peat						
6 / 2	saturated	307.8 / 1.8	3	SS	1		20, 21
8			4	SS	8		35, >40
10 / 3	**SILTY SAND** compact grey silty sand, trace to some gravel, saturated	306.6 / 3.0	5	SS	10		18
12 / 4			6	SS	7		11, 17
14	**SAND** loose grey sand, trace silt and gravel, saturated	305.5 / 4.1					
	SILTY SAND compact brown/grey silty sand, some gravel, with cobbles, saturated	305.0 / 4.6	7	SS	14		12
18 / 6							
20	**SAND** compact brown sand, trace silt, gravel, and clay, saturated	303.5 / 6.1	8	SS	10		21
22							
24							
26 / 8		301.5	9	SS	18		19
	Drilling Terminated	8.1					

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 51mm PVC Riser; Sand Pack; 51mm Slotted Screen

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

Sheet: 1 of 1

Notes:
Water encountered at 1.8mbgs (Elevation 307.8masl) during drilling.
Water measured at 6.1mbgs (Elevation 303.4masl) on July 31, 2024.

ID No.: BH114-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/22/2024

Drilling Contractor: London Soil Test Ltd.

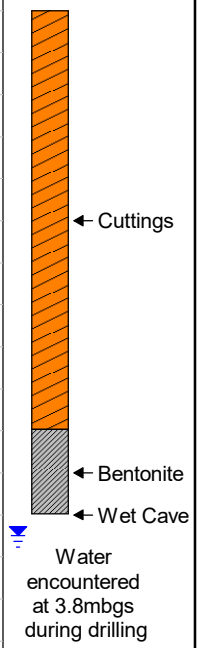
Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Standard Penetration (Dynamic Cone)	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %
0 / 0	Ground Surface	314.3					
	FILL (TOPSOIL) dark brown sandy silt, moist (300mm)	0.0	1	SS	9		
2 /	**SILTY SAND** loose brown silty sand, some grave, with cobbles, moist	313.5					
	GRAVELLY SAND compact to dense brown gravelly sand, some silt, with cobbles, damp	0.8	2	SS	27		3
4 /							
6 / 2			3	SS	31		3
		312.0					
8 /	**SILT AND SAND** loose brown silt and sand, trace gravel, wet	2.3	4	SS	8		18
10 /		311.3					
	SAND compact brown sand, some silt, trace gravel, wet	3.0	5	SS	18		19
12 /		310.5					
	saturated	3.8	6	SS	15		18
14 / 4		310.0					
	Drilling Terminated	4.3					
16 /							
18 /							
20 / 6							
22 /							
24 /							
26 / 8							

Groundwater Observations and Standpipe Details



Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

ID No.: MW115-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/22/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth (ft / m)	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone – Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
	Ground Surface	312.9						
0 / 0	**FILL (TOPSOIL)** dark brown sandy silt, moist (250mm)	0.0	1	SS	4		14	
2 / 0.6	**SILTY SAND** loose to very loose brown/red silty sand, trace to some gravel, very moist		2	SS	2		16	
4 / 1.2	saturated	311.8 / 1.1						
6 / 1.8	compact to dense	311.4 / 1.5	3	SS	11		18	
8 / 2.4			4	SS	12		17	
10 / 3.0			5	SS	18		20	
12 / 3.7			6	SS	18		19	
14 / 4.3			7	SS	34		19	
16 / 4.9			8	SS	22		19	
18 / 5.5			9	SS	20		19	
20 / 6.1								
22 / 6.7								
24 / 7.3								
26 / 7.9								

Groundwater Observations and Standpipe Details: Concrete; Bentonite; 51mm PVC Riser

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

Sheet: 1 of 2

Notes:
Water encountered at 1.1 and 12.2mbgs (Elevation 311.8 and 300.7masl) during drilling.
Water measured at 8.8mbgs (Elevation

ID No.: MW115-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

Date Completed: 7/22/2024

Drilling Contractor: London Soil Test Ltd.

Drill Rig: D50T Track Mounted

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration	Shear Strength (PP) kPa / Shear Strength (FV) kPa	Water Content %	Groundwater Observations and Standpipe Details
			303.8						
30		**SANDY SILT TILL** very stiff grey sandy silt, some clay, trace gravel, APL	9.1	10	SS	9		19	
32	10								
34			302.2						
36		**SILT AND CLAY TILL** very stiff grey silt and clay, some sand, trace gravel, APL	10.7	11	SS	9		29	
38									
40	12		300.7						
42		**SAND** compact grey sand, some silt, trace clay, saturated	12.2	12	SS	13		19	
44			299.2						
46	14	loose	13.7	13	SS	6		19	
48			298.7						
50		Drilling Terminated	14.2						
52	16								
54									

Sand Pack

51mm Slotted Screen

Field Technician: S. Landon

Drafted by: M. Bourque

Reviewed by: D. Gonser

MTE

Notes:
Water encountered at 1.1 and 12.2mbgs (Elevation 311.8 and 300.7masl) during drilling.
Water measured at 8.8mbgs (Elevation

ID No.: MP101-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

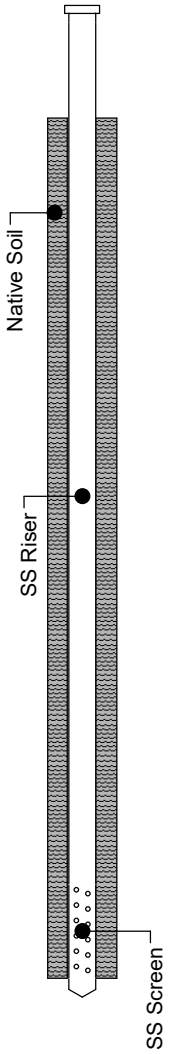
Site Location: Ayr, ON

Date Completed: 8/7/2024

Construction Materials: Stainless Steel

Installation Method: Post-pounder

Subsurface Profile				Soil Sample Lab Analysis	Piezometer
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) Depth (m)		
0 / 0		Ground Surface	0.0		
		SILTY SAND Dark grey silty sand, saturated	0.0		
4			-1.4		
		Excavation Terminated	1.4		
6 / 2					
8					
10					



Field Technician: T. Greer

Drafted by: T. Greer

Reviewed by:

Sheet: 1 of 1

UTM: 543462E 4797081N

Extent of sampler reached at 1.4 mbgs

ID No.: MP102-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

Site Location: Ayr, ON

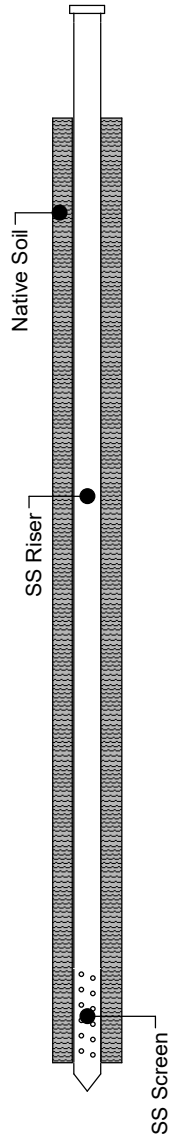
Date Completed: 8/7/2024

Construction Materials: Stainless Steel

Installation Method: Post-pounder

Subsurface Profile

Depth (ft)	Depth (m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Soil Sample Lab Analysis	Piezometer
0	0		Ground Surface	0.0		
			PEAT Black peat	0.0 -0.2		
			SILTY SAND Dark grey silty sand, moist	0.2 -0.3		
			Brown, saturated	0.3		
4			Excavation Terminated	-1.4 1.4		
2						
6						
	2					
8						
10						



Field Technician: T. Greer

Drafted by: T. Greer

Reviewed by:

MTE

Sheet: 1 of 1

UTM: 543642E 4796828N

Extent of sampler reached at 1.4 mbgs

ID No.: MP103-24

Project Name: 3027 Cedar Creek Road Civil Works

MTE File No.: 55566-100

Client: Royal Truck and Trailer Sales Ltd.

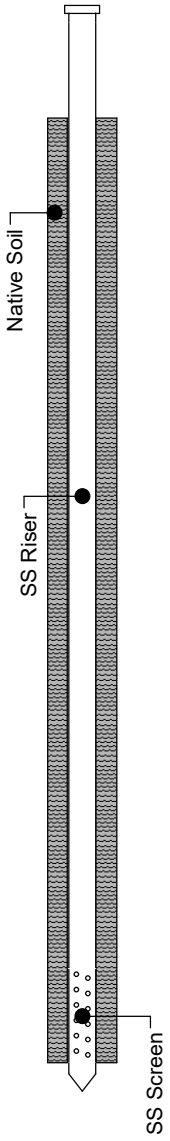
Site Location: Ayr, ON

Date Completed: 8/7/2024

Construction Materials: Stainless Steel

Installation Method: Post-pounder

Depth (ft)	Depth (m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Soil Sample Lab Analysis	Piezometer
0	0		Ground Surface	0.0		
0	0		**SILTY SAND** Dark grey silty sand, saturated	0.0		
				-1.4		
			Excavation Terminated	1.4		
2						
4						
6	2					
8						
10						



Field Technician: T. Greer

Drafted by: T. Greer

Reviewed by:

MTE

Sheet: 1 of 1

UTM: 543302E 4797260N

Extent of sampler reached at 1.4 mbgs

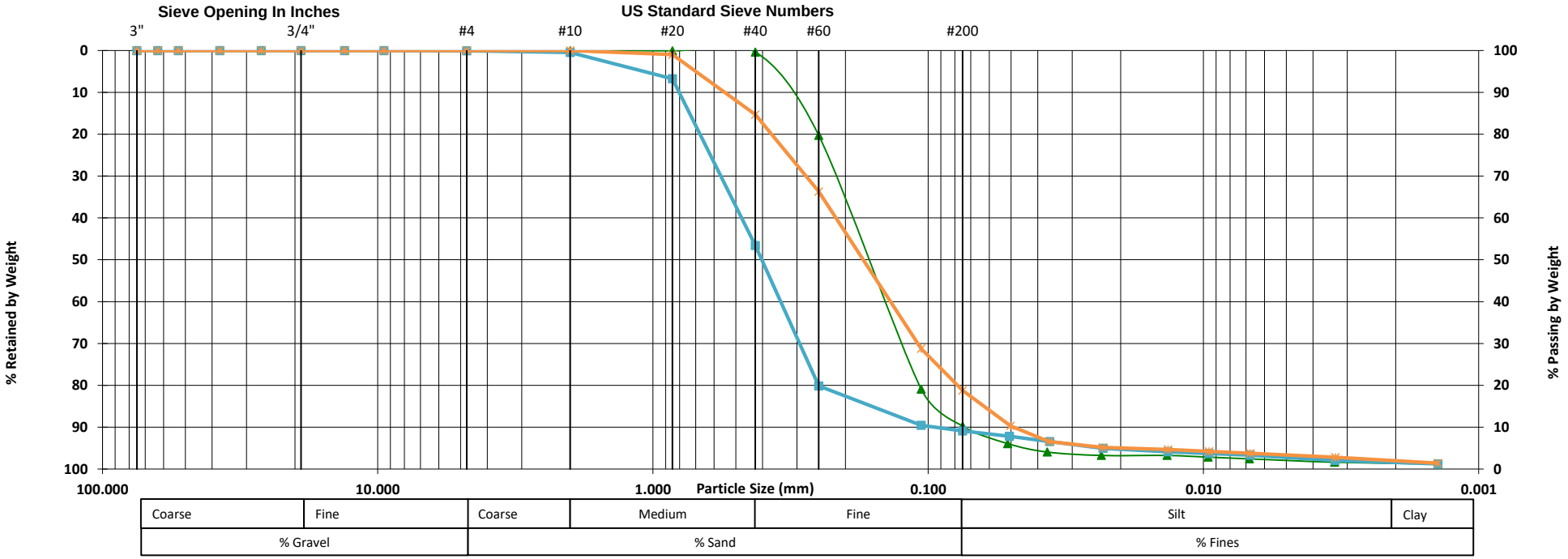
Appendix C

Particle Size Distribution

Particle Size Distribution Analysis Test Results

Project Name:	**Geotechnical Investigation**	**Date Sampled:**	**July 22-25, 2024**	**MTE File No.:**	**55566-100**
Client:	**Royal Truck and Trailer Sales Ltd.**	**Date Tested:**	**Aug. 7-9, 2024**	**Table No:**	**101**
Project Location:	**3027 Cedar Creek Road, Ayr, ON**				

Unified Soil Classification



Symbol	Borehole ID	Sample #	Sample Depth	Description
▲	MW103-24	SS-11	12.2-12.6 mbgs	SAND, trace Silt and Clay
■	BH109-24	SS-4	3.0-3.5 mbgs	SAND, trace Silt and Clay
✳	MW110-24	SS-2	1.5-2.0 mbgs	SAND, some Silt, trace Clay

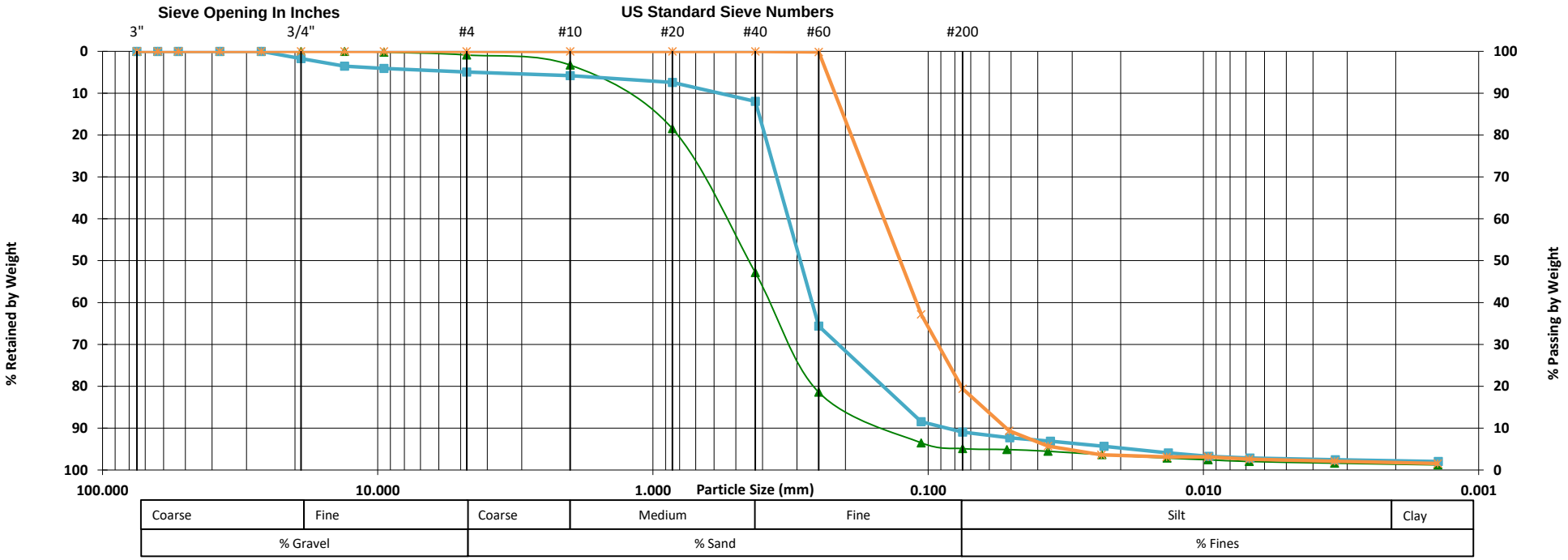
CERTIFIED BY CCIL Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

NOTES:

Particle Size Distribution Analysis Test Results

Project Name:	**Geotechnical Investigation**	**Date Sampled:**	**July 22-25, 2024**	**MTE File No.:**	**55566-100**
Client:	**Royal Truck and Trailer Sales Ltd.**	**Date Tested:**	**Aug. 7-9, 2024**	**Table No:**	**102**
Project Location:	**3027 Cedar Creek Road, Ayr, ON**				

Unified Soil Classification



Symbol	Borehole ID	Sample #	Sample Depth	Description
▲	MW110-24	SS-9	9.1-9.6 mbgs	SAND, trace Silt, Clay, and Gravel
■	MW113-24	SS-7	6.1-6.6 mbgs	SAND, trace Silt, Gravel, and Clay
✳	MW115-24	SS-11	12.2-12.6 mbgs	SAND, some Silt, trace Clay

CERTIFIED BY CCIL Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

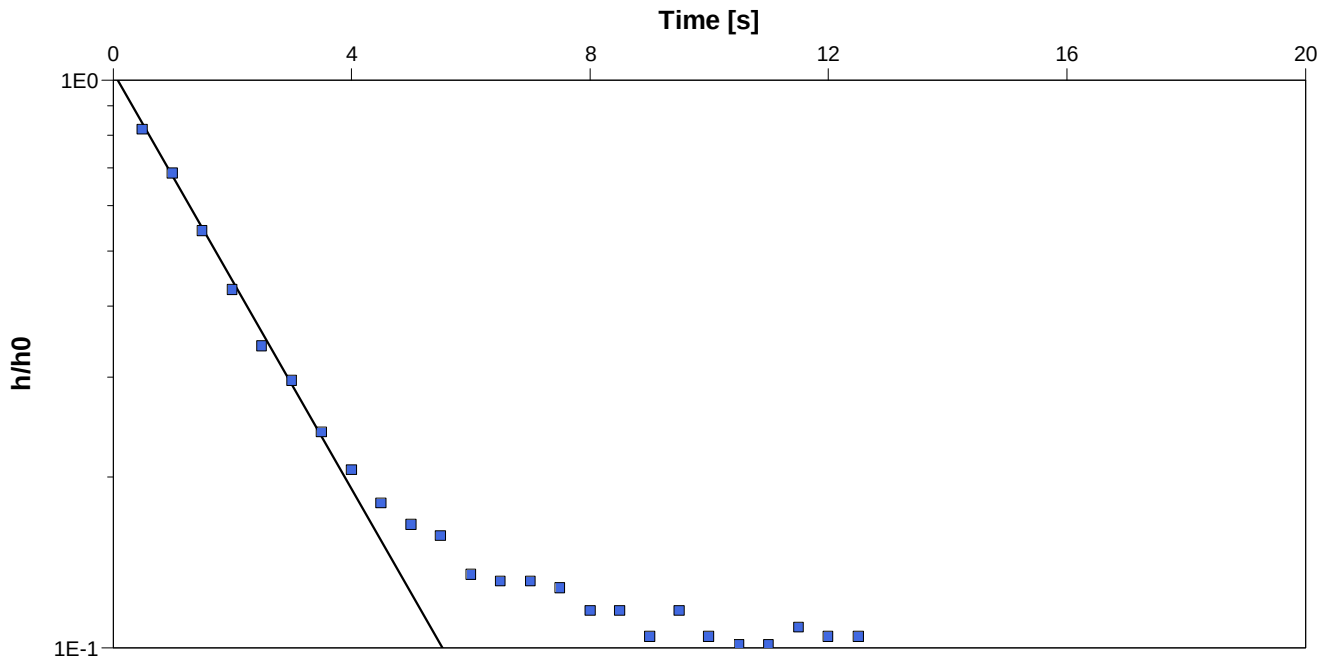
NOTES:

Appendix D

AquiferTest Pro Analysis

MTE Consultants Inc. 520 Bingemans Centre Drive Kitchener, ON N2B 3X9	**Slug Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 55566-100
	Client: Royal Truck and Trailer Sales Ltd.

Location: 3027 Cedar Creek Road, Ayr	Slug Test: MW110-24 Rising Head	Test Well: MW110-24
Test Conducted by: TXG		Test Date: 8/14/2024
Analysis Performed by: KNR	Bouwer & Rice	Analysis Date: 8/16/2024
Aquifer Thickness: 10.80 m		

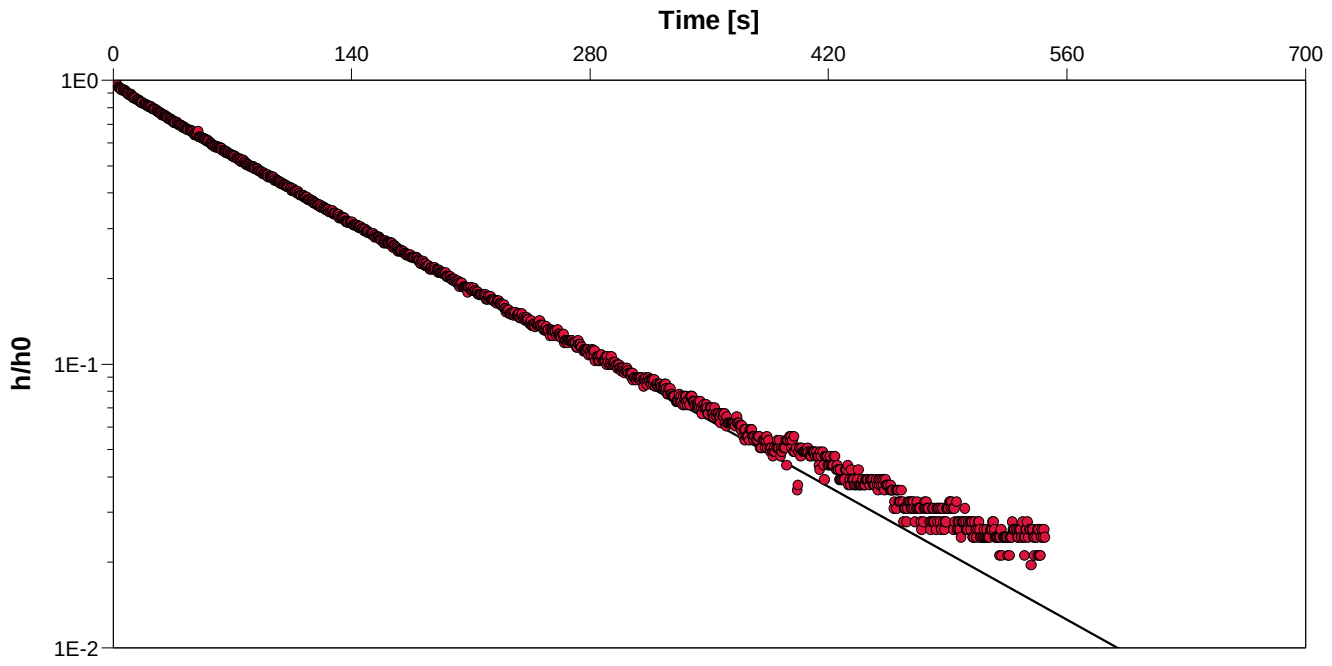


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW110-24	3.45×10^{-4}	

MTE Consultants Inc. 520 Bingemans Centre Drive Kitchener, ON N2B 3X9	**Slug Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 55566-100
	Client: Royal Truck and Trailer Sales Ltd.

Location: 3027 Cedar Creek Road, Ayr	Slug Test: MW113-24 Rising Head	Test Well: MW113-24
Test Conducted by: TXG		Test Date: 8/14/2024
Analysis Performed by: KNR	Bouwer & Rice	Analysis Date: 8/16/2024
Aquifer Thickness: 8.00 m		

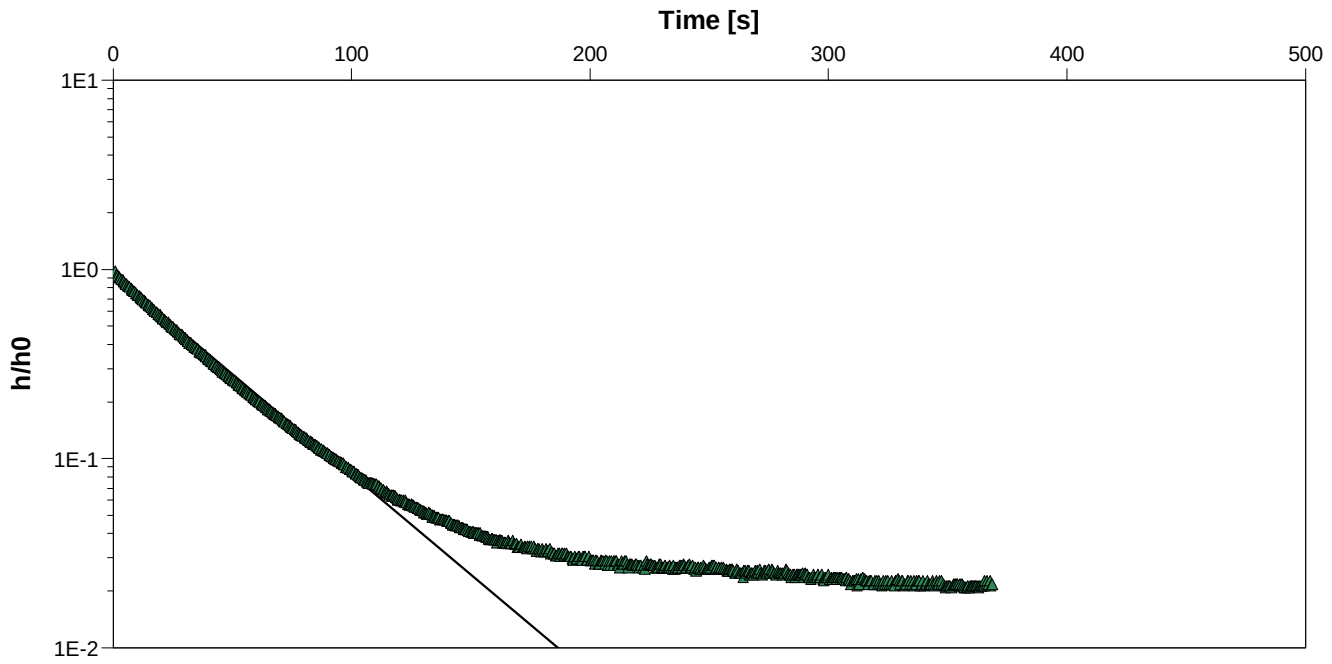


Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW113-24	6.01×10^{-6}	

MTE Consultants Inc. 520 Bingemans Centre Drive Kitchener, ON N2B 3X9	**Slug Test Analysis Report**
	Project: Hydrogeological Investigation
	Number: 55566-100
	Client: Royal Truck and Trailer Sales Ltd.

Location: 3027 Cedar Creek Road, Ayr	Slug Test: MW115-24 Recovery	Test Well: MW115-24
Test Conducted by: TXG		Test Date: 8/14/2024
Analysis Performed by: KNR	Bouwer & Rice	Analysis Date: 8/16/2024
Aquifer Thickness: 14.00 m		



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
MW115-24	2.03×10^{-5}	

Appendix E

Laboratory Certificates of Analysis

CERTIFICATE OF ANALYSIS

Work Order	: **WT2421973**	Page	: 1 of 6
Client	: **MTE Consultants Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Kyle Reed	Account Manager	: Emily Hansen
Address	: 520 Bingemans Centre Drive Kitchener ON Canada N2B 3X9	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: 519 743 6500	Telephone	: +1 519 886 6910
Project	: 55566-100	Date Samples Received	: 31-Jul-2024 15:45
PO	: ----	Date Analysis Commenced	: 01-Aug-2024
C-O-C number	: 23-1122048	Issue Date	: 08-Aug-2024 17:14
Sampler	: CLIENT		
Site	: ----		
Quote number	: HydroG		
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*
Cassandra Grzelewski	Team Leader - Inorganics	Inorganics, Thunder Bay, Ontario
Greg Pokocky	Manager - Inorganics	Inorganics, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Metals, Waterloo, Ontario
Kelly Fischer	Technical Specialist	Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Metals, Waterloo, Ontario

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 units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater 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.

Workorder Comments

Drinking Water Questions not completed on the Analytical Chain of Custody (COC). Please notify Laboratory if the submission is from a Regulated Drinking Water System, and if the samples are for Human Consumption.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
DLHC	*Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*
TMV	*Turbidity exceeded upper limit of the nephelometric method. Minimum value reported.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW103-24	MW115-24	MW113-24	MW110-24	----
					Client sampling date / time	31-Jul-2024 10:15	31-Jul-2024 11:40	31-Jul-2024 13:25	31-Jul-2024 14:45	----
						WT2421973-001	WT2421973-002	WT2421973-003	WT2421973-004	--------
						Result	Result	Result	Result	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/WT	1.0	mg/L		400	564	288	432	----
Colour, apparent	----	E330/WT	2.0	CU		1730	21200	339	6760	----
Conductivity	----	E100/WT	1.0	µS/cm		1420	521	633	649	----
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L		660	291	313	340	----
pH	----	E108/WT	0.10	pH units		7.53	7.94	8.09	7.75	----
Solids, total dissolved [TDS]	----	E162/WT	10	mg/L		928 DLDS	333 DLDS	352 DLDS	395 DLDS	----
Turbidity	----	E121/WT	0.10	NTU		482	>4000 TMV	76.1	3010	----
Anions and Nutrients										
Phosphorus, total	7723-14-0	E372-U/WT	2.0	µg/L		545	5340	82.6	1530	----
Ammonia, total (as N)	7664-41-7	E298/TY	0.0050	mg/L		0.238	0.255	0.560	0.0531	----
Chloride	16887-00-6	E235.Cl/WT	0.50	mg/L		246 DLDS	4.12	26.0	34.1	----
Fluoride	16984-48-8	E235.F/WT	0.020	mg/L		<0.100 DLDS	0.101	0.060	0.035	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	0.020	mg/L		5.08 DLDS	0.042	1.45	8.78	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	0.010	mg/L		<0.050 DLDS	<0.010	0.042	<0.010	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	0.0010	mg/L		<0.0010	0.0012	<0.0010	<0.0010	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	0.30	mg/L		54.2 DLDS	45.1	10.4	18.1	----
Total Metals										
Aluminum, total	7429-90-5	E420/WT	0.0030	mg/L		7.54 DLHC	75.6 DLHC	1.55 DLHC	26.7 DLHC	----
Antimony, total	7440-36-0	E420/WT	0.00010	mg/L		<0.00100 DLHC	<0.00100 DLHC	<0.00100 DLHC	<0.00100 DLHC	----
Arsenic, total	7440-38-2	E420/WT	0.00010	mg/L		0.00928 DLHC	0.0395 DLHC	0.00131 DLHC	0.0521 DLHC	----
Barium, total	7440-39-3	E420/WT	0.00010	mg/L		0.120 DLHC	0.710 DLHC	0.0474 DLHC	0.237 DLHC	----
Beryllium, total	7440-41-7	E420/WT	0.000020	mg/L		0.000417 DLHC	0.00433 DLHC	<0.000200 DLHC	0.00160 DLHC	----
Bismuth, total	7440-69-9	E420/WT	0.000050	mg/L		<0.000500 DLHC	0.00100 DLHC	<0.000500 DLHC	0.000978 DLHC	----
Boron, total	7440-42-8	E420/WT	0.010	mg/L		<0.100 DLHC	<0.100 DLHC	<0.100 DLHC	<0.100 DLHC	----
Cadmium, total	7440-43-9	E420/WT	0.0000050	mg/L		0.000490 DLHC	0.00135 DLHC	0.0000760 DLHC	0.00352 DLHC	----
Calcium, total	7440-70-2	E420/WT	0.050	mg/L		312 DLHC	1340 DLHC	112 DLHC	520 DLHC	----
Cesium, total	7440-46-2	E420/WT	0.000010	mg/L		0.000710 DLHC	0.00566 DLHC	0.000128 DLHC	0.00253 DLHC	----
Chromium, total	7440-47-3	E420/WT	0.00050	mg/L		0.0154 DLHC	0.112 DLHC	<0.00500 DLHC	0.0542 DLHC	----
Cobalt, total	7440-48-4	E420/WT	0.00010	mg/L		0.0126 DLHC	0.0731 DLHC	0.00289 DLHC	0.0648 DLHC	----
Copper, total	7440-50-8	E420/WT	0.00050	mg/L		0.0508 DLHC	0.196 DLHC	0.00622 DLHC	0.305 DLHC	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW103-24	MW115-24	MW113-24	MW110-24	----
					Client sampling date / time	31-Jul-2024 10:15	31-Jul-2024 11:40	31-Jul-2024 13:25	31-Jul-2024 14:45	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2421973-001	WT2421973-002	WT2421973-003	WT2421973-004	--------
						Result	Result	Result	Result	----
Total Metals										
Iron, total	7439-89-6	E420/WT	0.010	mg/L		18.0 DLHC	138 DLHC	2.64 DLHC	89.2 DLHC	----
Lead, total	7439-92-1	E420/WT	0.000050	mg/L		0.0609 DLHC	0.275 DLHC	0.00558 DLHC	0.294 DLHC	----
Lithium, total	7439-93-2	E420/WT	0.0010	mg/L		0.0130 DLHC	0.189 DLHC	<0.0100 DLHC	0.0523 DLHC	----
Magnesium, total	7439-95-4	E420/WT	0.0050	mg/L		87.0 DLHC	358 DLHC	29.8 DLHC	172 DLHC	----
Manganese, total	7439-96-5	E420/WT	0.00010	mg/L		0.868 DLHC	6.59 DLHC	1.43 DLHC	5.69 DLHC	----
Molybdenum, total	7439-98-7	E420/WT	0.000050	mg/L		0.00142 DLHC	0.00142 DLHC	0.000903 DLHC	0.00184 DLHC	----
Nickel, total	7440-02-0	E420/WT	0.00050	mg/L		0.0222 DLHC	0.155 DLHC	<0.00500 DLHC	0.0918 DLHC	----
Phosphorus, total	7723-14-0	E420/WT	0.050	mg/L		0.606 DLHC	7.71 DLHC	<0.500 DLHC	1.58 DLHC	----
Potassium, total	7440-09-7	E420/WT	0.050	mg/L		3.45 DLHC	11.8 DLHC	1.90 DLHC	5.13 DLHC	----
Rubidium, total	7440-17-7	E420/WT	0.00020	mg/L		0.0105 DLHC	0.0791 DLHC	0.00282 DLHC	0.0311 DLHC	----
Selenium, total	7782-49-2	E420/WT	0.000050	mg/L		<0.000500 DLHC	<0.000500 DLHC	<0.000500 DLHC	0.000541 DLHC	----
Silicon, total	7440-21-3	E420/WT	0.10	mg/L		17.9 DLHC	91.3 DLHC	6.83 DLHC	43.0 DLHC	----
Silver, total	7440-22-4	E420/WT	0.000010	mg/L		<0.000100 DLHC	0.000362 DLHC	<0.000100 DLHC	0.000124 DLHC	----
Sodium, total	7440-23-5	E420/WT	0.050	mg/L		41.1 DLHC	8.14 DLHC	13.3 DLHC	14.5 DLHC	----
Strontium, total	7440-24-6	E420/WT	0.00020	mg/L		0.401 DLHC	1.78 DLHC	0.170 DLHC	0.546 DLHC	----
Sulfur, total	7704-34-9	E420/WT	0.50	mg/L		19.2 DLHC	28.3 DLHC	<5.00 DLHC	6.36 DLHC	----
Tellurium, total	13494-80-9	E420/WT	0.00020	mg/L		<0.00200 DLHC	<0.00200 DLHC	<0.00200 DLHC	<0.00200 DLHC	----
Thallium, total	7440-28-0	E420/WT	0.000010	mg/L		0.000167 DLHC	0.000864 DLHC	<0.000100 DLHC	0.000859 DLHC	----
Thorium, total	7440-29-1	E420/WT	0.00010	mg/L		0.00360 DLHC	0.0323 DLHC	<0.00100 DLHC	0.0152 DLHC	----
Tin, total	7440-31-5	E420/WT	0.00010	mg/L		<0.00100 DLHC	<0.00100 DLHC	<0.00100 DLHC	<0.00100 DLHC	----
Titanium, total	7440-32-6	E420/WT	0.00030	mg/L		0.164 DLHC	0.801 DLHC	0.0466 DLHC	0.522 DLHC	----
Tungsten, total	7440-33-7	E420/WT	0.00010	mg/L		<0.00100 DLHC	<0.00100 DLHC	<0.00100 DLHC	<0.00100 DLHC	----
Uranium, total	7440-61-1	E420/WT	0.000010	mg/L		0.000750 DLHC	0.00847 DLHC	0.00131 DLHC	0.00186 DLHC	----
Vanadium, total	7440-62-2	E420/WT	0.00050	mg/L		0.0174 DLHC	0.130 DLHC	<0.00500 DLHC	0.0700 DLHC	----
Zinc, total	7440-66-6	E420/WT	0.0030	mg/L		0.271 DLHC	0.629 DLHC	0.0342 DLHC	1.68 DLHC	----
Zirconium, total	7440-67-7	E420/WT	0.00020	mg/L		0.00473 DLHC	<0.00200 DLHC	<0.00200 DLHC	<0.00200 DLHC	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/WT	0.0010	mg/L		0.0031	0.0022	0.0026	0.0022	----
Antimony, dissolved	7440-36-0	E421/WT	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, dissolved	7440-38-2	E421/WT	0.00010	mg/L		0.00011	0.00406	0.00052	0.00016	----
Barium, dissolved	7440-39-3	E421/WT	0.00010	mg/L		0.0693	0.129	0.0353	0.0327	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MW103-24	MW115-24	MW113-24	MW110-24	----
					Client sampling date / time	31-Jul-2024 10:15	31-Jul-2024 11:40	31-Jul-2024 13:25	31-Jul-2024 14:45	----
						WT2421973-001	WT2421973-002	WT2421973-003	WT2421973-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Beryllium, dissolved	7440-41-7	E421/WT	0.000020	mg/L		<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, dissolved	7440-69-9	E421/WT	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421/WT	0.010	mg/L		0.016	0.010	0.013	0.016	----
Cadmium, dissolved	7440-43-9	E421/WT	0.0000050	mg/L		0.0000221	<0.0000050	0.0000062	0.0000123	----
Calcium, dissolved	7440-70-2	E421/WT	0.050	mg/L		186	69.6	87.8	97.4	----
Cesium, dissolved	7440-46-2	E421/WT	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Chromium, dissolved	7440-47-3	E421/WT	0.00050	mg/L		0.00066	<0.00050	<0.00050	0.00052	----
Cobalt, dissolved	7440-48-4	E421/WT	0.00010	mg/L		0.00096	0.00020	0.00167	0.00016	----
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L		0.00217	0.00062	0.00086	0.00149	----
Iron, dissolved	7439-89-6	E421/WT	0.010	mg/L		0.027	0.416	0.122	0.011	----
Lead, dissolved	7439-92-1	E421/WT	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
Lithium, dissolved	7439-93-2	E421/WT	0.0010	mg/L		0.0015	0.0036	<0.0010	0.0011	----
Magnesium, dissolved	7439-95-4	E421/WT	0.0050	mg/L		47.4	28.4	22.7	23.4	----
Manganese, dissolved	7439-96-5	E421/WT	0.00010	mg/L		0.0232	0.0497	1.20	0.00252	----
Molybdenum, dissolved	7439-98-7	E421/WT	0.000050	mg/L		0.000490	0.000543	0.000816	0.000242	----
Nickel, dissolved	7440-02-0	E421/WT	0.00050	mg/L		0.00538	<0.00050	0.00080	0.00096	----
Phosphorus, dissolved	7723-14-0	E421/WT	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
Potassium, dissolved	7440-09-7	E421/WT	0.050	mg/L		1.84	1.11	1.45	0.895	----
Rubidium, dissolved	7440-17-7	E421/WT	0.00020	mg/L		0.00118	0.00058	0.00092	0.00029	----
Selenium, dissolved	7782-49-2	E421/WT	0.000050	mg/L		0.000156	<0.000050	0.000068	0.000367	----
Silicon, dissolved	7440-21-3	E421/WT	0.050	mg/L		6.08	9.76	4.28	4.95	----
Silver, dissolved	7440-22-4	E421/WT	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
Sodium, dissolved	7440-23-5	E421/WT	0.050	mg/L		39.1	5.12	12.1	12.7	----
Strontium, dissolved	7440-24-6	E421/WT	0.00020	mg/L		0.275	0.142	0.144	0.132	----
Sulfur, dissolved	7704-34-9	E421/WT	0.50	mg/L		19.7	15.5	4.24	6.74	----
Tellurium, dissolved	13494-80-9	E421/WT	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, dissolved	7440-28-0	E421/WT	0.000010	mg/L		0.000016	<0.000010	<0.000010	<0.000010	----
Thorium, dissolved	7440-29-1	E421/WT	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, dissolved	7440-31-5	E421/WT	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Titanium, dissolved	7440-32-6	E421/WT	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	----
Tungsten, dissolved	7440-33-7	E421/WT	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MW103-24	MW115-24	MW113-24	MW110-24	----
					Client sampling date / time	31-Jul-2024 10:15	31-Jul-2024 11:40	31-Jul-2024 13:25	31-Jul-2024 14:45	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2421973-001	WT2421973-002	WT2421973-003	WT2421973-004	--------
						Result	Result	Result	Result	----
Dissolved Metals										
Uranium, dissolved	7440-61-1	E421/WT	0.000010	mg/L		0.000328	0.000292	0.00109	0.000263	----
Vanadium, dissolved	7440-62-2	E421/WT	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, dissolved	7440-66-6	E421/WT	0.0010	mg/L		0.0124	0.0024	0.0040	0.0054	----
Zirconium, dissolved	7440-67-7	E421/WT	0.00030	mg/L		<0.00030	<0.00030	<0.00030	<0.00030	----
Dissolved metals filtration location	----	EP421/WT	-	-		Field	Field	Field	Field	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2421973**	Page	: 1 of 16
Client	: **MTE Consultants Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Kyle Reed	Account Manager	: Emily Hansen
Address	: 520 Bingemans Centre Drive Kitchener ON Canada N2B 3X9	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 743 6500	Telephone	: +1 519 886 6910
Project	: 55566-100	Date Samples Received	: 31-Jul-2024 15:45
PO	: ----	Issue Date	: 08-Aug-2024 17:02
C-O-C number	: 23-1122048		
Sampler	: CLIENT		
Site	: ----		
Quote number	: HydroG		
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 Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- 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.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-1574532-001	----	Magnesium, total	7439-95-4	E420	0.0171 B mg/L	0.005 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

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: **Water**

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

Analyte Group : Analytical Method / 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*
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] MW103-24	E298	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	07-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] MW110-24	E298	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	07-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] MW113-24	E298	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	07-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP] MW115-24	E298	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	07-Aug-2024	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] MW103-24	E235.Cl	31-Jul-2024	01-Aug-2024	28 days	1 days	✓	01-Aug-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] MW110-24	E235.Cl	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] MW113-24	E235.Cl	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] MW115-24	E235.Cl	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] MW103-24	E378-U	31-Jul-2024	02-Aug-2024	7 days	2 days	✓	07-Aug-2024	7 days	7 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] MW110-24	E378-U	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	07-Aug-2024	7 days	7 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] MW113-24	E378-U	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	07-Aug-2024	7 days	7 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] MW115-24	E378-U	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	07-Aug-2024	7 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] MW103-24	E235.F	31-Jul-2024	01-Aug-2024	28 days	1 days	✓	01-Aug-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] MW110-24	E235.F	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] MW113-24	E235.F	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] MW115-24	E235.F	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] MW103-24	E235.NO3	31-Jul-2024	01-Aug-2024	7 days	1 days	✓	01-Aug-2024	7 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] MW110-24	E235.NO3	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	06-Aug-2024	7 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] MW113-24	E235.NO3	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	06-Aug-2024	7 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] MW115-24	E235.NO3	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	06-Aug-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] MW103-24	E235.NO2	31-Jul-2024	01-Aug-2024	7 days	1 days	✓	01-Aug-2024	7 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] MW110-24	E235.NO2	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	06-Aug-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] MW113-24	E235.NO2	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	06-Aug-2024	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] MW115-24	E235.NO2	31-Jul-2024	03-Aug-2024	7 days	3 days	✓	06-Aug-2024	7 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] MW103-24	E235.SO4	31-Jul-2024	01-Aug-2024	28 days	1 days	✓	01-Aug-2024	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
MW110-24	E235.SO4	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
MW113-24	E235.SO4	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
MW115-24	E235.SO4	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	06-Aug-2024	28 days	6 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) [ON MECP]										
MW103-24	E372-U	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	08-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) [ON MECP]										
MW110-24	E372-U	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	08-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) [ON MECP]										
MW113-24	E372-U	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	08-Aug-2024	28 days	8 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) [ON MECP]										
MW115-24	E372-U	31-Jul-2024	07-Aug-2024	28 days	7 days	✓	08-Aug-2024	28 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
MW103-24	E421	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
MW110-24	E421	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) MW113-24	E421	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) MW115-24	E421	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MW103-24	E290	31-Jul-2024	01-Aug-2024	14 days	1 days	✓	02-Aug-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MW110-24	E290	31-Jul-2024	03-Aug-2024	14 days	3 days	✓	07-Aug-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MW113-24	E290	31-Jul-2024	03-Aug-2024	14 days	3 days	✓	07-Aug-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MW115-24	E290	31-Jul-2024	03-Aug-2024	14 days	3 days	✓	07-Aug-2024	14 days	7 days	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MW110-24	E330	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	22 hrs	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MW113-24	E330	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	23 hrs	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MW115-24	E330	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	25 hrs	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MW103-24	E330	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	26 hrs	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MW103-24	E100	31-Jul-2024	01-Aug-2024	28 days	1 days	✓	02-Aug-2024	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MW110-24	E100	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	07-Aug-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MW113-24	E100	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	07-Aug-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MW115-24	E100	31-Jul-2024	03-Aug-2024	28 days	3 days	✓	07-Aug-2024	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MW103-24	E108	31-Jul-2024	01-Aug-2024	14 days	1 days	✓	02-Aug-2024	14 days	2 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MW110-24	E108	31-Jul-2024	03-Aug-2024	14 days	3 days	✓	07-Aug-2024	14 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MW113-24	E108	31-Jul-2024	03-Aug-2024	14 days	3 days	✓	07-Aug-2024	14 days	7 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MW115-24	E108	31-Jul-2024	03-Aug-2024	14 days	3 days	✓	07-Aug-2024	14 days	7 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MW103-24	E162	31-Jul-2024	----	----	----		02-Aug-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MW110-24	E162	31-Jul-2024	----	----	----		02-Aug-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MW113-24	E162	31-Jul-2024	----	----	----		02-Aug-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MW115-24	E162	31-Jul-2024	----	----	----		02-Aug-2024	7 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MW110-24	E121	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	18 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MW113-24	E121	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	19 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MW115-24	E121	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	21 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MW103-24	E121	31-Jul-2024	----	----	----		01-Aug-2024	48 hrs	22 hrs	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) MW103-24	E420	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
MW110-24	E420	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
MW113-24	E420	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
MW115-24	E420	31-Jul-2024	01-Aug-2024	180 days	1 days	✓	01-Aug-2024	180 days	1 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: **Water**

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)							
Alkalinity Species by Titration	E290	1576546	2	15	13.3	5.0	✓
Ammonia by Fluorescence	E298	1583317	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1576552	2	14	14.2	5.0	✓
Colour (Apparent) by Spectrometer	E330	1575465	1	13	7.6	5.0	✓
Conductivity in Water	E100	1576548	2	8	25.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1574592	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1576948	2	21	9.5	5.0	✓
Fluoride in Water by IC	E235.F	1576549	2	12	16.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1576550	2	21	9.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1576551	2	21	9.5	5.0	✓
pH by Meter	E108	1576547	2	15	13.3	5.0	✓
Sulfate in Water by IC	E235.SO4	1576553	2	21	9.5	5.0	✓
TDS by Gravimetry	E162	1577853	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1574532	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1580381	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1574924	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1576546	2	15	13.3	5.0	✓
Ammonia by Fluorescence	E298	1583317	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1576552	2	14	14.2	5.0	✓
Colour (Apparent) by Spectrometer	E330	1575465	1	13	7.6	5.0	✓
Conductivity in Water	E100	1576548	2	8	25.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1574592	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1576948	2	21	9.5	5.0	✓
Fluoride in Water by IC	E235.F	1576549	2	12	16.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1576550	2	21	9.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1576551	2	21	9.5	5.0	✓
pH by Meter	E108	1576547	2	15	13.3	5.0	✓
Sulfate in Water by IC	E235.SO4	1576553	2	21	9.5	5.0	✓
TDS by Gravimetry	E162	1577853	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1574532	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1580381	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1574924	1	19	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1576546	2	15	13.3	5.0	✓

Matrix: **Water**

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*
Method Blanks (MB) - Continued							
Ammonia by Fluorescence	E298	1583317	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1576552	2	14	14.2	5.0	✓
Colour (Apparent) by Spectrometer	E330	1575465	1	13	7.6	5.0	✓
Conductivity in Water	E100	1576548	2	8	25.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1574592	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1576948	2	21	9.5	5.0	✓
Fluoride in Water by IC	E235.F	1576549	2	12	16.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1576550	2	21	9.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1576551	2	21	9.5	5.0	✓
Sulfate in Water by IC	E235.SO4	1576553	2	21	9.5	5.0	✓
TDS by Gravimetry	E162	1577853	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1574532	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1580381	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1574924	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1583317	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1576552	2	14	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1574592	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1576948	2	21	9.5	5.0	✓
Fluoride in Water by IC	E235.F	1576549	2	12	16.6	5.0	✓
Nitrate in Water by IC	E235.NO3	1576550	2	21	9.5	5.0	✓
Nitrite in Water by IC	E235.NO2	1576551	2	21	9.5	5.0	✓
Sulfate in Water by IC	E235.SO4	1576553	2	21	9.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1574532	1	12	8.3	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1580381	1	20	5.0	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
Conductivity in Water	E100 ALS Environmental - Waterloo	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Thunder Bay	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Waterloo	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Waterloo	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Thunder Bay	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Waterloo	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

QUALITY CONTROL REPORT

Work Order	: **WT2421973**	Page	: 1 of 17
Client	: MTE Consultants Inc.	Laboratory	: ALS Environmental - Waterloo
Contact	: Kyle Reed	Account Manager	: Emily Hansen
Address	: 520 Bingemans Centre Drive Kitchener ON Canada N2B 3X9	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 743 6500	Telephone	: +1 519 886 6910
Project	: 55566-100	Date Samples Received	: 31-Jul-2024 15:45
PO	: ----	Date Analysis Commenced	: 01-Aug-2024
C-O-C number	: 23-1122048	Issue Date	: 08-Aug-2024 17:05
Sampler	: CLIENT		
Site	: ----		
Quote number	: HydroG		
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
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) 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*
Cassandra Grzelewski	Team Leader - Inorganics	Thunder Bay Inorganics, Thunder Bay, Ontario
Greg Pokocky	Manager - Inorganics	Waterloo Inorganics, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Waterloo Metals, Waterloo, Ontario
Kelly Fischer	Technical Specialist	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Metals, Waterloo, Ontario

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: **Water**

					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
Physical Tests (QC Lot: 1574924)											
HA2401768-001	Anonymous	Turbidity	----	E121	0.10	NTU	14.6	14.3	2.07%	15%	----
Physical Tests (QC Lot: 1575465)											
WT2421916-001	Anonymous	Colour, apparent	----	E330	2.0	CU	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1576546)											
WT2421973-001	MW103-24	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	400	412	2.95%	20%	----
Physical Tests (QC Lot: 1576547)											
WT2421973-001	MW103-24	pH	----	E108	0.10	pH units	7.53	7.53	0.00%	4%	----
Physical Tests (QC Lot: 1576548)											
WT2421973-001	MW103-24	Conductivity	----	E100	1.0	µS/cm	1420	1440	1.05%	10%	----
Physical Tests (QC Lot: 1577853)											
WT2421905-019	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	578	610	5.39%	20%	----
Physical Tests (QC Lot: 1579304)											
WT2421973-003	MW113-24	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	288	284	1.59%	20%	----
Physical Tests (QC Lot: 1579305)											
WT2421973-003	MW113-24	pH	----	E108	0.10	pH units	8.09	8.13	0.493%	4%	----
Physical Tests (QC Lot: 1579306)											
WT2421973-003	MW113-24	Conductivity	----	E100	1.0	µS/cm	633	626	1.11%	10%	----
Anions and Nutrients (QC Lot: 1576549)											
WT2421973-001	MW103-24	Fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1576550)											
WT2421973-001	MW103-24	Nitrate (as N)	14797-55-8	E235.NO3	0.100	mg/L	5.08	5.10	0.315%	20%	----
Anions and Nutrients (QC Lot: 1576551)											
WT2421973-001	MW103-24	Nitrite (as N)	14797-65-0	E235.NO2	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1576552)											
WT2421973-001	MW103-24	Chloride	16887-00-6	E235.Cl	2.50	mg/L	246	245	0.356%	20%	----
Anions and Nutrients (QC Lot: 1576553)											
WT2421973-001	MW103-24	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	54.2	53.6	1.09%	20%	----
Anions and Nutrients (QC Lot: 1576948)											
HA2401806-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1579297)											

Sub-Matrix: **Water**

					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*
Anions and Nutrients (QC Lot: 1579297) - continued											
WT2422159-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1579298)											
WT2422159-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	3.00	mg/L	948	953	0.490%	20%	----
Anions and Nutrients (QC Lot: 1579299)											
WT2422159-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.200	mg/L	0.384	0.381	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1579300)											
WT2422159-001	Anonymous	Fluoride	16984-48-8	E235.F	0.200	mg/L	0.227	0.222	0.005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1579301)											
WT2422159-001	Anonymous	Chloride	16887-00-6	E235.Cl	5.00	mg/L	896	900	0.454%	20%	----
Anions and Nutrients (QC Lot: 1579303)											
HA2401812-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0011	0.0012	0.00006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1580381)											
WT2421633-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	4.87	4.89	0.389%	20%	----
Anions and Nutrients (QC Lot: 1583317)											
HA2401808-006	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1574532)											
HA2401769-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	2.60	2.60	0.0000385%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00014	0.00013	0.000006	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0154	0.0152	0.959%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	0.000055	0.000051	0.000004	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000250	0.0000234	0.0000016	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	3.50	3.33	4.78%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000025	0.000025	0.0000001	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00011	0.00011	0.000001	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00148	0.00147	0.00001	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.286	0.279	2.51%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000154	0.000143	0.000011	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	0.992	0.990	0.170%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0531	0.0528	0.529%	20%	----

Sub-Matrix: **Water**

					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*
Total Metals (QC Lot: 1574532) - continued											
HA2401769-001	Anonymous	Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000344	0.000344	0.0000001	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00237	0.00225	0.00011	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.443	0.434	0.009	Diff <2x LOR	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00088	0.00081	0.00007	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000068	<0.000050	0.000018	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	2.05	2.00	2.51%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	13.5	13.7	1.52%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0125	0.0124	0.926%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	1.45	1.37	0.07	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00095	0.00098	0.00003	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000095	0.000091	0.000004	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00097	0.00094	0.00003	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0050	0.0050	0.00002	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1574592)											
WT2421973-001	MW103-24	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0031	0.0029	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00011	0.00013	0.00001	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0693	0.0694	0.159%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.016	0.016	0.0004	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000221	0.0000173	0.0000048	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	186	183	2.08%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00066	0.00066	0.000006	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00096	0.00094	0.00002	Diff <2x LOR	----

Sub-Matrix: **Water**

					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*
Dissolved Metals (QC Lot: 1574592) - continued											
WT2421973-001	MW103-24	Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00217	0.00221	1.84%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.027	0.027	0.00008	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0015	0.0013	0.0003	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	47.4	46.8	1.32%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0232	0.0235	1.50%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000490	0.000477	0.000013	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00538	0.00552	2.60%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.84	1.85	0.494%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00118	0.00128	0.00009	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000156	0.000136	0.000020	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	6.08	6.12	0.653%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	39.1	39.4	0.758%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.275	0.275	0.132%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.7	19.9	0.694%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000016	0.000014	0.000001	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000328	0.000328	0.0305%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0124	0.0130	4.35%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1574924)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1575465)						
Colour, apparent	----	E330	2	CU	<2.0	----
Physical Tests (QCLot: 1576546)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1576548)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1577853)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1579304)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1579306)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 1576549)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1576550)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1576551)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1576552)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1576553)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1576948)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1579297)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1579298)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1579299)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1579300)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1579300) - continued						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1579301)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1579303)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1580381)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1583317)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Total Metals (QCLot: 1574532)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	# 0.0171	B
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1574532) - continued						
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1574592)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1574592) - continued						
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1574924)									
Turbidity	----	E121	0.1	NTU	200 NTU	92.5	85.0	115	----
Physical Tests (QCLot: 1575465)									
Colour, apparent	----	E330	2	CU	25 CU	95.5	70.0	130	----
Physical Tests (QCLot: 1576546)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	100	85.0	115	----
Physical Tests (QCLot: 1576547)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1576548)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 1577853)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
Physical Tests (QCLot: 1579304)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1579305)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1579306)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	102	90.0	110	----
Anions and Nutrients (QCLot: 1576549)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1576550)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	98.9	90.0	110	----
Anions and Nutrients (QCLot: 1576551)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1576552)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 1576553)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1576948)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.05 mg/L	99.8	80.0	120	----
Anions and Nutrients (QCLot: 1579297)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	104	90.0	110	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1579298)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1579299)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 1579300)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1579301)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 1579303)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.05 mg/L	99.9	80.0	120	----
Anions and Nutrients (QCLot: 1580381)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.333 mg/L	93.3	80.0	120	----
Anions and Nutrients (QCLot: 1583317)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
Total Metals (QCLot: 1574532)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	98.6	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	106	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	107	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	105	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	103	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	100	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	101	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	104	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	97.6	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	104	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	103	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	103	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	99.3	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	102	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	107	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	113	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	103	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	103	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	108	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1574532) - continued									
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	98.7	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	99.2	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	102	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	104	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	93.2	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	106	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	100	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	100	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	102	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	101	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	101	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	98.3	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	98.3	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	105	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	99.9	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	96.7	80.0	120	----
Dissolved Metals (QCLot: 1574592)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	0.1 mg/L	93.5	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	0.05 mg/L	103	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	0.05 mg/L	104	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.012 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.005 mg/L	96.4	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	0.05 mg/L	98.0	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	0.05 mg/L	93.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.005 mg/L	95.8	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	2.5 mg/L	98.9	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.002 mg/L	98.3	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.012 mg/L	97.9	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.012 mg/L	96.6	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.012 mg/L	95.9	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	0.05 mg/L	94.5	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.025 mg/L	98.5	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.012 mg/L	89.9	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1574592) - continued									
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	2.5 mg/L	105	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.012 mg/L	99.4	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.012 mg/L	102	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.025 mg/L	95.9	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	0.5 mg/L	99.4	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	2.5 mg/L	94.2	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.005 mg/L	102	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	0.05 mg/L	101	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	0.5 mg/L	102	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.005 mg/L	91.3	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	2.5 mg/L	102	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.012 mg/L	96.0	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	2.5 mg/L	95.7	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.005 mg/L	98.6	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	0.05 mg/L	97.6	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.005 mg/L	96.0	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.025 mg/L	100	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.012 mg/L	97.8	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.005 mg/L	96.7	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0 mg/L	101	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.025 mg/L	98.3	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.025 mg/L	96.4	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.005 mg/L	94.1	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1576549)										
WT2421973-001	MW103-24	Fluoride	16984-48-8	E235.F	5.00 mg/L	5 mg/L	100.0	75.0	125	----
Anions and Nutrients (QCLot: 1576550)										
WT2421973-001	MW103-24	Nitrate (as N)	14797-55-8	E235.NO3	12.5 mg/L	12.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1576551)										
WT2421973-001	MW103-24	Nitrite (as N)	14797-65-0	E235.NO2	2.44 mg/L	2.5 mg/L	97.5	75.0	125	----
Anions and Nutrients (QCLot: 1576552)										
WT2421973-001	MW103-24	Chloride	16887-00-6	E235.Cl	496 mg/L	500 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 1576553)										
WT2421973-001	MW103-24	Sulfate (as SO4)	14808-79-8	E235.SO4	500 mg/L	500 mg/L	100.0	75.0	125	----
Anions and Nutrients (QCLot: 1576948)										
HA2401806-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0196 mg/L	0.02 mg/L	99.7	70.0	130	----
Anions and Nutrients (QCLot: 1579297)										
WT2422159-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	4.77 mg/L	5 mg/L	95.4	75.0	125	----
Anions and Nutrients (QCLot: 1579298)										
WT2422159-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	933 mg/L	1000 mg/L	93.3	75.0	125	----
Anions and Nutrients (QCLot: 1579299)										
WT2422159-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	23.4 mg/L	25 mg/L	93.6	75.0	125	----
Anions and Nutrients (QCLot: 1579300)										
WT2422159-001	Anonymous	Fluoride	16984-48-8	E235.F	9.52 mg/L	10 mg/L	95.2	75.0	125	----
Anions and Nutrients (QCLot: 1579301)										
WT2422159-001	Anonymous	Chloride	16887-00-6	E235.Cl	947 mg/L	1000 mg/L	94.7	75.0	125	----
Anions and Nutrients (QCLot: 1579303)										
HA2401812-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0187 mg/L	0.02 mg/L	95.6	70.0	130	----
Anions and Nutrients (QCLot: 1580381)										
WT2421633-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1583317)										
WT2421897-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	----	----		75.0	125	----
Total Metals (QCLot: 1574532)										
HA2401769-002	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0536 mg/L	0.05 mg/L	107	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0577 mg/L	0.05 mg/L	115	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1574532) - continued										
HA2401769-002	Anonymous	Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00624 mg/L	0.005 mg/L	125	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0441 mg/L	0.05 mg/L	88.2	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00521 mg/L	0.005 mg/L	104	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00251 mg/L	0.002 mg/L	100	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0122 mg/L	0.012 mg/L	97.3	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0124 mg/L	0.012 mg/L	99.5	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0240 mg/L	0.025 mg/L	95.9	70.0	130	----
		Lithium, total	7439-93-2	E420	ND mg/L	----	ND	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0129 mg/L	0.012 mg/L	103	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0257 mg/L	0.025 mg/L	103	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.488 mg/L	0.5 mg/L	97.7	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0542 mg/L	0.05 mg/L	108	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00462 mg/L	0.005 mg/L	92.4	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00634 mg/L	0.005 mg/L	127	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0474 mg/L	0.05 mg/L	94.8	70.0	130	----
		Tin, total	7440-31-5	E420	0.0248 mg/L	0.025 mg/L	99.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0143 mg/L	0.012 mg/L	115	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00506 mg/L	0.005 mg/L	101	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0271 mg/L	0.025 mg/L	108	70.0	130	----
		Zinc, total	7440-66-6	E420	ND mg/L	----	ND	70.0	130	----
Dissolved Metals (QCLot: 1574592)										
WT2421973-002	MW115-24	Aluminum, dissolved	7429-90-5	E421	0.0962 mg/L	0.1 mg/L	96.2	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0528 mg/L	0.05 mg/L	106	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0568 mg/L	0.05 mg/L	114	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.00520 mg/L	0.005 mg/L	104	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0467 mg/L	0.05 mg/L	93.3	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.047 mg/L	0.05 mg/L	94.2	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00532 mg/L	0.005 mg/L	106	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1574592) - continued										
WT2421973-002	MW115-24	Cesium, dissolved	7440-46-2	E421	0.00258 mg/L	0.002 mg/L	103	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0123 mg/L	0.012 mg/L	98.7	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0122 mg/L	0.012 mg/L	97.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0120 mg/L	0.012 mg/L	96.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	----	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0246 mg/L	0.025 mg/L	98.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0122 mg/L	0.012 mg/L	98.0	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0130 mg/L	0.012 mg/L	104	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0241 mg/L	0.025 mg/L	96.6	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	0.529 mg/L	0.5 mg/L	106	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	2.43 mg/L	2.5 mg/L	97.4	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.00537 mg/L	0.005 mg/L	107	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0586 mg/L	0.05 mg/L	117	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	----	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00453 mg/L	0.005 mg/L	90.6	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	----	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.00574 mg/L	0.005 mg/L	115	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0499 mg/L	0.05 mg/L	99.9	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.00490 mg/L	0.005 mg/L	98.0	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0258 mg/L	0.025 mg/L	103	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0124 mg/L	0.012 mg/L	99.5	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.00489 mg/L	0.005 mg/L	97.9	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	----	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0257 mg/L	0.025 mg/L	103	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.0246 mg/L	0.025 mg/L	98.5	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.00494 mg/L	0.005 mg/L	98.9	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 23 - 1122048

Page of

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Waterloo

Work Order Reference WT2421973

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	MTE
Contact:	Kyle Reed
Phone:	519-743-6500
	Company address below will appear on the final report
Street:	520 Bingemans Centre Dr
City/Province:	Kitchener, ON
Postal Code:	
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Reports / Recipients	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	kreed@mte85.com
Email 2	
Email 3	

Invoice Recipients	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Turnaround Time (TAT) Requested
☒ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.
Additional fees may apply to rush requests on weekends,
Date and Time Required for all E&P TATs:
For all tests with rush TATs requested, please co

Project Information	
ALS Client Code / QUOTE #:	hydro6
Job / Project #:	555666-100
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): WT2421973

ALS Contact: | Sampler:

Analysis Rec

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

ALS Sample # (ALS 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	Gen Chem 1	Total P	Dissolved Metals (F)	Total Metals	SAMPLES ON HOLD	EXTENDED STORAGE REQ	SUSPECTED HAZARD (see
	MW103-24	July 31/24	10:15	GW	4	✓	✓	✓	✓			
	MW115-24	31-Jul-24	11:40	GW	4	✓	✓	✓	✓			
	MW113-24	"	13:25	GW	4	✓	✓	✓	✓			
	MW110-24	"	14:45	GW	4	✓	✓	✓	✓			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☑ COOLING INITIATED

Cooler Custody Seals Intact: ☐ YES ☑ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	21.7

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Zack Hopkins	Date: July 31/24	Time:	Received by:	Date:	Time:	Received by:	Date: 7/31/24	Time: 1545

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JAN 2023 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**.

LJ, GL-490 MM-929 N-094

CERTIFICATE OF ANALYSIS

Work Order	: **WT2423402**	Page	: 1 of 8
Amendment	: **1**		
Client	: **MTE Consultants Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Kyle Reed	Account Manager	: Emily Hansen
Address	: 520 Bingemans Centre Drive Kitchener ON Canada N2B 3X9	Address	: 60 Northland Road, Unit 1 Waterloo ON Canada N2V 2B8
Telephone	: 519 743 6500	Telephone	: +1 519 886 6910
Project	: 55566-100	Date Samples Received	: 14-Aug-2024 12:45
PO	: ----	Date Analysis Commenced	: 14-Aug-2024
C-O-C number	: 23-1122049	Issue Date	: 27-Aug-2024 15:31
Sampler	: TXG		
Site	: ----		
Quote number	: HydroG		
No. of samples received	: 3		
No. of samples analysed	: 3		

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*
Cassandra Grzelewski	Team Leader - Inorganics	Inorganics, Thunder Bay, Ontario
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kelly Fischer	Technical Specialist	Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Metals, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Inorganics, Waterloo, Ontario

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 units
µS/cm	microsiemens per centimetre
CU	colour units (1 cu = 1 mg/l pt)
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater 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.

Workorder Comments

Amendment (27-AUG-2024): This report has been amended following changes to the analytical data reported. The quality system is being utilised to resolve this issue. The specific data affected includes ortho-phosphate on fractions -001 and -003.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
DLHC	*Detection Limit Raised: Dilution required due to high concentration of test analyte(s).*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*
DLUI	*Detection Limit Raised: Unknown interference generated an apparent false positive test result.*

TMV	*Turbidity exceeded upper limit of the nephelometric method. Minimum value reported.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP101-24	MP102-24	POND	----	----
					Client sampling date / time	14-Aug-2024 10:00	14-Aug-2024 10:40	14-Aug-2024 10:05	----	----
						WT2423402-001	WT2423402-002	WT2423402-003	--------	--------
						Result	Result	Result	----	----
Physical Tests										
Alkalinity, total (as CaCO3)	----	E290/WT	1.0	mg/L		524	8400	----	----	----
Colour, apparent	----	E330/WT	2.0	CU		16900	164000	140	----	----
Conductivity	----	E100/WT	1.0	µS/cm		1070	1740	----	----	----
Conductivity	----	E100/WT	2.0	µS/cm		----	----	658	----	----
Hardness (as CaCO3), dissolved	----	EC100/WT	0.50	mg/L		399	410	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WT	0.50	mg/L		----	----	206	----	----
pH	----	E108/WT	0.10	pH units		7.78	7.35	7.71	----	----
Solids, total dissolved [TDS]	----	E162/WT	10	mg/L		657 DLDS	1250 DLDS	379 DLDS	----	----
Turbidity	----	E121/WT	0.10	NTU		>4000 TMV	>4000 TMV	19.8	----	----
Alkalinity, total (as CaCO3)	----	E290/WT	2.0	mg/L		----	----	165	----	----
Anions and Nutrients										
Phosphorus, total	7723-14-0	E372-U/WT	0.0020	mg/L		5.90	62.2	1.20	----	----
Ammonia, total (as N)	7664-41-7	E298/TY	0.0050	mg/L		1.42	0.311	1.78	----	----
Chloride	16887-00-6	E235.Cl/WT	0.50	mg/L		169 DLDS	443 DLDS	105	----	----
Fluoride	16984-48-8	E235.F/WT	0.020	mg/L		0.101 DLDS	0.122 DLDS	0.052	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	0.020	mg/L		<0.100 DLDS	<0.100 DLDS	<0.020	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	0.010	mg/L		<0.050 DLDS	<0.050 DLDS	0.010	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	0.0010	mg/L		0.0011	0.0038	0.0241	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	0.30	mg/L		14.1 DLDS	18.3 DLDS	0.72	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/WT	0.0030	mg/L		----	----	0.390 DLM	----	----
Aluminum, total	7429-90-5	E440B/WT	2.0	mg/L		409	2430	----	----	----
Antimony, total	7440-36-0	E420/WT	0.00010	mg/L		----	----	<0.00100 DLM	----	----
Antimony, total	7440-36-0	E440B/WT	0.020	mg/L		<0.020	0.025	----	----	----
Arsenic, total	7440-38-2	E420/WT	0.00010	mg/L		----	----	0.00142 DLM	----	----
Arsenic, total	7440-38-2	E440B/WT	0.020	mg/L		0.027	0.532	----	----	----
Barium, total	7440-39-3	E420/WT	0.00010	mg/L		----	----	0.0362 DLM	----	----
Barium, total	7440-39-3	E440B/WT	0.040	mg/L		0.570	10.0	----	----	----
Beryllium, total	7440-41-7	E420/WT	0.000020	mg/L		----	----	<0.000200 DLM	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MP101-24	MP102-24	POND	----	----
					Client sampling date / time	14-Aug-2024 10:00	14-Aug-2024 10:40	14-Aug-2024 10:05	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2423402-001	WT2423402-002	WT2423402-003	--------	--------
						Result	Result	Result	----	----
Total Metals										
Beryllium, total	7440-41-7	E440B/WT	0.020	mg/L		<0.020	0.103	----	----	----
Bismuth, total	7440-69-9	E420/WT	0.000050	mg/L		----	----	<0.000500 DLM	----	----
Bismuth, total	7440-69-9	E440B/WT	0.010	mg/L		<0.010	0.016	----	----	----
Boron, total	7440-42-8	E420/WT	0.010	mg/L		----	----	<0.100 DLM	----	----
Boron, total	7440-42-8	E440B/WT	2.0	mg/L		<2.0	3.0	----	----	----
Cadmium, total	7440-43-9	E420/WT	0.0000050	mg/L		----	----	<0.0000500 DLM	----	----
Cadmium, total	7440-43-9	E440B/WT	0.0020	mg/L		0.0047	0.0352	----	----	----
Calcium, total	7440-70-2	E420/WT	0.050	mg/L		----	----	50.5 DLM	----	----
Calcium, total	7440-70-2	E440B/WT	100	mg/L		250	40800	----	----	----
Cesium, total	7440-46-2	E420/WT	0.000010	mg/L		----	----	<0.000100 DLM	----	----
Chromium, total	7440-47-3	E420/WT	0.00050	mg/L		----	----	<0.00500 DLM	----	----
Chromium, total	7440-47-3	E440B/WT	0.10	mg/L		1.78	10.4	----	----	----
Cobalt, total	7440-48-4	E420/WT	0.00010	mg/L		----	----	<0.00100 DLM	----	----
Cobalt, total	7440-48-4	E440B/WT	0.10	mg/L		<0.10	1.36	----	----	----
Copper, total	7440-50-8	E420/WT	0.00050	mg/L		----	----	<0.00500 DLM	----	----
Copper, total	7440-50-8	E440B/WT	0.20	mg/L		1.17	4.17	----	----	----
Iron, total	7439-89-6	E420/WT	0.010	mg/L		----	----	3.35 DLM	----	----
Iron, total	7439-89-6	E440B/WT	10	mg/L		75	4580	----	----	----
Lead, total	7439-92-1	E420/WT	0.000050	mg/L		----	----	0.00101 DLM	----	----
Lead, total	7439-92-1	E440B/WT	0.020	mg/L		0.112	2.15	----	----	----
Lithium, total	7439-93-2	E420/WT	0.0010	mg/L		----	----	<0.0100 DLM	----	----
Lithium, total	7439-93-2	E440B/WT	0.20	mg/L		<0.20	2.31	----	----	----
Magnesium, total	7439-95-4	E420/WT	0.0050	mg/L		----	----	19.3 DLM	----	----
Magnesium, total	7439-95-4	E440B/WT	10	mg/L		73	15600	----	----	----
Manganese, total	7439-96-5	E420/WT	0.00010	mg/L		----	----	0.324 DLM	----	----
Manganese, total	7439-96-5	E440B/WT	0.10	mg/L		1.75	167	----	----	----
Molybdenum, total	7439-98-7	E420/WT	0.000050	mg/L		----	----	<0.000500 DLM	----	----
Molybdenum, total	7439-98-7	E440B/WT	0.010	mg/L		0.038	0.230	----	----	----
Nickel, total	7440-02-0	E420/WT	0.00050	mg/L		----	----	<0.00500 DLM	----	----
Nickel, total	7440-02-0	E440B/WT	0.10	mg/L		0.60	5.76	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP101-24	MP102-24	POND	----	----
					Client sampling date / time	14-Aug-2024 10:00	14-Aug-2024 10:40	14-Aug-2024 10:05	----	----
						WT2423402-001	WT2423402-002	WT2423402-003	--------	--------
						Result	Result	Result	----	----
Total Metals										
Phosphorus, total	7723-14-0	E420/WT	0.050	mg/L		----	----	3.40 DLM	----	----
Phosphorus, total	7723-14-0	E440B/WT	10	mg/L		<10	240	----	----	----
Potassium, total	7440-09-7	E420/WT	0.050	mg/L		----	----	4.80 DLM	----	----
Potassium, total	7440-09-7	E440B/WT	10	mg/L		18	360	----	----	----
Rubidium, total	7440-17-7	E420/WT	0.00020	mg/L		----	----	0.00647 DLM	----	----
Selenium, total	7782-49-2	E420/WT	0.000050	mg/L		----	----	<0.000500 DLM	----	----
Selenium, total	7782-49-2	E440B/WT	0.010	mg/L		<0.010	0.016	----	----	----
Silicon, total	7440-21-3	E420/WT	0.10	mg/L		----	----	1.91 DLM	----	----
Silver, total	7440-22-4	E420/WT	0.000010	mg/L		----	----	<0.000100 DLM	----	----
Silver, total	7440-22-4	E440B/WT	0.010	mg/L		<0.010	<0.010	----	----	----
Sodium, total	7440-23-5	E420/WT	0.050	mg/L		----	----	60.1 DLM	----	----
Sodium, total	7440-23-5	E440B/WT	10	mg/L		75	384	----	----	----
Strontium, total	7440-24-6	E420/WT	0.00020	mg/L		----	----	0.0912 DLM	----	----
Strontium, total	7440-24-6	E440B/WT	0.0200	mg/L		0.368	41.1	----	----	----
Sulfur, total	7704-34-9	E420/WT	0.50	mg/L		----	----	<5.00 DLM	----	----
Sulfur, total	7704-34-9	E440B/WT	100	mg/L		<100	<100	----	----	----
Tellurium, total	13494-80-9	E420/WT	0.00020	mg/L		----	----	<0.00200 DLM	----	----
Thallium, total	7440-28-0	E420/WT	0.000010	mg/L		----	----	<0.000100 DLM	----	----
Thallium, total	7440-28-0	E440B/WT	0.0020	mg/L		0.0026	0.0155	----	----	----
Thorium, total	7440-29-1	E420/WT	0.00010	mg/L		----	----	<0.00100 DLM	----	----
Tin, total	7440-31-5	E420/WT	0.00010	mg/L		----	----	<0.00100 DLM	----	----
Tin, total	7440-31-5	E440B/WT	0.020	mg/L		0.026	0.098	----	----	----
Titanium, total	7440-32-6	E420/WT	0.00030	mg/L		----	----	0.0123 DLM	----	----
Titanium, total	7440-32-6	E440B/WT	0.060	mg/L		2.16	101	----	----	----
Tungsten, total	7440-33-7	E420/WT	0.00010	mg/L		----	----	<0.00100 DLM	----	----
Tungsten, total	7440-33-7	E440B/WT	0.18	mg/L		<0.18	<0.18	----	----	----
Uranium, total	7440-61-1	E420/WT	0.000010	mg/L		----	----	0.000138 DLM	----	----
Uranium, total	7440-61-1	E440B/WT	0.0020	mg/L		0.0377	0.147	----	----	----
Vanadium, total	7440-62-2	E420/WT	0.00050	mg/L		----	----	<0.00500 DLM	----	----
Vanadium, total	7440-62-2	E440B/WT	0.10	mg/L		0.21	7.23	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	MP101-24	MP102-24	POND	----	----
					Client sampling date / time	14-Aug-2024 10:00	14-Aug-2024 10:40	14-Aug-2024 10:05	----	----
						WT2423402-001	WT2423402-002	WT2423402-003	--------	--------
						Result	Result	Result	----	----
Total Metals										
Zinc, total	7440-66-6	E420/WT	0.0030	mg/L		----	----	<0.0300 DLM	----	----
Zinc, total	7440-66-6	E440B/WT	0.60	mg/L		77.3	134	----	----	----
Zirconium, total	7440-67-7	E420/WT	0.00020	mg/L		----	----	<0.00200 DLM	----	----
Zirconium, total	7440-67-7	E440B/WT	0.060	mg/L		0.100	2.54	----	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/WT	0.0010	mg/L		0.0075	<0.0100 DLHC	----	----	----
Antimony, dissolved	7440-36-0	E421/WT	0.00010	mg/L		0.00040	<0.00100 DLHC	----	----	----
Arsenic, dissolved	7440-38-2	E421/WT	0.00010	mg/L		0.00053	<0.00100 DLHC	----	----	----
Barium, dissolved	7440-39-3	E421/WT	0.00010	mg/L		0.0449	0.108 DLHC	----	----	----
Beryllium, dissolved	7440-41-7	E421/WT	0.000020	mg/L		<0.000020	<0.000200 DLHC	----	----	----
Bismuth, dissolved	7440-69-9	E421/WT	0.000050	mg/L		<0.000050	<0.000500 DLHC	----	----	----
Boron, dissolved	7440-42-8	E421/WT	0.010	mg/L		0.330	0.446 DLHC	----	----	----
Cadmium, dissolved	7440-43-9	E421/WT	0.0000050	mg/L		0.0000080	0.0000655 DLHC	----	----	----
Calcium, dissolved	7440-70-2	E421/WT	0.050	mg/L		99.7	120 DLHC	----	----	----
Cesium, dissolved	7440-46-2	E421/WT	0.000010	mg/L		<0.000010	<0.000100 DLHC	----	----	----
Chromium, dissolved	7440-47-3	E421/WT	0.00050	mg/L		<0.00050	<0.00500 DLHC	----	----	----
Cobalt, dissolved	7440-48-4	E421/WT	0.00010	mg/L		0.00040	0.00409 DLHC	----	----	----
Copper, dissolved	7440-50-8	E421/WT	0.00020	mg/L		0.00937	<0.00200 DLHC	----	----	----
Iron, dissolved	7439-89-6	E421/WT	0.010	mg/L		0.634	<0.100 DLHC	----	----	----
Lead, dissolved	7439-92-1	E421/WT	0.000050	mg/L		0.000090	<0.000500 DLHC	----	----	----
Lithium, dissolved	7439-93-2	E421/WT	0.0010	mg/L		0.0010	<0.0100 DLHC	----	----	----
Magnesium, dissolved	7439-95-4	E421/WT	0.0050	mg/L		36.4	26.8 DLHC	----	----	----
Manganese, dissolved	7439-96-5	E421/WT	0.00010	mg/L		0.214	3.04 DLHC	----	----	----
Molybdenum, dissolved	7439-98-7	E421/WT	0.000050	mg/L		0.00145	0.00185 DLHC	----	----	----
Nickel, dissolved	7440-02-0	E421/WT	0.00050	mg/L		0.00477	0.00801 DLHC	----	----	----
Phosphorus, dissolved	7723-14-0	E421/WT	0.050	mg/L		<0.050	<0.500 DLHC	----	----	----
Potassium, dissolved	7440-09-7	E421/WT	0.050	mg/L		4.84	2.81 DLHC	----	----	----
Rubidium, dissolved	7440-17-7	E421/WT	0.00020	mg/L		0.00124	<0.00200 DLHC	----	----	----
Selenium, dissolved	7782-49-2	E421/WT	0.000050	mg/L		<0.000050	<0.000500 DLHC	----	----	----
Silicon, dissolved	7440-21-3	E421/WT	0.050	mg/L		5.13	4.44 DLHC	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	MP101-24	MP102-24	POND	----	----
					Client sampling date / time	14-Aug-2024 10:00	14-Aug-2024 10:40	14-Aug-2024 10:05	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit		WT2423402-001	WT2423402-002	WT2423402-003	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
Silver, dissolved	7440-22-4	E421/WT	0.000010	mg/L		<0.000010	<0.000100 DLHC	----	----	----
Sodium, dissolved	7440-23-5	E421/WT	0.050	mg/L		67.8	308 DLHC	----	----	----
Strontium, dissolved	7440-24-6	E421/WT	0.00020	mg/L		0.158	0.233 DLHC	----	----	----
Sulfur, dissolved	7704-34-9	E421/WT	0.50	mg/L		5.49	10.7 DLHC	----	----	----
Tellurium, dissolved	13494-80-9	E421/WT	0.00020	mg/L		<0.00020	<0.00200 DLHC	----	----	----
Thallium, dissolved	7440-28-0	E421/WT	0.000010	mg/L		0.000015	<0.000100 DLHC	----	----	----
Thorium, dissolved	7440-29-1	E421/WT	0.00010	mg/L		<0.00010	<0.00100 DLHC	----	----	----
Tin, dissolved	7440-31-5	E421/WT	0.00010	mg/L		<0.00010	<0.00100 DLHC	----	----	----
Titanium, dissolved	7440-32-6	E421/WT	0.00030	mg/L		<0.00040 DLUI	<0.00300 DLHC	----	----	----
Tungsten, dissolved	7440-33-7	E421/WT	0.00010	mg/L		0.00026	<0.00100 DLHC	----	----	----
Uranium, dissolved	7440-61-1	E421/WT	0.000010	mg/L		0.000168	0.000266 DLHC	----	----	----
Vanadium, dissolved	7440-62-2	E421/WT	0.00050	mg/L		<0.00050	<0.00500 DLHC	----	----	----
Zinc, dissolved	7440-66-6	E421/WT	0.0010	mg/L		2.94	2.65 DLHC	----	----	----
Zirconium, dissolved	7440-67-7	E421/WT	0.00020	mg/L		<0.00020	<0.00200 DLHC	----	----	----
Dissolved metals filtration location	----	EP421/WT	-	-		Field	Laboratory	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2423402**	Page	: 1 of 14
Amendment	: 1		
Client	: **MTE Consultants Inc.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Kyle Reed	Account Manager	: Emily Hansen
Address	: 520 Bingemans Centre Drive Kitchener ON Canada N2B 3X9	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 743 6500	Telephone	: +1 519 886 6910
Project	: 55566-100	Date Samples Received	: 14-Aug-2024 12:45
PO	: ----	Issue Date	: 27-Aug-2024 15:31
C-O-C number	: 23-1122049		
Sampler	: TXG		
Site	: ----		
Quote number	: HydroG		
No. of samples received	: 3		
No. of samples analysed	: 3		

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 Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- Reference Material (RM) Sample outliers occur - please see the following pages for full details.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Reference Material (RM) Sample								
Total Metals	QC-MRG2-1606103 003	----	Zirconium, total	7440-67-7	E440B	133 % MES	70.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Matrix Spike (MS) Recoveries								
Dissolved Metals	Anonymous	Anonymous	Silver, dissolved	7440-22-4	E421	64.0 % MES	70.0-130%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

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: **Water**

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

Analyte Group : Analytical Method / 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
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP101-24	E298	14-Aug-2024	19-Aug-2024	28 days	5 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) MP102-24	E298	14-Aug-2024	19-Aug-2024	28 days	5 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) POND	E298	14-Aug-2024	19-Aug-2024	28 days	5 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] MP101-24	E235.Cl	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] MP102-24	E235.Cl	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] POND	E235.Cl	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP] MP101-24	E378-U	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	16-Aug-2024	7 days	2 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP]										
MP102-24	E378-U	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	16-Aug-2024	7 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP]										
POND	E378-U	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	16-Aug-2024	7 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
MP101-24	E235.F	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
MP102-24	E235.F	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
POND	E235.F	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP]										
MP101-24	E235.NO3	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	19-Aug-2024	7 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP]										
MP102-24	E235.NO3	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	19-Aug-2024	7 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP]										
POND	E235.NO3	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	19-Aug-2024	7 days	5 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP]										
MP101-24	E235.NO2	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	19-Aug-2024	7 days	5 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] MP102-24	E235.NO2	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	19-Aug-2024	7 days	5 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] POND	E235.NO2	14-Aug-2024	16-Aug-2024	7 days	2 days	✓	19-Aug-2024	7 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] MP101-24	E235.SO4	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] MP102-24	E235.SO4	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] POND	E235.SO4	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	19-Aug-2024	28 days	5 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP101-24	E372-U	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	16-Aug-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) MP102-24	E372-U	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	16-Aug-2024	28 days	2 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) POND	E372-U	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	16-Aug-2024	28 days	2 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab filtered) MP102-24	E421	14-Aug-2024	15-Aug-2024	0 hrs	17 hrs	× UCP	15-Aug-2024	0 hrs	23 hrs	× UCP

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) MP101-24	E421	14-Aug-2024	15-Aug-2024	180 days	1 days	✓	15-Aug-2024	180 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MP101-24	E290	14-Aug-2024	16-Aug-2024	14 days	2 days	✓	17-Aug-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] MP102-24	E290	14-Aug-2024	16-Aug-2024	14 days	2 days	✓	17-Aug-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP] POND	E290	14-Aug-2024	16-Aug-2024	14 days	2 days	✓	17-Aug-2024	14 days	3 days	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MP101-24	E330	14-Aug-2024	----	----	----		15-Aug-2024	48 hrs	25 hrs	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] MP102-24	E330	14-Aug-2024	----	----	----		15-Aug-2024	48 hrs	25 hrs	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP] POND	E330	14-Aug-2024	----	----	----		15-Aug-2024	48 hrs	25 hrs	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MP101-24	E100	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	17-Aug-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE [ON MECP] MP102-24	E100	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	17-Aug-2024	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Physical Tests : Conductivity in Water										
HDPE [ON MECP] POND	E100	14-Aug-2024	16-Aug-2024	28 days	2 days	✓	17-Aug-2024	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MP101-24	E108	14-Aug-2024	16-Aug-2024	14 days	2 days	✓	17-Aug-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] MP102-24	E108	14-Aug-2024	16-Aug-2024	14 days	2 days	✓	17-Aug-2024	14 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP] POND	E108	14-Aug-2024	16-Aug-2024	14 days	2 days	✓	17-Aug-2024	14 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MP101-24	E162	14-Aug-2024	----	----	----		14-Aug-2024	7 days	0 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] MP102-24	E162	14-Aug-2024	----	----	----		14-Aug-2024	7 days	0 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] POND	E162	14-Aug-2024	----	----	----		14-Aug-2024	7 days	0 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MP102-24	E121	14-Aug-2024	----	----	----		15-Aug-2024	48 hrs	22 hrs	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] MP101-24	E121	14-Aug-2024	----	----	----		15-Aug-2024	48 hrs	23 hrs	✓

Matrix: **Water**

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

Analyte Group : Analytical Method / 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
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP]										
POND	E121	14-Aug-2024	----	----	----		15-Aug-2024	48 hrs	23 hrs	✓
Total Metals : Metals in Liquid Sludge by CRC ICPMS (mg/L)										
HDPE total (nitric acid)										
MP101-24	E440B	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	6 days	✓
Total Metals : Metals in Liquid Sludge by CRC ICPMS (mg/L)										
HDPE total (nitric acid)										
MP102-24	E440B	14-Aug-2024	20-Aug-2024	180 days	6 days	✓	20-Aug-2024	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
POND	E420	14-Aug-2024	15-Aug-2024	180 days	1 days	✓	15-Aug-2024	180 days	1 days	✓

Legend & Qualifier Definitions

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

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

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: **Water**

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)							
Alkalinity Species by Titration	E290	1599517	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	1603315	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1599511	1	10	10.0	5.0	✓
Colour (Apparent) by Spectrometer	E330	1597439	1	15	6.6	5.0	✓
Conductivity in Water	E100	1599515	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1596555	2	21	9.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1599528	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1599512	1	5	20.0	5.0	✓
Metals in Liquid Sludge by CRC ICPMS (mg/L)	E440B	1606104	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1599509	1	17	5.8	5.0	✓
Nitrite in Water by IC	E235.NO2	1599510	1	13	7.6	5.0	✓
pH by Meter	E108	1599516	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1599513	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	1595270	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1596491	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1596882	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1596943	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1599517	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	1603315	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1599511	1	10	10.0	5.0	✓
Colour (Apparent) by Spectrometer	E330	1597439	1	15	6.6	5.0	✓
Conductivity in Water	E100	1599515	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1596555	2	21	9.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1599528	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1599512	1	5	20.0	5.0	✓
Metals in Liquid Sludge by CRC ICPMS (mg/L)	E440B	1606104	2	9	22.2	10.0	✓
Nitrate in Water by IC	E235.NO3	1599509	1	17	5.8	5.0	✓
Nitrite in Water by IC	E235.NO2	1599510	1	13	7.6	5.0	✓
pH by Meter	E108	1599516	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1599513	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	1595270	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1596491	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1596882	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1596943	1	15	6.6	5.0	✓

Matrix: **Water**

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*
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1599517	1	7	14.2	5.0	✓
Ammonia by Fluorescence	E298	1603315	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1599511	1	10	10.0	5.0	✓
Colour (Apparent) by Spectrometer	E330	1597439	1	15	6.6	5.0	✓
Conductivity in Water	E100	1599515	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1596555	2	21	9.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1599528	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1599512	1	5	20.0	5.0	✓
Metals in Liquid Sludge by CRC ICPMS (mg/L)	E440B	1606104	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1599509	1	17	5.8	5.0	✓
Nitrite in Water by IC	E235.NO2	1599510	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1599513	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	1595270	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1596491	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1596882	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1596943	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1603315	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1599511	1	10	10.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1596555	2	21	9.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1599528	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1599512	1	5	20.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1599509	1	17	5.8	5.0	✓
Nitrite in Water by IC	E235.NO2	1599510	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1599513	1	6	16.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1596491	1	20	5.0	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1596882	1	20	5.0	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
Conductivity in Water	E100 ALS Environmental - Waterloo	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 ALS Environmental - Thunder Bay	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Waterloo	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Metals in Liquid Sludge by CRC ICPMS (mg/L)	E440B ALS Environmental - Waterloo	Water	6020B (mod)	Sludge samples are digested with nitric and hydrochloric acids, followed by analysis by Collision/Reaction Cell ICPMS. Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. This method does not dissolve all silicate materials and may result in a partial extraction. depending on the sample matrix, for some metals, including, but not limited to Al, Ba, Be, Cr, Sr, Ti, Tl, and V.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Waterloo	Water	APHA 2340B	“Hardness (as CaCO3), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Waterloo	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Thunder Bay	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Waterloo	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Waterloo	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Digestion for Metals and Mercury in Liquid Sludge	EP440B ALS Environmental - Waterloo	Water	EPA 200.2	Liquid Sludge samples are digested with nitric and hydrochloric acids.

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL REPORT

Work Order	: **WT2423402**	Page	: 1 of 26
Amendment	: **1**		
Client	: MTE Consultants Inc.	Laboratory	: ALS Environmental - Waterloo
Contact	: Kyle Reed	Account Manager	: Emily Hansen
Address	: 520 Bingemans Centre Drive Kitchener ON Canada N2B 3X9	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: 519 743 6500	Telephone	: +1 519 886 6910
Project	: 55566-100	Date Samples Received	: 14-Aug-2024 12:45
PO	: ----	Date Analysis Commenced	: 14-Aug-2024
C-O-C number	: 23-1122049	Issue Date	: 27-Aug-2024 15:31
Sampler	: TXG		
Site	: ----		
Quote number	: HydroG		
No. of samples received	: 3		
No. of samples analysed	: 3		

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
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) 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*
Cassandra Grzelewski	Team Leader - Inorganics	Thunder Bay Inorganics, Thunder Bay, Ontario
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Kelly Fischer	Technical Specialist	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Inorganics, Waterloo, Ontario
Nik Perkio	Senior Analyst	Waterloo Metals, Waterloo, Ontario
Walt Kippenhuck	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario

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: **Water**

					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*
Physical Tests (QC Lot: 1595270)											
HA2401870-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	147	149	2	Diff <2x LOR	----
Physical Tests (QC Lot: 1596943)											
WT2423441-002	Anonymous	Turbidity	----	E121	0.10	NTU	11.4	11.6	2.61%	15%	----
Physical Tests (QC Lot: 1597439)											
HA2401889-001	Anonymous	Colour, apparent	----	E330	20.0	CU	1590	1440	9.58%	20%	----
Physical Tests (QC Lot: 1599515)											
WT2423402-001	MP101-24	Conductivity	----	E100	1.0	µS/cm	1070	1070	0.373%	10%	----
Physical Tests (QC Lot: 1599516)											
WT2423402-001	MP101-24	pH	----	E108	0.10	pH units	7.78	7.87	1.15%	4%	----
Physical Tests (QC Lot: 1599517)											
WT2423402-001	MP101-24	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	524	520	0.763%	20%	----
Anions and Nutrients (QC Lot: 1596882)											
HA2401889-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.627	0.626	0.176%	20%	----
Anions and Nutrients (QC Lot: 1599509)											
WT2423460-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1599510)											
WT2423460-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1599511)											
WT2423460-004	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	443	443	0.00955%	20%	----
Anions and Nutrients (QC Lot: 1599512)											
WT2423460-004	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.611	0.614	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1599513)											
WT2423460-004	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	428	428	0.0693%	20%	----
Anions and Nutrients (QC Lot: 1599528)											
HA2401776-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0122	0.0119	2.66%	20%	----
Anions and Nutrients (QC Lot: 1603315)											
HA2401775-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.101	0.103	1.96%	20%	----
Total Metals (QC Lot: 1596491)											
HA2401884-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	136 µg/L	0.133	2.04%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					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*
Total Metals (QC Lot: 1596491) - continued											
HA2401884-001	Anonymous	Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.62 µg/L	0.00059	0.00002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	3.59 µg/L	0.00369	2.56%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	0.064 µg/L	0.000062	0.000002	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0120 µg/L	0.0000128	0.0000008	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	921 µg/L	0.904	0.017	Diff <2x LOR	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.054 µg/L	0.000052	0.000001	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	62.1 µg/L	0.0615	1.00%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	41 µg/L	0.040	0.0003	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.108 µg/L	0.000104	0.000004	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	383 µg/L	0.382	0.266%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	20.0 µg/L	0.0201	0.557%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<50 µg/L	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	251 µg/L	0.250	0.002	Diff <2x LOR	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.94 µg/L	0.00094	0.000003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.067 µg/L	0.000069	0.000002	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.02	1.01	1.68%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	4000 µg/L	4.00	0.102%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	5.78 µg/L	0.00572	1.02%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	0.70	0.76	0.06	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.30 µg/L	0.00034	0.00004	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.104 µg/L	0.000105	1.63%	20%	----

Sub-Matrix: **Water**

					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*
Total Metals (QC Lot: 1596491) - continued											
HA2401884-001	Anonymous	Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	5.4 µg/L	0.0054	0.000009	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.20 µg/L	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 1606104)											
WT2423406-001	Anonymous	Aluminum, total	7429-90-5	E440B	2.0	mg/L	3.1	4.0	1.0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E440B	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E440B	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Barium, total	7440-39-3	E440B	0.040	mg/L	<0.040	<0.040	0	Diff <2x LOR	----
		Beryllium, total	7440-41-7	E440B	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E440B	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E440B	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E440B	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E440B	100	mg/L	340	320	20	Diff <2x LOR	----
		Chromium, total	7440-47-3	E440B	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E440B	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E440B	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E440B	10	mg/L	200	198	0.875%	40%	----
		Lead, total	7439-92-1	E440B	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E440B	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E440B	10	mg/L	53	51	4.55%	40%	----
		Manganese, total	7439-96-5	E440B	0.10	mg/L	1.20	1.20	0.00332%	40%	----
		Molybdenum, total	7439-98-7	E440B	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Nickel, total	7440-02-0	E440B	0.10	mg/L	0.11	<0.10	0.009	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E440B	10	mg/L	54	50	8.92%	40%	----
		Potassium, total	7440-09-7	E440B	10	mg/L	83	82	0.851%	40%	----
		Selenium, total	7782-49-2	E440B	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Silver, total	7440-22-4	E440B	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E440B	10	mg/L	960	969	0.882%	40%	----
		Strontium, total	7440-24-6	E440B	0.0400	mg/L	1.47	1.48	0.538%	40%	----
		Sulfur, total	7704-34-9	E440B	100	mg/L	<100	<100	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E440B	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E440B	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E440B	0.060	mg/L	<0.060	<0.060	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E440B	0.18	mg/L	<0.18	<0.18	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					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*
Total Metals (QC Lot: 1606104) - continued											
WT2423406-001	Anonymous	Uranium, total	7440-61-1	E440B	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E440B	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E440B	0.60	mg/L	<0.60	<0.60	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E440B	0.060	mg/L	<0.060	<0.060	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1596555)											
WT2423254-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0037	0.0034	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.23 µg/L	0.00023	0.0000002	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.21 µg/L	0.00023	0.00002	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	104 µg/L	0.101	2.59%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	62 µg/L	0.063	0.0003	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.571 µg/L	0.000550	3.82%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	126	126	0.621%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.15 µg/L	0.00015	0.000002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	2.76 µg/L	0.00273	1.12%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.098 µg/L	0.000098	0.0000006	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	14.3	14.2	0.986%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0886	0.0887	0.198%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.565 µg/L	0.000577	2.15%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.78 µg/L	0.00073	0.00006	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.30	2.45	6.38%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00069	0.00067	0.00002	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.105 µg/L	0.000112	0.000007	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	5.35	5.32	0.516%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.010 µg/L	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	4870 µg/L	4.70	3.60%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	3.68	3.62	1.51%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	13.6	13.4	1.96%	20%	----

Sub-Matrix: **Water**

					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*
Dissolved Metals (QC Lot: 1596555) - continued											
WT2423254-001	Anonymous	Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	0.00022	0.00002	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.010 µg/L	<0.000010	0.0000002	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00019	0.00019	0.0000008	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.435 µg/L	0.000431	1.06%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.50 µg/L	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	9.2 µg/L	0.0088	0.0004	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1596578)											
WT2423402-002	MP102-24	Aluminum, dissolved	7429-90-5	E421	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00100	mg/L	0.108	0.108	0.410%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000200	mg/L	<0.000200	<0.000200	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.100	mg/L	0.446	0.448	0.002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000500	mg/L	0.0000655	0.0000916	0.0000261	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.500	mg/L	120	125	3.64%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00100	mg/L	0.00409	0.00414	0.00005	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00200	mg/L	<0.00200	0.00324	0.00124	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0500	mg/L	26.8	26.3	1.92%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00100	mg/L	3.04	3.08	1.57%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000500	mg/L	0.00185	0.00180	0.000046	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00500	mg/L	0.00801	0.00854	0.00053	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.500	mg/L	2.81	2.80	0.011	Diff <2x LOR	----
		Rubidium, dissolved	7440-17-7	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					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*
Dissolved Metals (QC Lot: 1596578) - continued											
WT2423402-002	MP102-24	Selenium, dissolved	7782-49-2	E421	0.000500	mg/L	<0.000500	<0.000500	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.500	mg/L	4.44	4.39	0.048	Diff <2x LOR	----
		Silver, dissolved	7440-22-4	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.500	mg/L	308	312	1.24%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00200	mg/L	0.233	0.234	0.267%	20%	----
		Sulfur, dissolved	7704-34-9	E421	5.00	mg/L	10.7	10.8	0.11	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00300	mg/L	<0.00300	<0.00300	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000100	mg/L	0.000266	0.000280	0.000015	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00500	mg/L	<0.00500	<0.00500	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0100	mg/L	2.65	2.69	1.27%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00200	mg/L	<0.00200	<0.00200	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1595270)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1596943)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1597439)						
Colour, apparent	----	E330	2	CU	<2.0	----
Physical Tests (QCLot: 1599515)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1599517)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 1596882)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1599509)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1599510)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1599511)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1599512)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1599513)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1599528)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1603315)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Total Metals (QCLot: 1596491)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1596491) - continued						
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 1606104)						
Aluminum, total	7429-90-5	E440B	2	mg/L	<2.0	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1606104) - continued						
Antimony, total	7440-36-0	E440B	0.02	mg/L	<0.020	----
Arsenic, total	7440-38-2	E440B	0.02	mg/L	<0.020	----
Barium, total	7440-39-3	E440B	0.04	mg/L	<0.040	----
Beryllium, total	7440-41-7	E440B	0.02	mg/L	<0.020	----
Bismuth, total	7440-69-9	E440B	0.01	mg/L	<0.010	----
Boron, total	7440-42-8	E440B	2	mg/L	<2.0	----
Cadmium, total	7440-43-9	E440B	0.002	mg/L	<0.0020	----
Calcium, total	7440-70-2	E440B	100	mg/L	<100	----
Chromium, total	7440-47-3	E440B	0.1	mg/L	<0.10	----
Cobalt, total	7440-48-4	E440B	0.1	mg/L	<0.10	----
Copper, total	7440-50-8	E440B	0.2	mg/L	<0.20	----
Iron, total	7439-89-6	E440B	10	mg/L	<10	----
Lead, total	7439-92-1	E440B	0.02	mg/L	<0.020	----
Lithium, total	7439-93-2	E440B	0.2	mg/L	<0.20	----
Magnesium, total	7439-95-4	E440B	10	mg/L	<10	----
Manganese, total	7439-96-5	E440B	0.1	mg/L	<0.10	----
Molybdenum, total	7439-98-7	E440B	0.01	mg/L	<0.010	----
Nickel, total	7440-02-0	E440B	0.1	mg/L	<0.10	----
Phosphorus, total	7723-14-0	E440B	10	mg/L	<10	----
Potassium, total	7440-09-7	E440B	10	mg/L	<10	----
Selenium, total	7782-49-2	E440B	0.01	mg/L	<0.010	----
Silver, total	7440-22-4	E440B	0.01	mg/L	<0.010	----
Sodium, total	7440-23-5	E440B	10	mg/L	<10	----
Strontium, total	7440-24-6	E440B	0.02	mg/L	<0.0400	----
Sulfur, total	7704-34-9	E440B	100	mg/L	<100	----
Thallium, total	7440-28-0	E440B	0.002	mg/L	<0.0020	----
Tin, total	7440-31-5	E440B	0.02	mg/L	<0.020	----
Titanium, total	7440-32-6	E440B	0.06	mg/L	<0.060	----
Uranium, total	7440-61-1	E440B	0.002	mg/L	<0.0020	----
Vanadium, total	7440-62-2	E440B	0.1	mg/L	<0.10	----
Zinc, total	7440-66-6	E440B	0.6	mg/L	<0.60	----
Zirconium, total	7440-67-7	E440B	0.06	mg/L	<0.060	----
Dissolved Metals (QCLot: 1596555)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1596555) - continued						
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1596555) - continued						
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 1596578)						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1596578) - continued						
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1595270)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	89.3	85.0	115	----
Physical Tests (QCLot: 1596943)									
Turbidity	----	E121	0.1	NTU	200 NTU	95.5	85.0	115	----
Physical Tests (QCLot: 1597439)									
Colour, apparent	----	E330	2	CU	25 CU	95.8	70.0	130	----
Physical Tests (QCLot: 1599515)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1599516)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1599517)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	98.4	85.0	115	----
Anions and Nutrients (QCLot: 1596882)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.333 mg/L	97.6	80.0	120	----
Anions and Nutrients (QCLot: 1599509)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1599510)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1599511)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1599512)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1599513)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1599528)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.05 mg/L	99.2	80.0	120	----
Anions and Nutrients (QCLot: 1603315)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----
Total Metals (QCLot: 1596491)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	98.8	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1596491) - continued									
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	109	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	98.9	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	100	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	104	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	99.9	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	98.8	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	101	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	102	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	105	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	104	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	105	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	104	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	105	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	103	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	113	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	106	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	104	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	106	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	107	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	103	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	107	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	92.9	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	111	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	102	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	101	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	98.6	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	102	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	103	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	99.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	105	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	107	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1596491) - continued									
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	99.1	80.0	120	----
Total Metals (QCLot: 1606104)									
Aluminum, total	7429-90-5	E440B	2	mg/L	200 mg/L	101	80.0	120	----
Antimony, total	7440-36-0	E440B	0.02	mg/L	100 mg/L	111	80.0	120	----
Arsenic, total	7440-38-2	E440B	0.02	mg/L	100 mg/L	114	80.0	120	----
Barium, total	7440-39-3	E440B	0.04	mg/L	25 mg/L	109	80.0	120	----
Beryllium, total	7440-41-7	E440B	0.02	mg/L	10 mg/L	102	80.0	120	----
Bismuth, total	7440-69-9	E440B	0.01	mg/L	100 mg/L	100	80.0	120	----
Boron, total	7440-42-8	E440B	2	mg/L	100 mg/L	103	80.0	120	----
Cadmium, total	7440-43-9	E440B	0.002	mg/L	10 mg/L	106	80.0	120	----
Calcium, total	7440-70-2	E440B	100	mg/L	5000 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E440B	0.1	mg/L	25 mg/L	106	80.0	120	----
Cobalt, total	7440-48-4	E440B	0.1	mg/L	25 mg/L	105	80.0	120	----
Copper, total	7440-50-8	E440B	0.2	mg/L	25 mg/L	105	80.0	120	----
Iron, total	7439-89-6	E440B	10	mg/L	100 mg/L	104	80.0	120	----
Lead, total	7439-92-1	E440B	0.02	mg/L	50 mg/L	107	80.0	120	----
Lithium, total	7439-93-2	E440B	0.2	mg/L	25 mg/L	96.3	80.0	120	----
Magnesium, total	7439-95-4	E440B	10	mg/L	5000 mg/L	118	80.0	120	----
Manganese, total	7439-96-5	E440B	0.1	mg/L	25 mg/L	108	80.0	120	----
Molybdenum, total	7439-98-7	E440B	0.01	mg/L	25 mg/L	109	80.0	120	----
Nickel, total	7440-02-0	E440B	0.1	mg/L	50 mg/L	104	80.0	120	----
Phosphorus, total	7723-14-0	E440B	10	mg/L	1000 mg/L	116	80.0	120	----
Potassium, total	7440-09-7	E440B	10	mg/L	5000 mg/L	107	80.0	120	----
Selenium, total	7782-49-2	E440B	0.01	mg/L	100 mg/L	107	80.0	120	----
Silver, total	7440-22-4	E440B	0.01	mg/L	10 mg/L	84.7	80.0	120	----
Sodium, total	7440-23-5	E440B	10	mg/L	5000 mg/L	108	80.0	120	----
Strontium, total	7440-24-6	E440B	0.02	mg/L	25 mg/L	110	80.0	120	----
Sulfur, total	7704-34-9	E440B	100	mg/L	5000 mg/L	111	80.0	120	----
Thallium, total	7440-28-0	E440B	0.002	mg/L	100 mg/L	104	80.0	120	----
Tin, total	7440-31-5	E440B	0.02	mg/L	50 mg/L	108	80.0	120	----
Titanium, total	7440-32-6	E440B	0.06	mg/L	25 mg/L	107	80.0	120	----
Uranium, total	7440-61-1	E440B	0.002	mg/L	0.5 mg/L	105	80.0	120	----
Vanadium, total	7440-62-2	E440B	0.1	mg/L	50 mg/L	108	80.0	120	----
Zinc, total	7440-66-6	E440B	0.6	mg/L	50 mg/L	104	80.0	120	----
Zirconium, total	7440-67-7	E440B	0.06	mg/L	10 mg/L	105	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1596555)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	0.1 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	0.05 mg/L	103	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	0.05 mg/L	106	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.012 mg/L	98.9	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.005 mg/L	107	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	0.05 mg/L	100	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	0.05 mg/L	99.2	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.005 mg/L	94.4	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	2.5 mg/L	98.5	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.002 mg/L	100	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.012 mg/L	102	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.012 mg/L	99.8	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.012 mg/L	100.0	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	0.05 mg/L	97.8	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.025 mg/L	101	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.012 mg/L	112	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	2.5 mg/L	115	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.012 mg/L	104	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.012 mg/L	100	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.025 mg/L	100	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	0.5 mg/L	111	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	2.5 mg/L	108	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.005 mg/L	99.2	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	0.05 mg/L	98.6	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	0.5 mg/L	105	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.005 mg/L	90.9	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	2.5 mg/L	109	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.012 mg/L	106	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	2.5 mg/L	109	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.005 mg/L	99.4	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.005 mg/L	96.9	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.025 mg/L	97.3	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.012 mg/L	100	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.005 mg/L	96.9	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0 mg/L	101	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1596555) - continued									
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.025 mg/L	98.5	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.005 mg/L	97.1	80.0	120	----
Dissolved Metals (QCLot: 1596578)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	0.1 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	0.05 mg/L	105	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	0.05 mg/L	105	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.012 mg/L	96.3	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.005 mg/L	101	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	0.05 mg/L	103	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	0.05 mg/L	96.4	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.005 mg/L	94.1	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	2.5 mg/L	94.8	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.002 mg/L	101	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.012 mg/L	100	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.012 mg/L	99.5	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.012 mg/L	100	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	0.05 mg/L	96.0	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.025 mg/L	102	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.012 mg/L	101	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	2.5 mg/L	112	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.012 mg/L	101	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.012 mg/L	99.2	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.025 mg/L	99.0	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	0.5 mg/L	109	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	2.5 mg/L	105	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.005 mg/L	103	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	0.05 mg/L	98.4	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	0.5 mg/L	105	60.0	140	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.005 mg/L	89.8	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	2.5 mg/L	108	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.012 mg/L	106	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	2.5 mg/L	102	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.005 mg/L	99.6	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.005 mg/L	98.9	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1596578) - continued									
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.025 mg/L	96.7	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.012 mg/L	99.2	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.005 mg/L	96.9	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0 mg/L	102	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.025 mg/L	104	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.025 mg/L	99.2	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.005 mg/L	97.2	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1596882)										
HA2401889-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1599509)										
WT2423460-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	12.4 mg/L	12.5 mg/L	99.4	75.0	125	----
Anions and Nutrients (QCLot: 1599510)										
WT2423460-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1599511)										
WT2423460-004	Anonymous	Chloride	16887-00-6	E235.Cl	500 mg/L	500 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1599512)										
WT2423460-004	Anonymous	Fluoride	16984-48-8	E235.F	5.30 mg/L	5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1599513)										
WT2423460-004	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	493 mg/L	500 mg/L	98.6	75.0	125	----
Anions and Nutrients (QCLot: 1599528)										
HA2401776-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0190 mg/L	0.02 mg/L	96.8	70.0	130	----
Anions and Nutrients (QCLot: 1603315)										
HA2401890-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Total Metals (QCLot: 1596491)										
HA2401891-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0942 mg/L	0.1 mg/L	94.2	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0514 mg/L	0.05 mg/L	103	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0533 mg/L	0.05 mg/L	107	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00485 mg/L	0.005 mg/L	97.0	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0499 mg/L	0.05 mg/L	99.8	70.0	130	----
		Boron, total	7440-42-8	E420	0.049 mg/L	0.05 mg/L	97.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00489 mg/L	0.005 mg/L	97.8	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00252 mg/L	0.002 mg/L	101	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0129 mg/L	0.012 mg/L	103	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0125 mg/L	0.012 mg/L	99.9	70.0	130	----
		Copper, total	7440-50-8	E420	0.0125 mg/L	0.012 mg/L	100	70.0	130	----
		Iron, total	7439-89-6	E420	0.049 mg/L	0.05 mg/L	98.7	70.0	130	----
		Lead, total	7439-92-1	E420	0.0252 mg/L	0.025 mg/L	101	70.0	130	----
		Lithium, total	7439-93-2	E420	ND mg/L	----	ND	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0121 mg/L	0.012 mg/L	96.8	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0130 mg/L	0.012 mg/L	104	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1596491) - continued										
HA2401891-001	Anonymous	Nickel, total	7440-02-0	E420	0.0248 mg/L	0.025 mg/L	99.4	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.528 mg/L	0.5 mg/L	106	70.0	130	----
		Potassium, total	7440-09-7	E420	2.60 mg/L	2.5 mg/L	104	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.00497 mg/L	0.005 mg/L	99.5	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0526 mg/L	0.05 mg/L	105	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00454 mg/L	0.005 mg/L	90.7	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00499 mg/L	0.005 mg/L	99.8	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0502 mg/L	0.05 mg/L	100	70.0	130	----
		Thorium, total	7440-29-1	E420	0.00515 mg/L	0.005 mg/L	103	70.0	130	----
		Tin, total	7440-31-5	E420	0.0249 mg/L	0.025 mg/L	99.7	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0125 mg/L	0.012 mg/L	99.8	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00492 mg/L	0.005 mg/L	98.4	70.0	130	----
		Uranium, total	7440-61-1	E420	0.000262 mg/L	0 mg/L	105	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0260 mg/L	0.025 mg/L	104	70.0	130	----
		Zinc, total	7440-66-6	E420	0.0242 mg/L	0.025 mg/L	97.0	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.00501 mg/L	0.005 mg/L	100	70.0	130	----
Dissolved Metals (QCLot: 1596555)										
WT2423254-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0993 mg/L	0.1 mg/L	99.3	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0508 mg/L	0.05 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0567 mg/L	0.05 mg/L	113	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	----	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.00516 mg/L	0.005 mg/L	103	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0465 mg/L	0.05 mg/L	93.0	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	----	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00481 mg/L	0.005 mg/L	96.3	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00252 mg/L	0.002 mg/L	101	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0125 mg/L	0.012 mg/L	100	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0120 mg/L	0.012 mg/L	96.1	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0119 mg/L	0.012 mg/L	95.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	----	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0246 mg/L	0.025 mg/L	98.6	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0128 mg/L	0.012 mg/L	103	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0127 mg/L	0.012 mg/L	102	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0238 mg/L	0.025 mg/L	95.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	0.544 mg/L	0.5 mg/L	109	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	ND mg/L	----	ND	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.00501 mg/L	0.005 mg/L	100	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1596555) - continued										
WT2423254-002	Anonymous	Selenium, dissolved	7782-49-2	E421	0.0576 mg/L	0.05 mg/L	115	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	ND mg/L	----	ND	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00320 mg/L	0.005 mg/L	64.0	70.0	130	MES
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	----	ND	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.00529 mg/L	0.005 mg/L	106	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.0504 mg/L	0.05 mg/L	101	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.00487 mg/L	0.005 mg/L	97.4	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0249 mg/L	0.025 mg/L	99.8	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0128 mg/L	0.012 mg/L	102	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.00486 mg/L	0.005 mg/L	97.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	----	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0261 mg/L	0.025 mg/L	104	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.0245 mg/L	0.025 mg/L	97.8	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.00500 mg/L	0.005 mg/L	100	70.0	130	----
Dissolved Metals (QCLot: 1596578)										
WT2423402-002	MP102-24	Aluminum, dissolved	7429-90-5	E421	0.971 mg/L	1 mg/L	97.1	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.490 mg/L	0.5 mg/L	98.1	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.507 mg/L	0.5 mg/L	101	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.109 mg/L	0.125 mg/L	87.0	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0494 mg/L	0.05 mg/L	98.9	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.461 mg/L	0.5 mg/L	92.3	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.438 mg/L	0.5 mg/L	87.5	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.0448 mg/L	0.05 mg/L	89.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.0242 mg/L	0.025 mg/L	96.7	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.121 mg/L	0.125 mg/L	96.9	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.118 mg/L	0.125 mg/L	94.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.120 mg/L	0.125 mg/L	95.7	70.0	130	----
		Iron, dissolved	7439-89-6	E421	0.449 mg/L	0.5 mg/L	89.8	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.234 mg/L	0.25 mg/L	93.6	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.127 mg/L	0.125 mg/L	102	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.120 mg/L	0.125 mg/L	96.1	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.233 mg/L	0.25 mg/L	93.1	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	5.19 mg/L	5 mg/L	104	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	25.7 mg/L	25 mg/L	103	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0490 mg/L	0.05 mg/L	97.9	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.469 mg/L	0.5 mg/L	93.9	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	4.80 mg/L	5 mg/L	96.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.0412 mg/L	0.05 mg/L	82.5	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 1596578) - continued										
WT2423402-002	MP102-24	Strontium, dissolved	7440-24-6	E421	ND mg/L	----	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	24.8 mg/L	25 mg/L	99.0	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0468 mg/L	0.05 mg/L	93.5	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.471 mg/L	0.5 mg/L	94.2	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0459 mg/L	0.05 mg/L	91.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.233 mg/L	0.25 mg/L	93.2	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.121 mg/L	0.125 mg/L	96.6	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0449 mg/L	0.05 mg/L	89.8	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00240 mg/L	0.002 mg/L	96.1	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.249 mg/L	0.25 mg/L	99.6	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	ND mg/L	----	ND	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0472 mg/L	0.05 mg/L	94.4	70.0	130	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

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
Total Metals (QCLot: 1606104)									
QC-1606104-003	RM	Aluminum, total	7429-90-5	E440B	22500 mg/L	109	70.0	130	----
QC-1606104-003	RM	Antimony, total	7440-36-0	E440B	24.8 mg/L	101	70.0	130	----
QC-1606104-003	RM	Arsenic, total	7440-38-2	E440B	21.2 mg/L	101	70.0	130	----
QC-1606104-003	RM	Barium, total	7440-39-3	E440B	788 mg/L	109	70.0	130	----
QC-1606104-003	RM	Beryllium, total	7440-41-7	E440B	1.82 mg/L	105	70.0	130	----
QC-1606104-003	RM	Bismuth, total	7440-69-9	E440B	1.78 mg/L	97.5	70.0	130	----
QC-1606104-003	RM	Cadmium, total	7440-43-9	E440B	2.15 mg/L	98.4	70.0	130	----
QC-1606104-003	RM	Calcium, total	7440-70-2	E440B	4900 mg/L	105	70.0	130	----
QC-1606104-003	RM	Chromium, total	7440-47-3	E440B	56.9 mg/L	102	70.0	130	----
QC-1606104-003	RM	Cobalt, total	7440-48-4	E440B	32 mg/L	101	70.0	130	----
QC-1606104-003	RM	Copper, total	7440-50-8	E440B	969 mg/L	109	70.0	130	----
QC-1606104-003	RM	Iron, total	7439-89-6	E440B	32700 mg/L	105	70.0	130	----
QC-1606104-003	RM	Lead, total	7439-92-1	E440B	919 mg/L	99.1	70.0	130	----
QC-1606104-003	RM	Lithium, total	7439-93-2	E440B	47.3 mg/L	102	70.0	130	----
QC-1606104-003	RM	Magnesium, total	7439-95-4	E440B	7780 mg/L	112	70.0	130	----
QC-1606104-003	RM	Manganese, total	7439-96-5	E440B	8640 mg/L	111	70.0	130	----
QC-1606104-003	RM	Molybdenum, total	7439-98-7	E440B	25.1 mg/L	104	70.0	130	----
QC-1606104-003	RM	Nickel, total	7440-02-0	E440B	1000 mg/L	110	70.0	130	----
QC-1606104-003	RM	Phosphorus, total	7723-14-0	E440B	660 mg/L	114	70.0	130	----
QC-1606104-003	RM	Potassium, total	7440-09-7	E440B	10800 mg/L	105	70.0	130	----
QC-1606104-003	RM	Selenium, total	7782-49-2	E440B	1.04 mg/L	104	60.0	140	----
QC-1606104-003	RM	Silver, total	7440-22-4	E440B	8.98 mg/L	95.6	70.0	130	----
QC-1606104-003	RM	Sodium, total	7440-23-5	E440B	1770 mg/L	109	70.0	130	----
QC-1606104-003	RM	Strontium, total	7440-24-6	E440B	41 mg/L	107	70.0	130	----
QC-1606104-003	RM	Sulfur, total	7704-34-9	E440B	3940 mg/L	117	50.0	150	----
QC-1606104-003	RM	Thallium, total	7440-28-0	E440B	0.907 mg/L	96.7	70.0	130	----
QC-1606104-003	RM	Tin, total	7440-31-5	E440B	3.79 mg/L	103	40.0	160	----
QC-1606104-003	RM	Titanium, total	7440-32-6	E440B	2790 mg/L	107	70.0	130	----
QC-1606104-003	RM	Tungsten, total	7440-33-7	E440B	6.99 mg/L	113	70.0	130	----
QC-1606104-003	RM	Uranium, total	7440-61-1	E440B	3.97 mg/L	101	70.0	130	----
QC-1606104-003	RM	Vanadium, total	7440-62-2	E440B	66.2 mg/L	101	70.0	130	----
QC-1606104-003	RM	Zinc, total	7440-66-6	E440B	828 mg/L	99.2	70.0	130	----
QC-1606104-003	RM	Zirconium, total	7440-67-7	E440B	6.91 mg/L	# 133	70.0	130	MES

Chain of Custody (COC) / Analytical Request Form

COC Number: 23 - 1122049

Page 1 of 7

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Waterloo

Work Order Reference WT2423402

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	MTE
Contact:	Kyle Reed
Phone:	
	Company address below will appear on the final report
Street:	
City/Province:	Kitchener
Postal Code:	
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☐ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: kreed@mtecs.com

Email 2: tgreer@mtecs.com

Email 3:

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge.

Additional fees may apply to rush requests on weekends, s

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please cont

Project Information

ALS Client Code / QUOTE #: HYDROG

Job / Project #: 55566-100

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (ALS use only): WT2423402 AH

ALS Contact: Emily

Sampler: TXG

Analysis Requ

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

ALS Sample # (ALS 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	Gen Chem	Total metals	Diss. metals	Total P	SAMPLES ON HOLD	EXTENDED STORAGE REQUIF	SUSPECTED HAZARD (see no
	MP101-24	14-Aug-24	1000	GW	4	X	X	X	X			
	MP102-24	↓	1040	GW	4	X	X	X	X			
	Pond		1005	SW	3	X	X		X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☑ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				24.4			

SHIPMENT RELEASE (client use)

Released by: Date: 1240 Aug 14/24 Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: LJ Date: Aug 14, 2024 Time: 12:41

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JAN 2023 FRONT

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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.**

LJ QC-555 MM-973

Appendix F

Nitrate Impact Assessment Calculations

NITRATE IMPACT ASSESSMENT CALCULATIONS
SCENARIO 1: Conventional Septic System (Design Flow)
3027 Cedar Creek Road
Ayr, Ontario
Project Number: 55566-100
Date: August 2024
Design By: KNR

Site Characteristics		
Based on Development Concept Drawing		
Total Site Area (Area Schedule on Draft Plan)	213,000	m^2
Impervious Area - Roadways and Buildings (Area Schedule on Draft Plan)	10,000	m^2
Total Post-Development Infiltration Area	203,000	m^2

IMPACT CALCULATION

$$C_{PB} = \frac{(SEF \times C_{SEF}) + (GR \times C_{BAC})}{SEF + GR}$$

Where:

C_{PB} = Nitrate concentration at the property boundary (mg/L as N)
SEF = Sewage effluent flow (L/yr)
C_{SEF} = Nitrate concentration of sewage effluent (mg/L as N)
GR = Groundwater recharge of precipitation infiltration (L/yr)
C_{BAC} = Background Nitrate Concentration (mg/L as N)

Nitrate Loading			
Nitrate Concentration in Sewage Effluent (N_E)	40	mg/L	
Background Nitrate Concentration (N_B)	3.8	mg/L	Average concentration from onsite monitoring wells

Waste Volume Calculation		
Number of Lots	**1.00**	
Total Effllluent Volume	9,500.00	L/day
Total Effluent Volume (Q_E)	3,467,500.00	L/yr

Dilution Volume Calculation[1]			
Mean Annual Precipitation	923.9	mm	
Evapotranspiration	586	mm	Hydrologic Component Values, adjusted for site latitude
Surplus	337.9	mm	
Infiltration Factor	0.2		
Infiltration (mm)	68	mm	
Infiltration (m)	0.068	m	
Dilution Volume	13,718.740	m^3/yr	
Dilution Volume (D_W)	13,718,740	L/yr	
C_o	11.10	mg/L	
Ontario Drinking Water Quality Standard	10	mg/L	

Development Considerations based on Number of Lots:

Lot Size (area / number of lots)	203000.000	m^2
	20.300	hectares
	50.162	acres

1. Determine whether Site is characterized as Hilly, Rolling, or Flat. Ranges are from Chart 2.4 of Ministry of Agriculture and Food Document "Determination of Runoff from Agricultural Areas"
   Hilly - 10-30% slope
   Rolling - 5-10% Slope
   Flat - 0-5% Slope

2. Infiltration Factor is based on Site characteristics as outlined in the attached Water Balance Table, derived from MOE Document "Stormwater Management Planning and Design Manual, 2003"

NITRATE IMPACT ASSESSMENT CALCULATIONS
SCENARIO 2: Conventional Septic System (Typical Flow)
3027 Cedar Creek Road
Ayr, Ontario
Project Number: 55566-100
Date: August 2024
Design By: KNR

Site Characteristics		
Based on Development Concept Drawing		
Total Site Area (Area Schedule on Draft Plan)	213,000	m^2
Impervious Area - Roadways and Buildings (Area Schedule on Draft Plan)	10,000	m^2
Total Post-Development Infiltration Area	203,000	m^2

IMPACT CALCULATION

$$C_{PB} = \frac{(SEF \times C_{SEF}) + (GR \times C_{BAC})}{SEF + GR}$$

Where:

C_{PB} = Nitrate concentration at the property boundary (mg/L as N)
SEF = Sewage effluent flow (L/yr)
C_{SEF} = Nitrate concentration of sewage effluent (mg/L as N)
GR = Groundwater recharge of precipitation infiltration (L/yr)
C_{BAC} = Background Nitrate Concentration (mg/L as N)

Nitrate Loading			
Nitrate Concentration in Sewage Effluent (N_E)	40	mg/L	
Background Nitrate Concentration (N_B)	3.8	mg/L	Average concentration from onsite monitoring wells

Waste Volume Calculation		
Number of Lots	**1.00**	
Total Effllluent Volume	4,750.00	L/day
Total Effluent Volume (Q_E)	1,733,750.00	L/yr

Dilution Volume Calculation[1]			
Mean Annual Precipitation	923.9	mm	
Evapotranspiration	586	mm	Hydrologic Component Values, adjusted for site latitude
Surplus	337.9	mm	
Infiltration Factor	0.2		
Infiltration (mm)	68	mm	
Infiltration (m)	0.068	m	
Dilution Volume	13,718.740	m^3/yr	
Dilution Volume (D_W)	13,718,740	L/yr	
C_o	7.86	mg/L	
Ontario Drinking Water Quality Standard	10	mg/L	

Development Considerations based on Number of Lots:

Lot Size (area / number of lots)	203000.000	m^2
	20.300	hectares
	50.162	acres

1. Determine whether Site is characterized as Hilly, Rolling, or Flat. Ranges are from Chart 2.4 of Ministry of Agriculture and Food Document "Determination of Runoff from Agricultural Areas"
   Hilly - 10-30% slope
   Rolling - 5-10% Slope
   Flat - 0-5% Slope

2. Infiltration Factor is based on Site characteristics as outlined in the attached Water Balance Table, derived from MOE Document "Stormwater Management Planning and Design Manual, 2003"

Appendix G

Phosphorus Impact Assessment Calculations

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	55566-100 Cedar Creek Road		
Date:	8/27/2024	Prepared by:	Kyle Reed
		Contaminant:	Phosphorus

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

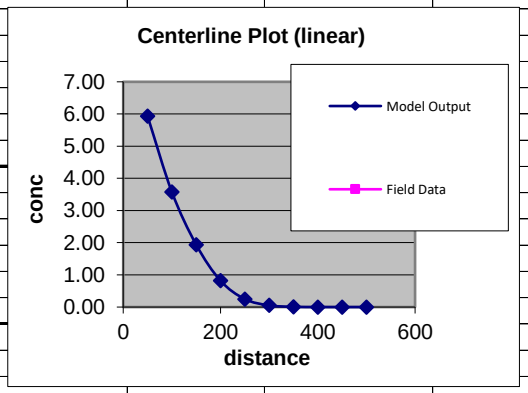
SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
12	1.80E+01	1.80E+00	1.00E-04	0	20	5	10950

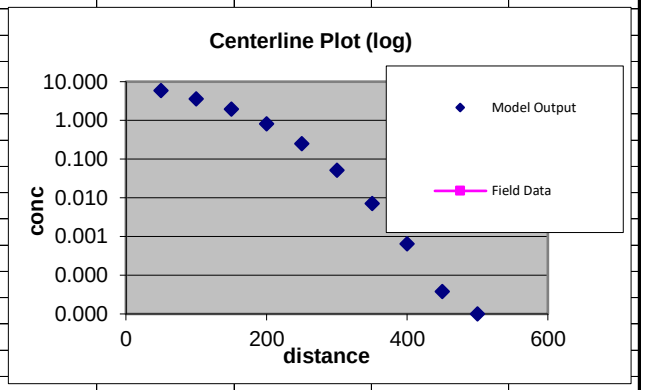
Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^3)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
9.90E+00	0.01	0.3	1.81	780	5.00E-03	24.53	0.013452915

Point Concentration

x(ft)	y(ft)	z(ft)
180	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	180	0	0
at	10950	days =	1.198 mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 500

Width (ft) 200

	50	100	150	200	250	300	350	400	450	500
200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000
0	5.935	3.578	1.939	0.818	0.248	0.052	0.007	0.001	0.000	0.000
-100	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000
-200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Field Data: Centerline C Concentration

Distance from Source

ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	55566-100 Cedar Creek Road						
Date:	8/27/2024	Prepared by:	Kyle Reed				
		Contaminant:	Phosphorus				

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
12	3.75E+01	3.75E+00	1.00E-04	0	20	5	10950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm^{3})	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
9.90E+00	0.01	0.3	1.81	780	5.00E-03	24.53	0.013452915

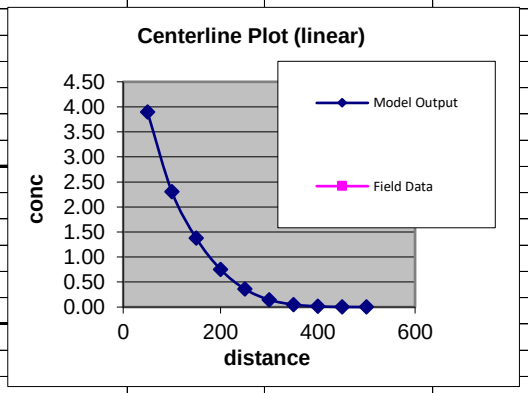
NEW QUICK_DOMENICO.XLS

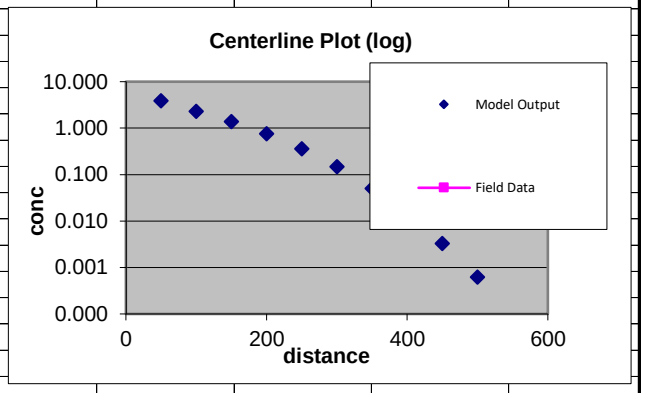
SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

Point Concentration

x(ft)	y(ft)	z(ft)
375	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	375	0	0
at	10950	days =	0.027 mg/l





AREAL MODEL CALCULATION DOMAIN

Length (ft) 500

Width (ft) 200

	50	100	150	200	250	300	350	400	450	500
200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.004	0.018	0.029	0.026	0.016	0.008	0.003	0.001	0.000
0	3.894	2.304	1.378	0.753	0.360	0.147	0.050	0.014	0.003	0.001
-100	0.000	0.004	0.018	0.029	0.026	0.016	0.008	0.003	0.001	0.000
-200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Field Data: Centerline C Concentration

Distance from Source