

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS

SANTAGUIDA SUBDIVISION, BECKWITH, ON



Project No: CCO-25-0472

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Table of Contents

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 1

1.1 Site Setting 1

1.2 Consultation 2

1.3 Neighbouring Properties and Land Uses 2

1.4 Neighbour Well Information..... 3

1.5 Hydrology 3

1.6 Background Geology and Hydrology 3

1.1.1 Surficial and Bedrock Geology 3

1.6.1 Recharge and Discharge Areas..... 4

1.6.2 Potential Sources of Contamination and Potential Impacts to Hydrogeological Conditions at the Site4

1.6.3 Water Well Record Review 5

1.6.4 Aquifer Vulnerability5

2.0 HYDROGEOLOGICAL ASSESSMENT 6

1.7 Preamble 6

1.8 Methodology..... 6

1.9 Initial Results 8

1.9.1 Static Conditions 8

1.9.2 Test Well Installations 8

1.9.3 Well Yield 11

1.9.4 Transmissivity and Storativity.....12

1.9.5 Hydraulic conductivity 13

1.9.6 Long Term Yield14

1.9.7 Water Quality16

1.10 Additional Groundwater Sampling 17

1.10.1	July 2023	17
1.10.2	February 2024	18
1.10.3	May 2024	18
1.10.4	June 2024 Private Well Sampling	19
1.10.5	June – September 2024	19
1.10.6	September 2024 – Storm Event	20
2.0	TERRAIN ANALYSIS.....	20
2.1	<i>Preamble</i>	<i>20</i>
2.2	<i>General Site Evaluation</i>	<i>20</i>
2.2.1	Overburden Depth	20
2.2.2	Overburden Characterization	20
2.2.3	Soil Classification for Private Sanitary Servicing	21
2.2.4	Bedrock	22
2.3	<i>Predictive Assessment - Contaminant Attenuation</i>	<i>22</i>
2.3.1	Contaminant Attenuation	22
3.0	SUMMARY OF CONDITIONS.....	26
3.1.1	Preamble	26
3.1.2	Regional Hydrogeology	26
3.1.3	Site Hydrogeology	27
3.1.4	Hydrogeological Conceptual Model	27
3.2	<i>Recommendations</i>	<i>29</i>
3.2.1	Well Construction	29
3.2.2	Water Quality and Treatment	29
3.2.3	Private Sewage Systems	30
4.0	LIMITATIONS.....	32
5.0	CLOSURE	33
6.0	REFERENCES.....	34

TABLES

Table 1	Test Well Construction Details
Table 2	Test Well Information
Table 3	Summary of Pumping Tests
Table 4	Transmissivity Values
Table 5	Storativity Values
Table 6	Summary of Hydraulic Conductivity Calculations
Table 7	Summary of Long-term Yields
Table 8	Summary of Test Pits
Table 9	Well Records within 500 m of the Site

Appended

Table 1	Field Data
Table 2	Lab Data

FIGURES

Figure 1	Site Location
Figure 2	Site Layout
Figure 3	MECP Water Well Information System Summary
Figure 4	Groundwater Flow
Figure 5	Regional Bedrock Formation
Figure 6	Regional Surficial Geology
Figure 7	Test Pit Layout

APPENDICES

Appendix A	Preliminary Concept Plan
Appendix B	Beckwith Township Official Plan
Appendix C	On-Site Water Well Records
Appendix D	MECP Well Records Summary
Appendix E	Water Level Data and Pumping Test Analyses
Appendix F	Laboratory Certificates of Analysis
Appendix G	Transmissivity, Storativity, Farvolden and Moell Method Calculations
Appendix H	Grain Size Analysis
Appendix I	Nitrate Attenuation Calculations

EXECUTIVE SUMMARY

Egis Canada Ltd ('Egis') was retained by Domenic Santaguida (owner of the property and 'the Client') to conduct a Hydrogeological Assessment and Terrain Analysis in support of a proposed subdivision in the Township of Beckwith, Franktown, Ontario ('the Site'). The subject lands are legally described as SW2 1/2 LT 18 CON 3 BECKWITH AS IN RS163988, EXCEPT PT 15, 27R777; BECKWITH. It is our understanding that this hydrogeological assessment and terrain analysis is needed based on hydrogeological requirements that stem from the Township of Beckwith for a severance development. At the present time, the Site consists primarily of undeveloped mixed forested land, with areas of low-lying brush and/or grass.

This report has been prepared using data collected from multiple on-site wells (Test Well 1, 2, 3, 4, and 5) and subsurface investigations by Egis staff between June 2023 and September 2024. Hydrogeological data from these test wells are considered representative of the proposed subdivision area.

Ground surface at the Site is relatively flat, and elevation ranges from approximately 131-135 m above sea level (asl), with a slight slope upwards towards the southwest. Surface drainage is interpreted to reflect surface topography and is likely controlled via areas of permeable ground surface. King's Creek is the closest permanent waterbody to the Site and is located approximately 800 m south of the Site at its closest point. On a local scale, shallow groundwater flow likely has an eastern component, based on topography and the relative position of a wetland complex to the east of the Site. However, this cannot be determined fully due to limited data from the Site. Based on water levels measured from on-site test wells, there is likely a northwestern flow component to bedrock groundwater flow.

To obtain hydrogeological data for the Site, all test wells were pumped for at least six hours and were sampled twice during this time. Certain on and offsite wells were subject to additional pumping and/or resampling to determine and confirm trends in water quality. Following the completion of all field testing, analytical data and pumping test results from all test wells supports Egis' opinion that the on-Site water supply aquifer is of high yield and acceptable quality.

With respect to the management of on-site sewage, Egis' terrain assessment findings indicate that there is sufficient land mass for each of the proposed lots to accommodate on-site septic systems as well as provide the necessary attenuation for on-site generated sewage.

Based on the analyses performed for this hydrogeological assessment and terrain analysis, Egis is of the opinion that the Site and underlying aquifer can adequately support the private services associated with the proposed subdivision. Offsite impacts to other well users due to development of the proposed subdivision are not anticipated.

1.0 INTRODUCTION

Egis Canada Ltd ('Egis') was retained by Domenic Santaguida (owner of the property and 'the Client') to conduct a Hydrogeological Assessment and Terrain Analysis in support of a proposed subdivision in the Township of Beckwith, Franktown, Ontario ('the Site'). It is our understanding that this hydrogeological assessment and terrain analysis is needed based on hydrogeological requirements that stem from the Township of Beckwith for a proposed 41 rural residential lot subdivision (legally described as: SW2 1/2 LT 18 CON 3 BECKWITH AS IN RS163988, EXCEPT PT 15, 27R777; BECKWITH). The proposed residential lots range from 1.33 – 2.74 acres in area. The total property area encompasses a total of 82.7 acres. At the present time, the Site consists primarily of undeveloped mixed forested land, with areas of low-lying brush and/or grass.

This work was conducted in general accordance with Ministry of Environment, Conservation and Parks (MECP) guidance as follows:

- Procedure D-5-5: Technical Guideline for Private Wells: Water Supply Assessment (August 1996); and
- Procedure D-5-4: Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment (August 1996).

A full Preliminary Concept Plan is included as Appendix A.

This report considers the development potential of the Site, which includes a total of 41 lots over a total area of approximately 28 hectares. The Hydrogeological Assessment and Terrain Analysis address the following:

- General Site setting information;
- Geological and hydrogeological background;
- Site-specific conditions;
- Soils evaluation; and
- Sewage (nitrate) attenuation.

1.1 Site Setting

The Site is located south of Richmond Road, which is approximately midway between the community development areas of Franktown and Prospect, Beckwith, Ontario (Figure 1). The Site currently exists predominantly as undeveloped mixed forested land, with some areas of low brush and/or grass. There are rural residential properties to the east, north, and west, and agricultural land and undeveloped forested land to the south.

This region is characterized by thin overburden overlying Paleozoic bedrock (OGS, 2017). It appears that the Site has never been contemporarily developed. On-site elevation ranges between 131 and 135 metres above sea level (m asl). The topography of the Site is generally flat, with a slight slope upwards towards the southwest.

1.2 Consultation

On March 9, 2020, Egis completed a pre-consultation with the Planning Administrator, Stephen Closs, from the Township of Beckwith. This pre-consultation was to discuss the plan for the subdivision, describe the current Site, and outline any requirements prior to development. This consultation outlined, per the Township of Beckwith's Official Plan, the creation of residential lots via subdivision in the Rural area to occur in one phase. In addition, the Official Plan requires applicants to submit the following supplemental reports:

- Hydrogeological Assessment;
- Conceptual Stormwater Management Plan;
- Species at Risk Assessment;
- Environmental Impact Assessment;
- Archaeological Assessment;
- Traffic Impact Assessment.

Accordingly, this report satisfies the 'Hydrogeological Assessment' supplemental report requirement.

On April 17, 2023, Egis additionally completed a pre-consultation with the Township of Beckwith's Hydrogeology peer reviewer, Gemtec. The purpose of this pre-consultation was to outline the subject investigations methodology, as well as to learn of any known hydrogeological issues for the investigation area. Gemtec provided feedback on the plan for the hydrogeological assessment, but did not specify any additional fieldwork that was needed beyond our original scope of work proposed. Egis employed best judgement and understanding from this informal pre-consultation to guide the subsequent hydrogeological study.

1.3 Neighbouring Properties and Land Uses

For purposes of this report, Richmond Road is assumed to be oriented in an east-west direction. The property is bound to the north by Richmond Road, rural residential properties to the north and west, rural residential properties and agricultural land to the east, and undeveloped forested land to the south. It is noted that a mineral aggregate establishment (operating Quarry) is located approximately 1.1 km southwest of the Site.

Based on a review of MECP Well Record Information System (WWIS) records, it appears that all residences in the area are privately serviced with wells and septic systems.

The subject site and the surrounding properties to the north and west are designated as rural lands. There is a designated agricultural land further east of the Site, and undeveloped forested land to the south. A quarry is located approximately 1.1 km southwest of the Site (operating and owned by Cavanagh Construction, with a licensed area of 20.4 hectares). All areas are zoned per the Township of Beckwith's Official Plan (included as Appendix B). A groundwater sample was collected from a neighbouring property located at 1056 Richmond Road, approximately 990 metres northeast of the Site and situated hydraulically upgradient of the Site. Details of this sample collected are presented in Section 1.10.4.

1.4 Neighbour Well Information

The following outlines the information received from neighbouring residents pertaining to their wells:

- 1056 Richmond Road: Two people have utilized this well for 35+ years. The homeowner reported a sulfur smell in the summer/in dry periods, and notes "high iron content". The homeowners do not regularly shock their well. There are two wells at the Site, one beside the house used to supply water for drinking and bathing, and another well in a pump house used for livestock.

1.5 Hydrology

The Site is relatively flat. Two unevaluated wetland areas are present within the northern portion of the Site, directly adjacent to Richmond Road. In addition, an unevaluated wetland is located to the northwest and southeast of the Site, as seen in Figure 2. King's Creek is the closest permanent waterbody to the Site and is located approximately 800 m south of the Site at its closest point. On a local scale, shallow groundwater flow likely has an eastern component, based on topography and the relative position of a wetland complex to the east of the Site. However, this cannot be determined fully due to limited data from the Site. Based on water levels measured from on-site test wells, there is likely a northwestern component to bedrock groundwater flow.

1.6 Background Geology and Hydrology

1.1.1 Surficial and Bedrock Geology

According to Ontario Geological Survey (OGS) regional mapping, surficial overburden at the Site is thin, and is characterized by Paleozoic bedrock (OGS, 2017). This classification is consistent with on-site observations made by Egis. Based on OGS 2017 data, the underlying bedrock is classified as dolostone and sandstone of the Beekmantown Group, which is consistent with MECP WWIS Records. At the Site, bedrock at surface was found between TW3 and TW5, and within the southern portion of the Site (see Figure 2 for areas of exposed bedrock).

Well records for on-site drilled test wells indicate an average overburden thickness of approximately 0.3 m, with only one record indicating an overburden depth greater than 0.3 m. It should be noted that based on areas investigated (see Figure 4), overburden thickness ranged from 0.1 to 0.6 m bgs. A review of the MECP Water Well Information System (WWIS) well records within 500 m of the Site showed that the depth to bedrock ranges from 0 – 12.4 m bgs, with an average depth of approximately 3.4 m bgs. Where noted in the well records, bedrock is typically referred to as either “sandstone” or “limestone” by the well driller (Appendix C).

1.6.1 Recharge and Discharge Areas

Based on a review of topographic data and geological maps, the Site is generally flat with some local elevated relief in the northwest and southwest portions. Site drainage is generally poor, and there are unnamed, unevaluated wetlands present within the north portion of the Site (adjacent to Richmond Road), as well as to the northwest and southeast of the Site.

King’s Creek is located south of the Site (approximately 800 m south at its closest point). Given the topography of the Site and proximity of King’s Creek, as well as observations of standing water noted during early Site investigations, surface water is likely to generally flow to the east, towards King’s Creek, which eventually connects to Jock River and flows north into Rideau River. It is noted that during the pumping tests conducted in June 2023, standing water was observed within the vicinity of TW5 and TW4, and along the constructed roadways in the southern half of the Site (vicinity of TW1 and TW2). Standing water was estimated to cover approximately 25-30% of the property in summer, fall and winter of 2023.

In early May 2024, the Client communicated to Egis that the standing water issue had been addressed with constructed drainage measures, which were generally observed to direct water to the east. A Site visit on May 22, 2024 for follow-up bacteria sampling indicated the presence of some standing water nearest TW2 and TW4, however, significantly less standing water was present within the southern portion of the Site. Improvements in Site drainage were noted from the summer to the fall of 2024.

A review of a map (MECP Source Protection Information Atlas) indicates a potentially significant groundwater recharge area within the south portion of the Site.

1.6.2 Potential Sources of Contamination and Potential Impacts to Hydrogeological Conditions at the Site

A windshield survey of the surrounding area was conducted in combination with a site walkthrough and review of maps and zoning information. The Site is located in a predominantly rural residential area. This rural residential property usage does not appear to pose any significant source of contamination to the proposed subdivision. It is noted that an established farm (including livestock) is present approximately 990 m northeast of the Site. A mineral aggregate zone (operating Quarry) is additionally located approximately 1.1 km southwest of the Site. Given the relative distances of these two land uses, neither

are expected to represent a significant risk to the Site. No other potentially contaminating activities (waste disposal sites, fuel outlets, improperly maintained bulk fuel storage, salt storage) were observed in the vicinity of the Site.

The Site and surrounding properties are not connected to municipal services. As such, there are likely private on-site sewage systems at all nearby residences. There are currently no known services located on the Site.

1.6.3 Water Well Record Review

The wells utilized for the pumping tests were completed in either sandstone or limestone to final depths ranging from 36.5 to 70.7 m btoc (see Table 1 for details). The drilling was conducted by licensed employees of Air Rock, and Egis personnel observed the grouting of each well per O. Reg. 903 (Wells), as amended. Overburden was not encountered for TW1, TW2, and TW4 (bedrock was at surface). For TW3, the drillers reported 0.3 m of overlying clay, and for TW5, the drillers reported of 0.6 m of overlying sandy clay and stones. All wells include 12.8 m of casing. Review of the well records indicates that the wells were constructed in compliance with O.Reg. 903.

The MECP's WWIS database indicated that 5 Well Records are located within 500 m of the Site. All 5 of these wells are listed for domestic purposes. MECP WWIS records are shown on Figure 3, and data are summarized in Appendix D.

All offsite wells were completed in bedrock at final depths ranging from 10.7 – 61.9 m below ground surface (bgs). The average depth to bedrock was reported to be 3.4 m bgs. Driller-reported static groundwater levels ranged from 0.6 – 10.7 m bgs at the time of installation. Casing depths in wells located within 500 m of the Site range from 6.7 to 13.4 m bgs, and water quality indicates that at the time of the initial pumping tests completed after well installation, a majority of the wells (3) consisted of cloudy water, while the remaining 2 were clear.

Driller-recommended well yields ranged from 18.9 – 75.7 L/min, with the exception of well record 5801959 which had a recommended well yield of 3.7 L/min. A majority of the well records within 500 m of the proposed severances were at or above the MECP recommended minimum rate of 18.75 L/min for a single-family dwelling.

1.6.4 Aquifer Vulnerability

Aquifers that are highly vulnerable are those in which water is able to infiltrate quickly from the ground surface. This typically includes thin soils (i.e. "shallow overburden") which consist of coarse or sandy soils, whereby water is able to flow through these materials more quickly than less permeable soils (i.e., clays and silts). Based on overburden conditions identified on Well Records within 500 m of the Site, plus overburden materials observed during the test pitting program at the Site, soils overlying the aquifer are

coarse-grained (sand/silty sand). Accordingly, the aquifer underlying the Site has the potential to be highly vulnerable. In addition, a map of aquifer vulnerability was reviewed from the MECP's "Source Protection Information Atlas" which indicated the Site is located within a highly vulnerable aquifer area. Given the depth at which groundwater was encountered during the well constructions (approximately 21.9 – 67.6 m bgs), Egis is of the opinion that sufficient spatial separation exists to provide adequate isolation of the supply aquifer (bedrock) from potential impacts from surface water infiltration with a properly grouted and cased well.

2.0 HYDROGEOLOGICAL ASSESSMENT

1.7 Preamble

Egis conducted a detailed hydrogeological investigation at the Site to assess the feasibility of individual private wells for servicing the proposed residential lots. As noted in Section 1, the work generally followed the Guidance of MECP Procedure D-5-5: Technical Guideline for Private Wells – Water Supply Assessment.

1.8 Methodology

Air Rock Drilling Ltd. (Air Rock; Well Contractor's Licence No.1119) was retained by Domenic Santaguida to drill five water wells at the Site for testing purposes and eventual domestic use when the property is developed. The drilling was conducted by licensed employees of Air Rock, and Egis personnel observed the grouting of each well per O. Reg. 903 (Wells), as amended. The driller also provided and installed a pump for the pumping test activities at the drilled test wells (TW1, TW2, TW3, TW4, TW5). A summary of the test well construction based on driller-provided well records is presented in Table 1. The location of all on-site wells is noted on Figure 2.

Table 1: Test Well Construction Details

Well ID	Depth (m bgs)	Completion Material ¹	Driller's Estimated Yield ² (L/min)
TW1	70.1	Limestone	37.8
TW2	67.1	Limestone with Sandstone (mix)	37.8
TW3	36.5	Sandstone	37.8

TW4	60.9	Sandstone	37.8
TW5	70.7	Sandstone	37.8

¹ Bedrock formations as noted on Well Record.

² Recommended pumping rates as noted on Well Record.

The initial estimation of the yield and quality of water from each test well was made by the drillers during development, which occurred the same day that each well was drilled. The yield determined by this one-hour test is noted in Table 1. The water well records are provided in Appendix C.

A minimum six-hour pumping test (with was conducted at each of the four on-site test wells (TW1, TW2, TW3, TW4, and TW5) by Egis staff between June 12 and June 20, 2023. During each test, the test wells were pumped at a rate not less than the driller-recommended pumping rate, with the exception of TW2 (see Section 1.9.2). Water levels were measured in the pumped well and at other on-site test wells in the vicinity, where possible. At least three manual measurements were made at each observation well, and a level logger was utilized at each observation well and within the pumped well. Water quality was also monitored and recorded in the field during the tests at all five locations. Two water samples were collected from each pumped well during their respective tests (one at the third hour and last hour of the test) for analysis of the “subdivision supply” suite of parameters, in addition to a select suite of metals.

All samples were collected unfiltered and unchlorinated directly into clean bottles supplied by the analytical laboratory (Paracel Laboratories or Eurofins of Ottawa, ON). Prior to each sample collection, a field test for chlorine (using the Hach DR900 Colorimeter) was completed to ensure no residual chlorine persisted from the initial well shocking. Visual and olfactory observations of the pumped water were made during each pumping test to monitor for effervescence, odours, or other physical indicators of water quality. Samples were kept on ice and delivered directly to Paracel or Eurofins under strict chain of custody procedures. Samples were received by the laboratory within 24 hours of collection, with the exception of the samples collected from TW5. Paracel and Eurofins are fully accredited by the Standards Council of Canada/Canadian Association for Laboratory Accreditation (SCC/CALA) and has accreditation for Ontario Safe Drinking Water Act (OSDWA) testing.

During all five pumping tests, water level monitoring consisted of manual readings with a water level tape. Drawdown was measured in the pumped wells and recovery measurements were made until at least 95% recovery was achieved in the pumping well, or 24 hours had passed (whichever came first).

Water level drawdown and recovery data from the pumping tests were plotted and analyzed using the Cooper-Jacob solution and were used to calculate transmissivity (T) and hydraulic conductivity (K) for the aquifer. Storativity (S) of the aquifer was estimated wherever suitable observation well measurements could be made.

1.9 Initial Results

Drawdown curves and tabular data from the pumping tests are available in Appendix E. A summary of groundwater quality data and the official Laboratory Certificates of Analysis are available in Appendix F.

1.9.1 Static Conditions

Prior to the initiation of pumping, water levels were measured in the five test wells (Table 2, below). The static groundwater elevation ranged between 128.04 – 129.66 m asl at the time of the pumping tests. Static groundwater elevations suggest that on-site bedrock groundwater flow has a southwestern component, toward King’s Creek. On-site wells were completed in reported “sandstone” and “limestone”. Depths are noted in Table 2, below.

Table 2: Test Well Information

Well ID	Well Depth (m bgs)	Top of Well Casing Elevation (m asl) ¹	Stick Up (m)	Static Groundwater Level (m btoc)	Static Water Elevation (m asl)
TW1	70.1	132.73	0.6	4.695	128.04
TW2	67.06	131.28	0.6	2.031	129.25
TW3	36.6	133.38	0.6	3.723	129.66
TW4	60.9	131.23	0.6	3.011	128.22
TW5	70.7	131.48	0.6	2.031	129.45

¹ As measured based on well survey elevations (November 2024)

1.9.2 Test Well Installations

Pumping tests were conducted at each of the five wells by Egis. The pump, hose, and power supply were provided by Air Rock, who installed and removed the pump from each well. The discharged water was directed away from each pumping well and allowed to flow overland away and downgradient from the test well. At the time of the on-site pumping tests, the weather was approximately between 15-20 °C, with sun and clouds, with one day of rain (June 14, 2023).

TW1

TW1 was drilled to a depth of 70.1 m. Limestone bedrock was reported at the ground surface by the drillers. A 13.4 m long steel casing (including approximately 0.6 m of above-ground stickup) was installed in the hole and sealed with a cement/bentonite grout. The hole was grouted from ground surface to approximately 12.8 m bgs. The remainder of the well is an open hole in the rock. The rock was described by the driller as "limestone" from ground surface to 30.4 m and "sandstone with grey limestone" from 30.4 – 70.1 m. Water was encountered at 54.8 m and 67.1 m bgs.

The driller initially estimated a yield of 56.8 L/min (15 gal/min). The final recommended pumping rate was 37.8 L/min (10 gal/min).

Egis undertook a pumping test at this location on June 15, 2023. The well was initially pumped at a rate of 26.5 L/min for 5 minutes, at which time it was increased to 37.8 L/min for the remainder of the pumping test (six and a half hours). The water levels were relatively stable throughout the entirety of the test, and drawdown stabilized at approximately 0.25 m btoc (127.78 m asl). 95% recovery in water level was achieved within 100 minutes of terminating the test, based on manual measurements.

TW2

TW2 was drilled to a depth of 67.1 m. Limestone bedrock was reported at the ground surface by the drillers. A 13.4 m long steel casing (including approximately 0.61 m of above-ground stickup) was installed in the hole and sealed with a cement/bentonite grout. The hole was grouted from ground surface to approximately 12.8 m bgs. The remainder of the well is an open hole in the rock. The rock was described by the driller as "limestone" from ground surface to 30.5 m, then "sandstone" from 30.5 to 48.7 m, followed by "limestone with sandstone" from 48.7 to 67.1 m by the driller. Water was encountered at 42.6 m and 64 m bgs.

The driller initially estimated a yield of 56.8 L/min (15 gal/min). The final recommended pumping rate was 37.8 L/min (10 gal/min).

Egis undertook a pumping test at this location on June 14, 2023. The well was initially pumped at a rate of 37.85 L/min for 20 minutes, at which time it was decreased to 26.5 L/min for an additional 10 minutes. As water levels were not stabilizing, the pumping rate was changed to a rate of 24 L/min for the remainder of the pumping test (six hours and ten minutes). The cumulative pumping rate used for this test was 23.5 L/min. The graphical representation of the pumping test indicates drawdown stabilized at approximately 35.1 m btoc (94.09 m asl). Over 95% recovery in water level was achieved within 1022 minutes of terminating the test, based on manual measurements.

TW3

TW3 was drilled to a depth of 36.6 m. Clay was reported at ground surface to approximately 0.3 m bgs by the drillers. A 13.4 m long steel casing (including approximately 0.61 m of above-ground stickup) was installed in the hole and sealed with a cement/bentonite grout. The hole was grouted from ground surface to approximately 12.8 m bgs. The remainder of the well is an open hole in the rock. The rock was described as "limestone" from 0.3 to 10.06 m followed by "sandstone" from 10.06 to 36.6 by the driller. Water was encountered at 21.9 m and 34.7 m bgs.

The driller initially estimated a yield of 56.8 L/min (15 gal/min). The final recommended pumping rate was 37.8 L/min (10 gal/min).

Egis undertook a pumping test at this location on June 20, 2023. The well was pumped at a rate of 37.85 L/min for the entirety of the test (six hours). The graphical representation of the pumping test indicates drawdown stabilized at approximately 1.48 m btoc (128.17 m asl). Over 95% recovery in water level was achieved within 50 minutes of terminating the test, based on level logger data.

TW4

TW4 was drilled to a depth of 60.9 m. Limestone bedrock was reported at the ground surface by the drillers. A 13.4 m long steel casing (including approximately 0.61 m of above-ground stickup) was installed in the hole and sealed with a cement/bentonite grout. The hole was grouted from ground surface to approximately 12.8 m bgs. The remainder of the well is an open hole in the rock. The rock was described as "limestone" from ground surface to 7.6 m, then "limestone with sandstone" from 7.6 to 21.3 m, followed by "sandstone" from 21.3 to 60.9 m by the driller. Water was encountered at 50.3 m and 58.5 m bgs.

The driller initially estimated a yield of 45.4 L/min (12 gal/min). The final recommended pumping rate was 37.8 L/min (10 gal/min).

Egis undertook a pumping test at this location on June 19, 2023. The well was pumped at a rate of 37.8 L/min for six hours. The drawdown stabilized at approximately 7.4 m btoc (120.81 m asl). Over 95% recovery in water level was achieved within 24 minutes of terminating the test, based on manual measurements.

TW5

TW 5 was drilled to a depth of 70.7 m. Sandy clay and stone was reported at ground surface to approximately 0.6 m bgs by the drillers. A 13.4 m long steel casing (including approximately 0.61 m of above-ground stickup) was installed in the hole and sealed with a cement/bentonite grout. The hole was grouted from ground surface to approximately 9.75 m bgs. The remainder of the well is an open hole in the rock. The rock was described as "limestone" from 0.6 – 24.6 m bgs, and "sandstone" from 24.6 – 70.7 m bgs by the driller. Water was encountered at 67.6 m bgs.

The driller initially estimated a yield of 75.7 L/min (20 gal/min). The final recommended pumping rate was 37.8 L/min (10 gal/min).

Egis undertook a pumping test at this location on June 13, 2023. The well was pumped at a rate of 75.7 L/min for six hours. The drawdown stabilized at approximately 0.57 m btoc (128.87 m asl). Over 95% recovery in water level was achieved within 60 minutes of terminating the test.

Table 3: Summary of Pumping Tests

Test Well ID	Final Pumping Rate (L/min)	Maximum Drawdown in Pumping Well (m)	Observation Well ID	Maximum Drawdown in Observation Well (m)	Approximate Distance between Pumping Well and Observation Well (m)
TW1	37	0.26	TW3	0.01	390
			TW4	0.09	270
TW2	24	35.9	TW1	0.01	190
			TW3	0.01	395
TW3	37	1.5	TW4	0.04	180
			TW5	0.04 ¹	313
TW4	37	7.4	TW3	0.04	180
			TW5	- ¹	426
TW5	75	0.59	TW3	0.04	313
			TW4	0.007	426

¹Some data considered anomalous, removed from analysis

1.9.3 Well Yield

The testing and development undertaken by the driller immediately after well installation provided a reasonable indication of the yield of each well. All test wells were demonstrated to have yields suitable for supplying single family homes. During Egis's pumping tests at the five well locations, at least 8,280 L of water was pumped from each well. This volume exceeds the daily demand for water for a typical 4-bedroom home (2,000 L) and the minimum volume for a 6-hour pumping test (6,750 L), as specified in

the Guideline Procedure D-5-5 Private Wells: Water Supply Assessment. At each location, at least 95% recovery was achieved between 0 and 60 minutes after the cessation of pumping, with the exception of TW1 and TW2.

The five well locations were spaced 180 m apart at minimum. Two (2) observation wells were monitored throughout each pumping test through the use of a level logger and at least three (3) manual water level measurements. Based on manual measurements, minimal drawdown was observed in all observation wells (0.007 – 0.04 m btoc).

1.9.4 Transmissivity and Storativity

A summary of the transmissivity values calculated using the Cooper-Jacob method are presented in Table 4.

Table 4: Transmissivity Values

Well ID	Transmissivity (m ² /day) (Pumping Test – Drawdown Calculation)	Transmissivity (m ² /day) (Recovery Calculation)
TW1	996	181
TW2	0.4	0.3
TW3	99.6	19.9
TW4	49.8	10
TW5	181.5	99.8

The calculations for transmissivity and storativity are presented in Appendix G.

Transmissivity is calculated using the Cooper-Jacob straight line method:

$$T = 2.3 Q / 4\pi \Delta s$$

Where possible, storativity is calculated using data from an observation well with the following equation:

$$S = 2.25 T t_0 / r^2$$

Where:

- T is the transmissivity (m²/day)
- Q is the pumping rate (m³/day)
- Δs is the change in hydraulic head over one log cycle (drawdown vs. log time)
- S is the storativity
- t₀ is the x-intercept of the observation well drawdown vs. log time line of best fit

- r is the distance between the pumped well and the observation well

Transmissivity values ranged from 0.3 – 996 m²/day, as calculated based on water level drawdown and recovery data from pumped test wells.

Storativity values are presented in the following Table 5.

Table 5: Storativity Values

Well ID	Storativity
TW1	(TW4 as Observation Well – TW4 Transmissivity Value) 1.07 x 10 ⁻⁷
TW2	(TW1 as Observation Well – TW1 Transmissivity Value) 4.02 x 10 ⁻⁸
TW3	(TW4 as Observation Well – TW4 Transmissivity Value) 1.24 x 10 ⁻⁵
TW4	(TW3 as Observation Well – TW3 Transmissivity Value) 2.76 x 10 ⁻⁵
TW5	(TW3 as Observation Well – TW3 Transmissivity Value) 6.36 x 10 ⁻⁷

Storativity at the Site was calculated to range from 10⁻⁸ to 10⁻⁵ based on water level drawdown data collected from the closest nearby observation well during each pumping test. The lowest transmissivity from each monitored observation well was used. The large range in storativities is indicative of a highly fractured aquifer.

1.9.5 Hydraulic conductivity

The hydraulic conductivity of each test well was calculated based on the average transmissivity.

Hydraulic conductivity is calculated using the following equation:

$$K = T/b$$

Where:

- K is the hydraulic conductivity (m/s)
- T is the transmissivity (m²/day, the more conservative value is used)
- b corresponds to the interval between the bottom of the casing and the bottom of the well, used as aquifer thickness (m)

Table 6: Summary of Hydraulic Conductivity Calculations

Well ID	TW1	TW2	TW3	TW4	TW5
Hydraulic Conductivity (m/s)	3.62×10^{-5}	6.12×10^{-8}	9.94×10^{-6}	2.43×10^{-6}	2.02×10^{-5}

The hydraulic conductivity values summarized in Table 5 are generally consistent with higher values for limestone published by Freeze and Cherry, 1979 (10^{-9} to 10^{-5}).

The calculations for hydraulic conductivity are presented in Appendix G.

1.9.6 Long Term Yield

Long term safe yield describes the amount of water that can safely be withdrawn from an aquifer without negative impact. The long-term safe yield of each well was estimated based on the following factors:

- Observations during six-hour pumping test;
- Driller's recommendation; and
- Calculated properties.

Farvolden Method

Utilizing transmissivity values calculated from individual pumping tests (Table 4), the theoretical long-term safe yield for each of the pumping wells was calculated following the Farvolden Method and presented in Table 7.

The following Farvolden equation calculates the long term 20-year safe pumping rate (Q_{20}).

$$Q_{20} = 0.68 T H_a S_f$$

Where:

- Q_{20} is the twenty-year safe yield (m^3/day)
- T , is the transmissivity (m^2/day)
- H_a is the available water column height (m)
- S_f is a safety factor

Moell Method

The Moell Method was also used to calculate the theoretical long-term 20-year safe pumping rate for each of the pumping wells. The long-term safe pumping rate (Q_{20}) was calculated using the following equation:

$$(Q_{20}) = (Q \text{ Ha Sf}) / (s_{100} + 5 \Delta s)$$

Where:

- Q_{20} is the twenty-year safe yield (m^3/day)
- Ha is the available water column height (m)
- S_f is a safety factor
- s_{100} is the drawdown at 100 minutes (semi-log long-term graph)
- Δs is the change in hydraulic head over one log cycle (drawdown vs. log time, see Appendix E)

Based on the above Farvolden and Moell calculations, the estimated pumping rate of each test well that could be sustained for a twenty-year period of continuous pumping is shown in Table 7, below. Long term yield calculations are presented in Appendix G.

Q20 Verification – Cooper-Jacob Graphical Method

It should be noted that long-term projections of drawdown using the Cooper-Jacob method indicate that all test wells, with the exception of TW2, can sustain a constant pumping at rates exceeding 13.7 L/min (considered the minimum base rate) if pumped constantly for 20 years (see Appendix E).

Table 7: Summary of Long-Term Yields

Well ID	TW1	TW2	TW3	TW4	TW5
Farvolden Method Long Term Yield (Q_{20}) (L/min)	3480	6.1	245	181	2143
Moell Method Long Term Yield (Q_{20}) (L/min)	5682	9.5	394	174	3211
Tested Pumping Rate (L/min)	37.8	23.5	37.8	37.8	75.7
Driller-Recommended Pumping Rate (L/min)	37.8	37.8	37.8	37.8	37.8

The calculation and consideration of long-term yield estimations is inherently conservative; wells are typically not pumped continuously for long periods of time, a safety factor is used, and the lowest and most conservative transmissivity value from each test well was used in the calculations. In all wells except TW2, both the tested pumping rates and the driller-recommended pumping rates are considerably lower than the estimated long-term Q_{20} values. Data collected from the Site generally indicate a highly productive but potentially fractured aquifer.

Accordingly, Egis is of the opinion that the aquifer is generally capable of supplying water at a flow rate which is greater than the minimum flow rate of 13.7 L/min as outlined in Procedure D-5-5, as well as the base rate of 18.75 L/min, which is considered a more reasonable peak flow rate for a house in this proposed development.

1.9.7 Water Quality

Laboratory Certificates of Analysis for all groundwater testing completed at the Site are presented in Appendix F. A summary of field quality and analytical results from the sampling of the test wells (TW1, TW2, TW3, TW4, and TW5) is presented in Table 1 and 2, appended to this report. Samples were taken twice during the initial six-hour test at all locations; initial samples are denoted by a '-1' (e.g. TW1-1), while secondary samples are denoted by a '-2' (e.g. TW1-2). For the *initial sampling* period (between June 13 and 20, 2023), the following exceedances were noted:

Laboratory-noted exceedances of health-related standards from the initial round of on-site sampling were as follows:

- Maximum Allowable Concentration (MAC) for total coliforms exceeded in TW1-1, TW2-2, TW3-1, TW3-2, and TW4-1.

Laboratory-noted exceedances of non-health related standards from the initial round of on-site sampling were as follows:

- Aesthetic Objective (AO) for laboratory-reported turbidity exceeded in TW1-1, TW2-1, TW2-2, TW4-1, and TW5-1. Laboratory results for turbidity are typically considered exaggerated due to the precipitation of iron and other low-solubility solids with changes in temperature and pH. As such, field measurements of turbidity were treated as a more accurate indicator of water quality and were compared to the AO of 1.0 NTU as set out in Procedure D-5-5. It is important to note that all field turbidity measurements were recorded below 1.0 NTU prior to the cessation of pumping (TW1: 0.66 NTU, TW2: 0.93 NTU, TW4: 0.83 NTU, and TW5: 0.69 NTU); Aesthetic Objective (AO) for aluminum exceeded in sample TW5-2;
- Aesthetic Objective (AO) for iron exceeded in all samples (TW1-1, TW1-2, TW2-1, TW2-2, TW3-1, TW3-2, TW4-1, TW4-2, TW5-1, and TW5-2);

- Aesthetic Objective (AO) for manganese exceeded in samples TW2-1, TW2-2, TW3-1, TW3-2, TW4-1, TW4-2, and TW5-2; and
- Aesthetic Objective (AO) for sodium exceeded in samples TW2-1 and TW2-2.

1.10 Additional Groundwater Sampling

Additional groundwater samples were collected in summer and winter of 2023, and the spring, summer, and fall of 2024. This additional sampling was conducted to better characterize potential surface impacts to the supply groundwater, and to ensure the supply aquifer is capable of providing groundwater of an acceptable quality under D-5-5 and the Ontario Drinking Water Standards. The methodology of the additional sampling is outlined in the below sections.

It is important to note that significant standing water was observed on the Site during visits on June 12-20, 2023, July 20, 2023, and February 22-23, 2023. This standing water (particularly the quantity of standing water immediately surrounding TW2 and TW4) was thought to potentially contribute to the continual bacteria exceedances within the groundwater samples collected in June, July, and February of 2023. Accordingly, in early May 2024, the Client constructed drainage pathways/ditches to remediate the standing water issue. Based on Site visits by Egis in May-September 2024, the standing water issue appeared to have been addressed, as significantly less standing water was present surrounding the wells, with the exception of the Site visit completed on June 19, 2024. On June 19, 2024, significant standing water was observed approximately 45-50 m east of TW1. Subsequent visits (conducted throughout June-September 2024) indicated less standing water in this area.

1.10.1 July 2023

On July 20, 2023, additional groundwater samples were collected based on the detection of elevated bacteria concentrations for all test wells from the June 2023 sampling. Egis collected follow up samples from TW1, TW2, TW3, TW4, and TW5 to confirm current Site conditions.

Prior to sample collection, the on-Site test wells were purged a minimum of three (3) well volumes to allow for the influx of fresh formation water. Based on the laboratory results, the following observations were noted:

- Concentration of total coliforms in TW1 increased from 4 CFU/100 mL (TW1-1) to 6 CFU/100 mL;
- Concentration of total coliforms in TW2 increased from 1 CFU/100 mL (TW2-2) to 1,200 CFU/100 mL;
- Concentration of total coliforms in TW3 increased from 1 CFU/100 mL (TW3-1, TW3-2) to 2 CFU/100 mL;
- Concentration of total coliforms in TW4 increased from 1 CFU/100 mL (TW4-1) to 12 CFU/100 mL; and

- Concentration of total coliforms in TW5 increased from non-detectable CFU/100 mL to 6 CFU/100 mL.

Based on these results, Egis was of the opinion that the noted nearby standing water was potentially influencing the presence of bacteria (total coliforms) detected in the samples. As such, Egis completed follow-up sampling in the winter (see below) under frozen conditions, to determine whether the bacteria exceedances would persist.

1.10.2 February 2024

On February 22, 2024, additional groundwater samples were collected from all test wells, with the exception of TW2 based on inaccessible and unsafe conditions. Prior to sample collection, the on-Site test wells were purged a minimum of three (3) well volumes to allow for the influx of fresh formation water. It is noted that TW2 was not sampled due to unsafe conditions (large volume of ice in close proximity to well). Based on the laboratory results, the following observations were noted:

- Concentration of total coliforms in TW1 decreased from 6 CFU/100 mL (TW1) to non-detectable;
- Concentration of total coliforms in TW3 decreased from 2 CFU/100 mL (TW3) to non-detectable;
- Concentration of total coliforms in TW4 decreased from 12 CFU/100 mL (TW4) to <10 CFU/100 mL; and
- Concentration of total coliforms in TW5 remained consistent from 6 CFU/100 mL (TW5) to 6 CFU/100 mL.

These data suggest that the standing water and warm summer/fall conditions were at least partly responsible for bacteriological exceedances in the on-site test wells. As such, it was determined that additional development of the wells and maintenance of dry conditions throughout the Site could lead to improved groundwater quality.

1.10.3 May 2024

All wells were re-tested in the spring of 2024 to determine if bacteria exceedances were still present following the winter snow and ice melt. All five (5) test wells were sampled. Prior to sample collection, the on-Site test wells were shocked with a small quantity of chlorine solution and purged a minimum of three (3) well volumes to allow for the influx of fresh formation water. Based on the laboratory results, the following observations were noted:

- Concentration of total coliforms in TW1 increased from non-detectable (TW1) to 2 CFU/100 mL, and E.Coli increased from non-detectable to 3 CFU/100 mL, and fecal coliforms increased from non-detectable to 6 CFU/100 mL;

- Concentration of total coliforms in TW2 decreased from 1,200 CFU/100 mL (TW2) to 18 CFU/100 mL;
- Concentration of total coliforms in TW3 increased from non-detectable (TW3) to 16 CFU/100 mL;
- Concentration of total coliforms in TW4 increased from <10 CFU/100 MI (TW4) to 10 CFU/100 mL; and
- Concentration of total coliforms in TW5 increased from 6 CFU/100 mL (TW5) to 15 CFU/100 mL.

1.10.4 June 2024 Private Well Sampling

To gain a better understanding of potential impacts originating from potential off-Site sources, Egis collected a groundwater sample from a neighbouring well (1056 Richmond Road), located approximately 990 m northeast and hydraulically upgradient of the Site on June 7, 2024. Results from this sample indicated the following exceedances:

- Maximum Allowable Concentration (MAC) for E.coli (2 ug/L);
- Maximum Allowable Concentration (MAC) for total coliforms (5 ug/L);
- Operational Guideline (OG) for hardness (312 mg/L);
- Operational Guideline (OG) for organic nitrogen (0.174 mg/L); and
- Aesthetic Objective (AO) for manganese (260 ug/L).

It is noted that the residence, located at 1056 Richmond Road, consists of a residential dwelling, a barn, and several livestock animals (cattle, sheep, donkeys, and chickens). These residents also noted that they do not regularly shock their well with a chlorine solution. The E. Coli and total coliforms exceedances are likely attributed to the presence of livestock animals in close proximity to the well locations. The well record was found online, and could not be provided by the residents to confirm well construction details.

1.10.5 June – September 2024

Following repeated exceedances of bacteriological parameters, Egis completed additional groundwater sampling at each test well following a 24-hour purging cycle after each well was shocked with a chlorine solution.

Each well was purged for 24 hours and then sampled twice. One sample was collected after the 24-hour purge, and another sample was collected at least one (1) week later, after again purging three (3) well volumes. The results from the post 24-hour purging event and secondary follow-up sample collected at each well (June, July, August, and September 2024) were shown to have no detections of E. Coli., fecal coliforms, or total coliforms.

1.10.6 September 2024 – Storm Event

Following a storm event on September 25, 2024 in which 15-30 mm of rain fell, Egis returned to the Site on September 26, 2024, to collect one round of microbial samples at all five (5) test wells, following an individual purge of three well volumes at each well. This sampling was done to determine whether significant rainfall would lead to bacteria exceedances (surface impacts) within the test wells. Egis collected five (5) groundwater samples on September 26, 2024. Results from this sampling event indicated no detections of E. Coli, fecal coliforms, or total coliforms.

2.0 TERRAIN ANALYSIS

2.1 Preamble

A total of ten (10) test pits were advanced under the supervision of Egis staff on September 17, 2024, at various locations throughout the Site (see Figure 4). Egis staff were present to collect subsurface characterization information. The test pits were advanced by use of a mini-excavator (operated by an Owner’s representative) to determine the exact depth of overburden, depth to shallow groundwater, and to permit the collection of overburden soil samples for characterization.

2.2 General Site Evaluation

2.2.1 Overburden Depth

Overburden across the Site was found to be shallow (<1.0 m) having an average thickness of approximately 0.31 m. Test pits were dug using a mini-excavator until refusal was encountered. Refusal on bedrock was encountered in all test pits at depths ranging from 0.15 to 0.60 m bgs.

2.2.2 Overburden Characterization

The soil and groundwater conditions logged in the test pits are presented in Table 3 below. The test pit summaries indicate the subsurface conditions at the specific test pit locations only; subsurface conditions at other locations outside of the investigated area could differ from those encountered within the investigated area.

Table 8: Summary of Test Pits

Test Pit ID	Total Depth (m)	Depth to Water (m)	Soil Characteristics
TP-1	0.30	-	Medium sand with topsoil, loose, trace cobbles, brown Refusal on bedrock

Test Pit ID	Total Depth (m)	Depth to Water (m)	Soil Characteristics
TP-2	0.30	-	Medium sand with topsoil, loose, trace cobbles, brown Refusal on bedrock
TP-3	0.30	-	Organic-rich, clayey medium sand, moist, trace cobbles, brown Refusal on bedrock
TP-4	0.30	-	Medium sand with topsoil, loose, trace cobbles, brown Refusal on bedrock
TP-5	0.15	-	Organic-rich, clayey medium sand, moist, trace cobbles, brown Refusal on bedrock
TP-6	0.15	-	Medium sand, organic materials, trace gravel, loose, brown Refusal on bedrock
TP-7	0.40	-	Medium sand, organic materials, trace gravel, loose, brown Refusal on bedrock
TP-8	0.30	-	Medium sand, organic materials, trace gravel, loose, brown Refusal on bedrock
TP-9	0.30	-	Medium silty sand, trace cobbles, moist, black/brown Refusal on bedrock
TP-10	0.60	-	Medium sand, organic materials, trace cobbles, dark brown Refusal on bedrock

The soil descriptions in this report are based on commonly accepted classification and identification employed in engineering practice. Egis employed judgment in the classification and description of soil and may not be exact but are accurate to what is common in current engineering practice.

A grain size analysis was undertaken for three (3) soil samples collected within the proposed subdivision area. The results of this analysis indicate that soils from the overburden consist of sand and silt/sandy silt with trace fine gravel (see Appendix H). It is also noted that the depth to bedrock was less than 2 m in all test pits, suggesting the Site is hydrogeologically sensitive.

2.2.3 Soil Classification for Private Sanitary Servicing

Comparison of the soil classification for the Unified Soil Classification System (UCSC) as provided in the Ministry of Municipal Affairs and Housing (MMAH) Supplementary Standard SB-6: Time and Soil Descriptions, reveals that the main native soil assessed on the Site for all test pits (TP-1, TP-2, TP-3, TP-4, TP-5, TP-6, TP-7, TP-8, TP-9, TP-10) appears to be within the following soil group:

- SM: Silty sands, sand-silt mixtures

- According to Table 2 of SB-6, the SM group of soils has a coefficient of permeability (K) of 10^{-5} to 10^{-3} with a percolation time (T) of 8 to 20 min/cm. This soil type has a medium to low permeability and is deemed acceptable as the native receiving soil for proposed Class 4 sewage systems.

Please note that for the purposes of this report, a minimum thickness of 0.25 m of native undisturbed soil located under the topsoil and above the bedrock was used when establishing the main soil type for each test pit. Given the hydrogeological sensitivity of the site and overburden soil thickness on-site (i.e. 0.15 – 0.6 m total depth), the following recommendations are to be incorporated in the design of the individual sewage systems servicing each lot:

- In areas with less than 0.25m of soil under the topsoil, it is recommended that an imported clay layer (minimum 0.15m in depth) be installed on the bedrock surface before placing leaching bed fill for sewage systems to prevent the possibility of short-circuiting of sewage effluent to the underlying bedrock aquifer.
- Where thicker overburden is present (i.e. greater than 0.25m of soil under the topsoil is present) it is also recommended that an imported clay layer (minimum 0.15m in depth) be installed under all sewage system leaching beds to prevent the possibility of short-circuiting of sewage effluent to the underlying bedrock aquifer, unless otherwise advised by the local sewage system regulator administering Part 8 of the Ontario Building Code.

2.2.4 *Bedrock*

As previously discussed, on-site bedrock is generally characterized as carbonate metasedimentary rocks (marble, calc-silicate rocks, skarn, and tectonic breccias). Bedrock was encountered in all test pits during the field assessment. Bedrock-type assessment was not made during the field work.

2.3 Predictive Assessment - Contaminant Attenuation

2.3.1 *Contaminant Attenuation*

As part of the subdivision application process, Egis performed a predictive attenuation assessment as outlined in the MECP Procedure D-5-4 (Technical Guideline for Individual On-site Sewage Systems: Water Quality Impact Risk Assessment). The predictive attenuation assessment is a three (3) step process which requires proceeding to the next step if the conditions for the preceding step are not met. The three (3) step process is:

- Step 1 – Lot Size Consideration
- Step 2 – System Isolation Consideration
- Step 3 – Contaminant Attenuation Considerations

The purpose of the predictive assessment is to ensure that the combined effluent discharges from all the individual on-site sewage systems forming a development will have a minimal effect on the groundwater and the present or potential use of the adjacent property (i.e., less than the boundary condition concentration of 10 mg/L for nitrate-nitrite).

The following outlines the results of the sewage system impact assessment undertaken by Egis.

Step 1 - Lot Size Consideration

The proposed subdivision consists of lots that range from approximately 0.53 to 0.95 hectares each in size. Per MECP Procedure D-5-4, developments with lots of 1.0 hectare or more, the risk that the boundary condition limit is typically low and considered acceptable in most cases. Where lots average 1.0 hectare with no lot less than 0.8 hectare, may not require a detailed predictive provided that the area is not hydrogeologically sensitive.

Given that the proposed lot sizing ranges between 0.53 to 0.95 hectares and that the average lot size is less than 0.8 hectares, the conditions for Step 1 are not met. Due to this, a review of Step 2 was undertaken.

Step 2 - System Isolation Considerations

If it can be demonstrated that the sewage system effluent is hydrogeologically isolated from the existing or potential drinking water supply aquifer, then the risk to groundwater is considered to be low. The system isolation review needs to account for lands that extend up to 500 metres from the Site.

Based on a review of available geological information and mapping, and in conjunction with site observations made during the Terrain Analysis, the overburden depth on-site is less than 2.0 m and consists of primarily coarse-grained material (silty sand), as detailed in Table 8. The Site appears to be hydrogeologically sensitive. Accordingly, the conditions for Step 2 are not met and calculations determining the predictive attenuation of nitrate-nitrogen were completed (outlined in Step 3 below).

Step 3 – Contaminant Attenuation Considerations

Due to the quality of materials observed during the test pit analysis, overburden depth, and size of the proposed lots, a predictive nitrate-nitrogen attenuation assessment was undertaken to determine if sufficient attenuation of nitrate-nitrogen could be achieved on the Site. The predictive attenuation is based on the land area available for attenuation, water surplus derived from precipitation less evapotranspiration and infiltration factors for topography, type of soil and cover.

For this assessment, Egis utilized the latest available data from the 1991 – 2020 Canadian Climate Normals from Drummond Centre station (climate ID: 6102J13).

Please see below for information regarding other inputs/parameters used in the analysis (refer to Appendix I for more information):

- A water surplus (W_s) value of 333.21 mm/yr was calculated based on 1991-2020 Climate Normal data for Drummond Centre station (Site Climate ID: 6102J13). This station represents the nearest station to the site with data quality that meets the “3 and 5 rule” per the United Nation’s World Meteorological Organization (WMO) 30 Year Standard Normals;
- An infiltration factor (I_f) of 0.791 was calculated as per Table 2 of MECP’s document titled “MOEE Hydrogeological Technical Requirements for Land Development Applications”, dated April 1995. The factors used to calculate the Infiltration Factor (I_f) and the associated rationale for selection are presented below:
 - A topographic factor of 0.241 was used for rolling land to flat land (average of 0.2% slope).
 - A soil factor of 0.4 was used, based on in-field observations and the grain size analysis.
 - A cover factor of 0.15 was used as the site is expected to consist of a mix of woodland and cultivated land after development.
- Available infiltration (I) was calculated by multiplying the water surplus (W_s) by the infiltration factor (I_f). This yielded an infiltration value of 0.264 m/yr.
- The infiltration area (A) was determined to be 240, 258 m². This consists of the total site area 270,713 m² minus the proposed road right-of-way (22,255 m²) and 200 m² for each of the proposed houses (road and house).
- The dilution water (D_w) available was calculated as 63,325 m³/yr (173,494 L/day) by multiplying the infiltration area (A) with the available infiltration (I).
- Background nitrate concentration (C_b) of 0.1 mg/L was used, which represents the maximum concentration found within all test well samples collected (refer to Appendix F).

Based on the above-noted information, in order to maintain the nitrate-nitrite concentration at the downgradient property boundary (C_w) below the Ontario Drinking Water Objective (ODWO) of 10 mg/L, the maximum number of lots in the proposed residential subdivision would be as follows:

- Assuming standard domestic strength sewage nitrate-nitrogen concentration (C_e) of 40 mg/L at the point of subsurface discharge: $N = 57.1$ severed lots.

As can be seen above, the property can accommodate a subdivision of up to 57 lots to proceed while ensuring the Ontario Drinking Water Objective (ODWO) of 10 mg/L for nitrate-nitrogen is not exceeded. The proposed 41 lot residential subdivision yields a calculated nitrate-nitrogen concentration of 7.746 mg/L at the property boundary.

The predictive attenuation was calculated using the following equation:

$$C_{boundary} = C_{background} + \frac{C_{eff} \times Q_{eff} \times N}{(Q_{eff} + N) + D_w}$$

Where:

- $C_{boundary}$ is the concentration at the boundary;
- $C_{background}$ is the background concentration of nitrate (0.1 mg/L);
- C_{eff} is nitrate concentration of the effluent (40 mg/L);
- Q_{eff} is flow of effluent (1,000 L/day);
- N is the number of proposed lots (41); and,
- D_w is the dilution water available taking into account total precipitation less evapotranspiration, infiltration factors for topography, type of soil and cover and total area available for infiltration.

The calculations for the Predictive Attenuation are presented in Appendix I.

It should be noted that the above-noted analysis does not account for the possible use of Low Impact Development (LID) into the developed Site's stormwater management strategy. The use of LID, such as infiltration trenches, are typically used to reduce stormwater runoff by increasing groundwater recharge, which in turn would be expected to be associated with a reduction of the predicted nitrate-nitrogen concentration compared to results presented from the calculations above.

3.0 SUMMARY OF CONDITIONS

3.1.1 Preamble

The Site is located south of Richmond Road, approximately midway between the community development areas of Franktown and Prospect, Beckwith, Ontario (Figure 1). The property is bounded to the north by Richmond Road, rural residential properties to the north and west, rural residential properties and agricultural land to the east, and undeveloped forested land to the south.

The Site currently exists predominantly as undeveloped mixed forested land, with some areas of low brush and/or grass. There are rural residential properties to the north and west, rural residential properties to the east, as well as agricultural land, and undeveloped forested land to the south.

According to Ontario Geological Survey (OGS) regional mapping, surficial overburden at the Site is thin, and is characterized by exposed areas of Paleozoic bedrock (OGS, 2017). This classification is consistent with on-site observations made by Egis. Based on OGS 2017 data, the underlying bedrock is classified as dolostone and sandstone of the Beekmantown Group, which is consistent with MECP WWIS Records.

The 1991-2020 mean annual precipitation is approximately 752.3 mm with 186.6 cm as snow, and the mean daily temperature is 6.5 °C (Environment Canada Climate Normals for Drummond Centre Climate Station).

The Site currently consists of mixed forested land, with areas of low-lying brush and/or grass, and has likely never been contemporarily developed. On-site elevation ranges between 131 and 135 metres above sea level (m asl). The topography of the Site is relatively flat, with a some local elevated relief in the northwest and southwest portions.

3.1.2 Regional Hydrogeology

The Site is relatively flat. Two unevaluated wetland areas are present within the northern portion of the Site, directly adjacent to Richmond Road. An unevaluated wetland is located to the northwest and southeast of the Site, as seen in Figure 2. King's Creek is the closest permanent waterbody to the Site and is located approximately 800 m south of the Site at its closest point. On a local scale, shallow groundwater flow likely has an eastern component, based on topography and the relative position of a wetland complex to the east of the Site. However, this cannot be determined fully due to limited data from the Site. Based on water levels measured from on-site test wells, there is likely a northwestern flow component to bedrock groundwater flow.

On a regional scale, data obtained from the Provincial Groundwater Monitoring Network (PGMN) accessed through the MECP's Source Water Protection Atlas (2010-2020 dataset) suggest groundwater in the deeper bedrock formation has a northwest component (PGMN 2024). Interpretation of regional

data trends to represent actual flow directions in the immediate vicinity of the Site should be made with caution; regional groundwater flow trends can be unreliable on a smaller scale in highly fractured bedrock systems.

3.1.3 Site Hydrogeology

A review of topographic data, geological maps, and field notes show that the property is generally flat with some local sloping upwards towards the southwest. Shallow groundwater and surface water likely drain in this direction. On a local scale, shallow groundwater flow cannot be determined fully due to limited data, however there is likely a northwestern bedrock flow component.

It is noted that during several Site visits conducted from June 2023 to early May 2024, standing water was observed throughout the Site, mainly concentrated towards the southern portion of the Site. The presence of bedrock at surface is also present. A review of a map of significant groundwater recharge was reviewed, and the central to south portion of the Site appears to exist within an area of significant groundwater recharge. The areas of standing water have been addressed with constructed drainage measures.

Based on OGS 2017 data, the underlying bedrock is classified as dolostone and sandstone of the Beekmantown Group, which is consistent with MECP WWIS Records.

A review of the MECP Water Well Information System (WWIS) well records within 500 m of the Site showed that the depth to bedrock ranges from 0 – 12.5 m bgs, with an average depth of approximately 03.4 m bgs. Where noted in the well records, bedrock is typically referred to as either “sandstone” or “limestone” by the driller.

Generally, the bedrock aquifer was found to have high yield and exhibited good recovery during pumping tests. There was generally minimal groundwater level movement observed in observation wells during the pumping tests, demonstrating minimal well interference across the Site. Due to the shallow bedrock observed throughout the property, the Site is considered to be hydrogeologically sensitive.

3.1.4 Hydrogeological Conceptual Model

The study area is located within a region characterized by thin overburden overlying Paleozoic bedrock (OGS 2017), and has been mapped as Highly Vulnerable Aquifer (HVA). Local MECP well records indicate average depths of overburden to be approximately 3.4 m bgs with variation between 0 – 12.5 m bgs. and overburden across the Site ranges from 0.15 – 0.6 m bgs, with an average of 0.31 m bgs. The Site is considered hydrogeologically sensitive.

The proposed development is not anticipated to impact the water supply aquifer and off-site well users given that all newly constructed wells will be constructed to prevent shallow groundwater and surface

water access via the wellhead by construction with a minimum of 18 m of casing, and by adhering to the requirements of O.Reg 903 (Wells), as amended. Properly constructed wells and septic systems provide protection from surface water intrusion to wells and aquifers. In addition, this study has determined that with incorporating the maximum background nitrate concentration found within all test well samples collected, a 41-lot subdivision meets D-5-4 maximum acceptable nitrate concentrations at the site boundary.

Groundwater testing at the site has shown that the supply aquifer is of acceptable yield and quality. Based on calculations following the Farvolden and Moell methods, on-site test wells (with the exception of TW2) could theoretically supply a twenty-year safe yield ranging from 174 – 5,682 L/min, as indicated in Table 7. It is Egis' professional opinion that TW1, TW3, TW4, and TW5 are capable of repeat pumping at the minimum required test rate under Procedure D-5-5. The precise reason as to why TW2 does not have comparable yield compared to other wells of similar construction is not known. However, recommendations are included below to ensure that any future wells installed at the Site which may have problematic yields are flagged immediately after drilling.

All health-related exceedances in on-site test wells have been followed-up and rectified with additional well improvements (i.e. chlorination) and development. Final samples from all test wells indicate that groundwater is potable.

Several additional ODWS Aesthetic Objectives (AO) were exceeded. These exceedances were noted for lab-reported turbidity, iron, manganese, aluminum, and the health-warning limit for sodium. It is important to note that field-measured turbidity was noted to be below 1.0 NTU at all wells during the pumping tests. Field-measured turbidity is generally considered to be more reliable than laboratory-reported data due to changes in temperature and pH that can occur during sample transport.

Additionally, Operational Guideline (OG) exceedances were noted for hardness. Exceedances of this Operational Guideline is considered normal for the region and is reasonably treatable. It is important to note that water with a hardness above 300 mg/L is considered very hard. All samples collected were below 300 mg/L, with the exception of the private well sample collected at 1056 Richmond Road. If water softening is desired, the use of potassium salts (i.e. KCl) is recommended. With the use of conventional water softeners, sodium concentrations will be elevated, which may affect persons on a sodium-reduced diet.

In terms of the bacteria (total coliforms) exceedances, elevated levels were noted during the initial pumping tests (June 2023) and a follow-up sampling event in July 2023. Follow-up sampling under frozen conditions (February 2023) indicated improving conditions, and following the construction of drainage features and 24-hour redevelopments of the wells, samples taken over June-September 2024 indicated no bacteria exceedances.

It has been shown that the bedrock aquifer is generally suitable for supplying the needs of 41 lots in the proposed development in terms of both quantity and quality when incorporating standard on-site sewage systems to service the individual lots.

Based on typical residential demand and minimal well interference noted in observation wells during pumping tests, it is not expected that the subdivision will cause any water supply issues for the surrounding private wells that exist in the vicinity.

3.2 Recommendations

3.2.1 Well Construction

- Four of the five newly installed test wells (TW1, TW3, TW4, and TW5) are suitable for supplying groundwater for domestic use at the Site. All future wells should adhere to the requirements of O. Reg. 903 (Wells), as amended, with regards to casing length, positive drainage, stickup height, etc.
- It is noted that TW2 may not be suitable for supporting a typical residential dwelling. Following the installation of future supply wells, 1-hour pumping tests should be completed by the driller as per O.Reg. 903 (Wells). It is recommended that in instances where the water level in the tested well does not recover by at least 90% within 1 hour of pump shutoff, the sustainable long-term yield of the well should be verified by a third-party geoscientist or engineer with a 6-hour pumping test.
- Any newly installed wells at the Santaguida Subdivision will require a minimum of 18 m of casing to protect against surface water and/or shallow groundwater intrusion. 18 m of casing is recommended to generally exceed the construction of on-site test wells used in this assessment, while not sealing off the deeper water-bearing aquifer formations. 18 m of casing is expected to provide suitable wellhead protection from surface impacts (e.g. nitrates and bacteria) due to private sewage treatment systems and other runoff. Wells must adhere to all other requirements of O.Reg. 903, as outlined above.
- Wells to be used for water supply purposes at the proposed subdivision must have grouting inspections conducted under the supervision of a qualified professional (P.Eng. or P.Geo.).
- The separation distance between wells and septic systems should be maximized, to a minimum of 30 meters. A conceptual Lot Layout is appended to this report which outlines the conceptual areas of future well and septic locations.
- The test wells should be maintained prior to domestic use.

3.2.2 Water Quality and Treatment

- Water generally meets all applicable health-related standards at the present time.

- Aesthetic parameters such as colour, turbidity, iron, manganese, aluminum, and sodium can be readily treated.
- Aluminum can be treated through reverse osmosis, if desired.
- Iron and manganese can be treated through water softeners or manganese greensand filters, oxidation with filtration through proprietary filter media, or chlorination followed by sand or multimedia filtration, depending on the concentrations.
- If water softening is desired, the use of potassium salts (i.e. KCl) is recommended. With the use of conventional water softeners, it is important to note that sodium concentrations will be elevated.
- It is important to note that water with a hardness above 300 mg/L is considered very hard. The ODWS states that groundwater with hardness that exceeds 500 mg/L is unacceptable for domestic purposes.
- 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.
- Prior to occupation, it is recommended that the Client notify the local Medical Officer of Health of the sodium exceeding the health-related warning limit at TW2.

3.2.3 Private Sewage Systems

- Approval for individual on-site sewage systems will be governed by the OBC;
- Based on the general characterization of overburden in the vicinity of the proposed sewage systems, it is expected that imported leaching bed fill will be necessary on a large portion of the lots to provide the required vertical separation from shallow groundwater and/or bedrock layer.
 - Given the hydrogeological sensitivity of the Site, in areas with less than 0.25m of soil under the topsoil, it is recommended that an imported clay layer (minimum 0.15m in depth) be installed on the bedrock surface before placing leaching bed fill for sewage systems to prevent the possibility of short-circuiting of sewage effluent to the underlying bedrock aquifer.
 - Where thicker overburden is present (i.e. greater than 0.25m of soil under the topsoil is present) it is also recommended that an imported clay layer (minimum 0.15m in depth) be installed under all sewage system leaching beds to prevent the possibility of short-circuiting of sewage effluent to the underlying bedrock aquifer, unless otherwise advised by the local sewage system regulator administering Part 8 of the Ontario Building Code.
- The proposed development of 41 lots is of sufficient spatial area to meet the requirements of Procedure D-5-4, assuming that each lot is serviced by an OBC-approved Class 4 sewage system. Due to the hydrogeological sensitivity of the Site, it is recommended that Level 4 or

enhanced treatment systems be considered for the individual sewage systems servicing the subdivision.

- Any sewage systems must be constructed with all appropriate setbacks, treatment units and stipulations as per applicable Ontario Regulations. Additionally, as outlined in the Environmental Impact Statement by Gemtec, all sewage systems must be located no closer than 30 m from the high-water mark of any surface water feature and not located in areas of exposed bedrock.

4.0 LIMITATIONS

This report has been prepared, and the work referred to in this report has been undertaken by Egis for the Client. It is intended for the sole, and exclusive use of the Client with respect to the stated purpose of the work carried out by Egis.

The report may not be relied upon by any other person or entity without the express written consent of Egis. Any use which a third party makes of this report, or any reliance on decisions made based on it, without a Reliance Letter, are the responsibility of such third parties. Egis accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report or the information contained within it.

The investigation undertaken by Egis with respect to this report and any conclusions or recommendations made in this report reflect Egis's judgment based on the Site conditions observed at the time of the Site investigations, inspections, and/or sampling on the date(s) set out in this report, and on information available at the time of the preparation of this report. Conditions such as ground cover, weather, physical obstructions, etc. may influence conclusions or recommendations made in this report. Egis does not certify or warrant the environmental status of the property.

This report has been prepared for specific application to this Site and it may be based, in part, upon visual observation of the Site, subsurface investigation at discrete locations and depths, and/or specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report. Unless otherwise stated, the findings cannot be extended to previous or future Site conditions, portions of the Site which were unavailable for direct investigation, Site locations, subsurface or otherwise, which were not investigated directly, or chemical parameters, materials, or analysis which were not addressed or performed. Substances other than those addressed by the investigation described in this report may exist at the Site, substances addressed by the investigation may exist in areas of the Site not investigated, and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken.

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

5.0 CLOSURE

We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,
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Ref.: [PP-20-9510 Santaguida Subdivision Hydrogeological Assessment and Terrain_07Aug2025.docx](#)

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HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



TABLES

Table 1
Summary of Field Water Quality Parameters
Santaguida Subdivision

Pumping Test at:		TW1		Date:		15-Jun-23			
Time Elapsed (min)	Turbidity (NTU)	pH	Conductivity (us/cm)	Temperature (°C)	TDS (ppm)	Residual Chlorine (mg/L)	Odour	Effervesence	Flow Rate (L/min)
10	MAX	7.91	454	10.9	225	2.03	Iron	None	37.8
35	21	7.91	451	10.8	225	0.68	Sulfur	None	37.8
60	14.8	7.89	446	12.6	223	0.21	Sulfur	None	37.8
95	9.13	7.87	450	12.6	223	0.05	Sulfur	None	37.8
120	3.54	7.78	450	11.9	223	0.02	Sulfur	None	37.8
180	3.26	7.68	448	13.7	224	0	Sulfur	None	37.8
210	2.42	7.75	448	16	224	0	Sulfur	None	37.8
255	2.42	-	448	12.7	225	0	Sulfur	None	37.8
300	1.49	7.72	457	14.3	226	0	Sulfur/Iron	None	37.8
330	1.33	-	-	-	-	-	Sulfur/Iron	None	37.8
345	-	-	-	-	-	-	Sulfur/Iron	None	37.8
350	1.04	7.87	457	16	227	0	Sulfur/Iron	None	37.8
370	0.66	8.03	459	13.1	226	0	Sulfur/Iron	None	37.8
Notes:									

(us/cm) Microsiemens per centimetre
(°C) Degrees celsius
mg/L Milligrams per litre
L/min Litres per minute
N/A Not Analyzed

Pumping Test at:		TW2		Date:		14-Jun-23			
Time Elapsed (min)	Turbidity (NTU)	pH	Conductivity (us/cm)	Temperature (°C)	TDS (ppm)	Chlorine (mg/L)	Odour	Effervesence	Flow Rate (L/min)
16.5	6.26	-	-	-	-	0.08	Sulfur/Iron	None	37.8
40	4.18	7.89	456	10.4	228	0.04	Sulfur/Iron	None	24
55	3.86	7.91	456	10.3	229	0.05	Iron	None	24
90	5.6	7.93	457	10.1	227	0.01	Iron	None	24
150	9.22	7.91	457	10.2	226	-	Iron	None	24
180	10.7	7.82	456	10.6	226	0.16	Iron	None	24
210	10.5	7.88	453	10.9	225	0.17	Iron	None	24
240	9.07	7.86	454	10.7	225	0.13	Iron	None	24
300	2.59	7.81	456	10.6	226	0.01	Iron	None	24
330	1.93	7.82	456	10.8	226	0.06	Iron	None	24
360	1.72	7.83	454	11	226	0.02	Iron	None	24
380	0.93	-	-	-	-	0.02	Iron	None	24
Notes:									

Pumping Test at:		TW3		Date:		20-Jun-23			
Time Elapsed (min)	Turbidity (NTU)	pH	Conductivity (us/cm)	Temperature (°C)	TDS (ppm)	Chlorine (mg/L)	Odour	Effervesence	Flow Rate (L/min)
35	0.77	7.97	391	13.5	190	0.1	Iron	None	37.8
65	0.56	8.09	371	13.5	187	0.09	Iron	None	37.8
95	0.91	8.11	372	13.4	186	0.07	None	None	37.8
135	1.37	8	371	13.4	185	0.11	None	None	37.8
150	1.17	8.07	375	13.5	186	0.09	None	None	37.8
170	0.63	8.07	370	13.5	179	0.08	None	None	37.8
185	0.72	-	-	-	-	0.07	None	None	37.8
227	-	-	-	-	-	0	None	None	37.8
228	-	-	-	-	-	0.02	None	None	37.8
270	0.43	7.6	370	15.8	181	0	None	None	37.8
340	0.88	7.88	374	15.8	188	0	None	None	37.8
Notes:									

Table 1
Summary of Field Water Quality Parameters
Santaguida Subdivision

Pumping Test at:		TW4		Date:		19-Jun-23			
Time Elapsed (min)	Turbidity (NTU)	pH	Conductivity (us/cm)	Temperature (°C)	TDS (ppm)	Chlorine (mg/L)	Odour	Effervesence	Flow Rate (L/min)
30	1.93	8.2	452	11.3	227	0.1	Iron	None	37.8
55	2.62	8.14	454	11.1	228	0.11	Iron	None	37.8
90	2.62	8.18	457	12.7	231	0.12	Iron	None	37.8
105	1.88	8.1	461	11.6	232	0.06	Iron	None	37.8
135	1.86	8.13	463	11.4	232	-	Iron	None	37.8
150	1.01	8.14	462	11	228	0.07	Iron	None	37.8
175	-	-	-	-	-	0.13	Iron	None	37.8
185	-	-	-	-	-	-	Iron	None	37.8
220	2.48	7.89	462	12.2	228	0.2	Iron	None	37.8
255	1.76	7.85	463	12.3	228	0.12	Iron	None	37.8
300	1.27	7.92	464	12	227	0.12	Iron	None	37.8
320	1.17	7.91	464	12.1	230	0.12	Iron	None	37.8
340	0.61	-	-	-	-	-	Iron	None	37.8
350	0.83	-	-	-	-	0	Iron	None	37.8
Notes:									

Pumping Test at:		TW5		Date:		13-Jun-23			
Time Elapsed (min)	Turbidity (NTU)	pH	Conductivity (us/cm)	Temperature (°C)	TDS (ppm)	Chlorine (mg/L)	Odour	Effervesence	Flow Rate (L/min)
15	10.6	7.88	536	10.6	269	0.71	Sulfur	None	75.7
25	4.4	7.73	526	10.4	265	0.53	Sulfur	None	75.7
40	3.28	7.73	537	10.5	266	0.53	Sulfur	None	75.7
50	2.31	7.75	531	10.2	267	0.74	Sulfur	None	75.7
70	1.77	7.69	532	10.3	265	0.32	Sulfur	None	85.7
95	0.79	7.69	532	10.3	263	0.21	Iron and Sulfur	None	75.7
105	-	-	-	-	-	0.2	Iron and Sulfur	None	75.7
115	-	7.69	531	10.1	263	0.2	Iron and Sulfur	None	75.7
128	3.78	-	-	-	-	0.19	Iron and Sulfur	None	75.7
135	0.97	7.68	531	10.1	262	0.16	Iron and Sulfur	None	75.7
150	0.95	-	-	-	-	0.13	Iron and Sulfur	None	75.7
165	0.57	7.69	524	10.4	261	0.15	Iron and Sulfur	None	75.7
180	0.54	-	-	-	-	0.14	Iron and Sulfur	None	75.7
240	-	7.95	523	12.8	261	0.13	Iron and Sulfur	None	75.7
285	1.05	7.7	525	11.4	261	0	Iron and Sulfur	None	75.7
330	0.72	7.61	525	11.7	264	0	Iron	None	75.7
350	0.69	7.62	525	12.1	265	0	Iron	None	75.7
Notes:									

Table 2
Summary of Laboratory Water Quality Results
Santaguida Subdivision

Sample ID	Units	MDL	ODWSOG	Limit Type	TW5-1	TW5-2	TW5	TW5	TW5	TW5	TW5	TW5	TW5	TW5	PW1
Sample Date					13-Jun-23		20-Jun-23	20-Jul-23	22-Feb-24	22-May-24	19-Jul-24	06-Aug-24	26-Sep-24	07-Jun-24	
Location	Test Well 5														1056
Parameter:															Richmond Road
Microbiological Parameters															
E. Coli	CFU/100 mL	1	0 CFU/100 mL (0 CFU/100mL)	MAC	-	-	ND (1)	<2	ND	ND	0	0	0	0	2
Fecal Coliforms	CFU/100 mL	1	-	-	-	-	ND (1)	<2	ND	ND	0	0	0	0	2
Total Coliforms	CFU/100 mL	1	0 CFU/100 mL (0 CFU/100mL)	MAC	-	-	ND (1)	6	6	15	0	0	0	0	5
Heterotrophic Plate Count	CFU/ml	2	-	-	-	-	-	206	70	80	0	1	0	0	-
General Inorganics															
Alkalinity (as CaCO3)	mg/L	5	500 mg/L	OG	274	274	-	-	-	-	-	-	-	-	266
Ammonia as N (N-NH3)	mg/L	0.01	-	-	0.01	0.01	-	-	-	0.06	-	-	-	-	0.024
Dissolved Organic Carbon (DOC)	mg/L	0.5	5 mg/L	AO	1.6	1.6	-	-	-	-	-	-	-	-	1
Colour	TCU	2	5 TCU	AO	ND (2)	ND (2)	-	-	-	-	-	-	-	-	<2
Conductivity	uS/cm	5	-	-	625	622	-	-	-	-	-	-	-	-	533
Hardness	mg/L	0.824	100 mg/L	OG	281	277	-	-	-	-	-	-	-	-	312
pH	pH Units	0.1	-	-	8.1	8.1	-	-	-	-	-	-	-	-	7.77
Phosphorus (total)	mg/L	0.01	-	-	-	-	-	-	ND (0.01)	-	-	-	-	-	-
Phenols	mg/L	0.001	-	-	ND (0.001)	ND (0.001)	-	-	-	-	-	-	-	-	<0.001
Total Dissolved Solids	mg/L	10	500 mg/L	AO	308	316	-	-	-	-	-	-	-	-	346
Sulphide (S2)	mg/L	0.02	0.05 mg/L	AO	ND (0.02)	ND (0.02)	-	-	-	-	-	-	-	-	<0.01
Tannin & Lignin	mg/L	0.1	-	-	ND (0.1)	ND (0.1)	-	-	-	-	-	-	-	-	0.1
Total Kjeldahl Nitrogen	mg/L	0.1	-	-	0.2	ND (0.1)	-	-	0.1	-	-	-	-	-	0.198
Turbidity	NTU	0.1	5 NTU	AO	5.1	3.6	-	-	-	-	-	-	-	-	0.2
Organic Nitrogen	mg/L	0.1	0.15	OG	-	-	-	-	-	-	-	-	-	-	0.174
Anions															
Chloride (Cl)	mg/L	1	250 mg/L	AO	25	24	-	-	-	-	-	-	-	-	<1
Fluoride (F)	mg/L	0.1	1.5 mg/L	MAC	0.2	0.2	-	-	-	-	-	-	-	-	0.32
Nitrate as N (N-NO3)	mg/L	0.1	10 mg/L	MAC	ND (0.1)	ND (0.1)	-	-	ND (0.1)	-	-	-	-	-	<0.10
Nitrite as N (N-NO2)	mg/L	0.05	1 mg/L	MAC	ND (0.05)	ND (0.05)	-	-	ND (0.05)	-	-	-	-	-	<0.10
Phosphate as P	mg/L	0.2	-	-	ND (0.5)	ND (0.5)	-	-	-	-	-	-	-	-	-
Sulphate (SO4)	mg/L	1	500 mg/L	AO	23	23	-	-	-	-	-	-	-	-	32
Metals															
Mercury	ug/L	0.1	0.001 mg/L (1 ug/L)	MAC	ND (0.1)	ND (0.1)	-	-	-	-	-	-	-	-	0.1
Aluminum	ug/L	1	0.1 mg/L (100 ug/L)	AO	14	126	-	-	-	-	-	-	-	-	10
Antimony	ug/L	0.5	0.006 mg/L (6 ug/L)	MAC	ND (0.5)	ND (0.5)	-	-	-	-	-	-	-	-	0.5
Arsenic	ug/L	1	0.01 mg/L (10 ug/L)	MAC	ND (1)	ND (1)	-	-	-	-	-	-	-	-	1
Barium	ug/L	1	2 mg/L (2000 ug/L)	MAC	217	224	-	-	-	-	-	-	-	-	170
Beryllium	ug/L	0.5	-	-	ND (0.5)	ND (0.5)	-	-	-	-	-	-	-	-	0.5
Boron	ug/L	10	5 mg/L (5000 ug/L)	MAC	29	28	-	-	-	-	-	-	-	-	70
Cadmium	ug/L	0.1	0.007 mg/L (7 ug/L)	MAC	ND (0.1)	ND (0.1)	-	-	-	-	-	-	-	-	0.1
Calcium	ug/L	100	-	-	68100	66600	-	-	-	-	-	-	-	-	74,000
Chromium	ug/L	1	0.05 mg/L (50 ug/L)	MAC	ND (1)	ND (1)	-	-	-	-	-	-	-	-	1
Cobalt	ug/L	0.5	-	-	ND (0.5)	ND (0.5)	-	-	-	-	-	-	-	-	0.4
Copper	ug/L	0.5	1 mg/L (1000 ug/L)	AO	ND (0.5)	ND (0.5)	-	-	-	-	-	-	-	-	1000
Iron	ug/L	100	0.3 mg/L (300 ug/L)	AO	524	432	-	-	-	-	-	-	-	-	30
Lead	ug/L	0.1	0.005 mg/L (5 ug/L)	MAC	ND (0.1)	0.4	-	-	-	-	-	-	-	-	1
Magnesium	ug/L	200	-	-	26900	26900	-	-	-	-	-	-	-	-	31,000
Manganese	ug/L	5	0.02 mg/L (20 ug/L)	AO	20	46	-	-	-	-	-	-	-	-	260
Molybdenum	ug/L	0.5	-	-	0.5	ND (0.5)	-	-	-	-	-	-	-	-	5
Nickel	ug/L	1	-	-	ND (1)	ND (1)	-	-	-	-	-	-	-	-	5
Potassium	ug/L	100	-	-	2130	2070	-	-	-	-	-	-	-	-	3,000
Selenium	ug/L	1	0.05 mg/L (50 ug/L)	MAC	ND (1)	ND (1)	-	-	-	-	-	-	-	-	1
Silver	ug/L	0.1	-	-	ND (0.1)	ND (0.1)	-	-	-	-	-	-	-	-	0.1
Sodium	ug/L	200	20 mg/L (20,000 ug/L)	AO	14100	13200	-	-	-	-	-	-	-	-	6,000
Strontium	ug/L	10	7 mg/L (7000 ug/L)	MAC	380	366	-	-	-	-	-	-	-	-	759
Thallium	ug/L	0.1	-	-	ND (0.1)	ND (0.1)	-	-	-	-	-	-	-	-	0.1
Tin	ug/L	5	-	-	ND (5)	ND (5)	-	-	-	-	-	-	-	-	10
Titanium	ug/L	5	-	-	ND (5)	ND (5)	-	-	-	-	-	-	-	-	10
Tungsten	ug/L	10	-	-	ND (10)	ND (10)	-	-	-	-	-	-	-	-	2
Uranium	ug/L	0.1	0.02 mg/L (20 ug/L)	MAC	0.7	0.7	-	-	-	-	-	-	-	-	1
Vanadium	ug/L	0.5	-	-	ND (0.5)	ND (0.5)	-	-	-	-	-	-	-	-	1
Zinc	ug/L	5	5 mg/L (5000 ug/L)	AO	ND (5)	ND (5)	-	-	-	-	-	-	-	-	10

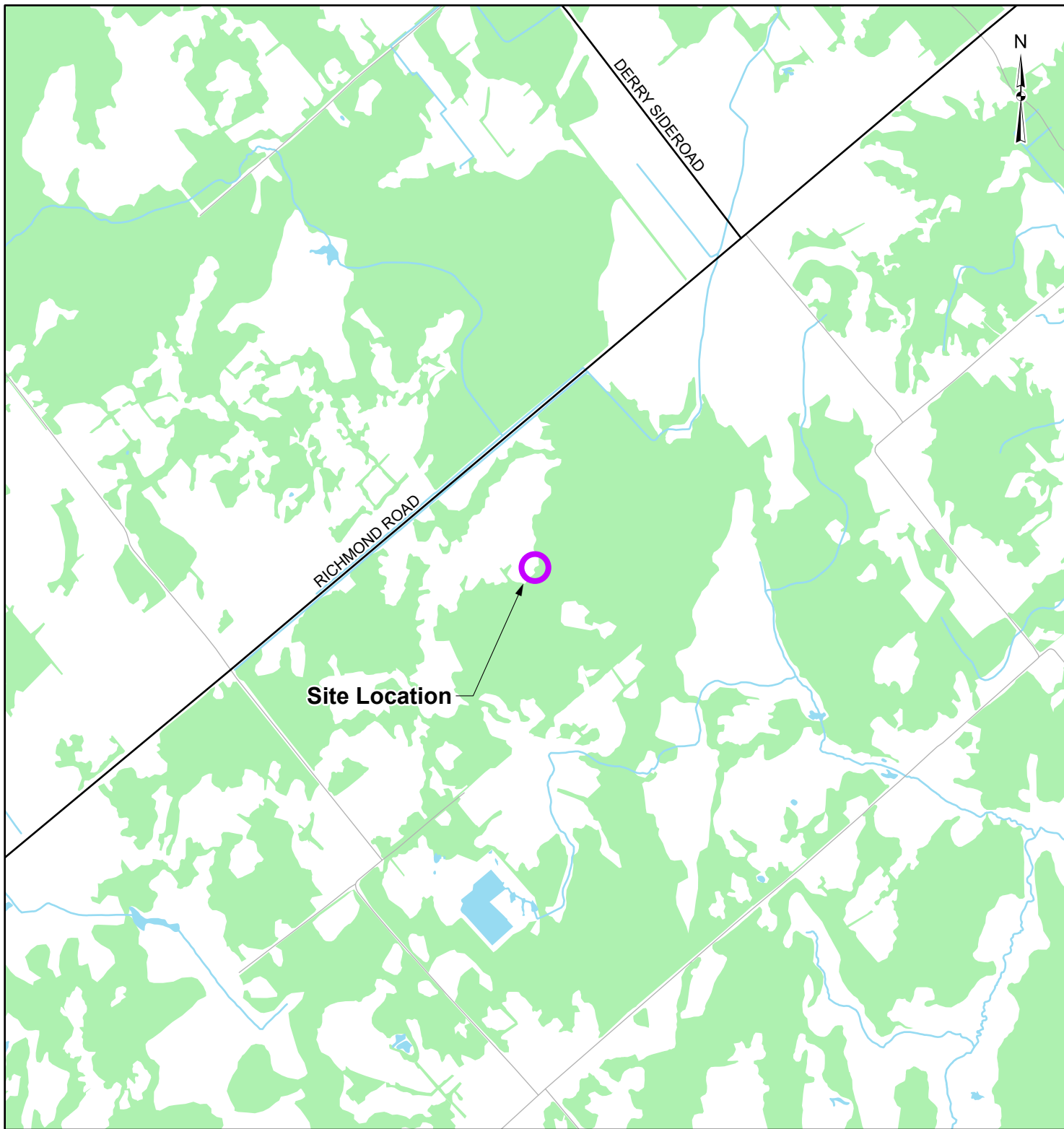
Notes:
1050 Exceeds Ontario Drinking Water Standards, Objectives, and Guidelines
20 Exceeds health warning limit for sodium (20 mg/L)
MDL Method Detection Limit
ODWSOG Ontario Drinking Water Standards, Objectives, and Guidelines (MOECC, 2003 rev. 4449e01)
AO Aesthetic Objective
MAC Maximum Allowable Concentration (Health-Related Parameter)
OG Operational Guideline
ug/L Micrograms per litre
mg/L Milligrams per litre
TCU True Colour Units
uS/cm Microsemens per centimeter
NTU Nephelometric Turbidity Units
CFU/100 mL Colony-forming units (bacteria) per 100 mL

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



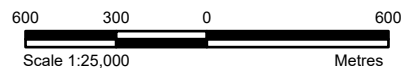
FIGURES

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LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area

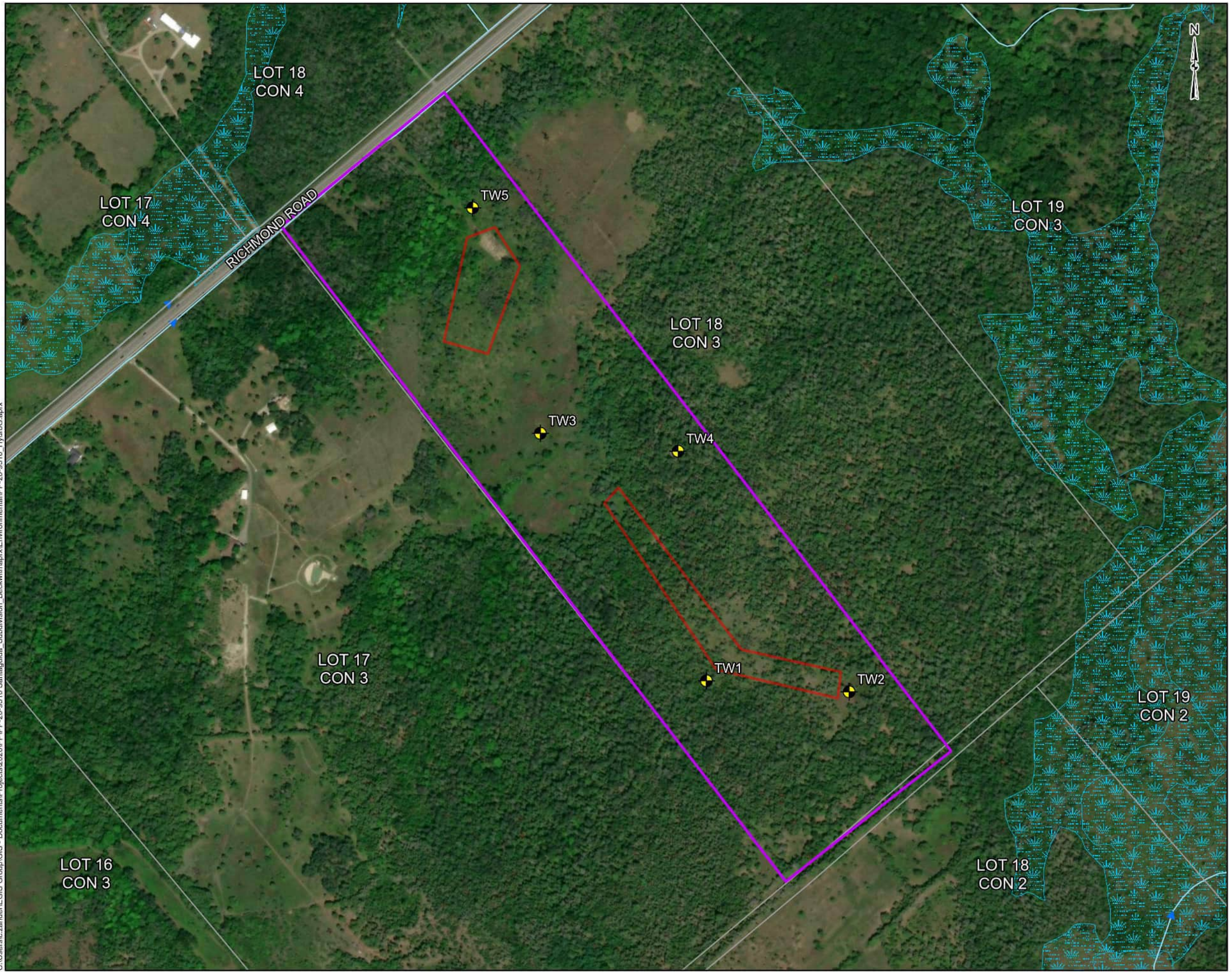


REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2024.

CLIENT:		DOMENIC SANTAGUIDA	
PROJECT:		HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS	
TITLE:		SITE LOCATION	
	PROJECT NO:	0PP-20-9510	FIGURE:
	Date	Oct., 25, 2024	1
	GIS	AH	
Checked By	RL		

115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742



LEGEND

- Site Boundary
- Test Well Locations
- Watercourse
- Unevaluated Wetland
- Lot & Concession
- Approximate Area of Exposed Bedrock at Surface

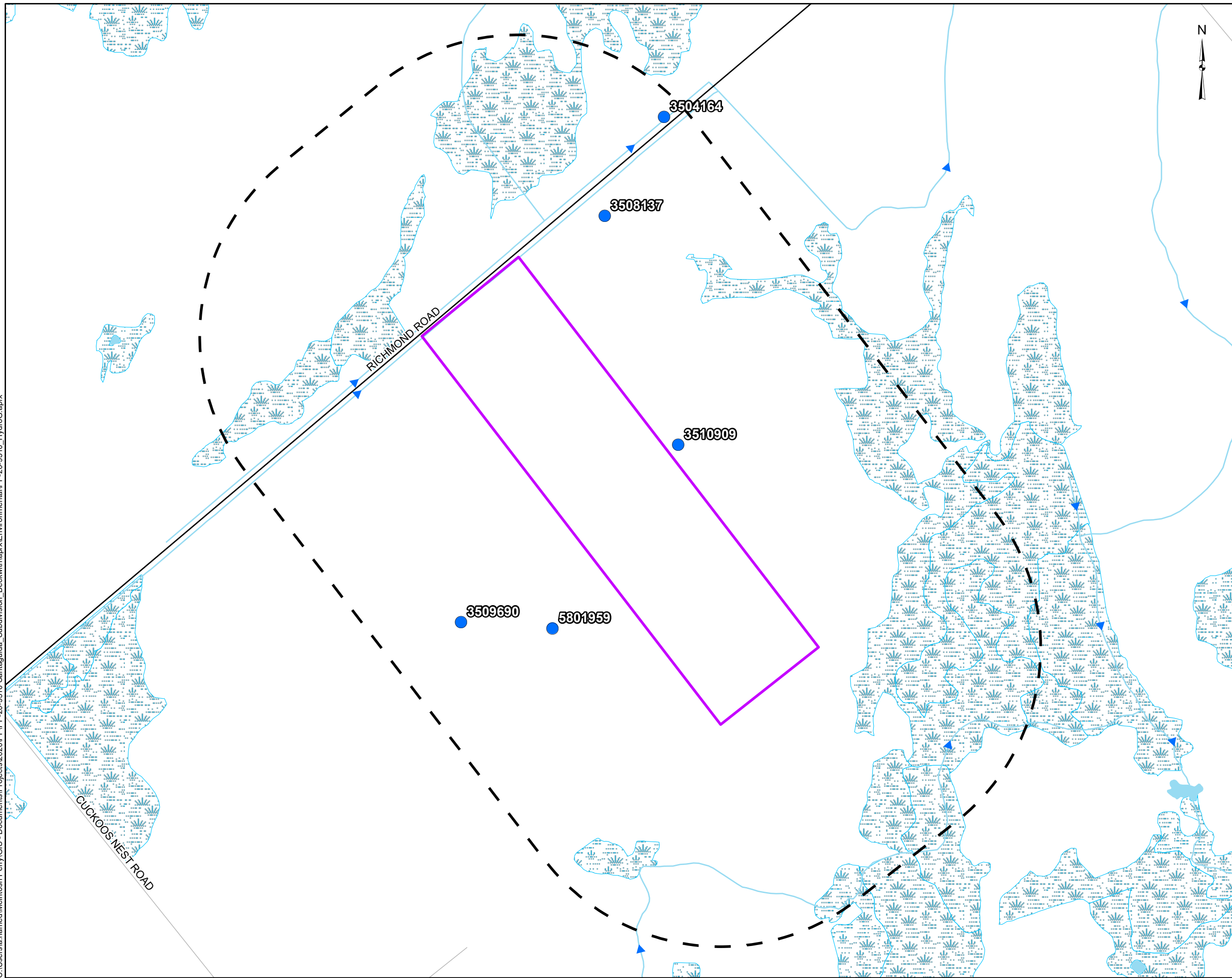
REFERENCE
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



CLIENT:		DOMENIC SANTAGUIDA	
PROJECT:		HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS	
TITLE:		SITE LAYOUT	
 <small>115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742</small>	PROJECT NO:	0PP-20-9510	FIGURE:
	Date	Nov., 18, 2024	2
	Checked By	RL	

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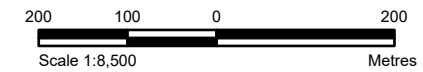



LEGEND

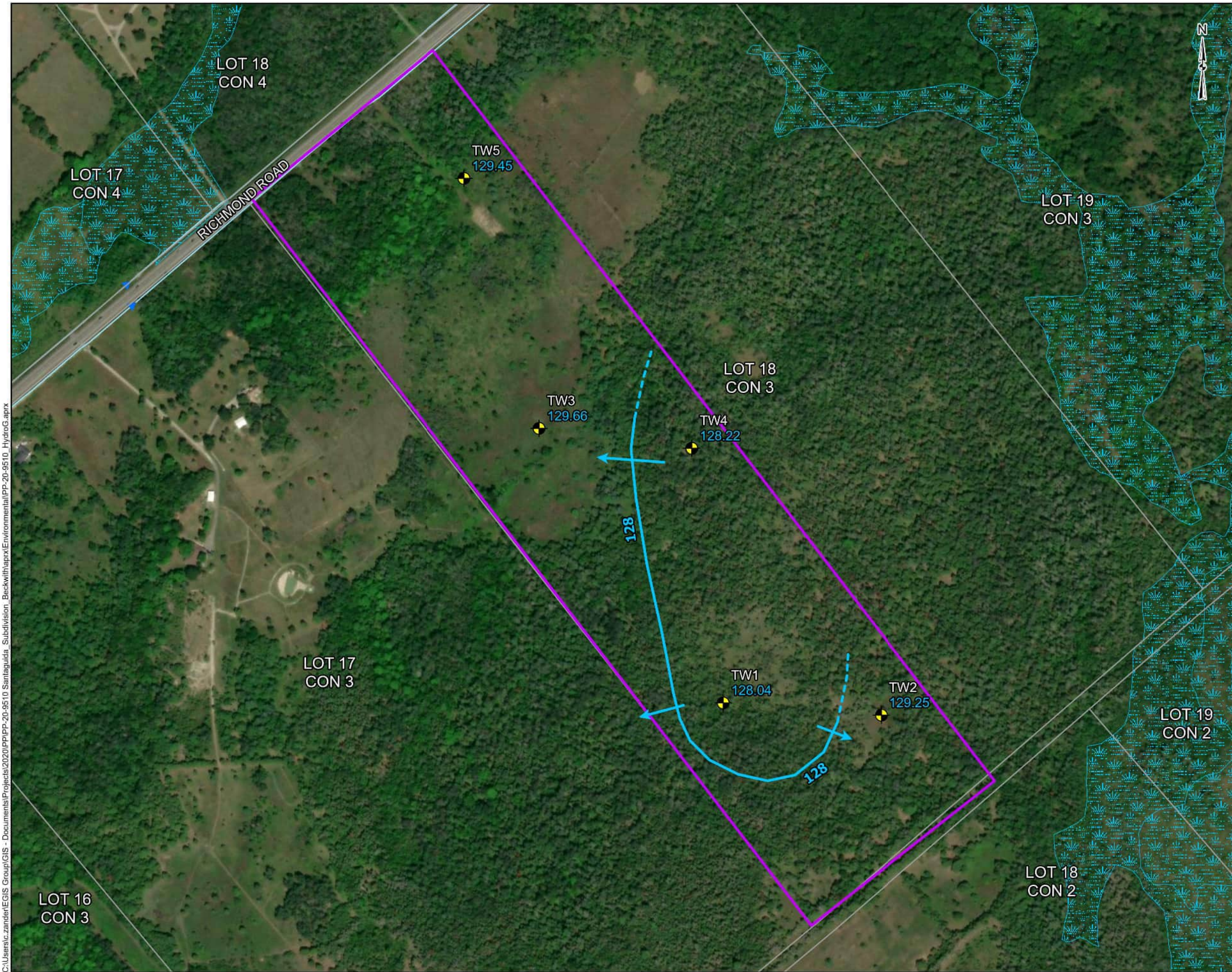
-  Site Boundary
-  500m Buffer
-  MECP Well Location
-  Local Road
-  Major Road
-  Watercourse
-  Waterbody
-  Unevaluated Wetland

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2023.



CLIENT:	DOMENIC SANTAGUIDA		
PROJECT:	HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS		
TITLE:	MECP WATER WELL INFORMATION SYSTEM SUMMARY		
 115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742	PROJECT NO:	0PP-20-9510	FIGURE:
	Date	Jul., 21, 2023	3
	GIS	AH	
	Checked By	RL	

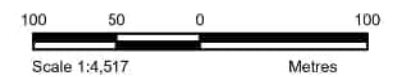


LEGEND

- Site Boundary
- ~ Watercourse
- Unevaluated Wetland
- Lot & Concession
- Test Well Locations
- ~ Approximate Bedrock Groundwater Elevation Contour
- Groundwater Elevation

REFERENCE

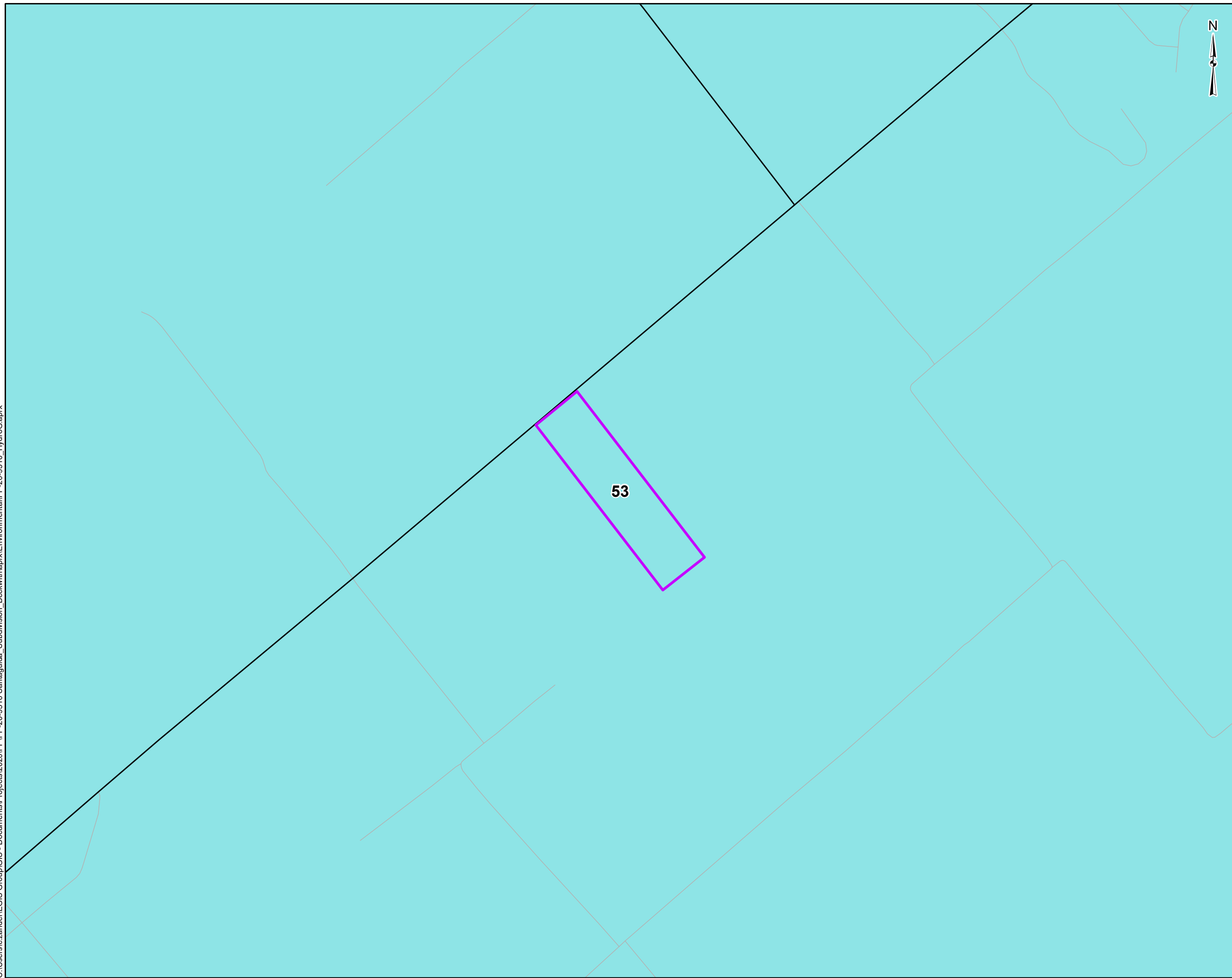
GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2024.



CLIENT:	DOMENIC SANTAGUIDA		
PROJECT:	HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS		
TITLE:	GROUNDWATER FLOW		
 <small>115 Walgreen Road, RR3, Carp, ON K0A 1L0 Tel: 613-836-2184 Fax: 613-836-3742</small>	PROJECT NO:	0PP-20-9510	FIGURE:
	Date	Nov., 18, 2024	4
	GIS	AH	
	Checked By	RL	

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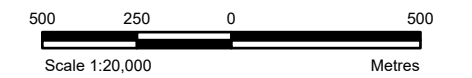


LEGEND

- 53: Dolostone, sandstone: Beekmantown Group
- Local Road
- Major Road

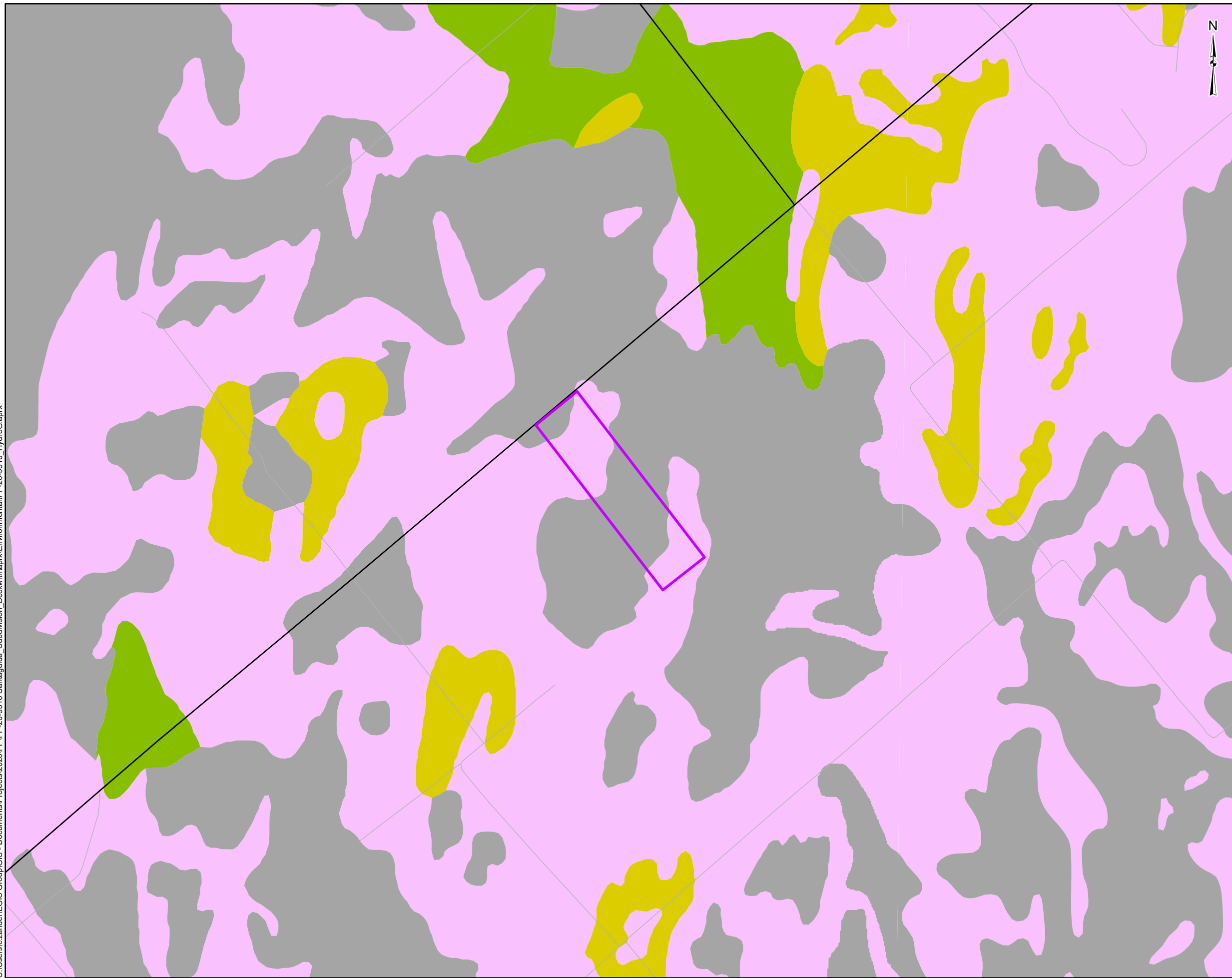
REFERENCE

Surficial Geology of Southern Ontario provided by the Ontario Geological Survey, Miscellaneous Release - Data 126 - Revised



CLIENT:		DOMENIC SANTAGUIDA		
PROJECT:		HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS		
TITLE:		REGIONAL BEDROCK FORMATION MAPPING		
 <small>115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742</small>	PROJECT NO: 0PP-20-9510		5	
	Date	Oct., 25, 2024		
	GIS	AH		
	Checked By	RL		

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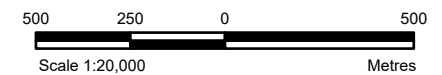


LEGEND

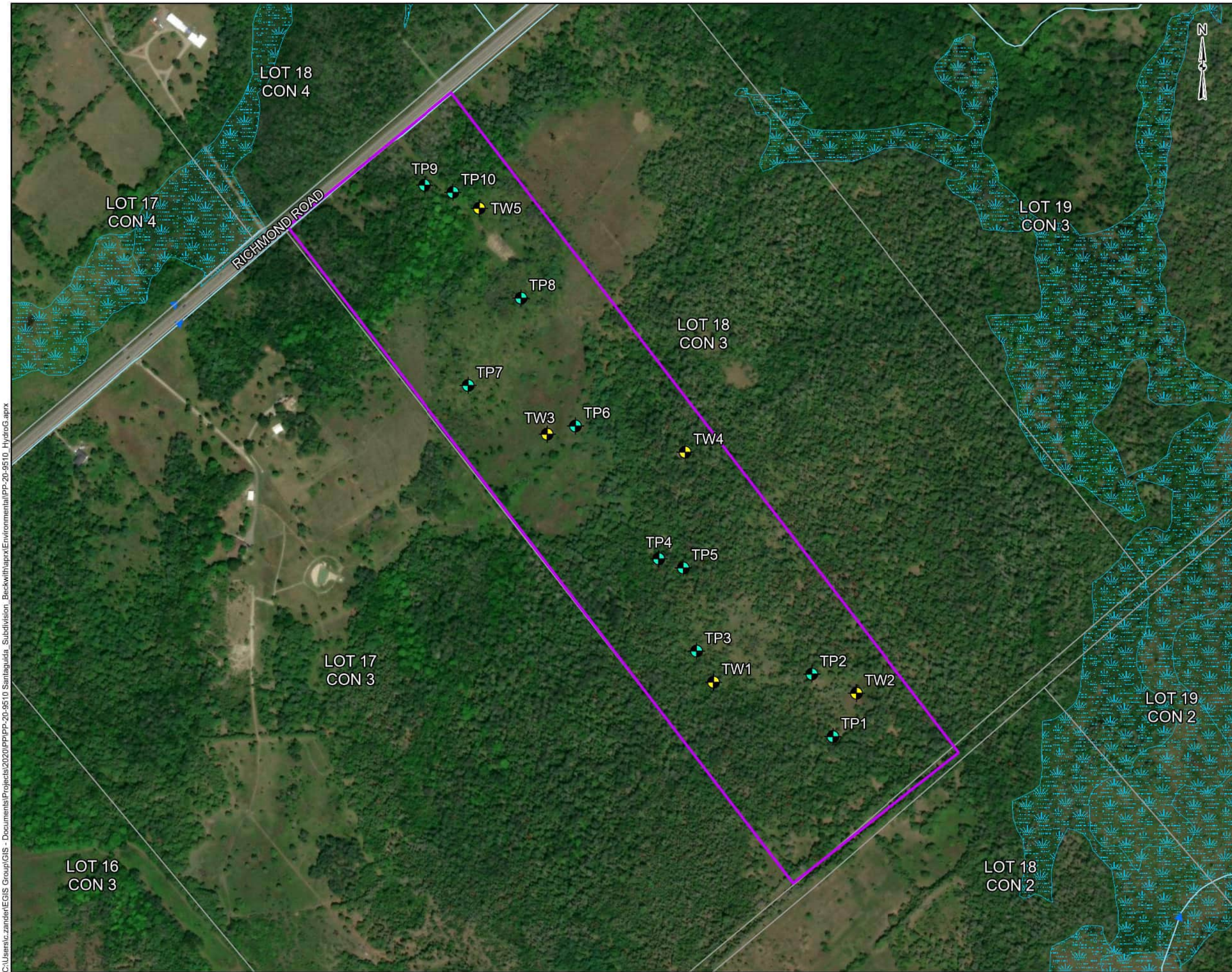
- 3: Paleozoic bedrock
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 11b: Littoral-foreshore deposits
- 20: Organic deposits
- Local Road
- Major Road

REFERENCE

Surficial Geology of Southern Ontario provided by the Ontario Geological Survey, Miscellaneous Release - Data 128 - Revised



CLIENT:	DOMENIC SANTAGUIDA		
PROJECT:	HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS		
TITLE:	REGIONAL SURFICIAL GEOLOGY MAPPING		
 <small>115 Walgreen Road, RR3, Carp, ON K0A1L0 Tel: 613-836-2184 Fax: 613-836-3742</small>	PROJECT NO: OPP-20-9510		FIGURE:
	Date	Oct., 25, 2024	6
	GIS	AH	
	Checked By	RL	



LEGEND

- Site Boundary
- Test Well Locations
- Test Pit Locations
- ~ Watercourse
- Unevaluated Wetland
- Lot & Concession

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2024.



CLIENT:	DOMENIC SANTAGUIDA		
PROJECT:	HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS		
TITLE:	TEST PIT LOCATION PLAN		
 <small>115 Walgreen Road, RR3, Carp, ON K0A 1L0 Tel: 613-836-2184 Fax: 613-836-3742</small>	PROJECT NO:	0PP-20-9510	FIGURE:
	Date	Nov., 28, 2024	7
	GIS	AH	
	Checked By	RL	

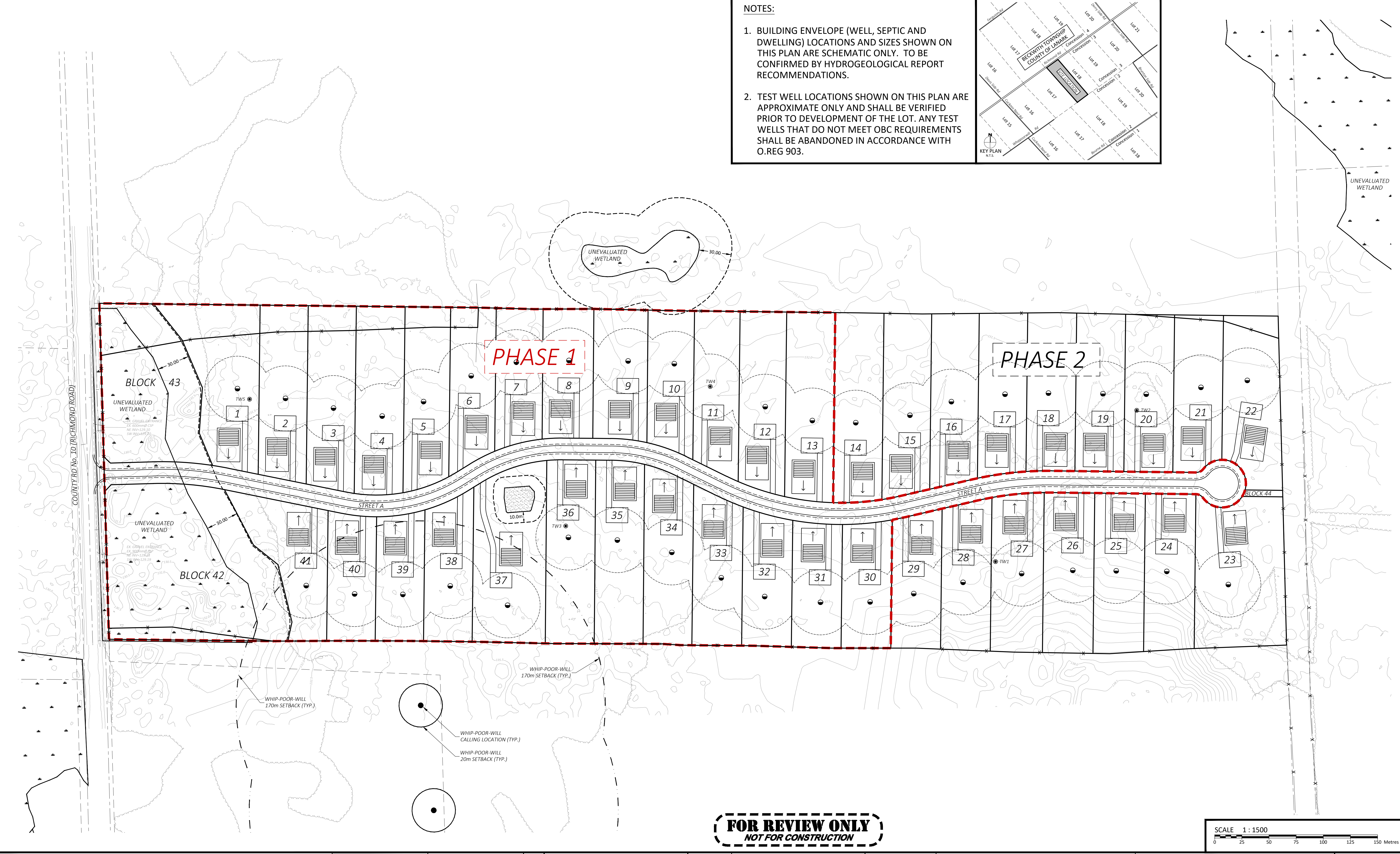
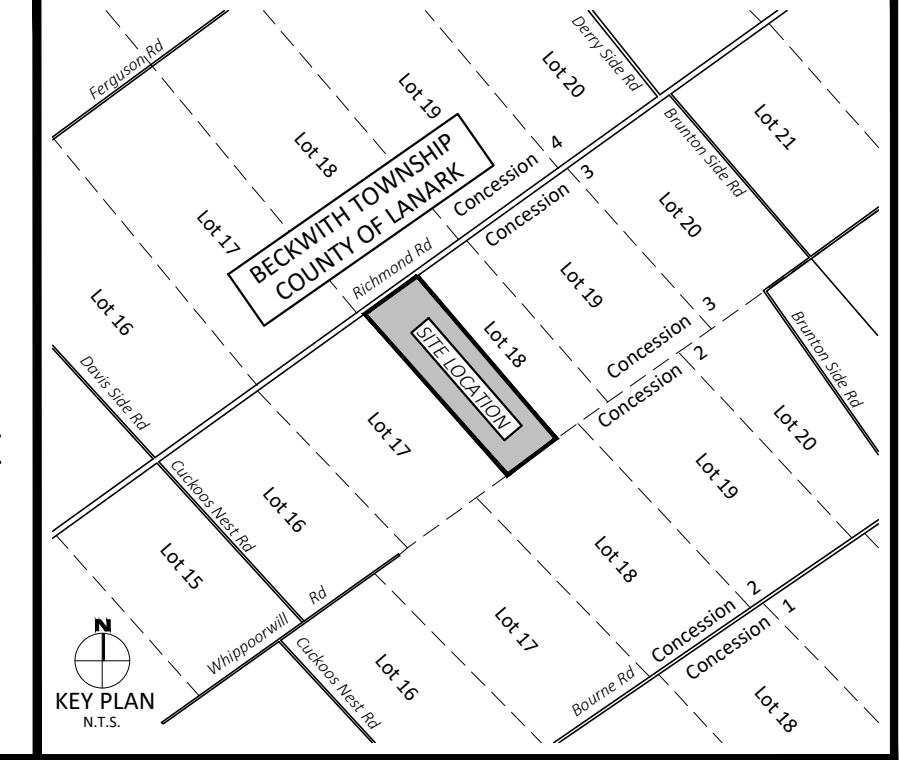
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HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON

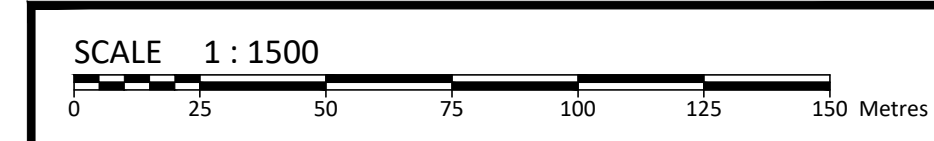


APPENDIX A PRELIMINARY CONCEPT PLAN

- NOTES:**
1. BUILDING ENVELOPE (WELL, SEPTIC AND DWELLING) LOCATIONS AND SIZES SHOWN ON THIS PLAN ARE SCHEMATIC ONLY. TO BE CONFIRMED BY HYDROGEOLOGICAL REPORT RECOMMENDATIONS.
 2. TEST WELL LOCATIONS SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND SHALL BE VERIFIED PRIOR TO DEVELOPMENT OF THE LOT. ANY TEST WELLS THAT DO NOT MEET OBC REQUIREMENTS SHALL BE ABANDONED IN ACCORDANCE WITH O.REG 903.

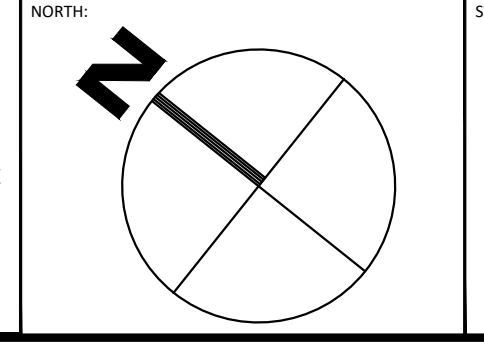


FOR REVIEW ONLY
NOT FOR CONSTRUCTION



LEGEND (IF APPLICABLE)

	CONCEPTUAL DWELLING & DRIVEWAY LOCATION		CONCEPTUAL WELL LOCATION & 30m SETBACK
	CONCEPTUAL SEPTIC LOCATION		APPROXIMATE EXISTING TEST WELL LOCATION (FROM HYDROGEOLOGICAL REPORT)
	ARCHAEOLOGICAL STAGE 3 SITE BUFFER		ARCHAEOLOGICAL SITE REQUIRED SETBACK



No.	Revision/Issue	Date

egis
3240 Drummond Concession 5A, R.R.7
Perth, ON K7H 3C3
Tel: 613-267-6524 Fax: 613-267-7992
www.egis-group.com

Designed by:
Drawn by:
Checked by:
Scale: 1:1500

Client:
DOMENIC SANTAGUIDA
3625 RIVERGATE WAY, OTTAWA, ON, K0A 1B0

Project:
SANTAGUIDA SUBDIVISION
BECKWITH TOWNSHIP

Drawing Title:
CONCEPTUAL LOT DEVELOPMENT PLAN

Date: JULY.22.2025
Project Number: OPP-20-9510
Drawing Number: DEV

Check and verify all dimensions before proceeding with the work. Do not scale drawings.

FILENAME: I:\Projects\2020\OPP-20-9510\Santaguida_Subdivision_Beckwith12_Drawing105 - Conceptual Drawing\OPP-20-9510\Santaguida_Subdivision_OPP-20-9510\2025_07_21.dwg
 USER: SAKED, Tuesday, July 22, 2025, 1:52:54 PM
 LAST PLOTTED: Tuesday, July 22, 2025, 1:52:54 PM

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



APPENDIX B

BECKWITH TOWNSHIP OFFICIAL PLAN

**OFFICE CONSOLIDATION
OFFICIAL PLAN
OF THE
TOWNSHIP OF BECKWITH**

Approved: November 15, 1989

This is an Office Consolidation of the approved
Official Plan of the Township of Beckwith including
all Minister's modifications and Amendments
No. 1 to 9 inclusive and Amendments No. 10, 11, 13, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27,
28 and 29.

Prepared for:

COUNCIL OF THE TOWNSHIP OF BECKWITH

Prepared by:

J.L. RICHARDS & ASSOCIATES LIMITED
Consulting Engineers, Architect & Planners
864 Lady Ellen Place
Ottawa, Ontario
K1Z 5M2

613-728-3571

JLR 11039-01

**OFFICIAL PLAN
OF THE
TOWNSHIP OF BECKWITH**

- TABLE OF CONTENTS -

	<u>PAGE</u>
SECTION 1 - TITLE, COMPONENTS AND ADMINISTRATION	1
SECTION 2 - PURPOSE AND OBJECTIVES	2
SECTION 3 - BASIS OF THE PLAN	4
SECTION 4 - GENERAL DEVELOPMENT POLICIES	7
4.1 Access to Public Road	7
4.2 Assessment Ratio	7
4.3 Community Improvement	7
4.4 Development Philosophy	7
4.5 Division of Land	8
4.6 Natural Heritage Features	13
4.7 Group Homes	19
4.8 Cultural Heritage and Archaeological Resources	19
4.9 Holding Zones	22
4.10 Home Occupations	23
4.11 Institutional Uses	24
4.12 Land Use Compatibility	24
4.13 Noise	25
4.14 Non-Conforming Uses	25
4.15 Parks and Recreation	27
4.16 Public Uses and Utilities	27
4.17 Separation Distances	28
4.18 Servicing Requirements	28
4.19 Setbacks from Water	30
4.20 Site Plan Control	30
4.21 Temporary Uses	31
4.22 Wayside Pits and Quarries	31
4.23 Secondary Units	32
4.24 Renewable Energy Systems	33
4.25 Hazard Protection	34

**OFFICIAL PLAN
OF THE
TOWNSHIP OF BECKWITH**

**- TABLE OF CONTENTS -
(continued)**

		<u>PAGE</u>
SECTION 5	- LAND USE POLICIES - COMMUNITY DEVELOPMENT AREAS	36
	5.1 Residential	36
	5.2 Commercial	37
	5.3 Industrial	38
	5.4 Institutional	38
	5.5 Black's Corners Community	39
	5.6 Expansions to Community Development Areas	43
SECTION 6	- LAND USE POLICIES - RURAL AREAS	44
	6.1 Agriculture	44
	6.2 Mineral Aggregate	46
	6.3 Highway 7 Corridor	49
	6.4 Flood Plain	50
	6.5 Rural Land	53
	6.6 Mobile Home Park	59
	6.7 Wrecking Yard	60
	6.8 Airport	60
	6.9 Waste Disposal Site	60
	6.10 Hauled Septage Disposal Site	61
SECTION 7	- ROADS	63
	7.1 Provincial Highways	63
	7.2 County Roads	63
	7.3 Local Roads	63
	7.4 Private Roads	64
	7.5 Road Widening	64
SECTION 8	- PROPERTY MAINTENANCE	65

**OFFICIAL PLAN
OF THE
TOWNSHIP OF BECKWITH**

**- TABLE OF CONTENTS -
(continued)**

	<u>PAGE</u>
SECTION 9 - IMPLEMENTATION	66
9.1 Zoning By-law	66
9.2 Site Plan Control By-law	66
9.3 Building By-law	66
9.4 Maintenance and Occupancy By-law	66
9.5 Other By-laws	66
9.6 Subdivision of Land	67
9.7 Construction of Public Works	67
9.8 Land Acquisition	67
9.9 Amendments	67
9.10 Committee of Adjustment and Land Division Committee	67
9.11 Review Procedure	68
9.12 Procedural Guidelines	68
9.13 Public Notification	68
9.14 Strategy	68
9.15 Provincial Policy Statement	68
9.16 Community Improvement	69
9.17 Interim Control By-laws	70
9.18 Temporary Use By-laws	70
9.19 Consultation and Application Requirements	71
 SECTION 10 - INTERPRETATION	 75
 SCHEDULE 'A' LAND USE SCHEDULE	
 SCHEDULE 'B' CONSTRAINTS SCHEDULE	

SECTION 1

TITLE, COMPONENTS AND ADMINISTRATION

1.1 Upon approval of the Minister of Municipal Affairs, this Official Plan will be known as the:

OFFICIAL PLAN OF THE TOWNSHIP OF BECKWITH

1.2 The Official Plan covers all land within the corporate limits of the Township of Beckwith. The Township is located on the most easterly side of Lanark County, bounded by the Townships of Montague and Drummond-North Elmsley, the Towns of Carleton Place and Mississippi Mills and the City of Ottawa.

1.3 The attached text and Schedule 'A' (Land Use Schedule) and Schedule 'B' (Constraints Schedule) constitute the Official Plan.

1.4 The background report contains supplementary background information which is the basis for the policies of this Plan but does not form part of the Official Plan.

1.5 Council will administer this Official Plan. The principal duties will be the review of all development applications for conformity to the Official Plan, including severances, subdivisions and zoning amendments; the review of all applications for amendments to the Official Plan, and the review of the Official Plan at least every five years to ensure its relevancy.

1.6 Council may appoint a Planning Advisory Committee under the terms and conditions that Council considers appropriate.

1.7 Pursuant to the Planning Act, no public work will be undertaken and no by-law will be passed for any purpose that does not conform to the Official Plan.

1.8 Council will ensure that the Official Plan and all amendments are available to the public so that the public can be kept informed of the Municipality's land use policies.

SECTION 2

PURPOSE AND OBJECTIVES

- 2.1 This Official Plan is a statement of policies which will provide guidance and direction for development and planning decisions within the Township of Beckwith over a 20-year planning horizon to the year 2029.
- 2.2 The objectives of this Official Plan are as follows:
- (i) Development will be encouraged in locations where services are available or can be made available at reasonable cost.
 - (ii) The communities will be encouraged to grow in a compact and orderly fashion with an appropriate range of uses and facilities to serve the residents.
 - (iii) Appropriate commercial and industrial development will be encouraged in order to provide a better assessment ratio and employment opportunities.
 - (iv) Land that is suitable for long-term agricultural production will be protected for agricultural uses.
 - (v) Mineral aggregate lands will be protected for the long term and utilized in a controlled and orderly manner.
 - (vi) A variety of appropriate land uses should be permitted in those rural lands that are not otherwise designated.
 - (vii) The policies of this Plan are intended to either ensure compatibility between land uses or facilitate mitigation measures that minimize adverse impacts between land uses to acceptable levels.
 - (viii) A variety of housing types will be permitted so that the housing needs of the existing and future residents of the Municipality can be satisfied.
 - (ix) Development will either be restricted in areas having environmental constraints, environmental hazards, human generated hazards or physical limitations or delayed until the identified constraints, hazards or limitations are resolved to the satisfaction of the Township and other appropriate approval authorities.
 - (x) An appropriate hierarchy of roads will be established so that both the efficient movement of traffic and access to property can be achieved.
 - (xi) It is the intent of this Plan that, through the effective use of this document, the quality of life for the residents will improve.
 - (xii) Development will be managed in a manner that maintains and restores the natural heritage system as a healthy ecosystem.

- (xiii) The conservation of cultural heritage resources will be encouraged so they may be enjoyed by present and future generations.
- (xiv) Energy conservation and sustainable forms of energy production, particularly alternative energy and renewable energy systems, will be encouraged, provided they are appropriate in type, scale and location.
- (xv) Development will be managed to protect groundwater and surface water resources. The Township will work with the Source Water Protection Committee to implement a Source Water Protection Plan.

The objectives of the Plan are not mutually exclusive but rather must be considered in relation to each other.

SECTION 3

BASIS OF THE PLAN

Since the late 1960s, the Township of Beckwith has evolved from being a predominantly rural community to a community consisting of settlement centre developments in Black's Corners, Franktown, Prospect, Ashton and Gillies Corners, as well as a mix of rural, agricultural and rural residential development in the rural areas. The population in the Township has increased from 3 to 5 percent per year over this period and has consistently exceeded the growth rates in the adjacent Townships and the Town of Carleton Place. This has been due to a number of factors, including:

- 1) the proximity of the Township to the City of Ottawa;
- 2) the varied landscape and attractive rural character of many areas of the Township for residential development, including the areas surrounding Mississippi Lake; and
- 3) the presence of:
 - (a) Highway 15 and County Road 17 that run north-south through the community; and
 - (b) Highway 7, which is being converted into a limited access freeway throughout the Township and County Road 10 that run east-west through the community, which have provided ease of access to the City of Ottawa and other adjacent communities and increased the appeal of the Township for employment-related development.

The Township is projected to grow by 4,586 people to 11,230 people by the 2029 planning horizon based on historical growth rates. It is anticipated that approximately 1,900 new housing units will be needed in the Township by the 2029 planning horizon, based on a projected growth rate of 3 percent per year that reflects the declining trend in average household size in the Township since 1996. It also reflects the likely re-emergence of development pressures in the Black's Corners area, given the recent resolution of groundwater contamination issues that impacted the extent of development in this area since 2000. It is further expected that low density single detached dwellings will continue to account for the majority of these new housing starts, based on the lack of municipal sewer and water services in the Township, which will remain unchanged over the 20-year planning horizon.

The 1997 inter-municipal agreement that resulted in the annexation of commercial lands along Highway 7 in the Township by the Town of Carleton Place has also subsequently impacted the local employment land base and resulted in the expansion of a large format retail node in the annexed area. Though this has impacted consumer and employment trends in the surrounding region, it is likely that employment development pressures will re-emerge with the expansion of Highway 7 through the Township of Beckwith.

The policies of the Official Plan are, therefore, based on the following assumptions:

- 3.1 The future development of the Township will be focused primarily on the Community Development Areas of Black's Corners, Franktown, Prospect, Ashton and Gillies Corners. In terms of this Plan, a community is an area which provides for concentrated residential development and supporting commercial and institutional uses. It has a recognizable identity to the inhabitants and to the Township in general. It fulfills social needs for interaction and provides for an attractive and functional physical environment. It will also provide for employment opportunities. The growth of these communities will provide a population base to support higher levels of services and facilities.
- 3.2 It is recognized that there will be a need to provide for limited development within the rural areas including development and redevelopment around Mississippi Lake. The policies of the Plan are based on such development taking place under controlled conditions so that it does not become a financial burden to the Township. The Township will manage redevelopment around Mississippi Lake to ensure that impacts to water quality, the lake environment and public health and safety are mitigated.
- 3.3 The provision of planned areas for future employment-related development, particularly along major transportation corridors, is essential to increase the Township's local resident labour force and regional market competitiveness, and to create a 'gateway' to the Township.
- 3.4 The policies of the Plan recognize that the Township has a varied physical land base and that there will be a need to:
- 1) protect land that is suitable for long-term agricultural production for agricultural uses;
 - 2) protect and encourage the stewardship and restoration of the natural heritage system as a valued visual, environmental and recreational resource;
 - 3) manage cultural heritage resources as part of the Township's identity and history; and
 - 4) protect land that contains identified mineral resources and is suitable for current or future mineral aggregate extraction or mining operations.
- 3.5 Constraint areas have been identified in this Plan. There are different standards for development in proximity to these areas depending on specific characteristics. These differing standards are incorporated into the Official Plan.
- 3.6 The policies of the Plan will either restrict development in areas having servicing or environmental constraints or delay development approval until identified constraints are resolved to the satisfaction of the Township and other appropriate approval authorities.
- 3.7 As a result of technological advances and energy deregulation, various forms of alternative energy and renewable energy are now able to provide thermal and electrical power on a site-specific basis, district basis, or as part of a more expansive utility grid system. The policies of the Plan will balance the social, economic and environmental benefits of using alternative energy and renewable energy technologies with whether the

functionality of the technology and its compatibility with the natural environment and adjacent land uses can be assured. The policies of the Plan also recognize the Green Energy Act and its regulations.

SECTION 4

GENERAL DEVELOPMENT POLICIES

The policies of this Section deal with development considerations that are common to a number of land use categories. These policies apply, where relevant, in addition to the policies under the specific land use categories.

4.1 Access to Public Road

All new development must have frontage on a public road which is maintained year round by the municipality or other public authority. An exception to this policy will be allowed for agriculture, forestry and conservation uses but does not apply to an accessory dwelling nor to any building or structure to which the public has access. An exception will also be allowed for the development of existing lots on private roads for rural residential uses around Mississippi Lake provided that such development is in accordance with all other relevant policies of this Plan.

All new development will be carefully located so that no traffic hazard is created by the new use.

The policies and guidelines of the Ministry of Transportation or the County of Lanark will apply to any new development abutting a provincial highway or a county road.

4.2 Assessment Ratio

The Municipality will give due consideration to the residential/non-residential assessment ratio and will endeavour to maintain a favourable balance of assessment to ensure a sound economic future for the Township.

4.3 Community Improvement

It is Council's intent to encourage improvements to the quality of existing development, community facilities and public services, particularly within the hamlets and to provide additional community facilities as circumstances and revenue permit. When considered appropriate, it is the intention of Council to prepare background studies, to develop more detailed Community Improvement policies and to amend the Official Plan to include these policies when the work has been completed.

4.4 Development Philosophy

It is the intention of Council to direct development to occur primarily in the Community Development Areas. Development will be permitted to occur on a limited basis in the rural area. Development will be discouraged in areas where services are not readily

available and where road improvements are a low priority as determined by the roads needs study.

Development should be tied in as much as possible with the scheduled improvements to roads and other services provided by the Municipality. Council will carefully monitor development, particularly in light of the obligations for improvements to services that may result from such development. In certain circumstances, Council may decide to restrict development in particular areas where it is deemed that the proposal may be premature in the context of the overall development of the Municipality.

In determining whether any development is premature, the Municipality will take into consideration, among other things, such factors as the condition of the existing roads, the amount of previous development activity in the immediate area and the number of undeveloped lots that exist in the Municipality.

4.5 Division of Land

The policies for the creation of new lots are outlined below. Regard must also be given to other applicable policies contained in the Plan, including the development philosophy policies of Section 4.4 and servicing requirements of Section 4.18. The division of land must also be consistent with the Provincial Policy Statement.

The division of land takes place in two ways; by consent and by plan of subdivision.

The consent process shall be used for creating new lots in the Community Development Areas and Rural Lands designation in accordance with the relevant policies of this Plan and the following:

- 1) a maximum of:
 - (a) three consents, excluding the retained lot, may be considered if the area of an original Township lot is 40 hectares (100 acres) or greater; or
 - (b) two consents, excluding the retained lots, may be considered if the area of an original Township lot is from 20 hectares (50 acres) up to but not including 40 hectares (100 acres);
- 2) a lot created through the consent process shall have:
 - (a) a minimum area of 0.6 hectares (1.5 acres) in the Community Development Areas and 0.8 hectares (2 acres) in the Rural Lands designation; and
 - (b) a minimum frontage as per the Zoning By-Law;

- 3) the retained parcel shall have a minimum frontage as per the Zoning By-Law;
- 4) consents within approved subdivisions shall be prohibited;
- 5) despite the above, residential infill through consents will be allowed in the Community Development Areas, subject to the following:
 - (a) a residential infill lot shall have a minimum area of 0.6 hectares (1.5 acres);
 - (b) the proposed infill lot shall have minimum frontage on a public road, as per the Zoning By-Law;
 - (c) the proposed infill lot shall occupy the road frontage between two existing residential lots that are located on the same side of a public road. The distance between the two existing residential lots can vary, however the width of the proposed infill lot should be consistent with the surrounding parcel fabric but shall not be more than twice the minimum frontage required by the Zoning By-law;
 - (d) the proposed infill lot shall not prohibit or adversely affect future development potential of the retained lands; and
 - (e) the retained parcel shall have a minimum area and frontage on a public road, as per the Zoning By-Law;
- 6) despite the above, a consent may be granted in addition to the consent policies outlined above for a technical severance as follows:
 - (a) to correct lot boundaries;
 - (b) to convey additional land to an adjacent lot provided the conveyance does not lead to the creation of an undersized lot for the purpose for which it is being or will be used;
 - (c) to clarify title to the land;
 - (d) where the effect of the consent does not create an additional lot;
 - (e) to permit an easement; or
 - (f) to permit a consent for municipal or other public purposes.

There are certain general policies that apply to all divisions of land and more specific policies that apply to severances or plans of subdivision.

4.5.1 General Policies

- (i) The size and shape of any lot created will be appropriate for the proposed

use and conform to the provisions of the Zoning By-law.

- (ii) Any application must not result in the landlocking of any parcel of land.
- (iii) The resevering of previously severed lots will generally be discouraged except where it can be shown that it would result in the proper development of the land.
- (iv) Where any division of land requires the opening up of new roads, approval must be obtained from Council. Council will consider any such requests in accordance with the overall plans for road maintenance and improvements. Any new roads must be constructed to Ministry of Transportation specifications for subsidy purposes. Where upgrading and additional maintenance may be required for new roads as part of any division of land, the Township will assess the financial impact of these additional expenditures and may request a contribution from the developer to offset these costs.

In addition to roads, Council will require trails and pathways, where appropriate, to be dedicated and constructed, at the cost of the developer, in conjunction with the development. Trails and pathways will be considered as part of the infrastructure necessary to support the proposed subdivision. Trails and pathways are an integral part of integrating the proposed subdivision into the adjacent lands and existing community.

The feasibility of incorporating trails and pathways into proposed plans of subdivision will be assessed on the basis of the following principles:

- 1) The development of a continuous route system within and between developments;
- 2) The potential linkages that could be provided between major activity areas to encourage usage;
- 3) Development of a pathway system to encourage active recreation and a healthy community; and
- 4) Its design in regard to public safety, emergency access and maintenance requirements.

Developers are to conform to the construction standards for trails and pathways as established by Council.

- (v) The opening up of existing unopened road allowances will require the approval of Council. Any such roads will be built to Ministry of Transportation standards for subsidy purposes. Council will normally require an agreement for the construction of the road. Where more than one landowner will benefit from the opening up of a road allowance, Council will endeavour to recover a reasonable share of the road building costs from any benefiting owners who did not contribute to the original cost of construction. Such costs may be recovered by means of a special development charge which will be a condition of a severance or plan of

subdivision.

- (vi) Strip development along Township roads in the rural area will be discouraged.
- (vii) The creation of a lot having access only to a provincial highway or a county road will generally be discouraged. In special circumstances where there is no other alternative available, such lot may be considered provided that the County or the Ministry of Transportation has approved the proposed entrance. The policies and guidelines of the Ministry of Transportation or the County of Lanark will apply in such circumstances.
- (viii) Any division of land must respect the separation distances for land uses as set out in this Plan and in the Zoning By-law.
- (ix) Where appropriate, all new or expanding farm and applicable non-farm developments shall comply with the Minimum Distance Separation formulae.
- (x) Road widenings may be required as a condition of any division of land.
- (xi) The municipality is entitled to a dedication of land for park purposes as a condition on any division of land. Cash in lieu of land may be requested by the municipality in situations where there is a public park in the area which is adequate for existing and future population. Cash in lieu may also be requested where the amount of land involved is small and therefore suitable for park development. Where lands are dedicated for park purposes, the municipality will accept only those lands suitable for park use. It is the intention of Council to obtain, wherever possible and practical, waterfront lands around Mississippi Lake.
- (xii) For any division of land, Council will impose certain conditions to the approval of the severance or subdivision. An agreement relating to the conditions may be required.
- (xiii) In considering applications for division of land, Council will consult with the School Boards and any other Boards or Committees which must plan for future growth.
- (xiv) The cumulative effect of development and the resulting financial implications for the Municipality will be monitored on an on-going basis.
- (xv) A division of land will not be allowed if the affected land parcel is subject to environmental constraints, environmental hazards, human generated hazards or physical limitations which would make it unsuitable for the intended use, unless the proposed lot(s) contain(s) sufficient suitable land outside the identified constraint, hazard or limitation to safely accommodate site access as well as all buildings, structures and sewage disposal facilities.

- (xvi) Additional information or studies relating to quality and quantity of groundwater for the proposed development and adjacent lands (such as hydrogeological and terrain analysis studies), drainage, stormwater management, noise or traffic may be required with the submission of an application for a division of land.

4.5.2 Additional Policies for Severance

- (i) On the Seventh Line Road from the western boundary of the Township to Highway No. 15 and along the Ninth Line Road (including that portion of the Drummond Townline Road which is the continuation of Ninth Line Road into Drummond Township and that portion of the Goulbourn Townline Road which is the continuation of the Ninth Line Road from Ashton to Highway No. 7), new entrances will be restricted to one for every 150 metres.

In Community Development Areas, where speed limits have been reduced because of existing development, the above provisions will not apply. In other than Community Development Areas, entrances will not be permitted on a Township road within 150 metres of the intersection with a County Road unless approval is received from the County Engineer.

- (ii) The applicant will provide sufficient information to substantiate that any lots created are suitable for wells and septic systems in accordance with current regulations. Such information will be to the satisfaction of Council and the Health Unit.
- (iii) Within the Special Service Area, as shown on Schedule 'B', the approval of any consent/severance will include a condition that will require participation in the municipal water program administered by the Township, hereinafter identified as the "Program". This Program involves the installation of water filtration equipment in the home and participation in the monitoring and rebedding program. All new homes, which are a result of new lot creation, are required to participate in the Program with no ability to opt out. The specific terms and conditions will be included in a development agreement, which will be registered on title. The approval of any consent will include a condition that will require participation in the municipal water program.
- (iv) Notwithstanding the above policies within Section 4.5 of this plan, the lands located in part Lot 23, Concession 3, Part 1 on 27R-10407 except 27M-64, shall be permitted a maximum of one severance to sever the subject lands into two approximately equal parcels. The subject lands were the remnant of subdivision application 09-T-12004, known as 'Cam's Ridge Phase 2' and registered as 27M-64. The Township shall require future development on these lands to adhere to the same standards as the Cam's Ridge Phase 2 subdivision.

4.5.3 Additional Policies for Plans of Subdivision

- (i) Access to lots in a subdivision will be from internal roads. Where necessary for design purposes or where there is no other alternative available, access to lots in a subdivision may be considered on an existing road of an appropriate standard where the Township and the authority having jurisdiction are satisfied that such access is appropriate.

The lands in part of Lot 3, Concession 1, on the east side of Ford Road in Gillies Corners may be developed by plan of subdivision utilizing the existing abutting public roads for direct lot access. Any special access conditions will be included in the subdivision agreement.

- (ii) For draft approval of a plan of subdivision, the applicant will be required to submit sufficient information, prepared in accordance with provincial regulations and guidelines, that ascertains that the land is, or can be made to be, suitable for sewage disposal systems and that there is an adequate supply of potable water available to service the proposed development. For final approval, the applicant will have to fulfil all of the conditions of draft approval as related to private sewer and water services.
- (iii) Subdivisions will be phased in accordance with the recommendations of Council. For residential subdivisions, generally 25 lots per phase will be allowed. Development of a subsequent phase will only be permitted when a substantial part of the previous phase has been built.
- (iv) The specific provisions of the Planning Act relating to plans of subdivision will apply in addition to the policies set out in this Plan.
- (v) Plans of subdivision shall be designed to allow for the appropriate integration of the affected lands with adjacent lands.
- (vi) Where necessary for design purposes or where there is no other alternative available, access to a subdivision may be considered on a provincial highway or a county road where the Township and the authority having jurisdiction are satisfied that such access is appropriate.
- (vii) Plan of subdivision applications will be required to demonstrate that a minimum average lot size of 0.6 hectares (1.5 acres) has been achieved. The Township will consider average lot size to mean the total area occupied by residential lots, divided by the total number of residential lots. This calculation does not include land occupied by roads, pathways, parks, blocks or other non-residential land. Where a subdivision is developed in a phased approach, the minimum average lot size of 0.6 hectares (1.5 acres) will be applied to the whole subdivision, rather than to each individual phase. No lots shall be less than 0.4 hectares (1 acre) in size.

4.6 Natural Heritage Features

4.6.1 Endangered and Threatened Species

- 1) No development will be permitted in significant habitat of endangered and threatened species. Screening maps from the Ministry of Natural Resources showing areas of documented occurrences of endangered and threatened species and regulated habitats will identify where this policy applies. In order to protect the exact location of such habitat or species, the Ministry of Natural Resources shall be consulted for further information.
- 2) Ecological site assessments, prepared by a qualified professional with expertise in environmental science, shall identify whether there is significant habitat of endangered and threatened species within or adjacent to an area proposed for development that is known as significant habitat of endangered and threatened species.
- 3) The Ministry of Natural Resources shall approve the extent of significant habitat identified in the ecological site assessments.
- 4) As per Section 4.6.8 of this Plan, environmental impact assessments shall be required in support of proposed developments within 120 metres of significant habitat of endangered and threatened species.

4.6.2 Areas of Natural and Scientific Interest

- 1) No development will be permitted in identified Areas of Natural and Scientific Interest or on adjacent lands within 120 metres of identified Areas of Natural and Scientific Interest, unless an environmental impact assessment, prepared in accordance with Section 4.6.8 of this Plan, demonstrates that there will be no negative impacts on the Areas of Natural and Scientific Interest or their ecological function.
- 2) The extent and significance of Areas of Natural and Scientific Interest shall be determined in consultation with the appropriate government agency and incorporated into this Plan as an overlay on Schedule 'B' through an Official Plan Amendment.

4.6.3 Fish Habitat

- 1) Development shall not be permitted in identified fish habitat, except in accordance with provincial and federal requirements. Where development is proposed within 120 metres of identified fish habitat, an environmental impact assessment, prepared in accordance with Section 4.6.8 of this Plan, shall demonstrate that there will be no negative impacts on the fish habitat or its ecological function.

- 2) The extent and significance of fish habitat shall be determined in consultation with the appropriate government agency.

4.6.4 Significant Wildlife Habitat

- 1) No development will be permitted in identified Significant Wildlife Habitat or on adjacent lands within 120 metres of identified Significant Wildlife Habitat, unless an environmental impact assessment, prepared in accordance with Section 4.6.8 of this Plan, demonstrates that there will be no negative impacts on the significant wildlife habitat or its ecological function.
- 2) The extent and significance of wildlife habitat shall be determined in consultation with the appropriate government agency.

4.6.5 Significant Woodlands

- 1) Development within Significant Woodlands may be permitted in accordance with the underlying land use designation shown on Schedule 'A' of this Plan, provided an environmental impact assessment, prepared in accordance with Section 4.6.8 of this Plan, demonstrates that there will be no negative impacts on the significant woodlands or their ecological function.
- 2) Development within 120 metres of identified Significant Woodlands, as shown as an overlay on Schedule 'B' of this Plan, may be permitted in accordance with the land use designation shown on Schedule 'A' of this Plan, provided an environmental impact assessment, prepared in accordance with Section 4.6.8 of this Plan, demonstrates that there will be no negative impacts on the significant woodlands.
- 3) Proposed developments shall retain as much natural vegetation as possible, especially along watercourses, public roads and municipal road allowances, on steep slopes, in valued woodlots, and in areas linking green spaces, and may be subject to the preparation of a Landscaping Plan at the discretion of the Township.

4.6.6 Significant Wetlands

- 1) Wetlands are areas of swamps, bogs, marshes or fens which are valuable in their natural state for biological, social or hydrological reasons.

- 2) Provincially Significant Wetlands are evaluated and approved by the Ministry of Natural Resources and, based on wetland functions and features, classified according to their significance. All wetlands identified on Schedule 'A' to this Plan are classified as Provincially Significant, except for McGibbon Creek Wetland, which is classified as Locally Significant.
- 3) Development and site alteration of Provincially or Locally Significant Wetland identified on Schedule 'A' is not permitted.
- 4) Development within 120 metres of a Provincially Significant Wetland shall be subject to the preparation of an Environmental Impact Study which demonstrates that there will be no negative impacts on the natural features or ecological functions of the wetland.
- 5) Within a wetland, all permitted and accessory uses shall be subject to Conservation Authority regulations and the only permitted uses shall be:
 - Open space and passive recreational uses which do not involve site alterations and do not adversely affect the natural features or ecological functions of the wetland;
 - Conservation uses which improve the ecological functions of the wetland;
 - Uses of a scientific or educational nature;
 - Established agricultural uses ongoing at the time of the adoption of this Official Plan. However, new or expanded structures or the clearing and draining of additional lands within the wetland shall not be permitted;
- 6) The Policies of this section will be applied to lands where the Ministry of Natural Resources has identified new wetlands or has revised wetland boundaries, regardless of whether new wetlands or new boundaries are designated in this plan.

4.6.7 Significant Valleylands

- 1) Valleylands are natural areas that occur in a valley or other landform depression that have has water flowing through or standing for some period of time.
- 2) No development or site alteration is permitted within any Significant Valleyland unless it can be demonstrated that there will be no negative impacts on the natural features or ecological functions of the valleyland.
- 3) Development within 120 metres of Provincially Significant Valleylands shall be subject to the preparation of an Environmental Impact Study

which demonstrates that there will be no negative impacts on the natural features or ecological functions of the valleyland.

- 4) No Significant Valleylands have been identified in Beckwith Township as of the date adoption of this Plan. Despite this, it is possible for valleylands to exist throughout the Township. Should any valleylands be identified in the future through an amendment to this plan or through any Environmental Impact Study, the policies of this section shall apply.

4.6.8 Lands Adjacent to Natural Heritage Features

- 1) The Province of Ontario's Natural Heritage Reference Manual specifies adjacent lands as buffer areas that are intended to protect natural heritage features that are identified on Schedule 'A' or Schedule 'B' of this Plan, either on the effective date of this Plan or identified in consultation with the appropriate government agency or identified in this Plan through an Official Plan Amendment. In considering any development or site alteration, an environmental impact assessment will be required as follows:
 - (a) within 120 metres of a Provincially Significant Wetland;
 - (b) within 30 metres of a Locally Significant Wetland;
 - (c) within 120 metres of fish habitat;
 - (d) within 120 metres of an Area of Natural and Scientific Interest;
 - (e) within 120 metres of significant habitat of endangered and threatened species; and
 - (f) within 120 metres of significant woodlands and significant wildlife habitat.
- 2) The scope and scale of the environmental impact assessment shall be determined by the Township in consultation with appropriate government agencies.
- 3) The Township may consider reducing an environmental impact assessment to a scoped study if the proposed development is:
 - (a) minor in nature; or
 - (b) located in an area where previous relevant studies are sufficient to provide the necessary technical information to assess a proposal.

If the scoped study indicates that there may be some potential impacts that warrant a more complete review, a full environmental impact assessment shall be required.

- 4) Where a full environmental impact assessment is required, it shall:
 - (a) be prepared by a qualified professional with expertise in environmental science;
 - (b) define and assess the nature and boundaries of any significant known and unknown features and ecological functions on or adjacent to the site;
 - (c) describe the location and nature of the proposed development;
 - (d) describe the relationship of adjacent lands to any significant features or ecological functions;
 - (e) describe the relationship of the significant features or ecological functions to the proposed development and adjacent lands;
 - (f) demonstrate how and where development can proceed without negative impacts on the significant features or ecological functions; and
 - (g) describe any mitigation measures that either alleviate or eliminate the negative impacts of the proposed development on the significant features or ecological functions.
- 5) All relevant First Nations communities shall be consulted for input where any environmental impact assessment indicates areas of First Nations interest or potential for encountering First Nations artifacts.
- 6) Existing agricultural uses and normal farm practices operating on lands affected by or adjacent to an identified natural heritage feature shall not be subject to the requirement for an environmental impact assessment and shall be allowed to continue.
- 7) Development on lots of record that are affected by an identified natural heritage feature may be permitted unless Planning Act approval is required, and shall be further considered in accordance with the other relevant policies of this Plan, the Zoning By-Law and the comments of other appropriate approval authorities.

4.6.9 Land Stewardship

- 1) The Township shall encourage, support and initiate, as appropriate, public education and awareness initiatives for the protection, rehabilitation and enhancement of natural heritage features.
- 2) The Township shall encourage innovative development patterns and techniques that support and strengthen natural heritage features.

- 3) The Township shall encourage land stewardship options, including protecting private lands through easements, purchase, tax incentives, and dedication to land trusts to preserve and enhance natural heritage features.

4.6.10 Source Protection Policies

The Mississippi-Rideau Source Protection Plan (MRSP) provides policy and direction on protecting sources of drinking water within the Mississippi and Rideau watersheds, covering an area of 8,500km² and affecting thirty-one (31) local municipalities. The MRSP provides a series of legally binding policies that are designed to give local municipalities the direction and tools required to mitigate drinking water threats. The Township of Beckwith recognizes the importance of these policies and is committed to implementing the legally binding policies of the MRSP.

The MRSP has identified the following vulnerable areas within the Township of Beckwith:

- **Carleton Place Intake Protection Zones (IPZs)** is an area upstream of the intake at the Carleton Place water treatment plant on the Mississippi River where land use activities have the potential to affect the quality of water at the intake.

The Township will use the following policies to guide land-use planning activities as they relate to source water protection:

- (1) Schedule 'C' identifies the IPZs upstream of the water intake for the Town of Carleton Place. These identified IPZs represent areas where the Township is legally required to implement the MRSP.
- (2) The Township shall ensure that all *Planning Act* and *Building Code Act* applications within the IPZs shown on Schedule 'C' shall conform to the policies of the MRSP. Municipal Staff and/or a designated Risk Management Official (RMO) shall review all applications to ensure compliance with the MRSP and Sections 57 and 58 of the *Clean Water Act*. Where a Risk Management Plan is required, the Township shall not finalize the *Planning Act* or *Building Code Act* application until the RMO has approved the required plan. Where an activity is considered a significant drinking water threat, the Township shall not approve the application. The Township or the RMO may include a requirement to provide source water protection information, such as a "Source Water Protection Checklist" prior to acceptance of the application as a complete application.
- (3) The Township shall appoint a RMO or maintain an enforcement transfer agreement with another body which has an appointment RMO, such as a local Conservation Authority or Health Unit.

- (4) The Township will use the Zoning By-law to prohibit all activities that would constitute a significant drinking water threat in the areas shown on Schedule 'C'.
- (5) By January 1, 2016, the Township will establish an education program to raise awareness about drinking water sources and good stewardship practices to protect them. Once established, the education program shall be ongoing with materials disseminated periodically as deemed appropriate by the Township.
- (6) By February 1 of each year the Township shall provide the Source Protection Authority with a summary of implementation activities for the previous calendar year related to the legally binding policies, where the Township is responsible for implementation.
- (7) The Township will amend the policies of this Official Plan to reflect any changes to the MRSP to remain in compliance. This being said, the Township will implement the legally binding policies of the MRSP regardless of the policies contained within the Official Plan.

4.7 Group Homes

- 4.7.1 A group home is a single housekeeping unit in a residential dwelling in which three to ten persons (excluding supervisory staff or the receiving family) live as a family under responsible supervision consistent with the particular requirements of its residents. The home is licensed or approved under provincial statutes and in compliance with municipal by-laws.
- 4.7.2 It is the intent of this Plan to recognize the need for group homes, to recognize the needs and concerns of the residents of the municipality and to ensure the effective integration of group homes into the community so that they will function successfully and achieve community acceptance. To achieve this objective, appropriate regulations will be included in the Zoning By-law and Council will provide input to the provincial licensing or approval authorities on any applications for group homes in the municipality.
- 4.7.3 Group homes shall be permitted in all land use designations which permit a residential uses and shall be encouraged to locate in proximity to community services and facilities that may serve its residents. Notwithstanding the foregoing, group homes shall not be permitted within the Special Service Area shown on Schedule A. Where a group home is to be established in an agricultural designation, the home must be located in an existing dwelling and will not qualify for a severance in accordance with the policies of Section 6.1 of this Plan.
- 4.7.4 Council may establish a Group Homes Advisory Committee to assist in implementing the group home policies of this Plan by providing advice on specific group home applications received, by providing advice on new group home programs approved by the Province, by assisting at public information meetings, by investigating complaints and by undertaking other related tasks.

4.8 Cultural Heritage and Archaeological Resources

4.8.1 Cultural Heritage Resources

- 1) The Township shall encourage the identification, conservation, maintenance and enhancement of cultural heritage resources.
- 2) The Township may participate in the conservation, maintenance and enhancement of cultural heritage resources by:
 - (a) consulting with the Municipal Heritage Committee on cultural heritage resource matters;
 - (b) designating heritage properties or heritage conservation districts in accordance with the Ontario Heritage Act;
 - (c) public acquisition;
 - (d) entering into public-private joint ventures or agreements;
 - (e) providing incentives to private owners; or
 - (f) using available government and non-government funding programs to assist in the implementation of cultural heritage policies.
- 3) Where a cultural heritage property is designated under the Ontario Heritage Act:
 - (a) no on-site alteration, removal or demolition shall be undertaken that would adversely affect its designation except in accordance with the Ontario Heritage Act; and
 - (b) the Township may require that a Heritage Impact Statement be prepared by a qualified professional to the satisfaction of the Township for any off-site development, site alteration or demolition which has the potential to impact the cultural heritage property.
- 4) Where an area or landscape of special heritage character is not designated under the Ontario Heritage Act but is recognized by the Township as having cultural heritage value:
 - (a) proposed developments shall be encouraged to be compatible with the cultural heritage value of the area or landscape;
 - (b) the Township shall encourage the adaptive reuse of existing buildings which are vacant or underused; and

- (c) the Township may require that a Heritage Impact Statement be prepared by a qualified professional to the satisfaction of the Township for any development, site alteration or demolition which has the potential to impact the cultural heritage value of the area or landscape.
- 5) The Township shall maintain a Register of Cultural Heritage Resources that have been:
 - (a) designated under the Ontario Heritage Act;

- (b) protected by an easement under the Ontario Heritage Act;
 - (c) identified by senior levels of government; or
 - (d) endorsed by Council as having cultural heritage value.
- 6) The Township shall co-ordinate its cultural heritage plans and programs with those of senior levels of government.

4.8.2 Archaeological Resources

- 1) Areas of archaeological potential shall be determined through the use of provincial screening criteria or criteria developed by archaeologists licensed under the Ontario Heritage Act that are prepared in compliance with Ministry of Culture guidelines.
- 2) Archaeological preservation in situ shall be the preferred method of maintaining the integrity of archaeological resources. Rescue excavation of significant archaeological resources may be permitted as a result of a proposed development, provided it is demonstrated to the satisfaction of the Township and the Ministry of Culture that in situ preservation is not possible.
- 3) The Township may require of the development proponent that archaeological assessments be conducted by archaeologists licensed under the Ontario Heritage Act and prepared in compliance with Ministry of Culture guidelines as a condition of any proposed development in areas containing a known archaeological site or considered to have archaeological potential. All relevant First Nations communities shall be consulted for input where any archaeological assessment indicates areas of First Nations interest or potential for encountering First Nations artifacts.
- 4) In the event that human remains or cemeteries are identified or encountered during site assessment or development, all work shall cease and the site shall be secured. The appropriate Township and provincial authorities shall be notified and the required provisions under the Ontario Heritage Act and the Cemeteries Act shall be followed. All relevant First Nations communities shall be consulted for input where any burial site or remains is considered to be of potential First Nations origin. The Township may require that the development proponent retain archaeologists licensed under the Ontario Heritage Act to assess or monitor the site and recommend conservation strategies to the satisfaction of the Township, the Ministry of Culture and all relevant First Nations communities.

4.9 Holding Zones

It is not intended that all land use areas designated in the Official Plan will be zoned for such uses immediately in the Zoning By-law. Areas may be zoned otherwise in the By-law for their existing uses or in a holding zone category as provided for in the Planning Act, and in accordance with the following objectives and criteria:

4.9.1 It is the intention of Council to place certain lands within a holding category in the implementing Zoning By-law when the principle of development has been established, in order to:

- (i) identify future development areas;
- (ii) reserve their use until it is clear that private services are appropriate;
- (iii) ensure that any development constraints can be properly overcome;
- (iv) effect the phasing and proper design of large scale residential, commercial or industrial developments;
- (v) determine the financial requirements;
- (vi) ensure that any necessary agreements have been established.

4.9.2 Lands throughout the municipality may be zoned in a holding zone in accordance with the objectives set forth above.

4.9.3 Lands which are subject to holding provisions will be identified in the Zoning By-law by the symbol "h" in conjunction with the appropriate zone symbol denoting the eventual usage of the land and will be subject to the following policies:

- (i) Lands in a holding zone will generally be limited to existing uses or uses which will not prejudice the future development of the lands such as agricultural uses, forestry uses, conservation uses, park and open space uses.
- (ii) New development proposed on land zoned for holding purposes will not be permitted until Council deems it appropriate to remove the holding symbol through an amending By-law in accordance with the conditions outlined below.

4.9.4 An application for removal of the holding symbol will be reviewed by Council in consideration of the following criteria:

- (i) The proposed use of lands is in conformity with the requirements of the Zoning By-law.
- (ii) The required services are provided or can be provided.

- (iii) Any required tests or reports are completed to Council's satisfaction.
- (iv) The financial requirements of the municipality have been fulfilled.
- (v) The phasing and design of the proposed development is approved by Council.
- (vi) Any agreements have been completed to Council's satisfaction.

4.9.5 When Council is satisfied that the above criteria have been met in full, Council will consider a proposal to remove the "h" symbol. Notice will be given of Council's intention to remove the holding symbol in accordance with the requirements of the Planning Act.

4.9.6 For those lands designated as "Commercial" and located in part of Lot 21, Concession 10, the implementing Zoning By-law will include a holding zone in accordance with this section. Prior to the removal of the holding symbol, Council will be satisfied that the following additional conditions have been met:

- (i) A study has been prepared by a qualified engineer demonstrating that the proposed development will have no impact on the flow of groundwater which has been contaminated with volatile organic compounds. Such study must be acceptable to the Township and the Ministry of the Environment.
- (ii) The results of the groundwater contamination modelling being undertaken, as part of the Class Environmental Assessment Alternate Water Study Report, by the Township and the Ministry of the Environment have been received, reviewed and approved.

4.10 Home Occupations

4.10.1 General Home Occupations

Professional uses and home occupations may be permitted as an accessory use to any residential use. Specific provisions relating to home occupations will be established in the Zoning By-law.

4.10.2 Rural Home Occupations

Rural home occupations which are accessory to a farming operation may be permitted. The requirements for such uses will be established in the Zoning By-law.

4.11 Institutional Uses

Institutional uses such as schools, day care centres, hospitals, museums, churches, libraries, community centres, service clubs and similar public or quasi-public uses will generally be permitted in all land use designations except Agriculture, Flood Plain, Mineral Aggregate, Wrecking Yard and Waste Disposal provided that the design and siting of the buildings and structures are in keeping with the character of the surrounding area and the institutional use will not detract from the primary function and use of the area. Institutional uses will be subject to the following policies:

4.11.1 The land is suitable for the proposed use.

4.11.2 Adequate off-street parking and loading space will be provided.

4.11.3 Consideration will be given to locating any institutional use that generates a significant amount of traffic in an appropriate place so that surrounding uses are not adversely affected by it.

4.11.4 The location and site development of institutional uses will be regulated through the Zoning By-law.

4.11.5 Institutional uses will be discouraged in the Agriculture designation, but may be permitted where there is favourable support from the Ministry of Agriculture and Food.

4.12 Land Use Compatibility

In reviewing any development application, Council will be satisfied that the proposed use will be compatible with surrounding uses or can be made to be compatible in a manner that either eliminates or minimizes to an acceptable level any adverse effects from the proposed use. Adverse effects may include, but are not limited to:

- (i) shadowing;
- (ii) loss of privacy;
- (iii) loss of neighbourhood or streetscape character;
- (iv) development that is inconsistent with applicable Ministry of Environment Guidelines;
- (v) increased levels of traffic that exceed the capacity of the affected road network or its intended function;
- (vi) environmental damage or degradation;
- (vii) impacts of private water and sewage services on groundwater resources;

- (viii) a decline in public health or safety; or
- (ix) incompatibility in terms of scale, style and massing of associated buildings or structures.

Compatibility can be achieved in a variety of ways. It can be a separation distance which is appropriate to the particular uses. It can be buffering features such as a berm, wall, fence or landscaping or a combination of these features. It can also consist of an intervening land use which would be compatible with both of the conflicting uses. Where buffering provisions are the means to be used to ensure compatibility, such provisions will be determined through the site plan approval process.

4.13 Noise

For any proposed residential subdivision in close proximity to a major source of noise, i.e. a highway, an airport, a railway or a quarry, the developer will be required to conduct a noise study. The noise study shall be prepared in accordance with applicable Ministry of Environment Guidelines. For any proposed residential severance in close proximity to a major source of noise, Council will consider any potential noise problem in determining the appropriateness of the proposed severance.

4.14 Non-Conforming Uses

Any uses legally existing at the date of adoption of this Official Plan that do not conform to this Plan will be deemed non-conforming uses.

4.14.1 Such uses may be zoned in any implementing Zoning By-law in accordance with their present use provided that:

- (i) the zoning will not permit any change of use or performance standard that will aggravate any situation detrimental to adjacent complying uses;
- (ii) they do not constitute a danger to surrounding uses and persons by virtue of their hazardous nature or the traffic flow they generate;
- (iii) they do not pollute the air, water or soil to the detriment of health, comfort and property; and
- (iv) they do not interfere with the development or enjoyment of adjacent areas in accordance with this Plan.

4.14.2 Where an existing use does not meet with the criteria set out above, it will not be zoned in accordance with its present use. Furthermore, the Municipality may seek means to eliminate the use and may acquire it when sufficient funds are available or assist in whatever way possible in the relocation of the use.

4.14.3 Where an existing non-conforming use is discontinued, any rezoning may only take place in conformity with this Official Plan.

4.14.4 Where an existing use has been zoned as a non-conforming use, but there is merit in granting permission to extend or enlarge the use either within the lands held in ownership or on adjacent properties, Council may amend the Zoning By-law to permit such extension or enlargement without the necessity of amending the Official Plan if it complies with the general intent and purpose of this Plan. The Committee of Adjustment also may, based on merit, permit the extension or enlargement of a non-conforming use on lands owned at the time of passing of the By-law, provided that the intent and purpose of the Official Plan are maintained.

Council or the Committee of Adjustment shall use the following guidelines when assessing any application for an extension or enlargement of a use which is zoned as a non-conforming use:

- (i) The extension or enlargement should not aggravate the non-conforming situation for neighbouring uses.
- (ii) The extension or enlargement should be in reasonable proportion to the existing use and to the land on which it is to be located.
- (iii) Any extension or enlargement involving land should be minor in relation to the total property. Any major change shall require an amendment to the Plan.
- (iv) The compatibility of the extension or enlargement to surrounding uses with regard to noise, vibration, fumes, smoke, dust, odours, lights and traffic generation will be examined carefully.
- (v) Adequate buffering, setbacks and any other measures necessary to reduce the nuisance will be required and where possible shall be extended to the existing use.
- (vi) Proper access to the site will be provided to ensure that no traffic hazards are created.
- (vii) Adequate on-site parking and loading space will be provided.
- (viii) Applicable services such as storm drainage, water supply, sewage disposal and roads, etc. are adequate or will be made adequate.
- (ix) Neighbouring uses will be notified of the proposed extension or enlargement of the non-conforming use before the final decision on the application is made.
- (x) In areas subject to environmental constraints, environmental hazards, human generated hazards or physical limitations, the Township, in

consultation with other appropriate approval authorities, shall consider the potential adverse impacts of the extension or enlargement on the identified constraints, hazards or limitations.

- 4.14.5 The Committee of Adjustment may permit a change in use to a similar use or more compatible use.
- 4.14.6 Where an existing building or structure which has been zoned as a non-conforming use is destroyed, such building or structure may be reconstructed to its former dimensions provided work is commenced within twelve months of the date of destruction. An existing building or structure which is zoned as a non-conforming use may be reconstructed or strengthened to a safe condition provided the external dimensions and use of the building or structure are not changed.
- 4.14.7 The development of existing undersized lots may be permitted in accordance with the relevant provisions of the Zoning By-law provided that where the development is on private services, the lot is of an adequate size for a well and sewage disposal system approved by the Ministry of the Environment or its agents. A lot addition or enlargement to an existing undersized lot may be permitted even though the addition does not bring the lot up to the standard required in the Zoning By-law. In such a case, the lot does not lose its non-conforming status and may be developed in accordance with the relevant provisions of the By-law.

4.15 Parks and Recreation

Parks will generally be permitted within all land use designations except Mineral Aggregate, Wrecking Yard or Waste Disposal. On lands designated as Agriculture, parks may be permitted provided that there are no recreational buildings, the land is left in parcels suitable for commercial farming and does not alter the soils or topography adversely. It is intended that parkland be acquired partly by dedication as outlined in Section 4.5 and partly by acquisition. The specific details of parkland acquisition and development will be dealt with through the Recreation Master Plan which will include such things as acquiring additional land, building appropriate facilities, establishing recreation programs, developing municipally owned water oriented facilities, and encouraging public/private initiatives in developing various trails through the Municipality.

It is an important priority that wherever possible, waterfront lands be acquired by the Township as outlined in the Recreation Master Plan. The Recreation Committee will provide guidance and suggestions to Council on the implementation of parks and recreational development through the regular updating of the Recreation Master Plan.

4.16 Public Uses and Utilities

Public uses and utilities such as power, water services, roads, railways, telephone and

gas but not including waste disposal sites will generally be permitted in all land use designations provided that such use or utility is necessary and appropriate in the location and can be made compatible with surrounding uses.

The following policy will apply specifically to electric power facilities:

4.16.1 The development of electric power facilities will occur in an orderly manner to facilitate the efficient and reliable provision of adequate electric power. As such, it is the policy of this Plan that electric power facilities are permitted in all land use designations without an amendment to the Plan provided that the planning of all such facilities is carried out having regard to the other policies of this Plan. Furthermore, Ontario Hydro will consult with the municipality on the location of any new electric power facilities.

4.17 Separation Distances

Residential uses in particular will be located an appropriate distance away from any use or facility which would be a potential source of nuisance such as railways, airports, freeways and major highways, industrial uses, waste disposal sites, wrecking yards, mineral aggregate areas, intensive livestock operations. Separation distances specific to the particular use will be established in the Zoning By-law or through development approval processes and will be subject to applicable Ministry of the Environment Guidelines. Where appropriate, the Minimum Separation Distance formulae shall also apply to all new or expanding farm and applicable non-farm development. Separation distances or appropriate remedial measures may also be incorporated into subdivision agreements or other agreements.

4.18 Servicing Requirements

4.18.1 General Requirements

- (i) For the foreseeable future, all development within the Township of Beckwith will take place on private water and sewage services. All development on private services must receive approval from the appropriate approval authority before proceeding. The minimum lot size for any private serviced development will be in accordance with the relevant Sections of this Plan and the Zoning By-law although the Ministry may increase these minimum standards and impose other conditions or restrictions where necessary in the interests of the health and safety of the residents of the Township. Any required servicing studies will be provided by the developer to the satisfaction of Council, the Health Unit and the Ministry of the Environment.
- (ii) Development will be encouraged to take place where other services are already available or can be readily provided. Such services and facilities include public roads, garbage collection and disposal, fire protection, police protection, education, school busing and parks. In general, new

development should not create an undue financial burden for the Municipality unless it can be shown that the long term benefits outweigh the costs.

4.18.2 Special Service Area Requirements

A Special Service Area has been delineated and shown on Schedule 'B'. The Special Service Area corresponds to the Implementation Area, which was determined through the Class Environmental Assessment process to arrive at a solution to the contaminated water problem. The solution to the contamination problem in Beckwith Township was determined through the Class EA process in consultation with the public and the Ministries of the Environment and Municipal Affairs and Housing. A site specific solution using in-house treatment systems, together with a Township administered monitoring and rebedding program, was determined to be the preferred solution. The boundary of the Special Service Area encompasses all properties that have had a detection of volatile organic compounds (VOCs). Within this boundary, there are also many properties that have had no detections of VOCs. However, since there is a potential for contaminated water within this area, certain special conditions for existing and future development will be required. There are 347 existing lots within the Special Service Area. Of these, 304 lots have dwellings with one property having two (2) dwellings. In addition, there are five (5) commercial lots, two (2) park properties, one (1) institutional property, and thirty-five (35) vacant lots. All existing residential property owners will be offered the opportunity to receive all required water filtration equipment, including installation, free of charge and must join the Program for five years. The monitoring and filter rebedding program will be offered on a cost recovery basis, by the Township, but participation in the Program will be voluntary after the first five years for the existing residential properties and for the existing vacant lots. In addition, for lots having existing uses other than residential, the owner will be offered the water filtration equipment and installation free of charge, provided that the water well provides for domestic type usage. Participation in the monitoring and filter rebedding program will be voluntary after five years. All existing vacant lots that are zoned to permit a residential use will be permitted to be developed. Those existing vacant lots for which a building permit is received prior to the effective date of the implementation of the water supply program will be eligible to receive the water filtration equipment, including installation, free of charge. Participation in the monitoring and filter rebedding program will be voluntary after five years. After the effective date, owners of existing vacant lots having water that exceeds the Ontario Drinking Water Standard for VOCs will be eligible to receive the water filtration equipment, including installation, free of charge, as long as there is sufficient money in the reserve fund. Participation in the monitoring and filter rebedding program will be voluntary after five years.

New lot creation within the Special Service Area will only be permitted by consent. On lands designated Residential or Rural Lands, a maximum of two new lots from a holding that existed as of July 1, 1973 will be allowed, provided that all other relevant policies of the Plan are met. Any such new development will only be approved with the condition that the homeowner must participate in

the Program of the Township in accordance with the policies set out in Section 4.5.2 (iii) of this Plan.

4.19 Setbacks from Water

- 1) The Zoning By-Law shall contain regulations that ensure that all buildings and structures, except for electric power transmission lines and other public utilities, as well as marinas and marine facilities, private and public docks, boathouses, public beach developments or improvements and shoreline stabilization works are set back the greater of the following:
 - (a) a minimum of 30 metres from the high water mark of any waterbody or watercourse;
 - (b) 15 metres from the top of bank;
 - (c) development limits established by the regulatory flood line;
 - (d) development limits established by environmental impact assessments; or
 - (e) development limits established by the erosion hazard limit.
- 2) Setback requirements may be increased or decreased, depending on site conditions and the nature of the proposed development. Decreases shall only be considered for proposed developments on existing lots of record which cannot meet a 30 metre setback for development and shall ensure the greatest setback possible is achieved.

4.20 Site Plan Control

Site plan control is intended to be used where the type of development proposed or the features of the particular site require greater care in regulating the development of buildings, structures and other proposed features than is possible or practical through the Zoning By-law.

The entire Township shall be designated as a Site Plan Control Area. Within the Township, all commercial uses, industrial uses, institutional uses, mobile home parks, multiple residential uses (3 or more units), wrecking yards, and all properties which abut a lake or watercourse or designated Wetlands are subject to Site Plan Control.

It is Council's intention to use site plan control to obtain road widenings where necessary, especially where the proposed use will generate significant volumes of traffic or where the entrance on to the public road would otherwise be unsafe. This policy applies to all roads under Township jurisdiction. It is also Council's intent to obtain trails and pathways wherever appropriate to assist with the implementation of Section 4.5.1(iv).

Any new non-residential use that requires a water well for domestic type usage in the Special Service Area, as shown on Schedule 'B', will be required, as a condition of site plan approval, to provide water filtration equipment and participate in the monitoring and filter rebedding program of the Township. The specific terms and conditions will be included in a site plan control agreement, which will be registered on title.

4.21 Temporary Uses

Temporary uses may be permitted in the implementing Zoning By-law. In particular, the By-law may provide for the use of a mobile home as a temporary residence in accordance with the conditions, location and time period prescribed in the By-law.

Notwithstanding the policies and designations of this Official Plan, Council may, in accordance with the provisions of Section 39 of the Planning Act, pass By-Laws to authorize the temporary use of land, buildings or structures for any purpose. In considering applications for such temporary uses, Council shall have regard for the following:

- 4.21.1 Such uses will be temporary in nature, be compatible with surrounding land uses and will not interfere with the long term development of the area; and
- 4.21.2 Appropriate controls will be included in the amending By-law to adequately regulate the temporary uses.

4.22 Wayside Pits, Wayside Quarries, Portable Asphalt Plants and Portable Concrete Plants

- 1) Wayside pits, wayside quarries, portable asphalt plants and portable concrete plants are generally permitted throughout the Township without the need to amend this Plan or the Zoning By-law, provided that:
 - (a) no severe environmental disruption will occur; and
 - (b) the site is not within existing residential areas or designated Wetlands or in proximity to any waterbody or watercourse.
- 2) Prior to the establishment of a wayside pit, wayside quarry, portable asphalt plant or portable concrete plant for provincial purposes, Council will be advised by the Ministry of Natural Resources that the proposed operation qualifies as a wayside pit, wayside quarry, portable asphalt plant or portable concrete plant.
- 3) Prior to the establishment of a wayside pit, wayside quarry, portable asphalt plant or portable concrete plant for municipal purposes, Council will be advised by Township staff and the Ministry of Natural Resources that the proposed operation qualifies as a wayside pit, wayside quarry, portable asphalt plant or portable concrete plant.
- 4) A rehabilitation plan shall be prepared to the satisfaction of the Township as a

condition of approval.

4.23 Secondary Units

- 1) Secondary units shall be permitted in certain zones of the By-Law in accordance with Sections 16(3) and 35.1 of the Planning Act.
- 2) The development of a secondary unit within a principal dwelling shall further be subject to the other relevant policies in this Plan and the following criteria:
 - (a) no more than 40 percent of the gross floor area of the principal dwelling may be developed for a secondary unit;
 - (b) the secondary unit shall comply with the Ontario Building and Fire Codes;
 - (c) safe access, parking and private amenity areas for all residents shall be provided;
 - (d) the secondary unit shall be designed and located in such a manner so as to not have an adverse effect on servicing requirements;
 - (e) a maximum of one secondary unit shall be permitted:
 - (i) within a detached dwelling;
 - (ii) within each half of a semi-detached dwelling;
 - (iii) for the whole of a duplex dwelling; or
 - (iv) within a row house dwelling;
 - (f) a secondary unit within the principal dwelling shall not be permitted where there is a pre-existing secondary unit within an accessory building on the lot; and
 - (g) as a condition of approval:
 - (i) the secondary unit shall be subject to site plan control approval; and

- (ii) the Township may require that the secondary unit is registered in accordance with the provisions of the Municipal Act.
- 3) The development of a secondary unit within an accessory building shall further be subject to the other relevant policies in this Plan and the following criteria:
 - (a) the secondary unit shall be limited to a single bedroom only with no sanitary, kitchen or cooking facilities;
 - (b) the secondary unit shall comply with the Ontario Building and Fire Codes;
 - (c) safe access and parking shall be provided;
 - (d) the secondary unit shall be designed and located in such a manner so as to not have an adverse effect on areas having environmental constraints, environmental hazards, human generated hazards or physical limitations, the streetscape, traffic levels, the character of the surrounding neighbourhood or privacy of adjacent residential properties;
 - (e) a maximum of one secondary unit shall be permitted;
 - (f) a secondary unit within an accessory building shall not be permitted where there is a pre-existing secondary unit within the principal dwelling on the lot; and
 - (g) as a condition of approval:
 - (i) the secondary unit shall be subject to site plan control approval; and
 - (ii) the Township may require that the secondary unit is registered in accordance with the provisions of the Municipal Act.

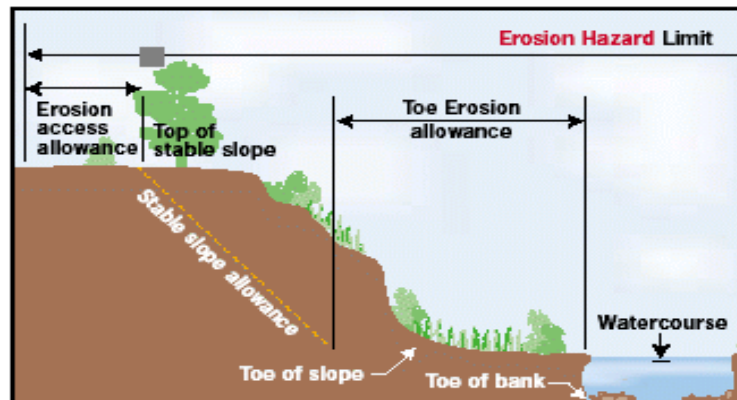
4.24 Renewable Energy Systems

- 1) For the purposes of this Section, renewable energy systems shall include, but not be limited to, wind energy, solar energy and biomass energy systems.
- 2) The Township shall:
 - (a) promote development that explores opportunities for the use of renewable energy infrastructure; and
 - (b) support public education, pilot projects and demonstration programs that explore ways to use renewable energy infrastructure in development.

4.25 Hazard Protection

4.25.1 Erosion Hazards

- 1) To reduce the risk to public safety and property due to erosion and slope instability, the Township, in consultation with the appropriate Conservation Authority, shall ensure that proposed developments are located outside erosion hazard limits, which are described and shown in Schedule 'EH-1' below as the sum of:
 - (a) an amount for toe erosion, which is defined as the erosion that takes place at the bottom of a slope;
 - (b) the stable slope allowance, which is defined as a horizontal setback measured from the toe of the bank, bluff or slope, equal to three times the height of the bank, bluff or slope; and
 - (c) an erosion access allowance of at least 6 metres from the top of the stable slope or 10 metres from the top of the bank, whichever is greater.



Schedule EH-1: Erosion Hazard Limit

- 2) Despite the above:
 - (a) the extent of the erosion hazard limit for areas containing organic soils, including muck, marsh and peat type soils, shall be equal to the outer limit of the organic soils, measured landward from the toe of slope; and
 - (b) the extent of the erosion hazard limit for areas containing or suspected of containing sensitive marine clays (Leda Clay) shall be determined by a geotechnical study prepared by a qualified engineer to the satisfaction of the Township.
- 3) This Plan encourages that the Township, in consultation with the appropriate Conservation Authority, continue to identify and map erosion hazard limits within the Township.

4.25.2 Contaminated Sites

- 1) Where Township records or other information indicate that a property may be contaminated by a prior or current use, a Phase 1 Environmental Site Assessment that documents prior uses shall be prepared by the proponent to the satisfaction of the Township as part of a proposed development of the property.
- 2) Where a Phase 1 Environmental Site Assessment prepared in support of a proposed development indicates that the affected property may have been contaminated, a Phase 2 Environmental Site Assessment shall be prepared by the proponent to the satisfaction of the Township.
- 3) If contamination has spread beyond the affected property, the Township shall require that an Off-Site Management Plan and Remedial Action Plan be implemented.
- 4) Mandatory filing of a Record of Site Condition in the Provincial Registry shall be required for the change in use of a property from industrial or commercial to residential or parkland. Cleanup of contaminated properties shall be done in accordance with Provincial Regulations and Guidelines.
- 5) Where a gasoline station site is being redeveloped and there is no change in use to a more sensitive use, the Township shall require a letter of continued use from the Technical Standards and Safety Authority.

SECTION 5

LAND USE POLICIES - COMMUNITY DEVELOPMENT AREAS

The community development areas shown on the Land Use Schedule are the locations where concentrated urban-type growth will be encouraged. The boundaries indicate the future limits for these areas. Any significant expansions beyond these boundaries will require an amendment to this Plan. The major land use designations within these areas are shown on Schedule 'A'. The policies for the various land uses are set out below.

5.1 Residential

- 5.1.1 Residential development will include a variety of dwelling types ranging from single family to low rise multiple family housing.
- 5.1.2 Development will take place in accordance with the policies of Section 4 and any other relevant policies of this Plan. It is Council's intention that development will generally occur by plan of subdivision. Severances may be allowed in infilling situations or in exceptional cases where it is clear that a plan of subdivision is not necessary for the orderly development of the land. Within the Special Service Area shown on Schedule 'B', new residential subdivisions will not be permitted.
- 5.1.3 For any proposal for multiple family development, the applicant must provide an engineer's report which sets out the recommendations for development on private services. The applicant may be required to provide such things as test wells, a hydrogeological study, detailed design or other such information as determined by Council in consultation with the Ministry of the Environment and the Health Unit. Within the Special Service Area shown on Schedule 'B', multiple family developments will not be permitted.
- 5.1.4 Where any proposed development is intended to involve condominium ownership or other ownership method where the Ministry of the Environment requires the municipality to be a party to the operating agreement, the municipality will not sign the agreement or enact the amending By-law until Council is satisfied that the proposed private services will be of the highest reasonable standard to ensure the reliable functioning of the systems in the future and that satisfactory financial arrangements have been made between the developer and the municipality to ensure that the Township will not incur the cost of repair or replacement of these systems. The Ministry of the Environment may require municipal ownership of communal water and/or sewage system works.
- 5.1.5 Local commercial uses such as convenience stores and personal services may be allowed within the residential area. Other commercial uses may be permitted subject to the policies outlined below.
- 5.1.6 Residential development shall be accommodated through development of vacant lands, evaluating surplus municipal lands for their suitability for housing

developments, converting non-residential structures, infill and redevelopment.

- 5.1.7 The Township may assist, where required by legislation, the Federal and Provincial Governments in the administration of housing programs.
- 5.1.8 Residential developments that offer innovative design features, construction techniques or tenure arrangements; which are consistent with the objectives of the Plan and which broaden the range of housing alternatives, including affordable housing, shall be encouraged.
- 5.1.9 When evaluating requests for new residential development or redevelopment, Council will:
 - (i) encourage a minimum 25% of new residential development to be affordable, that is, affordable to households within the lowest 60% of the income distribution as defined from time to time by the appropriate provincial agency; and
 - (ii) encourage housing forms and densities designed to be affordable.
- 5.1.10 Opportunities for intensification and redevelopment shall be promoted where it can be accommodated through existing building stock, infill and existing vacant lots, including brownfield sites. Consideration for such initiatives shall recognize the availability of existing or planned infrastructure suitable to accommodate projected needs. Council may establish minimum targets for intensification and redevelopment without an amendment to the Official Plan.

5.2 Commercial

- 5.2.1 Commercial uses will include a wide range of commercial services for the residents of the municipality and the travelling public. Commercial development will be permitted along the main roads in the communities and at key locations along the highways. Commercial areas have been identified on the Land Use Schedule along Highway No. 7 and in the Black's Corners community. In the other communities, specific commercial areas have not been identified but it will be the policy of Council to encourage such uses to locate in coherent groupings as much as possible along the main roads. The main roads will include the Ninth Line Road and the Goulbourn Townline Road in Ashton, County Road No. 10 in Prospect, Highway No. 15 and County Road No. 10 in Franktown and County Road No. 10 in Gillies Corners. The compatibility of commercial development with other uses will be ensured by such means as the control of ingress and egress to the site, provision of adequate parking and loading spaces, buffering and any other restrictions that Council considers appropriate.
- 5.2.2 For any proposed commercial development, the applicant must provide an engineer's report which sets out the recommendations for development on private services. The specific matters to be addressed in the report will be determined by Council in consultation with the Health Unit and the Ministry of the

Environment.

- 5.2.3 Commercial development in the form of shopping plazas will be permitted subject to the provisions of the Zoning By-law. For any proposed shopping centre with a proposed gross floor area in excess of 2500 m², Council may require that a market study be prepared.

5.3 Industrial

- 5.3.1 Industrial development will be permitted within lands so designated on the Land Use Schedule. It is Council's intention to encourage the development of these areas as industrial parks.
- 5.3.2 The uses permitted in the industrial parks will be restricted to those uses that do not require large quantities of water, do not pose problems for the disposal of wastes and do not create problems from smoke, dust, noise or similar obnoxious features. Complementary commercial and institutional uses will also be allowed within the industrial park. The Zoning By-Law will establish permitted uses and setbacks from residential or other sensitive uses in accordance with applicable Ministry of Environment Guidelines.
- 5.3.3 The industrial areas within the communities are intended to be developed as business parks with a mixture of light industrial, commercial, institutional and business uses.
- 5.3.4 For any proposed development in an industrial area, the applicant must provide an engineer's report which sets out the recommendations for development on private services. The specific matters to be addressed in the report will be determined by Council in consultation with the Health Unit and the Ministry of the Environment.

5.4 Institutional

- 5.4.1 There is one area in the community of Black's Corners that has been specifically designated for Institutional uses. This area presently contains the new school site, the municipal office, the firehall and some municipal parkland. It is Council's intention that this area become a focal point for the Township of Beckwith and for the community of Black's Corners.
- 5.4.2 Other uses such as commercial and residential uses will be allowed within this area subject to the relevant policies of this Plan. Any such development must be designed and arranged to complement the principal purpose of this area.
- 5.4.3 For any proposed institutional development, the applicant must provide an engineer's report which sets out the recommendations for development on private services. The specific matters to be addressed in the report will be determined by Council in consultation with the Health Unit and the Ministry of the

Environment.

5.4.4 Within the area designated Institutional in the community of Franktown, a private school and facilities related thereto will also be permitted. The other relevant policies of this Section will apply to this area.

5.5 Black's Corners Community

Black's Corners is the largest Community Development Area in Beckwith Township. Considerable growth has taken place in and around this community. Black's Corners has become the focal point for the municipality and it is intended to foster and enhance this role.

In recent years, over 60 percent of the Township's growth has occurred in Black's Corners. Given the recent resolution of groundwater contamination issues that impacted the extent of development in this area since 2000, it is assumed that this ratio will continue over the twenty-year planning horizon to 2029.

The boundary of the Black's Corners Community, as shown on Schedule 'A', reflects the following considerations:

- the boundary adjustment at the northern part of the community
- the additional lands required for future residential development
- natural and man made development constraints.

The Black's Corners Community has specific land use designations as shown on Schedule 'A'. The land use policies for the Community Development Areas as set out in preceding Sections of the Plan will continue to apply. As a result of the Black's Corners Planning Study, the following special policies will also apply specifically to the Black's Corners Community.

- 5.5.1 It is intended that Black's Corners will function as a focal point for the Township of Beckwith.
- 5.5.2 Wherever possible, linkages between residential areas will be encouraged.
- 5.5.3 Subdivision design should incorporate the natural features of the site.
- 5.5.4 In reviewing plans of subdivision, Council will encourage the retention of existing healthy vegetation beyond the site development envelope.
- 5.5.5 Through the requirements of the Zoning By-law, appropriate spacing between dwellings will be maintained so that the rural residential character of the community is preserved.
- 5.5.6 Multiple family housing will be encouraged to locate on the main roads within the community.

- 5.5.7 It is the intention of Council to protect significant woodlots or other interesting natural features to enhance the visual amenities of the Community.
- 5.5.8 Commercial and industrial uses which abut Highway 15 will be required to provide appropriate landscaping and other site elements to create an attractive appearance from the road.
- 5.5.9 Council will consider utilizing signage or other design elements to define the community as a place.
- 5.5.10 For any portion of a new residential development or any other sensitive land uses(s) with the Black's Corners Community that falls within 500m of lands east of the railway, and adjacent to the property containing the former Levine landfill site, located in Part of Lot 13, Concession 10, development is not permitted, except on existing lots of record. For any proposed development within 500 metres of lands west of the railways, and adjacent to the property containing the former Levine landfill site, a hydrogeological study must be undertaken prior to any development occurring in order to address any potential groundwater implications relating to the Volatile Organic Compounds (VOC) contaminants originating from this landfill site. The specific terms of reference for the study are to be determined in consultation with the Ministry of the Environment (MOE) and the Township.
- 5.5.11 For any portion of a new residential development or any other sensitive land uses(s) within the Black's Corners Community that falls within 500 metres of a main railway line, or near an airport for which NEF/NEP contours have not been developed, the policies of Sections 4.13 and 4.17 of this Plan apply.
- 5.5.12 Special Policy Areas – Part of Lot 13, and Part of Lot 14, Concession 10

The former Levine Landfill site is located on Part of Lot 13, Concession 10, as identified on Schedule 'B'. This site has been associated with groundwater contamination in an area originating at the site and flowing in an easterly and southeasterly direction.

Part of Lot 13 and Part of Lot 14, Concession 10, are identified as Special Policy Area 1, Special Policy Area 2 or Special Policy Area 3 on Schedule 'B'. The function of the Special Policy Areas is to provide appropriate requirements to ensure that sufficient studies are conducted to provide the Township with satisfaction that development can occur with adequate quality and quantity of water to service the development.

Special Policy Area 1

Prior to any development occurring on the subject lands identified on Schedule 'B' as Special Policy Area 1, the following requirements must be met to the satisfaction of the Ministry of Environment and the Township of Beckwith:

- Completion of a long term aquifer test at test well TW3-1 using a

minimum of three on-site observation wells and two observation wells on the Levine landfill site (if available). The duration of the aquifer test will be long enough to produce a measurable response in observation wells located within approximately 300 metres of the pumping well. Groundwater quality in TW3-1 and in the observation wells would be monitored during aquifer testing;

- Completion of a long term aquifer test at test well TW3-2 using a rate similar to the estimated groundwater demand for the proposed development in Special Policy Area 1;
- Installation of a minimum of two observation wells on-site, in addition to existing monitoring well BH8, to be used during aquifer testing. The observation wells will be positioned at various distances and directions from the pumping well. One of the two observation wells will be installed in a cored borehole. The core will be logged to provide additional information on geology, stratigraphy, and fracture density at the site;
- Preparation of a report presenting the results of the aquifer testing. The report will include a discussion of the site conceptual model and the 3-D numerical groundwater flow model used to predict the migration of groundwater contaminants originating at the Levine landfill site. Data from the aquifer test will be used to assess if the groundwater flow system in the vicinity of the site acts as an equivalent porous media (i.e. relatively consistent spatial distribution of drawdown) at the scale of interest. The report will also include recommendations regarding future groundwater monitoring;
- Completion of a hydrogeological report and terrain analysis assessment to determine the impact of nitrates on the groundwater from septic systems; and
- Completion of a Certificate of Well Compliance for the drilling of each well.

Special Policy Area 2

Prior to any development occurring on the subject lands identified on Schedule 'B' as Special Policy Area 2, the following requirements must be met to the satisfaction of the Ministry of Environment and the Township of Beckwith:

- Completion of a detailed conceptual model of the area in the vicinity of the Levine landfill site and the Beckenridge subdivision, and additional fieldwork (to include but not be limited to borehole core logging, downhole borehole geophysics and hydraulic testing) to characterize the fractured bedrock formations in the area;
- Completion of a 3-D numerical model that incorporates fracture flow and transport concepts in fractured rock to assess the potential for

contaminant transport from the Levine landfill site towards the Beckenridge subdivision;

- Installation of a monitoring well(s) between the Levine landfill site and the Beckenridge subdivision with regular monitoring for water quality and to validate model predictions;
- Completion of a long-term pumping test (2 weeks in duration) at test well TW3-1 and monitoring of groundwater levels and groundwater quality in a minimum of four (4) observation wells;
- Preparation of a report presenting the results of the aquifer testing, fractured bedrock characterization investigations and groundwater quality monitoring. The report will include a discussion of the site conceptual model and the 3-D numerical groundwater flow model used to predict migration of groundwater contaminants originating at the Levine landfill site. The report will also include recommendations regarding future groundwater monitoring;
- Completion of a hydrogeological report and terrain analysis assessment to determine the impact of nitrates on the groundwater from septic systems; and
- Completion of a Certificate of Well Compliance for the drilling of each well.

Special Policy Area 3

The former Levine Landfill site is located on Part of Lot 13, Concession 10, as identified on Schedule 'B'. No development will be permitted on these lands. The only permitted activities within this area will be those related to groundwater monitoring. Any site remediation will only be undertaken with the prior approval of the Ministry of the Environment and the Township of Beckwith. Any other proposed use of these lands will require an amendment to the Official Plan. Prior to initiating an amendment to the Official Plan, a terms of reference which will set out the required supporting studies will have to be prepared in consultation with the Ministry of the Environment and the Township. The required supporting studies must be submitted with the application for amendment.

All study requirements and pump testing for Special Policy Area 1, Special Policy Area 2, or Special Policy Area 3, as identified above, shall be completed in consultation with the Ministry of the Environment (MOE) and the Health Unit. No development shall occur unless Council is satisfied that the above information, and any subsequent information submitted, sufficiently concludes that an adequate supply of potable water will be available.

Council will require the use of development controls under the Planning Act to ensure that development within the Special Policy Areas occurs to its satisfaction and that the conclusions and recommendations of the above mentioned studies are implemented.

These controls may include conditions of approval on consent applications, conditions of approval for plans of subdivision, site plan approvals, and development agreements as appropriate.

Prior to development proceeding within the Special Policy Area, an amendment to the Zoning By-law will be required.

5.6 Expansions to Community Development Areas

The Township may identify a new community development area or allow for the expansion of a community development area boundary only at the time of a comprehensive review and only where it has been demonstrated that:

1. Sufficient opportunities for growth are not available through intensification, redevelopment and designated growth areas to accommodate the projected needs over the identified planning horizon;
2. The infrastructure and public service facilities which are planned or available are suitable for the development over the long term and protect public health and safety;
3. In prime agricultural areas:
 - a. the lands do not comprise specialty crop areas;
 - b. there are no reasonable alternatives which avoid prime agricultural areas;
 - c. there are no reasonable alternatives on lower priority agricultural lands in prime agricultural areas; and
4. Impacts from new or expanding community development areas on agricultural operations which are adjacent or close to the community development area are mitigated to the extent feasible.
5. During the consideration of any expansion to any Community Development Area within the Township, the Township shall review the Mississippi-Rideau Source Protection Plan to ensure sensitive areas are protected from incompatible development.

In determining the most appropriate direction for expansions to the boundaries of settlement areas or the identification of a new community development area the Township shall consider and apply all the policies related to natural heritage features, natural resource protection, cultural heritage protection and protection of public health and safety.

SECTION 6

LAND USE POLICIES - RURAL AREAS

The rural areas constitute the remainder of the Township, excluding the community development areas. The following land use designations are provided for the rural areas: Agriculture, Mineral Aggregate, Flood Plain, Wetlands, Rural, Mobile Home Park, Wrecking Yard, Airport, Waste Disposal Site and Hauled Septage Disposal Site. The policies for these various land uses are set out below.

6.1 Agriculture

6.1.1 Permitted uses in the Agriculture designation will be limited to:

- 1) agricultural uses, including the growing of crops, including nursery and horticultural crops; raising of livestock; raising of other animals for food, fur or fibre, including poultry and fish; aquaculture; apiaries; agro-forestry; maple syrup production; and associated on-farm buildings and structures, including accommodation for full-time farm labour when the size and nature of the operation requires additional employment;
- 2) agriculture-related commercial and agriculture-related industrial uses that are small scale and directly related to the farm operation and are required in close proximity to the farm operation; and
- 3) secondary farm occupations, including home occupations, home industries, bed and breakfast operations, agri-tourism uses and uses that produce value-added agricultural products from the farm operation on the property.

6.1.2 Land may be removed from the Agriculture designation for the following purposes:

- 1) the expansion of Community Development Area boundaries at the time of a comprehensive review of the Official Plan;
- 2) mining or quarry operations, subject to the policies in Section 6 of this Plan; or
- 3) limited non-residential uses, provided that:
 - (a) the land does not comprise a specialty crop area;

- (b) there is a demonstrated need for additional land to be designated within the planning horizon for the proposed use;

- (c) there are no reasonable alternative areas that avoid Agriculture lands; and
 - (d) there are no alternative areas in the Agriculture designation consisting of lower capability agricultural soils to accommodate the proposed use.
- 6.1.3 In considering an amendment to the Agriculture designation, Council will consult with the Ministry of Agriculture and Food.
- 6.1.4 All new or expanding farm and applicable non-farm developments shall comply with the Minimum Distance Separation formulae. This policy may have implications for land use designations other than Agriculture.
- 6.1.5 Severances for agricultural purposes may be permitted if the consent is intended to consolidate or re-divide good agricultural lands, and provided that both the retained and severed lots are generally at least 39 hectares (96 acres) in size and appropriate for the agricultural activity in the area and agricultural practices in the long run. In determining the appropriateness, consideration will be given to the capability, flexibility, suitability and viability of both the severed and retained farm parcels, and the Ministry of Agriculture and Food should be consulted in this regard.
- 6.1.6 Agriculture-related commercial and agriculture-related industrial uses will be encouraged to consolidate into groups and locate within, or adjacent to Community Development Areas or on lower quality agricultural land. Such uses will be zoned appropriately in the Zoning By-Law.
- 6.1.7 Farm-related severances will only be permitted for the following:
 - 1) an existing residence that is surplus to a farming operation resulting from a farm consolidation, provided that the minimum lot area is 0.6 hectares (1.5 acres) and no new residential dwelling is permitted on any additional vacant remnant parcel that may be created by the severance;
 - 2) an agricultural-related business and service use subject to Section 6.1.1 of this Plan, and provided that any new lot is limited to the minimum size needed to accommodate the proposed use and appropriate private water and sewage services; and
 - 3) public uses and utility corridors in cases where easements or rights-of-way are not appropriate.
- 6.1.8 An existing lot of record in the Agriculture designation may be used for residential purposes in accordance with the relevant provisions of the Zoning By-Law provided the lot complies with the Minimum Distance Separation Formulae and other relevant policies of this Plan.

6.1.9 New farm-related severances and any new or expanding non-farm use shall not limit normal farm practices and shall comply with the Minimum Distance Separation formulae.

6.1.10 Notwithstanding the policies in Section 6.1.7 of this Plan, the creation of non-farm residential lots in the Agriculture designation shall be prohibited.

6.2 Mineral Aggregate

6.2.1 Mineral Aggregate areas include sand, gravel and limestone resources. These resources have been identified in studies by the Ministry of Natural Resources. It is the intention of Council to protect mineral aggregate resources as much as possible for long-term use and to ensure that the resources are utilized in accordance with proper controls.

6.2.2 On the Land Use Schedule, the areas designated as Mineral Aggregate have been further identified as Pit or Quarry. These designations include both existing licensed operations as well as reserve areas. In the areas identified as Mineral Aggregate - Pit, only pit operations together with accessory uses such as crushing facilities, stockpiles and screening operations will be permitted. Within the areas identified as Mineral Aggregate - Quarry, pit and quarry operations will be permitted together with accessory uses such as crushing facilities, stockpiles and screening operations. Asphalt plants, ready-mix concrete plants and aggregate transfer stations may be permitted within the land designated as Mineral Aggregate - Quarry but will require site specific zoning in the Zoning By-law. Within the reserve areas, interim land uses such as agriculture, forestry and outdoor recreation uses may be permitted provided that these do not include buildings or activities which would preclude the establishment of a pit or quarry.

6.2.3 For the areas designated as Mineral Aggregate - Quarry, the area to be zoned or licensed must be located within the boundaries of the designation shown on Schedule 'A'. Any proposal to expand beyond these limits will require an amendment to the Official Plan. For the areas designated as Mineral Aggregate - Pit, the area to be zoned or licensed may extend beyond the boundaries of the designation shown on Schedule 'A' provided such expansion is reasonable, respects any separation distances and does not encroach on existing uses in the area.

6.2.4 The concept of an influence area is recognized as a means to provide mutual protection from encroachment by incompatible uses for either sensitive land uses or existing or proposed mineral aggregate operations. The extent of the influence area from the boundary of an existing or proposed Mineral Aggregate designation shall be at least 300 metres for a pit and 500 metres for a quarry. These distances may be increased without amendment to this Plan in order to address public health and safety concerns, environmental impacts, land use impacts, and any other adverse effects. In these areas, development which would preclude or hinder the establishment of new mineral aggregate operations or access to the resources will only be permitted if a Land Use Compatibility

Study, undertaken by a qualified professional, demonstrates that:

- 1) resource use would not be feasible;
- 2) the proposed land use or development will not prevent mineral resource extraction;
- 3) the proposed land use or development serves a greater long term public interest; and
- 4) public health and safety concerns, environmental impacts, land use impacts, and any other adverse effects are addressed and mitigated.

6.2.5 Generally, only existing licensed pit and quarry operations will be zoned in the Zoning By-law. The zoning will define the specific uses to be allowed as well as the zone requirements that will apply. Existing pits and quarries which are not designated as Mineral Aggregate in the Official Plan may be zoned as such in the Zoning By-law provided that Council is satisfied that such zoning is appropriate.

6.2.6 Within the areas designated Mineral Aggregate in the Official Plan, the establishment of a new pit or quarry or the expansion of an existing operation onto lands not zoned for such use shall require an amendment to the Zoning By-law.

6.2.7 The lands within the Mineral Aggregate designation which are not zoned for a pit or quarry will be placed in an appropriate zone category which will protect the lands from any incompatible development.

6.2.8 The Township is designated under the Aggregate Resources Act. All pit and quarry operations must be licensed by the Ministry of Natural Resources and must meet the requirements of that Act. Through the licensing procedure, Council may recommend to the Ministry of Natural Resources that certain conditions be placed on the licence.

6.2.9 All pits and quarries must satisfy the requirements of the Ministry of the Environment with respect to pumping and dewatering, water supply, waste water, solid and liquid waste disposal, dust and all emissions to the atmosphere including noise and vibrations.

6.2.10 Small pit operations (Class B licence) which remove up to a maximum of 20,000 tonnes of material per year will also be permitted within the Rural Land and Agriculture categories in the Official Plan. Such operations normally provide material where demand for aggregate is not large. It is intended that by limiting the amount of material per year to 20,000 tonnes that this type of operation can proceed and should have very minimal impact on surrounding uses. Any such pit must be zoned in accordance with the appropriate zone category in the Zoning By-law. Such operations must also be licensed by the Ministry of Natural Resources, meet with the requirements of the Ministry of the Environment and

Energy comply with any other relevant provisions of this Plan. Any pit operation which exceeds the limit of 20,000 tonnes per year which is not within an area designated Mineral Aggregate will require an amendment to this Plan.

6.2.11 The removal of part of the Mineral Aggregate designation from the Schedule will require an amendment to this Plan. Such an amendment will provide justification for the change in designation and clearly demonstrate and document the need for the alternate land use. In considering such amendments, Council will consult with the Ministry of Natural Resources and shall take into account the following:

- (i) evidence provided by the applicant that aggregate extraction is not feasible due to quality, quantity or other development constraints;
- (ii) the necessity of the alternate land use in comparison to the necessity of the mineral aggregate resource;
- (iii) the reason for the choice of the location and consideration given to alternate locations on non-aggregate lands;
- (iv) the consideration given to the option of sequential land use in which the mineral aggregate is removed prior to development of land for the proposed use.

6.2.12 Pits, quarries and related facilities except for short form pits and wayside operations are only permitted within the areas designated as Mineral Aggregate in accordance with the policies of this Section. The establishment of any new Mineral Aggregate areas will require an amendment to the Official Plan. In proposing any such amendment, the applicant must provide sufficient information for Council and the Ministry of Natural Resources to properly evaluate the proposal. The information that the applicant must provide may include, but not necessarily be limited to, the following:

- (i) the compatibility of the proposed development with existing and planned land uses within a 500 metre radius;
- (ii) location of access and haulage routes, including consideration of upgrading of existing roads and truck traffic impacts on Community Development Areas or the residents along those routes;
- (iii) reports from qualified professionals regarding noise, blasting, hydrogeology, drainage, environmental impact, archaeological assessment and any other relevant matters; and
- (iv) mining or quarry plans and supporting information related to site development, landscaping and buffering, operations, decommissioning and progressive and final site rehabilitation.

6.2.13 All relevant First Nations communities shall be consulted for input where any archaeological assessment, submitted in support of an Official Plan amendment

that proposes to establish any new Mineral Aggregate area, indicates areas of First Nations interest or potential for encountering First Nations artifacts.

6.2.14 In the Agriculture designation, the extraction of mineral aggregates may be permitted as an interim use provided that the site is rehabilitated with substantially the same area and soil capability for agriculture being restored. Complete agricultural rehabilitation may not be required only if it is demonstrated that:

- 1) there is a substantial quantity of mineral aggregate below the water table warranting extraction;
- 2) the depth of planned extraction in a quarry makes restoration of pre-extraction agricultural capability unfeasible;
- 3) other alternatives have been considered by the applicant and found to be unsuitable; and
- 4) agricultural rehabilitation in the remaining areas will be maximized.

6.2.15 The proponent of the mineral aggregate operation shall undertake progressive and final site rehabilitation in accordance with Provincial Regulations.

6.3 Highway 7 Corridor

- 1) Permitted uses on lands designated Highway 7 Corridor shall include:
 - (a) agricultural related business and service uses;
 - (b) research and development, technology, office, administrative, professional and technical service uses;
 - (c) limited highway commercial uses that require large sites and have extensive parking, loading and storage requirements; and
 - (d) accessory retail and service commercial uses.
- 2) Prior to future developments being considered, a secondary plan shall be prepared by the Township in partnership with affected landowners and in consultation with the Ministry of Transportation that addresses such matters as:
 - (a) land assembly requirements;
 - (b) proposed lot patterns, land uses and zoning considerations;
 - (c) service road access to individual landholdings;
 - (d) traffic circulation patterns and impacts;

- (e) compatibility with existing, planned or adjacent land uses;
 - (f) on-site and off-site servicing requirements and impacts;
 - (g) provisions for landscaping, buffering, exterior lighting, parking, loading, fencing, storage and signage;
 - (h) architectural design treatments; and
 - (i) timing and phasing of proposed development.
- 3) The preparation of the secondary plan and the consideration of future proposed developments shall be guided by the following:
- (a) rationalization of land ownership patterns is encouraged to create appropriately sized parcels and lot patterns;
 - (b) service road access to individual landholdings is a primary consideration in the context of reorganizing ownership patterns and facilitating future development;
 - (c) plans of subdivision shall be the preferred means of land division;
 - (d) proposed developments shall be of a high quality in terms of building and site design, which shall be established through architectural design and landscaping plans and guidelines;
 - (e) adequate buffering, in the form of fencing, berming and landscaping, shall be required to minimize potential impacts between existing, planned or adjacent land uses;
 - (f) adequate parking and loading facilities shall be provided;
 - (g) exterior lighting of any building or parking area shall be designed to deflect glare from adjacent properties; and
 - (h) servicing shall meet the requirements of the appropriate approval authority.
- 4) The Township shall not consider any development applications for Zoning By-Law Amendments or draft plans of subdivision within the Highway 7 Corridor until the secondary plan has been approved and implemented, either through an Official Plan Amendment, Zoning By-law amendment, or a combination of both.

6.4 Flood Plain

- 6.4.1 Lands designated as Flood Plain include those lands in the Township that are mapped by the local Conservation Authorities and are susceptible to flooding. It

is recognized that not all flood plain areas are identified on Schedule 'B'. Where a proposed development is proximate to a known flood plain for which a flood line study has not been completed, the proponent may be required to undertake a flood line study in accordance with Provincial Regulations and Guidelines.

- 6.4.2 The floodplain around Mississippi Lake is based on the “Two Zone” flood hazard delineation. On Mississippi Lake, the Floodway and Flood Fringe are defined as follows:

Flood Fringe: The outer portion of the floodplain between the Floodway and the 1:100 regulatory flood line. For Mississippi Lake, the Flood Fringe is defined as all areas around the lake between 135.0 meters and 135.6 metres elevation.

Flood Way: The hazardous portion of the floodplain where water flows during flood conditions are expected to be greatest and would cause danger to public health and safety, or property damage. For Mississippi Lake, the Floodway is defined as all areas around the lake that fall below the elevation of 135.0 metres.

6.4.2.1 Flood Fringe

Within the flood fringe, permitted uses include those allowed in the abutting designation where it has been demonstrated that such development can occur safely and with no adverse impacts.

Development and site alteration in the Flood Fringe is subject to the permit requirements of the Mississippi Valley Conservation Authority in order to address flood proofing requirement and ensure safe access.

Uses not permitted within the flood fringe include: any institutional use associated with hospitals, nursing homes, pre-school, schools, nurseries, and day-cares; essential emergency services such as fire, police and ambulance stations, and electrical sub-stations; and uses associated with the disposal, manufacturing, treatment or storage of hazardous substances.

Existing buildings, structures or private sewage disposal systems which are damaged or destroyed by flooding may only be repaired or reconstructed if approved flood proofing techniques are used to the satisfaction of the public body having jurisdiction, or Council. Council will encourage property owners to relocate such buildings or structure outside the floodplain where there is sufficient land available for such relocation.

Minor extensions or enlargements of existing habitable or occupied buildings located in the flood fringe, other than those listed as permitted above, may be permitted where it is clearly demonstrated to Council and the relevant Conservation Authority, through engineering or other studies, that the flood hazard can be overcome. Such measures may include flood proofing, ensuring that any openings are located above the flood elevation, and ensuring safe access in the event of a flood.

6.4.2.2 Flood Way

Within the flood way, permitted uses are limited to uses which by their nature must locate within the flood plain, including flood or erosion control structure; ancillary facilities which are passive, non-structural, and do not adversely impact the floodplain; minor additions to existing uses.

Uses not permitted within the flood way include: any institutional use associated with hospitals, nursing homes, pre-school, schools, nurseries, and day-cares; essential emergency services such as fire, police and ambulance stations, and electrical sub-stations; and uses associated with the disposal, manufacturing, treatment or storage of hazardous substances.

Existing buildings, structures or private sewage disposal systems which are damaged or destroyed by flooding may only be repaired or reconstructed if approved flood proofing techniques are used to the satisfaction of the public body having jurisdiction, or Council. Council will encourage property owners to relocate such buildings or structure outside the flood way where there is sufficient land available for such relocation.

Minor extensions or enlargements of existing habitable or occupied buildings located in the floodplain, other than those listed as permitted above, may be permitted where it is clearly demonstrated to Council and the relevant Conservation Authority, through engineering or other studies, that the flood hazard can be overcome. Such measures may include flood proofing, ensuring that any openings are located above the flood elevation, and ensuring safe access in the event of a flood.

6.4.3 For those areas designated Flood Plain which are located along the Mississippi River downstream from the Highway No. 7 bridge, the following policies will apply:

- (i) No development will be permitted within the flood plain except for flood or erosion control structures, shoreline stabilization, water intake facilities and minor recreational facilities such as docks and boathouses. Uses such as agriculture, forestry, conservation, wildlife management and similar activities will be permitted provided that no associated buildings and structures are located on the flood plain.

6.4.4 For those areas designated Flood Plain along the Jock River, the following policies will apply.

- (i) No development will be permitted within the flood plain except for flood or erosion control structures and shoreline stabilization. Uses such as agriculture, forestry, conservation, wildlife management and similar activities will be permitted provided that no associated buildings and structures are located on the flood plain.

- (ii) Minor changes to the boundary of the flood plain may be considered without an amendment to this Plan provided that the applicant can demonstrate to the satisfaction of Council and the Rideau Valley Conservation Authority that such changes are appropriate.

6.4.5 Where any new or additional engineered flood line mapping is available, it will be included in the Official Plan by amendment.

6.4.6 In any area designated Flood Plain, it will be the policy of Council to encourage the retention of natural vegetation.

6.4.7 All development, including the placement or removal of fill, in any area designated Flood Plain will require the approval of the appropriate Conservation Authority.

6.5 Rural Land

Lands designated as Rural Land represent the balance of the rural area after excluding the resource and environmental land use designations. Within these areas, a variety of land uses will be permitted including uses within the Agriculture designation, as well as residential, commercial, industrial and outdoor recreation uses.

The policies for residential, commercial, industrial development and outdoor recreation are set out below.

Not all Rural Land is equally suitable for development. Local conditions such as bedrock at surface, poor drainage, organic soils or high water table may make certain areas undesirable for development. Council will discourage the use of lands that would require substantial changes and improvements before development could occur.

6.5.1 Rural Residential

6.5.1.1 General Policies for Rural Residential

- (i) Rural residential uses will generally be limited to single family dwellings. The conversion of existing single family dwellings into two family dwellings may be permitted in accordance with the provisions of the zoning By-law.
- (ii) The creation of lots may take place by severance and by subdivision in accordance with the policies set out in Section 4. Plans of subdivision in areas designated as Rural Land will be limited to a maximum of 25 lots. Any proposal to expand beyond 25 lots will require an amendment to the Official Plan. In considering such amendment, Council will take into account the amount of undeveloped land with the Community Development Areas, the actual growth rate of the municipality in relation to the growth projections and the potential demand for the new lots

proposed, as well as all of the other relevant criteria as set out in this Plan. Within the Special Service Area shown on Schedule 'B', new rural residential subdivisions will not be permitted.

- (iii) Rural residential development will be in accordance with the other relevant policies of this Plan, including the Minimum Distance Separation formulae.
- (iv) It is the intent that rural residential development be located so that the impact on natural heritage features will be minimal.
- (v) It is anticipated that there may be proposals for multiple residential development in the rural area from time to time. Council will consider such proposals for exceptional circumstances such as a multiple residential development related to a major recreational facility or public or private senior citizens projects. For any such proposal, the applicant must provide an engineer's report which sets out the recommendations for development on private services. The applicant may be required to provide such things as test wells, a hydrogeological study, detailed design or other information as determined by Council in consultation with the Ministry of the Environment and the Health Unit. Where any proposed development is intended to involve condominium ownership or other ownership method where the Ministry of the Environment requires the municipality to be a party to the operating agreement, the municipality will not sign the agreement or enact the amending By-law until Council is satisfied that the proposed private services will be of the highest reasonable standard to ensure the reliable functioning of the systems in the future and that satisfactory financial arrangements have been made between the developer and the municipality to ensure that the Township will not incur the cost of repair or replacement of these systems. The Ministry of the Environment may require municipal ownership of communal water and/or sewage system works.
- (vi) There is rural residential development around Mississippi Lake that does not have frontage on a public street. Such areas may be zoned in an appropriate zone category to recognize this condition. Development of existing vacant lots on private roads may be permitted subject to the provisions of the Zoning By-law.

6.5.1.2 Special Policy Areas for Rural Residential

(1) Gardiner Shore

Gardiner Shore began as an unplanned cottage area on Mississippi Lake and has evolved into a mixed cottage and permanent residential area. It is anticipated that, over time,

Gardiner Shore will become a lake-oriented rural residential community. While there is already an established pattern of development, the creation of a planning framework is essential in order to guide this transition for the future. This planning framework will ensure the incremental improvements which will benefit not only the existing and future residents of this community but the municipality as well. The following policies will guide future development within Gardiner Shore.

- (i) The initial lot creation will only be permitted by plan of subdivision. The entire subdivision may be registered as one phase. After the subdivision is registered, consents may be considered for lot line adjustments or to effect the consolidation of properties.
- (ii) A maximum of 89 residential lots will be permitted within the Gardiner Shore community. Single detached dwellings only will be permitted.
- (iii) Servicing will continue to be on the basis of private water and sewage disposal systems. New or replacement water and sewage disposal services will be on the basis of on-site individual systems. Improvements to the servicing systems will be encouraged. Any such improvements must be undertaken in accordance with the recommendations set out in the hydrogeological report and will be subject to the approval of the municipality or its agent. Conditions relating to servicing will be incorporated into the subdivision agreement.
- (iv) Lot configurations in the subdivision will reflect the following criteria:
 - sufficient area for on-site services
 - frontage on a public road
 - provision of reasonable side yards
 - retention of the middle tier (Centre Block) as one block.
- (v) The roads within the subdivision will be dedicated as public roads. The right-of-way width of the Gardiner Shore Road will be 20 metres wherever possible. Where the right-of-way width is less than 20 metres, road widenings will be encouraged when opportunities arise. It is anticipated that a road widening will be possible when the Centre Block is phased out. Road widenings may also be achieved through dedications on site plans. The Lower Gardiner Shore Road will have a right-of-way of 9 metres which reflects the ultimate disposition of this road. It is intended that when the Centre Block is vacant, the Lower Gardiner

Shore Road will be closed and removed. Any surplus land after the road widening may be conveyed as lot additions to abutting lots.

- (vi) The subdivision roads will be maintained by the lot owners. The subdivision roads will be assumed by the municipality only if the roads are upgraded to a standard acceptable to the Council. The specific details regarding maintenance and possible eventual assumption by the municipality will be set out in the subdivision agreement.
- (vii) The middle tier of dwellings which is shown as the Centre Block on the plan of subdivision will be phased out over time. This portion of the property will be retained as one block on the plan. Nine new residential lots are being created along Gardiner Shore Road for the eventual replacement of the dwellings in the Centre Block. The nine lots will be zoned with a holding provision in the Zoning By-law. Council will not enact a By-law removing the holding provision until documents are provided which establish that the owner of such new lot assumes the responsibility for the removal of a dwelling within the Centre Block and provides to the municipality an appropriate financial security to guarantee the removal.
- (viii) Access to the water for the back lots in the subdivision will be provided by the Park Block, easements or water access blocks. The ownership of these user-in-common lands and the rights of the property owners to such lands will be set out in the subdivision agreement.
- (ix) A condition of subdivision approval will be the rezoning of the lands into appropriate zone categories. Special zoning provisions will need to be created for the residential lots. The Park Block will be zoned as Open Space. The Centre Block will be zoned appropriately to reflect the long term objective of the removal of the dwellings and the dedication of the lands for road widening and lot additions. Zoning provisions that encourage lot consolidation will also be considered.
- (x) The Gardiner Shore Community is included as a site plan control area. Any development or redevelopment may require a site plan as a condition for approval.
- (xi) The shoreline of Mississippi Lake is designated "Flood Plain". Many of the lots created by means of the subdivision will include an area in this designation and will be affected by the policies of this designation.

6.5.2 Commercial

Most commercial development will take place in the areas designated as commercial nodes or as commercial areas within the community development areas. However, it is anticipated that there will still be a need for small scale commercial development in the rural area. As well, there will be resort commercial development associated with Mississippi Lake and River or with other significant recreational facilities. Commercial uses will be allowed in the Rural Land designation in accordance with the policies outlined below.

- (i) Small scale commercial uses should provide services to residents, businesses or the travelling public such as vehicle sales and service, antique shops, automobile service stations and similar uses. Resort commercial uses should be related to a natural or man-made tourist attraction.
- (ii) The use must be appropriate for the proposed location.
- (iii) Access to commercial uses will be carefully controlled in order to avoid creating any traffic hazard. Generally there should be no more than two access points per lot.
- (iv) Adequate off-street parking and loading spaces will be provided.
- (v) Advertising devices and outdoor storage of goods and materials will be strictly controlled.
- (vi) Commercial development will be in accordance with the other relevant policies of this Plan, including the Minimum Distance Separation formulae and Ministry of Environment Guidelines. Commercial uses will be placed in a separate zone category in the Zoning By-Law.
- (vii) Tent and trailer parks will be permitted as a resort commercial type of development. Tent and trailer parks include seasonally operated parks for the accommodation of tents and recreational vehicles together with accessory facilities such as convenience stores and services catering to the day to day needs of the visitors. The following policies will apply to tent and trailer parks.
 - (a) The site development standards such as lot area, density, campsite area, frontage and others, will be established in the Zoning By-law.
 - (b) Adequate buffering will be provided between the tent and trailer park and any adjacent residential uses.
 - (c) Adequate parking for users as well as visitors will be provided on site.

- (d) Water and sewage disposal services for the park must be provided in accordance with the requirements of the Ministry of the Environment.
- (e) New tent and trailer parks will require an amendment to the Zoning By-law.
- (f) The applicant will submit a site plan for the proposed park which must be approved by Council before an amending By-law is enacted.

6.5.3 Industrial

Most industrial development will take place within the areas designated as Industrial Parks or as industrial areas within the community development areas. However, it is anticipated that certain types of industrial uses can be located in the rural area. Industrial uses will be allowed in the Rural Land designation in accordance with the policies outlined below.

- (i) The industrial uses permitted will be of the type that do not require large quantities of water and do not pose problems for the disposal of wastes. They should be oriented to the local economy such as those which use local resources or serve local businesses and residents such as sawmills, feedmills, processing of agricultural produce, open storage, farm service businesses and similar uses.
- (ii) The use must be appropriate for the proposed location.
- (iii) Access to the industrial uses will be carefully controlled in order to avoid creating any traffic hazard. Generally there should be no more than two accesses per lot.
- (iv) Adequate off-street parking and loading spaces will be provided.
- (v) Advertising devices and outdoor storage of goods and materials will be strictly controlled.
- (vi) Industrial development will be in accordance with the other relevant policies of this Plan, including the Minimum Distance Separation formulae and Ministry of Environment Guidelines. Industrial uses will be placed in a separate zone category in the Zoning By-Law.

6.5.4 Outdoor Recreation

- (i) Outdoor recreation uses may include golf courses, country clubs, snowmobile clubs, nature study activities and other such uses.
- (ii) Outdoor recreation development will be in accordance with the other relevant policies of this Plan, including the Minimum Distance Separation

formulae.

- (iii) Adequate off-street parking and loading spaces will be provided.

6.6 Mobile Home Park

- 6.6.1 A mobile home park will mean a property developed for the placement of mobile homes on permanent foundations. Uses which are incidental to a mobile home park including a park management office, accessory commercial uses such as convenience stores, recreational facilities, laundromat, storage facilities, and other similar uses will be permitted. Mobile home parks will be subject to the following policies.
- 6.6.2 The establishment of a new mobile home park will require an amendment to the Official Plan and Zoning By-law.
- 6.6.3 Mobile home parks may be developed either as a single entity or on a freehold basis.
- 6.6.4 Where a park is a single entity, ownership and maintenance of the roads, servicing systems, snow clearance, garbage collection, landscaping, and other amenities and services will rest with the management of the park.
- 6.6.5 Sewer and water services may be provided either on a communal or individual basis in accordance with the requirements of the Ministry of the Environment. The provision of communal sewer and water services at the park will be contingent upon agreement for future municipal ownership and appropriate responsibility and operating agreements for such services.
- 6.6.6 Internal roads will be built to municipal standards.
- 6.6.7 All mobile home sites will have frontage on an internal road.
- 6.6.8 Where the park is a single entity, development will take place in accordance with a site plan approved by the municipality. Where the park is on a freehold basis, development will take place by plan of subdivision. A site plan agreement or a subdivision agreement as the case may be, will be required.
- 6.6.9 Lot area, density, site size, yard requirements, parking requirements and other such matters will be regulated through the implementing Zoning By-law.
- 6.6.10 A minimum of 5% of the total area of the park should be provided in a consolidated form for recreational purposes.
- 6.6.11 Generally mobile home parks should be located within a reasonable distance from existing communities.

6.7 Wrecking Yard

- 6.7.1 Wrecking yards will be located an adequate distance away from any existing or proposed residential, commercial, institutional or park uses. The actual separation distance may vary depending on topography, intervening land uses or natural buffering. Site specific distances will be established in the Zoning By-law.
- 6.7.2 The wrecking yard will be adequately screened on all sides either naturally or by artificial means so that no portion of the operation, including the storage area, is visible from a public road.
- 6.7.3 The wrecking yard will not cause or contribute to the pollution of any watercourse or designated Wetland.
- 6.7.4 An accessory dwelling for the owner of the wrecking yard will be permitted.
- 6.7.5 All wrecking yards will be licenced by the Municipality.
- 6.7.6 An amendment to the Official Plan and Zoning By-law will be required to establish a new wrecking yard. A new wrecking yard will only be considered in a Rural Land designation.

6.8 Airport

The Airport designation will permit a public or private airport which is used primarily for commercial or recreational purposes. Any related facilities which are normally incidental to the operation of an airport will also be permitted.

- 6.8.1 Site specific standards and uses for airports will be established in the Zoning By-law.
- 6.8.2 The Zoning By-law will also establish appropriate controls in the vicinity of the airport to restrict land use and provide limits on the height of buildings and structures in accordance with Ministry of Transport regulations.
- 6.8.3 The establishment of a new airport will require an amendment to this Plan.

6.9 Waste Disposal Site

- 6.9.1 Waste disposal sites will be located an adequate distance away from any Wetland or any existing or proposed residential, commercial, institutional or outdoor recreation uses. A report from a qualified professional which establishes appropriate separation distances based on site specific considerations will be required for new waste disposal sites.
- 6.9.2 All waste disposal sites will be located so that contamination of any water supply does not occur.

- 6.9.3 All waste disposal sites will be set back a sufficient distance from a public road so that all functions related to the operation of the site can be carried on within the site so that there is no unsightly appearance visible from the road.
- 6.9.4 All waste disposal sites will be located so that ingress and egress points do not create a traffic hazard.
- 6.9.5 All waste disposal sites no longer in use will be rehabilitated to the standards required by the Ministry of the Environment. No use will be made of land used as a waste disposal site within a period of twenty-five years from the year in which such land ceased to be used, without prior approval of the Ministry of the Environment.
- 6.9.6 All waste disposal sites will be operated and maintained in accordance with the standards set by the Ministry of the Environment.
- 6.9.7 The establishment of a new waste disposal site will require an amendment to the Official Plan and Zoning By-law.
- 6.9.8 Generally, no new development shall be permitted within 500 metres of the perimeter of a fill area of an open or closed waste disposal site. On the basis of site specific studies carried out by a qualified professional and in accordance with Ministry of the Environment Guideline D-4: Land Use on or Near Landfills and Dumps, this distance may be reduced in accordance with the recommendations of such studies without the need to amend this Plan.

6.10 Hauled Septage Disposal Site

- 6.10.1 Septage means waste removed from a cesspool, a septic tank system, a privy vault or privy pit, a chemical toilet or portable toilet.
- 6.10.2 The establishment of a hauled septage disposal site will require an amendment to the Official Plan and Zoning By-law. In considering any proposed amendment, Council will be guided by the following criteria:
 - (i) No sites will be permitted within 450 metres of a Community Development Area, 200 metres of any residential or institutional development including associated wells, within 30 metres of public roads, within 100 metres of surface waters such as lakes and rivers or within 150 metres of designated Wetlands. These distances may be varied depending on site specific conditions or septage application procedures;
 - (ii) All sites will be located a reasonable distance from existing or proposed commercial or other use requiring the installation of a well;
 - (iii) All sites will be located so that pollution of any watercourse or the groundwater does not occur;

- (iv) All sites will be adequately screened on all sides either naturally or by artificial means and such screening will apply to all open storage areas and disposal site operations;
- (v) All sites will be located so that ingress and egress points do not create a traffic hazard;
- (vi) Council will consult with the Ministry of the Environment for any such amendment.

6.10.3 All hauled septage disposal sites must be approved, operated and maintained in accordance with the requirements of the Ministry of the Environment.

SECTION 7

ROADS

A safe, convenient and functional road network is of great importance to the municipality. It is especially important to the residents for the delivery of municipal services such as road maintenance, snow plowing, school bus service, fire protection, police protection and garbage collection. It is therefore a policy of this Plan to work toward the maintenance and improvement of the road system within the financial capability of the Township and in cooperation with the County of Lanark and the Ministry of Transportation. The various types of roads in the municipality and the policies relating thereto are set out below.

7.1 Provincial Highways

Highways No. 7 and No. 15 in the Township of Beckwith are Special Controlled Access Highways. Highway No. 7B is classed as a Major Access. These highways are under provincial jurisdiction and subject to the Ministry of Transportation policies and regulations.

Entrances serving any home occupation, industry or business located adjacent to a provincial highway require approval of the Ministry of Transportation. Typically, the Ministry of Transportation will require that the property owner obtain an entrance permit and a sign permit if necessary. As a condition of these permits, the Ministry of Transportation requires the property owner to acknowledge that the use of their existing entrance cannot be converted to a commercial entrance in the future and that an additional entrance will not be permitted to accommodate the home occupation, industry of business. In addition, the Ministry of Transportation would not support a future severance that would result in a separate entrance to a business and one for the retained parcel.

7.2 County Roads

County Roads 10 and 17 presently serve the Township of Beckwith. County Road 10 traverses the southern part of the Township passing through the community of Franktown. County Road 17 presently runs between Lots 20 and 21, north from County Road No. 10.

Where development is proposed adjacent to a County road, permission for an entrance must be obtained by the County in accordance with the policies of this Plan.

7.3 Local Roads

The Township roads identified on Schedule 'A' are under municipal jurisdiction and are maintained year round. Direct access to these roads will only be permitted in locations which can accommodate traffic in a safe manner. Where sight deficiencies exist

because of curves or grades, no new access will be permitted unless the applicant corrects the deficiency in a manner acceptable to the municipality, at his own expense.

The Official Plan designates Township roads as either Primary Local Roads or Secondary Local Roads. The Primary Local Roads include the Ninth Line Road; the Seventh Line Road from Highway No. 15 to the westerly limit of the Township; the Tenth Line Road from Highway No. 15 to Mississippi Lake and Lake Park Road from Highway No. 7 to Mississippi Lake. The remainder of the Township roads are Secondary Local Roads.

New entrances will not be established unless a permit is issued by the municipality. Where the Township determines that a culvert is necessary, it will be installed by the Township at the owner's expense or by the owner under the supervision of the road superintendent.

The Township has prepared a road needs study and a roads plan. These documents will be used to establish priorities for road improvements. The schedule of road improvements will be a consideration in reviewing development applications.

7.4 Private Roads

Where a private road exists within the municipality, there is no legal obligation on the part of the municipality to maintain, repair or otherwise service any development located on that private road or right-of-way. If a private road is reconstructed by landowners to the standards of the Ministry of Transportation for subsidy purposes and the road allowance on which it is located is deeded to the municipality, the Council may assume the road by By-law if it abuts an existing public road which is currently maintained year round.

Prior to undertaking any such work, the landowners will obtain the approval of Council. The work will be supervised by the Township and will be to the standards determined by the Municipality.

7.5 Road Widenings

It is the intention of Council that all roads under the jurisdiction of the Township eventually be widened to the proposed right-of-way width of 20 m, using such mechanisms as subdivision approvals, consent approvals and site plan control approvals. The maximum dedication which may be required for a road widening as a condition of site plan approval shall be 5 m, or the amount necessary to provide the proposed right-of-way width, whichever is less. Country roads within the Township may eventually be widened to a right-of-way width of 30 metres.

SECTION 8

PROPERTY MAINTENANCE

- 8.1 In order to encourage the rehabilitation of existing buildings and property, the municipality will endeavour to ensure that the detracting influence of substandard structures is minimized. If so required, the municipality may pass a By-law which prescribes standards for the maintenance and occupancy of property (Maintenance and Occupancy By-law). Before adopting the By-law, Council will hold a public meeting to provide an opportunity for interested persons to have input.
- 8.2 Any Maintenance and Occupancy By-law passed under the authority of the Planning Act will have regard to and will prescribe appropriate standards for the physical condition of yards and passageways including the accumulation of debris and rubbish and the physical condition of all buildings and structures.
- 8.3 Any Maintenance and Occupancy By-law may also require substandard properties to be repaired and maintained to comply with the standards, prohibit the use of substandard property and require the demolition and clearing of such property where the owner does not intend to repair and maintain it. Any Maintenance and Occupancy By-law may also prescribe appropriate standards for the protection and maintenance of cultural heritage resources that have been:
- (a) designated under the Ontario Heritage Act;
 - (b) protected by an easement under the Ontario Heritage Act;
 - (c) identified by senior levels of government; or
 - (d) endorsed by Council as having cultural heritage value.
- 8.4 Following the passage of a Maintenance and Occupancy By-law, the municipality will appoint a Property Standards Officer who will be responsible for administering and enforcing the By-law. The municipality will also appoint a Property Standards Committee for the purpose of hearing appeals against an order of the Property Standards Officer.
- 8.5 The measures to be used generally in achieving a property maintenance program would include an education and public relations program to show people the benefits of continued property maintenance, together with information showing that improvements can be made without increasing assessment.
- 8.6 Complementary to the enforcement of minimum standards on private properties, the municipality will undertake to keep in a fit and well-maintained condition all municipally-owned properties and structures, and to provide or maintain in good repair such municipal services as roads, sidewalks and other such facilities.

SECTION 9
IMPLEMENTATION

9.1 Zoning By-law

The Township of Beckwith has an approved comprehensive Zoning By-law.

When this Official Plan is approved, Council will enact a new Zoning By-law to implement the provisions of this Official Plan.

Zoning is the principal means for implementing an Official Plan. As set out in Section 34 of the Planning Act, the Zoning By-law will regulate the use of land, the erection and use of buildings and structures, yard requirements, parking and loading space requirements and other such matters.

9.2 Site Plan Control By-law

Various land uses as set out in this Plan are proposed site plan control areas.

For these areas, Council may pass a Site Plan Control By-law pursuant to the Planning Act. Where a Site Plan Control By-law is in effect, the applicant will submit for approval such plans or drawings as required by Council. The applicant may also be required to enter into an agreement with the municipality to provide and maintain those facilities required on the site plan. Such agreements may be registered against the land to which it applies.

9.3 Building By-law

The Building Code Act has been adopted by By-law as the Building By-law for the Township of Beckwith.

9.4 Maintenance and Occupancy By-law

Council may pass a Maintenance and Occupancy By-law for prescribing the standards for the maintenance and occupancy of property and for prohibiting the use of such property that does not conform to the standards.

9.5 Other By-laws

By-laws passed by Council under the authority of the Municipal Act or any other Act may implement the policies of this Plan. For instance, By-laws dealing with the regulation of derelict motor vehicles, wrecking yards, pits and quarries, trailers or signs may be passed by Council where considered appropriate. Any such By-law must conform to this

Official Plan.

9.6 Subdivision of Land

Council will use subdivision and consent approval processes to ensure control over the subdivision of land. All plans of subdivision and consent applications must conform to the requirements of this Plan. As part of the approval process, certain requirements may be imposed as a condition to the approval of a plan of subdivision or a consent and the owner may be required to enter into an agreement with the municipality before final approval.

9.7 Construction of Public Works

Certain policies of this Plan will be implemented through the construction of public works. No public works will be undertaken that do not conform to the intent and purpose of the Official Plan.

9.8 Land Acquisition

The municipality may acquire and hold land within the municipality for the purpose of developing any feature of the Official Plan. The municipality may also sell, lease or otherwise dispose of such land when no longer required.

9.9 Amendments

Amendments may be made to the Official Plan when such changes are warranted. The provisions of the Planning Act with respect to Official Plans apply similarly to amendments including the approval of the Minister or the Ontario Municipal Board as the case may be. When amendments are made to the Official Plan, appropriate amendments will also be made to implementing By-laws so that any such By-law is in conformity with the Plan.

9.10 Committee of Adjustment and Land Division Committee

When a Zoning By-law is in effect, a Committee of Adjustment may be appointed to rule on applications for minor variance from the provisions of the Zoning By-law. In granting a variance, the Committee will be satisfied that such variance is minor, is desirable for the appropriate development or use of the land, building or structure and that the intent and purpose of the Official Plan and Zoning By-law are maintained.

In addition, the Committee of Adjustment has the power to permit an extension or enlargement for a building or structure which is a non-conforming use. The Committee will have regard for the policies of Section 4.14 of this Plan in reviewing such applications.

The Land Division Committee for the County of Lanark has the power to grant consents to sever land within Beckwith Township. The Land Division Committee will follow the policies governing consents as well as any other relevant policies in this Plan.

9.11 Review Procedure

- 1) Council shall, not less than every five years after the Official Plan comes into effect, undertake a review of the Official Plan, hold a separate meeting open to the public and revise the Plan, as required, in accordance with the Planning Act. The revisions shall ensure that the Official Plan conforms to provincial plans, has regard to matters of provincial interest, and is consistent with the policy statements issued under Section 3 of the Planning Act.

9.12 Procedural Guidelines

From time to time, Council may adopt procedural guidelines in order to assist Council, municipal staff and the public in effectively dealing with such matters as subdivisions, consents and site plan. These guidelines will not form a part of the Official Plan.

9.13 Public Notification

The Planning Act provides the statutory requirements for giving notice of planning matters. Council may establish additional requirements for notification which will be set out in the procedural guidelines. On a case by case basis, additional notification over and above the statutory requirements and the Council procedural requirements may be considered. For those amendments to the Official Plan and Zoning By-law which are of a housekeeping nature (for example, typographical, grammatical or dimensioning errors, rearranging format or renumbering, consolidations, etc.), Council may forego public notification. This will not apply to any changes which would affect the policies or intent of the Official Plan.

9.14 Strategy

The Official Plan is for the most part implemented as a result of development proposals. The role of Council is to review and evaluate such proposals in the context of the Official Plan. There are, however, certain initiatives that Council can take to implement certain goals of the Official Plan. Some of the initiatives that Council may undertake include applications under the PRIDE program, the completion of the Franktown plan, the preparation of a municipal housing statement and the formation of an economic development commission.

9.15 Provincial Policy Statement

Council is committed to updating this Official Plan in accordance with section 26(1) of

the Planning Act. The purpose is to reflect new local direction on development and to ensure this Plan is consistent with the Provincial Policy Statement (PPS). Until this Plan is updated, Council shall recognize that where conflicts may arise in interpretation of this Plan, the PPS takes precedent.

9.16 Community Improvement

- 1) As set out in Section 28 of the Planning Act, Council intends to use Community Improvement Policies to plan for and coordinate physical improvements to the quality of existing development, community facilities and public services.
- 2) The Township shall be considered a Community Improvement Area, focusing particularly on the Community Development Areas in this Plan.
- 3) The objectives in designating Community Improvement Project Areas and preparing Community Improvement Plans are to:
 - (a) upgrade physical services as well as social and recreational facilities;
 - (b) stimulate private property maintenance and reinvestment activity for unused or underused lands or buildings;
 - (c) facilitate the cleanup and redevelopment of environmentally contaminated properties;
 - (d) recognize and protect cultural heritage resources;
 - (e) enhance land use compatibility;
 - (f) promote energy efficiency standards for existing land uses;
 - (g) integrate improvement projects with other local programs and senior government initiatives;
 - (h) support the creation of affordable housing by considering any municipally-owned, undeclared surplus land for affordable housing before any other use is considered;
 - (i) support the implementation of measures that will assist in achieving sustainable development and sustainable living;
 - (j) support the recognition and protection of heritage buildings or areas; and
 - (k) where feasible, acquire lands or buildings to carry out improvement projects.
- 4) The designation of a Community Improvement Project Area, preparation of a Community Improvement Plan and provision of financial assistance in a

Community Improvement Plan shall be at the sole discretion of the Township.

9.17 Interim Control By-laws

- 1) As set out in Section 38 of the Planning Act, Council may pass Interim Control By-laws to prevent or limit the use of land, buildings or structures within designated areas of the Township until detailed planning studies for the area are completed and approved by the Municipality.
- 2) An Interim Control By-law shall initially be in effect for a period of up to one year from the date of its passing but may be extended for a maximum of one additional year.

9.18 Temporary Use By-laws

- 1) As set out in Section 39 of the Planning Act, Council may pass Temporary Use By-laws to permit the temporary use of land, buildings or structures for any purpose that is otherwise prohibited by the Zoning By-law.
- 2) In considering an application for a temporary use, Council shall be satisfied that:
 - (a) the proposed use:
 - i. shall be temporary in nature;
 - ii. shall be compatible with surrounding land uses;
 - iii. shall not have adverse effects on the future development of the area; and
 - (b) the amending By-law contains appropriate controls to regulate the temporary use.
- 3) A Temporary Use By-law may initially be authorized for a period of up to three years from the date of its passing, except in the case of garden suites, which may:
 - (a) be authorized for a period of up to twenty years; and
 - (b) be subject to an agreement between the owner of the garden suite and the Municipality in accordance with the Municipal Act.
- 4) A Temporary Use By-law may be extended by By-law for further periods of not more than three years each. Upon expiry of a Temporary Use By-law, the use authorized by the said By-law shall cease.

9.19 Consultation and Application Requirements

9.19.1 Pre-Consultation

- 1) The Township shall make staff available for pre-consultation for all development applications for which it is the approval authority, and will also be available for pre-consultation for subdivisions.
- 2) Township Council shall require that all applications for subdivision and consents receive pre-consultation approval from Planning Committee prior to submission to the County.

9.19.2 Development Applications: Required Information and Material

- 1) As per the Planning Act, Council or its designated approval authorities may require applicants to provide additional information or material to accompany the following development applications:
 - (a) Official Plan Amendments;
 - (b) Zoning By-Law Amendments;
 - (c) Applications for Plan of Subdivision or Condominium;
 - (d) Applications for Site Plan Control;
 - (e) Consent Applications; and
 - (f) Applications for Minor Variance.
- 2) In addition to the information and materials required under the Planning Act and any other legislation or regulation, as amended, the Township shall confirm which of the following must be provided by the applicant at the time of the pre-consultation regarding a development proposal for a planning approval listed in Section 9.19.2 (1) of this Plan:
 - (a) description of the applicant's interest in the land (owner, tenant, purchaser);
 - (b) identification of the registered landowner, if different from the applicant;
 - (c) the owner's authorization / consent to apply for Planning Approval, if the owner is not the applicant;
 - (d) identification of the agent for the applicant, if any, with written authorization from the applicant;
 - (e) identification of the applicant's planner, if any;

- (f) the owner's authorization / consent to use and disclose personal information and to allow site visits;
- (g) written confirmation of pre-consultation with Planning Committee for all subdivision and consent applications;
- (h) the Assessment Roll Number of the subject land(s);
- (i) the existing Official Plan designation and Zoning By-Law classification for the property;
- (j) description and sketch of any existing or proposed easements and/or rights-of-way;
- (k) description and/or sketch of existing uses, previous uses and a complete description (e.g. frontage and depth) of the subject lands;
- (l) description and/or sketch of the existing land uses adjacent to and within 500 metres of the subject lands;
- (m) description and/or sketch of the natural and artificial features on the subject lands and within 500 metres of the subject lands (e.g. buildings, railways, wells, roads, watercourses, drainage ditches, banks of rivers or streams, wetlands, wooded areas, etc.); and
- (n) any studies identified by the Township under Section 9.19.3 of this Plan.

9.19.3 Development Applications: Additional Studies and Assessments

- 1) In addition to the requirements of Section 9.19.2 of this Plan, additional information in the form of the studies or assessments listed in this Section may be required in order to consider a planning application complete.
- 2) The additional information will be required as part of a complete application in order to ensure that all relevant and required information pertaining to a planning application is available at the time of submission to enable Council and/or its designated approval authorities to make informed decisions within the prescribed time periods, and also ensure that the public and other stakeholders have access to all relevant information early in the planning process.
- 3) The number and scope of studies and assessments to be required for the submission of a complete application shall be in keeping with the scope and complexity of the application.

4) The additional information or material that may be required includes, but is not limited to, the studies and assessments listed below:

- i. Aggregate Studies / Impact Assessments;
- ii. Agricultural Soils Assessment / Impact Analysis;
- iii. Air Quality / Dust / Odour / Noise Study;
- iv. Archaeological Assessments;
- v. Compatibility Assessments;
- vi. Concept Plans;
- vii. Construction Management Plans;
- viii. Decommissioning Plans;
- ix. Dispute Resolution Protocol;
- x. Electromagnetic Interference Reports;
- xi. Emergency Management Plans;
- xii. Environmental Impact Assessments / Audits / Previous Land Use Inventories / Site-Specific Risk Assessments;
- xiii. Financial Impact Assessments / Analyses;
- xiv. First Nations Consultation;
- xv. Flood Plain Management / Slope Stability Reports;
- xvi. Forest Management Plans;
- xvii. Geotechnical Studies;
- xviii. Groundwater Nitrate Impact Assessment;
- xix. Heritage Impact Statements;
- xx. Hydrogeological Reports;
- xxi. Ice Throw Reports;
- xxii. Influence Area Studies;
- xxiii. Lake Capacity Assessments;
- xxiv. Landscaping Plans;
- xxv. Market Justification / Impact Assessments;
- xxvi. Micro-Climatic Impact Assessments;
- xxvii. Minimum Distance Separation Formulae;
- xxviii. Natural Heritage Evaluation / Impact Studies;
- xxix. Nutrient Management Plans;
- xxx. Parking and/or Loading Studies;
- xxxi. Planning Justification / Rationale;
- xxxii. Servicing Reports;
- xxxiii. Shadow Impact / Flicker Studies;
- xxxiv. Site Rehabilitation Plans;
- xxxv. Stormwater Management / Master Drainage Plans;
- xxxvi. Structural Engineering Analyses;
- xxxvii. Transportation / Traffic Impact / Access Analyses;
- xxxviii. Tree Inventory / Tree Preservation / Tree Protection Plans;
- xxxix. Urban Design Study/Guidelines; and
- xl. Visual Impact Studies.
- xli. Source Water Impact information, such as a Source Water Protection Checklist, and when required by the Risk Management Official (RMO) or Township, a Risk Management Plan, shall be provided prior to the application either being deemed complete, or approval being granted, respectively.

- 5) Notwithstanding the required studies and assessments listed above in Section 9.19.3 (4), Council may ask for any additional information that is considered reasonable and necessary in order to make a decision on a development application.
- 6) The Township may require any of the studies or assessments noted in Section 9.19.3 (4) to be peer reviewed on behalf of the Township at the proponent's expense.

9.20 Source Water Protection – Risk Management Official

Council shall appoint a Risk Management Official or maintain an enforcement transfer agreement with another body which has an appointed Risk Management Official (such as the Conservation Authority or Health Unit). A Risk Management Official is required to enforce the Source Protection Plan policies that invoke Part IV of the Clean Water Act. These policies either prohibit activities under Section 57 or require a Risk Management Plan (to reduce risks to drinking water sources) under Section 58.

SECTION 10

INTERPRETATION

- 10.1 It is intended that the boundaries of any areas shown on Schedule 'A' or Schedule 'B' be considered as approximate only, except where bounded by such features as existing roads, railways, rivers or other natural features. It will not be necessary to make amendments to the Official Plan for minor variations in the approximate boundaries provided that the intent of the Plan is preserved.
- 10.2 It is intended that all figures and quantities contained in the Plan be considered as approximate only. Amendments will not be required for any reasonable variation from these figures.
- 10.3 It is intended that buildings, structures and uses that are normally incidental, accessory and essential to a permitted use will also be allowed even though not specifically stated in the land use policies.
- 10.4 Any significant change from the policies contained herein will require an amendment to the Official Plan and implementing By-law. If a change is major, particularly if it will cause changes in the way in which an area is developing, then the Official Plan should be reviewed in whole.

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



APPENDIX C ON-SITE WATER WELL RECORDS

CERTIFICATE OF WELL COMPLIANCE

I, Jeremy Hanna (License T3632) 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

PROPERTY OF : 13126102 CANADA INC. (M Signature Homes)

(NO CIVIC) RICHMOND ROAD Franktown

LOCATED AT : _____

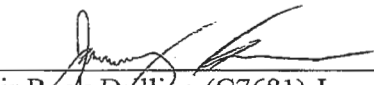
LOT # 18 CON # 3 PLAN # 27R-777 S/L # LOT 37

IN the Township of Beckwith -- in the County of Lanark.

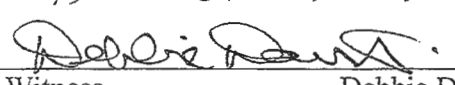
AND FURTHER that I am aware of the Well Drilling Requirements, Guidelines, And Regulations of the Ministry of the Environment, as they govern well installation in the Province of Ontario (Reg. 903)

AND DO HEREBY CERTIFIY THAT the said well has been drilled, cased, grouted to Regulation 903.

Signed this 9 TH day of MARCH, 2023



Air Rock Drilling (C7681) Jeremy Hanna



Witness

Debbie Davis

The Engineer 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
(Signature / Stamp)

2023106
A342325
TEST WELL 1 / 5

Measurements recorded in: Metric Imperial

Well Owner's Information

First Name _____ Last Name/Organization **M Signature Homes** E-mail Address _____ Well Constructed by Well Owner

Mailing Address (Street Number/Name) **193 Chemin du Marquis** Municipality **Luskville** Province **PQ** Postal Code **J0X 2G0** Telephone No. (inc. area code) _____

Well Location

Address of Well Location (Street Number/Name) **(No Civic) Richmond Road** Township **Beckwith** Lot **18** Concession **3**

County/District/Municipality **Lanark** City/Town/Village **Franktown** Province **Ontario** Postal Code _____

UTM Coordinates Zone **18** Easting **419878** Northing **4990793** Municipal Plan and Sublot Number **27R-777** Other **TW#1 of 5 Lot 37**

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 From (m)	Depth To (m)
Grey	Limestone			0'	100'
White	Sandstone	w/ Grey Limestone	Mix	100'	180'
White	Sandstone	w/ Grey Limestone	Mix	180'	220'
White	Sandstone	w/ Grey Limestone	Mix	220'	230'

* Owner: 13126102 CANADA INC
* Test well # 1 of 5 *

Annular Space

Depth Set at (m)	Type of Sealant Used (Material and Type)	Volume Placed (m³)
42' to 32'	Neat cement	10.92
32' to 0'	Bentonite slurry	4.20

Method of Construction: Air percussion, Cable Tool, Rotary (Conventional), Rotary (Reverse), Boring, Other, specify _____

Well Use: Domestic, Commercial, Municipal, Test Hole, Cooling & Air Conditioning, Not used, Dewatering, Monitoring, Livestock, Industrial, Other, specify _____

Construction Record - Casing

Inside Diameter (cm)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm)	Depth (m)	Status of Well
6 1/4"	Steel	188	+2' to 42'	<input checked="" type="checkbox"/> Water Supply, <input type="checkbox"/> Replacement Well, <input type="checkbox"/> Test Hole, <input type="checkbox"/> Recharge Well, <input type="checkbox"/> Dewatering Well, <input type="checkbox"/> Observation and/or Monitoring Hole, <input type="checkbox"/> Alteration (Construction), <input type="checkbox"/> Abandoned, <input type="checkbox"/> Insufficient Supply, <input type="checkbox"/> Abandoned, Poor Water Quality, <input type="checkbox"/> Abandoned, other, specify _____, <input type="checkbox"/> Other, specify _____
6"	Open Hole		42' to 230'	

Construction Record - Screen

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

Water Details

Water found at Depth (m)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Other, specify _____	Hole Diameter
180'		Depth (m) From _____ To _____ Diameter (cm) _____
220'		0' to 42' 9 3/4"
		42' to 230' 6"

Well Contractor and Well Technician Information

Business Name of Well Contractor **Air Rock Drilling Co. Ltd.** Well Contractor's Licence No. **7881**

Business Address (Street Number/Name) **6665 Franktown Road** Municipality **Richmond**

Province **ON** Postal Code **K0A 2Z0** Business E-mail Address **air-rock@sympatico.ca**

Bus. Telephone No. (inc. area code) **6138382170** Name of Well Technician (Last Name, First Name) **Hanna, Jeremy**

Well Technician's Licence No. **T3632** Signature of Technician and/or Contractor _____ Date **2023 Oct 4 30**

Results of Well Yield Testing

After test of well yield, water was: Clear and sand free, Other, specify **Not tested**

If pumping discontinued, give reason: _____

Pump intake set at (m) **220**

Pumping rate (l/min/GPM) **15**

Duration of pumping **1 hrs + 0 min**

Final water level end of pumping (m) **106.4"**

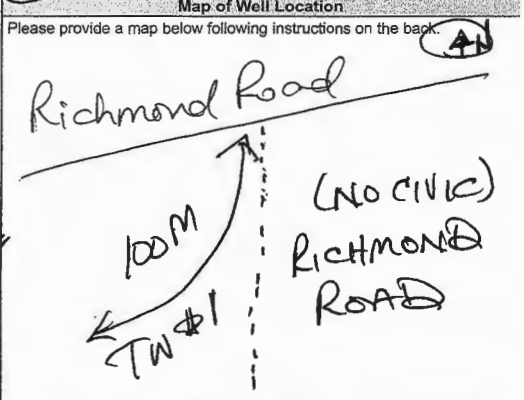
If flowing give rate (l/min/GPM) _____

Recommended pump depth (m) **140'**

Recommended pump rate (l/min/GPM) **10**

Well production (l/min/GPM) **15**

Disinfected? Yes No



Comments: **1/2 HR 10 GPM Set @ 140 ft**

Well owner's information package delivered Yes No

Date Package Delivered **2023 10 3 16**

Ministry Use Only: Audit No. **Z394559**

Received: **20230309**

CERTIFICATE OF WELL COMPLIANCE

I, Jeremy Hanna (License T3632) DO HEREBY CERTIFY, that I am licensed to drill water wells in the Province of Ontario, and that I have supervised the drilling of a well on

PROPERTY OF : 13126102 CANADA INC. (M Signature Homes)

(NO CIVIC) RICHMOND ROAD Franktown

LOCATED AT : _____


LOT # 18 CON # 3 PLAN # 27R-777 S/L # LOT 37

IN the Township of Beckwith – in the County of Lanark.


AND FURTHER that I am aware of the Well Drilling Requirements, Guidelines, And Regulations of the Ministry of the Environment, as they govern well installation in the Province of Ontario (Reg. 903)

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted to Regulation 903.

Signed this 9 TH day of MARCH, 2023



Air Rock Drilling (C7681) Jeremy Hanna



Witness Debbie Davis

The Engineer 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
(Signature / Stamp)

2023105
A342323
TEST WELL 2 /5

Measurements recorded in: Metric Imperial

A342323

Page _____ of _____

Well Owner's Information

First Name _____ Last Name/Organization **M Signature Homes** E-mail Address _____ Well Constructed by Well Owner

Mailing Address (Street Number/Name) **193 Chemin du Marquis** Municipality **Luskville** Province **PQ** Postal Code **J0X 2G0** Telephone No. (inc. area code) _____

Well Location

Address of Well Location (Street Number/Name) **(No Civic) Richmond Road** Township **Beckwith** Lot **18** Concession **3**

County/District/Municipality **Lanark** City/Town/Village **Franktown** Province **Ontario** Postal Code _____

UTM Coordinates Zone **18** Easting **420887** Northing **4990754** Municipal Plan and Sublot Number **27R-777 Tw# 2 & 5** Other **Lot 37**

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)
				From To
Grey	Limestone			0' 100'
White	Sandstone			100' 140'
White	Sandstone			140' 160'
Grey	Limestone	w/white Sandstone mix		160' 210'
Grey	Limestone	w/white Sandstone mix		210' 220'

Owner: 13126102 CANADA INC
 * Test well # 2 & 5 *

Annular Space

Depth Set at (m)	Type of Sealant Used (Material and Type)	Volume Placed (m ³)
42' - 32'	Neat cement	10.92
32' - 0'	Bentonite slurry	4.20

Results of Well Yield Testing

Pump intake set at (m)	Draw Down		Recovery	
	Time (min)	Water Level (m)	Time (min)	Water Level (m)
210	5'5"	102.4'		
15	1	89.4	1	88.4
	2	81.3	2	81.3
	3	76.8	3	76.8
	4	69.2	4	69.2
	5	66.1	5	66.1
	10	60.2	10	60.2
	15	58.3	15	58.3
	20	56.5	20	56.5
	25	55.8	25	55.8
	30	55.2	30	55.2
	40	54.6	40	54.6
	50	54.4	50	54.4
	60	54.2"	60	54.2"

Method of Construction

Cable Tool Diamond Public Commercial Not used

Rotary (Conventional) Jetting Domestic Municipal Dewatering

Rotary (Reverse) Driving Livestock Test Hole Monitoring

Boring Digging Irrigation Cooling & Air Conditioning

Air percussion Other, specify _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m)	Status of Well
			From To	
6 1/4"	Steel	.188	+2' 42'	<input checked="" type="checkbox"/> Water Supply
6"	Open Hole		42' 220'	<input type="checkbox"/> Replacement Well
				<input type="checkbox"/> Test Hole
				<input type="checkbox"/> Recharge Well
				<input type="checkbox"/> Dewatering Well
				<input type="checkbox"/> Observation and/or Monitoring Hole
				<input type="checkbox"/> Alteration (Construction)
				<input type="checkbox"/> Abandoned, Insufficient Supply
				<input type="checkbox"/> Abandoned, Poor Water Quality
				<input type="checkbox"/> Abandoned, other, specify _____
				<input type="checkbox"/> Other, specify _____

Construction Record - Screen

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

Water Details

Water found at Depth (m)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Other, specify _____	Hole Diameter
		Depth (m) From To Diameter (cm/in)
140		0' 42' 93/4"
210		42' 220' 6"

Well Contractor and Well Technician Information

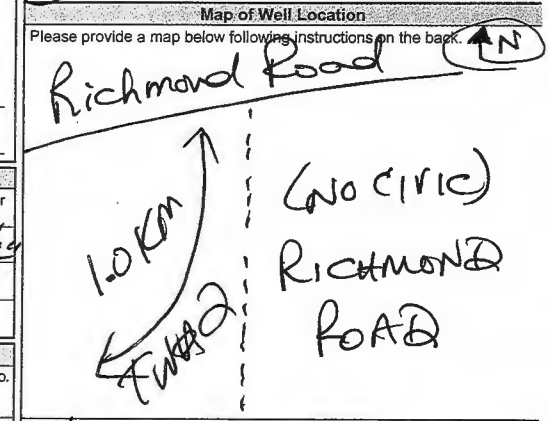
Business Name of Well Contractor **Air Rock Drilling Co. Ltd.** Well Contractor's Licence No. **C7681**

Business Address (Street Number/Name) **6659 Franktown Road** Municipality **Richmond**

Province **ON** Postal Code **K0A 2Z0** Business E-mail Address **air-rock@sympatico.ca**

Bus. Telephone No. (inc. area code) **8138382170** Name of Well Technician (Last Name, First Name) **Hanna, Jeremy**

Well Technician's Licence No. **T3632** Signature of Technician and/or Contractor *[Signature]* Date Submitted **2023 04 30**



Comments: **1/2 HR - 10 GPM @ 140 FT**

Well owner's information package delivered Yes No

Date Package Delivered **2023 03 09**

Ministry Use Only

Audit No. **Z394558**

Received _____

CERTIFICATE OF WELL COMPLIANCE

I, Jeremy Hanna (License T3632) DO HEREBY CERTIFY, that I am licensed to drill water wells in the Province of Ontario, and that I have supervised the drilling of a well on

PROPERTY OF : 13126102 CANADA INC. (M Signature Homes)

(NO CIVIC) RICHMOND ROAD Franktown

LOCATED AT : _____

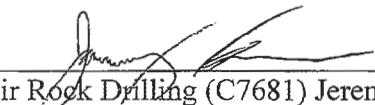
LOT # 18 CON # 3 PLAN # 27R-777 S/L # LOT 37

IN the Township of Beckwith -- in the County of Lanark.

AND FURTHER that I am aware of the Well Drilling Requirements, Guidelines, And Regulations of the Ministry of the Environment, as they govern well installation in the Province of Ontario (Reg. 903)

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted to Regulation 903.

Signed this 3 RD day of MARCH, 2023



Air Rock Drilling (C7681) Jeremy Hanna



Witness Debbie Davis

The Engineer 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
(Signature / Stamp)

2023102
A360955
TEST WELL 3 /5

Measurements recorded in: Metric Imperial

Page _____ of _____

Well Owner's Information

First Name _____ Last Name/Organization **M Signature Homes** E-mail Address _____ Well Constructed by Well Owner

Mailing Address (Street Number/Name) **193 Chemin du Marquis** Municipality **Luskville** Province **PQ** Postal Code **J0X 2G0** Telephone No. (inc. area code) _____

Well Location

Address of Well Location (Street Number/Name) **(No Civic) Richmond Road** Township **Beckwith** Lot **18** Concession **3**

County/District/Municipality **Lanark** City/Town/Village **Franktown** Province **Ontario** Postal Code _____

UTM Coordinates/Zone Easting Northing Municipal Plan and Sublot Number Other
NAD 83 **18 419671 4991112 27R-777 TW#3 & 5** **Lot 37**

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)
				From To
	Clay			0' 1'
Grey	Limestone			1' 33'
Grey	Sandstone			33' 72'
Grey	Sandstone			72' 114'
Grey	Sandstone			114' 120'

** Owner: 13126102 CANADA INC
* Test well # 3 of 5 **

Annular Space

Depth Set at (m)	Type of Sealant Used (Material and Type)	Volume Placed (m³/m)
From To		
42' 32'	Neat cement	10.92
32' 0'	Bentonite slurry	4.20

Results of Well Yield Testing

After test of well yield, water was:
 Clear and sand free
 Other, specify **Not tested**

If pumping discontinued, give reason: _____

Pump intake set at (m/ft) **110**

Pumping rate (l/min (GPM)) **15**

Duration of pumping **1** hrs + **0** min

Final water level and of pumping (m/ft) **18.9**

If flowing give rate (l/min/GPM) _____

Recommended pump depth (m/ft) **100'**

Recommended pump rate (l/min/GPM) **10**

Well production (l/min/GPM) **15**

Discontinued? Yes No

Time (min)	Draw Down		Recovery	
	Water Level (m/ft)	Time (min)	Water Level (m/ft)	Time (min)
Static Level	10'		18.9	
1	14	1	13	
2	15	2	12.6	
3	15.5	3	12.3	
4	15.9	4	12.1	
5	16.2	5	11.9	
10	17	10	11.4	
15	17.5	15	11.1	
20	17.8	20	10.9	
25	18	25	10.7	
30	18.2	30	10.6	
40	18.5	40	10.5	
50	18.7	50	10.4	
60	18.9	60	10.3	

Method of Construction

Cable Tool Rotary (Conventional) Rotary (Reverse) Boring Air percussion Other, specify _____

Diamond Jetting Driving Digging

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)		Status of Well
			From	To	
6 1/4"	Steel	.188	+2'	42'	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____
6"	Open Hole		42'	120'	

Construction Record - Screen

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

Water Details

Water found at Depth **72** (m/ft) Gas Fresh Untested Other, specify _____

Water found at Depth **114** (m/ft) Gas Fresh Untested Other, specify _____

Water found at Depth _____ (m/ft) Gas Fresh Untested Other, specify _____

Hole Diameter

Depth (m/ft)	Diameter (cm/in)	
	From	To
0' 42'	93/4"	
42' 120'	6"	

Well Contractor and Well Technician Information

Business Name of Well Contractor **Air Rock Drilling Co. Ltd.** Well Contractor's Licence No. **67681**

Business Address (Street Number/Name) **6650 Franktown Road** Municipality **Richmond**

Province **ON** Postal Code **R0A 2Z0** Business E-mail Address **air-rock@sympatico.ca**

Business Telephone No. (inc. area code) **8138382170** Name of Well Technician (Last Name, First Name) **Hanna, Jeremy**

Well Contractor's Licence No. **13652** Signature of Technician and/or Contractor _____ Date **2023 04 30**

Map of Well Location

Please provide a map below following instructions on the back.

Comments: **1/2 HR 10 GPM Set @ 100'**

Well owner's information package delivered Yes No **2023 03 06**

Date Package Delivered **2023 03 06**

Ministry Use Only
Audit No. **Z394556**
Received **2023 03 03**

CERTIFICATE OF WELL COMPLIANCE

I, Jeremy Hanna (License T3632) DO HEREBY CERTIFY, that I am licensed to drill water wells in the Province of Ontario, and that I have supervised the drilling of a well on

PROPERTY OF : 13126102 CANADA INC. (M Signature Homes)

(NO CIVIC) RICHMOND ROAD Franktown

LOCATED AT : _____

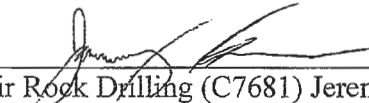
LOT # 18 CON # 3 PLAN # 27R-777 S/L # LOT 37

IN the Township of Beckwith -- in the County of Lanark.


AND FURTHER that I am aware of the Well Drilling Requirements, Guidelines, And Regulations of the Ministry of the Environment, as they govern well installation in the Province of Ontario (Reg. 903)

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted to Regulation 903.

Signed this 3 RD day of MARCH, 2023



Air Rock Drilling (C7681) Jeremy Hanna



Witness Debbie Davis

The Engineer 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
(Signature / Stamp)

2023103
A360956
TEST WELL 4 /5

Measurements recorded in: Metric Imperial

A360956

Page ___ of ___

Well Owner's Information

First Name _____ Last Name/Organization **M Signature Homes** E-mail Address _____ Well Constructed by Well Owner

Mailing Address (Street Number/Name) **193 Chemin du Marquis** Municipality **Luskville** Province **PQ** Postal Code **J0X 2G0** Telephone No. (inc. area code) _____

Well Location

Address of Well Location (Street Number/Name) **(No Civic) Richmond Road** Township **Beckwith** Lot **18** Concession **3**

County/District/Municipality **Lanark** City/Town/Village **Franktown** Province **Ontario** Postal Code _____

UTM Coordinates Zone **18** Easting **419848** Northing **4991063** Municipal Plan and Sublot Number **27R-777 TW# 4 & 5** Other **lot 37**

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)
Grey	Limestone			0' - 25'
Grey	Limestone	w/ Grey Sandstone mix		25' - 70'
Grey	Sandstone			70' - 165'
Grey	Sandstone			165' - 192'
Grey	Sandstone			192' - 200'

*Owner: 13126102 CANADA INC.
Test well # 4 & 5

Annular Space

Depth Set at (m)	Type of Sealant Used (Material and Type)	Volume Placed (m³)
42' - 32'	Neat cement	10.92
32' - 0'	Bentonite slurry	4.20

Results of Well Yield Testing

Draw Down Time (min)	Water Level (m)	Recovery Time (min)	Water Level (m)
1	13.1	1	30.8
2	17.7	2	24.5
3	21.3	3	20.1
4	24.2	4	16.8
5	28.7	5	14
10	33.8	10	8.4
15	36.8	15	6.8
20	38.3	20	6.4
25	39.5	25	6.3
30	40.2	30	6.3
40	41	40	6.3
50	41.8	50	6.3
60	42.1	60	6.3

After test of well yield, water was:
 Clear and sand free
 Other, specify **Not tested**

If pumping discontinued, give reason:

Pump intake set at (m) **190**

Pumping rate (l/min / GPM) **12**

Duration of pumping **1** hrs + **0** min

Final water level end of pumping (m) **42.1**

If flowing, give rate (l/min/GPM) _____

Recommended pump depth (m) **140'**

Recommended pump rate (l/min/GPM) **10**

Well production (l/min/GPM) **12**

Discontinued?
 Yes No

Method of Construction

Cable Tool Diamond Public Commercial Not used
 Rotary (Conventional) Jetting Domestic Municipal Dewatering
 Rotary (Reverse) Driving Livestock Test Hole Monitoring
 Boring Digging Irrigation Cooling & Air Conditioning
 Air percussion Industrial Other, specify _____

Construction Record - Casing

Inside Diameter (cm)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Well Thickness (cm)	Depth (m)	Status of Well
6 1/4"	Steel	.188"	+2' - 42'	<input checked="" type="checkbox"/> Water Supply
6"	Open Hole		42' - 200'	<input type="checkbox"/> Replacement Well

Construction Record - Screen

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

Water Details

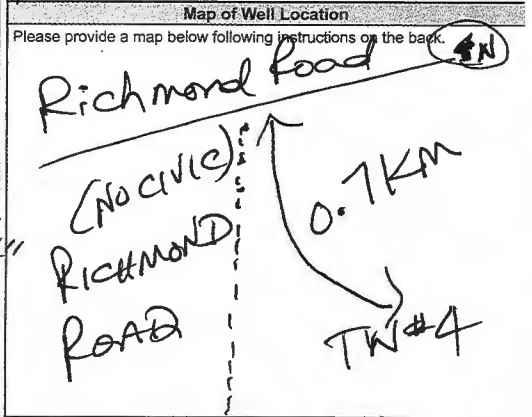
Water found at Depth (m)	Kind of Water	Hole Diameter (m)
185 (m)	<input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	0' - 42' 9 3/4"
192 (m)	<input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested	42' - 200' 6"

Well Contractor and Well Technician Information

Business Name of Well Contractor **Air Rock Drilling Co. Ltd.** Well Contractor's Licence No. **C7681**

Business Address (Street Number/Name) **6658 Franktown Road** Municipality **Richmond**

Province **ON** Postal Code **K0A 2Z0** Business E-mail Address **air-rock@sympatico.ca**



Bus. Telephone No. (inc. area code) **8138382170** Name of Well Technician (Last Name, First Name) **Hanna, Jeremy**

Well Technician's Licence No. **T3632** Signature of Technician and/or Contractor *[Signature]* Date Submitted **2023 04 30**

Comments: **1/2HP - 10 GPM Seal 140'**

Well owner's information package delivered Yes No

Date Package Delivered **2023 03 03**

Ministry Use Only
 Audit No. **Z394555**
 Received _____

CERTIFICATE OF WELL COMPLIANCE

I, Jeremy Hanna (License T3632) DO HEREBY CERTIFY, that I am licensed to drill water wells in the Province of Ontario, and that I have supervised the drilling of a well on

PROPERTY OF : 13126102 CANADA INC. (M Signature Homes)

(NO CIVIC) RICHMOND ROAD Franktown

LOCATED AT : _____

LOT # 18 CON # 3 PLAN # 27R-777 S/L # LOT 37

IN the Township of Beckwith – in the County of Lanark.

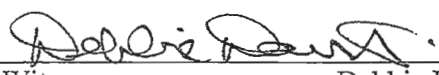
AND FURTHER that I am aware of the Well Drilling Requirements, Guidelines, And Regulations of the Ministry of the Environment, as they govern well installation in the Province of Ontario (Reg. 903)

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted to Regulation 903.

Signed this 6 TH day of MARCH, 2023



Air Rock Drilling (C7681) Jeremy Hanna



Witness

Debbie Davis

The Engineer 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
(Signature / Stamp)

2023104
A361125
TEST WELL 5 /5

Measurements recorded in: Metric Imperial

Page 1 of 1

A361125

Well Owner's Information

First Name: M Last Name/Organization: Signature Homes E-mail Address: _____ Well Constructed by Well Owner

Mailing Address (Street Number/Name): 193 Chemin du Marquis Municipality: Luskville Province: PQ Postal Code: J0X 2G0 Telephone No. (inc. area code): _____

Well Location

Address of Well Location (Street Number/Name): (No Civic) Richmond Road Township: Beckwith Lot: 18 Concession: 3

County/District/Municipality: Lanark City/Town/Village: Franktown Province: Ontario Postal Code: _____

UTM Coordinates: Zone: 18 Easting: 419596 Northing: 4991393 Municipal Plan and Sublot Number: 27R-777 TW# 505 Other: Lot 37

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)
	<u>Sand & Clay & Stone</u>			0' 2'
<u>Grey</u>	<u>Limestone</u>			2' 27'
<u>Grey</u>	<u>Limestone</u>	<u>w/gray Sandstone</u>	<u>Nix</u>	27' 81'
<u>Grey</u>	<u>Sandstone</u>			81' 222'
<u>Grey</u>	<u>Sandstone</u>			222' 232'

Owner: 13126102 CANADA INC
Test well # 505

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)
42' 32'	<u>Neat cement</u>	<u>10.92</u>
32' 0'	<u>Bentonite slurry</u>	<u>4.20</u>

Results of Well Yield Testing

Time (min)	Draw Down		Recovery	
	Water Level (m/ft)	Time (min)	Water Level (m/ft)	Time (min)
Static Level	<u>3' 9"</u>		<u>5.9"</u>	
1	<u>5.2</u>	1	<u>4.9</u>	
2	<u>5.3</u>	2	<u>4.7</u>	
3	<u>5.4</u>	3	<u>4.6</u>	
4	<u>5.4</u>	4	<u>4.5</u>	
5	<u>5.5</u>	5	<u>4.5</u>	
10	<u>5.6</u>	10	<u>4.3</u>	
15	<u>5.7</u>	15	<u>4.2</u>	
20	<u>5.8</u>	20	<u>4.1</u>	
25	<u>5.8</u>	25	<u>4.1</u>	
30	<u>5.9</u>	30	<u>4</u>	
40	<u>5.9</u>	40	<u>3.9</u>	
50	<u>5.9</u>	50	<u>3.9</u>	
60	<u>5.9"</u>	60	<u>3.9"</u>	

After test of well yield, water was:
 Clear and sand free
 Other, specify Not tested

If pumping discontinued, give reason: _____

Pump intake set at (m/ft): 222

Pumping rate (l/min / GPM): 20

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 5.9"

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

Recommended pump depth (m/ft): 140'

Recommended pump rate (l/min/GPM): 10

Well production (l/min/GPM): 20

Disinfected? Yes No

Method of Construction

<input type="checkbox"/> Cable Tool	<input type="checkbox"/> Diamond	<input type="checkbox"/> Public	<input type="checkbox"/> Commercial	<input type="checkbox"/> Not used
<input type="checkbox"/> Rotary (Conventional)	<input type="checkbox"/> Jetting	<input checked="" type="checkbox"/> Domestic	<input type="checkbox"/> Municipal	<input type="checkbox"/> Dewatering
<input type="checkbox"/> Rotary (Reverse)	<input type="checkbox"/> Driving	<input checked="" type="checkbox"/> Livestock	<input type="checkbox"/> Test Hole	<input type="checkbox"/> Monitoring
<input type="checkbox"/> Boring	<input type="checkbox"/> Digging	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Cooling & Air Conditioning	
<input checked="" type="checkbox"/> Air percussion		<input type="checkbox"/> Industrial		
<input type="checkbox"/> Other, specify _____		<input type="checkbox"/> 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)		Status of Well
			From	To	
<u>6 1/4"</u>	<u>Steel</u>	<u>.188"</u>	<u>+2'</u>	<u>42'</u>	<input checked="" type="checkbox"/> Water Supply <input type="checkbox"/> Replacement Well <input type="checkbox"/> Test Hole <input type="checkbox"/> Recharge Well <input type="checkbox"/> Dewatering Well <input type="checkbox"/> Observation and/or Monitoring Hole <input type="checkbox"/> Alteration (Construction) <input type="checkbox"/> Abandoned, Insufficient Supply <input type="checkbox"/> Abandoned, Poor Water Quality <input type="checkbox"/> Abandoned, other, specify _____ <input type="checkbox"/> Other, specify _____
<u>6"</u>	<u>Open Hole</u>		<u>42'</u>	<u>232'</u>	

Construction Record - Screen

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

Water Details

Water found at Depth (m/ft)	Kind of Water: <input type="checkbox"/> Fresh <input checked="" type="checkbox"/> Untested <input type="checkbox"/> Gas <input type="checkbox"/> Other, specify _____
<u>222</u>	

Hole Diameter

Depth (m/ft)	Diameter (cm/in)
<u>0' 42'</u>	<u>9 3/4"</u>
<u>42' 232'</u>	<u>6"</u>

Well Contractor and Well Technician Information

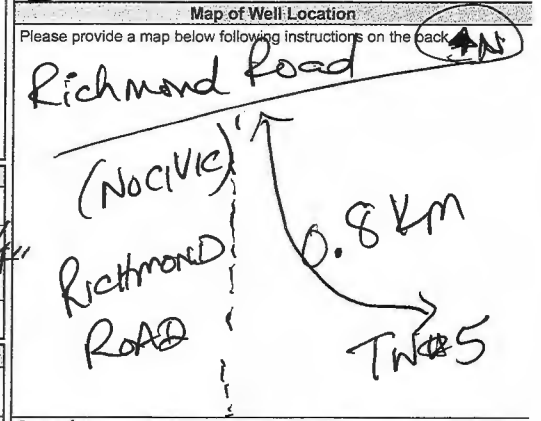
Business Name of Well Contractor: Air Rock Drilling Co. Ltd. Well Contractor's Licence No.: C7681

Business Address (Street Number/Name): 6550 Franktown Road Municipality: Richmond

Province: ON Postal Code: K0A 2Z0 Business E-mail Address: air-rock@sympatico.ca

Bus. Telephone No. (inc. area code): 8138382170 Name of Well Technician (Last Name, First Name): Hanna, Jeremy

Well Technician's Licence No.: T3632 Signature of Technician and/or Contractor: _____ Date Submitted: 2023 04 30



Comments: 1/244-106m Set @ 140'

Well owner's information package delivered: Yes No

Date Package Delivered: 2023 03 10

Ministry Use Only

Audit No.: 2394557

Received: _____

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



APPENDIX D

MECP WELL RECORDS SUMMARY



Ontario

WATER WELL RECORD

31/11

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11 3504164- 35.002 04

COUNTY OR DISTRICT: Frank TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Beckwith CON.: Con 4 LOT: 019

DATE COMPLETED: DAY 29 MO 09 YEAR 75

RC: 5 ELEVATION: 0420 BASIN CODE: 5 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
<u>grey</u>	<u>sandstone</u>			<u>0</u>	<u>35</u>

31 0035218

32

41 **WATER RECORD**

WATER FOUND AT - FEET: 0033

10-13	1 <input checked="" type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
15-18	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
20-23	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
25-28	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL
30-33	1 <input type="checkbox"/> FRESH 3 <input type="checkbox"/> SULPHUR 2 <input type="checkbox"/> SALTY 4 <input type="checkbox"/> MINERAL

51 **CASING & OPEN HOLE RECORD**

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
<u>10-11</u>	<u>1 <input checked="" type="checkbox"/> STEEL</u>			
<u>16</u>	<u>2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE</u>	<u>188</u>	<u>0</u>	<u>0025</u>
<u>17-18</u>	<u>1 <input type="checkbox"/> STEEL</u>			<u>20-23</u>
<u>24-25</u>	<u>1 <input type="checkbox"/> STEEL 2 <input type="checkbox"/> GALVANIZED 3 <input type="checkbox"/> CONCRETE 4 <input type="checkbox"/> OPEN HOLE</u>			<u>27-30</u>

SCREEN

SIZES: OF OPENING (SLOT NO.) 31-33

DIAMETER 34-38 INCHES

LENGTH 39-40 FEET

MATERIAL AND TYPE

DEPTH TO TOP OF SCREEN 41-44 FEET

61 **PLUGGING & SEALING RECORD**

DEPTH SET AT - FEET		MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
FROM	TO		
<u>10-13</u>	<u>14-17</u>		
<u>18-21</u>	<u>22-25</u>		
<u>26-29</u>	<u>30-33</u>		

71 **PUMPING TEST**

PUMPING TEST METHOD: 1 PUMP 2 BAILER

STATIC LEVEL: 002

WATER LEVEL END OF PUMPING: 025

WATER LEVELS DURING PUMPING:

15-18	<u>025</u>	20-24	<u>025</u>	25-29	<u>025</u>	30-34	<u>025</u>	35-37	<u>025</u>
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IF FLOWING, GIVE RATE: _____ GPM

PUMP INTAKE SET AT: _____ FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: 025 FEET

RECOMMENDED PUMPING RATE: 0005 GPM

1991 **LOCATION OF WELL**

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

DRILLERS REMARKS:

54 **FINAL STATUS OF WELL**

1 WATER SUPPLY
2 OBSERVATION WELL
3 TEST HOLE
4 RECHARGE WELL

5 ABANDONED, INSUFFICIENT CAPACITY
6 ABANDONED POOR QUALITY
7 UNFINISHED

55-56 **WATER USE**

1 DOMESTIC
2 STOCK
3 IRRIGATION
4 INDUSTRIAL
5 OTHER

5 COMMERCIAL
6 MUNICIPAL
7 PUBLIC SUPPLY
8 COOLING OR AIR CONDITIONING
9 NOT USED

57 **METHOD OF DRILLING**

1 CABLE TOOL
2 ROTARY (CONVENTIONAL)
3 ROTARY (REVERSE)
4 ROTARY (AIR)
5 AIR PERCUSSION

6 BORING
7 DIAMOND
8 JETTING
9 DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling LICENCE NUMBER: 3644

ADDRESS: Box 326, Richmond Ont.

NAME OF DRILLER OR BORER: Henry Mains LICENCE NUMBER: _____

SIGNATURE OF CONTRACTOR: _____ SUBMISSION DATE: DAY 6 NO 10 YEAR 75

OFFICE USE ONLY

DATA SOURCE: 1 CONTRACTOR: 3644 DATE RECEIVED: 150176

DATE OF INSPECTION: _____ INSPECTOR: MA

REMARKS: _____

P
WI

The Ontario Water Resources Act WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11

3508137

MUNICIPALITY: 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
CON. LOT: 25-27

COUNTY OR DISTRICT: [REDACTED] TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Beckwith
CON. BLOCK, TRACT, SURVEY ETC: 3 LOT: 19
DATE COMPLETED: 48-53
DAY: 8 MO: 10 YR: 87
ING: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
	Sandy clay + stones			0	10
grey	limestone			10	60
"	sands			60	85

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER					
10-13	1 <input checked="" type="checkbox"/> FRESH	2 <input type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	5 <input type="checkbox"/> GAS	6 <input type="checkbox"/> OTHER
15-18	1 <input type="checkbox"/> FRESH	2 <input type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	5 <input type="checkbox"/> GAS	6 <input type="checkbox"/> OTHER
20-23	1 <input type="checkbox"/> FRESH	2 <input type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	5 <input type="checkbox"/> GAS	6 <input type="checkbox"/> OTHER
25-28	1 <input type="checkbox"/> FRESH	2 <input type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	5 <input type="checkbox"/> GAS	6 <input type="checkbox"/> OTHER
30-33	1 <input type="checkbox"/> FRESH	2 <input type="checkbox"/> SALTY	3 <input type="checkbox"/> SULPHUR	4 <input type="checkbox"/> MINERALS	5 <input type="checkbox"/> GAS	6 <input type="checkbox"/> OTHER

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
10-11	1 <input checked="" type="checkbox"/> STEEL		FROM	TO
17-18	2 <input type="checkbox"/> GALVANIZED		0	27
24-25	3 <input type="checkbox"/> CONCRETE			
	4 <input type="checkbox"/> OPEN HOLE			
	5 <input type="checkbox"/> PLASTIC			

SCREEN

SIZE (S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
	31-33	34-38
		39-40

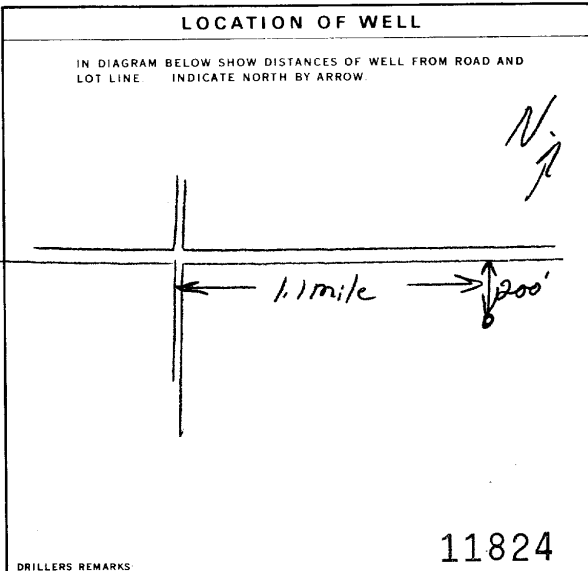
MATERIAL AND TYPE: _____ DEPTH TO TOP OF SCREEN: _____ FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)	
FROM	TO		
10-13	14-17	6	22 cement grout
18-21	22-25		
26-29	30-33	80	

71 PUMPING TEST

PUMPING TEST METHOD	PUMP RATE	DURATION OF PUMPING
1 <input checked="" type="checkbox"/> PUMP 2 <input type="checkbox"/> BAILEY	50 GPM	15-16 HOURS 17-18 MINS
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
4 FEET	50 FEET	15 MINUTES: 50 FEET
		30 MINUTES: 50 FEET
		45 MINUTES: 50 FEET
		60 MINUTES: 50 FEET



FINAL STATUS OF WELL

1 WATER SUPPLY 4 ABANDONED, INSUFFICIENT SUPPLY
2 OBSERVATION WELL 5 ABANDONED POOR QUALITY
3 TEST HOLE 6 UNFINISHED
4 RECHARGE WELL 7 DEWATERING

WATER USE

1 DOMESTIC 5 COMMERCIAL
2 STOCK 6 MUNICIPAL
3 IRRIGATION 7 PUBLIC SUPPLY
4 INDUSTRIAL 8 COOLING OR AIR CONDITIONING
9 OTHER

METHOD OF CONSTRUCTION

1 CABLE TOOL 6 BORING
2 ROTARY (CONVENTIONAL) 7 DIAMOND
3 ROTARY (REVERSE) 8 JETTING
4 ROTARY (AIR) 9 DRIVING
5 AIR PERCUSSION 10 DIGGING 11 OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: HiRock Drilling Co Ltd WELL CONTRACTOR'S LICENCE NUMBER: 1119
ADDRESS: RR 2 Jasper Ont
NAME OF WELL TECHNICIAN: Kenny Desautels WELL TECHNICIAN'S LICENCE NUMBER: 7004
SIGNATURE OF TECHNICIAN/CONTRACTOR: [Signature] SUBMISSION DATE: DAY 30 NO. 12 YR 87

OFFICE USE ONLY

DATA SOURCE: _____ CONTRACTOR: _____ DATE RECEIVED: JAN 08 1988
DATE OF INSPECTION: _____ INSPECTOR: _____
REMARKS: _____

CSS.ES

WATER WELL RECORD

3509690 35002 CON

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11 Plan 27R 3038 16 15 17 18 19 20 21 22 23 24

COUNTY OR DISTRICT: *Frank* TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: *Beckwith* CON. BLOCK, TRACT, SURVEY, ETC.: *Con 3* LOT: *17*

DATE COMPLETED: DAY *27* MO *9* YR *90*

ADDRESS: *2 Ontario Drive, Unit 108, Niagara Falls, ON*

ELEVATION: *174.7* RESIN CODE: *II*

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
<i>grey</i>	<i>sand</i>	<i>gravel</i>		<i>0</i>	<i>5</i>
<i>grey</i>	<i>limestone</i>			<i>5</i>	<i>70</i>
<i>white</i>	<i>sandstone</i>	<i>limestone layers</i>		<i>70</i>	<i>203</i>

31 32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER					
<i>198</i>	<input type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	
<i>85</i>	<input checked="" type="checkbox"/> FRESH	<input type="checkbox"/> SALTY	<input type="checkbox"/> SULPHUR	<input type="checkbox"/> MINERALS	<input type="checkbox"/> GAS	

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
<i>6.5</i>	<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC	<i>1.88</i>	<i>0</i>	<i>22</i>
<i>6</i>	<input type="checkbox"/> STEEL <input checked="" type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE <input type="checkbox"/> PLASTIC		<i>22</i>	<i>203</i>

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
<i>10-13</i>		
<i>18-21</i>	<i>cement grout</i>	

71 PUMPING TEST

PUMPING TEST METHOD: PUMPING BAILER

PUMPING RATE: *12* GPM

DURATION OF PUMPING: *1* HOUR *0* MIN

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING			
<i>10</i> FEET	<i>80</i> FEET	15 MINUTES: <i>80</i> FEET	30 MINUTES: <i>80</i> FEET	45 MINUTES: <i>80</i> FEET	60 MINUTES: <i>80</i> FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: *60* FEET

RECOMMENDED PUMPING RATE: *10* GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

68503

DRILLERS REMARKS

FINAL STATUS OF WELL

WATER SUPPLY ABANDONED, INSUFFICIENT SUPPLY

OBSERVATION WELL ABANDONED, POOR QUALITY

TEST HOLE UNFINISHED

RECHARGE WELL DEWATERING

WATER USE

DOMESTIC COMMERCIAL

STOCK MUNICIPAL

IRRIGATION PUBLIC SUPPLY

INDUSTRIAL COOLING OR AIR CONDITIONING

OTHER NOT USED

METHOD OF CONSTRUCTION

CABLE TOOL BORING

ROTARY (CONVENTIONAL) DIAMOND

ROTARY (REVERSE) JETTING

ROTARY (AIR) DRIVING

AIR PERCUSSION DIGGING OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: *D. Mains Well Drilling*

WELL CONTRACTOR'S LICENCE NUMBER: *3644*

ADDRESS: *Box 326, Richmond Ont*

NAME OF WELL TECHNICIAN: *[Signature]*

WELL TECHNICIAN'S LICENCE NUMBER: *[Blank]*

SIGNATURE OF TECHNICIAN/CONTRACTOR: *[Signature]*

SUBMISSION DATE: DAY *28* MO *9* YR *90*

OFFICE USE ONLY

DATA SOURCE: *3644*

CONTRACTOR: *3644*

DATE RECEIVED: *JAN 16 1991*

DATE OF INSPECTION: *[Blank]*

INSPECTOR: *[Blank]*

REMARKS: *[Blank]*

CSS.ES

WATER WELL RECORD

3510909

35002

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11

Don De Vries

CON. BLOCK, TRACT, SURVEY ETC. LOT 18

COUNTY OR DISTRICT: *16* TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: *Beckwith* CON. BLOCK, TRACT, SURVEY ETC.: *Windmill St.* LOT: *18*

DATE COMPLETED: DAY *10* MO *9* YR *93*

NO. OF WELL: *#2, Ashton KOA 1B0*

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
<i>grey</i>	<i>limestone</i>			<i>0</i>	<i>95</i>
<i>grey</i>	<i>sandstone</i>	<i>white layers</i>		<i>95</i>	<i>142</i>

31

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
<i>118</i>	<i>Not tested</i>
<i>138</i>	

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
<i>6 1/2</i>	<i>STEEL</i>	<i>.188</i>	<i>0 - 44</i>
<i>6</i>	<i>STEEL</i>		<i>44 - 142</i>

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER ETC.
<i>10-13</i>	<i>14-17</i>	<i>Cement grouted</i>

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
<i>1 Air</i>	<i>15</i>	<i>1</i>

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING
<i>35</i>	<i>100</i>	<i>39, 35, 35, 35</i>

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE INDICATE NORTH BY ARROW.

Rd #4, Richmond Rd.

30.2

71.2

Windmill St.

76782

FINAL STATUS OF WELL

WATER SUPPLY

WATER USE

DOMESTIC

METHOD OF CONSTRUCTION

CABLE TOOL

CONTRACTOR

NAME OF WELL CONTRACTOR: *H. Mains Well Drilling*

WELL CONTRACTOR'S LICENSE NUMBER: *3644*

ADDRESS: *Box 326, Richmond Ont*

WELL TECHNICIAN'S LICENSE NUMBER: *7-0004*

SIGNATURE OF TECHNICIAN/CONTRACTOR: *[Signature]*

SUBMISSION DATE: DAY *10* MO *9* YR *93*

OFFICE USE ONLY

DATE RECEIVED: **OCT 08 1993**

CONTRACTOR: **3644**

INSPECTOR: **CSS.ES**



WATER WELL RECORD

3162c

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

11 5801959

MUNICIPALITY 58.001 CON. CQIN 104

COUNTY OR DISTRICT: **Stormont** TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: **Cornwall** CON., BLOCK, TRACT, SURVEY, ETC.: **4. part 1.** LOT: **006**

DATE COMPLETED: **03** MO **Nov.** YR **77**

WELL NO. **90499** RC **4** ELEVATION **0200** RC **4** BASIN CODE **25**

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
Brown	Fill		Loose packed	0	2
Grey	Clay	Boulders	Hard packed	2	39
Grey	Rock Layers		Layered	39	41
Grey	Limestone Rock		Hard	41	203

31 00926017779 00392051373 004121274 02932151273

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
	1 FRESH	3 SULPHUR	2 SALTY	4 MINERAL
0-195	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15-18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20-23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25-28	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30-33	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

51 CASING & OPEN HOLE RECORD

WIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
06	<input checked="" type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE	.188	0	204
17-18	<input type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE			20-23
24-25	<input type="checkbox"/> STEEL <input type="checkbox"/> GALVANIZED <input type="checkbox"/> CONCRETE <input type="checkbox"/> OPEN HOLE			27-30

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE	CEMENT GROUT LEAD PACKER, ETC.
10-13		
18-21		
26-29		

71 PUMPING TEST

PUMPING TEST METHOD: PUMP BAILER

PUMPING RATE: **0010** GPM

DURATION OF PUMPING: **0** HOURS **00** MINS

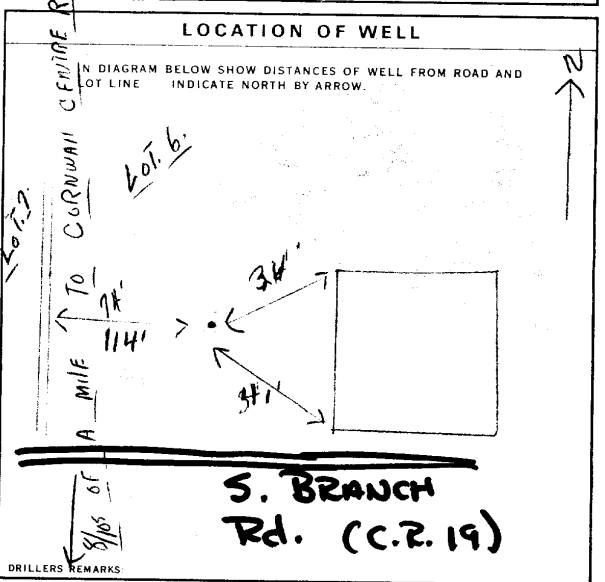
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING				
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES	
014 FEET	200 FEET	200 FEET	200 FEET	200 FEET	200 FEET	200 FEET

RECOMMENDED PUMP TYPE: SHALLOW DEEP

RECOMMENDED PUMP SETTING: **200** FEET

RECOMMENDED PUMPING RATE: **0001** GPM

submersible



81 FINAL STATUS OF WELL: WATER SUPPLY

82 WATER USE: **02** DOMESTIC

83 METHOD OF DRILLING: **4** ROTARY (CONVENTIONAL)

CONTRACTOR: **Ramon H. Casselman** LICENCE NUMBER: **1505**

ADDRESS: **Williamsburg, Ontario**

NAME OF DRILLER OR BORER: **Dalton Gow** LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: *Ramon H. Casselman* SUBMISSION DATE: DAY **3** MO **Nov.** YR **77**

OFFICE USE ONLY

DATA SOURCE: **1** CONTRACTOR: **1505** DATE RECEIVED: **080378**

DATE OF INSPECTION: **1505** INSPECTOR: *[Signature]*

REMARKS:

The Ontario Water Resources Act WATER WELL RECORD

3510909

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK CORRECT BOX WHERE APPLICABLE

COUNTY OR DISTRICT: Parade TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Beckwith CON. BLOCK, TRACT, SURVEY, ETC.: Windmill St 3 LOT: 25-27
 OWNER (NAME FIRST): [REDACTED] ADDRESS: RR#2, Ashton KOA 1B0 DATE COMPLETED: DAY 10 MO 9 YR 93

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
grey	limestone			0	95
grey	sandstone	white layers		95	142

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
118	1 FRESH 3 SULPHUR 4 MINERALS 6 GAS
138	1 FRESH 3 SULPHUR 4 MINERALS 6 GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET
6 1/4	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC	1.88	0 44
6	1 STEEL 2 GALVANIZED 3 CONCRETE 4 OPEN HOLE 5 PLASTIC		44 142

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
10-13	14-17 cement grout
18-21	22-25 cement grout

71 PUMPING TEST

PUMPING TEST METHOD: AIR BAILER
 PUMPING RATE: 15 GPM DURATION OF PUMPING: 1 HOURS 0 MIN
 WATER LEVELS DURING PUMPING:
 15 MINUTES: 39 FEET 30 MINUTES: 35 FEET 45 MINUTES: 35 FEET 60 MINUTES: 35 FEET
 RECOMMENDED PUMP TYPE: SHALLOW DEEP
 RECOMMENDED PUMP SETTING: 100 FEET RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE INDICATE NORTH BY ARROW.

76782

Drillers Remarks: Rd #4, Richmond Rd.
32m ↓ Windmill St.
 ← 21.2

FINAL STATUS OF WELL

1 WATER SUPPLY 8 ABANDONED, INSUFFICIENT SUPPLY
 2 OBSERVATION WELL 9 ABANDONED POOR QUALITY
 3 TEST HOLE 10 UNFINISHED
 4 RECHARGE WELL 11 DEWATERING

WATER USE

1 DOMESTIC 5 COMMERCIAL
 2 STOCK 6 MUNICIPAL
 3 IRRIGATION 7 PUBLIC SUPPLY
 4 INDUSTRIAL 8 COOLING OR AIR CONDITIONING
 OTHER NOT USED

METHOD OF CONSTRUCTION

1 CABLE TOOL 6 BORING
 2 ROTARY (CONVENTIONAL) 7 DIAMOND
 3 ROTARY (REVERSE) 8 JETTING
 4 ROTARY (AIR) 9 DRIVING
 AIR PERCUSSION DIGGING OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: H. Mains Well Drilling WELL CONTRACTOR'S LICENSE NUMBER: 3644
 ADDRESS: Box 326, Richmond Ont
 NAME OF WELL TECHNICIAN: [Signature] WELL TECHNICIAN'S LICENSE NUMBER: 7-0064
 SIGNATURE OF TECHNICIAN/CONTRACTOR: [Signature] SUBMISSION DATE: DAY 10 MO 9 YR 93

OFFICE USE ONLY

DATE SOURCE: 3644 CONTRACTOR: 3644 DATE RECEIVED: OCT 08 1993
 DATE OF INSPECTION: _____ INSPECTOR: _____
 REMARKS: _____

CSS.ES
FORM NO. 0506 (11/86) FORM 9

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



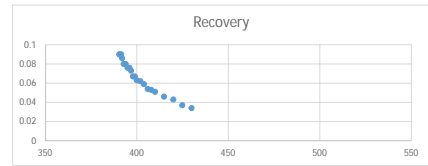
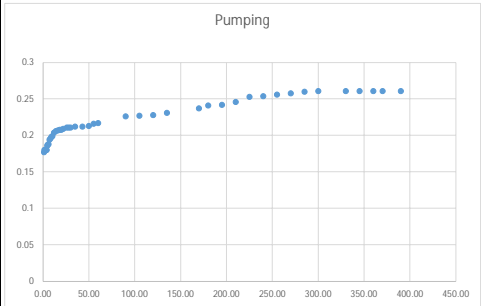
APPENDIX E

WATER LEVEL DATA AND PUMPING TEST ANALYSES

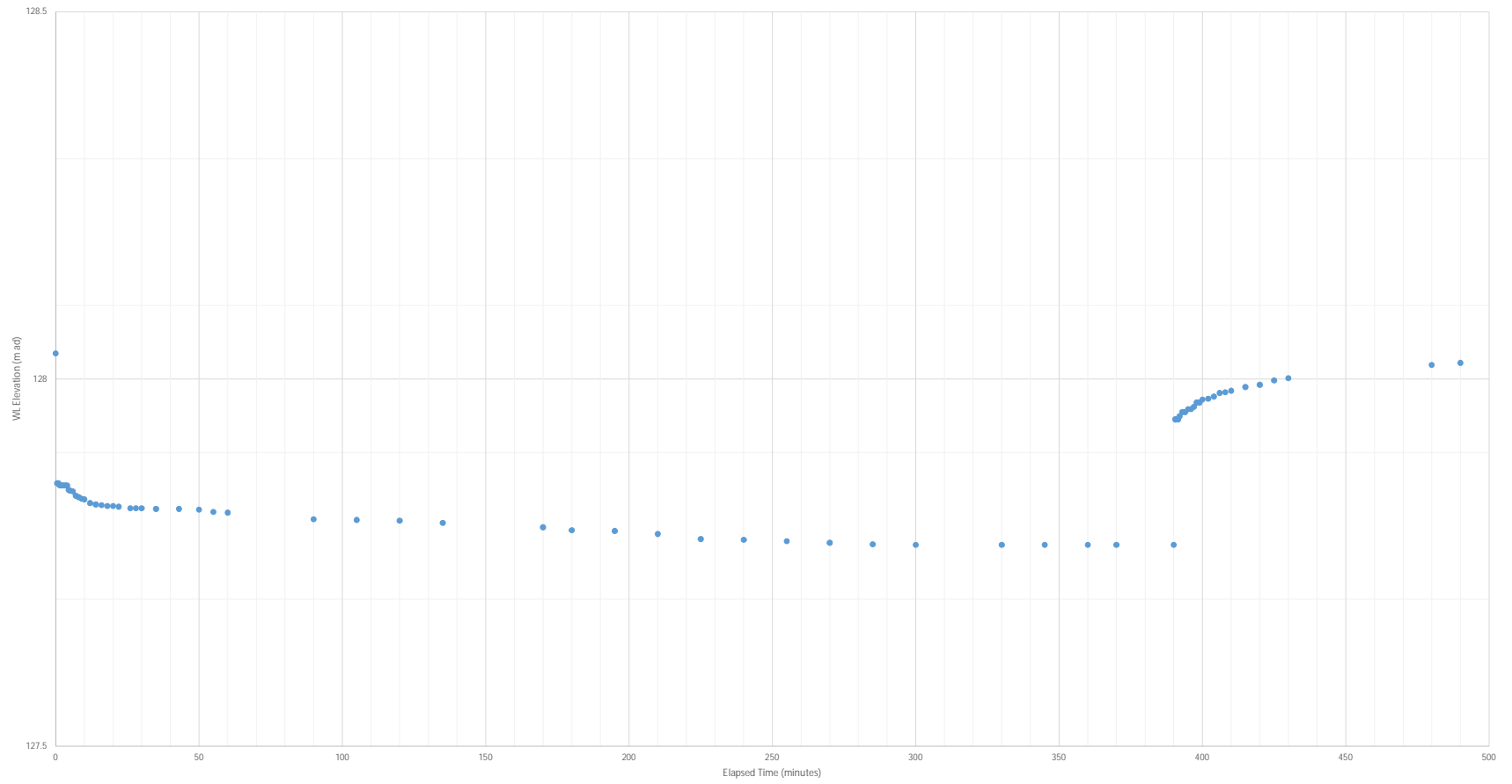
Summary of Water Level Data
Pumping Test - TW1, June 15, 2023

TOC Elevation (assumed) 132.73 m AD (Above Datum)
 Static Water Level 4.695 m BTOC
 Static Water Level 128.035 m AD (Above Datum)
 95% Recovery 4.7085 m BTOC
 128.02195 m AD (Above Datum)
 Well depth 230
 Pump Depth 64 m BTOC 210

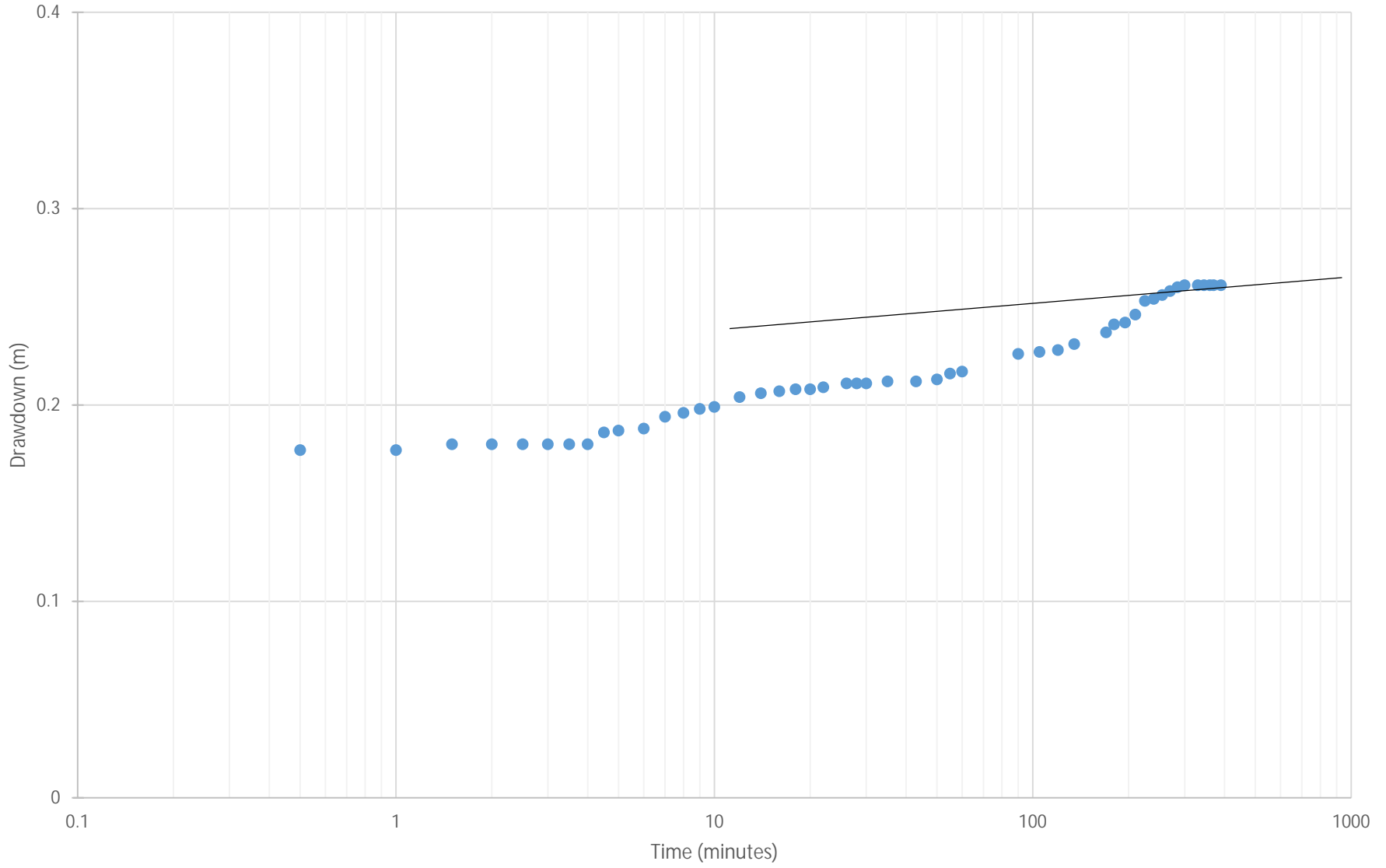
Elapsed Time (minutes)	Water Level (m BTOC)	Elapsed Time after pump shut off (min)	T/t'	Water Level (m Datum)	Drawdown (m)	Water Column Remaining (m)	% Utilization	Notes
0	4.695			128.035	0	59.305	0.0%	Pumping rate at 10 GPM
0.50	4.872			127.858	0.177	59.128	0.3%	
1.00	4.872			127.858	0.177	59.128	0.3%	
1.50	4.875			127.855	0.18	59.125	0.3%	
2.00	4.875			127.855	0.18	59.125	0.3%	
2.50	4.875			127.855	0.18	59.125	0.3%	
3.00	4.875			127.855	0.18	59.125	0.3%	
3.50	4.875			127.855	0.18	59.125	0.3%	
4.00	4.875			127.855	0.18	59.125	0.3%	
4.50	4.881			127.849	0.186	59.119	0.3%	
5.00	4.882			127.848	0.187	59.118	0.3%	
6.00	4.883			127.847	0.188	59.117	0.3%	
7.00	4.889			127.841	0.194	59.111	0.3%	
8.00	4.891			127.839	0.196	59.109	0.3%	
9.00	4.893			127.837	0.198	59.107	0.3%	
10.00	4.894			127.836	0.199	59.106	0.3%	
12.00	4.899			127.831	0.204	59.101	0.3%	
14.00	4.901			127.829	0.206	59.099	0.3%	
16.00	4.902			127.828	0.207	59.098	0.3%	
18.00	4.903			127.827	0.208	59.097	0.3%	
20.00	4.903			127.827	0.208	59.097	0.3%	
22.00	4.904			127.826	0.209	59.096	0.3%	
26.00	4.906			127.824	0.211	59.094	0.3%	
28.00	4.906			127.824	0.211	59.094	0.3%	
30.00	4.906			127.824	0.211	59.094	0.3%	
35.00	4.907			127.823	0.212	59.093	0.3%	
43.00	4.907			127.823	0.212	59.093	0.3%	
50.00	4.908			127.822	0.213	59.092	0.3%	
55.00	4.911			127.819	0.216	59.089	0.3%	
60.00	4.912			127.818	0.217	59.088	0.3%	
90.00	4.921			127.809	0.226	59.079	0.3%	
105.00	4.922			127.808	0.227	59.078	0.3%	
120.00	4.923			127.807	0.228	59.077	0.3%	
135.00	4.926			127.804	0.231	59.074	0.3%	
170.00	4.932			127.798	0.237	59.068	0.3%	
180.00	4.936			127.794	0.241	59.064	0.3%	
195.00	4.937			127.793	0.242	59.063	0.3%	
210.00	4.941			127.789	0.246	59.059	0.4%	
225.00	4.948			127.782	0.253	59.052	0.4%	
240.00	4.949			127.781	0.254	59.051	0.4%	
255.00	4.951			127.779	0.256	59.049	0.4%	
270.00	4.953			127.777	0.258	59.047	0.4%	
285.00	4.955			127.775	0.26	59.045	0.4%	
300.00	4.956			127.774	0.261	59.044	0.4%	
330.00	4.956			127.774	0.261	59.044	0.4%	
345.00	4.956			127.774	0.261	59.044	0.4%	
360.00	4.956			127.774	0.261	59.044	0.4%	
370.00	4.956			127.774	0.261	59.044	0.4%	
380.00	4.956			127.774	0.261	59.044	0.4%	
390.5	4.785	0.5	781.000	127.945	0.09	59.215	0.1%	
390.75	4.785	0.75	521.000	127.945	0.09	59.215	0.1%	
391.5	4.785	1.5	261.000	127.945	0.09	59.215	0.1%	
392	4.781	2	196.000	127.949	0.086	59.219	0.1%	
393	4.775	3	131.000	127.955	0.08	59.225	0.1%	
394	4.775	4	98.500	127.955	0.08	59.225	0.1%	
395	4.771	5	79.000	127.959	0.076	59.229	0.1%	
396	4.771	6	66.000	127.959	0.076	59.229	0.1%	
397	4.768	7	56.714	127.962	0.073	59.232	0.1%	
398	4.762	8	49.750	127.968	0.067	59.238	0.1%	
399	4.762	9	44.333	127.968	0.067	59.238	0.1%	
400	4.758	10	40.000	127.972	0.063	59.242	0.1%	
402	4.757	12	33.500	127.973	0.062	59.243	0.1%	
404	4.754	14	28.857	127.976	0.059	59.246	0.1%	
406	4.749	16	25.375	127.981	0.054	59.251	0.1%	
408	4.748	18	22.667	127.982	0.053	59.252	0.1%	
410	4.746	20	20.500	127.984	0.051	59.254	0.1%	
415	4.741	25	16.600	127.989	0.046	59.259	0.1%	
420	4.738	30	14.000	127.992	0.043	59.262	0.1%	
425	4.732	35	12.143	127.998	0.037	59.268	0.1%	
430	4.729	40	10.750	128.001	0.034	59.271	0.0%	
480	4.711	90	5.333	128.019	0.016	59.289	0.0%	
490	4.708	100	4.900	128.022	0.013	59.292	0.0%	



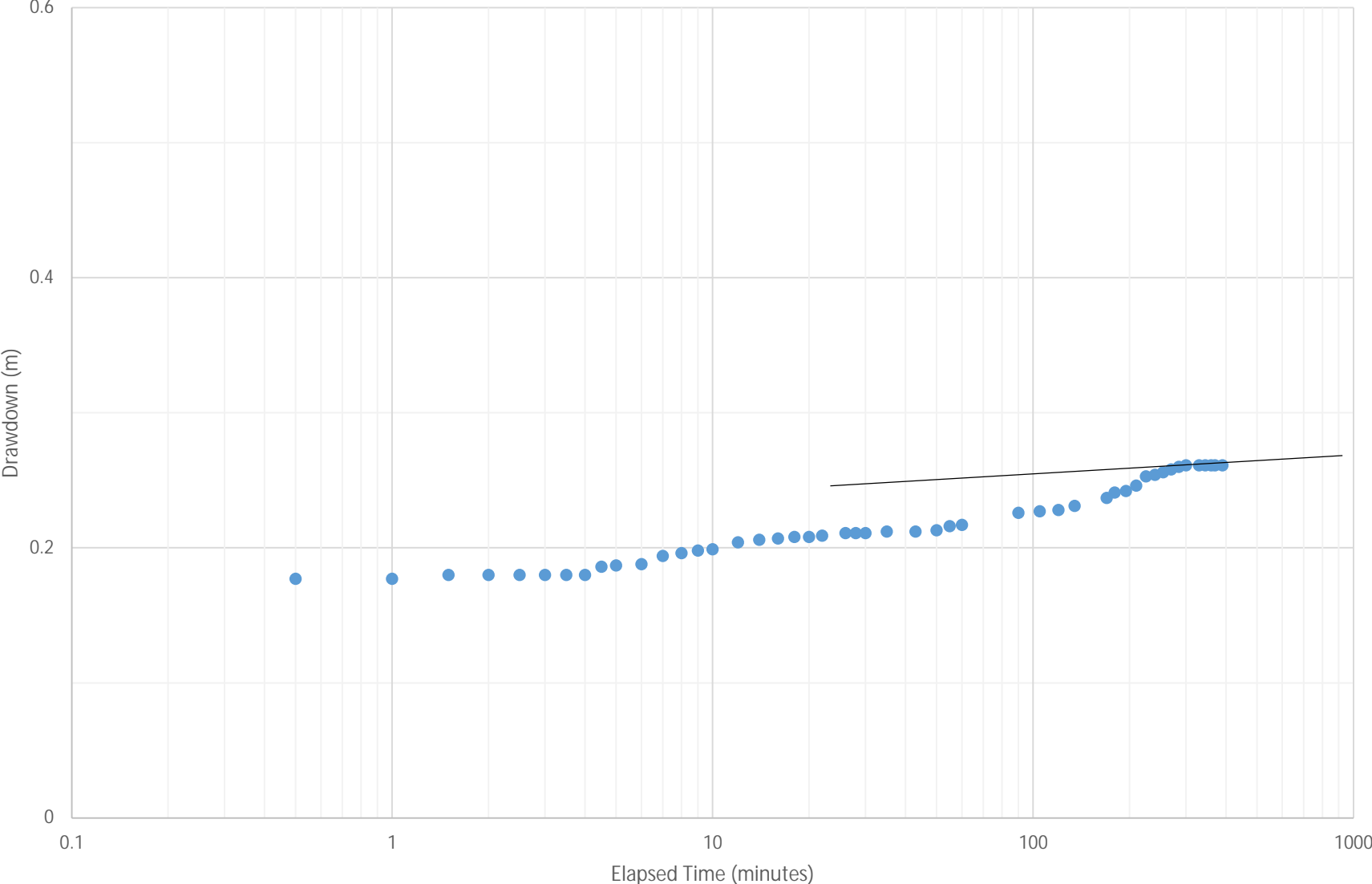
Water Level Elevation vs Time
Pumping Test (Drawdown and Recovery, TW1)



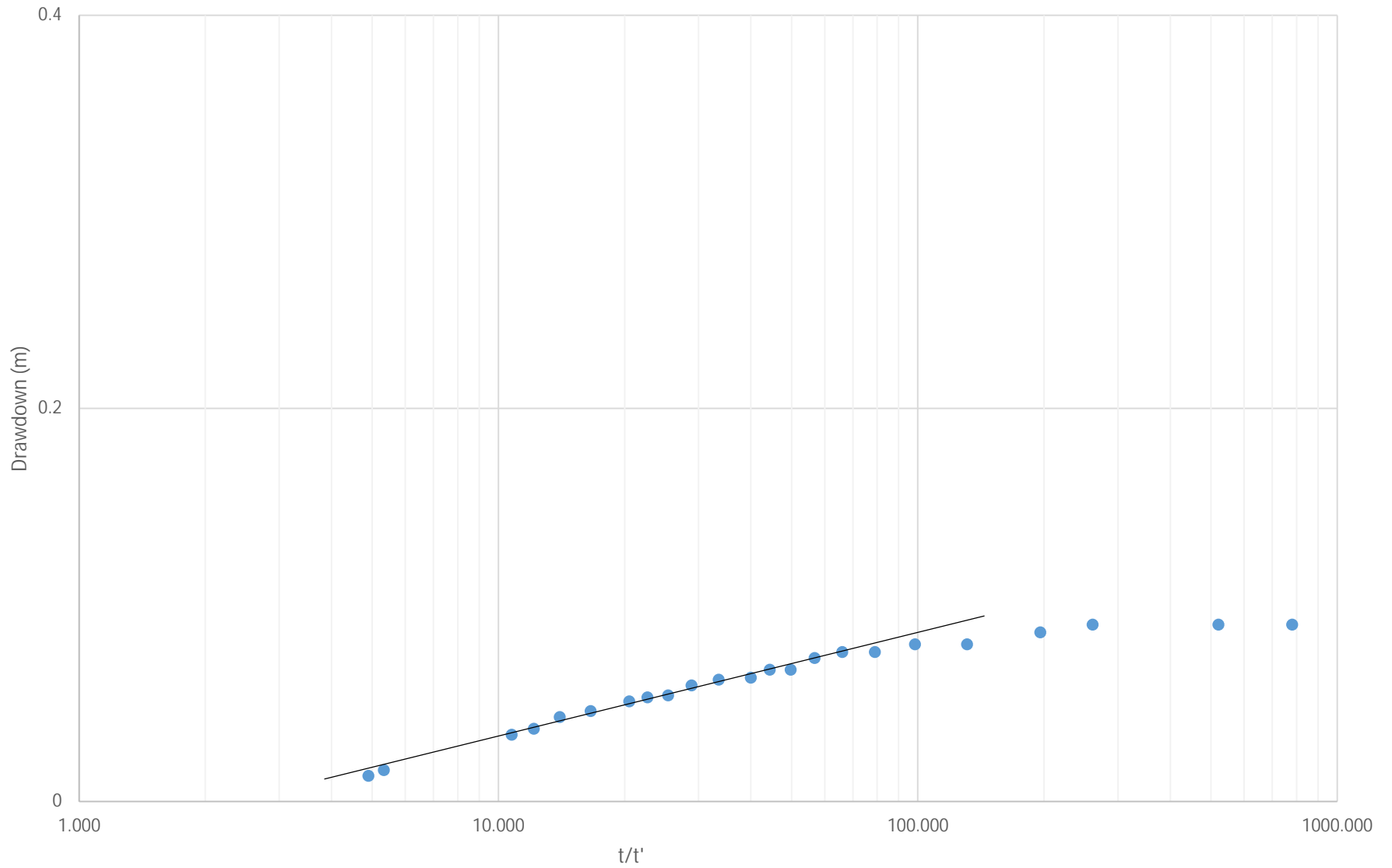
Drawdown vs Log Time
Pumping Test (Drawdown), June 15, 2023
TW1 - Santaguida Subdivision



Drawdown vs Log Time
Pumping Test (Long-Term), June 15, 2023
TW1 - Santaguida Subdivision



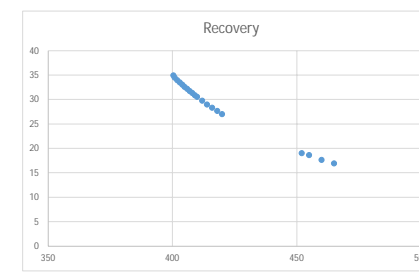
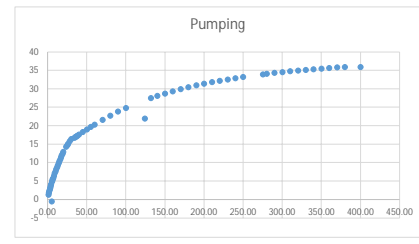
Drawdown vs Log Time
Pumping Test (Recovery), June 15, 2023
TW1 - Santaguida Subdivision



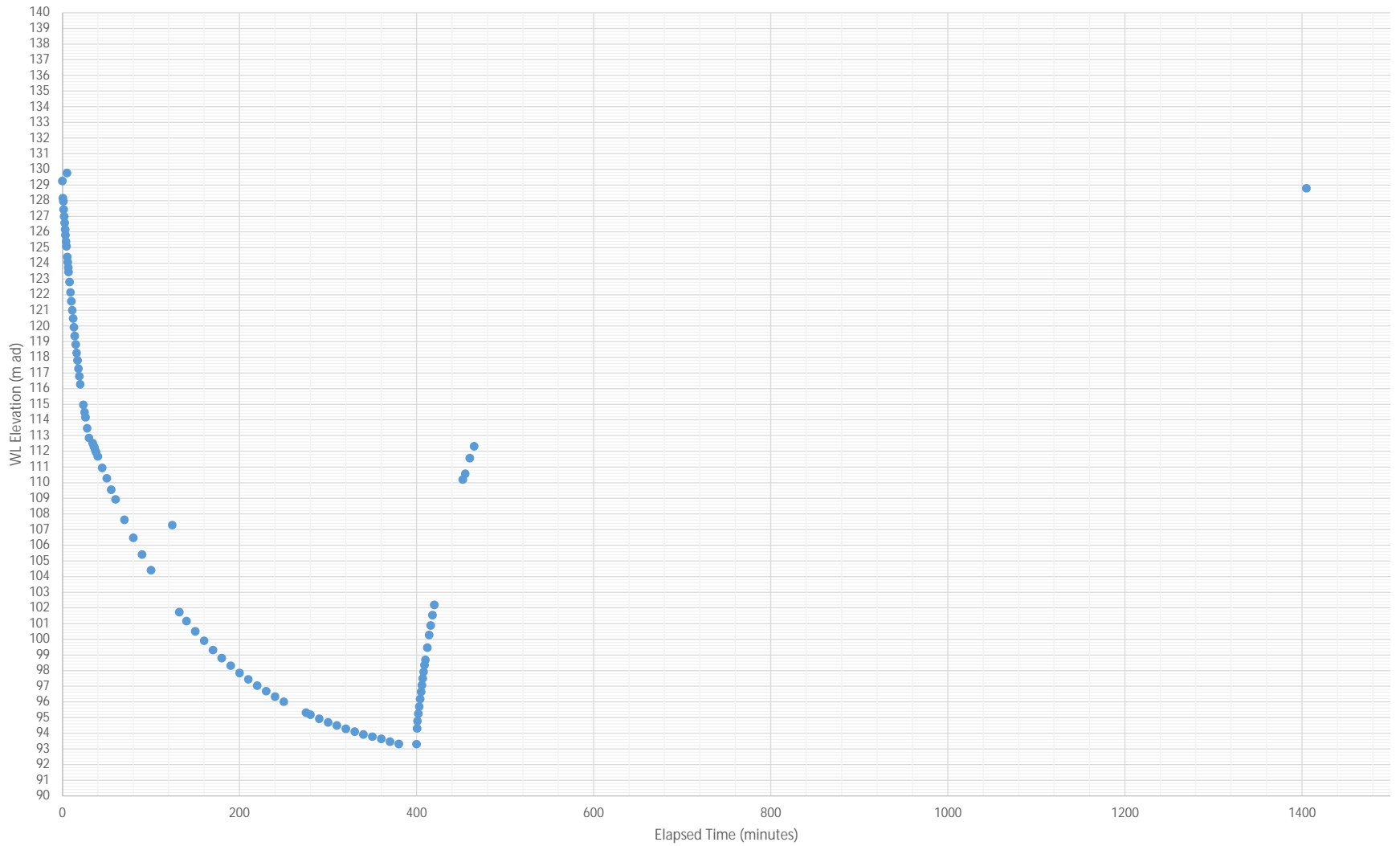
Summary of Water Level Data
Pumping Test - TW2, June 14, 2023

TOC Elevation (assumed) 131.28 m AD (Above Datum)
 Static Water Level 2.031 m BTOC
 Static Water Elevation 129.249 m AD (Above Datum)
 95% Recovery 3.828 m BTOC
 Well depth 127.452 m AD (Above Datum) 230
 Pump Depth 70 m BTOC 210
 64 m BTOC 210

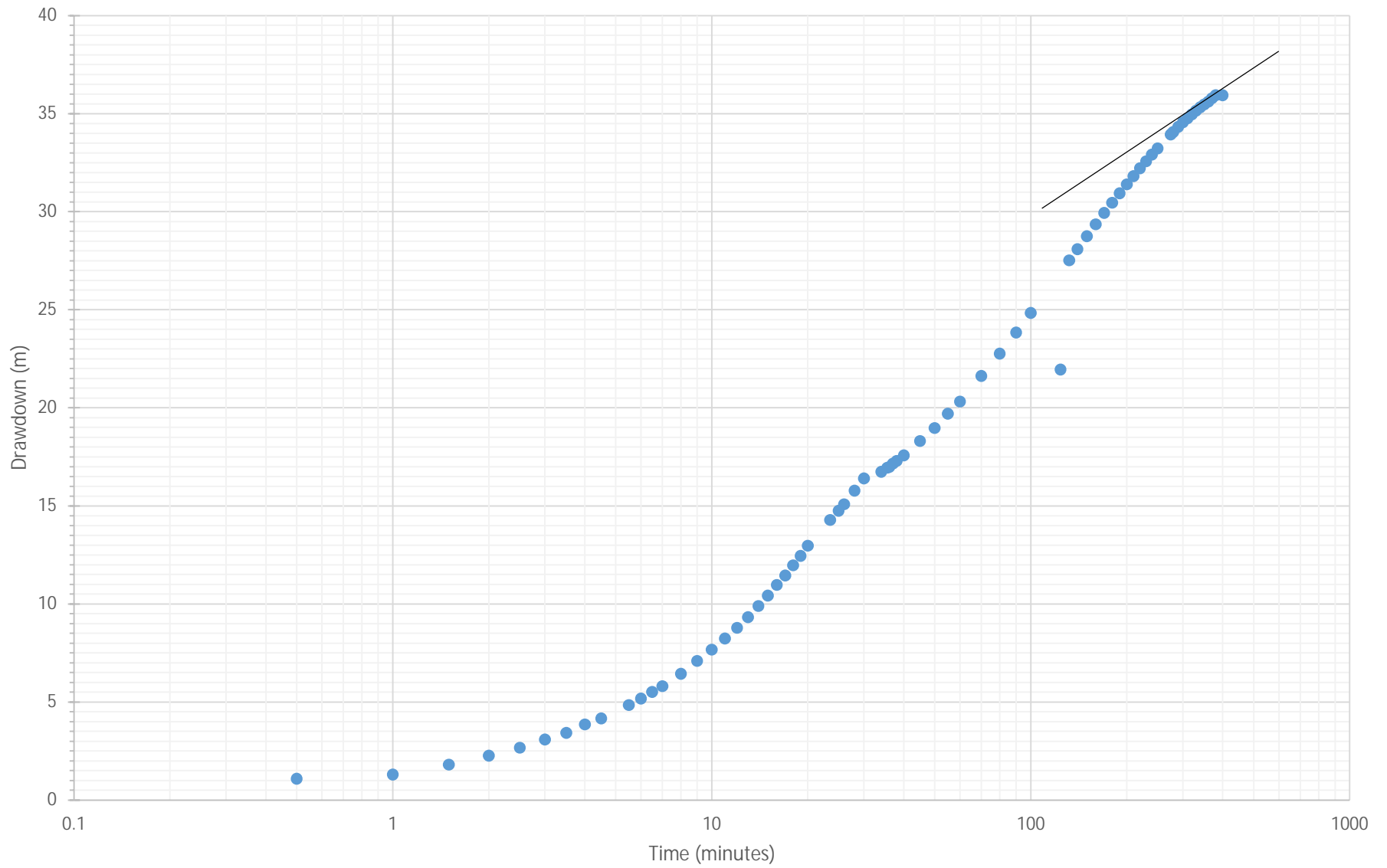
Elapsed Time (minutes)	Water Level (m BTOC)	Elapsed Time after pump shut off (min)	T/t	Water Level (m Datum)	Drawdown (m)	Water Column Remaining (m)	% Utilization	Notes
0	2.031			129.249	0	61.969	0.0%	Pumping rate at 10 GPM
0.50	3.120			128.16	1.089	60.88	1.6%	
1.00	3.328			127.952	1.297	60.672	1.9%	
1.50	3.835			127.445	1.804	60.165	2.6%	
2.00	4.295			126.985	2.264	59.705	3.2%	
2.50	4.703			126.577	2.672	59.297	3.8%	
3.00	5.121			126.159	3.09	58.879	4.4%	
3.50	5.459			125.821	3.428	58.541	4.9%	
4.00	5.888			125.392	3.857	58.112	5.5%	
4.50	6.191			125.089	4.16	57.809	5.9%	
5.00	1.511			129.769	-0.52	62.489	-0.7%	
5.50	6.871			124.409	4.84	57.129	6.9%	
6.00	7.211			124.069	5.18	56.789	7.4%	
6.50	7.551			123.729	5.52	56.449	7.9%	
7.00	7.835			123.445	5.804	56.165	8.3%	
8.00	8.471			122.809	6.44	55.529	9.2%	
9.00	9.131			122.149	7.1	54.869	10.1%	
10.00	9.699			121.581	7.668	54.301	11.0%	
11.00	10.273			121.007	8.242	53.727	11.8%	
12.00	10.811			120.469	8.789	53.189	12.5%	
13.00	11.331			119.918	9.331	52.638	13.3%	
14.00	11.822			119.357	9.889	52.077	14.1%	
15.00	12.285			118.822	10.427	51.542	14.9%	
16.00	13.001			118.279	10.97	50.999	15.7%	
17.00	13.652			117.797	11.452	50.517	16.4%	
18.00	14.308			117.282	11.967	50.002	17.1%	
19.00	14.485			116.795	12.484	49.515	17.8%	
20.00	14.998			116.282	12.967	49.002	18.5%	Changed pumping rate to 7 GPM
22.50	16.315			114.965	14.284	47.685	20.4%	
25.00	16.785			114.495	14.754	47.215	21.1%	
26.00	17.110			114.17	15.079	46.89	21.5%	
28.00	17.811			113.469	15.78	46.189	22.5%	
30.00	18.431			112.849	16.4	45.569	23.4%	Changed pumping rate to 6 GPM
34.00	18.768			112.512	16.737	45.232	23.9%	
35.50	18.978			112.302	16.947	45.022	24.2%	
36.00	19.006			112.274	16.975	44.994	24.3%	
37.00	19.195			112.085	17.164	44.805	24.5%	
38.00	19.335			111.945	17.304	44.665	24.7%	
40.00	19.611			111.669	17.58	44.389	25.1%	
45.00	20.338			110.942	18.307	43.662	26.2%	
50.00	21.001			110.279	18.97	42.999	27.1%	
55.00	21.731			109.549	19.7	42.269	28.1%	
60.00	22.351			108.929	20.32	41.649	29.0%	
70.00	23.655			107.625	21.624	40.345	30.9%	
80.00	24.799			106.481	22.768	39.201	32.5%	
90.00	25.869			105.411	23.838	38.131	34.1%	
100.00	26.875			104.405	24.844	37.125	35.5%	
124.00	29.985			107.795	21.454	40.015	31.4%	
132.00	29.555			101.725	27.524	34.445	39.3%	
140.00	30.723			101.157	28.092	33.877	40.1%	
150	30.775			100.505	28.744	33.225	41.1%	
160	31.382			99.898	29.351	32.618	41.9%	
170	31.965			99.314	29.935	32.034	42.8%	
180	32.483			98.797	30.452	31.517	43.5%	
190	32.968			98.312	30.937	31.032	44.2%	
200	33.429			97.851	31.398	30.571	44.9%	
210	33.845			97.435	31.814	30.155	45.4%	
220	34.242			97.038	32.211	29.758	46.0%	
230	34.598			96.682	32.567	29.402	46.5%	
240	34.942			96.338	32.911	29.058	47.0%	
250	35.265			96.015	33.234	28.735	47.5%	
275	35.965			95.315	33.934	28.035	48.5%	
280	36.098			95.182	34.067	27.902	48.7%	
290	36.362			94.918	34.331	27.638	49.0%	
300	36.592			94.688	34.561	27.408	49.4%	
310	36.792			94.488	34.761	27.208	49.7%	
320	36.998			94.282	34.967	27.002	50.0%	
330	37.185			94.095	35.154	26.815	50.2%	
340	37.358			93.922	35.327	26.642	50.5%	
350	37.495			93.785	35.464	26.505	50.7%	
360	37.641			93.639	35.61	26.359	50.9%	
370	37.821			93.459	35.79	26.179	51.1%	
380	37.968			93.312	35.937	26.032	51.3%	
400	37.971			93.309	35.94	26.029	51.3%	
400.5	36.98	0.5		801.000	94.3	34.949	27.02	Pump off at 3:10 pm
401	36.515	1		401.000	94.75	34.484	27.485	49.3%
402	36.04	2		201.000	95.24	34.009	27.96	48.6%
403	35.585	3		134.333	95.695	33.554	28.415	47.9%
404	35.095	4		101.000	96.185	33.064	28.905	47.2%
405	34.645	5		81.000	96.635	32.614	29.355	46.6%
406	34.212	6		67.667	97.068	32.181	29.788	46.0%
407	33.781	7		58.143	97.499	31.75	30.219	45.4%
408	33.365	8		51.000	97.915	31.334	30.635	44.8%
409	32.935	9		45.444	98.345	30.904	31.065	44.1%
410	32.595	10		41.000	98.685	30.564	31.405	43.7%
412	31.815	12		34.333	99.465	29.784	32.185	42.5%
414	31.01	14		29.571	100.27	28.979	32.99	41.4%
416	30.398	16		26.000	100.882	28.367	33.602	40.5%
418	29.741	18		23.222	101.539	27.71	34.259	39.6%
420	29.091	20		21.000	102.189	27.06	34.909	38.7%
452	21.083	32		14.125	110.197	19.052	42.917	27.2%
455	20.711	35		13.000	110.569	18.68	43.289	26.7%
460	19.715	40		11.500	111.565	17.684	44.285	25.3%
465	18.955	45		10.333	112.325	16.924	45.045	24.2%
1405	2.495	1020		1.377	128.785	0.464	61.505	0.7%



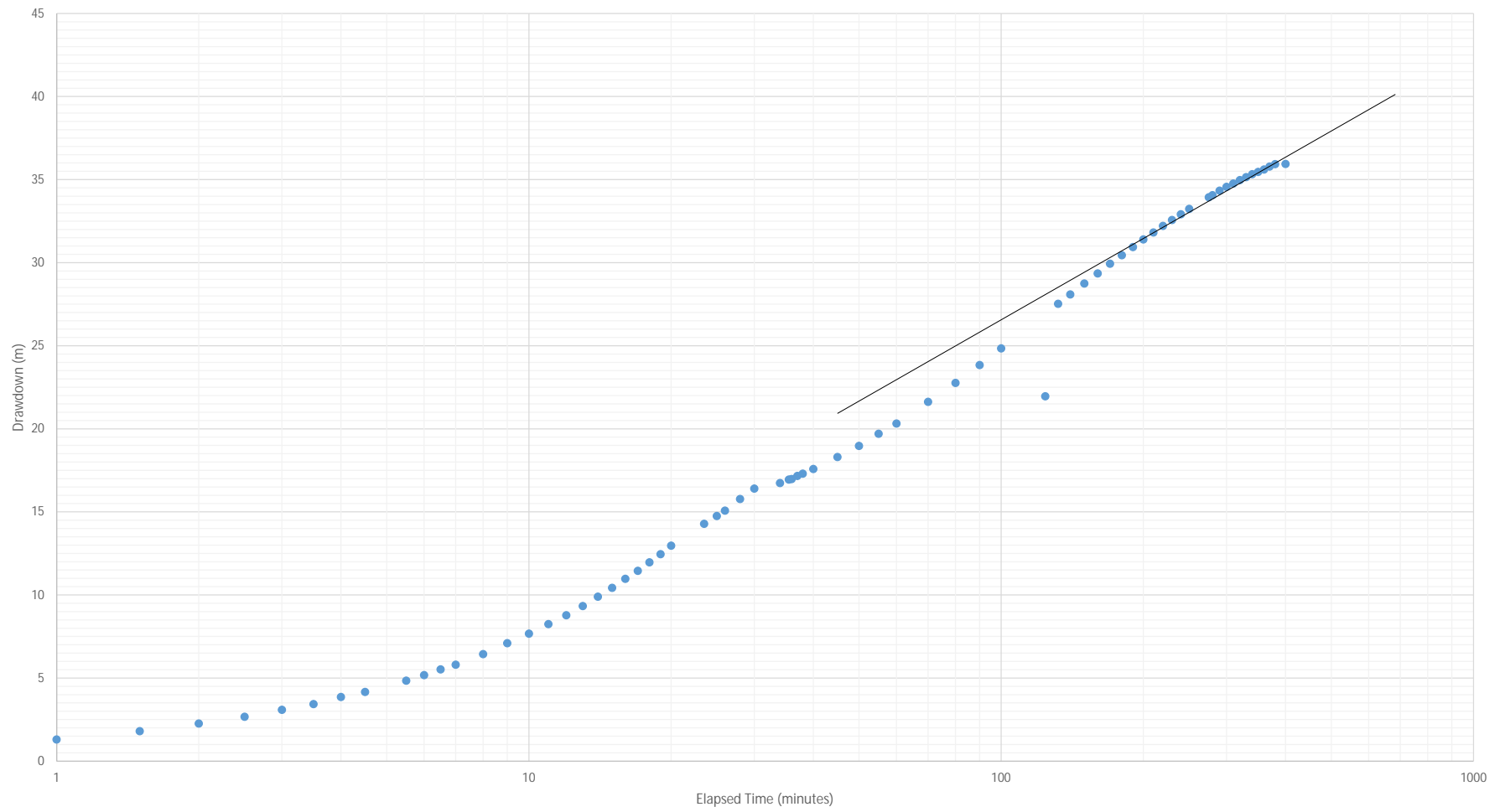
Water Level Elevation vs Time
Pumping Test (Drawdown and Recovery, TW2)



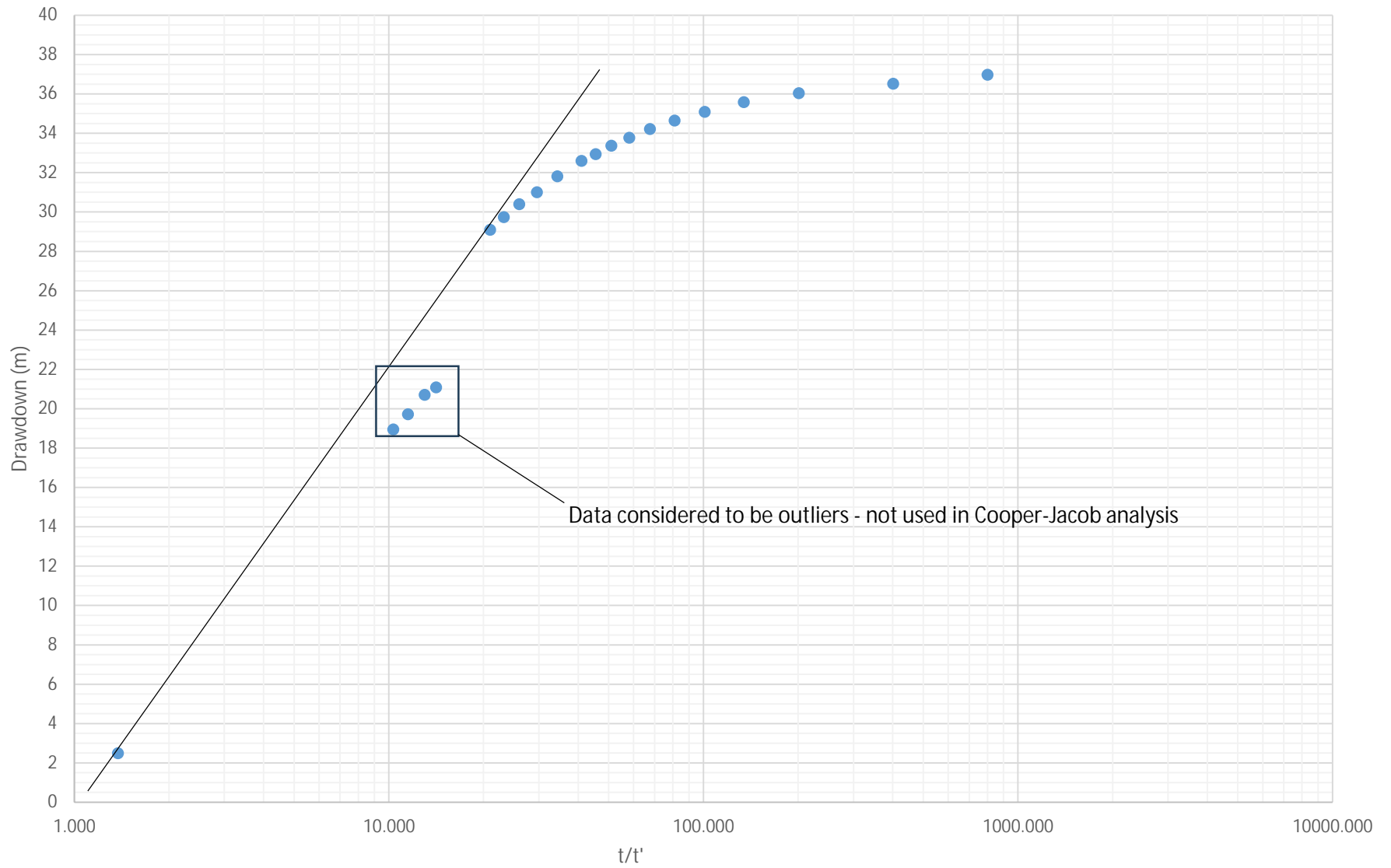
Drawdown vs Log Time
Pumping Test (Drawdown), June 14, 2023
TW2 - Santaguida Subdivision



Drawdown vs Log Time
Pumping Test (Long-Term), June 14, 2023
TW2 - Santaguida Subdivision



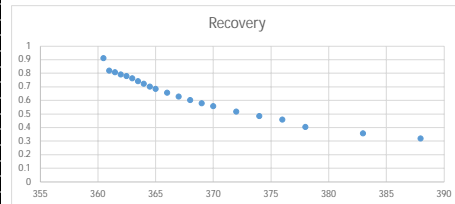
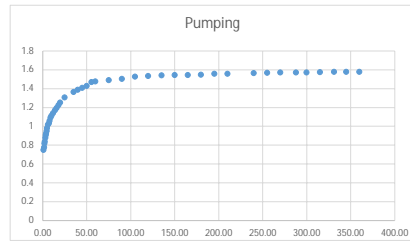
Drawdown vs Log Time
Pumping Test (Recovery), June 14, 2023
TW2 - Santaguida Subdivision



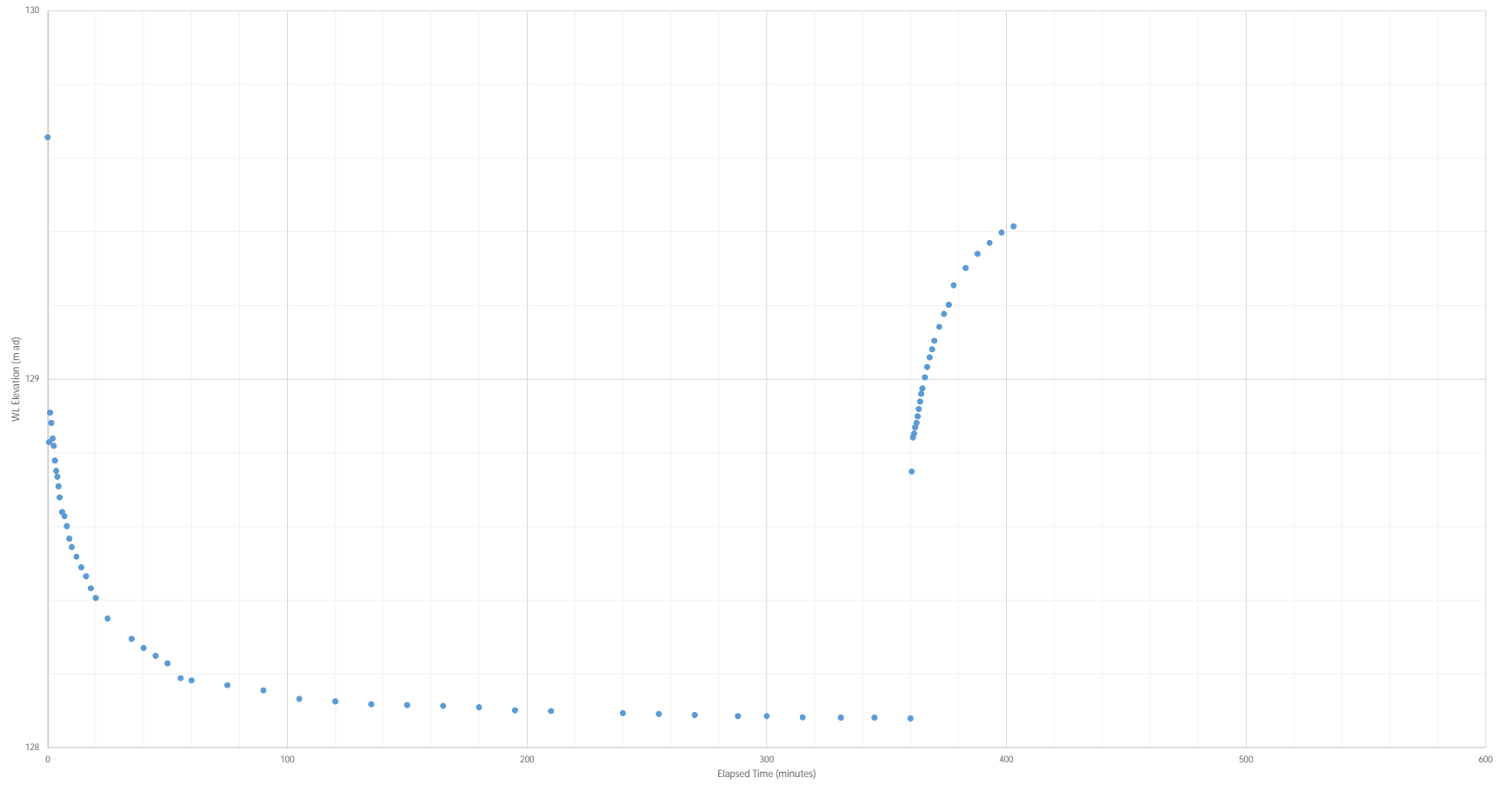
Summary of Water Level Data
Pumping Test - TW3, June 20, 2023

TOC Elevation (assumed) 133.38 m AD (Above Datum)
 Static Water Level 3.723 m BTOC
 Static Water Elevation 129.657 m AD (Above Datum)
 95% Recovery 3.8019 m BTOC
 Well depth 129.5781 m AD (Above Datum) 120
 Pump Depth 36.6 m BTOC 110
 33.5 m BTOC

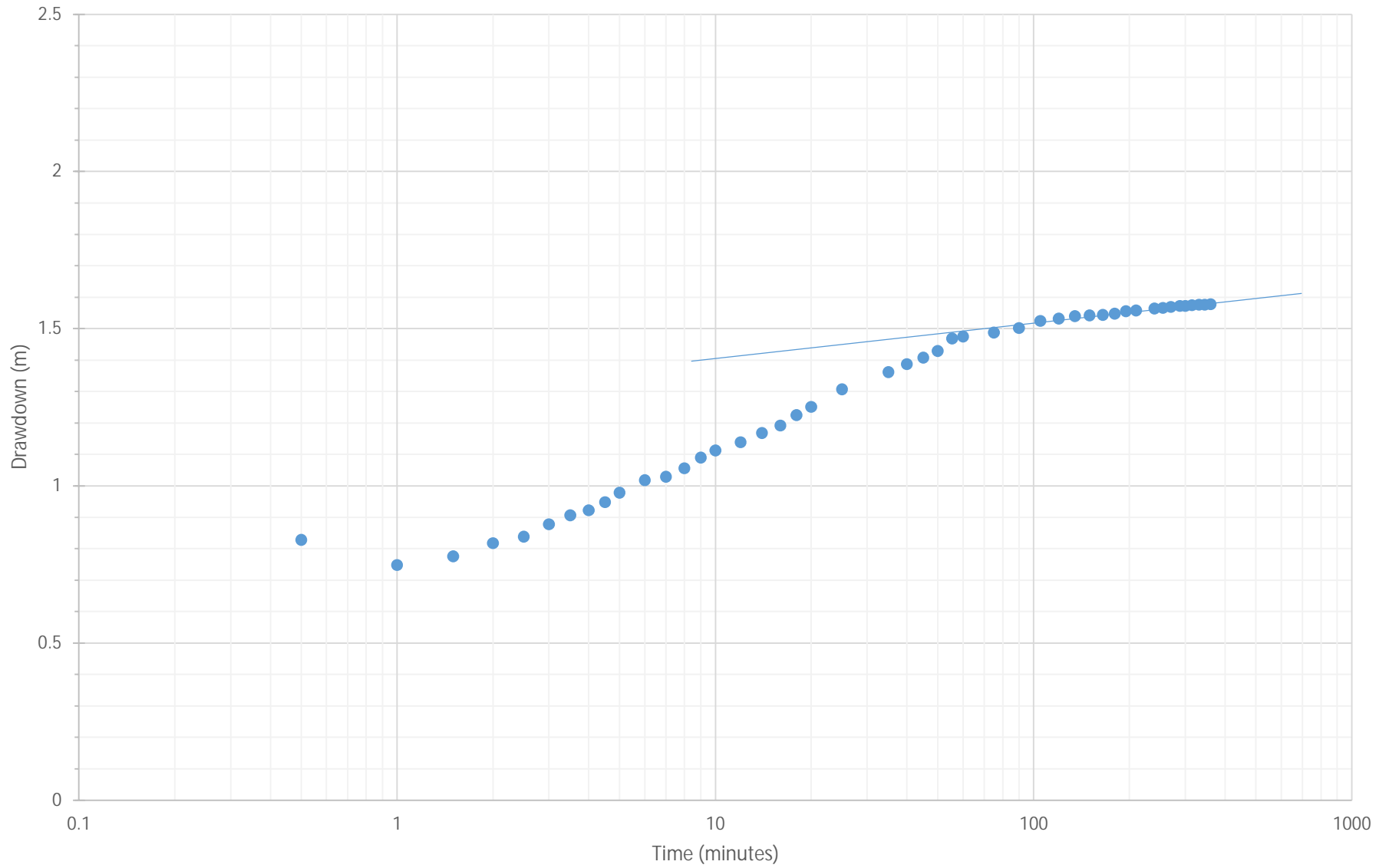
Elapsed Time (minutes)	Water Level (m BTOC)	Elapsed Time after pump shut off (min)	T/t'	Water Level (m Datum)	Drawdown (m)	Water Column Remaining (m)	% Utilization	Notes
0	3.723			129.657	0	29.777	0.0%	Pumping rate at 10 GPM
0.50	4.551			128.829	0.828	28.949	2.3%	Pump on at 8:30am
1.00	4.471			128.909	0.748	29.029	2.0%	
1.50	4.499			128.881	0.776	29.001	2.1%	
2.00	4.511			128.839	0.818	28.959	2.2%	
2.50	4.561			128.819	0.838	28.939	2.3%	
3.00	4.601			128.779	0.878	28.899	2.4%	
3.50	4.629			128.751	0.906	28.871	2.5%	
4.00	4.654			128.725	0.932	28.845	2.5%	
4.50	4.671			128.709	0.948	28.829	2.6%	
5.00	4.701			128.679	0.978	28.799	2.7%	
6.00	4.741			128.639	1.018	28.759	2.8%	
7.00	4.752			128.628	1.029	28.748	2.8%	
8.00	4.779			128.601	1.056	28.721	2.9%	
9.00	4.813			128.557	1.099	28.667	3.0%	
10.00	4.836			128.544	1.113	28.654	3.0%	
12.00	4.862			128.518	1.139	28.628	3.1%	
14.00	4.891			128.489	1.168	28.609	3.2%	
16.00	4.915			128.465	1.192	28.585	3.3%	
18.00	4.948			128.432	1.225	28.552	3.3%	
20.00	4.974			128.406	1.251	28.526	3.4%	
25.00	5.030			128.35	1.307	28.47	3.6%	
35.00	5.085			128.295	1.362	28.415	3.7%	
40.00	5.110			128.27	1.387	28.39	3.8%	
45.00	5.131			128.249	1.408	28.369	3.8%	
50.00	5.152			128.228	1.429	28.348	3.9%	
55.00	5.192			128.188	1.469	28.308	4.0%	
60.00	5.198			128.182	1.475	28.302	4.0%	
75.00	5.211			128.169	1.488	28.289	4.1%	
90.00	5.225			128.155	1.502	28.275	4.1%	
105.00	5.248			128.132	1.525	28.252	4.2%	
120.00	5.255			128.125	1.532	28.245	4.2%	
135.00	5.263			128.117	1.54	28.237	4.2%	
150.00	5.265			128.115	1.542	28.235	4.2%	
165.00	5.267			128.113	1.544	28.233	4.2%	
180.00	5.271			128.109	1.548	28.229	4.2%	
195.00	5.279			128.101	1.556	28.221	4.3%	
210.00	5.281			128.099	1.558	28.219	4.3%	
240.00	5.287			128.093	1.564	28.213	4.3%	
255.00	5.289			128.091	1.566	28.211	4.3%	
270.00	5.292			128.088	1.569	28.208	4.3%	
288.00	5.295			128.085	1.572	28.205	4.3%	
300.00	5.295			128.085	1.572	28.205	4.3%	
315.00	5.298			128.082	1.575	28.202	4.3%	
331.00	5.299			128.081	1.576	28.201	4.3%	
345.00	5.299			128.081	1.576	28.201	4.3%	
360.00	5.301			128.079	1.578	28.199	4.3%	
360.5	4.631	0.5	721.000	128.749	0.908	28.869	2.5%	Pump off at 2:30 pm
361	4.538	1	361.000	128.842	0.815	28.962	2.2%	
361.5	4.528	1.5	241.000	128.852	0.805	28.972	2.2%	
362.00	4.511	2	181.000	128.869	0.788	28.989	2.2%	
362.50	4.499	2.5	145.000	128.881	0.776	29.001	2.1%	
363.00	4.461	3	121.000	128.899	0.758	29.019	2.1%	
363.30	4.461	3.5	103.857	128.919	0.738	29.039	2.0%	
364.00	4.441	4	91.000	128.939	0.718	29.059	2.0%	
364.50	4.42	4.5	81.000	128.96	0.697	29.08	1.9%	
365.00	4.405	5	73.000	128.975	0.682	29.095	1.9%	
366.00	4.375	6	67.000	129.005	0.652	29.125	1.8%	
367.00	4.347	7	52.429	129.033	0.624	29.153	1.7%	
368	4.321	8	45.000	129.059	0.598	29.179	1.6%	
369	4.299	9	41.000	129.081	0.576	29.201	1.6%	
370	4.276	10	37.000	129.104	0.553	29.224	1.5%	
372	4.238	12	31.000	129.142	0.515	29.262	1.4%	
374	4.203	14	26.714	129.177	0.48	29.297	1.3%	
376	4.178	16	23.500	129.202	0.455	29.322	1.2%	
378	4.175	20	18.900	129.255	0.402	29.375	1.1%	
383	4.078	25	15.300	129.302	0.355	29.422	1.0%	
388	4.04	30	12.933	129.34	0.317	29.46	0.9%	
393	4.01	35	11.229	129.37	0.287	29.49	0.8%	
398	3.982	40	9.950	129.398	0.259	29.518	0.7%	
403	3.965	45	8.956	129.415	0.242	29.535	0.7%	



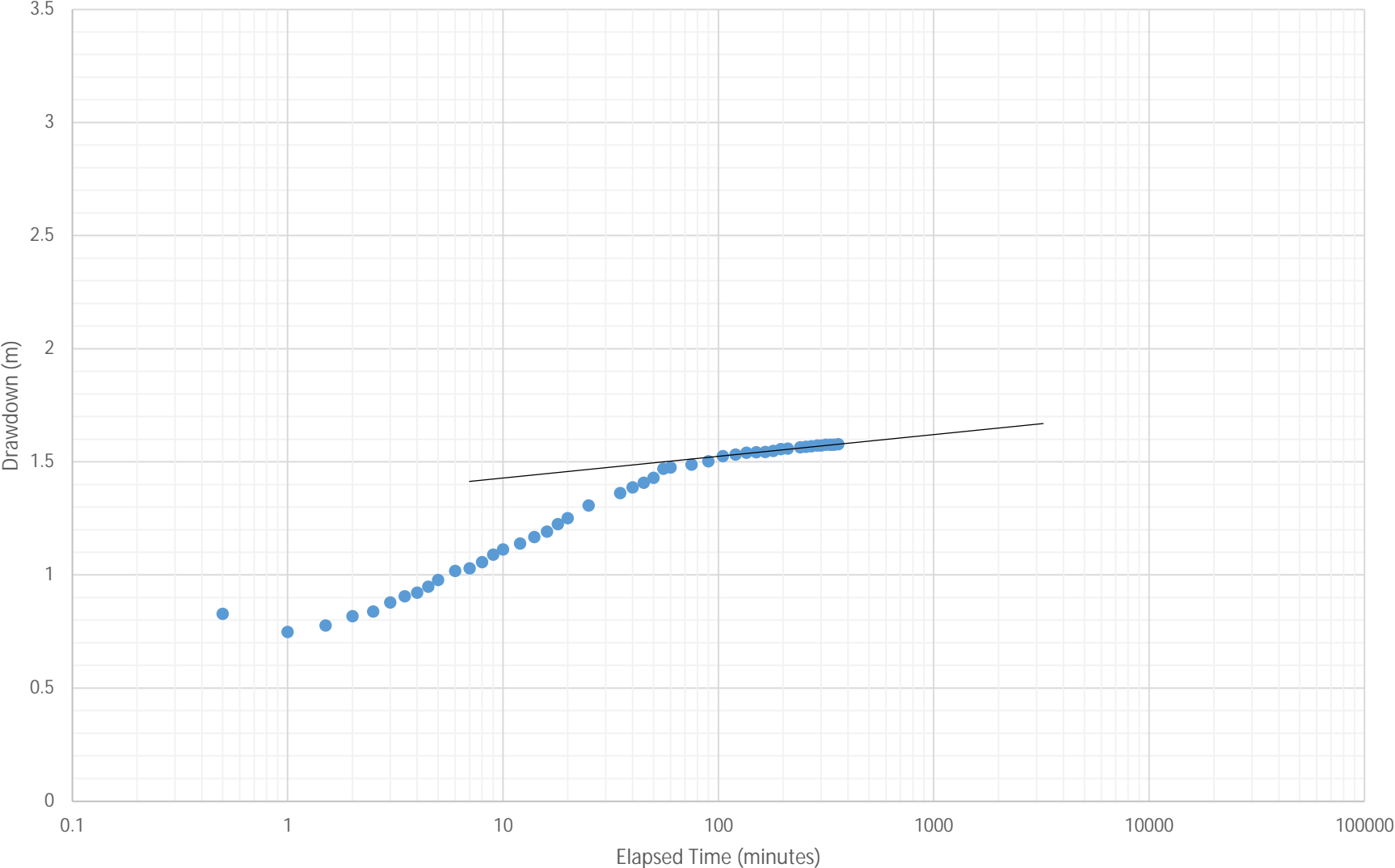
Water Level Elevation vs Time
Pumping Test (Drawdown and Recovery, TW3)



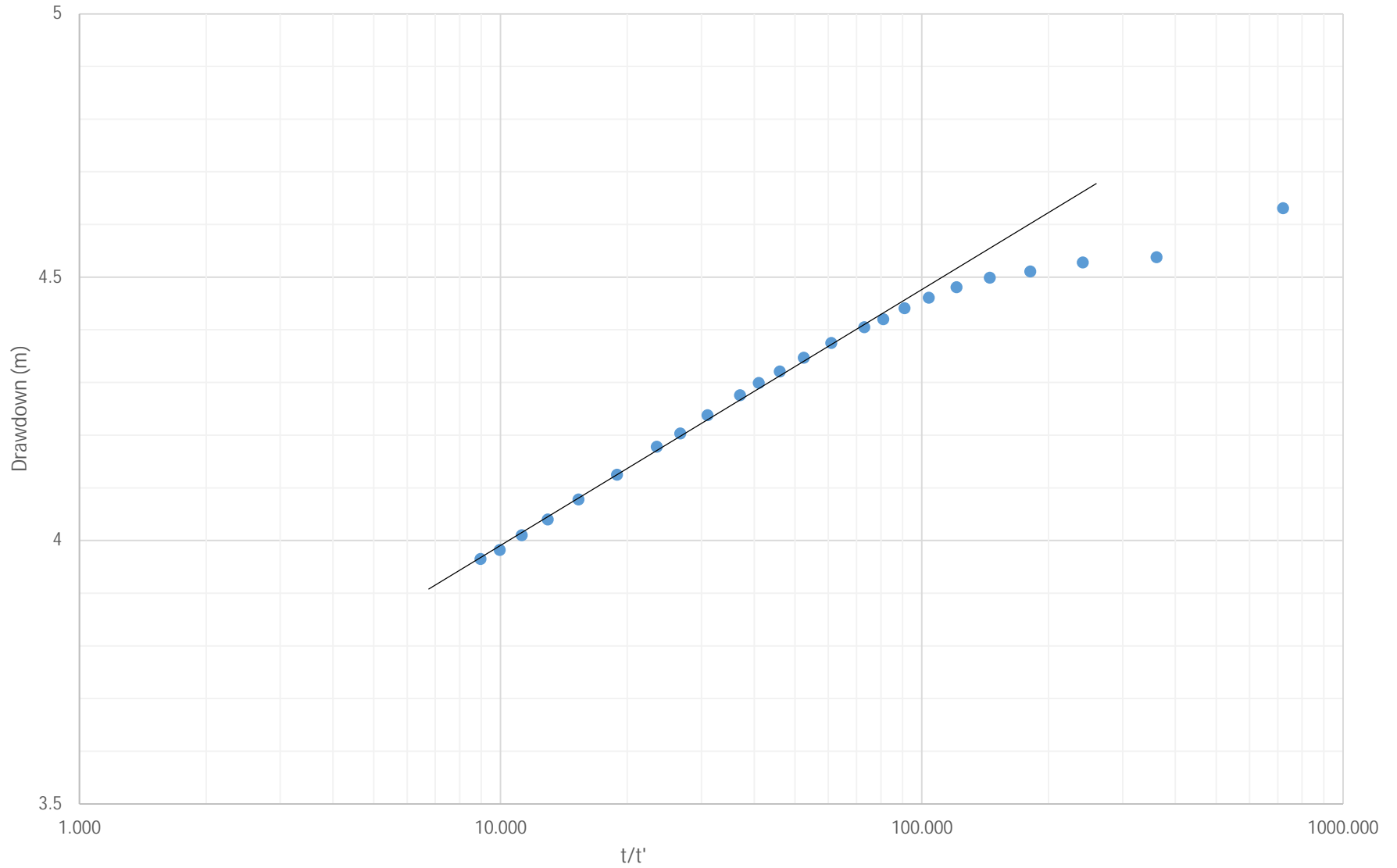
Drawdown vs Log Time
Pumping Test (Drawdown), June 20, 2023
TW3 - Santaguida Subdivision



Drawdown vs Log Time
Pumping Test (Long-Term), June 20, 2023
TW3 - Santaguida Subdivision



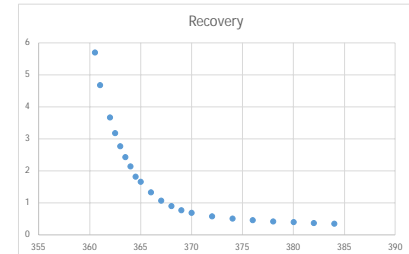
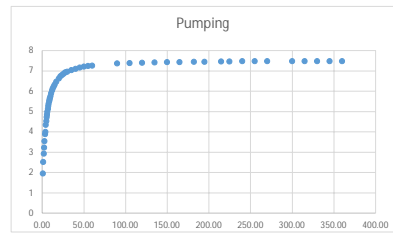
Drawdown vs Log Time
Pumping Test (Recovery), June 20, 2023
TW3 - Santaguida Subdivision



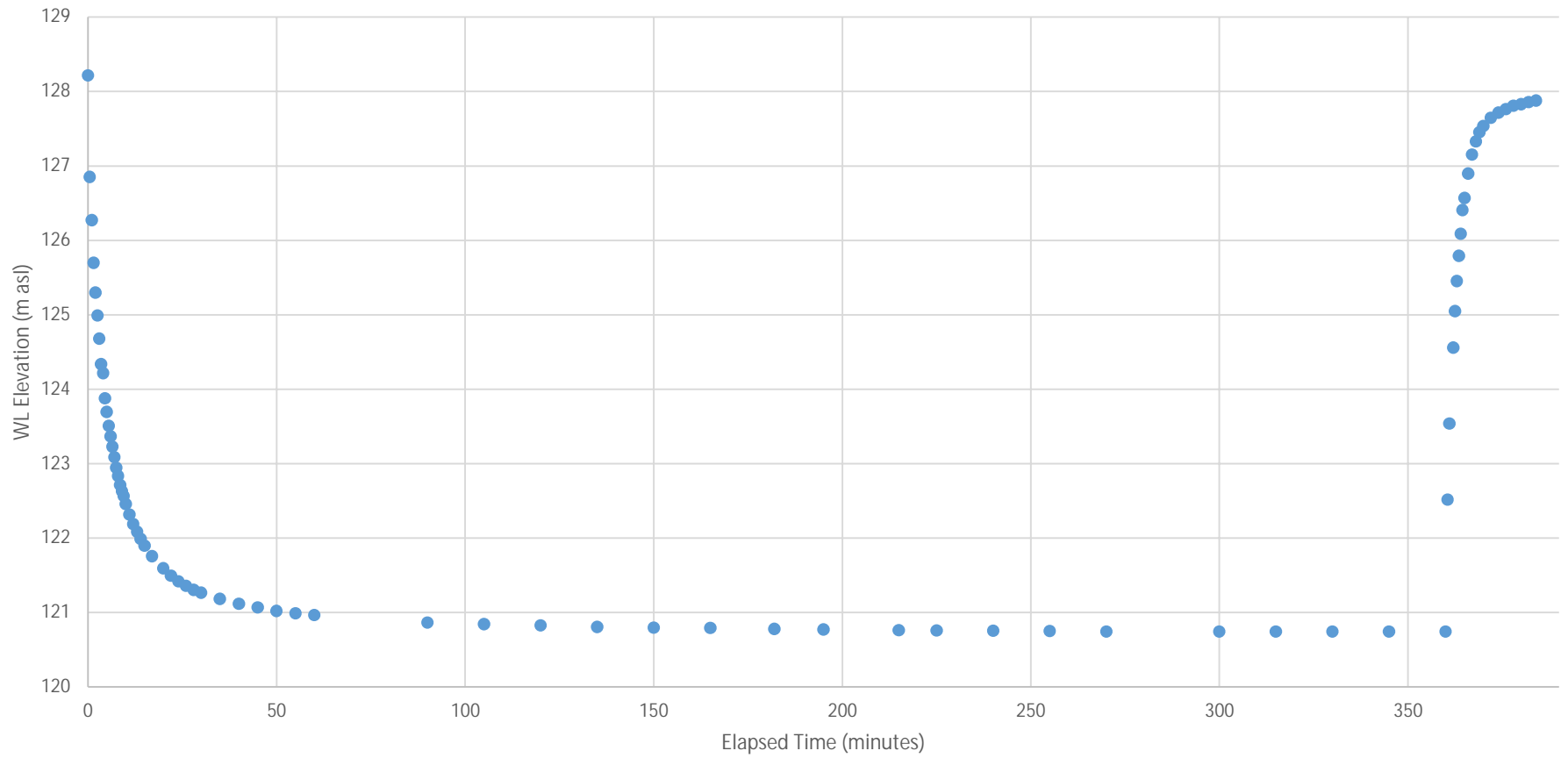
Summary of Water Level Data
Pumping Test - TW4, June 19, 2023

TOC Elevation (assumed) 131.23 m AD (Above Datum)
 Static Water Level 3.011 m BTOC
 Static Water Elevation 128.219 m AD (Above Datum)
 95% Recovery 3.38465 m BTOC
 127.84535 m AD (Above Datum)
 Well depth 200
 Pump Depth 190

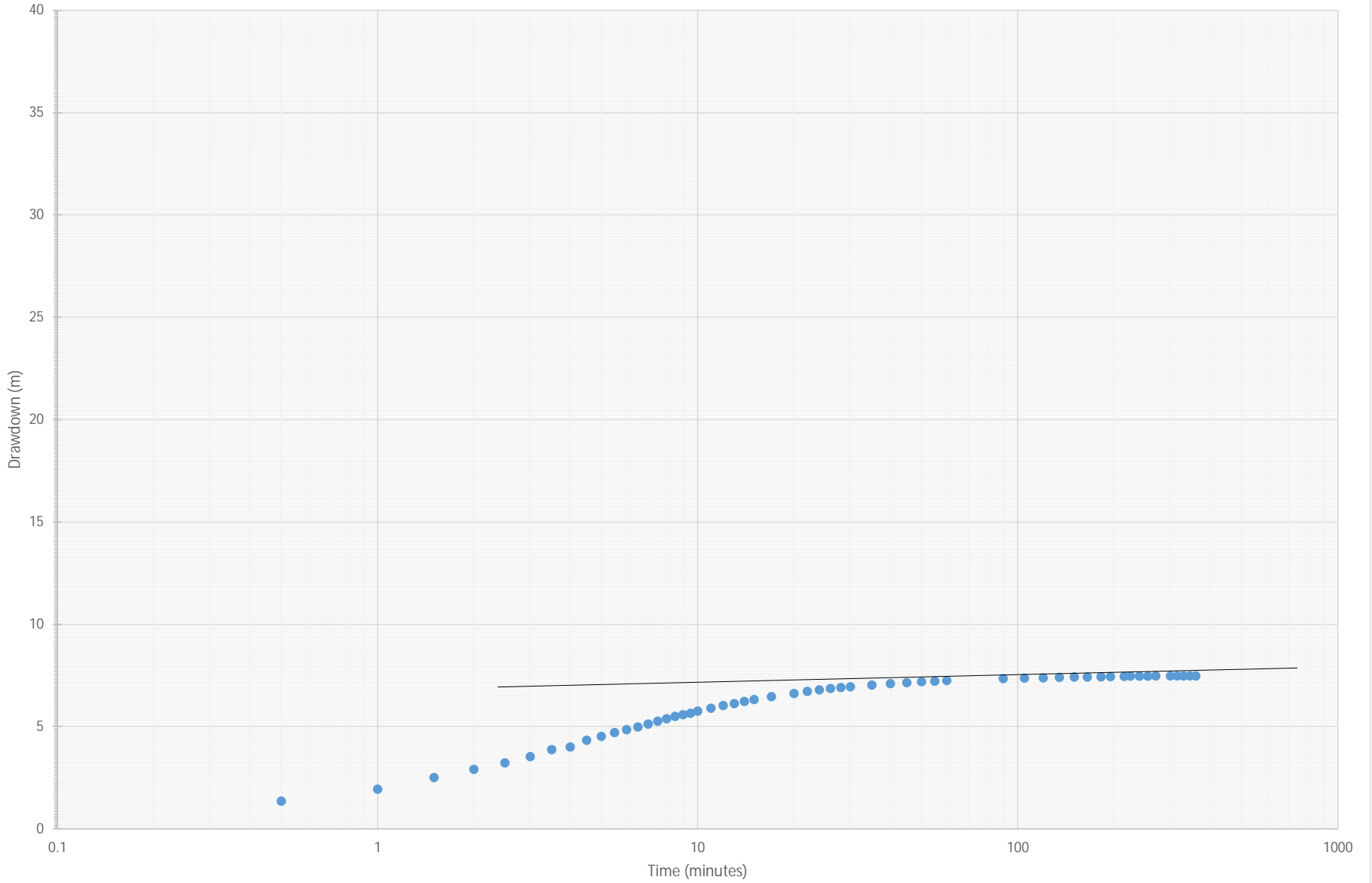
Elapsed Time (minutes)	Water Level (m BTOC)	Elapsed Time after pump shut off (min)	T/t'	Water Level (m Datum)	Drawdown (m)	Water Column Remaining (m)	% Utilization	Notes
0	3.011			128.219	0	54.889	0.0%	Pumping at 37.8 L/min
0.50	4.375			126.855	1.364	53.525	2.2%	Pump on at 8am
1.00	4.956			126.274	1.945	52.944	3.2%	
1.50	5.531			125.699	2.52	52.369	4.1%	
2.00	5.931			125.299	2.92	51.969	4.8%	
2.50	6.239			124.991	3.228	51.661	5.3%	
3.00	6.551			124.679	3.54	51.349	5.8%	
3.50	6.891			124.359	3.88	51.029	6.4%	
4.00	7.071			124.219	4.04	50.889	6.6%	
4.50	7.251			123.879	4.34	50.549	7.1%	
5.00	7.535			123.695	4.524	50.365	7.4%	
5.50	7.721			123.506	4.71	50.176	7.7%	
6.00	7.861			123.369	4.85	50.039	8.0%	
6.50	8.001			123.229	4.99	49.899	8.2%	
7.00	8.141			123.089	5.13	49.759	8.4%	
7.50	8.283			122.947	5.272	49.617	8.6%	
8.00	8.395			122.835	5.384	49.505	8.8%	
8.50	8.515			122.715	5.504	49.385	9.0%	
9.00	8.599			122.631	5.588	49.301	9.2%	
9.50	8.665			122.565	5.654	49.235	9.3%	
10.00	8.771			122.459	5.76	49.129	9.4%	
11.00	8.912			122.318	5.901	48.988	9.7%	
12.00	9.042			122.188	6.031	48.858	9.9%	
13.00	9.143			122.067	6.132	48.757	10.1%	
14.00	9.231			121.988	6.231	48.658	10.2%	
15.00	9.277			121.899	6.323	48.559	10.4%	
16.00	9.371			121.759	6.464	48.429	10.6%	
17.00	9.471			121.595	6.624	48.265	10.9%	
18.00	9.635			121.495	6.724	48.165	11.0%	
19.00	9.755			121.419	6.8	48.089	11.2%	
20.00	9.811			121.359	6.86	48.029	11.3%	
21.00	9.871			121.305	6.914	47.975	11.3%	
22.00	9.925			121.268	6.951	47.938	11.4%	
23.00	10.045			121.185	7.034	47.855	11.5%	
24.00	10.111			121.119	7.1	47.789	11.6%	
25.00	10.161			121.069	7.15	47.739	11.7%	
26.00	10.208			121.022	7.197	47.692	11.8%	
27.00	10.241			120.989	7.23	47.659	11.9%	
28.00	10.262			120.968	7.251	47.638	11.9%	
29.00	10.365			120.865	7.354	47.535	12.1%	
30.00	10.383			120.847	7.372	47.517	12.1%	
31.00	10.423			120.827	7.392	47.497	12.1%	
32.00	10.421			120.809	7.41	47.479	12.2%	
33.00	10.431			120.797	7.422	47.467	12.2%	
34.00	10.436			120.794	7.425	47.464	12.2%	
35.00	10.451			120.776	7.44	47.445	12.2%	
36.00	10.458			120.772	7.447	47.442	12.2%	
37.00	10.468			120.762	7.457	47.432	12.2%	
38.00	10.471			120.759	7.46	47.429	12.2%	
39.00	10.475			120.755	7.464	47.425	12.2%	
40.00	10.479			120.751	7.468	47.421	12.3%	
41.00	10.483			120.747	7.472	47.417	12.3%	
42.00	10.483			120.747	7.472	47.417	12.3%	
43.00	10.484			120.746	7.473	47.416	12.3%	
44.00	10.484			120.746	7.473	47.416	12.3%	
45.00	10.484			120.746	7.473	47.416	12.3%	
46.00	10.484			120.746	7.473	47.416	12.3%	
47.00	8.711	0.5		122.519	5.7	49.189	9.4%	
48.00	7.689	1		121.541	4.678	50.211	7.7%	
49.00	6.571	2		121.562	3.65	51.229	6.0%	
50.00	6.181	2.5		121.000	3.177	51.719	5.2%	
51.00	5.775	3		121.000	2.764	52.225	4.5%	
52.00	5.438	3.5		103.857	2.427	52.462	4.0%	
53.00	5.141	4		91.000	2.113	52.759	3.5%	
54.00	4.823	4.5		81.000	1.812	53.077	3.0%	
55.00	4.659	5		73.000	1.648	53.241	2.7%	
56.00	4.331	6		61.000	1.32	53.569	2.2%	
57.00	4.075	7		52.429	1.064	53.825	1.7%	
58.00	3.899	8		46.000	0.888	54.001	1.5%	
59.00	3.775	9		41.000	0.764	54.125	1.3%	
60.00	3.691	10		37.000	0.68	54.209	1.1%	
61.00	3.582	12		31.000	0.571	54.318	0.9%	
62.00	3.512	14		26.714	0.501	54.388	0.8%	
63.00	3.463	16		23.500	0.452	54.437	0.7%	
64.00	3.421	18		21.000	0.41	54.479	0.7%	
65.00	3.398	20		19.000	0.387	54.502	0.6%	
66.00	3.371	22		17.364	0.36	54.529	0.6%	
67.00	5.351	24		16.000	0.34	54.549	0.56%	



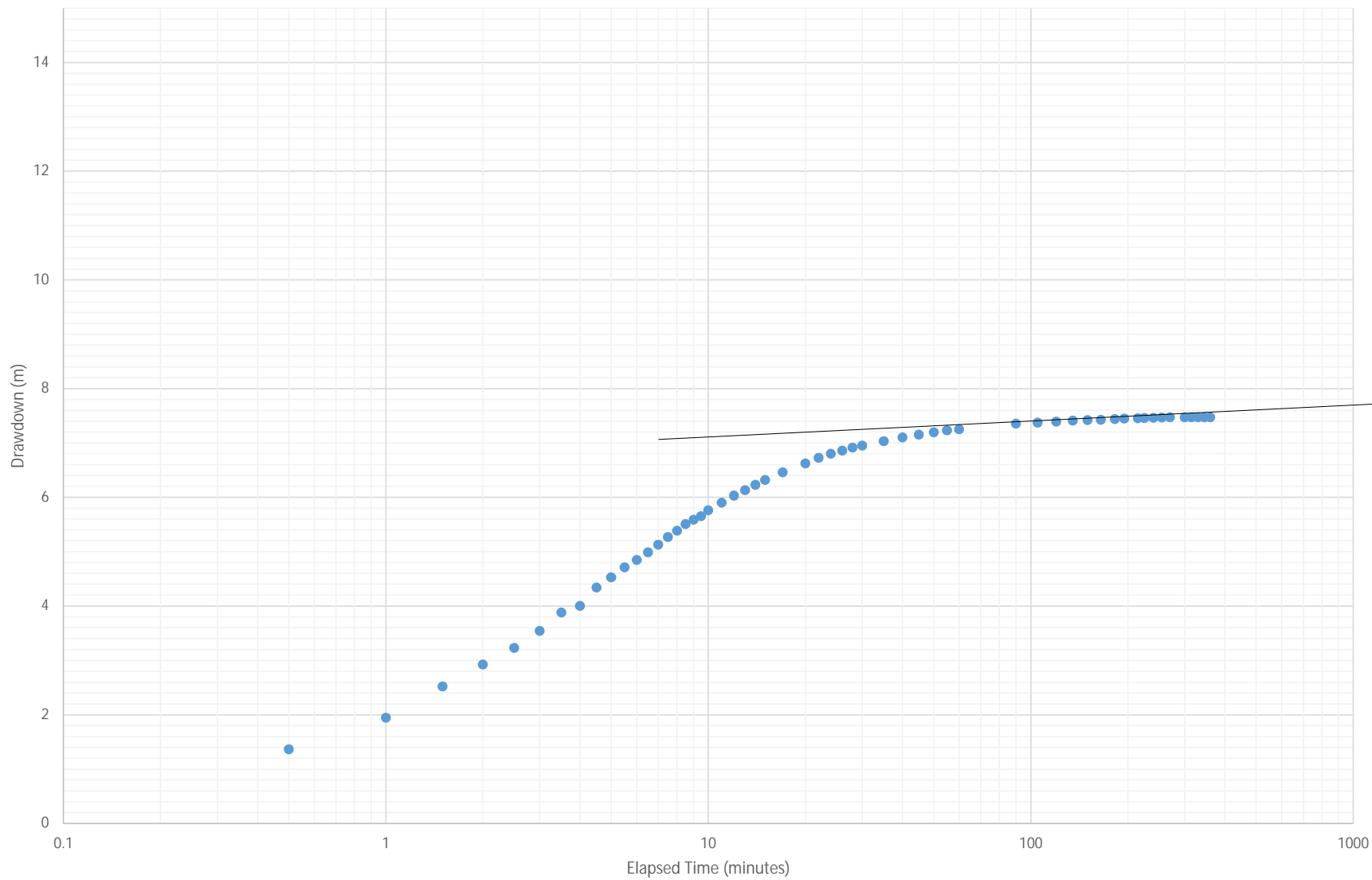
WL vs. Time, June 19, 2023
TW4 - Santaguida Subdivision



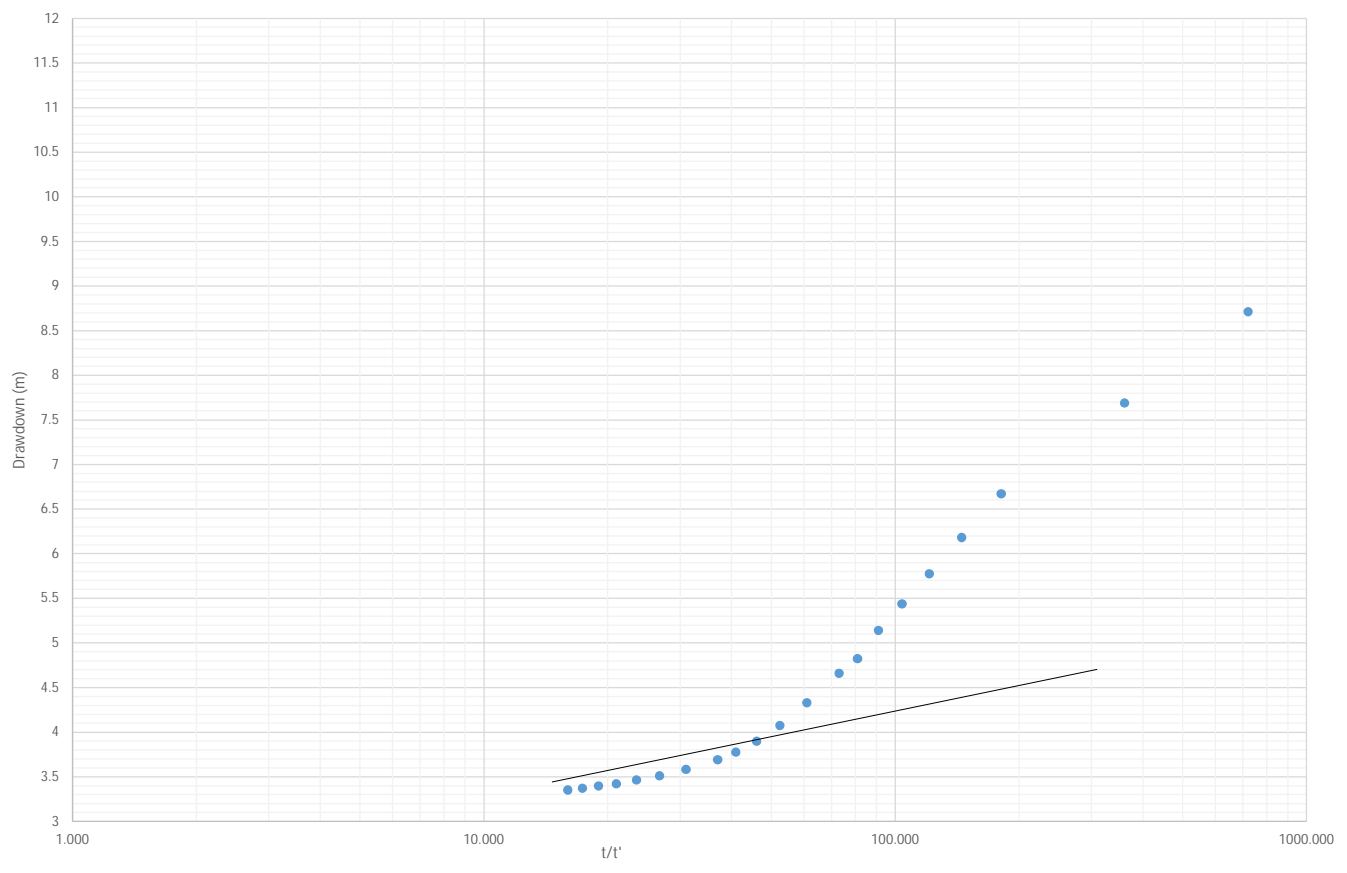
Drawdown vs Log Time
Pumping Test (Drawdown), June 19, 2023
TW4 - Santaguida Subdivision



Drawdown vs Log Time
Pumping Test (Long-Term), June 19, 2023
TW4 - Santaguida Subdivision



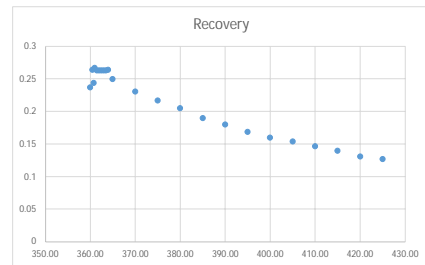
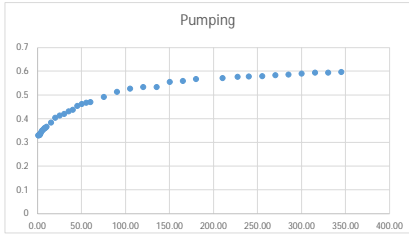
Drawdown vs Log Time
Pumping Test (Recovery), June 19, 2023
TW4 - Santaguida Subdivision



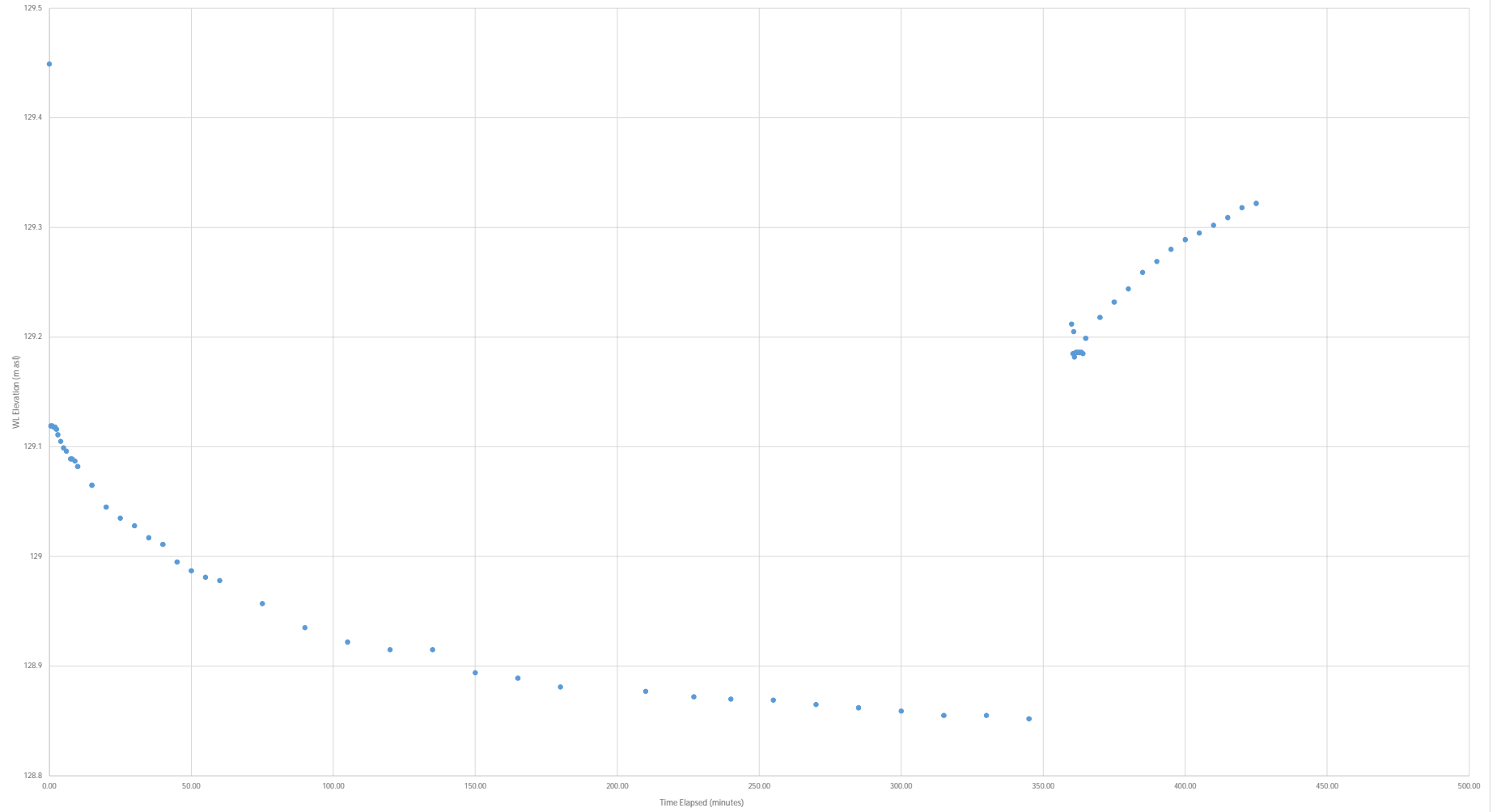
Summary of Water Level Data
Pumping Test - TW1, June 13, 2023

TOC Elevation (assumed) 131.48 m AD (Above Datum)
 Static Water Level 2.031 m BTOC
 Static Water Elevation 129.449 m AD (Above Datum)
 95% Recovery 2.1624 m BTOC
 Well depth 129.3176 m AD (Above Datum) 230
 Pump Depth 70 m BTOC 220
 67 m BTOC

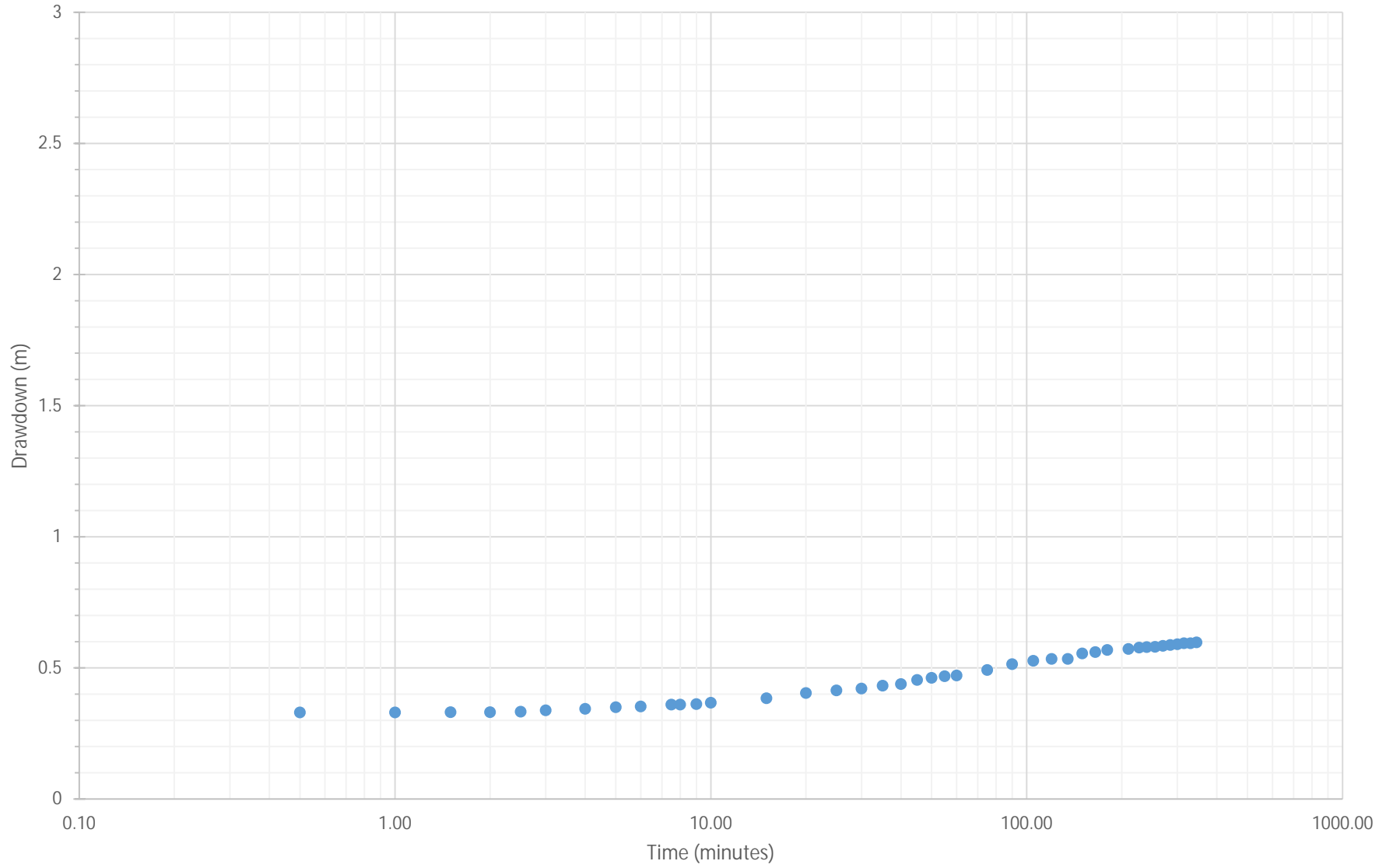
Elapsed Time (minutes)	Water Level (m BTOC)	Elapsed Time after pump shut off (min)	T/t	Water Level (m Datum)	Drawdown (m)	Water Column Remaining (m)	% Utilization	Notes
0.00	2.031			129.449	0	64.969	0.0%	
0.50	2.361			129.119	0.33	64.639	0.5%	
1.00	2.361			129.119	0.33	64.639	0.5%	
1.50	2.362			129.118	0.331	64.638	0.5%	
2.00	2.362			129.118	0.331	64.638	0.5%	
2.50	2.364			129.116	0.333	64.636	0.5%	
3.00	2.369			129.111	0.338	64.631	0.5%	
4.00	2.375			129.105	0.344	64.625	0.5%	
5.00	2.381			129.099	0.35	64.619	0.5%	
6.00	2.384			129.096	0.353	64.616	0.5%	
7.50	2.391			129.089	0.36	64.609	0.5%	
8.00	2.391			129.089	0.36	64.609	0.5%	
9.00	2.393			129.087	0.362	64.607	0.5%	
10.00	2.398			129.082	0.367	64.602	0.5%	
15.00	2.415			129.065	0.384	64.585	0.5%	
20.00	2.435			129.045	0.404	64.565	0.6%	
25.00	2.445			129.035	0.414	64.555	0.6%	
30.00	2.452			129.028	0.421	64.548	0.6%	
35.00	2.463			129.017	0.433	64.537	0.6%	
40.00	2.469			129.011	0.439	64.531	0.6%	
45.00	2.485			128.995	0.454	64.515	0.6%	
50.00	2.493			128.987	0.463	64.507	0.7%	
55.00	2.499			128.981	0.468	64.501	0.7%	
60.00	2.502			128.978	0.471	64.498	0.7%	
75.00	2.523			128.957	0.492	64.477	0.7%	
90.00	2.545			128.935	0.514	64.455	0.7%	
105.00	2.558			128.922	0.527	64.442	0.8%	
120.00	2.565			128.915	0.534	64.435	0.8%	
135.00	2.565			128.915	0.534	64.435	0.8%	
150.00	2.586			128.894	0.555	64.414	0.8%	
165.00	2.591			128.889	0.56	64.409	0.8%	
180.00	2.599			128.881	0.568	64.401	0.8%	
210.00	2.603			128.877	0.572	64.397	0.8%	
227.00	2.608			128.872	0.577	64.392	0.8%	
240.00	2.610			128.87	0.579	64.39	0.8%	
255.00	2.611			128.869	0.58	64.389	0.8%	
270.00	2.615			128.865	0.584	64.385	0.8%	
285.00	2.618			128.862	0.587	64.382	0.8%	
300.00	2.621			128.859	0.59	64.379	0.8%	
315.00	2.625			128.855	0.594	64.375	0.8%	
330.00	2.625			128.855	0.594	64.375	0.8%	
345.00	2.628			128.852	0.597	64.372	0.9%	
360.00	2.268	0	#DIV/0!	129.212	0.237	64.732	0.3%	Pump off at 2:20 pm
360.50	2.295	0.5	721.000	129.185	0.264	64.705	0.4%	
360.75	2.275	0.75	481.000	129.205	0.244	64.725	0.3%	
361.00	2.298	1	361.000	129.182	0.267	64.702	0.4%	
361.50	2.294	1.5	241.000	129.186	0.263	64.706	0.4%	
362.00	2.294	2	181.000	129.186	0.263	64.706	0.4%	
362.50	2.294	2.5	145.000	129.186	0.263	64.706	0.4%	
363	2.294	3	121.000	129.186	0.263	64.706	0.4%	
363.5	2.294	3.5	103.857	129.186	0.263	64.706	0.4%	
364	2.295	4	91.000	129.185	0.264	64.705	0.4%	
365	2.281	5	73.000	129.199	0.25	64.712	0.4%	
370	2.262	10	37.000	129.218	0.231	64.738	0.3%	
375	2.248	15	25.000	129.232	0.217	64.752	0.3%	
380	2.236	20	19.000	129.244	0.205	64.764	0.3%	
385	2.221	25	15.400	129.259	0.19	64.779	0.3%	
390	2.211	30	13.000	129.269	0.18	64.789	0.3%	
395	2.2	35	11.286	129.28	0.169	64.8	0.2%	
400	2.191	40	10.000	129.289	0.16	64.809	0.2%	
405	2.185	45	9.000	129.295	0.154	64.815	0.2%	
410	2.178	50	8.200	129.302	0.147	64.822	0.2%	
415	2.171	55	7.545	129.309	0.14	64.829	0.2%	
420	2.162	60	7.000	129.318	0.131	64.838	0.2%	
425	2.158	65	6.538	129.322	0.127	64.842	0.2%	



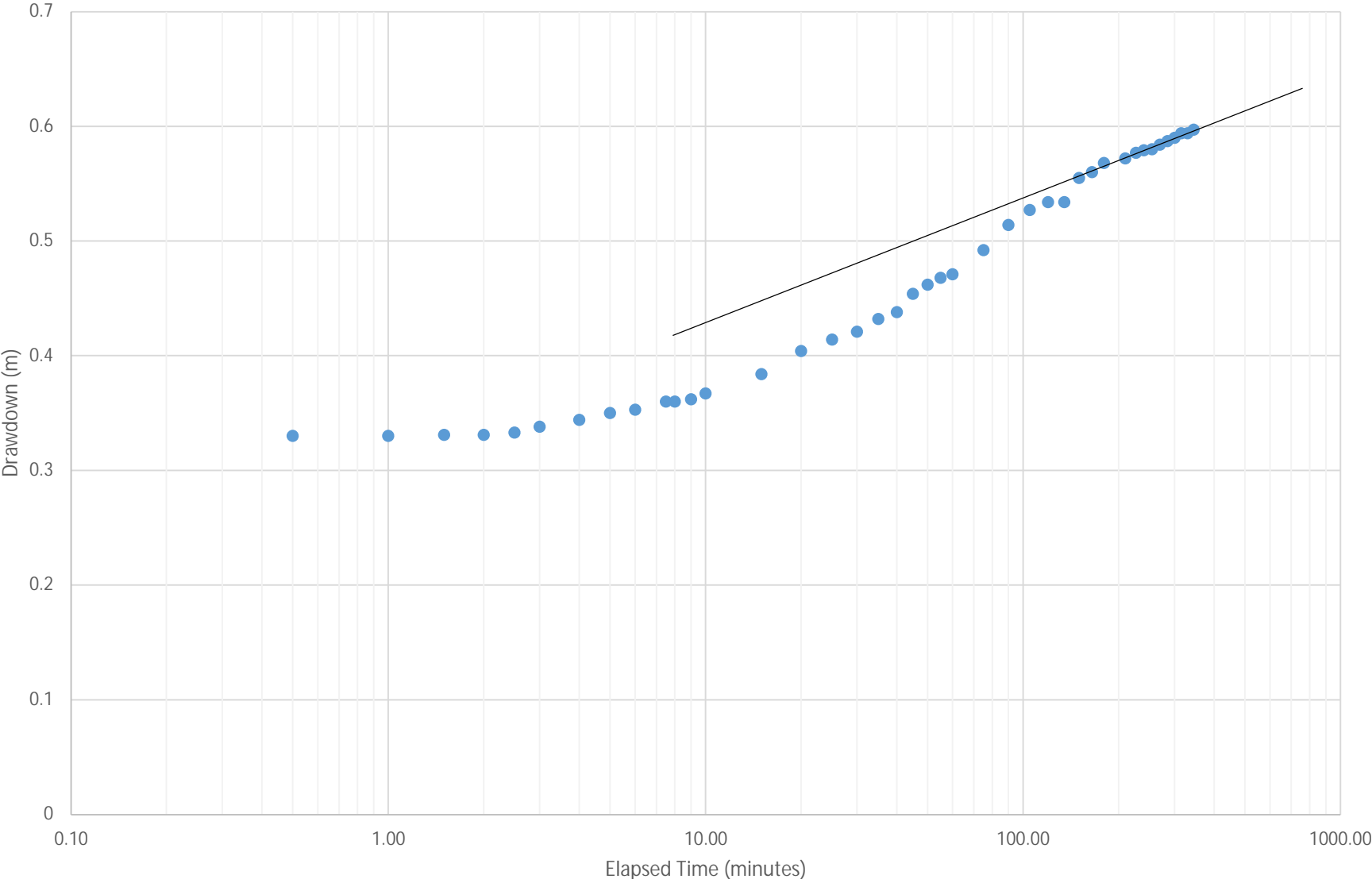
WL vs. Time, June 13, 2023
TW5 - Santaguida Subdivision



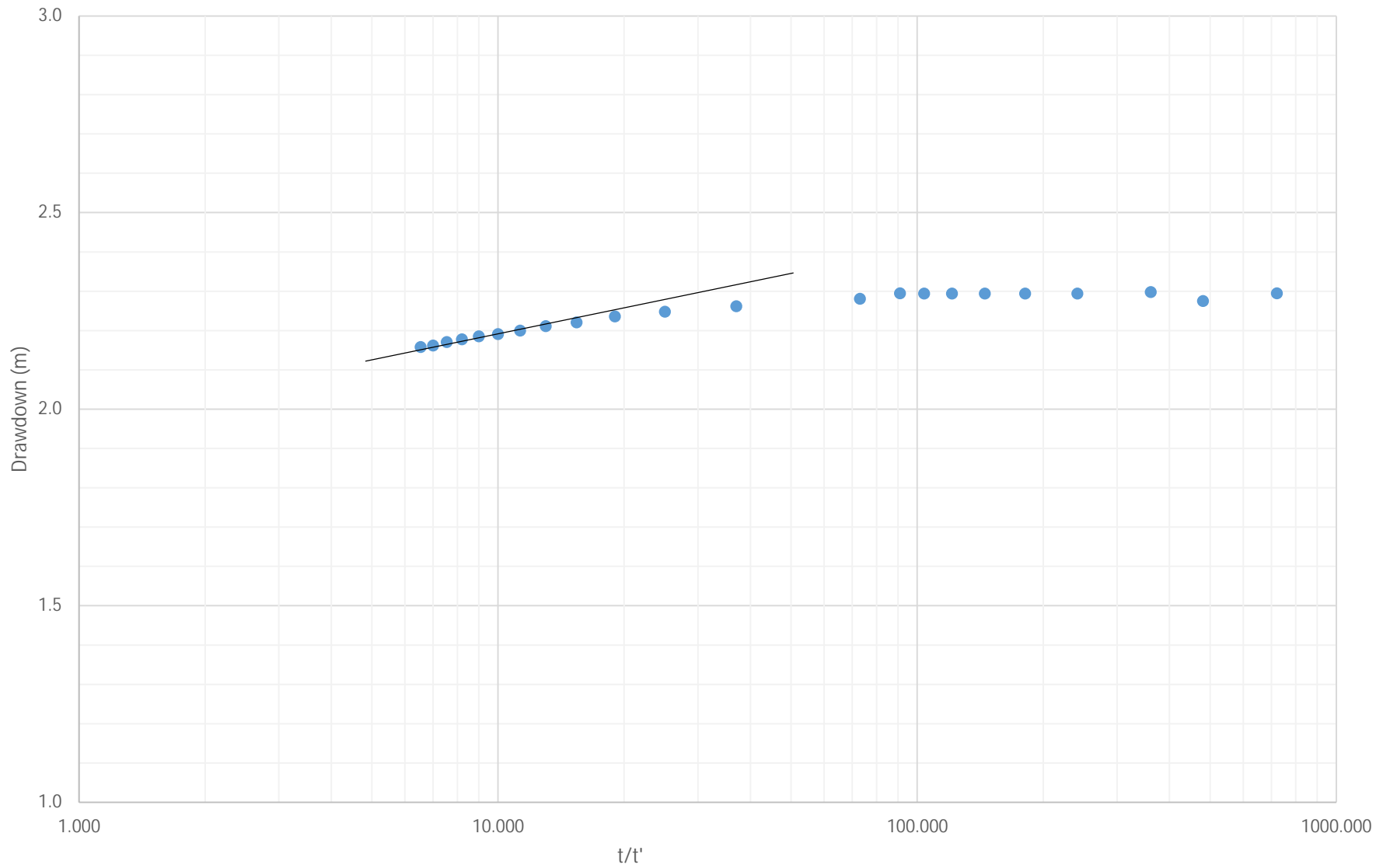
Drawdown vs Log Time
Pumping Test (Drawdown), June 13, 2023
TW5 - Santaguida Subdivision



Drawdown vs Log Time
Pumping Test (Long-Term), June 13, 2023
TW5 - Santaguida Subdivision



Drawdown vs Log Time
Pumping Test (Recovery), June 13, 2023
TW5 - Santaguida Subdivision



HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



APPENDIX F LABORATORY CERTIFICATES OF ANALYSIS

Certificate of Analysis

McIntosh Perry Consulting Eng. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 71777

Report Date: 26-Jun-2023

Order Date: 16-Jun-2023

Order #: 2324482

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

Parcel ID	Client ID
2324482-01	TW1-1
2324482-02	TW1-2

Approved By:



Dale Robertson, BSc

Laboratory Director

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	19-Jun-23	19-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	20-Jun-23	20-Jun-23
Anions	EPA 300.1 - IC	19-Jun-23	19-Jun-23
Colour	SM2120 - Spectrophotometric	16-Jun-23	16-Jun-23
Conductivity	EPA 9050A- probe @25 °C	19-Jun-23	19-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	19-Jun-23	23-Jun-23
E. coli	MOE E3407	16-Jun-23	16-Jun-23
Fecal Coliform	SM 9222D	16-Jun-23	16-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	19-Jun-23	19-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	20-Jun-23	21-Jun-23
pH	EPA 150.1 - pH probe @25 °C	19-Jun-23	19-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	19-Jun-23	19-Jun-23
Hardness	Hardness as CaCO ₃	20-Jun-23	21-Jun-23
Sulphide	SM 4500SE - Colourimetric	19-Jun-23	19-Jun-23
Tannin/Lignin	SM 5550B - Colourimetric	20-Jun-23	20-Jun-23
Total Coliform	MOE E3407	16-Jun-23	16-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	23-Jun-23	26-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	21-Jun-23	22-Jun-23
Turbidity	SM 2130B - Turbidity meter	16-Jun-23	16-Jun-23

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW1-1	TW1-2	-	-	-	-
Sample Date:	15-Jun-23 10:55	15-Jun-23 15:00	-	-	-	-
Sample ID:	2324482-01	2324482-02	-	-	-	-
Matrix:	Ground Water	Ground Water	-	-	-	-
MDL/Units						

Microbiological Parameters

E. coli	1 CFU/100mL	ND [1]	ND	-	-	-	-
Total Coliforms	1 CFU/100mL	4 [1]	ND	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	-	-	-	-

General Inorganics

Alkalinity, total	5 mg/L	249	249	-	-	-	-
Ammonia as N	0.01 mg/L	0.04	0.04	-	-	-	-
Dissolved Organic Carbon	0.5 mg/L	2.3	2.0	-	-	-	-
Colour	2 TCU	<2	<2	-	-	-	-
Conductivity	5 uS/cm	526	527	-	-	-	-
Hardness	0.824 mg/L	238	239	-	-	-	-
pH	0.1 pH Units	8.1	8.1	-	-	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-	-	-
Total Dissolved Solids	10 mg/L	244	264	-	-	-	-
Sulphide	0.02 mg/L	<0.02	<0.02	-	-	-	-
Tannin & Lignin	0.1 mg/L	<0.1	0.1	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.1	0.1	-	-	-	-
Turbidity	0.1 NTU	10.1	3.4	-	-	-	-

Anions

Chloride	1 mg/L	10	10	-	-	-	-
Fluoride	0.1 mg/L	0.3	0.3	-	-	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-	-	-
Phosphate as P	0.5 mg/L	<0.5	<0.5	-	-	-	-
Sulphate	1 mg/L	19	19	-	-	-	-

Metals

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW1-1	TW1-2	-	-	-	-
Sample Date:	15-Jun-23 10:55	15-Jun-23 15:00	-	-	-	-
Sample ID:	2324482-01	2324482-02	-	-	-	-
Matrix:	Ground Water	Ground Water	-	-	-	-
MDL/Units						

Metals

	0.1 ug/L	<0.1	<0.1	-	-	-	-
Mercury	0.1 ug/L	<0.1	<0.1	-	-	-	-
Aluminum	1 ug/L	76	15	-	-	-	-
Antimony	0.5 ug/L	<0.5	<0.5	-	-	-	-
Arsenic	1 ug/L	<1	<1	-	-	-	-
Barium	1 ug/L	399	207	-	-	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	-	-	-	-
Boron	10 ug/L	62	61	-	-	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	-	-	-	-
Calcium	100 ug/L	60300	60500	-	-	-	-
Chromium	1 ug/L	<1	<1	-	-	-	-
Cobalt	0.5 ug/L	<0.5	<0.5	-	-	-	-
Copper	0.5 ug/L	<0.5	<0.5	-	-	-	-
Iron	100 ug/L	538	496	-	-	-	-
Lead	0.1 ug/L	0.3	<0.1	-	-	-	-
Magnesium	200 ug/L	21200	21400	-	-	-	-
Manganese	5 ug/L	27	23	-	-	-	-
Molybdenum	0.5 ug/L	<0.5	<0.5	-	-	-	-
Nickel	1 ug/L	<1	<1	-	-	-	-
Potassium	100 ug/L	2760	2650	-	-	-	-
Selenium	1 ug/L	<1	<1	-	-	-	-
Silver	0.1 ug/L	<0.1	<0.1	-	-	-	-
Sodium	200 ug/L	8520	7760	-	-	-	-
Strontium	10 ug/L	936	892	-	-	-	-
Thallium	0.1 ug/L	<0.1	<0.1	-	-	-	-
Tin	5 ug/L	<5	<5	-	-	-	-

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW1-1	TW1-2	-	-	
Sample Date:	15-Jun-23 10:55	15-Jun-23 15:00	-	-	-
Sample ID:	2324482-01	2324482-02	-	-	-
Matrix:	Ground Water	Ground Water	-	-	-
MDL/Units					

Metals

Titanium	5 ug/L	<5	<5	-	-	-	-
Tungsten	10 ug/L	<10	<10	-	-	-	-
Uranium	0.1 ug/L	0.4	0.4	-	-	-	-
Vanadium	0.5 ug/L	<0.5	<0.5	-	-	-	-
Zinc	5 ug/L	<5	<5	-	-	-	-

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Phosphate as P	ND	0.5	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	TCU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NTU					
Metals								
Mercury	ND	0.1	ug/L					
Aluminum	ND	1	ug/L					
Antimony	ND	0.5	ug/L					
Arsenic	ND	1	ug/L					
Barium	ND	1	ug/L					
Beryllium	ND	0.5	ug/L					
Boron	ND	10	ug/L					
Cadmium	ND	0.1	ug/L					
Calcium	ND	100	ug/L					
Chromium	ND	1	ug/L					
Cobalt	ND	0.5	ug/L					
Copper	ND	0.5	ug/L					
Iron	ND	100	ug/L					

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Lead	ND	0.1	ug/L					
Magnesium	ND	200	ug/L					
Manganese	ND	5	ug/L					
Molybdenum	ND	0.5	ug/L					
Nickel	ND	1	ug/L					
Potassium	ND	100	ug/L					
Selenium	ND	1	ug/L					
Silver	ND	0.1	ug/L					
Sodium	ND	200	ug/L					
Strontium	ND	10	ug/L					
Thallium	ND	0.1	ug/L					
Tin	ND	5	ug/L					
Titanium	ND	5	ug/L					
Tungsten	ND	10	ug/L					
Uranium	ND	0.1	ug/L					
Vanadium	ND	0.5	ug/L					
Zinc	ND	5	ug/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	9.66	1	mg/L	9.67			0.1	20	
Fluoride	ND	0.1	mg/L	ND			NC	20	
Nitrate as N	3.23	0.1	mg/L	3.21			0.6	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Phosphate as P	ND	0.5	mg/L	ND			NC	20	
Sulphate	11.6	1	mg/L	11.7			0.5	10	
General Inorganics									
Alkalinity, total	251	5	mg/L	249			1.0	14	
Ammonia as N	0.024	0.01	mg/L	0.029			NC	18	
Dissolved Organic Carbon	7.1	0.5	mg/L	5.6			23.0	37	
Colour	ND	2	TCU	ND			NC	12	
Conductivity	529	5	uS/cm	526			0.7	5	
pH	8.1	0.1	pH Units	8.1			0.1	3.3	
Phenolics	0.001	0.001	mg/L	0.002			NC	10	
Total Dissolved Solids	264	10	mg/L	264			0.0	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	ND	0.1	mg/L	0.1			NC	11	
Total Kjeldahl Nitrogen	1.05	0.1	mg/L	1.07			1.5	16	
Turbidity	9.5	0.1	NTU	10.1			5.7	10	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Aluminum	42.4	1	ug/L	43.3			2.0	20	
Antimony	0.60	0.5	ug/L	0.74			NC	20	
Arsenic	1.9	1	ug/L	1.8			4.2	20	
Barium	409	1	ug/L	423			3.2	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	86	10	ug/L	86			0.0	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	350000	5020	ug/L	323000			8.1	20	
Chromium	ND	1	ug/L	ND			NC	20	

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Cobalt	0.52	0.5	ug/L	0.55			5.2	20	
Copper	1.05	0.5	ug/L	1.08			2.9	20	
Iron	ND	100	ug/L	ND			NC	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Magnesium	35200	200	ug/L	35700			1.4	20	
Manganese	400	5	ug/L	399			0.3	20	
Molybdenum	2.21	0.5	ug/L	2.23			1.2	20	
Nickel	1.1	1	ug/L	1.2			2.5	20	
Potassium	5240	100	ug/L	5400			2.8	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	7590	200	ug/L	7850			3.4	20	
Strontium	30100	502	ug/L	30300			0.8	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Tin	ND	5	ug/L	ND			NC	20	
Titanium	ND	5	ug/L	ND			NC	20	
Tungsten	ND	10	ug/L	ND			NC	20	
Uranium	1.9	0.1	ug/L	2.0			1.4	20	
Vanadium	ND	0.5	ug/L	0.52			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	BAC01
Total Coliforms	4	1	CFU/100mL	4			0.0	30	BAC01
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	19.8	1	mg/L	9.67	101	70-124			
Fluoride	1.02	0.1	mg/L	ND	102	70-130			
Nitrate as N	4.12	0.1	mg/L	3.21	91.0	77-126			
Nitrite as N	0.904	0.05	mg/L	ND	90.4	82-115			
Phosphate as P	5.56	0.5	mg/L	ND	111	76-130			
Sulphate	21.4	1	mg/L	11.7	97.4	74-126			
General Inorganics									
Ammonia as N	1.05	0.01	mg/L	0.029	102	81-124			
Dissolved Organic Carbon	18.2	0.5	mg/L	9.1	91.2	60-133			
Phenolics	0.028	0.001	mg/L	0.002	104	67-133			
Total Dissolved Solids	92.0	10	mg/L	ND	92.0	75-125			
Sulphide	0.50	0.02	mg/L	ND	100	79-115			
Tannin & Lignin	1.1	0.1	mg/L	0.1	101	71-113			
Total Kjeldahl Nitrogen	1.97	0.1	mg/L	1.07	90.8	81-126			
Metals									
Mercury	2.82	0.1	ug/L	ND	94.0	70-130			
Aluminum	47.1	1	ug/L	ND	94.2	80-120			
Arsenic	52.9	1	ug/L	1.8	102	80-120			
Barium	46.0	1	ug/L	ND	92.0	80-120			
Beryllium	43.7	0.5	ug/L	ND	87.5	80-120			
Boron	45	10	ug/L	ND	89.6	80-120			
Cadmium	44.4	0.1	ug/L	ND	88.8	80-120			
Calcium	9430	100	ug/L	ND	94.3	80-120			
Chromium	52.3	1	ug/L	ND	104	80-120			
Cobalt	48.3	0.5	ug/L	0.55	95.6	80-120			
Copper	45.3	0.5	ug/L	1.08	88.5	80-120			
Iron	2270	100	ug/L	ND	86.9	80-120			
Lead	41.6	0.1	ug/L	ND	83.2	80-120			
Magnesium	8500	200	ug/L	ND	85.0	80-120			
Manganese	49.2	5	ug/L	ND	98.4	80-120			

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Molybdenum	47.4	0.5	ug/L	2.23	90.2	80-120			
Nickel	47.4	1	ug/L	1.2	92.6	80-120			
Potassium	14600	100	ug/L	5400	91.6	80-120			
Selenium	48.2	1	ug/L	ND	95.6	80-120			
Silver	46.7	0.1	ug/L	ND	93.3	80-120			
Sodium	16300	200	ug/L	7850	84.3	80-120			
Thallium	42.6	0.1	ug/L	ND	85.0	80-120			
Tin	45.9	5	ug/L	ND	91.4	80-120			
Titanium	54.3	5	ug/L	ND	108	80-120			
Tungsten	43.9	10	ug/L	ND	87.6	80-120			
Uranium	48.8	0.1	ug/L	2.0	93.7	80-120			
Vanadium	53.2	0.5	ug/L	0.52	105	80-120			
Zinc	43	5	ug/L	ND	81.6	80-120			

Certificate of Analysis

Report Date: 26-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 16-Jun-2023

Client PO:

Project Description: 20-9510

Qualifier Notes:

Sample Qualifiers :

- 1: Greater than 200 CFU of background colonies present. This may interfere with target growth and ability of the analyst to count E. coli & Total Coliform. The target colonies may be under-represented.

QC Qualifiers:

- BAC01 Greater than 200 CFU of background colonies present. This may interfere with target growth and ability of the analyst to count E. coli & Total Coliform. The target colonies may be under-represented.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



Parcel Order Number (Lab Use Only) 2324482	Chain Of Custody (Lab Use Only) No 71777
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Client Name: McIntosh Perry Consulting Engineers	Project Ref: 20-9510	Page 1 of 1
Contact Name: Rebecca Leduc	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 105 Walgreen Rd, Carp. ON COA 110	PO #:	
Telephone: 613-229-8986	E-mail: r.leduc@mcintoshperry.com m.black@mcintoshperry.com	
Date Required: _____		

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ <input type="checkbox"/> Mun: _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Other: ODWS		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis															
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		E-CO ₂ , TC, FC	Substraction package metals by ICP-MS	Phosphate + Nitrate											
				Date	Time														
1 TWL-1	GW		9	15-June-23	10:55 am	X	X	X	X										
2 TWL-2	GW		9	15-June-23	3:00 pm	X	X	X	X										
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments: **These are not drinking water samples.** Method of Delivery: **Drop Box**

Relinquished By (Sign): Rebecca Leduc	Received By Driver/Depot: [Signature]	Received by Lab: [Signature]	Verified By: SD
Relinquished By (Print): Rebecca Leduc	Date/Time: 06/16/23 8:30 am	Date/Time: 2023/6/16	Date/Time: June 16, 2023 11:27 am
Date/Time: 15 June 2023 6:05 pm	Temperature: 7.9 °C	Temperature: 6.9 °C	pH Verified: <input checked="" type="checkbox"/> By SD

Certificate of Analysis

McIntosh Perry Consulting Eng. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 71776

Report Date: 23-Jun-2023
Order Date: 15-Jun-2023

Order #: 2324375

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

Paracel ID	Client ID
2324375-01	TW5-1
2324375-02	TW5-2
2324375-03	TW2-1
2324375-04	TW2-2

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	15-Jun-23	15-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	16-Jun-23	16-Jun-23
Anions	EPA 300.1 - IC	15-Jun-23	15-Jun-23
Colour	SM2120 - Spectrophotometric	15-Jun-23	15-Jun-23
Conductivity	EPA 9050A- probe @25 °C	15-Jun-23	15-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	15-Jun-23	16-Jun-23
E. coli	MOE E3407	15-Jun-23	15-Jun-23
Fecal Coliform	SM 9222D	15-Jun-23	15-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	15-Jun-23	16-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	15-Jun-23	16-Jun-23
pH	EPA 150.1 - pH probe @25 °C	15-Jun-23	15-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	15-Jun-23	16-Jun-23
Hardness	Hardness as CaCO ₃	15-Jun-23	16-Jun-23
Sulphide	SM 4500SE - Colourimetric	15-Jun-23	16-Jun-23
Tannin/Lignin	SM 5550B - Colourimetric	20-Jun-23	20-Jun-23
Total Coliform	MOE E3407	15-Jun-23	15-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	21-Jun-23	22-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	19-Jun-23	19-Jun-23
Turbidity	SM 2130B - Turbidity meter	15-Jun-23	15-Jun-23

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW5-1	TW5-2	TW2-1	TW2-2
Sample Date:	13-Jun-23 11:35	13-Jun-23 14:20	14-Jun-23 10:50	14-Jun-23 15:15
Sample ID:	2324375-01	2324375-02	2324375-03	2324375-04
MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water

Microbiological Parameters

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
E. coli	1 CFU/100mL	-	-	ND [2]	ND [1]
Total Coliforms	1 CFU/100mL	-	-	ND [2]	1 [1]
Fecal Coliforms	1 CFU/100mL	-	-	ND	ND

General Inorganics

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
Alkalinity, total	5 mg/L	274	274	252	252
Ammonia as N	0.01 mg/L	0.01	0.01	0.13	0.13
Dissolved Organic Carbon	0.5 mg/L	1.6	1.6	1.3	1.0
Colour	2 TCU	<2	<2	<2	<2
Conductivity	5 uS/cm	625	622	542	545
Hardness	0.824 mg/L	281	277	208	238
pH	0.1 pH Units	8.1	8.1	8.2	8.2
Phenolics	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	10 mg/L	308	316	272	280
Sulphide	0.02 mg/L	<0.02	<0.02	<0.02	<0.02
Tannin & Lignin	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	0.1 mg/L	0.2	<0.1	0.2	0.2
Turbidity	0.1 NTU	5.1	3.6	28.8	5.5

Anions

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
Chloride	1 mg/L	25	24	10	10
Fluoride	0.1 mg/L	0.2	0.2	0.7	0.8
Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05
Phosphate as P	0.5 mg/L	<0.5	<0.5	<0.5	<0.5
Sulphate	1 mg/L	23	23	24	24

Metals

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Aluminum	1 ug/L	14	126	8	6
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	217	224	70	80
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	29	28	254	259
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	68100	66600	52800	59900
Chromium	1 ug/L	<1	<1	<1	<1

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

	Client ID:	TW5-1	TW5-2	TW2-1	TW2-2
	Sample Date:	13-Jun-23 11:35	13-Jun-23 14:20	14-Jun-23 10:50	14-Jun-23 15:15
	Sample ID:	2324375-01	2324375-02	2324375-03	2324375-04
	MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water
Cobalt	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Copper	0.5 ug/L	<0.5	<0.5	0.6	<0.5
Iron	100 ug/L	524	432	2010	704
Lead	0.1 ug/L	<0.1	0.4	<0.1	<0.1
Magnesium	200 ug/L	26900	26900	18600	21400
Manganese	5 ug/L	20	46	31	28
Molybdenum	0.5 ug/L	0.5	<0.5	<0.5	0.5
Nickel	1 ug/L	<1	<1	<1	<1
Potassium	100 ug/L	2130	2070	5100	5470
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	14100	13200	28000	31400
Strontium	10 ug/L	380	366	2200	2120
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Tin	5 ug/L	<5	<5	<5	<5
Titanium	5 ug/L	<5	<5	<5	<5
Tungsten	10 ug/L	<10	<10	<10	<10
Uranium	0.1 ug/L	0.7	0.7	0.6	0.6
Vanadium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Zinc	5 ug/L	<5	<5	<5	<5

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	0.5	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Mercury	ND	0.1	ug/L						
Aluminum	ND	1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Calcium	ND	100	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Iron	ND	100	ug/L						
Lead	ND	0.1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Potassium	ND	100	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	10	ug/L						
Thallium	ND	0.1	ug/L						
Tin	ND	5	ug/L						
Titanium	ND	5	ug/L						
Tungsten	ND	10	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	321	1	mg/L	319			0.6	20	
Fluoride	0.15	0.1	mg/L	0.15			3.5	20	
Nitrate as N	0.48	0.1	mg/L	0.46			3.7	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Phosphate as P	ND	0.5	mg/L	ND			NC	20	
Sulphate	76.9	1	mg/L	76.7			0.3	10	
General Inorganics									
Alkalinity, total	404	5	mg/L	400			1.0	14	
Ammonia as N	0.433	0.01	mg/L	0.390			10.5	18	
Dissolved Organic Carbon	2.7	0.5	mg/L	2.9			8.4	37	
Colour	ND	2	TCU	ND			NC	12	
Conductivity	1050	5	uS/cm	1070			1.5	5	
pH	7.7	0.1	pH Units	7.7			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	284	10	mg/L	296			4.1	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	ND	0.1	mg/L	0.1			NC	11	
Total Kjeldahl Nitrogen	1.85	0.1	mg/L	1.71			8.0	16	
Turbidity	12.6	0.1	NTU	12.1			4.0	10	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Aluminum	2.8	1	ug/L	3.6			NC	20	
Antimony	ND	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	489	1	ug/L	490			0.2	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	36	10	ug/L	36			1.0	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	165000	100	ug/L	164000			0.2	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	0.56	0.5	ug/L	0.56			0.9	20	
Copper	2.09	0.5	ug/L	2.08			0.5	20	
Iron	26400	100	ug/L	26000			1.5	20	
Lead	1.09	0.1	ug/L	1.07			1.7	20	
Magnesium	8830	200	ug/L	9220			4.3	20	
Manganese	485	5	ug/L	479			1.3	20	
Molybdenum	ND	0.5	ug/L	ND			NC	20	
Nickel	2.8	1	ug/L	2.8			0.3	20	
Potassium	4830	100	ug/L	4610			4.8	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	15700	200	ug/L	15800			0.4	20	
Strontium	1340	10	ug/L	1340			0.1	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Tin	ND	5	ug/L	ND			NC	20	
Titanium	ND	5	ug/L	ND			NC	20	
Tungsten	ND	10	ug/L	ND			NC	20	
Uranium	ND	0.1	ug/L	ND			NC	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	8	1	CFU/100mL	8			0.0	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	328	1	mg/L	319	94.6	70-124			
Fluoride	1.19	0.1	mg/L	0.15	104	70-130			
Nitrate as N	1.53	0.1	mg/L	0.46	107	77-126			
Nitrite as N	0.895	0.05	mg/L	ND	89.5	82-115			
Phosphate as P	5.71	0.5	mg/L	ND	114	76-130			
Sulphate	86.3	1	mg/L	76.7	95.7	74-126			
General Inorganics									
Ammonia as N	1.48	0.01	mg/L	0.390	109	81-124			
Dissolved Organic Carbon	13.4	0.5	mg/L	4.3	90.2	60-133			
Phenolics	0.027	0.001	mg/L	ND	107	67-133			
Total Dissolved Solids	94.0	10	mg/L	ND	94.0	75-125			
Sulphide	0.51	0.02	mg/L	ND	101	79-115			
Tannin & Lignin	1.1	0.1	mg/L	0.1	101	71-113			
Total Kjeldahl Nitrogen	2.65	0.1	mg/L	1.71	94.5	81-126			
Metals									
Mercury	2.68	0.1	ug/L	ND	89.3	70-130			
Aluminum	44.4	1	ug/L	3.6	81.6	80-120			
Arsenic	51.4	1	ug/L	ND	101	80-120			
Barium	43.4	1	ug/L	ND	86.8	80-120			
Beryllium	44.3	0.5	ug/L	ND	88.5	80-120			
Boron	75	10	ug/L	36	77.6	80-120			QM-07
Cadmium	42.8	0.1	ug/L	ND	85.4	80-120			
Calcium	75100	100	ug/L	68300	67.1	80-120			QM-07
Chromium	52.1	1	ug/L	ND	103	80-120			
Cobalt	48.2	0.5	ug/L	0.56	95.3	80-120			
Copper	46.0	0.5	ug/L	2.08	87.9	80-120			
Iron	2380	100	ug/L	136	89.6	80-120			
Lead	40.8	0.1	ug/L	1.07	79.5	80-120			QM-07
Magnesium	17900	200	ug/L	9220	87.0	80-120			
Manganese	55.3	5	ug/L	6.1	98.5	80-120			
Molybdenum	43.7	0.5	ug/L	ND	86.8	80-120			
Nickel	48.8	1	ug/L	2.8	92.0	80-120			
Potassium	15200	100	ug/L	4610	106	80-120			
Selenium	47.0	1	ug/L	ND	93.8	80-120			
Silver	43.8	0.1	ug/L	ND	87.6	80-120			
Sodium	24300	200	ug/L	15800	85.5	80-120			
Strontium	46	10	ug/L	ND	92.3	80-120			
Thallium	42.0	0.1	ug/L	ND	84.0	80-120			
Tin	43.9	5	ug/L	ND	87.2	80-120			
Titanium	54.9	5	ug/L	ND	110	80-120			
Tungsten	43.3	10	ug/L	ND	86.2	80-120			
Uranium	43.0	0.1	ug/L	ND	86.0	80-120			
Vanadium	52.9	0.5	ug/L	ND	106	80-120			
Zinc	42	5	ug/L	ND	80.3	80-120			

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time - E. coli, Total Coliform, and Fecal Coliform.

Applies to samples: TW5-1, TW5-2

Sample Qualifiers :

- 1 : Greater than 200 CFU of background colonies present. This may interfere with target growth and ability of the analyst to count E. coli & Total Coliform. The target colonies may be under-represented.
- 2 : Confluent background colonies on filter: may interfere with target reactions and the analysts' ability to count E. coli & Total Coliform. The target colonies may be under-represented.

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated



Client Name: Moham Perry Consulting Engineers Ltd.	Project Ref: 20-AS10	Page 1 of 1
Contact Name: Rebecca Leduc	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 115 Walgreen Rd Camp, ON L6A 1L0	PO #: E-mail: r.leduc@mcantisiny.com m.black@mcantisiny.com	
Telephone: 613-229-8986	Date Required: _____	

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Other: DDWS		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)			Required Analysis										
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		E-CO ₂ , EC, TC	Subdivision Package	Phosphate, Mercury	Metals by ICP-MS						
				Date	Time										
1 TWS-1	GW		9	13-June-23	11:35	X	X	X	X						
2 TWS-2	GW		9	13-June-23	2:20	X	X	X	X						
3 TW2-1	GW		9	14-June-23	10:50	X	X	X	X						
4 TW2-2	GW		9	14-June-23	3:15	X	X	X	X						
5															
6															
7															
8															
9															
10															

Comments:		Method of Delivery: Drop Box	
Relinquished By (Sign): [Signature]	Received By (Print/Depot): [Signature]	Received at Lab: SD	Verified By: SD
Relinquished By (Print): Rebecca Leduc	Date/Time: June 15, 2023 8:30 AM	Date/Time: June 15, 2023 11:30 AM	Date/Time: June 15, 2023 12:05 PM
Date/Time: 14 June 23 5:35 pm	Temperature: 13.1 °C	Temperature: 10.1, 8.8 °C	pH Verified: <input checked="" type="checkbox"/> By: SD

Certificate of Analysis

McIntosh Perry Consulting Eng. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 70525

Report Date: 29-Jun-2023
Order Date: 21-Jun-2023

Order #: 2325273

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

Parcel ID	Client ID
2325273-01	TW3-1
2325273-02	TW3-2
2325273-03	TW5

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	23-Jun-23	23-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	23-Jun-23	23-Jun-23
Anions	EPA 300.1 - IC	26-Jun-23	26-Jun-23
Colour	SM2120 - Spectrophotometric	22-Jun-23	22-Jun-23
Conductivity	EPA 9050A- probe @25 °C	23-Jun-23	23-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	28-Jun-23	29-Jun-23
E. coli	MOE E3407	21-Jun-23	21-Jun-23
Fecal Coliform	SM 9222D	21-Jun-23	21-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	22-Jun-23	23-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	22-Jun-23	22-Jun-23
pH	EPA 150.1 - pH probe @25 °C	23-Jun-23	23-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	22-Jun-23	22-Jun-23
Hardness	Hardness as CaCO ₃	22-Jun-23	22-Jun-23
Sulphide	SM 4500SE - Colourimetric	26-Jun-23	26-Jun-23
Tannin/Lignin	SM 5550B - Colourimetric	23-Jun-23	23-Jun-23
Total Coliform	MOE E3407	21-Jun-23	21-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	23-Jun-23	26-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	22-Jun-23	23-Jun-23
Turbidity	SM 2130B - Turbidity meter	21-Jun-23	21-Jun-23

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW3-1	TW3-2	TW5	-
Sample Date:	20-Jun-23 12:20	20-Jun-23 14:25	20-Jun-23 07:50	-
Sample ID:	2325273-01	2325273-02	2325273-03	-
MDL/Units	Ground Water	Ground Water	Ground Water	-

Microbiological Parameters

E. coli	1 CFU/100mL	ND	ND	ND	-
Total Coliforms	1 CFU/100mL	1	1	ND	-
Fecal Coliforms	1 CFU/100mL	ND	ND	ND	-

General Inorganics

Alkalinity, total	5 mg/L	224	226	-	-
Ammonia as N	0.01 mg/L	0.05	0.05	-	-
Dissolved Organic Carbon	0.5 mg/L	2.5	2.2	-	-
Colour	2 TCU	<2	<2	-	-
Conductivity	5 uS/cm	452	437	-	-
Hardness	0.824 mg/L	239	240	-	-
pH	0.1 pH Units	8.0	8.0	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	222	224	-	-
Sulphide	0.02 mg/L	<0.02	<0.02	-	-
Tannin & Lignin	0.1 mg/L	0.3	0.2	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	<0.1	0.1	-	-
Turbidity	0.1 NTU	3.2	3.0	-	-

Anions

Chloride	1 mg/L	<1	<1	-	-
Fluoride	0.1 mg/L	0.2	0.2	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Phosphate as P	0.5 mg/L	<0.5	<0.5	-	-
Sulphate	1 mg/L	8	8	-	-

Metals

Mercury	0.1 ug/L	<0.1	<0.1	-	-
Aluminum	1 ug/L	<1	1	-	-
Antimony	0.5 ug/L	<0.5	<0.5	-	-
Arsenic	1 ug/L	<1	<1	-	-
Barium	1 ug/L	169	172	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	-	-
Boron	10 ug/L	45	45	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	-	-
Calcium	100 ug/L	58400	59100	-	-
Chromium	1 ug/L	<1	<1	-	-

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

	Client ID:	TW3-1	TW3-2	TW5	-
	Sample Date:	20-Jun-23 12:20	20-Jun-23 14:25	20-Jun-23 07:50	-
	Sample ID:	2325273-01	2325273-02	2325273-03	-
	MDL/Units	Ground Water	Ground Water	Ground Water	-
Cobalt	0.5 ug/L	<0.5	<0.5	-	-
Copper	0.5 ug/L	<0.5	<0.5	-	-
Iron	100 ug/L	755	760	-	-
Lead	0.1 ug/L	<0.1	<0.1	-	-
Magnesium	200 ug/L	22600	22500	-	-
Manganese	5 ug/L	55	56	-	-
Molybdenum	0.5 ug/L	0.5	<0.5	-	-
Nickel	1 ug/L	<1	<1	-	-
Potassium	100 ug/L	2800	2760	-	-
Selenium	1 ug/L	<1	<1	-	-
Silver	0.1 ug/L	<0.1	<0.1	-	-
Sodium	200 ug/L	904	903	-	-
Strontium	10 ug/L	1010	1010	-	-
Thallium	0.1 ug/L	<0.1	<0.1	-	-
Tin	5 ug/L	<5	<5	-	-
Titanium	5 ug/L	<5	<5	-	-
Tungsten	10 ug/L	<10	<10	-	-
Uranium	0.1 ug/L	0.3	0.3	-	-
Vanadium	0.5 ug/L	<0.5	<0.5	-	-
Zinc	5 ug/L	<5	<5	-	-

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	0.5	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Mercury	ND	0.1	ug/L						
Aluminum	ND	1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Calcium	ND	100	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Iron	ND	100	ug/L						
Lead	ND	0.1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Potassium	ND	100	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	10	ug/L						
Thallium	ND	0.1	ug/L						
Tin	ND	5	ug/L						
Titanium	ND	5	ug/L						
Tungsten	ND	10	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	288	1	mg/L	288			0.1	20	
Fluoride	0.40	0.1	mg/L	0.40			0.4	20	
Nitrate as N	0.14	0.1	mg/L	0.13			2.2	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Phosphate as P	ND	2.5	mg/L	ND			NC	20	GEN02
Sulphate	53.8	1	mg/L	53.1			1.2	10	
General Inorganics									
Alkalinity, total	189	5	mg/L	189			0.3	14	
Ammonia as N	ND	0.01	mg/L	ND			NC	18	
Dissolved Organic Carbon	3.2	0.5	mg/L	3.1			1.6	37	
Colour	ND	2	TCU	ND			NC	12	
Conductivity	332	5	uS/cm	333			0.3	5	
pH	7.9	0.1	pH Units	7.9			0.4	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	264	10	mg/L	264			0.0	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	0.1	0.1	mg/L	0.1			NC	11	
Total Kjeldahl Nitrogen	0.31	0.1	mg/L	0.34			9.8	16	
Turbidity	3.1	0.1	NTU	3.2			1.3	10	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Aluminum	6.4	1	ug/L	4.7			NC	20	
Antimony	1.48	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	165	1	ug/L	175			5.9	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	85	10	ug/L	86			1.0	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	62700	100	ug/L	64700			3.0	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	0.50	0.5	ug/L	ND			NC	20	
Iron	787	100	ug/L	786			0.1	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Magnesium	25200	200	ug/L	26300			4.1	20	
Manganese	29.9	5	ug/L	30.5			2.0	20	
Molybdenum	0.67	0.5	ug/L	ND			NC	20	
Nickel	ND	1	ug/L	ND			NC	20	
Potassium	3290	100	ug/L	3290			0.2	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	7420	200	ug/L	7740			4.2	20	
Strontium	1020	10	ug/L	1010			1.3	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Tin	ND	5	ug/L	ND			NC	20	
Titanium	ND	5	ug/L	ND			NC	20	
Tungsten	ND	10	ug/L	ND			NC	20	
Uranium	0.6	0.1	ug/L	0.6			5.8	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	1	1	CFU/100mL	1			0.0	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	299	1	mg/L	288	108	70-124			
Fluoride	1.34	0.1	mg/L	0.40	94.3	70-130			
Nitrate as N	1.16	0.1	mg/L	0.13	103	77-126			
Nitrite as N	0.901	0.05	mg/L	ND	90.1	82-115			
Phosphate as P	4.82	0.5	mg/L	ND	96.4	82-130			
Sulphate	62.4	1	mg/L	53.1	92.6	74-126			
General Inorganics									
Ammonia as N	1.05	0.01	mg/L	ND	105	81-124			
Dissolved Organic Carbon	14.3	0.5	mg/L	3.3	110	60-133			
Phenolics	0.027	0.001	mg/L	ND	108	67-133			
Total Dissolved Solids	92.0	10	mg/L	ND	92.0	75-125			
Sulphide	0.50	0.02	mg/L	ND	99.6	79-115			
Tannin & Lignin	1.0	0.1	mg/L	0.1	91.6	71-113			
Total Kjeldahl Nitrogen	1.32	0.1	mg/L	0.34	97.3	81-126			
Metals									
Mercury	2.66	0.1	ug/L	ND	88.5	80-120			
Aluminum	51.3	1	ug/L	4.7	93.1	80-120			
Arsenic	51.4	1	ug/L	ND	102	80-120			
Barium	44.7	1	ug/L	ND	89.4	80-120			
Beryllium	47.4	0.5	ug/L	ND	94.7	80-120			
Boron	124	10	ug/L	86	75.6	80-120			QM-07
Cadmium	46.7	0.1	ug/L	ND	93.3	80-120			
Calcium	9470	100	ug/L	ND	94.7	80-120			
Chromium	51.7	1	ug/L	ND	103	80-120			
Cobalt	48.7	0.5	ug/L	ND	97.3	80-120			
Copper	46.7	0.5	ug/L	ND	92.5	80-120			
Iron	3030	100	ug/L	786	89.6	80-120			
Lead	43.6	0.1	ug/L	ND	87.1	80-120			
Magnesium	34200	200	ug/L	26300	79.3	80-120			QM-07
Manganese	78.1	5	ug/L	30.5	95.2	80-120			
Molybdenum	45.6	0.5	ug/L	0.50	90.2	80-120			
Nickel	47.4	1	ug/L	ND	94.4	80-120			
Potassium	13100	100	ug/L	3290	98.2	80-120			
Selenium	47.6	1	ug/L	ND	94.9	80-120			
Silver	45.9	0.1	ug/L	ND	91.6	80-120			
Sodium	16200	200	ug/L	7740	84.7	80-120			
Strontium	47	10	ug/L	ND	93.5	80-120			
Thallium	44.8	0.1	ug/L	ND	89.4	80-120			
Tin	45.8	5	ug/L	ND	91.4	80-120			
Titanium	53.2	5	ug/L	ND	106	80-120			
Tungsten	45.9	10	ug/L	ND	91.3	80-120			
Uranium	46.8	0.1	ug/L	0.6	92.4	80-120			
Vanadium	51.9	0.5	ug/L	ND	104	80-120			
Zinc	45	5	ug/L	ND	88.2	80-120			

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers :

GEN02 Elevated Reporting Limit due to matrix interference.

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated



Parcel Order Number (Lab Use Only) 2325273	Chain Of Custody (Lab Use Only) No 70525
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Client Name: McIntosh Perry Consulting Eng Ltd	Project Ref: 20-9510	Page 1 of 1
Contact Name: Rebecca Ledue	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 115 Walgreen Rd Carp, ON L0A 1L6	PO #:	
Telephone: 613-224-8986	E-mail: r.ledue@mcintoshperry.com m.blair@mcintoshperry.com	
Date Required: _____		

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Other: ODWS		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis													
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		E-W, TC, PC	Subdivision Package	Metals by ICP-MS	Phosphate	Nitrate	Ammonia						
				Date	Time												
1 TW3-1	GW		9	20-June-23	12:20 pm	X	X	X	X								
2 TW3-2	GW		9	20-June-23	2:25 pm	X	X	X	✓								
3 TW5	GW		2	20-June-23	7:50 am	X											
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: These are not drinking water samples.		Method of Delivery: Drop Box	
Relinquished By (Sign): [Signature]	Received By Driver/Dept: [Signature]	Received at: [Signature]	Verified By: SO
Relinquished By (Print): Rebecca Ledue	Date/Time: 06/20/23 8:30 am	Date/Time: June 21, 2023 12:00	Date/Time: June 21, 2023 12:44 pm
Date/Time: 20/06/2023	Temperature: 8.9 °C	Temperature: 17 °C	pH Verified: <input checked="" type="checkbox"/> By: SO

Certificate of Analysis

McIntosh Perry Consulting Eng. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 70524

Report Date: 28-Jun-2023
Order Date: 19-Jun-2023

Order #: 2325126

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

Parcel ID	Client ID
2325126-01	TW4-1
2325126-02	TW4-2

Approved By:



Dale Robertson, BSc

Laboratory Director

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	21-Jun-23	21-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	21-Jun-23	21-Jun-23
Anions	EPA 300.1 - IC	20-Jun-23	20-Jun-23
Colour	SM2120 - Spectrophotometric	20-Jun-23	20-Jun-23
Conductivity	EPA 9050A- probe @25 °C	21-Jun-23	21-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	23-Jun-23	28-Jun-23
E. coli	MOE E3407	21-Jun-23	21-Jun-23
Fecal Coliform	SM 9222D	21-Jun-23	21-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	21-Jun-23	21-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	22-Jun-23	22-Jun-23
pH	EPA 150.1 - pH probe @25 °C	21-Jun-23	21-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	20-Jun-23	20-Jun-23
Hardness	Hardness as CaCO ₃	22-Jun-23	22-Jun-23
Sulphide	SM 4500SE - Colourimetric	26-Jun-23	26-Jun-23
Tannin/Lignin	SM 5550B - Colourimetric	23-Jun-23	23-Jun-23
Total Coliform	MOE E3407	21-Jun-23	21-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	23-Jun-23	26-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	21-Jun-23	22-Jun-23
Turbidity	SM 2130B - Turbidity meter	20-Jun-23	20-Jun-23

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW4-1	TW4-2	-	-	
Sample Date:	19-Jun-23 10:55	19-Jun-23 13:55	-	-	-
Sample ID:	2325126-01	2325126-02	-	-	-
Matrix:	Ground Water	Ground Water	-	-	-
MDL/Units					

Microbiological Parameters

E. coli	1 CFU/100mL	ND [1]	ND [1]	-	-	-	-
Total Coliforms	1 CFU/100mL	1 [1]	ND [1]	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	-	-	-	-

General Inorganics

Alkalinity, total	5 mg/L	254	254	-	-	-	-
Ammonia as N	0.01 mg/L	0.05	0.04	-	-	-	-
Dissolved Organic Carbon	0.5 mg/L	1.3	1.3	-	-	-	-
Colour	2 TCU	<2	<2	-	-	-	-
Conductivity	5 uS/cm	542	538	-	-	-	-
Hardness	0.824 mg/L	270	270	-	-	-	-
pH	0.1 pH Units	8.2	8.1	-	-	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-	-	-
Total Dissolved Solids	10 mg/L	284	278	-	-	-	-
Sulphide	0.02 mg/L	<0.02	<0.02	-	-	-	-
Tannin & Lignin	0.1 mg/L	0.1	0.1	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.1	<0.1	-	-	-	-
Turbidity	0.1 NTU	6.8	4.0	-	-	-	-

Anions

Chloride	1 mg/L	12	12	-	-	-	-
Fluoride	0.1 mg/L	0.4	0.4	-	-	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-	-	-
Phosphate as P	0.5 mg/L	<0.5	<0.5	-	-	-	-
Sulphate	1 mg/L	19	19	-	-	-	-

Metals

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW4-1	TW4-2	-	-	-	-
Sample Date:	19-Jun-23 10:55	19-Jun-23 13:55	-	-	-	-
Sample ID:	2325126-01	2325126-02	-	-	-	-
Matrix:	Ground Water	Ground Water	-	-	-	-
MDL/Units						

Metals

	0.1 ug/L	<0.1	<0.1	-	-	-	-
Mercury	0.1 ug/L	<0.1	<0.1	-	-	-	-
Aluminum	1 ug/L	5	6	-	-	-	-
Antimony	0.5 ug/L	<0.5	<0.5	-	-	-	-
Arsenic	1 ug/L	<1	<1	-	-	-	-
Barium	1 ug/L	175	174	-	-	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	-	-	-	-
Boron	10 ug/L	86	85	-	-	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	-	-	-	-
Calcium	100 ug/L	64700	64100	-	-	-	-
Chromium	1 ug/L	<1	<1	-	-	-	-
Cobalt	0.5 ug/L	<0.5	<0.5	-	-	-	-
Copper	0.5 ug/L	<0.5	<0.5	-	-	-	-
Iron	100 ug/L	786	747	-	-	-	-
Lead	0.1 ug/L	<0.1	<0.1	-	-	-	-
Magnesium	200 ug/L	26300	26600	-	-	-	-
Manganese	5 ug/L	30	32	-	-	-	-
Molybdenum	0.5 ug/L	<0.5	0.6	-	-	-	-
Nickel	1 ug/L	<1	<1	-	-	-	-
Potassium	100 ug/L	3290	3210	-	-	-	-
Selenium	1 ug/L	<1	<1	-	-	-	-
Silver	0.1 ug/L	<0.1	<0.1	-	-	-	-
Sodium	200 ug/L	7740	7460	-	-	-	-
Strontium	10 ug/L	1010	969	-	-	-	-
Thallium	0.1 ug/L	<0.1	<0.1	-	-	-	-
Tin	5 ug/L	<5	<5	-	-	-	-

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW4-1	TW4-2	-	-	
Sample Date:	19-Jun-23 10:55	19-Jun-23 13:55	-	-	-
Sample ID:	2325126-01	2325126-02	-	-	-
Matrix:	Ground Water	Ground Water	-	-	-
MDL/Units					

Metals

Titanium	5 ug/L	<5	<5	-	-	-	-
Tungsten	10 ug/L	<10	<10	-	-	-	-
Uranium	0.1 ug/L	0.6	0.6	-	-	-	-
Vanadium	0.5 ug/L	<0.5	<0.5	-	-	-	-
Zinc	5 ug/L	<5	<5	-	-	-	-

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Phosphate as P	ND	0.5	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	TCU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NTU					
Metals								
Mercury	ND	0.1	ug/L					
Aluminum	ND	1	ug/L					
Antimony	ND	0.5	ug/L					
Arsenic	ND	1	ug/L					
Barium	ND	1	ug/L					
Beryllium	ND	0.5	ug/L					
Boron	ND	10	ug/L					
Cadmium	ND	0.1	ug/L					
Calcium	ND	100	ug/L					
Chromium	ND	1	ug/L					
Cobalt	ND	0.5	ug/L					
Copper	ND	0.5	ug/L					
Iron	ND	100	ug/L					

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Lead	ND	0.1	ug/L					
Magnesium	ND	200	ug/L					
Manganese	ND	5	ug/L					
Molybdenum	ND	0.5	ug/L					
Nickel	ND	1	ug/L					
Potassium	ND	100	ug/L					
Selenium	ND	1	ug/L					
Silver	ND	0.1	ug/L					
Sodium	ND	200	ug/L					
Strontium	ND	10	ug/L					
Thallium	ND	0.1	ug/L					
Tin	ND	5	ug/L					
Titanium	ND	5	ug/L					
Tungsten	ND	10	ug/L					
Uranium	ND	0.1	ug/L					
Vanadium	ND	0.5	ug/L					
Zinc	ND	5	ug/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L	ND			NC	20	
Fluoride	ND	0.1	mg/L	ND			NC	20	
Nitrate as N	ND	0.1	mg/L	ND			NC	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Phosphate as P	ND	0.5	mg/L	ND			NC	20	
Sulphate	ND	1	mg/L	ND			NC	10	
General Inorganics									
Alkalinity, total	254	5	mg/L	254			0.0	14	
Ammonia as N	0.024	0.01	mg/L	0.029			NC	18	
Dissolved Organic Carbon	1.2	0.5	mg/L	1.3			5.6	37	
Colour	ND	2	TCU	ND			NC	12	
Conductivity	548	5	uS/cm	542			1.1	5	
pH	8.1	0.1	pH Units	8.2			0.2	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	264	10	mg/L	264			0.0	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	0.1	0.1	mg/L	0.1			NC	11	
Total Kjeldahl Nitrogen	1.05	0.1	mg/L	1.07			1.5	16	
Turbidity	6.6	0.1	NTU	6.8			2.9	10	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Aluminum	6.4	1	ug/L	4.7			NC	20	
Antimony	1.48	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	165	1	ug/L	175			5.9	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	85	10	ug/L	86			1.0	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	62700	100	ug/L	64700			3.0	20	
Chromium	ND	1	ug/L	ND			NC	20	

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	0.50	0.5	ug/L	ND			NC	20	
Iron	787	100	ug/L	786			0.1	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Magnesium	25200	200	ug/L	26300			4.1	20	
Manganese	29.9	5	ug/L	30.5			2.0	20	
Molybdenum	0.67	0.5	ug/L	ND			NC	20	
Nickel	ND	1	ug/L	ND			NC	20	
Potassium	3290	100	ug/L	3290			0.2	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	7420	200	ug/L	7740			4.2	20	
Strontium	1020	10	ug/L	1010			1.3	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Tin	ND	5	ug/L	ND			NC	20	
Titanium	ND	5	ug/L	ND			NC	20	
Tungsten	ND	10	ug/L	ND			NC	20	
Uranium	0.6	0.1	ug/L	0.6			5.8	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	BAC01
Total Coliforms	ND	1	CFU/100mL	1			NC	30	BAC01
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	10.4	1	mg/L	ND	104	70-124			
Fluoride	1.00	0.1	mg/L	ND	100	70-130			
Nitrate as N	1.10	0.1	mg/L	ND	110	77-126			
Nitrite as N	0.896	0.05	mg/L	ND	89.6	82-115			
Phosphate as P	5.05	0.5	mg/L	ND	101	76-130			
Sulphate	10.9	1	mg/L	ND	109	74-126			
General Inorganics									
Ammonia as N	1.05	0.01	mg/L	0.029	102	81-124			
Dissolved Organic Carbon	12.0	0.5	mg/L	1.3	108	60-133			
Phenolics	0.027	0.001	mg/L	ND	106	67-133			
Total Dissolved Solids	92.0	10	mg/L	ND	92.0	75-125			
Sulphide	0.50	0.02	mg/L	ND	99.6	79-115			
Tannin & Lignin	1.0	0.1	mg/L	0.1	91.6	71-113			
Total Kjeldahl Nitrogen	1.97	0.1	mg/L	1.07	90.8	81-126			
Metals									
Mercury	2.62	0.1	ug/L	ND	87.4	70-130			
Aluminum	51.3	1	ug/L	4.7	93.1	80-120			
Arsenic	51.4	1	ug/L	ND	102	80-120			
Barium	44.7	1	ug/L	ND	89.4	80-120			
Beryllium	47.4	0.5	ug/L	ND	94.7	80-120			
Boron	124	10	ug/L	86	75.6	80-120			QM-07
Cadmium	46.7	0.1	ug/L	ND	93.3	80-120			
Calcium	9470	100	ug/L	ND	94.7	80-120			
Chromium	51.7	1	ug/L	ND	103	80-120			
Cobalt	48.7	0.5	ug/L	ND	97.3	80-120			
Copper	46.7	0.5	ug/L	ND	92.5	80-120			
Iron	3030	100	ug/L	786	89.6	80-120			
Lead	43.6	0.1	ug/L	ND	87.1	80-120			
Magnesium	34200	200	ug/L	26300	79.3	80-120			QM-07
Manganese	78.1	5	ug/L	30.5	95.2	80-120			

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Molybdenum	45.6	0.5	ug/L	0.50	90.2	80-120			
Nickel	47.4	1	ug/L	ND	94.4	80-120			
Potassium	13100	100	ug/L	3290	98.2	80-120			
Selenium	47.6	1	ug/L	ND	94.9	80-120			
Silver	45.9	0.1	ug/L	ND	91.6	80-120			
Sodium	16200	200	ug/L	7740	84.7	80-120			
Strontium	47	10	ug/L	ND	93.5	80-120			
Thallium	44.8	0.1	ug/L	ND	89.4	80-120			
Tin	45.8	5	ug/L	ND	91.4	80-120			
Titanium	53.2	5	ug/L	ND	106	80-120			
Tungsten	45.9	10	ug/L	ND	91.3	80-120			
Uranium	46.8	0.1	ug/L	0.6	92.4	80-120			
Vanadium	51.9	0.5	ug/L	ND	104	80-120			
Zinc	45	5	ug/L	ND	88.2	80-120			

Certificate of Analysis

Report Date: 28-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 19-Jun-2023

Client PO:

Project Description: 20-9510

Qualifier Notes:

Sample Qualifiers :

- 1: Greater than 200 CFU of background colonies present. This may interfere with target growth and ability of the analyst to count E. coli & Total Coliform. The target colonies may be under-represented.

QC Qualifiers:

- BAC01 Greater than 200 CFU of background colonies present. This may interfere with target growth and ability of the analyst to count E. coli & Total Coliform. The target colonies may be under-represented.
- QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



2325126

No 70524

Client Name: McIntosh Perry Consulting Eng. Ltd	Project Ref: 20-9510	Page 1 of 1
Contact Name: Rebecca Cedue	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 65 Walgreen Rd Carp, ON L0A 1W0	PO #:	
Telephone: 613-221-8986	E-mail: r.cedue@mcintoshperry.com m.blair@mcintoshperry.com	
Date Required: _____		

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PW00 <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Other: <u>ODWS</u>		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis																
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		EC, FC, TC	Subdivision	Package Metals by ICP-MS	Phosphate + Mercury											
				Date	Time															
1 TW4-1			9	19-June-23	10:55 am	x	x	x	x											
2 TW4-2			9	19-June-23	1:55 pm	x	x	x	x											
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				

Comments: These are ~~not~~ drinking water samples Method of Delivery: Walk

Relinquished By (Sign): <u>R Cedue</u>	Received By (Driver/Dep): <u>[Signature]</u>	Received at Lab: <u>SD</u>	Verified By: <u>SD</u>
Relinquished By (Print): Rebecca Cedue	Date/Time: <u>June 19/23 3:38 pm</u>	Date/Time: <u>June 20, 2023 12:20 pm</u>	Date/Time: <u>June 20, 2023 12:37 pm</u>
Date/Time: <u>19/06/23 3:35 pm</u>	Temperature: <u>15.7</u> °C	Temperature: <u>5.4</u> °C	pH Verified: <u>7</u> By: <u>SD</u>

Certificate of Analysis

McIntosh Perry Consulting Eng. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 71776

Report Date: 23-Jun-2023
Order Date: 15-Jun-2023

Order #: 2324375

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

Paracel ID	Client ID
2324375-01	TW5-1
2324375-02	TW5-2
2324375-03	TW2-1
2324375-04	TW2-2

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	15-Jun-23	15-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	16-Jun-23	16-Jun-23
Anions	EPA 300.1 - IC	15-Jun-23	15-Jun-23
Colour	SM2120 - Spectrophotometric	15-Jun-23	15-Jun-23
Conductivity	EPA 9050A- probe @25 °C	15-Jun-23	15-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	15-Jun-23	16-Jun-23
E. coli	MOE E3407	15-Jun-23	15-Jun-23
Fecal Coliform	SM 9222D	15-Jun-23	15-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	15-Jun-23	16-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	15-Jun-23	16-Jun-23
pH	EPA 150.1 - pH probe @25 °C	15-Jun-23	15-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	15-Jun-23	16-Jun-23
Hardness	Hardness as CaCO ₃	15-Jun-23	16-Jun-23
Sulphide	SM 4500SE - Colourimetric	15-Jun-23	16-Jun-23
Tannin/Lignin	SM 5550B - Colourimetric	20-Jun-23	20-Jun-23
Total Coliform	MOE E3407	15-Jun-23	15-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	21-Jun-23	22-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	19-Jun-23	19-Jun-23
Turbidity	SM 2130B - Turbidity meter	15-Jun-23	15-Jun-23

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW5-1	TW5-2	TW2-1	TW2-2
Sample Date:	13-Jun-23 11:35	13-Jun-23 14:20	14-Jun-23 10:50	14-Jun-23 15:15
Sample ID:	2324375-01	2324375-02	2324375-03	2324375-04
MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water

Microbiological Parameters

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
E. coli	1 CFU/100mL	-	-	ND [2]	ND [1]
Total Coliforms	1 CFU/100mL	-	-	ND [2]	1 [1]
Fecal Coliforms	1 CFU/100mL	-	-	ND	ND

General Inorganics

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
Alkalinity, total	5 mg/L	274	274	252	252
Ammonia as N	0.01 mg/L	0.01	0.01	0.13	0.13
Dissolved Organic Carbon	0.5 mg/L	1.6	1.6	1.3	1.0
Colour	2 TCU	<2	<2	<2	<2
Conductivity	5 uS/cm	625	622	542	545
Hardness	0.824 mg/L	281	277	208	238
pH	0.1 pH Units	8.1	8.1	8.2	8.2
Phenolics	0.001 mg/L	<0.001	<0.001	<0.001	<0.001
Total Dissolved Solids	10 mg/L	308	316	272	280
Sulphide	0.02 mg/L	<0.02	<0.02	<0.02	<0.02
Tannin & Lignin	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	0.1 mg/L	0.2	<0.1	0.2	0.2
Turbidity	0.1 NTU	5.1	3.6	28.8	5.5

Anions

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
Chloride	1 mg/L	25	24	10	10
Fluoride	0.1 mg/L	0.2	0.2	0.7	0.8
Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	<0.1
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	<0.05
Phosphate as P	0.5 mg/L	<0.5	<0.5	<0.5	<0.5
Sulphate	1 mg/L	23	23	24	24

Metals

Parameter	MDL/Units	TW5-1	TW5-2	TW2-1	TW2-2
Mercury	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Aluminum	1 ug/L	14	126	8	6
Antimony	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Arsenic	1 ug/L	<1	<1	<1	<1
Barium	1 ug/L	217	224	70	80
Beryllium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Boron	10 ug/L	29	28	254	259
Cadmium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Calcium	100 ug/L	68100	66600	52800	59900
Chromium	1 ug/L	<1	<1	<1	<1

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

	Client ID:	TW5-1	TW5-2	TW2-1	TW2-2
	Sample Date:	13-Jun-23 11:35	13-Jun-23 14:20	14-Jun-23 10:50	14-Jun-23 15:15
	Sample ID:	2324375-01	2324375-02	2324375-03	2324375-04
	MDL/Units	Ground Water	Ground Water	Ground Water	Ground Water
Cobalt	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Copper	0.5 ug/L	<0.5	<0.5	0.6	<0.5
Iron	100 ug/L	524	432	2010	704
Lead	0.1 ug/L	<0.1	0.4	<0.1	<0.1
Magnesium	200 ug/L	26900	26900	18600	21400
Manganese	5 ug/L	20	46	31	28
Molybdenum	0.5 ug/L	0.5	<0.5	<0.5	0.5
Nickel	1 ug/L	<1	<1	<1	<1
Potassium	100 ug/L	2130	2070	5100	5470
Selenium	1 ug/L	<1	<1	<1	<1
Silver	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Sodium	200 ug/L	14100	13200	28000	31400
Strontium	10 ug/L	380	366	2200	2120
Thallium	0.1 ug/L	<0.1	<0.1	<0.1	<0.1
Tin	5 ug/L	<5	<5	<5	<5
Titanium	5 ug/L	<5	<5	<5	<5
Tungsten	10 ug/L	<10	<10	<10	<10
Uranium	0.1 ug/L	0.7	0.7	0.6	0.6
Vanadium	0.5 ug/L	<0.5	<0.5	<0.5	<0.5
Zinc	5 ug/L	<5	<5	<5	<5

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	0.5	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Mercury	ND	0.1	ug/L						
Aluminum	ND	1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Calcium	ND	100	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Iron	ND	100	ug/L						
Lead	ND	0.1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Potassium	ND	100	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	10	ug/L						
Thallium	ND	0.1	ug/L						
Tin	ND	5	ug/L						
Titanium	ND	5	ug/L						
Tungsten	ND	10	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	321	1	mg/L	319			0.6	20	
Fluoride	0.15	0.1	mg/L	0.15			3.5	20	
Nitrate as N	0.48	0.1	mg/L	0.46			3.7	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Phosphate as P	ND	0.5	mg/L	ND			NC	20	
Sulphate	76.9	1	mg/L	76.7			0.3	10	
General Inorganics									
Alkalinity, total	404	5	mg/L	400			1.0	14	
Ammonia as N	0.433	0.01	mg/L	0.390			10.5	18	
Dissolved Organic Carbon	2.7	0.5	mg/L	2.9			8.4	37	
Colour	ND	2	TCU	ND			NC	12	
Conductivity	1050	5	uS/cm	1070			1.5	5	
pH	7.7	0.1	pH Units	7.7			0.3	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	284	10	mg/L	296			4.1	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	ND	0.1	mg/L	0.1			NC	11	
Total Kjeldahl Nitrogen	1.85	0.1	mg/L	1.71			8.0	16	
Turbidity	12.6	0.1	NTU	12.1			4.0	10	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Aluminum	2.8	1	ug/L	3.6			NC	20	
Antimony	ND	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	489	1	ug/L	490			0.2	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	36	10	ug/L	36			1.0	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	165000	100	ug/L	164000			0.2	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	0.56	0.5	ug/L	0.56			0.9	20	
Copper	2.09	0.5	ug/L	2.08			0.5	20	
Iron	26400	100	ug/L	26000			1.5	20	
Lead	1.09	0.1	ug/L	1.07			1.7	20	
Magnesium	8830	200	ug/L	9220			4.3	20	
Manganese	485	5	ug/L	479			1.3	20	
Molybdenum	ND	0.5	ug/L	ND			NC	20	
Nickel	2.8	1	ug/L	2.8			0.3	20	
Potassium	4830	100	ug/L	4610			4.8	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	15700	200	ug/L	15800			0.4	20	
Strontium	1340	10	ug/L	1340			0.1	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Tin	ND	5	ug/L	ND			NC	20	
Titanium	ND	5	ug/L	ND			NC	20	
Tungsten	ND	10	ug/L	ND			NC	20	
Uranium	ND	0.1	ug/L	ND			NC	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	8	1	CFU/100mL	8			0.0	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	328	1	mg/L	319	94.6	70-124			
Fluoride	1.19	0.1	mg/L	0.15	104	70-130			
Nitrate as N	1.53	0.1	mg/L	0.46	107	77-126			
Nitrite as N	0.895	0.05	mg/L	ND	89.5	82-115			
Phosphate as P	5.71	0.5	mg/L	ND	114	76-130			
Sulphate	86.3	1	mg/L	76.7	95.7	74-126			
General Inorganics									
Ammonia as N	1.48	0.01	mg/L	0.390	109	81-124			
Dissolved Organic Carbon	13.4	0.5	mg/L	4.3	90.2	60-133			
Phenolics	0.027	0.001	mg/L	ND	107	67-133			
Total Dissolved Solids	94.0	10	mg/L	ND	94.0	75-125			
Sulphide	0.51	0.02	mg/L	ND	101	79-115			
Tannin & Lignin	1.1	0.1	mg/L	0.1	101	71-113			
Total Kjeldahl Nitrogen	2.65	0.1	mg/L	1.71	94.5	81-126			
Metals									
Mercury	2.68	0.1	ug/L	ND	89.3	70-130			
Aluminum	44.4	1	ug/L	3.6	81.6	80-120			
Arsenic	51.4	1	ug/L	ND	101	80-120			
Barium	43.4	1	ug/L	ND	86.8	80-120			
Beryllium	44.3	0.5	ug/L	ND	88.5	80-120			
Boron	75	10	ug/L	36	77.6	80-120			QM-07
Cadmium	42.8	0.1	ug/L	ND	85.4	80-120			
Calcium	75100	100	ug/L	68300	67.1	80-120			QM-07
Chromium	52.1	1	ug/L	ND	103	80-120			
Cobalt	48.2	0.5	ug/L	0.56	95.3	80-120			
Copper	46.0	0.5	ug/L	2.08	87.9	80-120			
Iron	2380	100	ug/L	136	89.6	80-120			
Lead	40.8	0.1	ug/L	1.07	79.5	80-120			QM-07
Magnesium	17900	200	ug/L	9220	87.0	80-120			
Manganese	55.3	5	ug/L	6.1	98.5	80-120			
Molybdenum	43.7	0.5	ug/L	ND	86.8	80-120			
Nickel	48.8	1	ug/L	2.8	92.0	80-120			
Potassium	15200	100	ug/L	4610	106	80-120			
Selenium	47.0	1	ug/L	ND	93.8	80-120			
Silver	43.8	0.1	ug/L	ND	87.6	80-120			
Sodium	24300	200	ug/L	15800	85.5	80-120			
Strontium	46	10	ug/L	ND	92.3	80-120			
Thallium	42.0	0.1	ug/L	ND	84.0	80-120			
Tin	43.9	5	ug/L	ND	87.2	80-120			
Titanium	54.9	5	ug/L	ND	110	80-120			
Tungsten	43.3	10	ug/L	ND	86.2	80-120			
Uranium	43.0	0.1	ug/L	ND	86.0	80-120			
Vanadium	52.9	0.5	ug/L	ND	106	80-120			
Zinc	42	5	ug/L	ND	80.3	80-120			

Certificate of Analysis

Report Date: 23-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 15-Jun-2023

Client PO:

Project Description: 20-9510

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time - E. coli, Total Coliform, and Fecal Coliform.

Applies to samples: TW5-1, TW5-2

Sample Qualifiers :

- 1 : Greater than 200 CFU of background colonies present. This may interfere with target growth and ability of the analyst to count E. coli & Total Coliform. The target colonies may be under-represented.
- 2 : Confluent background colonies on filter: may interfere with target reactions and the analysts' ability to count E. coli & Total Coliform. The target colonies may be under-represented.

QC Qualifiers :

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

Sample Data Revisions

None

Work Order Revisions / Comments:

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated



Client Name: MCM Environmental Consulting Engineers Ltd.	Project Ref: 20-AS10	Page 1 of 1
Contact Name: Rebecca Leduc	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 115 Walgreen Rd Lamp, ON L6A 1G0	PO #:	
Telephone: 613-229-8986	E-mail: r.leduc@mantisinfenvy.com m.black@mantisinfenvy.com	Date Required: _____

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Other: DDWS		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)			Required Analysis											
Sample ID/Location Name		Matrix	Air Volume	# of Containers	Sample Taken		E-CO ₂ , EC, TC	Subdivision Package	Phosphate, Mercury	Metals by ICP-MS						
					Date	Time										
1	TWS-1	GW		9	13-June-23	11:35	X	X	X	X						
2	TWS-2	GW		9	13-June-23	2:20	X	X	X	X						
3	TW2-1	GW		9	14-June-23	10:50	X	X	X	X						
4	TW2-2	GW		9	14-June-23	3:15	X	X	X	X						
5																
6																
7																
8																
9																
10																

Comments:		Method of Delivery: Drop Box	
Relinquished By (Sign): [Signature]	Received By (Print/Depot): [Signature]	Received at Lab: SD	Verified By: SD
Relinquished By (Print): Rebecca Leduc	Date/Time: June 15, 2023 8:30 AM	Date/Time: June 15, 2023 11:30 AM	Date/Time: June 15, 2023 12:05 PM
Date/Time: 14 June 23 5:35 pm	Temperature: 13.1 °C	Temperature: 10.1, 8.8 °C	pH Verified: <input checked="" type="checkbox"/> By: SD

Certificate of Analysis

McIntosh Perry Consulting Eng. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 70525

Report Date: 29-Jun-2023
Order Date: 21-Jun-2023

Order #: 2325273

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

Paracel ID	Client ID
2325273-01	TW3-1
2325273-02	TW3-2
2325273-03	TW5

Approved By:



Dale Robertson, BSc
Laboratory Director

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	23-Jun-23	23-Jun-23
Ammonia, as N	EPA 351.2 - Auto Colour	23-Jun-23	23-Jun-23
Anions	EPA 300.1 - IC	26-Jun-23	26-Jun-23
Colour	SM2120 - Spectrophotometric	22-Jun-23	22-Jun-23
Conductivity	EPA 9050A- probe @25 °C	23-Jun-23	23-Jun-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	28-Jun-23	29-Jun-23
E. coli	MOE E3407	21-Jun-23	21-Jun-23
Fecal Coliform	SM 9222D	21-Jun-23	21-Jun-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	22-Jun-23	23-Jun-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	22-Jun-23	22-Jun-23
pH	EPA 150.1 - pH probe @25 °C	23-Jun-23	23-Jun-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	22-Jun-23	22-Jun-23
Hardness	Hardness as CaCO ₃	22-Jun-23	22-Jun-23
Sulphide	SM 4500SE - Colourimetric	26-Jun-23	26-Jun-23
Tannin/Lignin	SM 5550B - Colourimetric	23-Jun-23	23-Jun-23
Total Coliform	MOE E3407	21-Jun-23	21-Jun-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	23-Jun-23	26-Jun-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	22-Jun-23	23-Jun-23
Turbidity	SM 2130B - Turbidity meter	21-Jun-23	21-Jun-23

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Client ID:	TW3-1	TW3-2	TW5	-
Sample Date:	20-Jun-23 12:20	20-Jun-23 14:25	20-Jun-23 07:50	-
Sample ID:	2325273-01	2325273-02	2325273-03	-
MDL/Units	Ground Water	Ground Water	Ground Water	-

Microbiological Parameters

E. coli	1 CFU/100mL	ND	ND	ND	-
Total Coliforms	1 CFU/100mL	1	1	ND	-
Fecal Coliforms	1 CFU/100mL	ND	ND	ND	-

General Inorganics

Alkalinity, total	5 mg/L	224	226	-	-
Ammonia as N	0.01 mg/L	0.05	0.05	-	-
Dissolved Organic Carbon	0.5 mg/L	2.5	2.2	-	-
Colour	2 TCU	<2	<2	-	-
Conductivity	5 uS/cm	452	437	-	-
Hardness	0.824 mg/L	239	240	-	-
pH	0.1 pH Units	8.0	8.0	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-
Total Dissolved Solids	10 mg/L	222	224	-	-
Sulphide	0.02 mg/L	<0.02	<0.02	-	-
Tannin & Lignin	0.1 mg/L	0.3	0.2	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	<0.1	0.1	-	-
Turbidity	0.1 NTU	3.2	3.0	-	-

Anions

Chloride	1 mg/L	<1	<1	-	-
Fluoride	0.1 mg/L	0.2	0.2	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-
Phosphate as P	0.5 mg/L	<0.5	<0.5	-	-
Sulphate	1 mg/L	8	8	-	-

Metals

Mercury	0.1 ug/L	<0.1	<0.1	-	-
Aluminum	1 ug/L	<1	1	-	-
Antimony	0.5 ug/L	<0.5	<0.5	-	-
Arsenic	1 ug/L	<1	<1	-	-
Barium	1 ug/L	169	172	-	-
Beryllium	0.5 ug/L	<0.5	<0.5	-	-
Boron	10 ug/L	45	45	-	-
Cadmium	0.1 ug/L	<0.1	<0.1	-	-
Calcium	100 ug/L	58400	59100	-	-
Chromium	1 ug/L	<1	<1	-	-

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

	Client ID:	TW3-1	TW3-2	TW5	-
	Sample Date:	20-Jun-23 12:20	20-Jun-23 14:25	20-Jun-23 07:50	-
	Sample ID:	2325273-01	2325273-02	2325273-03	-
	MDL/Units	Ground Water	Ground Water	Ground Water	-
Cobalt	0.5 ug/L	<0.5	<0.5	-	-
Copper	0.5 ug/L	<0.5	<0.5	-	-
Iron	100 ug/L	755	760	-	-
Lead	0.1 ug/L	<0.1	<0.1	-	-
Magnesium	200 ug/L	22600	22500	-	-
Manganese	5 ug/L	55	56	-	-
Molybdenum	0.5 ug/L	0.5	<0.5	-	-
Nickel	1 ug/L	<1	<1	-	-
Potassium	100 ug/L	2800	2760	-	-
Selenium	1 ug/L	<1	<1	-	-
Silver	0.1 ug/L	<0.1	<0.1	-	-
Sodium	200 ug/L	904	903	-	-
Strontium	10 ug/L	1010	1010	-	-
Thallium	0.1 ug/L	<0.1	<0.1	-	-
Tin	5 ug/L	<5	<5	-	-
Titanium	5 ug/L	<5	<5	-	-
Tungsten	10 ug/L	<10	<10	-	-
Uranium	0.1 ug/L	0.3	0.3	-	-
Vanadium	0.5 ug/L	<0.5	<0.5	-	-
Zinc	5 ug/L	<5	<5	-	-

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	0.5	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Mercury	ND	0.1	ug/L						
Aluminum	ND	1	ug/L						
Antimony	ND	0.5	ug/L						
Arsenic	ND	1	ug/L						
Barium	ND	1	ug/L						
Beryllium	ND	0.5	ug/L						
Boron	ND	10	ug/L						
Cadmium	ND	0.1	ug/L						
Calcium	ND	100	ug/L						
Chromium	ND	1	ug/L						
Cobalt	ND	0.5	ug/L						
Copper	ND	0.5	ug/L						
Iron	ND	100	ug/L						
Lead	ND	0.1	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Molybdenum	ND	0.5	ug/L						
Nickel	ND	1	ug/L						
Potassium	ND	100	ug/L						
Selenium	ND	1	ug/L						
Silver	ND	0.1	ug/L						
Sodium	ND	200	ug/L						
Strontium	ND	10	ug/L						
Thallium	ND	0.1	ug/L						
Tin	ND	5	ug/L						
Titanium	ND	5	ug/L						
Tungsten	ND	10	ug/L						
Uranium	ND	0.1	ug/L						
Vanadium	ND	0.5	ug/L						
Zinc	ND	5	ug/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	288	1	mg/L	288			0.1	20	
Fluoride	0.40	0.1	mg/L	0.40			0.4	20	
Nitrate as N	0.14	0.1	mg/L	0.13			2.2	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Phosphate as P	ND	2.5	mg/L	ND			NC	20	GEN02
Sulphate	53.8	1	mg/L	53.1			1.2	10	
General Inorganics									
Alkalinity, total	189	5	mg/L	189			0.3	14	
Ammonia as N	ND	0.01	mg/L	ND			NC	18	
Dissolved Organic Carbon	3.2	0.5	mg/L	3.1			1.6	37	
Colour	ND	2	TCU	ND			NC	12	
Conductivity	332	5	uS/cm	333			0.3	5	
pH	7.9	0.1	pH Units	7.9			0.4	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	264	10	mg/L	264			0.0	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	0.1	0.1	mg/L	0.1			NC	11	
Total Kjeldahl Nitrogen	0.31	0.1	mg/L	0.34			9.8	16	
Turbidity	3.1	0.1	NTU	3.2			1.3	10	
Metals									
Mercury	ND	0.1	ug/L	ND			NC	20	
Aluminum	6.4	1	ug/L	4.7			NC	20	
Antimony	1.48	0.5	ug/L	ND			NC	20	
Arsenic	ND	1	ug/L	ND			NC	20	
Barium	165	1	ug/L	175			5.9	20	
Beryllium	ND	0.5	ug/L	ND			NC	20	
Boron	85	10	ug/L	86			1.0	20	
Cadmium	ND	0.1	ug/L	ND			NC	20	
Calcium	62700	100	ug/L	64700			3.0	20	
Chromium	ND	1	ug/L	ND			NC	20	
Cobalt	ND	0.5	ug/L	ND			NC	20	
Copper	0.50	0.5	ug/L	ND			NC	20	
Iron	787	100	ug/L	786			0.1	20	
Lead	ND	0.1	ug/L	ND			NC	20	
Magnesium	25200	200	ug/L	26300			4.1	20	
Manganese	29.9	5	ug/L	30.5			2.0	20	
Molybdenum	0.67	0.5	ug/L	ND			NC	20	
Nickel	ND	1	ug/L	ND			NC	20	
Potassium	3290	100	ug/L	3290			0.2	20	
Selenium	ND	1	ug/L	ND			NC	20	
Silver	ND	0.1	ug/L	ND			NC	20	
Sodium	7420	200	ug/L	7740			4.2	20	
Strontium	1020	10	ug/L	1010			1.3	20	
Thallium	ND	0.1	ug/L	ND			NC	20	
Tin	ND	5	ug/L	ND			NC	20	
Titanium	ND	5	ug/L	ND			NC	20	
Tungsten	ND	10	ug/L	ND			NC	20	
Uranium	0.6	0.1	ug/L	0.6			5.8	20	
Vanadium	ND	0.5	ug/L	ND			NC	20	
Zinc	ND	5	ug/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	1	1	CFU/100mL	1			0.0	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	299	1	mg/L	288	108	70-124			
Fluoride	1.34	0.1	mg/L	0.40	94.3	70-130			
Nitrate as N	1.16	0.1	mg/L	0.13	103	77-126			
Nitrite as N	0.901	0.05	mg/L	ND	90.1	82-115			
Phosphate as P	4.82	0.5	mg/L	ND	96.4	82-130			
Sulphate	62.4	1	mg/L	53.1	92.6	74-126			
General Inorganics									
Ammonia as N	1.05	0.01	mg/L	ND	105	81-124			
Dissolved Organic Carbon	14.3	0.5	mg/L	3.3	110	60-133			
Phenolics	0.027	0.001	mg/L	ND	108	67-133			
Total Dissolved Solids	92.0	10	mg/L	ND	92.0	75-125			
Sulphide	0.50	0.02	mg/L	ND	99.6	79-115			
Tannin & Lignin	1.0	0.1	mg/L	0.1	91.6	71-113			
Total Kjeldahl Nitrogen	1.32	0.1	mg/L	0.34	97.3	81-126			
Metals									
Mercury	2.66	0.1	ug/L	ND	88.5	80-120			
Aluminum	51.3	1	ug/L	4.7	93.1	80-120			
Arsenic	51.4	1	ug/L	ND	102	80-120			
Barium	44.7	1	ug/L	ND	89.4	80-120			
Beryllium	47.4	0.5	ug/L	ND	94.7	80-120			
Boron	124	10	ug/L	86	75.6	80-120			QM-07
Cadmium	46.7	0.1	ug/L	ND	93.3	80-120			
Calcium	9470	100	ug/L	ND	94.7	80-120			
Chromium	51.7	1	ug/L	ND	103	80-120			
Cobalt	48.7	0.5	ug/L	ND	97.3	80-120			
Copper	46.7	0.5	ug/L	ND	92.5	80-120			
Iron	3030	100	ug/L	786	89.6	80-120			
Lead	43.6	0.1	ug/L	ND	87.1	80-120			
Magnesium	34200	200	ug/L	26300	79.3	80-120			QM-07
Manganese	78.1	5	ug/L	30.5	95.2	80-120			
Molybdenum	45.6	0.5	ug/L	0.50	90.2	80-120			
Nickel	47.4	1	ug/L	ND	94.4	80-120			
Potassium	13100	100	ug/L	3290	98.2	80-120			
Selenium	47.6	1	ug/L	ND	94.9	80-120			
Silver	45.9	0.1	ug/L	ND	91.6	80-120			
Sodium	16200	200	ug/L	7740	84.7	80-120			
Strontium	47	10	ug/L	ND	93.5	80-120			
Thallium	44.8	0.1	ug/L	ND	89.4	80-120			
Tin	45.8	5	ug/L	ND	91.4	80-120			
Titanium	53.2	5	ug/L	ND	106	80-120			
Tungsten	45.9	10	ug/L	ND	91.3	80-120			
Uranium	46.8	0.1	ug/L	0.6	92.4	80-120			
Vanadium	51.9	0.5	ug/L	ND	104	80-120			
Zinc	45	5	ug/L	ND	88.2	80-120			

Certificate of Analysis

Report Date: 29-Jun-2023

Client: McIntosh Perry Consulting Eng. (Carp)

Order Date: 21-Jun-2023

Client PO:

Project Description: 20-9510

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers :

GEN02 Elevated Reporting Limit due to matrix interference.

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

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated



Parcel Order Number (Lab Use Only) 2325273	Chain Of Custody (Lab Use Only) No 70525
---	---

Client Name: McIntosh Perry Consulting Eng Ltd	Project Ref: 20-9510	Page 1 of 1
Contact Name: Rebecca Ledue	Quote #:	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular
Address: 115 Walgreen Rd Carp, ON L0A 1L6	PO #:	
Telephone: 613-224-8986	E-mail: r.ledue@mcintoshperry.com m.blair@mcintoshperry.com	
Date Required: _____		

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Other: ODWS		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis													
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		E-W, TC, PC	Subdivision Package	Metals by ICP-MS	Phosphate	Nitrate	Ammonia						
				Date	Time												
1 TW3-1	GW		9	20-June-23	12:20 pm	X	X	X	X								
2 TW3-2	GW		9	20-June-23	2:25 pm	X	X	X	✓								
3 TW5	GW		2	20-June-23	7:50 am	X											
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: These are not drinking water samples.		Method of Delivery: Drop Box	
Relinquished By (Sign): [Signature]	Received By Driver/Dept: [Signature]	Received at: [Signature]	Verified By: SO
Relinquished By (Print): Rebecca Ledue	Date/Time: 06/20/23 8:30 am	Date/Time: June 21, 2023 12:00	Date/Time: June 21, 2023 12:44 pm
Date/Time: 20/06/2023	Temperature: 8.9 °C	Temperature: 17 °C	pH Verified: <input checked="" type="checkbox"/> By: SO

C.O.C.: -

REPORT No: 23-018390 - Rev. 0

Report To:

McIntosh Perry
 115 Walgreen Rd.
 R.R. #3
 Carp, ON K0A 1L0

CADUCEON Environmental Laboratories

2378 Holly Lane
 Ottawa, ON K1V 7P1

Attention: Rebecca Leduc

DATE RECEIVED: 2023-Jul-21
 DATE REPORTED: 2023-Jul-24
 SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: 20-9510
 P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
E.Coli m-TECH Media (Liquid)	5	OTTAWA	AHIRSI	2023-Jul-21	EC-001	MECP E3371
Fecal Coliforms (Liquid)	5	OTTAWA	AHIRSI	2023-Jul-21	FC-001	SM 9222D
HPC Spread Plate (Liquid)	5	OTTAWA	AHIRSI	2023-Jul-21	HPC-001	SM 9215D
Total Coliforms (m-Endo Media)	5	OTTAWA	AHIRSI	2023-Jul-21	TC-001	SM 9222B

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an *

Parameter	Units	R.L.	Client I.D.					
			TW1	TW2	TW3	TW4	TW5	
			Sample I.D.	23-018390-1	23-018390-2	23-018390-3	23-018390-4	23-018390-5
			Date Collected	2023-07-20	2023-07-20	2023-07-20	2023-07-20	2023-07-20
Total Coliform	CFU/100mL	1	6	1200	2	12	6	
E coli	CFU/100mL	1	<2	<2	<2	<2	<2	
Heterotrophic Plate Count	CFU/1mL	2	202	>500	34	>500	206	
Fecal Coliform	CFU/100mL	1	<2	<2	2	<2	<2	
pH (Client Data)	pH units	-	7.93	7.94	7.90	7.97	7.83	
Temperature (Client Data)	°C	-	16.5	12.7	13.5	14.7	17.0	



Shelly Lozo
 Microbiology Supervisor

Certificate of Analysis

Egis Canada Ltd. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 70541

Report Date: 28-Feb-2024
Order Date: 23-Feb-2024

Order #: 2408316

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

Parcel ID	Client ID
2408316-01	TW1
2408316-02	TW4
2408316-03	TW3

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Ammonia, as N	EPA 351.2 - Auto Colour	28-Feb-24	28-Feb-24
Anions	EPA 300.1 - IC	26-Feb-24	26-Feb-24
E. coli	MOE E3407	23-Feb-24	23-Feb-24
Fecal Coliform	SM 9222D	23-Feb-24	23-Feb-24
Heterotrophic Plate Count	SM 9215C	24-Feb-24	24-Feb-24
Phosphorus, total, water	EPA 365.4 - Auto Colour, digestion	26-Feb-24	26-Feb-24
Total Coliform	MOE E3407	23-Feb-24	23-Feb-24
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	26-Feb-24	26-Feb-24

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Client ID:	TW1	TW4	TW3	-	-
Sample Date:	22-Feb-24 13:00	22-Feb-24 15:50	22-Feb-24 17:20	-	-
Sample ID:	2408316-01	2408316-02	2408316-03	-	-
Matrix:	Ground Water	Ground Water	Ground Water	-	-
MDL/Units					

Microbiological Parameters

E. coli	1 CFU/100mL	ND	<10 [2]	ND	-	-
Total Coliforms	1 CFU/100mL	ND	<10 [2]	ND	-	-
Fecal Coliforms	1 CFU/100mL	ND	<10 [2]	ND	-	-
Heterotrophic Plate Count	10 CFU/mL	280	>2000	110	-	-

General Inorganics

Organic Nitrogen	0.1 mg/L	<0.100	<0.100	<0.100	-	-
Ammonia as N	0.01 mg/L	0.08	0.09	0.09	-	-
Phosphorus, total	0.01 mg/L	<0.01	<0.01	<0.01	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.1	0.1	0.1	-	-

Anions

Nitrate as N	0.1 mg/L	<0.1	<0.1	<0.1	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	<0.05	-	-

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
General Inorganics								
Ammonia as N	ND	0.01	mg/L					
Phosphorus, total	ND	0.01	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					
Heterotrophic Plate Count	ND	10	CFU/mL					

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	1.55	0.1	mg/L	1.51			2.3	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
General Inorganics									
Ammonia as N	0.078	0.01	mg/L	0.079			0.4	18	
Phosphorus, total	ND	0.01	mg/L	ND			NC	15	
Total Kjeldahl Nitrogen	0.13	0.1	mg/L	0.11			NC	16	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	3	1	CFU/100mL	6			66.7	30	BAC04
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	210	10	CFU/mL	280			29.0	30	

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	2.62	0.1	mg/L	1.51	111	77-126			
Nitrite as N	0.888	0.05	mg/L	ND	88.8	82-115			
General Inorganics									
Ammonia as N	1.10	0.01	mg/L	0.079	102	81-124			
Phosphorus, total	0.988	0.01	mg/L	ND	98.8	80-120			
Total Kjeldahl Nitrogen	1.23	0.1	mg/L	0.11	112	81-126			

Certificate of Analysis

Report Date: 28-Feb-2024

Client: **Egis Canada Ltd. (Carp)**

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Qualifier Notes:

Sample Qualifiers :

2: Bacteria sample was diluted due to suspended particulate matter.

QC Qualifiers:

BAC04 Duplicate QC data falls within method prescribed 95% confidence limits.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



2408316

No 70541

Client Name: Egis Project Ref: 20-9510 Page 1 of 1

Contact Name: Rebecca Leduc Quote #: 24-193

Address: 115 Walgreen Rd PO #: _____
Carleton Place ON E-mail: rebecca.leduc@egis-group.com
613-229-8986 Munka. Black@egis-group.com

Turnaround Time
 1 day 3 day
 2 day Regular
 Date Required: _____

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19		Other Regulation		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis												
<input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> REG 558 <input type="checkbox"/> PW00 <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm Mun: <u>ODWS</u> <input type="checkbox"/> Other: _____	Matrix	Air Volume	# of Containers	Sample Taken	E-W, TC, FC, H, PE	Nitrate, Nitrite	Ammonia, Phosphorus	TKW	Organic Nitrogen								
Sample ID/Location Name					Date						Time							
1	<u>TW1</u>	<u>GW</u>	<u>4</u>	<u>22-Feb-24</u>	<u>1:00 pm</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>								
2	<u>TW4</u>	<u>GW</u>	<u>4</u>	<u>22-Feb-24</u>	<u>3:50 pm</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>								
3	<u>TW3</u>	<u>GW</u>	<u>4</u>	<u>22-Feb-24</u>	<u>5:20 pm</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>	<u>x</u>								
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comment: These are not drinking water samples

Method of Delivery: # Drop Box

Relinquished By (Sign): [Signature] Received By (Sign): [Signature]

Relinquished By (Print): Rebecca Leduc Date/Time: Feb 23 2024 10:30

Date/Time: 22 Feb 24 6:35 pm Temperature: 9.0 °C

Received at Lab: [Signature] Date/Time: Feb 23 2024 10:30 Temperature: 4.2 °C

Verified By: [Signature] Date/Time: Feb 23 2024 10:30

pH Verified: By: [Signature]

Certificate of Analysis

Egis Canada Ltd. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Rebecca Leduc

Client PO:
Project: 20-9510
Custody: 141834

Report Date: 28-Feb-2024

Order Date: 23-Feb-2024

Order #: 2408349

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

Parcel ID	Client ID
2408349-01	TW5

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Ammonia, as N	EPA 351.2 - Auto Colour	28-Feb-24	28-Feb-24
Anions	EPA 300.1 - IC	26-Feb-24	26-Feb-24
E. coli	MOE E3407	23-Feb-24	23-Feb-24
Fecal Coliform	SM 9222D	23-Feb-24	23-Feb-24
Heterotrophic Plate Count	SM 9215C	24-Feb-24	24-Feb-24
Phosphorus, total, water	EPA 365.4 - Auto Colour, digestion	26-Feb-24	26-Feb-24
Total Coliform	MOE E3407	23-Feb-24	23-Feb-24
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	26-Feb-24	26-Feb-24

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Client ID:	TW5	-	-	-	-
Sample Date:	23-Feb-24 09:50	-	-	-	-
Sample ID:	2408349-01	-	-	-	-
Matrix:	Ground Water	-	-	-	-
MDL/Units					

Microbiological Parameters

E. coli	1 CFU/100mL	ND	-	-	-	-
Total Coliforms	1 CFU/100mL	6	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-	-	-
Heterotrophic Plate Count	10 CFU/mL	70	-	-	-	-

General Inorganics

Organic Nitrogen	0.1 mg/L	<0.100	-	-	-	-
Ammonia as N	0.01 mg/L	0.06	-	-	-	-
Phosphorus, total	0.01 mg/L	<0.01	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.1	-	-	-	-

Anions

Nitrate as N	0.1 mg/L	<0.1	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-	-

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
General Inorganics								
Ammonia as N	ND	0.01	mg/L					
Phosphorus, total	ND	0.01	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					
Heterotrophic Plate Count	ND	10	CFU/mL					

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	1.55	0.1	mg/L	1.51			2.3	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
General Inorganics									
Ammonia as N	0.078	0.01	mg/L	0.079			0.4	18	
Phosphorus, total	ND	0.01	mg/L	ND			NC	15	
Total Kjeldahl Nitrogen	0.13	0.1	mg/L	0.11			NC	16	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	3	1	CFU/100mL	6			66.7	30	BAC04
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	210	10	CFU/mL	280			29.0	30	

Certificate of Analysis

Report Date: 28-Feb-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Nitrate as N	2.62	0.1	mg/L	1.51	111	77-126			
Nitrite as N	0.888	0.05	mg/L	ND	88.8	82-115			
General Inorganics									
Ammonia as N	1.10	0.01	mg/L	0.079	102	81-124			
Phosphorus, total	0.988	0.01	mg/L	ND	98.8	80-120			
Total Kjeldahl Nitrogen	1.23	0.1	mg/L	0.11	112	81-126			

Certificate of Analysis

Report Date: 28-Feb-2024

Client: **Egis Canada Ltd. (Carp)**

Order Date: 23-Feb-2024

Client PO:

Project Description: 20-9510

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers:

BAC04 Duplicate QC data falls within method prescribed 95% confidence limits.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

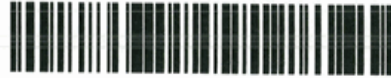
%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Parcel ID: 2408349



Parcel Order Number
(Lab Use Only)

2408349

Chain Of Custody
(Lab Use Only)

No 141834

Client Name: Egis	Project Ref: 24 20-9510	Page 1 of 1
Contact Name: Rebecca Leduc	Quote #: 24-193	Turnaround Time <input type="checkbox"/> 1 day <input type="checkbox"/> 3 day <input type="checkbox"/> 2 day <input checked="" type="checkbox"/> Regular Date Required: _____
Address: 115 Walgreen Rd, Carp, ON	PO #:	
Telephone: 613-279-8986	E-mail: rebecca.leduc@egis-group.com monica.black@egis-group.com	

<input type="checkbox"/> REG 153/04 <input type="checkbox"/> REG 406/19 Other Regulation <input type="checkbox"/> Table 1 <input type="checkbox"/> Res/Park <input type="checkbox"/> Med/Fine <input type="checkbox"/> REG 558 <input type="checkbox"/> PWQO <input type="checkbox"/> Table 2 <input type="checkbox"/> Ind/Comm <input type="checkbox"/> Coarse <input type="checkbox"/> CCME <input type="checkbox"/> MISA <input type="checkbox"/> Table 3 <input type="checkbox"/> Agri/Other <input type="checkbox"/> SU - Sani <input type="checkbox"/> SU - Storm <input type="checkbox"/> Table _____ For RSC: <input type="checkbox"/> Yes <input type="checkbox"/> No		Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)		Required Analysis													
Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	Hg	CrVI	B (HWS)	E.coli, TC, FC, HPC	Nitrate + Nitrite	Ammonia + Phosphorus	TKN	Organic Nitrogen
				Date	Time												
1 TW5	GW		4	Feb 23/24	9:50am								X	X	X	X	X
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Comments: Not drinking water samples.			Method of Delivery: Walk		
Relinquished By (Sign): Pamela Muniz	Received By Driver/Depot:	Received at (Sign): SS	Verified By: SS		
Relinquished By (Print): dkai	Date/Time: _____	Date/Time: Feb 23/24 11:22	Date/Time: Feb 23, 24 1148		
Date/Time: Feb 23/24 11:30am	Temperature: _____ °C	Temperature: 7.5 °C	pH Verified: <input checked="" type="checkbox"/>	By: SS	

Certificate of Analysis

Egis Canada Ltd. (Carp)

115 Walgreen Rd.
Carp, ON K0A 1L0
Attn: Monica Black

Client PO:
Project: PP-20-9510
Custody: 142432

Report Date: 27-May-2024
Order Date: 23-May-2024

Order #: 2421210

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

Parcel ID	Client ID
2421210-01	TW2
2421210-02	TW4
2421210-03	TW1
2421210-04	TW3
2421210-05	TW5

Approved By:



Mark Foto, M.Sc.

Lab Supervisor

Certificate of Analysis

Report Date: 27-May-2024

Client: **Egis Canada Ltd. (Carp)**

Order Date: 23-May-2024

Client PO:

Project Description: PP-20-9510

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
E. coli	MOE E3407	23-May-24	23-May-24
Fecal Coliform	SM 9222D	23-May-24	23-May-24
Heterotrophic Plate Count	SM 9215C	23-May-24	23-May-24
Total Coliform	MOE E3407	23-May-24	23-May-24

Certificate of Analysis

Report Date: 27-May-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-May-2024

Client PO:

Project Description: PP-20-9510

Client ID:	TW2	TW4	TW1	TW3	-	-
Sample Date:	22-May-24 09:30	22-May-24 14:30	22-May-24 11:40	22-May-24 13:15	-	-
Sample ID:	2421210-01	2421210-02	2421210-03	2421210-04	-	-
Matrix:	Ground Water	Ground Water	Ground Water	Ground Water	-	-
MDL/Units						

Microbiological Parameters

E. coli	1 CFU/100mL	ND	ND	3 [3]	ND	-	-
Total Coliforms	1 CFU/100mL	18	10	Confluent [2]	16	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	6	ND	-	-
Heterotrophic Plate Count	10 CFU/mL	170	20	230	50	-	-

Certificate of Analysis

Report Date: 27-May-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-May-2024

Client PO:

Project Description: PP-20-9510

Client ID:	TW5					
Sample Date:	22-May-24 16:10				-	-
Sample ID:	2421210-05					
Matrix:	Ground Water					
MDL/Units						

Microbiological Parameters

E. coli	1 CFU/100mL	ND	-	-	-	-
Total Coliforms	1 CFU/100mL	15	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-	-	-
Heterotrophic Plate Count	10 CFU/mL	80	-	-	-	-

Certificate of Analysis

Report Date: 27-May-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-May-2024

Client PO:

Project Description: PP-20-9510

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					
Heterotrophic Plate Count	ND	10	CFU/mL					

Certificate of Analysis

Report Date: 27-May-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-May-2024

Client PO:

Project Description: PP-20-9510

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	7	1	CFU/100mL	18			88.0	30	BAC04
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	160	10	CFU/mL	170			6.0	30	

Certificate of Analysis

Report Date: 27-May-2024

Client: Egis Canada Ltd. (Carp)

Order Date: 23-May-2024

Client PO:

Project Description: PP-20-9510

Qualifier Notes:

Sample Qualifiers :

- 2: Confluent - continuous bacterial growth on the identification media in which bacterial colonies are not discrete and individual colonies cannot be counted.
Applies to Samples: TW1
- 3: Confluent background colonies on filter: may interfere with target reactions and the analysts' ability to count E. coli & Total Coliform. The target colonies may be under-represented.
Applies to Samples: TW1

QC Qualifiers:

BAC04 Duplicate QC data falls within method prescribed 95% confidence limits.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.



nt Blvd.
G 4J8
abs.com
om

Parcel Order Number
(Lab Use Only)

2421210

Chain Of Custody
(Lab Use Only)

No 142432

Client Name: **EGIS**
Contact Name: **Monica Black / Rebecca Ledue**
Address: **115 Walgreen Rd Corp, ON
HOA ILD**
Telephone: **613 836 2184**

Project Ref: **PP-20-9510**
Quote #: **24-193**
PO #:
E-mail: **rebecca.ledue@egis-group.com
Monica.Black@egis-group.com**

Page 1 of 1

Turnaround Time

- 1 day 3 day
 2 day Regular

Date Required:

- REG 153/04 REG 406/19
 Table 1 Res/Park Med/Fine
 Table 2 Ind/Comm Coarse
 Table 3 Agri/Other
 Table _____
For RSC: Yes No
- Other Regulation
 REG 558 PWQO
 CCME MISA
 SU - Sani SU - Storm
Mun: _____
 Other: **ODWS**

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

Required Analysis

Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken		PHCs F1-F4+BTEX	VOCs	PAHs	Metals by ICP	# pH	Temp	B (HWS)	E. coli in Tech Media	Fecal coliforms	HPC	Total Coliforms
				Date	Time											
1 TW2	GW		2	22 May 24	9:30 AM					7.2	11.1		/	/	/	/
2 TW4	GW		2	22 May 24	2:30 PM					7.6	9.1		/	/	/	/
3 TW1	GW		2	22 May 24	11:40 AM					7.5	8.9		/	/	/	/
4 TW3	GW		2	22 May 24	1:15 PM					7.6	9.5		/	/	/	/
5 TW5	GW		2	22 May 24	4:10 PM					7.2	9.0		/	/	/	/
6																
7																
8																
9																
10																

Comments:

These are not Drinking Water Samples

Method of Delivery:

Drop Box

Relinquished By (Sign): **FARIS MASOUMZADEH**
Relinquished By (Print): **FARIS MASOUMZADEH**
Date/Time: **22 May 24 15:30 PM**

Received By Driver/Depot: **J**
Date/Time: **May 23/24 8:30**
Temperature: **5.55 °C**

Received at Lab: **SD**
Date/Time: **May 23, 2024 10:25**
Temperature: **4.1 °C**

Verified by: **[Signature]**
Date/Time: **May 23 2024 10:16**
pH Verified: **NA**



Certificate of Analysis

Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3008139
Date Submitted: 2024-06-07
Date Reported: 2024-06-18
Project: 20-9510
COC #: 227898

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____
Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Anions	Cl	1	mg/L	AO 250	1730303 GW
	F	0.10	mg/L	MAC 1.5	2024-06-07 PW1
	N-NO2	0.10	mg/L	MAC 1.0	
	N-NO3	0.10	mg/L	MAC 10.0	
	SO4	1	mg/L	AO 500	
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 30-500	266
	Colour (Apparent)	2	TCU	AO 5	<2
	Conductivity	5	uS/cm		533
	DOC	0.5	mg/L	AO 5	1.0
	pH	1.00		6.5-8.5	7.77
	Phenols	0.001	mg/L		<0.001
	S2-	0.01	mg/L	AO 0.05	<0.01
	Tannin & Lignin	0.1	mg/L		0.1
	TDS (COND - CALC)	1	mg/L	AO 500	346
Turbidity	0.1	NTU	AO 5	0.2	
Hardness	Hardness as CaCO3	1	mg/L	OG 80-100	312*
Indices/Calc	Ion Balance	0.01			1.10
Metals	Ag	0.0001	mg/L		<0.0001
	Al	0.01	mg/L	OG 0.1	<0.01
	As	0.001	mg/L	IMAC 0.01	<0.001
	B	0.01	mg/L	IMAC 5.0	0.07
	Ba	0.01	mg/L	MAC 1.0	0.17
	Be	0.0005	mg/L		<0.0005
	Ca	1	mg/L		74
	Cd	0.0001	mg/L	MAC 0.005	<0.0001

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

Lab I.D. 1730303
 Sample Matrix GW
 Sample Type
 Sampling Date 2024-06-07
 Sample I.D. PW1

Group	Analyte	MRL	Units	Guideline	
Metals	Co	0.0002	mg/L		0.0004
	Cr	0.001	mg/L	MAC 0.05	<0.001
	Cu	0.001	mg/L	AO 1	0.006
	Fe	0.03	mg/L	AO 0.3	<0.03
	Hg	0.0001	mg/L	MAC 0.001	<0.0001
	K	1	mg/L		3
	Mg	1	mg/L		31
	Mn	0.01	mg/L	AO 0.05	0.26*
	Mo	0.005	mg/L		<0.005
	Na	1	mg/L	AO 200	6
	Ni	0.005	mg/L		<0.005
	Pb	0.001	mg/L	MAC 0.010	<0.001
	Sb	0.0005	mg/L	IMAC 0.006	<0.0005
	Se	0.001	mg/L	MAC 0.05	<0.001
	Sn	0.01	mg/L		<0.01
	Sr	0.001	mg/L		0.759
	Ti	0.01	mg/L		<0.01
	Tl	0.0001	mg/L		<0.0001
	U	0.001	mg/L	MAC 0.02	<0.001
	V	0.001	mg/L		<0.001
W	0.002	mg/L		<0.002	
Zn	0.01	mg/L	AO 5	<0.01	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	2*
	Faecal Coliforms	0	ct/100mL		2
	Total Coliforms	0	ct/100mL	MAC 0	5*

Guideline = ODWSOG

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Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

Lab I.D.	1730303
Sample Matrix	GW
Sample Type	
Sampling Date	2024-06-07
Sample I.D.	PW1

Group	Analyte	MRL	Units	Guideline
Nutrients	N-NH3	0.020	mg/L	0.024
	Total Kjeldahl Nitrogen	0.100	mg/L	0.198

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 461142 Analysis/Extraction Date 2024-06-08 Analyst MS Method AMBCOLM1			
Escherichia Coli			
Faecal Coliforms			
Total Coliforms			
Run No 461145 Analysis/Extraction Date 2024-06-08 Analyst S Y Method C SM2130B			
Turbidity	<0.1 NTU	96	70-130
Run No 461171 Analysis/Extraction Date 2024-06-10 Analyst AsA Method C SM5550B			
Tannin & Lignin	<0.1 mg/L	90	80-120
Run No 461204 Analysis/Extraction Date 2024-06-10 Analyst AsA Method C SM4500-S2-D			
S2-	<0.01 mg/L	118	80-120
Run No 461253 Analysis/Extraction Date 2024-06-11 Analyst AaN Method EPA 200.8			
Silver	<0.0001 mg/L	92	80-120
Aluminum	<0.01 mg/L	103	80-120
Arsenic	<0.001 mg/L	96	80-120

Guideline = ODWSOG

*** = Guideline Exceedence**

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MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Boron (total)	<0.01 mg/L	99	80-120
Barium	<0.01 mg/L	89	80-120
Beryllium	<0.0005 mg/L	104	80-120
Cadmium	<0.0001 mg/L	93	80-120
Cobalt	<0.0002 mg/L	99	80-120
Chromium Total	<0.001 mg/L	102	80-120
Copper	<0.001 mg/L	103	80-120
Iron	<0.03 mg/L	96	80-120
Mercury	<0.0001 mg/L	105	80-120
Manganese	<0.01 mg/L	106	80-120
Molybdenum	<0.005 mg/L	90	80-120
Nickel	<0.005 mg/L	103	80-120
Lead	<0.001 mg/L	94	80-120
Antimony	<0.0005 mg/L	94	80-120
Selenium	<0.001 mg/L	99	80-120
Sn	<0.01 mg/L	95	80-120
Strontium	<0.001 mg/L	96	80-120
Titanium	<0.01 mg/L	102	80-120

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Thallium	<0.0001 mg/L	94	80-120
Uranium	<0.001 mg/L	91	80-120
Vanadium	<0.001 mg/L	98	80-120
W	<0.002 mg/L	96	80-120
Zinc	<0.01 mg/L	107	80-120
Run No 461260 Analysis/Extraction Date 2024-06-11 Analyst SKH Method EPA 351.2			
Total Kjeldahl Nitrogen	<0.100 mg/L	106	70-130
Run No 461267 Analysis/Extraction Date 2024-06-11 Analyst MiV Method EPA 350.1			
N-NH3	<0.020 mg/L	112	80-120
Run No 461268 Analysis/Extraction Date 2024-06-12 Analyst AsA Method C SM2120C			
Colour (Apparent)	<2 TCU	97	90-110
Run No 461324 Analysis/Extraction Date 2024-06-12 Analyst AsA Method SM2320,2510,4500H/F			
Alkalinity (CaCO3)	<5 mg/L	101	90-110
Conductivity	<5 uS/cm	99	90-110
F	<0.10 mg/L	102	90-110

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

QC Summary

Analyte	Blank	QC % Rec	QC Limits
pH		100	90-110
Run No 461325 Analysis/Extraction Date 2024-06-12 Analyst AsA Method SM 5310B			
DOC	<0.5 mg/L	96	80-120
Run No 461332 Analysis/Extraction Date 2024-06-13 Analyst IP Method SM 4110			
Chloride	<1 mg/L	100	90-110
N-NO2	<0.10 mg/L	102	90-110
N-NO3	<0.10 mg/L	103	90-110
SO4	<1 mg/L	95	90-110
Run No 461372 Analysis/Extraction Date 2024-06-13 Analyst IP Method SM5530D/EPA420.2			
Phenols	<0.001 mg/L	100	50-120
Run No 461570 Analysis/Extraction Date 2024-06-18 Analyst Z S Method M SM3120B-3500C			
Calcium	<1 mg/L	106	90-110
Potassium	<1 mg/L	112	87-113
Magnesium	<1 mg/L	103	76-124
Sodium	<1 mg/L	111	82-118

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008139
 Date Submitted: 2024-06-07
 Date Reported: 2024-06-18
 Project: 20-9510
 COC #: 227898

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 461574 Analysis/Extraction Date 2024-06-18 Analyst Z S Method C SM2340B			
Hardness as CaCO3			
Ion Balance			
TDS (COND - CALC)			

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
 Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3008081
Date Submitted: 2024-06-06
Date Reported: 2024-06-10
Project: 20-9510
COC #: 914876

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Additional QA/QC, method, and analytical run information is available upon request.

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008081
 Date Submitted: 2024-06-06
 Date Reported: 2024-06-10
 Project: 20-9510
 COC #: 914876

Lab I.D. 1730038
 Sample Matrix GW
 Sample Type
 Sampling Date 2024-06-06
 Sample I.D. TW1

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		0
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Monica Black
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3008504
Date Submitted: 2024-06-19
Date Reported: 2024-06-21
Project: 20-9510
COC #: 227993

Dear Monica Black:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Additional QA/QC, method, and analytical run information is available upon request.

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Monica Black
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008504
 Date Submitted: 2024-06-19
 Date Reported: 2024-06-21
 Project: 20-9510
 COC #: 227993

Lab I.D. 1732206
 Sample Matrix Water
 Sample Type
 Sampling Date 2024-06-19
 Sample I.D. TW1

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		7
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Taylor Gariepy
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3010682
Date Submitted: 2024-09-04
Date Reported: 2024-09-06
Project: 20-9510
COC #: 231064

Dear Taylor Gariepy:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____
Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Additional QA/QC, method, and analytical run information is available upon request.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Taylor Gariepy
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3010682
 Date Submitted: 2024-09-04
 Date Reported: 2024-09-06
 Project: 20-9510
 COC #: 231064

Group	Analyte	MRL	Units	Guideline	Lab I.D.	Sample Matrix	Sample Type	Sampling Date	Sample I.D.
					1741764	1741765	GW	GW	2024-09-04
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0					
	Faecal Coliforms	0	ct/100mL						
	Heterotrophic Plate Count	0	ct/1mL						
	Total Coliforms	0	ct/100mL	MAC 0					

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3010883
Date Submitted: 2024-09-12
Date Reported: 2024-09-16
Project: 20-9510
COC #: 231094

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL:

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Additional QA/QC, method, and analytical run information is available upon request.

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3010883
 Date Submitted: 2024-09-12
 Date Reported: 2024-09-16
 Project: 20-9510
 COC #: 231094

Lab I.D.	1742523
Sample Matrix	GW
Sample Type	
Sampling Date	2024-09-12
Sample I.D.	TW2

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		12
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3009262
Date Submitted: 2024-07-12
Date Reported: 2024-07-15
Project: 20-9510
COC #: 228928

Page 1 of 2

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

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Additional QA/QC, method, and analytical run information is available upon request.

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3009262
 Date Submitted: 2024-07-12
 Date Reported: 2024-07-15
 Project: 20-9510
 COC #: 228928

Lab I.D.	1735352
Sample Matrix	GW
Sample Type	
Sampling Date	2024-07-12
Sample I.D.	TW3

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		2
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3009452
Date Submitted: 2024-07-18
Date Reported: 2024-07-24
Project: 20-9510
COC #: 228929

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Additional QA/QC, method, and analytical run information is available upon request.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3009452
 Date Submitted: 2024-07-18
 Date Reported: 2024-07-24
 Project: 20-9510
 COC #: 228929

Lab I.D.	1736204
Sample Matrix	GW
Sample Type	
Sampling Date	2024-07-18
Sample I.D.	TW3

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		0
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3008855
Date Submitted: 2024-06-28
Date Reported: 2024-07-02
Project: 20-9510
COC #: 915450

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

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Additional QA/QC, method, and analytical run information is available upon request.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3008855
 Date Submitted: 2024-06-28
 Date Reported: 2024-07-02
 Project: 20-9510
 COC #: 915450

Lab I.D.	1733302
Sample Matrix	GW
Sample Type	
Sampling Date	2024-06-28
Sample I.D.	TW4

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		1
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3009217
Date Submitted: 2024-07-11
Date Reported: 2024-07-15
Project: 20-9510
COC #: 228915

Page 1 of 2

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

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Additional QA/QC, method, and analytical run information is available upon request.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3009217
 Date Submitted: 2024-07-11
 Date Reported: 2024-07-15
 Project: 20-9510
 COC #: 228915

Lab I.D. 1735139
 Sample Matrix GW
 Sample Type
 Sampling Date 2024-07-11
 Sample I.D. TW4

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		3
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range



Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3009539
Date Submitted: 2024-07-19
Date Reported: 2024-07-22
Project: 20-9510
COC #: 229226

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL:

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Additional QA/QC, method, and analytical run information is available upon request.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3009539
 Date Submitted: 2024-07-19
 Date Reported: 2024-07-22
 Project: 20-9510
 COC #: 229226

Lab I.D. 1736772
 Sample Matrix Water
 Sample Type
 Sampling Date 2024-07-19
 Sample I.D. TW5

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		0
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Monica Black
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3009997
Date Submitted: 2024-08-06
Date Reported: 2024-08-08
Project: 20-9510
COC #: 229373

Page 1 of 2

Dear Monica Black:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Additional QA/QC, method, and analytical run information is available upon request.

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Monica Black
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3009997
 Date Submitted: 2024-08-06
 Date Reported: 2024-08-08
 Project: 20-9510
 COC #: 229373

Lab I.D. 1738695
 Sample Matrix GW
 Sample Type
 Sampling Date 2024-08-06
 Sample I.D. TW5

Group	Analyte	MRL	Units	Guideline	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Faecal Coliforms	0	ct/100mL		0
	Heterotrophic Plate Count	0	ct/1mL		1
	Total Coliforms	0	ct/100mL	MAC 0	0

Guideline = ODWSOG

*** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Client: Egis Canada Ltd.
115 Walgreen Rd., R.R. #3
Carp, ON
K0A 1L0
Attention: Ms. Rebecca Leduc
PO#:
Invoice to: EGIS Canada Ltd.

Report Number: 3011271
Date Submitted: 2024-09-26
Date Reported: 2024-10-03
Project: 20-9510
COC #: 916847

Page 1 of 2

Dear Rebecca Leduc:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____

Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: <https://directory.cala.ca/>.

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Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Additional QA/QC, method, and analytical run information is available upon request.

Certificate of Analysis

Client: Egis Canada Ltd.
 115 Walgreen Rd., R.R. #3
 Carp, ON
 K0A 1L0
 Attention: Ms. Rebecca Leduc
 PO#:
 Invoice to: EGIS Canada Ltd.

Report Number: 3011271
 Date Submitted: 2024-09-26
 Date Reported: 2024-10-03
 Project: 20-9510
 COC #: 916847

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1744348 GW 2024-09-26 TW5	1744349 GW 2024-09-26 TW3	1744350 GW 2024-09-26 TW4	1744351 GW 2024-09-26 TW1
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0		0	0	0	0
	Faecal Coliforms	0	ct/100mL			0	0	0	0
	Heterotrophic Plate Count	0	ct/1mL			0	0	0	0
	Total Coliforms	0	ct/100mL	MAC 0		0	0	0	0

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	1744352 GW 2024-09-26 TW2
	Faecal Coliforms	0	ct/100mL		
	Heterotrophic Plate Count	0	ct/1mL		
	Total Coliforms	0	ct/100mL	MAC 0	

Guideline = ODWSOG

* = Guideline Exceedence

Results relate only to the parameters tested on the samples submitted.

Analytical Method: AMBCOLM1

Additional QA/QC, method, and analytical run information is available upon request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



APPENDIX G

TRANSMISSIVITY, STORATIVITY, FARVOLDEN AND MOELL METHOD CALCULATIONS

Transmissivity Calculations

$$T = \frac{2.3 Q}{4 \pi \Delta s}$$

T is the transmissivity (m²/day)

Q is the pumping rate during the pumping test (L/min); and,

Δs is the differential for residual drawdown for one log cycle (m)

Test Well 1 Drawdown

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.05 \text{ m})$$

$$T = 996.2 \text{ m}^2/\text{day}$$

$$Q = 37.8 \text{ L/min}$$

$$Q = ((37.8 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 54.40 \text{ m}^3/\text{day}$$

$$\Delta s = 0.01 \text{ m}$$

Test Well 2 Drawdown

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (33.84 \text{ m}^3/\text{day}) / 4\pi (16.5 \text{ m})$$

$$T = 0.4 \text{ m}^2/\text{day}$$

$$Q = 23.5 \text{ L/min} \quad \text{*cumulative average}$$

$$Q = ((23.5 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 33.84 \text{ m}^3/\text{day}$$

$$\Delta s = 16.5 \text{ m}$$

Test Well 3 Drawdown

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (54.44 \text{ m}^3/\text{day}) / 4\pi (0.1 \text{ m})$$

$$T = 99.6 \text{ m}^2/\text{day}$$

$$Q = 37.8 \text{ L/min}$$

$$Q = ((37.8 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 54.40 \text{ m}^3/\text{day}$$

$$\Delta s = 0.1 \text{ m}$$

Test Well 4 Drawdown

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.2 \text{ m})$$

$$T = 49.8 \text{ m}^2/\text{day}$$

$$Q = 37.8 \text{ L/min}$$

$$Q = ((37.8 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 54.40 \text{ m}^3/\text{day}$$

$$\Delta s = 0.2 \text{ m}$$

Test Well 5 Drawdown

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (109 \text{ m}^3/\text{day}) / 4\pi (0.11 \text{ m})$$

$$T = 181.5 \text{ m}^2/\text{day}$$

$$Q = 75.7 \text{ L/min}$$

$$Q = ((75.7 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 109.01 \text{ m}^3/\text{day}$$

$$\Delta s = 0.11 \text{ m}$$

Test Well 1 Recovery

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.01 \text{ m})$$

$$T = 181.1 \text{ m}^2/\text{day}$$

$$Q = 37.8 \text{ L/min}$$

$$Q = ((37.8 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 54.4 \text{ m}^3/\text{day}$$

$$\Delta s = 0.06 \text{ m}$$

Test Well 2 Recovery

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (33.84 \text{ m}^3/\text{day}) / 4\pi (23 \text{ m})$$

$$T = 0.3 \text{ m}^2/\text{day}$$

$$Q = 23.5 \text{ L/min}$$

$$Q = ((23.5 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 33.84 \text{ m}^3/\text{day}$$

$$\Delta s = 23 \text{ m}$$

Test Well 3 Recovery

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.5)$$

$$T = 19.9 \text{ m}^2/\text{day}$$

$$Q = 37.8 \text{ L/min}$$

$$Q = ((37.8 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 54.40 \text{ m}^3/\text{day}$$

$$\Delta s = 0.5 \text{ m}$$

Test Well 4 Recovery

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (1)$$

$$T = 10.0 \text{ m}^2/\text{day}$$

$$Q = 37.8 \text{ L/min}$$

$$Q = ((37.8 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 54.40 \text{ m}^3/\text{day}$$

$$\Delta s = 1 \text{ m}$$

Test Well 5 Recovery

$$T = 2.3 Q / 4\pi \Delta S$$

$$T = 2.3 (109 \text{ m}^3/\text{day}) / 4\pi (0.2)$$

$$T = 99.8 \text{ m}^2/\text{day}$$

$$Q = 75.7 \text{ L/min}$$

$$Q = ((75.7 \text{ L/min}) / (1000 \text{ L})) * (60 \text{ min}) (24 \text{ hour})$$

$$Q = 109.00 \text{ m}^3/\text{day}$$

$$\Delta s = 0.2 \text{ m}$$

Farvolden Method - Long Term Yield Calculations

$Q_{20} = 0.68 T Ha Sf$

Ha= the available water column height (m)
 Sf= safety factor
 T= Transmissivity (m²/day)

Test Well 1

		T= 177.5	m ² /day	*used recovery T value
		Sf= 0.7		
Q ₂₀ =	0.68 (177.5 m ² /day)(59.31 m)(0.7)			
		pump at 210 ft =	64.00 m btop	
Q ₂₀ =	5010.68 m ³ /day	static WL	4.695 m btop	
Q ₂₀ =	5010679.5 L/day	Ha = 64 - 4.695 m		
Q ₂₀ =	3479.6 L/min	Ha =	59.31 m	

Test Well 2

		T= 0.3	m ² /day	*used recovery T value
		Sf= 0.7		
Q ₂₀ =	0.68 (0.3 m ² /day)(61.97 m)(0.7)			
		pump at 210 ft =	64.00 m btop	
Q ₂₀ =	8.8 m ³ /day	static WL	2.031 m btop	
Q ₂₀ =	8849.1732 L/day	Ha = 64 - 2.031 m		
Q ₂₀ =	6.1 L/min	Ha =	61.97 m	

Test Well 3

		T= 24.9	m ² /day	*used recovery T value
		Sf= 0.7		
Q ₂₀ =	0.68 (24.9 m ² /day)(29.78 m)(0.7)			
		pump at 110 ft =	33.50 m btop	
Q ₂₀ =	352.9 m ³ /day	static WL	3.723 m btop	
Q ₂₀ =	352928.91 L/day	Ha = 33.5 m - 3.723 m		
Q ₂₀ =	245.1 L/min	Ha =	29.78 m	

Test Well 4

		T= 10.0	m ² /day	*used recovery T value
		Sf= 0.7		
Q ₂₀ =	0.68 (10 m ² /day)(54.89 m)(0.7)			
		pump at 190 ft =	57.90 m btop	
Q ₂₀ =	261.3 m ³ /day	static WL	3.011 m btop	
Q ₂₀ =	261271.6 L/day	Ha = 57.9 m - 3.011 m		
Q ₂₀ =	181.4 L/min	Ha =	54.89 m	

Test Well 5

		T= 99.8	m ² /day	*used recovery T value
		Sf= 0.7		
Q ₂₀ =	0.68 (99.8 m ² /day)(64.97 m)(0.7)			
		pump at 220 ft =	67.00 m btop	
Q ₂₀ =	3086.3 m ³ /day	static WL	2.031 m btop	
Q ₂₀ =	3086339.4 L/day	Ha = 67 m - 2.031 m		
Q ₂₀ =	2143.3 L/min	Ha =	64.97 m	

Moell Method - Long Term Yield Calculations

$$Q_{20} = (Q H_a S_f) / (s_{100} + 5 \Delta s)$$

- Q= the pumping rate (m³/day)
- Ha= the available water column height (m)
- Sf= safety factor
- s₁₀₀= the drawdown at 100 minutes (semi-log long-term graph)
- Δs= the change in hydraulic head over one log cycle (drawdown vs. log time)

Test Well 1

$$Q_{20} = ((54.4 \text{ m}^3/\text{day})(59.31 \text{ m})(0.7))/[(0.226 \text{ m} + 5(0.01 \text{ m})]$$

Q₂₀= 8183.1 m³/day
 Q₂₀= 8183061 L/day
 Q₂₀= 5682.7 L/min

Q= 54.40 m³/day
 Ha = 59.31 m
 Sf = 0.7
 s₁₀₀ = 0.226 m
 Δs = 0.01 m

Test Well 2

$$Q_{20} = ((33.84 \text{ m}^3/\text{day})(61.97 \text{ m})(0.7))/[(27.5 \text{ m} + 5(10.5 \text{ m})]$$

Q₂₀= 13.7 m³/day
 Q₂₀= 13675.15 L/day
 Q₂₀= 9.5 L/min

Q= 33.84 m³/day
 Ha = 61.97 m
 Sf = 0.7
 s₁₀₀ = 24.844 m
 Δs = 16.5 m

Test Well 3

$$Q_{20} = ((54.4 \text{ m}^3/\text{day})(29.78 \text{ m})(0.7))/[(1.5 \text{ m} + 5(0.1 \text{ m})]$$

Q₂₀= 567.0 m³/day
 Q₂₀= 567011.2 L/day
 Q₂₀= 393.8 L/min

Q= 54.40 m³/day
 Ha = 29.78 m
 Sf = 0.7
 s₁₀₀ = 1.5 m
 Δs = 0.1 m

Test Well 4

$$Q_{20} = ((54.4 \text{ m}^3/\text{day})(54.89 \text{ m})(0.7))/[(7.36 \text{ m} + 5(0.2 \text{ m})]$$

Q₂₀= 250.0 m³/day
 Q₂₀= 250025.3 L/day
 Q₂₀= 173.6 L/min

Q= 54.4 m³/day
 Ha = 54.89 m
 Sf = 0.7
 s₁₀₀ = 7.36
 Δs = 0.2

Test Well 5

$$Q_{20} = ((109 \text{ m}^3/\text{day})(64.97 \text{ m})(0.7))/[(0.522 \text{ m} + 5(0.11 \text{ m})]$$

Q₂₀= 4624.3 m³/day
 Q₂₀= 4624264 L/day
 Q₂₀= 3211.3 L/min

Q= 109 m³/day
 Ha = 64.97 m
 Sf = 0.7
 s₁₀₀ = 0.522
 Δs = 0.11

Hydraulic Conductivity

$$k = T/B$$

T is the transmissivity (m²/day, the more conservative value is used)

b is the thickness of X m, which corresponds to the interval between the bottom of the casing and the bottom of the well, used as aquifer thickness (m)

TW1	TW2	TW3	TW4	TW5
Casing length 44 ft	Casing length 44 ft	Casing length 44 ft	Casing length 44 ft	Casing length 44 ft
Well Depth 230 ft	Well Depth 230 ft	Well Depth 120 ft	Well Depth 200 ft	Well Depth 232 ft
B= 186 ft 56.7 m	B= 186 ft 56.7 m	B= 76 ft 23.2 m	B= 156 ft 47.5 m	B= 188 ft 57.3 m
T= 177.5 m ² /day	T = 0.3 m ² /day	T=19.9 m ² /day	T=10 m ² /day	T=99.8 m ² /day
T= 2.05E-03 m ² /s	T= 3.47222E-06 m ² /s	T= 0.000230324 m ² /s	T= 0.000115741 m ² /s	T= 0.001155093 m ² /s
k= T/B	k= T/B	k= T/B	k= T/B	k= T/B
k= 3.62E-05 m/s	k= 6.12E-08 m/s	k= 9.94E-06 m/s	k= 2.43E-06 m/s	k= 2.02E-05 m/s

$$k \text{ (avg)} = 1.38E-05$$

Test Well 1

TW4

$$S=2.25 T t_0 / r^2$$

T is the transmissivity (m²/day)

t₀ is the x-intercept of the observation well drawdown vs. log time line of best fit

r is the distance between the pumped well and the observation well

$$S = 2.25 (195.2 \text{ m}^2/\text{day})(2.50\text{e-}3)/(270^2)$$
$$S = 1.07\text{E-}07$$

$$t_0 = 2.78\text{E-}05 \text{ days}$$
$$T = 124.5 \text{ m}^2/\text{day}$$
$$r = 270 \text{ m}$$

Test Well 2

TW1

$$S=2.25 T t_0 / r^2$$

T is the transmissivity (m²/day)

t₀ is the x-intercept of the observation well drawdown vs. log time line of best fit

r is the distance between the pumped well and the observation well

$$S = 2.25 (45000 \text{ m}^2/\text{day})(1.60\text{e-}2)/(192^2)$$
$$S = 4.02\text{E-}08$$

$$t_0 = 1.25\text{E-}06 \text{ days} \quad \text{no appreciable change/interception with x axis}$$
$$T = 516.4 \text{ m}^2/\text{day}$$
$$r = 190 \text{ m}$$

Test Well 3

TW4

$$S=2.25 T t_0 / r^2$$

T is the transmissivity (m²/day)

t₀ is the x-intercept of the observation well drawdown vs. log time line of best fit

r is the distance between the pumped well and the observation well

$$S = 2.25 (498.1 \text{ m}^2/\text{day})(1.80\text{e-}3)/(180^2)$$
$$S = 1.24\text{E-}05$$

$$t_0 = 1.25\text{E-}03 \text{ days}$$
$$T = 142.3 \text{ m}^2/\text{day}$$
$$r = 180 \text{ m}$$

Test Well 4

TW3

$$S=2.25 T t_0 / r^2$$

T is the transmissivity (m²/day)

t₀ is the x-intercept of the observation well drawdown vs. log time line of best fit

r is the distance between the pumped well and the observation well

$$S = 2.25 (45000 \text{ m}^2/\text{day})(1.60\text{e-}2)/(192^2)$$
$$S = 2.76\text{E-}05$$

$$t_0 = 1.60\text{E-}03 \text{ days}$$
$$T = 249.0 \text{ m}^2/\text{day}$$
$$r = 180 \text{ m}$$

Test Well 5

TW3

$$S=2.25 T t_0 / r^2$$

T is the transmissivity (m²/day)

t₀ is the x-intercept of the observation well drawdown vs. log time line of best fit

r is the distance between the pumped well and the observation well

$$S = 2.25 (181.5 \text{ m}^2/\text{day})(1.50\text{e-}3)/(313^2)$$
$$S = 6.36\text{E-}07$$

$$t_0 = 6.94\text{E-}05 \text{ days}$$
$$T = 399.2 \text{ m}^2/\text{day}$$
$$r = 313 \text{ m}$$

Transmissivity Calculations - Observation Wells

$$T = \frac{2.3 Q}{4 \pi \Delta s}$$

T is the transmissivity (m²/day)

Q is the pumping rate during the pumping test (L/min); and,

Δs is the differential for residual drawdown for one log cycle (m)

Mell 1 Drawdown - TW4 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 37.8 \text{ L/min} \\ T &= 2.3 (53.3 \text{ m}^3/\text{day}) / 4\pi (0.05 \text{ m}) & Q &= ((37.8 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 199.2 \text{ m}^2/\text{day} & Q &= 54.40 \text{ m}^3/\text{day} \\ \Delta s &= 0.05 \text{ m} \end{aligned}$$

Mell 2 Drawdown - TW1 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 23.5 \text{ L/min} \quad \text{*cumulative average} \\ T &= 2.3 (33.84 \text{ m}^3/\text{day}) / 4\pi (0.008 \text{ m}) & Q &= ((23.5 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 516.4 \text{ m}^2/\text{day} & Q &= 33.84 \text{ m}^3/\text{day} \\ \Delta s &= 0.012 \text{ m} \end{aligned}$$

Mell 3 Drawdown - TW4 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 37.8 \text{ L/min} \\ T &= 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.07 \text{ m}) & Q &= ((37.8 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 142.3 \text{ m}^2/\text{day} & Q &= 54.40 \text{ m}^3/\text{day} \\ \Delta s &= 0.07 \text{ m} \end{aligned}$$

Mell 4 Drawdown - TW3 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 37.8 \text{ L/min} \\ T &= 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.04 \text{ m}) & Q &= ((37.8 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 249.0 \text{ m}^2/\text{day} & Q &= 54.40 \text{ m}^3/\text{day} \\ \Delta s &= 0.04 \text{ m} \end{aligned}$$

Mell 5 Drawdown - TW3 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 75.7 \text{ L/min} \\ T &= 2.3 (109 \text{ m}^3/\text{day}) / 4\pi (0.05 \text{ m}) & Q &= ((75.7 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 399.2 \text{ m}^2/\text{day} & Q &= 109.01 \text{ m}^3/\text{day} \\ \Delta s &= 0.05 \text{ m} \end{aligned}$$

Test Well 1 Recovery - TW4 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 37.8 \text{ L/min} \\ T &= 2.3 (53.3 \text{ m}^3/\text{day}) / 4\pi (0.08 \text{ m}) & Q &= ((37.8 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 124.5 \text{ m}^2/\text{day} & Q &= 54.4 \text{ m}^3/\text{day} \\ \Delta s &= 0.08 \text{ m} \end{aligned}$$

Test Well 2 Recovery - TW1 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 23.5 \text{ L/min} \\ T &= 2.3 (33.84 \text{ m}^3/\text{day}) / 4\pi (0.01 \text{ m}) & Q &= ((23.5 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 619.7 \text{ m}^2/\text{day} & Q &= 33.84 \text{ m}^3/\text{day} \\ \Delta s &= 0.01 \text{ m} \end{aligned}$$

Test Well 3 Recovery - TW4 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 37.8 \text{ L/min} \\ T &= 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.001) & Q &= ((37.8 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 9961.8 \text{ m}^2/\text{day} & Q &= 54.40 \text{ m}^3/\text{day} \\ \Delta s &= 0.001 \text{ m} \end{aligned}$$

Test Well 4 Recovery - TW3 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 37.8 \text{ L/min} \\ T &= 2.3 (54.4 \text{ m}^3/\text{day}) / 4\pi (0.001) & Q &= ((37.8 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 9961.8 \text{ m}^2/\text{day} & Q &= 54.40 \text{ m}^3/\text{day} \\ \Delta s &= 0.001 \text{ m} \end{aligned}$$

Test Well 5 Recovery - TW3 Observation Well

$$\begin{aligned} T &= 2.3 Q / 4\pi \Delta s & Q &= 75.7 \text{ L/min} \\ T &= 2.3 (109 \text{ m}^3/\text{day}) / 4\pi (0.001) & Q &= ((75.7 \text{ L/min}) / (1000\text{L})) * (60 \text{ min})(24 \text{ hour}) \\ T &= 19962.0 \text{ m}^2/\text{day} & Q &= 109.01 \text{ m}^3/\text{day} \\ \Delta s &= 0.001 \text{ m} \end{aligned}$$

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



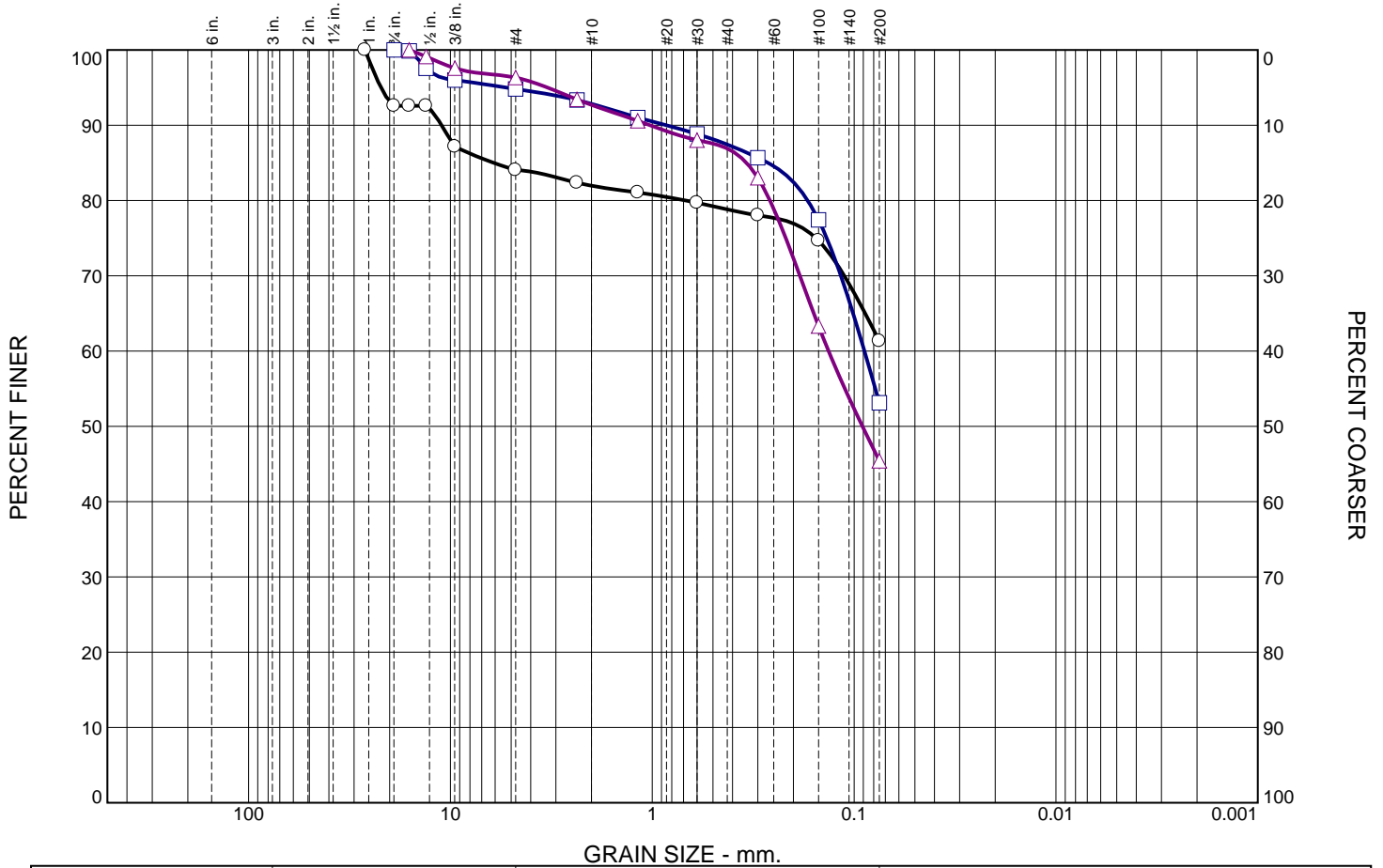
APPENDIX H GRAIN SIZE ANALYSIS



WATER CONTENT DETERMINATION

Test Method Utilized		<input checked="" type="checkbox"/> MTO LS-701		<input type="checkbox"/> ASTM D 2216		<input type="checkbox"/> AASHTO T-265	
Project No.: OPP-20-9510-06-08					Date Received: Sept 19,2024		
Project Name/Location: Enviro Invest. - Santaguida_Subdiviosion_Beckwith					Date Tested: Sept 25,2024		
Material Type: Soils					Lab Sample No.: OL-24039		
Borehole No.	Depth Sample Taken (ft ')	Sample Container I.D.	Wet Sample + Tare (A)	Dry Sample + Tare (B)	Tare (C)	Mass of Sample (D) (B-C)	% Moisture (A-B)/Dx100
TP-1		P.58	607.83	514.62	141.72	372.90	25.0
TP-3		P.95	553.02	418.56	129.83	288.73	46.6
TP-8		P.67	444.06	347.30	137.25	210.05	46.1
Non-Conformance's from Test Procedure: N/A							
Comments:							
Checked by: J.H-J					Signature:		

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	7.4	8.6	2.0	3.2	17.5	61.3	
□	0.0	0.0	5.2	2.0	5.4	34.3	53.1	
△	0.0	0.0	3.7	3.6	5.8	41.5	45.4	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	Beckwith	TP-1		Sandy Silt/Clay some Gravel - High Organics present	
□	Beckwith	TP-3		Sand and Silt/Clay trace fine Gravel - Organics Present	
△	Beckwith	TP-8		Sand and Silt/Clay trace fine Gravel - Organics Present	



Client: 13126102 Canada Inc
Project: Santaguida_Subdivision_Beckwith

Project No.: OPP-20-9510-06-08

Figure

Tested By: N.T

Checked By: J.Hopwood-Jones

GRAIN SIZE DISTRIBUTION TEST DATA

2024-09-25

Client: 13126102 Canada Inc

Project: Santaguida_Subdivision_Beckwith

Project Number: OPP-20-9510-06-08

Location: TP-1

Sample Number: TP-1

Material Description: Sandy Silt/Clay some Gravel - High Organics present

Tested by: N.T

Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
372.90	0.00	0.00	26.5mm	0.00	100.0	0.0
			19.0mm	27.70	92.6	7.4
			16.0mm	27.70	92.6	7.4
			13.2mm	27.70	92.6	7.4
			9.5mm	47.95	87.1	12.9
			4.75mm	59.53	84.0	16.0
			2.36mm	65.79	82.4	17.6
			1.18mm	70.65	81.1	18.9
			0.600mm	75.73	79.7	20.3
			0.300mm	81.96	78.0	22.0
			0.150mm	94.51	74.7	25.3
			0.075mm	144.22	61.3	38.7

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	7.4	8.6	16.0	2.0	3.2	17.5	22.7			61.3

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
								0.6842	6.1130	11.0619	22.0945

Fineness Modulus

1.40

GRAIN SIZE DISTRIBUTION TEST DATA

2024-09-25

Client: 13126102 Canada Inc

Project: Santaguida_Subdivision_Beckwith

Project Number: OPP-20-9510-06-08

Location: TP-3

Sample Number: TP-3

Material Description: Sand and Silt/Clay trace fine Gravel - Organics Present

Tested by: N.T

Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
288.73	0.00	0.00	19.0mm	0.00	100.0	0.0
			16.0mm	0.38	99.9	0.1
			13.2mm	7.03	97.6	2.4
			9.5mm	11.56	96.0	4.0
			4.75mm	15.00	94.8	5.2
			2.36mm	19.22	93.3	6.7
			1.18mm	25.93	91.0	9.0
			0.600mm	32.25	88.8	11.2
			0.300mm	41.35	85.7	14.3
			0.150mm	65.20	77.4	22.6
			0.075mm	135.35	53.1	46.9

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	5.2	5.2	2.0	5.4	34.3	41.7			53.1

D5	D10	D15	D20	D30	D40	D50	D60	D80	D85	D90	D95
							0.0889	0.1699	0.2672	0.8554	5.2967

Fineness Modulus
0.73

GRAIN SIZE DISTRIBUTION TEST DATA

2024-09-25

Client: 13126102 Canada Inc

Project: Santaguida_Subdivision_Beckwith

Project Number: OPP-20-9510-06-08

Location: TP-8

Sample Number: TP-8

Material Description: Sand and Silt/Clay trace fine Gravel - Organics Present

Tested by: N.T

Checked by: J.Hopwood-Jones

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer	Percent Retained
210.05	0.00	0.00	16.0mm	0.00	100.0	0.0
			13.2mm	1.85	99.1	0.9
			9.5mm	5.11	97.6	2.4
			4.75mm	7.73	96.3	3.7
			2.36mm	13.81	93.4	6.6
			1.18mm	19.79	90.6	9.4
			0.600mm	25.18	88.0	12.0
			0.300mm	35.68	83.0	17.0
			0.150mm	77.07	63.3	36.7
			0.075mm	114.67	45.4	54.6

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	3.7	3.7	3.6	5.8	41.5	50.9			45.4

D ₅	D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₄₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
						0.0909	0.1339	0.2613	0.3412	1.0285	3.3037

Fineness Modulus
0.88

HYDROGEOLOGICAL ASSESSMENT AND TERRAIN ANALYSIS SANTAGUIDA SUBDIVISION, BECKWITH, ON



APPENDIX I NITRATE ATTENUATION CALCULATIONS

Nitrate Dilution Calculation

PP-20-9510
Santaguida Subdivision, Beckwith, ON

	A_{total}	270,713.00 m ²
	A_{imperv}	30,455.00 m ²
	Infiltrating Area	88.8%
	A_{perv}	240,258.00 m ²
Water Surplus (W_s)		
Precipitation		938.9 mm/yr
Evapotranspiration		605.6856 mm/yr
$W_s = \text{Precipitation} - \text{Evapotranspiration}$	W_s	333.2144 mm/yr
		0.333214 m/yr
Infiltration Factor (I_f) per MOEE 1995		
Topo		0.24100
Soil		0.4000
Cover		0.15 Woodland
	$I_f =$	0.791
Infiltration (I)		
$I = W_s * I_f$	$I =$	0.263573 m/yr
Runoff = $W_s - I$	Runoff =	0.069642 m/yr
Dilution Water Available (D_w)		
$D_{w,perv} = A_{perv} * I$	$D_w =$	63325.4 m ³ /yr
		173494.33 L/day
Runoff _{perv} = $A_{perv} * W_s * (1 - I_f)$	Runoff _{perv} =	16732 m ³ /yr
Runoff _{imperv} = $A_{imperv} * W_s$	Runoff _{imperv} =	10148.05 m ³ /yr
Runoff _{total} = Runoff _{perv} + Runoff _{imperv}	Runoff _{total} =	26880.05 m ³ /yr
	Runoff Reduction % =	0% (if using LID for stormwater management)
	Runoff Reduction =	0.00 m ³ /yr
$D_w (final) = D_{w,perv} + \text{Runoff Reduction}$	$D_w (final) =$	63325.43 m ³ /yr
	$D_w (final) =$	173494.33 L/day
Nitrate Concentrations		
Background Nitrate Concentration (C_b)	$C_b =$	0.1 mg/L
Max Boundary Nitrate Concentration (C_{boun})	$C_{boun} =$	10 mg/L
Effluent Nitrate Concentration (C_e)	$C_e =$	40 mg/L
	Nitrate Reduction	0% (if CAN/BNQ 3680-600 N-I or NSF/ANSI 245 applies)
	$C_e (final) =$	40 mg/L
Effluent Loading (Q_e)	$Q_e =$	1000 L/day/Residential Lot
Maximum Allowable Number of Lots (N)	or	Calculated Nitrate Concentration (C_w)
$N = [D_w * (C_b - C_{boun})] / [Q_e * (C_{boun} - C_b - C_e)]$	N =	41 lots
N =	$C_w = [(C_e * Q_e * N) / ((Q_e * N) + D_w)] + C_b$	
	$C_w =$	7.746 mg/L
	$C_w \leq C_{boun}$, therefore proposed development will not exceed ODWO at property limit	

Potential Evapotranspiration

Thornthwaite Method, "Hydrology & Hydraulic Systems", Gupta

$Et_{month} = 1.62 (10 * T_m / I)^a$

where:

$a = 675 * 10^{-9} * I^3 - 771 * 10^{-7} * I^2 + 179 * 10^{-4} * I + 492 * 10^{-3}$

$I = \text{sum}(T_m / 5)^{1.514}$

Stn: **DRUMMOND CENTRE**
Site Climate ID: 6102J13

Month	Temp C	I	ET (cm) unadjusted	Daylight Factor	ET (cm) adjusted
January	-9.5			0.79	
Feb	-8			0.81	
March	-1.9			1.03	
April	5.9	1.2848	2.6925	1.12	3.0156
May	13.2	4.3482	6.4305	1.28	8.2310
June	18.1	7.0127	9.0462	1.29	11.6697
July	20.7	8.5929	10.4590	1.31	13.7012
Aug	19.5	7.8500	9.8050	1.21	11.8641
Sept	15.2	5.3836	7.4900	1.04	7.7896
Oct	8.4	2.1934	3.9448	0.94	3.7081
Nov	1.8	0.2129	0.7460	0.79	0.5893
Dec	-5.1			0.76	
I		36.87848	50.6139		60.5686
thus a =		1.0811			

Notes:

-Daylight Factor is an adjustment Factor for possible hours of sunshine based on latitude for Ottawa.

-Monthly temperatures from Environment Canada Climate Normals (1991-2020)

Input data from user
Set value
Site Constant (adjustment for latitude)
Calculated by worksheet