Hydrogeology Assessment
Metcalfe Agricultural Society
2821 8th Line Road, Metcalfe, Ontario

Final Report

October 21, 2025

Prepared for:
Metcalfe Agricultural Society

Prepared by:
Stantec Consulting Ltd.

Project Number
160901295

Stantec

Limitations and Sign-off

The conclusions in the Report titled Hydrogeology Assessment Metcalfe Agricultural Society 2821 8th Line Road, Metcalfe, Ontario are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Senior Groundwater Modeller
Printed Name and Title

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List of Appendices

Abbreviations

AMSL	Above Mean Sea Level
Egis	Egis Canada Ltd.
LSI	Langelier Saturation Index
m BGS	Meters Below Ground Surface
MECP	Ministry of Environment, Conservation and Parks
MNR	Ministry of Natural Resources
NTU	Nephelometric Turbidity Unit
ODWQS	Ontario Drinking Water Quality Standards
OGS	Ontario Geological Survey
O.Reg.	Ontario Regulation
Project	Proposed single-storey building and sewage treatment system
RSI	Ryznar Stability Index
Site	2821 8th Line Road in Metcalfe, Ontario
Stantec	Stantec Consulting, Ltd.
UV	Ultraviolet
WWR	Water Well Record

1 Introduction

On behalf of the Metcalfe Agricultural Society (the Client), Stantec Consulting Ltd. (Stantec) has completed a hydrogeology assessment to support the proposed development of a single-storey building and associated sewage treatment system (the Project), located at 2821 8th Line Road in Metcalfe, Ontario, herein referred to as the Site (Figure 1, Appendix A).

The Site is in the Village of Metcalfe and is currently owned and operated by the Client. The Site is the location for community activities such as a farmers' market, the Metcalfe Fair, agricultural exhibitions, weddings, and other public and private events. Structures on Site include a single-storey building, a barn, and shade structures. Site structures are identified by name on Figure 1. There is an existing private well on Site that provides potable drinking water to the Lion's Den and Curling Club, ('Existing Water Supply Well' Figure 1). There is a second water supply well on the west side of the Hicks Building ('Existing Well', Figure 1), which supplies water to a livestock wash station. Reportedly, the water from this well is not used for drinking.

The proposed development plans include demolishing the existing Lion's Den building and replacing it with a new single-storey building in the same location. A new sewage treatment system will be installed at the southwestern corner of the Site and service the Curling Club and the Lion's Den buildings. A new water supply well (PW25-01) was installed at the Site in September 2025 and will service the new Lion's Den building and the Curling Club.

1.1 Purpose

In support of a Site Plan Control application, a pre-consultation meeting was held with the Client and the City of Ottawa (the "City") and noted the following:

- A previous groundwater assessment program completed for the Village of Metcalfe (Golder 2003) identified groundwater quality concerns in the shallow bedrock aquifer.
- Thin overburden soils (less than 2 m thick) are mapped in the north and northwest portion of the Site requiring an investigation to determine if the Site is hydrogeologically sensitive.

As a result of the consultation, a hydrogeological investigation (this report) and a terrain analysis were deemed a necessary component of the Site Plan Control application. This hydrogeological report has been prepared in accordance with the following: Ontario Ministry of Environment, Conservation and Parks (MECP) provincial procedure D-5-5 (MOEE 1996) and the City of Ottawa's hydrogeological and terrain analysis guidelines (City of Ottawa 2021). Performance testing of the new groundwater supply well was undertaken to determine sustainable yield and groundwater samples were collected to assess groundwater quality.

Stantec understands Egis Canada Ltd. (Egis) is in the process of designing a new septic system to service the proposed building. Septic design details and the terrain analysis are provided by Egis under separate cover.

1.2 Water Demand

Egis advised Stantec the anticipated average water demand for the new Lion's Den and the Curling Club are estimated at 3,336 L/day and 4,455 L/day, respectively. Peak demand for the Lion's Den is expected to be in the range of about 3,300 L/hour over a four-hour period (when the facility is used for private events, such as a wedding) and 1,113 L/hour over a 4-hour period for the Curling Club.

Although it is not expected, if peak demand for the Lion's Den and Curling Club occur simultaneously, the total peak demand becomes 4,414 L/hour (17,655 L over four hours) or 73.6 L/minute.

1.3 Report Organization

This report is arranged into eight sections, including this introduction (Section 1). Section 2 provides a summary of the Site setting. A summary of the field study methodology and results are provided in Sections 3 and 4, respectively. The study conclusions and recommendations are presented in Section 5, with references provided in Section 6.

All figures and tables referenced in the report are presented in Appendix A and 1, respectively. Appendix C provides the MECP Water Well Record (WWR). The pumping test analysis results are included in Appendix D. The certificate of analysis from the laboratory is included in Appendix E.

2 Site Setting

Land use within 500 m of the Site reflects a combination of community, agricultural farmland, residential and institutional (schools) areas. There is a community arena on the north adjacent side of the Site, residential homes to the south and east, and a school to the west.

2.1 Topography and Surface Water Features

Based on a review of regional topographic mapping, ground surface topography in Metcalfe generally slopes from northwest to southeast towards the Middle Cator River. Ground surface elevations on Site generally range between 85 m above mean sea level (AMSL) near the eastern end of the Site and rises to about 90 m AMSL towards the western end of the Site (MNR, 2025).

Based on a review of the Ministry of Natural Resources (MNR) Web Mapping application (MNR, 2025), the Middle Castor River is located approximately 650 m southeast of the Site and flows eastward into the Castor River. There is an unnamed tributary of the Middle Castor River located approximately 500 m west of the Site.

2.2 Geology and Hydrogeology

The geology and hydrogeology at the Site were assessed based on a review on regional geology mapping, MECP (2024) Water Well Records (WWRs), and available reports.

Surficial geology and bedrock mapping by the Ontario Geological Survey (OGS 2010) are presented on Figure 2 and Figure 3, respectively. As shown on Figure 2, the Site is mapped in an area characterized by silty to sandy till deposits. Areas surrounding the Site are mapped as fine textured glaciomarine deposits. Bedrock near the Site is described by Armstrong and Dodge (2007) as dolostone and sandstone of the Oxford Formation, part of the Beekmantown Group ((Figure 3). Bedrock beneath the Site consists of limestone and was confirmed during coring completed as part of Stantec's geotechnical investigation (2025) at depths between 0.9 m and 0.8 m below ground surface (BGS).

The key geological units in the vicinity of the Site are presented below based on the review of the regional mapping, MECP WWR and available public reports:

Overburden: MECP WWR within 500 m of the Site indicate the overburden material is generally characterized by clay with some silt and sand (MECP 2024). Overburden generally extends from ground surface to about 17 m BGS.

Oxford Formation (Aquifer): The Oxford Formation is characterized by dolostone with thin shale interbeds (Golder, MRSPR, 2009). The dolostone can be thinly to thickly bedded and occurrences of calcite-filled vugs are common (OGS 1991).

March Formation (Aquifer): The March Formation is composed of interbedded quartz sandstone and dolostone. This formation represents a transition zone from the dolostone and shale of the Oxford Formation to the sandstone of the underlying Nepean Formation (OGS 1991). The Oxford / March Formation contact is about 40 m BGS in the Metcalfe area (Golder 2003). Sustainable yield for the Oxford and March formations is estimated at 7.87 L/s and 47.2 L/s, respectively (Golder 2003).

Nepean Formation (Aquifer): The Nepean Formation is a sandstone bedrock aquifer that underlies a large portion of the City of Ottawa. The Nepean Sandstone Aquifer is a significant regional bedrock aquifer that provides drinking water to the City of Ottawa and central Eastern Ontario (Golder, MRSPR, 2009). The Nepean Formation is about 67 m BGS in the Metcalfe area and is expected to be at least 10 m thick (Golder 2003). Pumping tests indicate sustainable yield in the Nepean aquifer is about 92 L/s (Golder 2003).

The inferred direction of regional groundwater flow in the lower Oxford / March and Nepean Formations is to the east / southeast (Golder 2003). The inferred direction of groundwater flow in the upper shallow aquifer (Oxford Formation) is to the southeast, toward the Middle Castor River.

2.2.1 Local Geology

There are two water supply wells near the western end of the Site (Figure 4). The MECP WWR for the commercial well (Well ID 1517002) indicates a layer of clay with sand from ground surface to 1 m BGS followed by limestone bedrock to 40 m BGS. The domestic well (Well ID 1507651) describes the subsurface as hardpan (cemented soil) from surface to 4 m BGS, underlain by limestone bedrock to its completion depth of 10 m BGS.

The Stantec (2025) geotechnical investigation reported similar subsurface conditions to those described above for WWRs. The subsurface conditions encountered consisted of topsoil / fill extending from surface to approximately 1 m BGS followed by limestone bedrock (Stantec 2025). The geotechnical borehole locations are shown on Figure 1.

Lithology at the new water supply well (PW25-01) is described as gravel / broken rock from surface to 1.8 m BGS followed by blue limestone to 11 m BGS. Grey limestone was observed from 11 m BGS to the completion depth. It is noted trace white sandstone was observed between 55 m and 73 m BGS, suggesting potential transition zone from the Oxford / March to the Nepean Formation. The location of PW25-01 is shown on Figure 1 and a copy of the MECP well record is provided in Appendix C.

Based on the available WWR and existing reports, overburden thickness in the vicinity of the proposed building is expected to be 1 m or less deeming the Site hydrogeologically sensitive.

2.3 Local Groundwater Use

The potential for private wells within 500 m of the Site was reviewed. Results of the MECP WWRs review identified 103 records, with five reporting wells as abandoned and the remaining reporting wells utilized for water supply (Figure 4). These wells were constructed between 1949 and 2019 and completed to depths ranging from 10 m to 135 m BGS in bedrock. The median well depth within 500 m of the Site is about 30 m BGS.

The shallow bedrock aquifers (the March / Oxford formation) are interpreted to be the main water supply aquifer for the surrounding private water supply wells.

At the Site, the private well that provides potable drinking water to the Lion's Den and Curling Club ('Existing Water Supply Well' on Figure 1) is interpreted to be associated with MECP WWR ID 1517002 (Figure 4). The water supply well on the west side of the Hicks Building ('Existing Well' on Figure 1) which supplies water to a livestock wash station is interpreted to be associated with WWR ID 1507651 (Figure 4).

3 Field Study Instrumentation and Methodology

3.1 PW25-01 Well Drilling

Under the supervision of the Client, a groundwater supply well (PW25-01) was drilled by Air-Rock Drilling Ltd. (Well Contractor License No. T3632) on September 8, 2025. The well was completed with a 158.75 mm diameter (6 ¼ inch) steel casing extending to 14.6 m BGS. The annular space was grouted with bentonite slurry and neat cement slurry in accordance with Ontario Regulation (O.Reg.) 903. A 155.6 mm open hole was drilled from 14.6 m to the completion depth of 73 m BGS. The well was drilled using the air-percussion method and has a lockable protective cover with a stick-up of 0.4 m above ground.

The location of PW25-01 is shown on Figure 1 and a copy of the MECP well record is provided in Appendix C. As described in Section 2.2.1, the main formation encountered during drilling was limestone bedrock. Overburden was not observed.

3.2 PW25-01 Performance Testing

An 8-hour well performance test was conducted at PW25-01 on September 10, 2025. Prior to the test, PW25-01 was instrumented with a Solinst Levelogger® pressure transducer to measure and record the groundwater level at one second intervals. A Solinst Barologger™ was also deployed to measure and record barometric pressure to allow for compensation of the level data. Pressure transducer measurements were supplemented with manual measurements recorded using an electronic water level tape. The discharge point was located approximately 10 m northeast of TW25-01.

The sequence of the pumping test program is summarized below:

- A pump was installed at approximately 70 m BGS.
- Pumping was started at PW25-01 at 8:30 AM at a flow rate of 56.8 L/minute (15 Gal/minute).
- Pumping was temporarily suspended at approximately 1:30 PM (5 hours after pumping began) to re-fuel the generator. The pump was turned back on and continued at a rate of 56.8 L/minute (15 Gal/minute).
- The pumping test was concluded at 4:30 PM.
- Recovery was monitored until approximately 5:30 PM.

Field parameters (pH, temperature, turbidity, colour, conductivity, chlorine, and hydrogen sulphide) were measured throughout the test using a Hanna instrument, HACH turbidity meter, a HACH DR 900 and 890 colourimeter, and chlorine reagent kits. A summary of manual water level measurements and field parameters is provided in Table 1 (Appendix B).

During the pumping test, two groundwater samples were collected from PW25-01: the first after four hours of pumping and the second after eight hours of pumping (just before the conclusion of the test). The samples were collected from an outlet in the discharge line. Sample bottles were packed into coolers with ice to maintain sample temperature below 10°C during transit to Bureau Veritas Laboratory (BV Lab) in Ottawa, Ontario for analysis. Groundwater samples were submitted for analysis of the 'Subdivision Package' suite of parameters as outlined in the Hydrogeological and Terrain Analysis Guidelines (City of Ottawa 2021). At the request of the City at the pre-consultation stage, samples were also analyzed for petroleum hydrocarbons (PHCs) and benzene, toluene, ethylbenzene and xylenes (BTEX).

4 Field Study Results and Interpretation

After the groundwater supply well installation, the driller completed a one-hour pumping test to estimate the potential yield of the well. The recommended pump rate as noted on the well record is 56.8 L/minute, or 15 Gal/minute (Appendix C). The recommended rate was used to conduct an eight-hour pumping test at the groundwater supply well (PW25-01).

4.1 Groundwater Quantity

4.1.1 Constant Rate Pumping Test Results

A complete record of water level response to pumping over time at PW25-01 is shown on Figure 5 and a plot of drawdown vs log time is shown on Figure 6. Prior to the test, a static water level of 7.1 m BGS was recorded. During pumping, the maximum drawdown in PW25-01 was 14 m. At the conclusion of the test, the water level recovered to approximately 90% of static level within one hour. A total of approximately 27,200 L of water was pumped from PW25-01 over the course of eight hours.

A conventional approach to calculating aquifer parameters in response to groundwater pumping is through application of the Theis (1935) solution. This solution is designed to calculate the transmissivity and storativity of the aquifer based on the observed groundwater level drawdown, with respect to time and distance from the pumping well. The Theis solution carries several assumptions (i.e., groundwater flows within a confined, uniformly thick, horizontal, homogeneous, isotropic aquifer of infinite lateral extent and with no groundwater recharge to the aquifer). However, this analysis is generally considered to provide satisfactory estimates where these ideal conditions are not met (Toth, 1966).

The pumping test and recovery data were analyzed with the Aqtesolv™ software package using the Theis (1935) analytical solution to determine the bulk aquifer formation parameters (transmissivity and storativity).

Applying the Theis analytical solution to the PW25-01 data, the bulk transmissivity (T in units of m^2/day) of the bedrock can be estimated as follows:

$$T = 0.183 \frac{Q}{\Delta s}$$

Where: Q = pumping rate (m^3/day)

Δs = slope of the observed drawdown per log cycle (m of drawdown per log cycle in time)

Based on the above assessment, the bulk transmissivity of the bedrock near PW25-01 is interpreted to be approximately 5 m^2/day. The solution curve from Aqtesolv for the above analysis is provided in Appendix D.

4.1.2 Long Term and Peak Yield

Also as noted in Section 1.2, although it is not expected, the estimated peak demand of 73.6 L/minute would have to be sustained for four hours. The well was pumped at approximately 77% of this rate for eight hours and the water level was stable with approximately 14 m of drawdown and 24 m of remaining available drawdown for the final three hours. As such, it is reasonable to assume that PW25-01 is capable of meeting the estimated peak demand.

The 20-year safe pumping rate was calculated using the Farvolden method as 64 L/minute and using the Moell method as 50 L/minute. Details of the calculations, including references to the documentation of the methods are provided in Appendix D. These numbers imply that the well could be pumped continuously at this rate for 20 years without going dry. As noted in Section 1.2, the average combined demand for the Lion's Den and the Curling Club is 5.4 L/minute or approximately one tenth of the theoretical safe yield. Therefore, it is reasonable to assume that the well is capable of meeting the estimated average demand.

4.2 Groundwater Quality

4.2.1 Existing Groundwater Quality

Elevated concentrations of nitrate are common within agricultural areas and residential areas serviced by private septic systems. A groundwater sampling program conducted for the Village of Metcalfe by Golder (2003) identified detectable levels of nitrate throughout the Village. Other indicator parameters tested such as chloride and total coliforms were detected at elevated levels where population density in the Village is highest (Golder 2003). Chloride was found to be increasing in concentration with time (Golder 2003). Road salt application often contributes to elevated concentrations of chloride in groundwater. The deep water bearing zone in Metcalfe (71 m to 74 m deep) is expected to be protected from potential contaminants of concern originating at ground surface (Golder 2003).

Therefore, to mitigate the long-term risk of encountering poor water quality, the new groundwater supply well (PW25-01) was set with a 15 m casing which is longer than the minimum 6 m required by O.Reg. 903 and drilled into the deeper water bearing zone (73 m BGS). To mitigate potential impacts from the proposed septic system, the newly installed groundwater supply well was installed approximately 250 m northeast of the leaching bed. Septic design details are provided in the septic and terrain analysis report provided by Egis under separate cover.

4.2.2 Groundwater Quality Results

As shown in Table 1, field parameters improved during the pumping test. For example, turbidity decreased from 15.2 Nephelometric Turbidity Unit (NTU) at one hour to 0.9 NTU at eight hours. According to Health Canada (2013), groundwater turbidity below 1.0 NTU is less likely to interfere with treatment such as ultraviolet (UV) disinfection. Free and total chlorine concentrations were confirmed using a colorimeter DR900 with chorine reagent kits with test range of 0.01 to 2 mg/L. The chlorine concentration dropped from 1.6 mg/L at one hour to less than 0.01 mg/L at eight hours (Table 1).

Groundwater quality analytical results are summarized in Table 2. The laboratory certificate of analysis is provided in Appendix E. The analytical results indicated that the quality of groundwater from the groundwater supply well (PW25-01) met all health related parameters of the Ontario Drinking Water Quality Standards (ODWQS). Specific notes regarding the analytical results are as follows:

- Hardness (460 mg/L after four hours of pumping and 450 mg/L after eight hours of pumping) exceeded the operational guideline of 80-100 mg/L, which is common in the area.
- Total dissolved solids (TDS) (995 mg/L after four hours of pumping and 990 mg/L after eight hours of pumping), exceeded the operational guideline of 500 mg/L.
- Total sodium was 120 mg/L and below the aesthetic objective of 200 mg/L, however exceeded the Medical Officer of Health Reporting Limit of 20 mg/L. Once sodium concentrations exceed 20 mg/L, the local Medical Officer of Health should be notified. It is noted that dissolved chloride was detected at 110 mg/L.

The Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) calculations are provided in Appendix F. The LSI result indicates the water is super saturated and tends to precipitate a scale layer of calcium carbonate (slightly scale forming). The RSI result is in the ideal range for the formation of a protective corrosion inhibitor film. No treatment is normally required for these levels of LSI and RSI.

A standard water softener can be installed to remove hardness in the raw water. Conventional water softeners will introduce sodium into the water supply, and it may be appropriate to bypass the water softener with a separate tap for drinking water.

The use of disinfection such as an ultraviolet (UV) system may be desired. Based on the observed water quality results, there should not be any hindrances to UV disinfection.

5 Conclusions and Recommendations

The Metcalfe Agricultural Society is re-developing a portion of the Site with a single-storey building and associated sewage treatment system. As part of the re-development process, a new groundwater supply well (PW25-01) was installed at the Site in September 2025 which will supply potable water to the Curling Club and the new Lion's Den buildings. The new groundwater supply well was drilled to a total depth of 73 m and completed with a 15 m long steel casing as the Site is considered hydrogeologically sensitive.

To assess the groundwater supply potential at PW25-01, a groundwater pumping test was conducted over an eight-hour period. The test indicated that the well can meet the average and peak demand for the Lion's Den and Curling Club combined. The groundwater quality results met all ODWQS health-related criteria, however, exhibited concentrations of hardness and total dissolved solids above operational guidelines, and sodium above the Medical Officer of Health Reporting Limit . Water softening may be desirable, which may increase sodium concentrations. Prior to occupation, it is recommended that the Client notify the local Medical Officer of Health of the sodium concentration exceeding the 20 mg/L limit. Due to the low field turbidity observed in the fully developed test wells, a UV system may be used as a precaution against bacteriological impacts.

Septic design details are provided in the septic and terrain analysis report prepared by Egis under separate cover. A separation distance of at least 50 m is recommended between the groundwater supply well and the on-site septic system.

6 References

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Appendices

Appendix A Figures

Stantec

Legend

- Site Boundary
- Borehole (Stantec, 2024)
- Existing Water Supply Well
- Existing Well
- Test Well
- Hydro Line
- Proposed 1 Storey Building

0 25 50 m

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Notes

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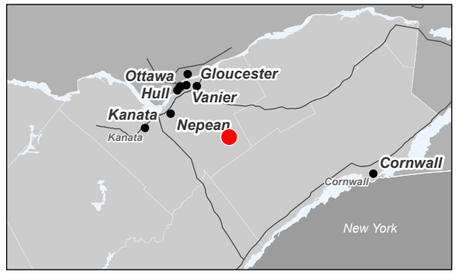

Project Location

REVA
Prepared by PMoser on 2025-10-09
Technical Review by JM on 2025-08-26

Client/Project
METCALFE AGRICULTURAL SOCIETY
2821 8TH LINE ROAD, METCALFE, ON

Figure No.
1

Title
Site Location

Stantec

Legend

- Site Boundary
- Study Area (500m)
- Major Road
- Minor Road
- Hydro Line
- Contour (10 m Interval)
- Contour (5 m Interval)
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody

Surficial Geology

- 20: Organic deposits
- 19: Modern alluvial deposits
- 11b: Coarse-textured glaciomarine deposits (Littoral-foreshore deposits)
- 10a: Fine-textured glaciomarine deposits (Massive-well laminated)
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 3: Paleozoic bedrock

0 250 500 m

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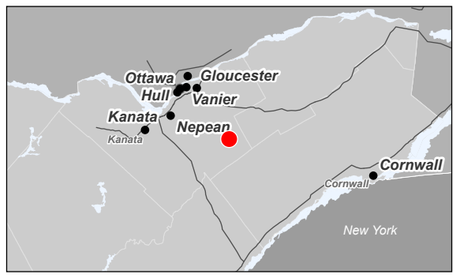

Project Location
Metcalfe, Ontario

160920195 REVA
Prepared by PMoser on 2025-10-21
Technical Review by JM on 2025-08-26

Client/Project
METCALFE AGRICULTURAL SOCIETY
2821 8TH LINE ROAD, METCALFE, ON

Figure No.
2

Title
Surficial Geology

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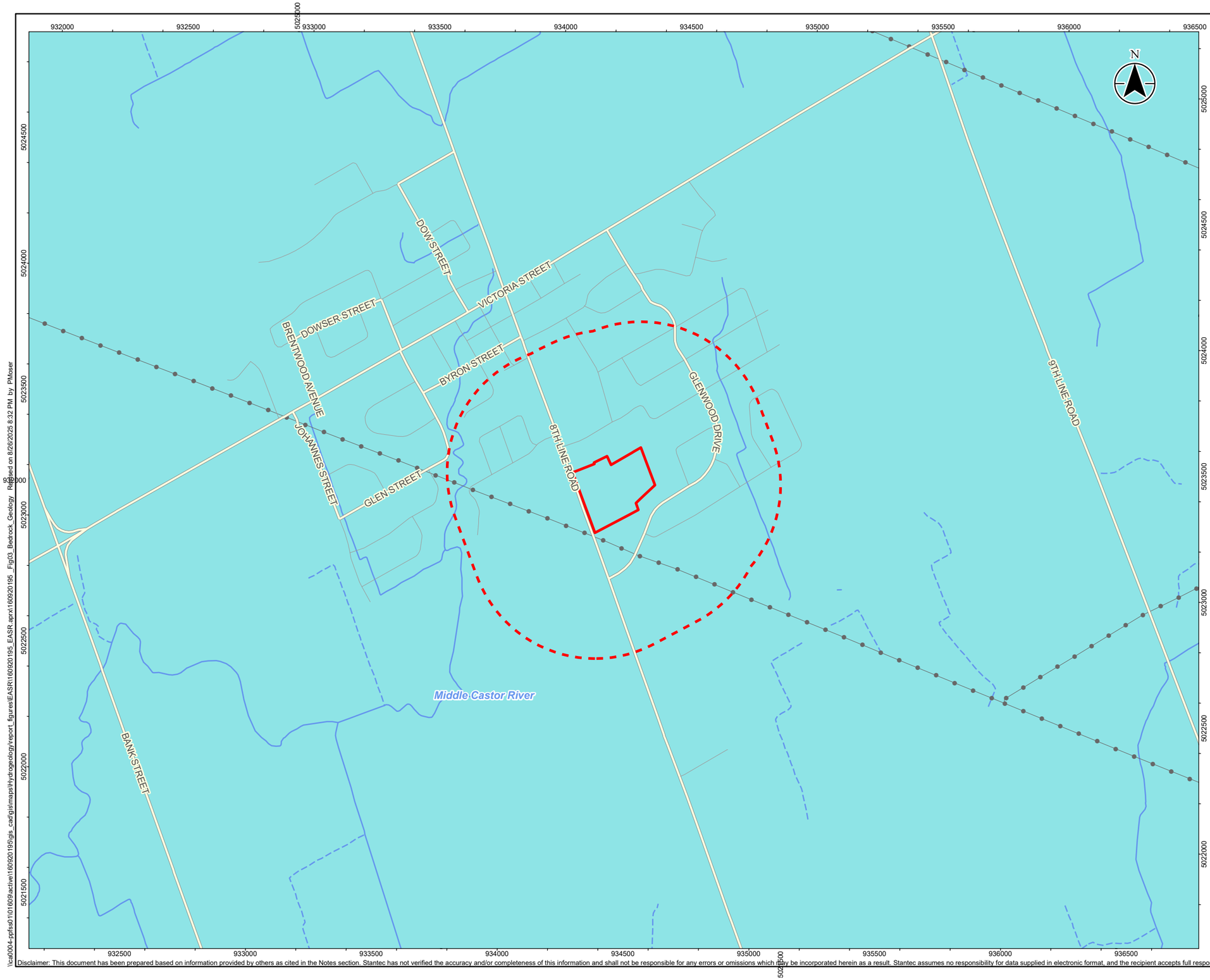

Stantec

Legend

- Site Boundary
- Study Area (500m)
- Major Road
- Minor Road
- Hydro Line
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody

Bedrock Geology

- 53: Dolostone, sandstone: Beekmantown Gp.

0 250 500 m

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Notes

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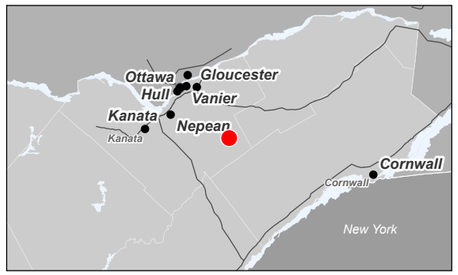

Project Location
Metcalfe, Ontario

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Client/Project
METCALFE AGRICULTURAL SOCIETY
2821 8TH LINE ROAD, METCALFE, ON

Figure No.
3

Title
Bedrock Geology

Stantec

Legend

- Site Boundary
- Study Area (500m)

Water Well Record (MECP)

- Test Hole
- Water Supply
- Abandoned / Other
- Topographic Contours (5m Interval)
- Topographic Contours (1m Interval)
- Hydro Line
- Watercourse (Intermittent)
- Watercourse (Permanent)

0 200 400 m

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2. Contains information licensed under the Open Government Licence – Ontario, and the Open Government Licence - Canada, accessed 2025.
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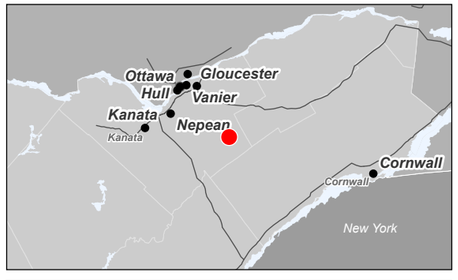


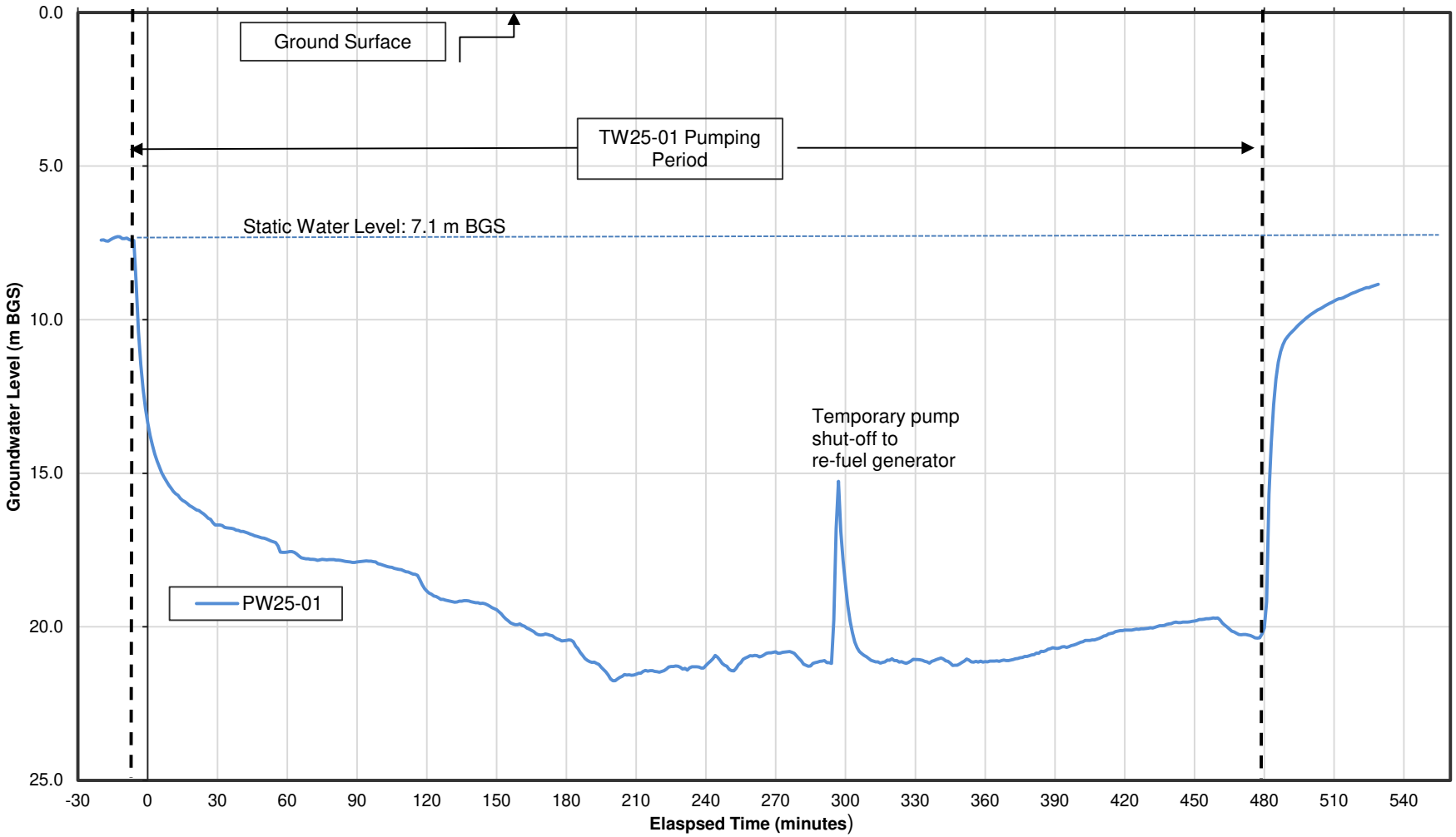
Project Location
Metcalfe, Ontario

160920195 REVA
Prepared by PMoser on 2025-10-09
Technical Review by JM on 2025-08-26

Client/Project
METCALFE AGRICULTURAL SOCIETY
2821 8TH LINE ROAD, METCALFE, ON

Figure No.
4

Title
Water Well Record



Notes:

Client/Project

Hydrogeological Assessment
Metcalfe Agricultural Society

Figure No.

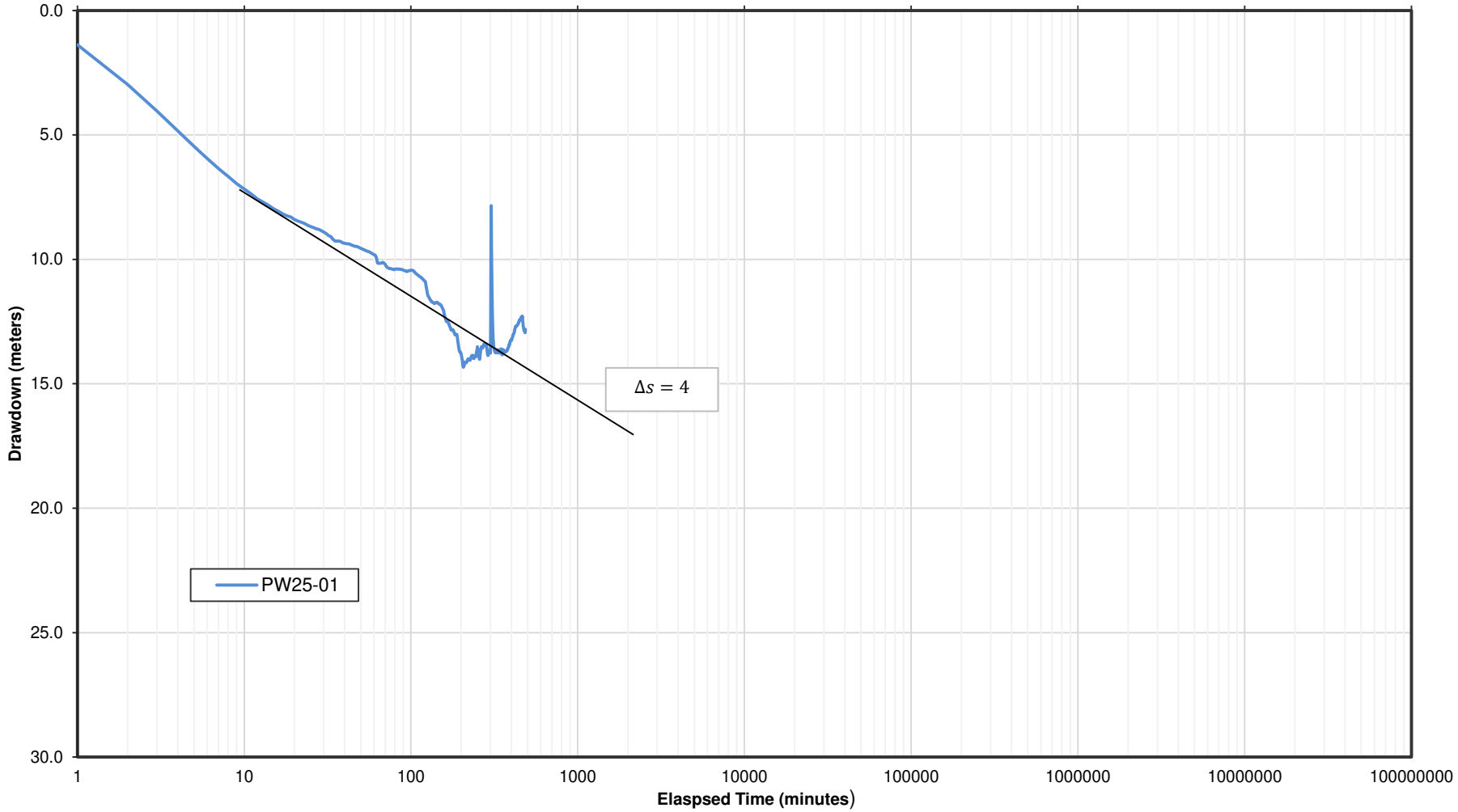
5

Title

Pumping Test PW25-01
Water Level versus Time

Stantec

\\Ca0004-ppfss01\01609\active\160901295\05_report_deliv\App_A_Figs\pumping_data_and_Fig5and6.xlsx



Notes:

Client/Project

Hydrogeological Assessment
Metcalfe Agricultural Society

Figure No.

6

Title

Pumping Test
PW25-01 Drawdown vs Time

Stantec

Appendix B Tables

Table 1
PW25-01 Pump Test Field Measurements
Hydrogeological Assessment
2821 8th Line Road
Metcalfe Agricultural Society

Date	Actual Time	Elapsed Minutes	WL	pH	Temperature	Turbidity	Colour	Conductiviity	Chlorine	Hydrogen Sulphide	Notes
		minutes	mBTOC		°C	NTU	Pt/Co	µS	mg/L	mg/L	
9/10/2025	8:35:00 AM	0									
		0.15	7.4								
		0.5	8.5								
		0.75	10.0								
		1	10.2								
		1.25	10.5								
		1.5	10.9								
		1.75	11.1								
		2	11.5								
		2.25									
		2.5									
		2.75									
		3	12.0								
		3.25									
		3.5									
		3.75									
		4									
		4.25									
		4.5									
		4.75									
		5	12.4								
		5.5	13.7								
		6	14.0								
		7.5	14.2								
		8.25	14.1								
		9									
		11	14.9								
		12	15.1								
		13	15.2								
		14	15.5								
		15	15.5								
		16	15.6								
		18	15.7								
		19	15.8								
		20	15.9								
		22	16.0								
		24	16.1								
		26	16.2								
		28	16.3								
		30	16.4								
		35	16.7								
		40	16.8								
		45	16.9								
		50	17.0								
		55	17.1								
		60	17.2	7.45	11.5	15.2	62	1505	1.6	0	
		70	17.7								
		80	17.8								
		90	17.8	7.45	11.6	10.37	25	1510	1.2	0	
		100	17.9								
		110	18.1								
		120	18.3	7.44	11.8	5.07	0	1512	0.5	0	
		135	19.1								
		150	19.3	7.41	11.9	3.21	0	1511	0.5	0	
		165	19.9								
		180	20.3	7.39	12.7	2.42	0	1518	0.51	0	
		210	21.4	7.4	12.7	0.8	0	1502	0.09	0	
		240	21.5	7.39	12.9	0.93	0	1509	0.07	0	Collect groundwater sample at 4 hours
		270	21.3								
		300	21.2	7.3	13.7	1.02	0	1480	0.15	0	Temporary pump shut-ff to re-fuel generator
		330	21.2								
		360	21.1	7.53	13.3	0.92	0	1488	0.01	0	
		390	21.0								
		420	20.4	7.54	12.7	0.74	0	1487	0.01	0	
		450	19.9								
		480	20.1	7.46	12.7	0.9	0	1504	0	0	Collect groundwater sample at 8 hours
		485									Pump stopped
		495	10.5								
		510	9.5								
		525	9.1								
		530	9.0								
											Datalogger removal at 5:30 pm
											Stantec off-site at 5:45 pm

Notes

m BTOC	meters below top of casing
NTU	nephelometric turbidity unit
Pt/Co	platinum-cobalt scale
µS	microsiemens
mg/L	milligrams per liter

Table 2
PW25-01 Summary of Groundwater Analytical Results
Hydrogeological Assessment
2821 8th Line Road, Metcalfe
Metcalfe Agricultural Society

Sample Location				PW25-01	
Sample Date				10-Sep-25	10-Sep-25
Sample ID				PW25-01-4HR	PW25-01-8HR
Sampling Company				STANTEC	STANTEC
Laboratory				BV	BV
Laboratory Work Order				C5B3108	C5B3108
Laboratory Sample ID	Units	O. Reg. 169/03	MECP	AVAR02	AVAR03
General Chemistry					
Alkalinity, Total (as CaCO3)	mg/L	30-500[E]	n/v	340	340
Ammonia (as N)	mg/L	n/v	n/v	0.25	0.16
Chloride	mg/L	250[C]	n/v	210	210
Color	color unit (CU)	5[C]	7[F]	<2	<2
Dissolved Organic Carbon (DOC)	mg/L	5[C]	10[F]	0.89	0.93
Electrical Conductivity, Lab	mS/cm	n/v	n/v	1.49	1.49
Fluoride	mg/L	1.5[B]	n/v	0.39	0.38
Hardness (as CaCO3)	mg/L	80-100[E]	n/v	**460[E]**	**450[E]**
Nitrate (as N)	mg/L	10.0_d[B]	n/v	0.29	0.45
Nitrate + Nitrite (as N)	mg/L	10.0_d[B]	n/v	0.29	0.50
Nitrite (as N)	mg/L	1.0_d[B]	n/v	<0.010	0.047
Nitrogen (Organic)	mg/L	0.15[E]	n/v	<0.10	<0.10
Orthophosphate (as P)	mg/L	n/v	n/v	<0.010	<0.010
pH, lab	S.U.	6.5-8.5[E]	n/v	7.84	7.87
Phenols-4AAP	mg/L	n/v	n/v	<0.0010	<0.0010
Sulfate	mg/L	500_h[C]	n/v	82	84
Tannin/Lignin	mg/L	n/v	n/v	<0.2	<0.2
Total Dissolved Solids	mg/L	500[C]	n/v	**995[C]**	**990[C]**
Total Kjeldahl Nitrogen	mg/L	n/v	n/v	0.20	0.17
Turbidity, Lab	NTU	5_i[C] $_j$[E]	n/v	0.4	0.7
BTEX and Petroleum Hydrocarbons					
Benzene	µg/L	1[B]	n/v	<0.20	<0.20
Toluene	µg/L	60[B] 24[C]	n/v	<0.20	<0.20
Ethylbenzene	µg/L	140[B] 1.6[C]	n/v	<0.20	<0.20
Xylene, m & p-	µg/L	n/v	n/v	<0.40	<0.40
Xylene, o-	µg/L	n/v	n/v	<0.20	<0.20
Xylenes, Total	µg/L	90[B]	n/v	<0.40	<0.40
PHC F1 (C6-C10 range)	µg/L	n/v	n/v	<25	<25
PHC F1 (C6-C10 range) minus BTEX	µg/L	n/v	n/v	<25	<25
PHC F2 (>C10-C16 range)	µg/L	n/v	n/v	<90	<90
PHC F3 (>C16-C34 range)	µg/L	n/v	n/v	<200	<200
PHC F4 (>C34-C50 range)	µg/L	n/v	n/v	<200	<200
Chromatogram to baseline at C50	none	n/v	n/v	YES	YES
Microbiological Analysis					
Escherichia coli (E.Coli)	cfu/100mL	0[A]	n/v	0	0
Fecal Coliforms	cfu/100mL	n/v	n/v	0	0
Total Coliform Background	cfu/100mL	n/v	n/v	1	4
Total Coliforms	cfu/100mL	0[A]	n/v	0	0
Metals, Dissolved					
Antimony	mg/L	0.006[B]	n/v	<0.00050	<0.00050
Arsenic	mg/L	0.01[B]	n/v	<0.0010	<0.0010
Barium	mg/L	1[B]	n/v	0.037	0.041
Boron	mg/L	5[B]	n/v	0.28	0.26
Cadmium	mg/L	0.005[B]	n/v	<0.000090	<0.000090
Chromium	mg/L	0.05[B]	n/v	<0.0050	<0.0050
Cobalt	mg/L	n/v	n/v	<0.00050	<0.00050
Iron	mg/L	0.3[C]	10[F]	<0.10	<0.10
Lead	mg/L	0.01[B]	n/v	<0.00050	<0.00050
Selenium	mg/L	0.05[B]	n/v	<0.0020	<0.0020
Sodium	mg/L	200_g[C] 20_g[D]	n/v	**110[D]**	**110[D]**
Uranium	mg/L	0.02[B]	n/v	0.0016	0.0014
Zinc	mg/L	5[C]	n/v	<0.0050	<0.0050
Metals, Total					
Antimony	mg/L	0.006[B]	n/v	<0.00050	<0.00050
Arsenic	mg/L	0.01[B]	n/v	<0.0010	<0.0010
Barium	mg/L	1[B]	n/v	0.038	0.040
Boron	mg/L	5[B]	n/v	0.29	0.29
Cadmium	mg/L	0.005[B]	n/v	<0.000090	<0.000090
Chromium	mg/L	0.05[B]	n/v	<0.0050	<0.0050
Cobalt	mg/L	n/v	n/v	<0.00050	<0.00050
Iron	mg/L	0.3[C]	10[F]	0.14	<0.10
Lead	mg/L	0.01[B]	n/v	<0.00050	<0.00050
Magnesium	mg/L	n/v	n/v	49	49
Manganese	mg/L	0.05[C]	1[F]	0.022	0.020
Mercury	µg/L	1[B]	n/v	<0.10	<0.10
Selenium	mg/L	0.05[B]	n/v	<0.0020	<0.0020
Sodium	mg/L	200_g[C] 20_g[D]	n/v	**120[D]**	**120[D]**
Uranium	mg/L	0.02[B]	n/v	0.0015	0.0015
Zinc	mg/L	5[C]	n/v	<0.0050	<0.0050

Notes:

O. Reg. 169/03	Ontario Drinking Water Quality Standards (January 1, 2018)
A	Schedule 1 - Microbiological Standards (expressed as a maximum)
B	Schedule 2 - Chemical Standards (expressed as a maximum acceptable concentration)
C	ODWS Table 4 - Chemical/Physical Objectives and Guidelines, Aesthetic Objectives
D	ODWS Table 4 - Medical Officer of Health Reporting Limit
E	ODWS Table 4 - Chemical/Physical Objectives and Guidelines, Operational Guidelines
MECP	Ministry of the Environment, Conservation and Parks
F	D-5-5 Private Wells, Table 3, Maximum Concentration Considered Reasonably Treatable
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
d	Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).
g[CD]	The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.
h	When sulfate levels exceed 500 mg/L, water may have a laxative effect on some people.
i	Applicable for all waters at the point of consumption.
j	The operational guidelines for filtration processes are provided as performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.

Appendix C MECP Water Well Record

CERTIFICATE OF WELL COMPLIANCE

I , Jeremy Hanna (License T3632), **AIR ROCK DRILLING CO. LTD.,** DO HEREBY CERTIFIY, that I am licensed to drill water wells in the Province of Ontario, and that I have supervised the drilling of a well on the

PROPERTY OF: METCALFE AGRICULTURAL SOCIETY

LOCATED AT : # 2821 - 8 TH LINE ROAD Metcalfe

LOT # 28 **CON #** 8 **PLAN #** XXX **S/L #** XXX

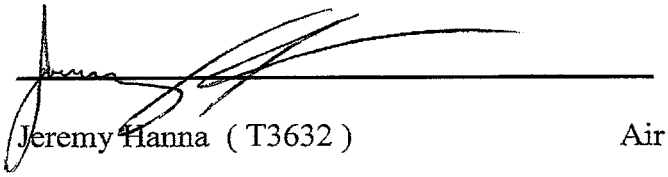
Geographical Township OSGOODE

of OTTAWA-CARLETON

I CERTIFY FURTHER that, I am aware of the well drilling requirements, the guidelines, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario, and the standards specified in any subdivision agreement and hydrogeological report applicable to this site and City Standards.

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted (cement or bentonite) as applicable and constructed in strict conformity with the standards required.

Signed this 8 th day of SEPTEMBER 2025,



Jeremy Hanna (T3632) Air Rock Drilling Co. Ltd. (C-7681)

The Engineer / Hydrologist on behalf of the Landowner set out above Certifies that He/She has Inspected the well and it was constructed in accordance with the specifications In Ministry of Environment Regulation 903

Signed this _____ day of _____, _____

_____

HYDROLOGIST / ENGINEER
(Signature / STAMP)

2025517

A 437720

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☐ Imperial

Tag#:A437720 (Print Below)
A437720

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	Metcalfe Agricultural Society		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
2821 8th Line Road	Metcalfe	Ont	K0A2P0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
#2821 8th Line Road	Osgoode	28	8

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa-Carleton	Metcalfe	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	463259	5008506		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Gravel & Broken Rock			0'	6'
Blue	(Soft) Limestone			6'	37'
Grey	limestone			37'	180'
Grey	limestone w/ trace White Sandstone			180'	242'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
48'	38'	Neat Cement Slurry	10.92
38'	0'	Bentonite Slurry	12.60

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify SURGED

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4"	Steel	.188"	+2'	48'
6 1/8"	Open Hole		48'	242'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Other, specify
90	☐	☐ Fresh ☒ Untested	
160	☐	☐ Fresh ☒ Untested	
218	☐	☐ Fresh ☒ Untested	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason: X

Pump intake set at (m/ft): 220

Pumping rate (l/min / GPM): 15

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 69'4"

If flowing give rate (l/min/GPM): X

Recommended pump depth (m/ft): 150'

Recommended pump rate (l/min/GPM): 15

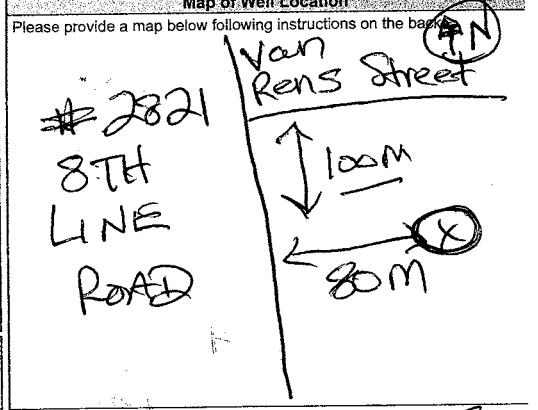
Well production (l/min/GPM): 15

Disinfected? ☒ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	24'9"			69'4"
1	34.3		1	56.5
2	39.4		2	47.7
3	43.3		3	42.4
4	46.4		4	38.3
5	48.9		5	35.9
10	57.		10	30.3
15	61.2		15	26.9
20	63.4		20	25.3
25	64.8		25	24.9
30	65.9		30	24'9"
40	67.5		40	
50	68.7		50	
60	69'4"		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 1HP-15GPM Set @ 150 FT

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Air Rock Drilling Co Ltd	7681

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
6659 Frankford Road	Richmond	Ont	K0A2Z0	

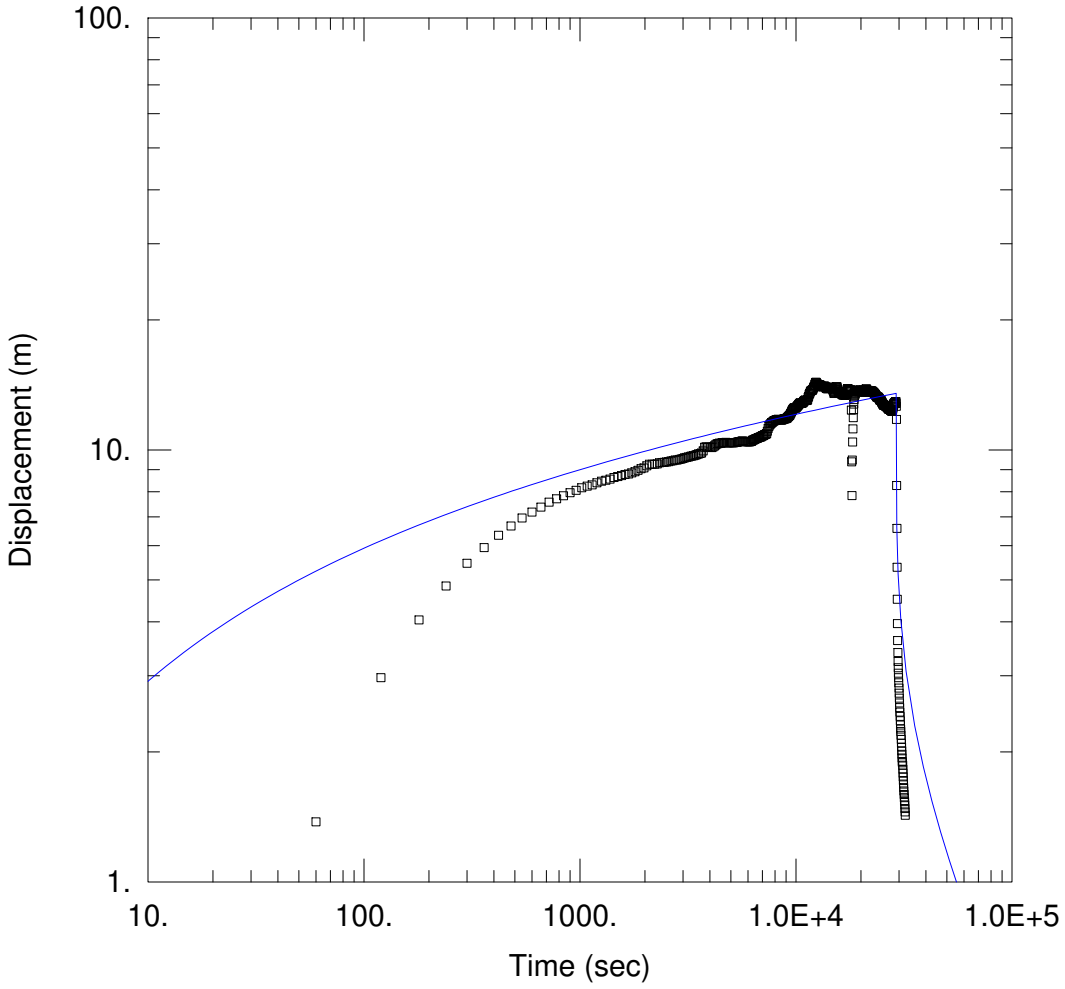
Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
6138382470	Horne, Jeremy	13632		2025/10/31

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	2025/09/25	2025/09/08

Ministry Use Only
Audit No. Z364888
Received

Ministry's Copy

Appendix D Pump Test Analysis



PW25-01 PUMPING TEST

Data Set: \...\Metcalfe_pumpingtest_PW25-01.aqt
Date: 10/16/25 Time: 16:40:55

PROJECT INFORMATION

Company: Stantec Consulting Ltd
Client: Metcalfe Agricultrual Society
Project: 160901295
Location: 2821 8th Line Road, Metcalfe
Test Well: PW25-01
Test Date: August 10, 2025

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW25-01	0	0

Observation Wells

Well Name	X (m)	Y (m)
▫ PW25-01	0	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis/Hantush

T = 4.851 m^2/day
S = 0.02648
Kz/Kr = 0.5
b = 58. m

Farvolden Method

Equation

$$Q_{20} = \frac{4\pi T(H_A/8)}{2.30} S_f = 0.683 T H_A S_f$$

Definitions:

Q_{20} = 20 year safe pumping rate for the well (m^3/day)
T = Transmissivity (m^2/day)
S_f = Safety factor = 0.7 (no units)
H_A = Available head (m)
Q = Pumping rate used during the pumping test (m3/day)

Input data:

Parameter	Value	Comment
T (m^2/day) =	5	Result of 8 hour pumping test
Static Level (m)	7.1	Measured prior to 8 hour pumping test
Pump Depth (m)	45.72	Pump level taken from well record
H_A (m) =	38.62	

Results:

Q_{20} (m^3/day) =	92
Q_{20} (L/min) =	64

Notes:

a. This workbook calculates a 20-year safe pumping rate for a well using the method described in: Farvolden, R.N. 1959. Groundwater supply in Alberta. Alberta Research Council. Unpublished report.

b. Values in the colour shaded cells can be updated by the user; all other cells are protected.

c. Unless otherwise known, set Pump Depth at Well Depth minus 3 metres.

Prepared by: AW
Reviewed by: JM
Date: 10/17/2025

Stantec

Moell Method

Equation:

$$Q_{20} = \frac{QH_A S_f}{s_{100} + 5\Delta s}$$

Definitions:

Q_{20} = 20 year safe pumping rate for the well (m^3/day)
T = Transmissivity (m^2/day)
S_f = Safety factor = 0.7 (no units)
H_A = Available head (m)
Q = Pumping rate used during the pumping test (m^3/day)
S_{100min} = Drawdown observed in well during the pumping test at 100 minutes (m)
Δs = Drawdown over five log cycles, when plotted against log time (m)

Input data:

Q (m^3/day) =	81.8	S_{100}min (m) =	11
H_A (m) =	38.6	Δs (m) =	4

Results:

Q_{20} (m^3/day) =	71
Q_{20} (L/min) =	50

Notes:

a. This workbook calculates a 20-year safe pumping rate for a well using the method described in: Moell, C.E. 1975. Guidelines – groundwater supply evaluations for residential subdivisions – single family wells. Alberta Environment, Earth Sciences and Licensing Division, Report No. 1617, 8p. Referenced in: Maathuis, H. and van der Kamp, G. 2006. The Q20 Concept: Sustainable Well Yield and Sustainable Aquifer Yield. Saskatchewan Research Council

b. Values in the colour shaded cells can be updated by the user; all other cells are protected.

Appendix E Laboratory Certificate of Analysis

Your Project #: 160901295
Your C.O.C. #: C#1060205-01-01

Attention: Jennifer Mule

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2025/09/24
Report #: R8619340
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C5B3108
Received: 2025/09/11, 11:10

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity (1)	2	N/A	2025/09/17	CAM SOP-00448	SM 24 2320 B m
Chloride by Automated Colourimetry (1)	2	N/A	2025/09/17	CAM SOP-00463	SM 24 4500-Cl E m
Colour (1)	2	N/A	2025/09/17	CAM SOP-00412	SM 24 2120C m
Conductivity (1)	2	N/A	2025/09/17	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	2	N/A	2025/09/16	CAM SOP-00446	SM 24 5310 B m
Petroleum Hydro. CCME F1 & BTEX in Water (1)	2	N/A	2025/09/16	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Water (1, 3)	2	2025/09/15	2025/09/15	CAM SOP-00316	CCME PHC-CWS m
Fluoride (1)	2	2025/09/15	2025/09/17	CAM SOP-00449	SM 24 4500-F C m
Hardness (calculated as CaCO3) (1)	2	N/A	2025/09/17	CAM SOP 00102/00408/00447	SM 2340 B
Mercury (1)	2	2025/09/17	2025/09/18	CAM SOP-00453	EPA 7470A m
Lab Filtered Metals by ICPMS (1)	2	2025/09/23	2025/09/24	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS (1)	2	2025/09/17	2025/09/18	CAM SOP-00447	EPA 6020B m
Total Coliforms/ E. coli, CFU/100mL (1)	2	N/A	2025/09/12	CAM SOP-00551	MECP-E3407
Fecal coliform, (CFU/100mL) (1)	2	N/A	2025/09/12	CAM SOP-00552	SM9222D, MECP E3371
Total Ammonia-N (1)	2	N/A	2025/09/18	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (1, 4)	2	N/A	2025/09/15	CAM SOP-00440	SM 24 4500-NO3I/NO2B
Organic Nitrogen (1)	2	N/A	2025/09/18	Auto Calc.	
pH (1, 5)	2	2025/09/15	2025/09/17	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP) (1)	2	N/A	2025/09/15	CAM SOP-00444	OMOE E3179 m
Orthophosphate (1)	2	N/A	2025/09/16	CAM SOP-00461	SM 24 4500-P E
Sulphate by Automated Turbidimetry (1)	2	N/A	2025/09/17	CAM SOP-00464	SM 24 4500-SO42- E m
Tannins & Lignins (1)	2	N/A	2025/09/15	CAM SOP-00410	SM 24 5550 B m
Total Dissolved Solids (1)	2	2025/09/16	2025/09/17	CAM SOP-00428	SM 24 2540C m
Total Kjeldahl Nitrogen in Water (1)	2	2025/09/16	2025/09/17	CAM SOP-00938	SM 4500-N B m
Turbidity (1)	2	N/A	2025/09/17	CAM SOP-00417	SM 24 2130 B

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession

Your Project #: 160901295
Your C.O.C. #: C#1060205-01-01

Attention: Jennifer Mule

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2025/09/24
Report #: R8619340
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C5B3108

Received: 2025/09/11, 11:10

using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8

(2) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

(4) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

(5) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Your Project #: 160901295
Your C.O.C. #: C#1060205-01-01

Attention: Jennifer Mule

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2025/09/24
Report #: R8619340
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C5B3108
Received: 2025/09/11, 11:10

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		AVAR02				AVAR02			
Sampling Date		2025/09/10 12:35				2025/09/10 12:35			
COC Number		C#1060205-01-01				C#1060205-01-01			
	UNITS	PW25-01-4HR	RDL	MDL	QC Batch	PW25-01-4HR Lab-Dup	RDL	MDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	460	1.0	1.0	A008813				
Total Organic Nitrogen	mg/L	<0.10	0.10	N/A	A008814				
Inorganics									
Total Ammonia-N	mg/L	0.25	0.050	0.021	A012333				
Colour	TCU	<2	2	0.7	A012332				
Conductivity	mS/cm	1.49	0.002	0.0007	A010898				
Total Dissolved Solids	mg/L	995	10	9.9	A011246				
Fluoride (F-)	mg/L	0.39	0.10	0.014	A010900				
Total Kjeldahl Nitrogen (TKN)	mg/L	0.20	0.10	0.060	A011811	0.16	0.10	0.060	A011811
Dissolved Organic Carbon	mg/L	0.89	0.40	0.15	A010872	0.89	0.40	0.15	A010872
Orthophosphate (P)	mg/L	<0.010	0.010	0.0020	A010876				
pH	pH	7.84			A010899				
Phenols-4AAP	mg/L	<0.0010	0.0010	0.00040	A010446				
Dissolved Sulphate (SO4)	mg/L	82	1.0	0.49	A010878				
Tannins & Lignins	mg/L	<0.2	0.2	0.03	A010233				
Turbidity	NTU	0.4	0.1	0.03	A010887				
Alkalinity (Total as CaCO3)	mg/L	340	1.0	0.69	A010897				
Dissolved Chloride (Cl-)	mg/L	210	2.0	1.3	A010874				
Nitrite (N)	mg/L	<0.010	0.010	0.0020	A010714				
Nitrate (N)	mg/L	0.29	0.10	0.010	A010714				
Nitrate + Nitrite (N)	mg/L	0.29	0.10	0.010	A010714				

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Job #: C5B3108
Report Date: 2025/09/24

Stantec Consulting Ltd
Client Project #: 160901295
Sampler Initials: ND

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		AVAR03				AVAR03			
Sampling Date		2025/09/10 16:35				2025/09/10 16:35			
COC Number		C#1060205-01-01				C#1060205-01-01			
	UNITS	PW25-01-8HR	RDL	MDL	QC Batch	PW25-01-8HR Lab-Dup	RDL	MDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	450	1.0	1.0	A008813				
Total Organic Nitrogen	mg/L	<0.10	0.10	N/A	A008814				
Inorganics									
Total Ammonia-N	mg/L	0.16	0.050	0.021	A012377				
Colour	TCU	<2	2	0.7	A012332				
Conductivity	mS/cm	1.49	0.002	0.0007	A010898				
Total Dissolved Solids	mg/L	990	10	9.9	A011246	985	10	9.9	A011246
Fluoride (F-)	mg/L	0.38	0.10	0.014	A010900				
Total Kjeldahl Nitrogen (TKN)	mg/L	0.17	0.10	0.060	A011810				
Dissolved Organic Carbon	mg/L	0.93	0.40	0.15	A010872				
Orthophosphate (P)	mg/L	<0.010	0.010	0.0020	A010876				
pH	pH	7.87			A010899				
Phenols-4AAP	mg/L	<0.0010	0.0010	0.00040	A010446				
Dissolved Sulphate (SO4)	mg/L	84	1.0	0.49	A010878				
Tannins & Lignins	mg/L	<0.2	0.2	0.03	A010233				
Turbidity	NTU	0.7	0.1	0.03	A010887				
Alkalinity (Total as CaCO3)	mg/L	340	1.0	0.69	A010897				
Dissolved Chloride (Cl-)	mg/L	210	2.0	1.3	A010874				
Nitrite (N)	mg/L	0.047	0.010	0.0020	A010714				
Nitrate (N)	mg/L	0.45	0.10	0.010	A010714				
Nitrate + Nitrite (N)	mg/L	0.50	0.10	0.010	A010714				

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		AVAR02	AVAR03			
Sampling Date		2025/09/10 12:35	2025/09/10 16:35			
COC Number		C#1060205-01-01	C#1060205-01-01			
	UNITS	PW25-01-4HR	PW25-01-8HR	RDL	MDL	QC Batch
Metals						
Mercury (Hg)	ug/L	<0.10	<0.10	0.10	0.020	A012016
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	0.00050	N/A	A016955
Total Antimony (Sb)	mg/L	<0.00050	<0.00050	0.00050	0.00020	A012484
Dissolved Arsenic (As)	mg/L	<0.0010	<0.0010	0.0010	N/A	A016955
Total Arsenic (As)	mg/L	<0.0010	<0.0010	0.0010	0.00010	A012484
Dissolved Barium (Ba)	mg/L	0.037	0.041	0.0020	0.0020	A016955
Total Barium (Ba)	mg/L	0.038	0.040	0.0020	0.00030	A012484
Dissolved Boron (B)	mg/L	0.28	0.26	0.010	N/A	A016955
Total Boron (B)	mg/L	0.29	0.29	0.010	0.00090	A012484
Dissolved Cadmium (Cd)	mg/L	<0.000090	<0.000090	0.000090	0.000081	A016955
Total Cadmium (Cd)	mg/L	<0.000090	<0.000090	0.000090	0.000050	A012484
Dissolved Chromium (Cr)	mg/L	<0.0050	<0.0050	0.0050	N/A	A016955
Total Chromium (Cr)	mg/L	<0.0050	<0.0050	0.0050	0.00040	A012484
Dissolved Cobalt (Co)	mg/L	<0.00050	<0.00050	0.00050	N/A	A016955
Total Cobalt (Co)	mg/L	<0.00050	<0.00050	0.00050	0.000080	A012484
Dissolved Iron (Fe)	mg/L	<0.10	<0.10	0.10	N/A	A016955
Total Iron (Fe)	mg/L	0.14	<0.10	0.10	0.0050	A012484
Dissolved Lead (Pb)	mg/L	<0.00050	<0.00050	0.00050	N/A	A016955
Total Lead (Pb)	mg/L	<0.00050	<0.00050	0.00050	0.000060	A012484
Total Magnesium (Mg)	mg/L	49	49	0.050	0.010	A012484
Total Manganese (Mn)	mg/L	0.022	0.020	0.0020	0.00060	A012484
Dissolved Selenium (Se)	mg/L	<0.0020	<0.0020	0.0020	N/A	A016955
Total Selenium (Se)	mg/L	<0.0020	<0.0020	0.0020	0.00020	A012484
Dissolved Sodium (Na)	mg/L	110	110	0.10	N/A	A016955
Total Sodium (Na)	mg/L	120	120	0.10	0.010	A012484
Dissolved Uranium (U)	mg/L	0.0016	0.0014	0.00010	N/A	A016955
Total Uranium (U)	mg/L	0.0015	0.0015	0.00010	0.000020	A012484
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	0.0050	N/A	A016955
Total Zinc (Zn)	mg/L	<0.0050	<0.0050	0.0050	0.0010	A012484

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

MICROBIOLOGY (WATER)

Bureau Veritas ID		AVAR02	AVAR03		
Sampling Date		2025/09/10 12:35	2025/09/10 16:35		
COC Number		C#1060205-01-01	C#1060205-01-01		
	UNITS	PW25-01-4HR	PW25-01-8HR	MDL	QC Batch
Microbiological					
Fecal coliform	CFU/100mL	0	0	N/A	A009420
Background	CFU/100mL	1	4	N/A	A009377
Total Coliforms	CFU/100mL	0	0	N/A	A009377
Escherichia coli	CFU/100mL	0	0	N/A	A009377

QC Batch = Quality Control Batch
N/A = Not Applicable

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		AVAR02				AVAR02			
Sampling Date		2025/09/10 12:35				2025/09/10 12:35			
COC Number		C#1060205-01-01				C#1060205-01-01			
	UNITS	PW25-01-4HR	RDL	MDL	QC Batch	PW25-01-4HR Lab-Dup	RDL	MDL	QC Batch
BTEX & F1 Hydrocarbons									
Benzene	ug/L	<0.20	0.20	0.040	A009818	<0.20	0.20	0.040	A009818
Toluene	ug/L	<0.20	0.20	0.040	A009818	<0.20	0.20	0.040	A009818
Ethylbenzene	ug/L	<0.20	0.20	0.040	A009818	<0.20	0.20	0.040	A009818
o-Xylene	ug/L	<0.20	0.20	0.040	A009818	<0.20	0.20	0.040	A009818
p+m-Xylene	ug/L	<0.40	0.40	0.080	A009818	<0.40	0.40	0.080	A009818
Total Xylenes	ug/L	<0.40	0.40	0.080	A009818	<0.40	0.40	0.080	A009818
F1 (C6-C10)	ug/L	<25	25	20	A009818	<25	25	20	A009818
F1 (C6-C10) - BTEX	ug/L	<25	25	20	A009818	<25	25	20	A009818
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/L	<90	90	50	A010065				
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	70	A010065				
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	50	A010065				
Reached Baseline at C50	ug/L	Yes			A010065				
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	105			A009818	106			A009818
4-Bromofluorobenzene	%	99			A009818	96			A009818
D10-o-Xylene	%	81			A009818	110			A009818
D4-1,2-Dichloroethane	%	100			A009818	99			A009818
o-Terphenyl	%	111			A010065				

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

O.REG 153 PHCS, BTEX/F1-F4 (WATER)

Bureau Veritas ID		AVAR03				AVAR03			
Sampling Date		2025/09/10 16:35				2025/09/10 16:35			
COC Number		C#1060205-01-01				C#1060205-01-01			
	UNITS	PW25-01-8HR	RDL	MDL	QC Batch	PW25-01-8HR Lab-Dup	RDL	MDL	QC Batch
BTEX & F1 Hydrocarbons									
Benzene	ug/L	<0.20	0.20	0.040	A009818				
Toluene	ug/L	<0.20	0.20	0.040	A009818				
Ethylbenzene	ug/L	<0.20	0.20	0.040	A009818				
o-Xylene	ug/L	<0.20	0.20	0.040	A009818				
p+m-Xylene	ug/L	<0.40	0.40	0.080	A009818				
Total Xylenes	ug/L	<0.40	0.40	0.080	A009818				
F1 (C6-C10)	ug/L	<25	25	20	A009818				
F1 (C6-C10) - BTEX	ug/L	<25	25	20	A009818				
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/L	<90	90	50	A010065	<90	90	50	A010065
F3 (C16-C34 Hydrocarbons)	ug/L	<200	200	70	A010065	<200	200	70	A010065
F4 (C34-C50 Hydrocarbons)	ug/L	<200	200	50	A010065	<200	200	50	A010065
Reached Baseline at C50	ug/L	Yes			A010065	Yes			A010065
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	107			A009818				
4-Bromofluorobenzene	%	97			A009818				
D10-o-Xylene	%	124			A009818				
D4-1,2-Dichloroethane	%	97			A009818				
o-Terphenyl	%	111			A010065	111			A010065

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

TEST SUMMARY

Bureau Veritas ID: AVAR02 **Collected:** 2025/09/10
Sample ID: PW25-01-4HR **Shipped:**
Matrix: Water **Received:** 2025/09/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	A010897	N/A	2025/09/17	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	A010874	N/A	2025/09/17	Alina Dobreanu
Colour	SPEC	A012332	N/A	2025/09/17	Viorica Rotaru
Conductivity	AT	A010898	N/A	2025/09/17	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	A010872	N/A	2025/09/16	Gyulshen Idriz
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	A009818	N/A	2025/09/16	Ravinder Gaidhu
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	A010065	2025/09/15	2025/09/15	Jeevaraj Jeevaratrnam
Fluoride	ISE	A010900	2025/09/15	2025/09/17	Nachiketa Gohil
Hardness (calculated as CaCO3)		A008813	N/A	2025/09/17	Automated Statchk
Mercury	CV/AA	A012016	2025/09/17	2025/09/18	Maitri PATIL
Lab Filtered Metals by ICPMS	ICP/MS	A016955	2025/09/23	2025/09/24	Azita Fazaeli
Total Metals Analysis by ICPMS	ICP/MS	A012484	2025/09/17	2025/09/18	Nan Raykha
Total Coliforms/ E. coli, CFU/100mL	PL	A009377	N/A	2025/09/12	Paramjit Paramjit
Fecal coliform, (CFU/100mL)	PL	A009420	N/A	2025/09/12	Paramjit Paramjit
Total Ammonia-N	SKAL/NH4	A012333	N/A	2025/09/18	Kruti Jitesh Patel
Nitrate & Nitrite as Nitrogen in Water	LACH	A010714	N/A	2025/09/15	Chandra Nandlal
Organic Nitrogen	CALC	A008814	N/A	2025/09/18	Automated Statchk
pH	AT	A010899	2025/09/15	2025/09/17	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	A010446	N/A	2025/09/15	Jency Sara Johnson
Orthophosphate	SKAL	A010876	N/A	2025/09/16	Massarat Jan
Sulphate by Automated Turbidimetry	SKAL	A010878	N/A	2025/09/17	Massarat Jan
Tannins & Lignins	SPEC	A010233	N/A	2025/09/15	Gyulshen Idriz
Total Dissolved Solids	BAL	A011246	2025/09/16	2025/09/17	Manowalage shanika GUNASEKARA
Total Kjeldahl Nitrogen in Water	SKAL	A011811	2025/09/16	2025/09/17	Rajni Tyagi
Turbidity	AT	A010887	N/A	2025/09/17	Pinky joy JANABAN

Bureau Veritas ID: AVAR02 Dup **Collected:** 2025/09/10
Sample ID: PW25-01-4HR **Shipped:**
Matrix: Water **Received:** 2025/09/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	A010872	N/A	2025/09/16	Gyulshen Idriz
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	A009818	N/A	2025/09/16	Ravinder Gaidhu
Total Kjeldahl Nitrogen in Water	SKAL	A011811	2025/09/16	2025/09/17	Rajni Tyagi

Bureau Veritas ID: AVAR03 **Collected:** 2025/09/10
Sample ID: PW25-01-8HR **Shipped:**
Matrix: Water **Received:** 2025/09/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	A010897	N/A	2025/09/17	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	A010874	N/A	2025/09/17	Alina Dobreanu
Colour	SPEC	A012332	N/A	2025/09/17	Viorica Rotaru
Conductivity	AT	A010898	N/A	2025/09/17	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	A010872	N/A	2025/09/16	Gyulshen Idriz
Petroleum Hydro. CCME F1 & BTEX in Water	HSGC/MSFD	A009818	N/A	2025/09/16	Ravinder Gaidhu

Bureau Veritas Job #: C5B3108
Report Date: 2025/09/24

Stantec Consulting Ltd
Client Project #: 160901295
Sampler Initials: ND

TEST SUMMARY

Bureau Veritas ID: AVAR03
Sample ID: PW25-01-8HR
Matrix: Water

Collected: 2025/09/10
Shipped:
Received: 2025/09/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	A010065	2025/09/15	2025/09/15	Jeevaraj Jeevaratrnam
Fluoride	ISE	A010900	2025/09/15	2025/09/17	Nachiketa Gohil
Hardness (calculated as CaCO3)		A008813	N/A	2025/09/17	Automated Statchk
Mercury	CV/AA	A012016	2025/09/17	2025/09/18	Maitri PATIL
Lab Filtered Metals by ICPMS	ICP/MS	A016955	2025/09/23	2025/09/24	Azita Fazaeli
Total Metals Analysis by ICPMS	ICP/MS	A012484	2025/09/17	2025/09/18	Nan Raykha
Total Coliforms/ E. coli, CFU/100mL	PL	A009377	N/A	2025/09/12	Paramjit Paramjit
Fecal coliform, (CFU/100mL)	PL	A009420	N/A	2025/09/12	Paramjit Paramjit
Total Ammonia-N	SKAL/NH4	A012377	N/A	2025/09/18	Rishi Modi
Nitrate & Nitrite as Nitrogen in Water	LACH	A010714	N/A	2025/09/15	Chandra Nandlal
Organic Nitrogen	CALC	A008814	N/A	2025/09/18	Automated Statchk
pH	AT	A010899	2025/09/15	2025/09/17	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	A010446	N/A	2025/09/15	Jency Sara Johnson
Orthophosphate	SKAL	A010876	N/A	2025/09/16	Massarat Jan
Sulphate by Automated Turbidimetry	SKAL	A010878	N/A	2025/09/17	Massarat Jan
Tannins & Lignins	SPEC	A010233	N/A	2025/09/15	Gyulshen Idriz
Total Dissolved Solids	BAL	A011246	2025/09/16	2025/09/17	Manowalage shanika GUNASEKARA
Total Kjeldahl Nitrogen in Water	SKAL	A011810	2025/09/16	2025/09/17	Rajni Tyagi
Turbidity	AT	A010887	N/A	2025/09/17	Pinky joy JANABAN

Bureau Veritas ID: AVAR03 Dup
Sample ID: PW25-01-8HR
Matrix: Water

Collected: 2025/09/10
Shipped:
Received: 2025/09/11

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Water	GC/FID	A010065	2025/09/15	2025/09/15	Jeevaraj Jeevaratrnam
Total Dissolved Solids	BAL	A011246	2025/09/16	2025/09/17	Manowalage shanika GUNASEKARA

GENERAL COMMENTS

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

Package 1	6.7°C

Sample AVAR02 [PW25-01-4HR] : TKN < Ammonia: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A009818	1,4-Difluorobenzene	2025/09/16	100	70 - 130	101	70 - 130	101	%				
A009818	4-Bromofluorobenzene	2025/09/16	100	70 - 130	100	70 - 130	99	%				
A009818	D10-o-Xylene	2025/09/16	100	70 - 130	101	70 - 130	100	%				
A009818	D4-1,2-Dichloroethane	2025/09/16	101	70 - 130	100	70 - 130	102	%				
A010065	o-Terphenyl	2025/09/15	115	60 - 140	113	60 - 140	114	%				
A009818	Benzene	2025/09/16	101	50 - 140	104	50 - 140	<0.20	ug/L	NC	30		
A009818	Ethylbenzene	2025/09/16	107	50 - 140	109	50 - 140	<0.20	ug/L	NC	30		
A009818	F1 (C6-C10) - BTEX	2025/09/16					<25	ug/L	NC	30		
A009818	F1 (C6-C10)	2025/09/16	109	60 - 140	111	60 - 140	<25	ug/L	NC	30		
A009818	o-Xylene	2025/09/16	104	50 - 140	105	50 - 140	<0.20	ug/L	NC	30		
A009818	p+m-Xylene	2025/09/16	97	50 - 140	99	50 - 140	<0.40	ug/L	NC	30		
A009818	Toluene	2025/09/16	93	50 - 140	94	50 - 140	<0.20	ug/L	NC	30		
A009818	Total Xylenes	2025/09/16					<0.40	ug/L	NC	30		
A010065	F2 (C10-C16 Hydrocarbons)	2025/09/15	104	60 - 140	105	60 - 140	<90	ug/L	NC	30		
A010065	F3 (C16-C34 Hydrocarbons)	2025/09/15	113	60 - 140	116	60 - 140	<200	ug/L	NC	30		
A010065	F4 (C34-C50 Hydrocarbons)	2025/09/15	105	60 - 140	109	60 - 140	<200	ug/L	NC	30		
A010233	Tannins & Lignins	2025/09/15	94	80 - 120	98	80 - 120	<0.2	mg/L	NC	20		
A010446	Phenols-4AAP	2025/09/15	98	80 - 120	100	80 - 120	<0.0010	mg/L	0	20		
A010714	Nitrate (N)	2025/09/15	95	80 - 120	103	80 - 120	<0.10	mg/L	3.7	20		
A010714	Nitrite (N)	2025/09/15	105	80 - 120	110	80 - 120	<0.010	mg/L	NC	20		
A010872	Dissolved Organic Carbon	2025/09/16	93	80 - 120	96	80 - 120	<0.40	mg/L	0.81	20		
A010874	Dissolved Chloride (Cl-)	2025/09/17	NC	80 - 120	95	80 - 120	<1.0	mg/L	0.71	20		
A010876	Orthophosphate (P)	2025/09/16	95	75 - 125	94	80 - 120	<0.010	mg/L	NC	20		
A010878	Dissolved Sulphate (SO4)	2025/09/17	NC	75 - 125	101	80 - 120	<1.0	mg/L	0.42	20		
A010887	Turbidity	2025/09/17			100	80 - 120	<0.1	NTU	15	20		
A010897	Alkalinity (Total as CaCO3)	2025/09/17			100	85 - 115	<1.0	mg/L	0.40	20		
A010898	Conductivity	2025/09/17			103	85 - 115	<0.002	mS/cm	0.34	10		
A010899	pH	2025/09/17			102	98 - 103			0.30	N/A		
A010900	Fluoride (F-)	2025/09/17	95	80 - 120	96	80 - 120	<0.10	mg/L	NC	20		
A011246	Total Dissolved Solids	2025/09/17			97	80 - 120	<10	mg/L	0.51	20		
A011810	Total Kjeldahl Nitrogen (TKN)	2025/09/17	100	80 - 120	99	80 - 120	<0.10	mg/L	3.3	20	99	80 - 120
A011811	Total Kjeldahl Nitrogen (TKN)	2025/09/17	91	80 - 120	100	80 - 120	<0.10	mg/L	NC	20	102	80 - 120

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A012016	Mercury (Hg)	2025/09/18	95	75 - 125	97	80 - 120	<0.10	ug/L	NC	20		
A012332	Colour	2025/09/17			99	80 - 120	<2	TCU	NC	25		
A012333	Total Ammonia-N	2025/09/18	103	75 - 125	103	80 - 120	<0.050	mg/L	5.8	20		
A012377	Total Ammonia-N	2025/09/18	100	75 - 125	103	80 - 120	<0.050	mg/L	10	20		
A012484	Total Antimony (Sb)	2025/09/18	101	80 - 120	104	80 - 120	<0.00050	mg/L				
A012484	Total Arsenic (As)	2025/09/18	104	80 - 120	105	80 - 120	<0.0010	mg/L				
A012484	Total Barium (Ba)	2025/09/18	101	80 - 120	103	80 - 120	<0.0020	mg/L				
A012484	Total Boron (B)	2025/09/18	100	80 - 120	101	80 - 120	<0.010	mg/L				
A012484	Total Cadmium (Cd)	2025/09/18	99	80 - 120	101	80 - 120	<0.000090	mg/L				
A012484	Total Chromium (Cr)	2025/09/18	103	80 - 120	106	80 - 120	<0.0050	mg/L				
A012484	Total Cobalt (Co)	2025/09/18	107	80 - 120	108	80 - 120	<0.00050	mg/L				
A012484	Total Iron (Fe)	2025/09/18	104	80 - 120	105	80 - 120	<0.10	mg/L	NC	20		
A012484	Total Lead (Pb)	2025/09/18	107	80 - 120	107	80 - 120	<0.00050	mg/L				
A012484	Total Magnesium (Mg)	2025/09/18	101	80 - 120	104	80 - 120	<0.050	mg/L	NC	20		
A012484	Total Manganese (Mn)	2025/09/18	100	80 - 120	102	80 - 120	<0.0020	mg/L				
A012484	Total Selenium (Se)	2025/09/18	104	80 - 120	104	80 - 120	<0.0020	mg/L				
A012484	Total Sodium (Na)	2025/09/18	102	80 - 120	106	80 - 120	<0.10	mg/L				
A012484	Total Uranium (U)	2025/09/18	107	80 - 120	107	80 - 120	<0.00010	mg/L				
A012484	Total Zinc (Zn)	2025/09/18	99	80 - 120	101	80 - 120	<0.0050	mg/L				
A016955	Dissolved Antimony (Sb)	2025/09/24	108	80 - 120	104	80 - 120	<0.00050	mg/L	NC	20		
A016955	Dissolved Arsenic (As)	2025/09/24	101	80 - 120	98	80 - 120	<0.0010	mg/L	0.74	20		
A016955	Dissolved Barium (Ba)	2025/09/24	99	80 - 120	97	80 - 120	<0.0020	mg/L	7.5	20		
A016955	Dissolved Boron (B)	2025/09/24	102	80 - 120	98	80 - 120	<0.010	mg/L	3.1	20		
A016955	Dissolved Cadmium (Cd)	2025/09/24	102	80 - 120	100	80 - 120	<0.000090	mg/L	NC	20		
A016955	Dissolved Chromium (Cr)	2025/09/24	98	80 - 120	96	80 - 120	<0.0050	mg/L	NC	20		
A016955	Dissolved Cobalt (Co)	2025/09/24	100	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20		
A016955	Dissolved Iron (Fe)	2025/09/24	101	80 - 120	101	80 - 120	<0.10	mg/L	NC	20		
A016955	Dissolved Lead (Pb)	2025/09/24	102	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20		
A016955	Dissolved Selenium (Se)	2025/09/24	103	80 - 120	102	80 - 120	<0.0020	mg/L	NC	20		
A016955	Dissolved Sodium (Na)	2025/09/24	100	80 - 120	97	80 - 120	<0.10	mg/L	1.8	20		
A016955	Dissolved Uranium (U)	2025/09/24	105	80 - 120	101	80 - 120	<0.00010	mg/L	1.2	20		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
A016955	Dissolved Zinc (Zn)	2025/09/24	99	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Louise Harding, Scientific Specialist

Paramjit Paramjit, Analyst I

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

BUREAU VERITAS

SERVICE CENTER COOLER TEMPERATURE RECORD

CHAIN-OF-CUSTODY RECORD

COOLER OBSERVATIONS:

SHIPPED FROM BV SERVICE CENTER: OTTAWA

RECEIVED AT: MISSISSAUGA

BV Receipt #	CUSTODY SEAL	YES	NO	Drinking Water	TEMP 1	TEMP 2	TEMP 3
1 OTT-2025-09-168	PRESENT / INTACT / ICE PRESENT	✓		☐	4	0	2
2 187	PRESENT / INTACT / ICE PRESENT	✓		☐	-1	0	0
3 185	PRESENT / INTACT / ICE PRESENT	✓		☐	0	0	0
4 169	PRESENT / INTACT / ICE PRESENT	✓		☐	2	1	2
5 179	PRESENT / INTACT / ICE PRESENT	✓		☐	2	4	3
6 186	PRESENT / INTACT / ICE PRESENT	✓		☐	2	3	2
7 170	PRESENT / INTACT / ICE PRESENT	✓		☐	4	5	2
8 180	PRESENT / INTACT / ICE PRESENT	✓		☐	2	1	2
9 183 184	PRESENT / INTACT / ICE PRESENT	✓	✓	☐	NA	NA	NA
10 ↓ 189	PRESENT / INTACT / ICE PRESENT	✓		☐	2	2	2

BV Receipt #	CUSTODY SEAL	YES	NO	Drinking Water	TEMP 1	TEMP 2	TEMP 3
11 OTT-2025-09-189	PRESENT / INTACT / ICE PRESENT	✓		☐	3	2	2
12 188	PRESENT / INTACT / ICE PRESENT	✓		☐	2	1	1
13 164 166	PRESENT / INTACT / ICE PRESENT	✓		☐	2	4	2
14	PRESENT / INTACT / ICE PRESENT	✓		☐	3	3	3
15	PRESENT / INTACT / ICE PRESENT	✓		☐	4	3	2
16 182	PRESENT / INTACT / ICE PRESENT	✓		☐	1	4	2
17	PRESENT / INTACT / ICE PRESENT	✓		☐	0	-1	-1
18	PRESENT / INTACT / ICE PRESENT	✓		☐	0	-2	1
19 177	PRESENT / INTACT / ICE PRESENT	✓		☐	-2	1	-1
20 ↓ 178	PRESENT / INTACT / ICE PRESENT	✓		☐	1	1	1

RECEIVED BY (PRINT & SIGN)		DATE (YYYY/MM/DD)	TIME (HH:MM)
ANMOLPREET SINGH Sign		2025/09/12	06:07

If Custody seal condition and presence of ice is the same for all, use these boxes:

CUSTODY SEAL	YES	NO
PRESENT		
INTACT		
ICE PRESENT		

C5B3108
2025/09/11 11:10

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.bvna.com

Page 1 of 1

CHAIN OF CUSTODY RECORD

Invoice To:		Report To:		PROJECT INFORMATION:		Laboratory Use Only:	
Company:	#9197 Stantec Consulting Ltd	Company:		Quotation #:	C52490	Bureau Veritas Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Jennifer Mule	P.O. #:			1060205
Address:	300 Hagey Blvd Suite 100	Address:		Project:	160901295	COC #:	Project Manager:
	Waterloo ON N2L 0A4			Project Name:		C#1060205-01-01	Julie Clement
Tel:	(519) 579-4410 Fax: (519) 579-6733	Tel:	Fax:	Site #:			
Email:	SAPinvoices@Stantec.com	Email:	jennifer.mule@stantec.com	Sampled By:			

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

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

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558 ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☑ PWQO ☐ Reg 406 Table ___
- ☐ Other ___

Special Instructions

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

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

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

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

Received in Ottawa

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle) Metals / Hg / Cr VI	Ottawa subdivision	# of Bottles	Comments
1	PW25-01-4hr	Metcalfe, ON	Sept 10 2025	12:35			X	14	
2	PW25-01-8hr	Metcalfe, ON	11	16.35			X	14	
3									
4									
5									
6									
7									
8									
9									ON Ice
10									

OTT-2025-09-168

* Relinquished By (Print):	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
MIA DINH	10/09/25	8:00PM		2025/09/11	11:10	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	7.2 | 6	Present	☒	
		Intact	☒	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

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

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

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

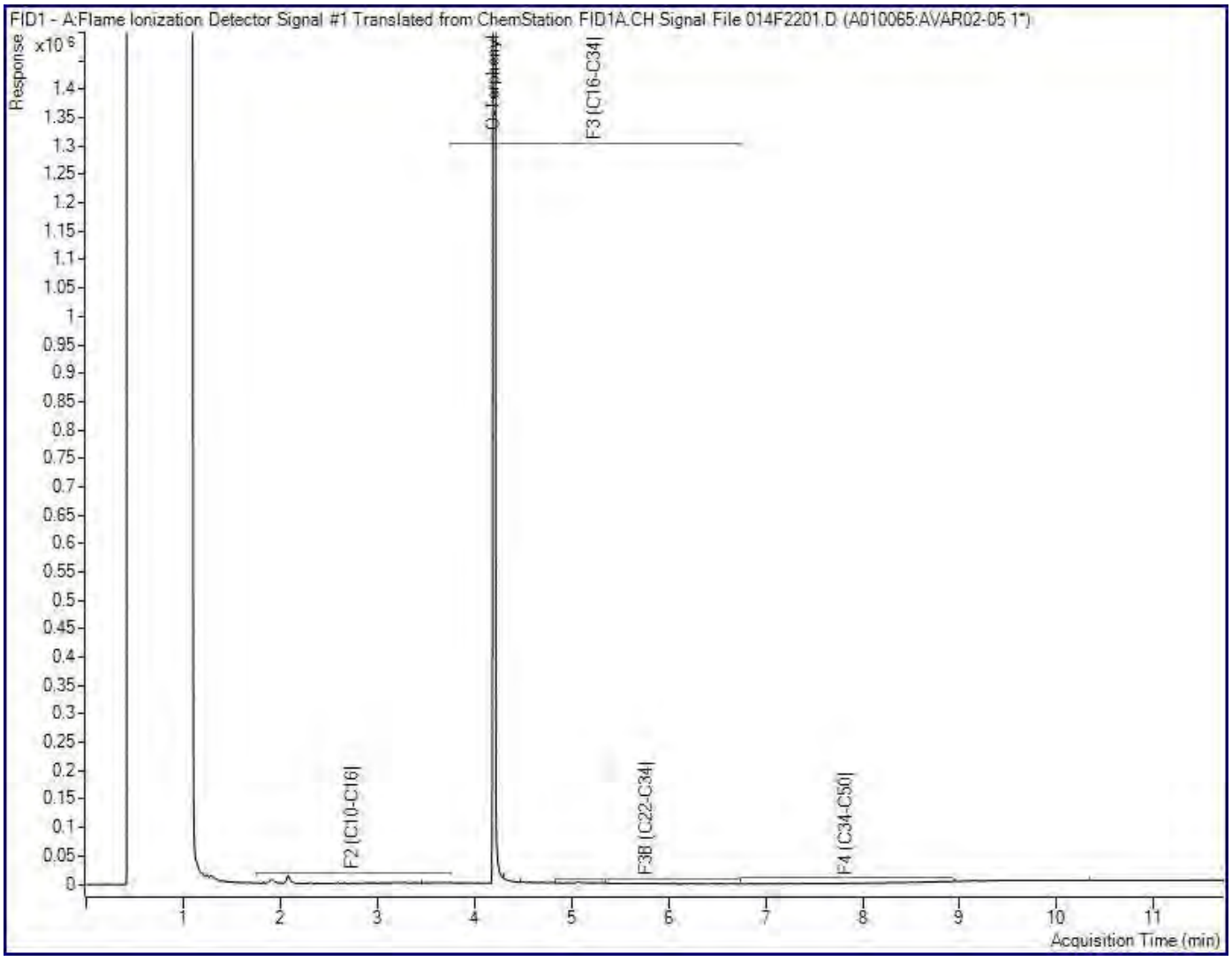
White: Bureau Veritas Yellow: Client

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C5B3108
Report Date: 2025/09/24
Bureau Veritas Sample: AVAR02

Stantec Consulting Ltd
Client Project #: 160901295
Client ID: PW25-01-4HR

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

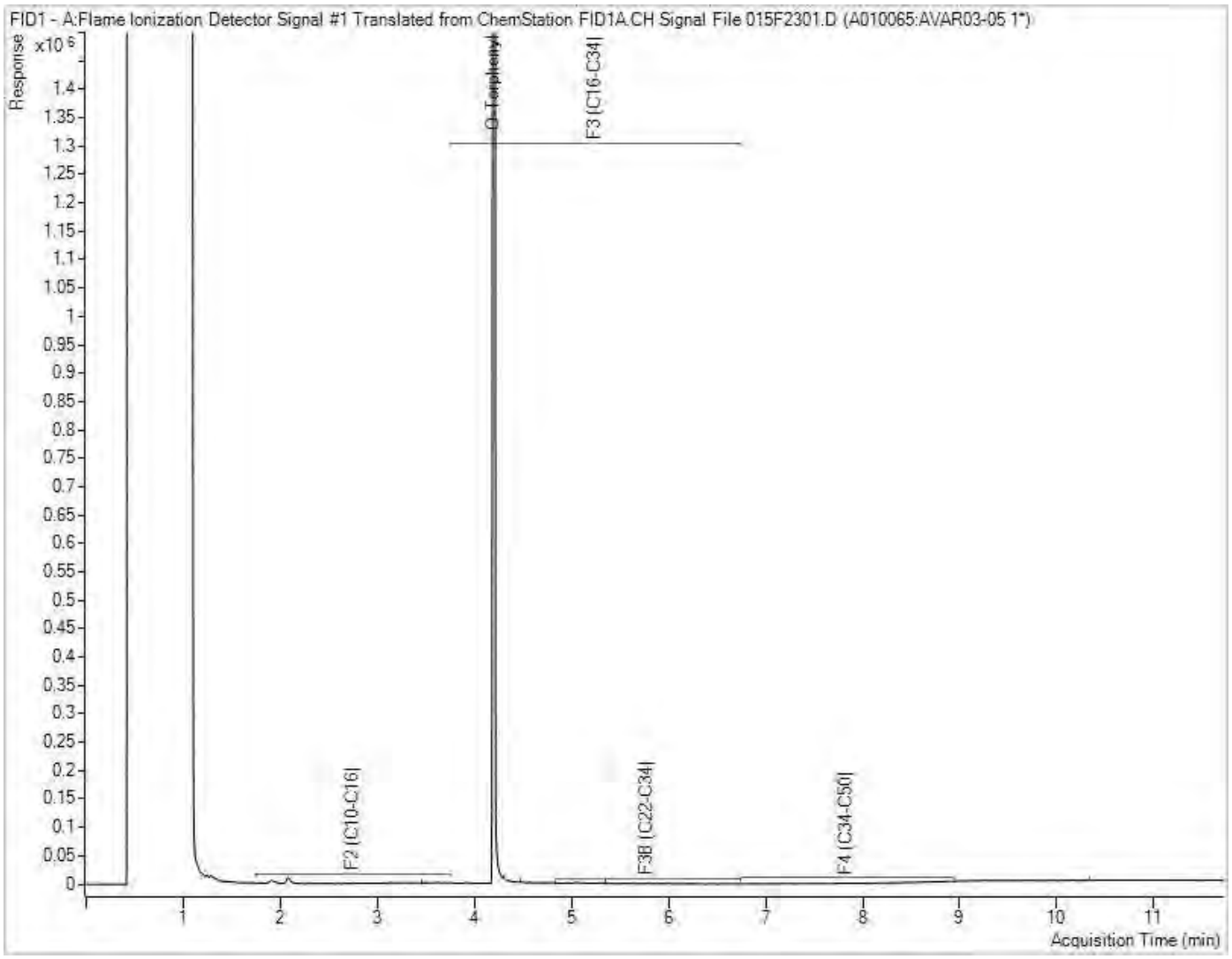


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C5B3108
Report Date: 2025/09/24
Bureau Veritas Sample: AVAR03

Stantec Consulting Ltd
Client Project #: 160901295
Client ID: PW25-01-8HR

Petroleum Hydrocarbons F2-F4 in Water Chromatogram

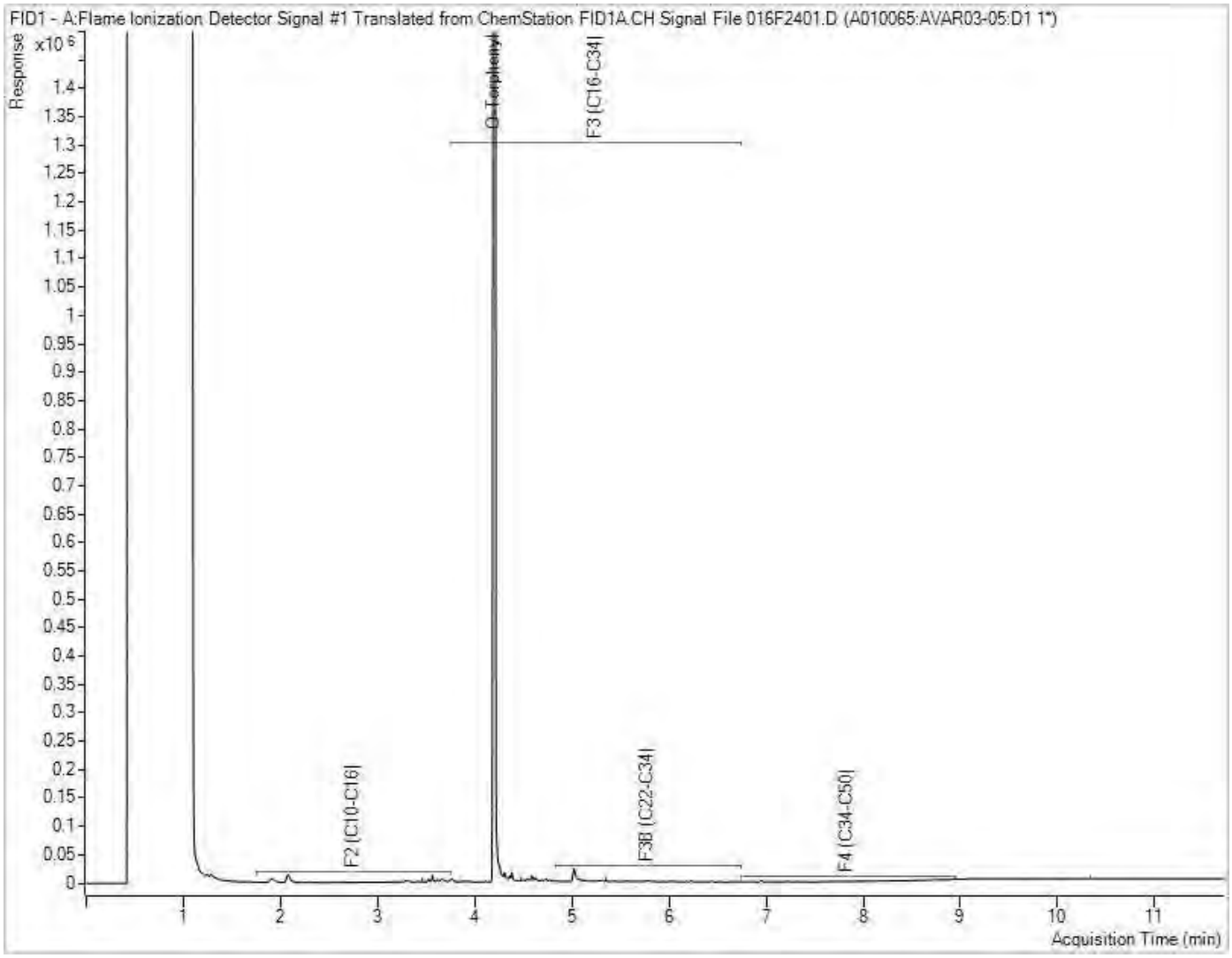


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C5B3108
Report Date: 2025/09/24
Bureau Veritas Sample: AVAR03 Lab-Dup

Stantec Consulting Ltd
Client Project #: 160901295
Client ID: PW25-01-8HR

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



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

Appendix F LSI and RSI Calculation

Langlier Saturation Index (LSI) Calculation

	Inputs		
pH	7.5	A	0.20
TDS	990	B	2.32
Hardness	460	C	2.26
Alkalinity	340	D	2.53
Temperature	13		
		pHs=	7.03
		LSI=	0.47

Where:

$A = (\text{Log}_{10}\,[\text{TDS}] - 1) / 10$

$B = -13.12 \times \text{Log}_{10}\,(^{\circ}\text{C} + 273) + 34.55$

$C = \text{Log}_{10}\,[Ca^{2+}\text{ as }CaCO_3] - 0.4$

$D = \text{Log}_{10}\,[\text{alkalinity as }CaCO_3]$

LSI	Effect
0.5 to 2	Water is super saturated and tends to precipitate a scale layer of calcium carbonate (scale forming but non-corrosive)
0 to 0.5	Water is super saturated and tends to precipitate a scale layer of calcium carbonate (slightly scale forming)
0	Water is saturated (in equilibrium) with calcium carbonate. A scale layer of calcium carbonate is neither precipitated nor dissolved
0 to -0.5	Water is under saturated and tends to dissolve solid calcium carbonate (slightly corrosive but non-scale forming)
-0.5 to -2	Water is under saturated and tends to dissolve solid calcium carbonate (seriously corrosive)

Ryznar Stability Index (RSI) Calculation

RSI=	6.56

RSI	Effect
<6	The scale tendency increases as the index decreases
6-7	In the ideal range for the formation of a protective corrosion inhibitor film
>7	The calcium carbonate formation probably does not lead to a protective corrosion inhibitor film
>8	Mild steel corrosion becomes a problem