Block 18 (51M 917), Fesserton
Hydrogeological Assessment

2801829 Ontario Inc.
Fesserton, Ontario

Block 18 (51M 917), Fesserton
Hydrogeological Assessment

2801829 Ontario Inc.
Fesserton, Ontario

R.J. Burnside & Associates Limited
292 Speedvale Avenue West Unit 20
Guelph ON N1H 1C4 CANADA

January 2021
300050086.0000

Distribution List

No. of Hard Copies	PDF	Email	Organization Name
0	Yes	Yes	PGC Land Management Inc.
0	Yes	Yes	2801829 Ontario Inc.

Record of Revisions

Revision	Date	Description
-	January 29, 2021	Initial Submission

R.J. Burnside & Associates Limited

Report Prepared By:

Stephanie Charity, P.Geo.
Hydrogeologist
SC:cl

Report Reviewed By:

Dwight Smikle, P.Geo.
Senior Hydrogeologist
DS:cl

Table of Contents

Tables

Figures

Appendices

Disclaimer

Other than by the addressee, copying or distribution of this document, in whole or in part, is not permitted without the express written consent of R.J. Burnside & Associates Limited.

In the preparation of the various instruments of service contained herein, R.J. Burnside & Associates Limited was required to use and rely upon various sources of information (including but not limited to: reports, data, drawings, observations) produced by parties other than R.J. Burnside & Associates Limited. For its part R.J. Burnside & Associates Limited has proceeded based on the belief that the third party/parties in question produced this documentation using accepted industry standards and best practices and that all information was therefore accurate, correct and free of errors at the time of consultation. As such, the comments, recommendations and materials presented in this instrument of service reflect our best judgment in light of the information available at the time of preparation. R.J. Burnside & Associates Limited, its employees, affiliates and subcontractors accept no liability for inaccuracies or errors in the instruments of service provided to the client, arising from deficiencies in the aforementioned third party materials and documents.

R.J. Burnside & Associates Limited makes no warranties, either express or implied, of merchantability and fitness of the documents and other instruments of service for any purpose other than that specified by the contract.

1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) was retained by 2801829 Ontario Inc. to complete a hydrogeological assessment for lands located in Fesserton, Ontario (Figure 1). New residential development is proposed for the lands and a hydrogeological study is required in support of the planning approval process for these lands that are part of the Georgian Heights Subdivision. The proposed residential development will be on approximately 10.3 ha of lands that are located east of Georgian Heights Boulevard and Highway 400 and west of County Road 16 in the Village of Fesserton (Figure 1). The legal address of the lands is 2970 Fesserton Sideroad North, Lot 6, Concession 11, Block 18 on Registered Plan 51M-917 in the geographic Township of Tay, Severn Township. For the purposes of this study the lands are referred to as the subject lands and are shown in Figure 2.

1.1 Scope of Work

The scope of work completed for the hydrogeological study was developed based on criteria provided by in a document entitled “Hydrogeological Assessments - Conservation Authority Guidelines to Support Development Applications (2013) and on guidelines for residential supply wells in Guideline D-5-5 Private Wells: Water Supply Assessment from the Ministry of Environment, Conservation and Parks (MECP). A groundwater impact assessment was also conducted in keeping with the three -step assessment process outlined in Guideline D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment. In completing the current study, the scope of work included completion of the following tasks:

1. Compilation and review of available hydrogeological and geological data in the vicinity of the subject lands, including a review of the Ministry of the Environment, Conservation and Parks (MECP) online water well records. A list of the available MECP water well records for local wells is provided in Appendix A.

2. Drilling and installation of two test wells and one monitoring well to assess the groundwater conditions. The locations of the test wells and monitoring well are shown on Figure 2 and well construction details are provided in the well logs in Appendix B.

3. Installation of a piezometer (PZ) nest (with one shallow and one deep piezometer pipe) to assess the shallow soil and groundwater conditions and also evaluate the potential for surface water and groundwater interactions. The location of the piezometer nest is shown on Figure 2.

4. Completion of a door-to-door well survey to collect information about private water wells within an approximate 500 m radius of the subject lands and identify

potential monitoring locations. The results of the well survey are provided in Appendix C.

5. Six-hour duration pumping tests were completed at the two new test wells on the subject lands (TW2 and TW3) as well as the previously completed test well (TW1) on the subject lands (total of three tests). Groundwater levels were monitored in the test wells and nearby monitoring wells during the testing. Monitoring was also conducted at selected residential wells. The results of the pumping tests and analyses of well performance are provided in Appendix D.

6. Groundwater level monitoring was completed in monitoring wells, private wells and piezometers to establish groundwater conditions. Monitoring started in October and continued for three months till December 2020. The groundwater monitoring data collected to date is provided in Appendix E.

7. Water quality sampling from test wells was conducted for laboratory testing to characterize the background water quality and determine suitability for domestic supply. The water quality results are provided in Appendix F.

8. Infiltration testing using an infiltrometer was completed at selected locations across the subject lands to typify the expected infiltration rates for local soils in development areas. The infiltration test results are included in Appendix G.

9. An assessment of the subject lands for septic system suitability based on Ministry of Environment and Climate Change's Procedure D-5-4. Calculations are provided in Appendix H.

10. Data compilation, assessment of site conditions and reporting.

2.0 Methodology

2.1 Borehole Drilling and Well Installation

In September 2020, two test wells and one monitoring well were drilled and installed by Allan Wright Water Wells Inc. of Hillsdale Ontario. The wells were constructed according to O.Reg. 903 standards by a licensed well technician.

The test wells were drilled using conventional rotary drilling with casing installed in the overburden and the well screen completed as open hole in the bedrock. In order to improve yields at one of the test wells (TW2) a hydrofracturing contractor was brought in to clean up fractures in the bedrock and improve yield. Table 1 below summarizes the construction of the test wells and a description of each well is provided in the sections below. Water well records for the wells are included in Appendix B. Locations of wells are shown on Figure 2.

Table 1: Summary of Well Construction

Well Name	Construction Date	Well Depth (m)	Screen Type and Depth
TW1	April 2009	68.3	Open hole 9.1 m – 68.3 m
TW2	September 2020	68.3	Open hole 6.0 m – 68.3 m
TW3	September 2020	53.3	Open hole 8.0 m – 53.3 m
MW1	September 2020	4.57	PVC screen 1.57 m – 4.57 m

TW1

TW1 was drilled as a test well in 2009. This well was constructed as a 155 mm (6 inch) diameter well with casing installed from 0.5 m above surface to a depth of 9.1 m below grade. The well was completed as open hole between 9.1 m and 68.3 m below grade and groundwater was encountered at 19.5 m and 62 m during drilling. The static water level on completion of the well was 23.92 m below top of casing.

TW2

TW2 was drilled as a test well in 2020 as part of the current study, 25 m southeast of TW1 (see Figure 2). The well was constructed as a 155 mm diameter well with steel casing installed from 0.7 m above surface to a depth of 6.0 m below grade. The well was completed as open hole in the bedrock between 6.0 m and 68.3 m. In order to improve yields, a hydrofracturing contractor was brought in to clean up fractures in the bedrock and improve the yield of this well. The static water level in this well was found to be 23.49 m below top of casing.

TW3

TW3 was drilled in 2020 as the third test well for the current study 175 m northeast of TW2 (see Figure 2). The well was constructed as a 155 mm diameter well with steel casing installed from 0.7 m above surface to a depth of 8.0 m below grade. The well was completed as open hole in the bedrock between 8.0 m and 53.3 m below grade. Groundwater was encountered during drilling at 51 m below grade. The static water level on completion of the well was 20.90 m below top of casing.

MW1

MW1 is a monitoring well that was completed in 2020 into the overburden on the subject lands to evaluate shallow groundwater conditions. The monitoring well is located approximately 20 m southeast of TW3 (see Figure 2). The monitoring well was drilled using a conventional auger drilling rig and was installed using 51 mm (2 inch) diameter PVC riser pipe with a 3.0 m long 10 slot PVC screen. Sand was put in place around the screen and borehole and bentonite was used to seal the well to surface. The well was

screened from 1.57 m to 4.57 m below ground surface. The static water level encountered in this well was 1.23 m below top of casing.

PZ-1s/d

A piezometer nest was installed on the subject lands to assess the shallow groundwater elevations and vertical gradients in a small depressional feature. The piezometer nest, which consisted of 1.5 m of steel pipe (for shallow) and 3.0 m of steel pipe (for deep) and a 0.31 m stainless steel drive-point, was installed with a manual post pounder. The location of the piezometer nest is shown in Figure 2.

2.2 Well Survey

A door-to-door well survey was completed by Burnside at residences and buildings within an approximate 500 m radius of the subject lands on September 18 and 21, 2020. The purpose of the survey was to identify private water supply wells in the vicinity of the subject lands and obtain information on the status of these wells. If the homeowner/resident was not present at the time of the visit a copy of a well survey form was left for the homeowner/resident along with a stamped self-addressed envelope for the owner to complete and submit by mail or email. A letter was also provided that explained that the purpose of the survey and contact details for the project hydrogeologist who could offer more information on the project. The results of the survey are provided in Appendix C and indicated that a total of 107 surveys were distributed and 30 responses were received.

2.3 Pumping Tests

Three test wells were tested as per the MECP's Procedure D-5-5 for Private Wells: Water Supply Assessment. Each of the wells were pumped for a total of six hours using a submersible pump while both pumping rate and water levels were recorded in the pumping well and any nearby test well, monitoring wells or the onsite piezometers.

Water levels were measured manually at some locations with a datalogger being installed in at least one monitoring location during each test. Offsite monitoring was conducted at selected surrounding residential wells in order to determine the area of influence and indicate impacts to surrounding water resource users. At the end of each test, the recovery of water level in the test well was also recorded.

2.4 Water Level Monitoring

Water levels in the test wells/monitoring wells and piezometers were recorded manually using an electronic water level meter. Dataloggers (automatic water level meters) were installed in selected wells to provide continuous data of water levels during the monitoring period. Readings are taken by the loggers every 10 minutes during the

monitoring period. A barometric pressure logger was also installed to measure changes in barometric pressure. The barometric pressure readings were used to correct the water level data by accounting for changes in atmospheric pressure. The available groundwater monitoring data is provided as hydrographs Figures E-1 to E-12, in Appendix E.

2.5 Water Quality Sampling

Water quality samples were collected from the test wells after 1 hour and after 6 hours during the pumping tests. Samples were collected to typify the water quality and determine the suitability for domestic use. The samples collected between October 5 and October 7, 2020 were submitted for analysis of general water quality parameters including metals and inorganics. The water quality results were compared to relevant provincial and federal standards for determination of suitability for domestic use. The analytical results from the laboratory are provided in Table F-1, Appendix F.

2.6 Infiltration Testing

Infiltration testing was completed in October 2020 at three locations across the subject lands. The locations of the infiltration tests are shown on Figure 2 and are identified as IT-1, IT-2 and IT-3. A Turf-Tec double ring infiltrometer was used to conduct the infiltration tests. The tests were completed by removing the topsoil in the test area and installing the infiltrometer into the underlying soil. Both rings of the infiltrometer were then filled with water and water level was recorded at regular intervals as it drained into the soil. The tests were continued until a consistent rate was obtained or the rate of infiltration was determined to be very low. The use of the infiltrometer for measuring infiltration has advantages over lab methods as it is representative of all conditions at the site including compaction, soil texture and fractures within the soil. The results of the infiltration tests are provided in Appendix G.

3.0 Site Characterization

3.1 Physiography and Topography

The subject lands are located on a sand plain within the broad physiographic region known as the Simcoe Uplands (Chapman & Putnam, 1984). A shore cliff is mapped 250 m east of the subject lands.

The lands are generally gently sloping and the topographic high on the subject lands is 218 metres above sea level (masl) in the northwest corner (Figure 3). The topography slopes to the northeast with a topographic low on the eastern edge of the subject lands with an elevation of 192 masl. Wetlands are located in low lying area in the center of the subject lands at an elevation of 198 to 200 masl.

3.2 Drainage

The subject lands are located in the Severn Sound watershed. Drainage on the subject lands is to the northeast. There is a depressional feature in the south-central portion of the subject lands where water may become ponded. This feature drains via a small channel and culvert to the northeast. There is also a larger watercourse that traverses the central portion of the subject lands from west to east, however this watercourse is obscured by vegetation on the aerial photography. It is our understanding that this watercourse is steeply incised and flows within the incised channel across the subject lands, draining areas to the west of the subject lands Drainage from the subject lands is assumed to flow to the east and eventually enter Matchedash Bay which is part of the larger Georgian Bay arm of Lake Huron.

3.3 Geology

Surficial geology mapping published by the Ontario Geological Survey (2003) shows that the subject lands are underlain by coarse textured glaciolacustrine deposits (Littoral foreshore deposits) (Figure 4). A small area of massive well laminated glaciolacustrine deposits is mapped in the southeast corner of the site. Paleozoic bedrock outcrops are mapped along the northeast edge of the subject lands.

3.3.1 Bedrock Geology

A review of bedrock geology mapping published by the Ontario Geological Survey (2007) indicates that the subject lands are located along a shelf of Paleozoic bedrock consisting of the Bobcaygeon Formation, Gull River Formation and Shadow Lake Formation (Figure 5). The Paleozoic bedrock consisting of limestone, dolostone, shale, arkose and sandstone unconformably overlies Precambrian bedrock. The bedrock geology mapping also indicates a known area of karst on the northeast edge of the subject lands that corresponds to the location of the Paleozoic bedrock. Karst topography is known to develop in areas where solutional features are formed due to the subsurface movement of water through carbonate formations. The disappearance of the watercourse noted in Section 3.2 above may be due to the watercourse disappearing into a karst feature.

3.3.2 Site-Specific Geology

A review of borehole logs from a previous geotechnical investigation (Soil Eng, 2019) and soils encountered during drilling of monitoring wells indicate that the surficial soils on the subject lands generally consist of 1.5 m to 3 m of fill overlying silty sand to sandy silt. Beneath the silty sand to sandy silt, silt and silty clay till were encountered to a depth of 4.6 m. Silty sand/sand layers were encountered at BH2 to BH5 at depths around 3.8 m to 4.6 m. The borehole logs completed during subsurface investigations are provided in Appendix B.

A review of the test well logs indicates overburden ranges from 5 to 8 m overlying limestone bedrock with a thickness of about 13 m. Beneath the limestone is black and red granite. The well records indicate that water was found within the granite bedrock.

The MECP maintains a database of geological records for water supply wells drilled in the province. A list of the available MECP water well records for local wells is provided in Appendix A and the well locations are plotted on Figure 9. In conjunction with the site-specific geological information obtained from the test wells drilled on the subject lands (logs provided in Appendix B), these MECP records provide geology data that have been used to prepare schematic cross-sections through the subject lands to illustrate the local stratigraphy. The cross-section locations are shown on Figure 6, and the cross-sections are provided as Figures 7 and 8. The cross-sections show that the overburden in the vicinity of the subject lands ranges from 5 m to 17 m in depth. Bedrock is encountered at elevations between 193 masl and 190 masl.

3.3.3 Site Soils

According to Soils of Ontario mapping, the soils on the subject lands are mapped as Vasey Sandy Loam that are well drained and classified as Hydrological Group B (Ministry of Agriculture, Food and Rural Affairs, 2020).

3.4 Hydrogeology

It is interpreted that some layers within the overburden sediments form shallow perched aquifer systems above the regional water table within the bedrock. The local perched systems are interpreted to potentially interact with the local wetlands and water features within the low lying areas of the subject lands. The bedrock forms a more regional aquifer that is the main source of water supply in the area and groundwater within the bedrock is in the region of 20 m below grade.

3.5 Local Groundwater Use

The Village of Fesserton is not serviced with a municipal water supply and therefore each property relies on a private water supply well. A review of the MECP well records for an area of approximately 500 m surrounding the subject lands identified 66 water well records. Of the 66 records, 64 records were for water supply wells, 1 record was for monitoring wells and 1 was a well abandonment record. Of the 64 water supply wells, 43 of the wells are completed in the bedrock at depths ranging from 15.2 m to 189 m and 21 of the wells were overburden wells with depths ranging from 11.6 m to 33.8 m. The yield of the wells reviewed ranged between 4.5 L/min (1 gpm) and 113 L/min (25 gpm). Summaries of the MECP records are provided in Appendix A. A water well survey completed by Burnside confirms the use of private water supply wells in the vicinity of the subject lands. The results of the water well survey are provided in Appendix C.

3.6 Groundwater Levels

Groundwater levels were monitored at the test wells and monitoring well between October and December 2020. Groundwater level data is provided in Table D-1 in Appendix D. The groundwater monitoring data show that groundwater in the bedrock formations varies between elevations of 177 masl and 182 masl (20.3 m to 18.6 m below grade) across the subject lands. The data also show that groundwater in shallow systems within the overburden as recorded at MW1 are within 1 m of surface after recharge events but that these systems drain over time and that the encountered water table does not appear to be permanent. Groundwater in the vicinity of watercourses as reported at PZ1s/d is interpreted to discharge to watercourses due to the upwards (discharge) gradient observed at this location. It is interpreted that the shallow overburden system discharges to the watercourses and serves as the driver for the upward gradient observed. These gradients may vary and dissipate over time as shallow systems dry up.

4.0 Water Supply Assessment

The proposed residential lots will be serviced with private water wells. It is proposed that individual private wells be completed on each lot with the target aquifer remaining the bedrock aquifer as targeted by the existing test wells. In order to typify the bedrock aquifer a water supply assessment based on MECP D-5-5 Private Wells: Water Supply Assessment has been completed to assess the aquifers ability to supply private water wells.

4.1 Pumping Tests

A total of three test wells on the subject lands were tested as per the D-5-5 pump test procedures. Wells were tested for a 6-hour duration during which both water level and well yield were monitored. The results of the pumping tests are provided in pumping test reports of water level, pumping rate and aquifer parameter analysis provided in Appendix E. The aquifer test report and results are summarized below in Table 2.

Table 2: Pumping Test Results

Test Well	Static Water Level (m)	Pumping Rate (L/min)	Drawdown after 6 hours (m)	Well Yield (L/min)
TW1	19	13.5	28.05	13
TW2	23.49	19	19.9	20
TW3	20.90	30	7.02	75

TW1 is a 150 mm diameter test well with an open hole in the bedrock from 9.1 m to 68.3 m. The static water level in TW1 prior to the test was 19.0 m bmp. At the end of the pumping the water level at TW1 was47.05 m bmp (total drawdown of 28.05 m).

TW2 is a 155 mm diameter test well with an open hole in the bedrock from 6.0 m to 68.3 m. The static water level in TW2 prior to the test was 23.49 m bmp. At the end of the pumping the water level at TW2 was 43.39 m bmp (total drawdown of 19.9 m).

TW3 is a 155 mm diameter test well with an open hole in the bedrock from 8.0 m to 53.3 m. The static water level in TW3 prior to the test was 20.09 m bmp. At the end of the pumping the water level at TW2 was 27.92 m bmp (total drawdown of 7.02 m).

4.2 Monitoring Well Response

Groundwater levels were recorded at monitoring locations before, during and after the test. The monitoring locations included an overburden monitoring well, a wetland piezometer nest and 7 private supply wells. The monitoring locations are shown on Figure 2 and summarized in Table 3.

Table 3: Monitoring Locations

Monitoring Location	Monitoring Method	Well Type	Well Depth (m)	Aquifer
TW1 (MECP#7125829)	Manual/Logger	Test Well (6”)	68.3	Bedrock
TW2	Manual	Test Well (6”)	68.3	Bedrock
TW3	Manual/Logger	Test Well (6”)	53.3	Bedrock
MW1	Manual/Logger	Monitoring Well (2”)	4.57	Shallow Overburden
PZ1s/d	Manual	Piezometer	1.23/1.9	Shallow Overburden
2995 Fesserton SRD (MECP#5727196)	Manual/Logger	Domestic Well	25.04	Deep Overburden
12925 County RD 16	Manual	Domestic Well	20.4 m	unknown
13001 County RD 16	Manual/Logger	Domestic Well	23.85	unknown
1635 Georgian Bay Heights	Manual/Logger	Domestic Well	26.5	unknown
1645 Georgian Bay Heights (MECP#7310103)	Manual	Domestic Well	29.01	Deep Overburden

Monitoring Location	Monitoring Method	Well Type	Well Depth (m)	Aquifer
1665 Georgian Bay Heights (MECP#5731656)	Manual	Domestic Well	151.6	Bedrock
1796 Georgian Bay Heights	Manual	Domestic Well	36.1	unknown

4.2.1 Test Well Response

When each test well was pumped the response in the adjacent test wells were monitored and recorded. During testing of TW1, drawdown in TW2 was observed to be 0.53 m and drawdown in TW3 was 0.08 m. During testing of TW2, drawdown in TW1 was 1.37 m and drawdown in TW3 was 0.13 m. During the TW3 test, drawdown in TW2 was 0.13 m. The water levels measured during the pumping tests are shown on Figures E-1, E-2 and E-3, Appendix E. All wells showed indicators of achieving stabilized water table after 6 hours of operation. This indicates that the aquifer encountered can produce at the test rate. It should be noted that under typical operational conditions domestic wells will not be required to operate for 6 hours continuously. Typical water use may be restricted to a two-hour peak use period each day and hence the expected response due to individual wells pumping in the future may be lower than those recorded during the current tests. The tests completed indicate that individual wells are a suitable source for water supply to the proposed development.

4.2.2 Overburden Response

The response from pumping of the test wells in the overburden was monitored in MW1 screened in the shallow overburden at 4.6 m and in a piezometer nest installed in the wetland on the subject lands. Groundwater levels collected during the pumping tests at MW1 and PZ1s/d are provided in Figures E-4 and E-5, Appendix E. The groundwater data indicates no impacts from pumping.

At MW1 automatic water level readings show increases in water levels occurring on October 4 and October 7 (Figure E-4). The increases are interpreted to be a response in the groundwater table after precipitation events. A review of precipitation data from the nearest climate station (Coldwater Warminster Climate Station 6111769) supports this interpretation as precipitation events occurred on both October 4 and October 7. In between these dates there is a gradual decrease in groundwater levels as the recharge event dissipates and groundwater returns to static conditions. The decreases are not a result of the pumping tests.

Manual water levels collected at the piezometers during the pumping tests showed no impact in water levels (Figure E-5).

4.2.3 Private Well Impacts

Monitoring was completed in seven private water wells. The results of the groundwater monitoring are provided as hydrographs Figures E-6 to E-12.

Table 4: Private Well Response to Pumping

Monitoring Location	Well Depth (m)	Distance to Site (m)	Drawdown/Impact
2995 Fesserton SRD (MECP#5727196)	25.04	125	No impact observed
12925 County RD 16	20.4	300	No impact observed
13001 County RD 16	23.85	320	0.2 m
1635 Georgian Bay Heights	26.5	75	No impact observed
1645 Georgian Bay Heights (MECP#7310103)	29.0	75	No impact observed
1665 Georgian Bay Heights (MECP#5731656)	151.6	75	No impact observed
1796 Georgian Bay Heights	36.1	190	No impact observed

A review of the private well groundwater level data (Figures E-5 to E-12) was completed in order to evaluate for potential indicators of impact due to test well pumping. Our review indicates that most wells do not show any impacts that can be associated with pumping at the test wells. Several wells show fluctuations in water levels due to private use that occur during the test period. It is noted however that these fluctuations show both a decrease and subsequent increase in water level occurring during the test which indicates that no impact due to pumping is occurring as an impact due to pumping should continue till the end of pumping. The well at 130001 County RD 16 showed a very slight response that may be associated with the testing, but the response was not significant and will not impact the supply of water from the well. The drawdowns observed at the well at 130001 County Rd 16 were 0.01 m during the TW2 test, 0.08 m during the TW1 test and 0.2 m during the TW3 test. It should be noted that the magnitude of these variations is small and well within the available capacity of the well at 130001 County RD 16 to compensate as there is an additional 15 m of available drawdown at this well. The exact magnitude of the impacts predicted may also be impacted by the margin of error associated with the equipment used for the water level monitoring.

4.3 Water Quality

Water quality samples were collected from each of the test wells to typify the water quality and determine the suitability for domestic use. Samples were collected from the test wells after 1 hour and after 6 hours during the pumping tests. The samples collected between October 5 and October 7, 2020 were submitted for analysis of general water quality indicator parameters and basic ions (e.g., pH, alkalinity, hardness, conductivity, chloride, nitrate, etc.) and selected metals. The water quality results were compared to relevant provincial and federal standards for determination of suitability for domestic use. The analytical results from the laboratory are provided in Table F-1 and summarized in Table 5.

Table 5: Pumping Test Water Quality

Parameter	ODWQS	TW1 (1hr / 6hr) mg/L	TW2 (1hr / 6hr) mg/L	TW3 (1hr / 6hr) mg/L
Hardness	(80-100)	716 / 340	235 / 193	515 / 382
Total Dissolved Solids	500	400 / 384	466 / 548	448 / 630
Colour	5	18300 / 182	312 / 15.3	1340 / 21.4
Turbidity	5	3870 / 24.5	42.9 / 3.4	263 / 3.4
Sodium	20 (200)	15.11 / 15.94	69.71 / 112.31	37.29 / 75.6
Aluminum	0.1	34 / 0.523	2.04 / 0.078	7.96 / 0.157
Iron	0.3	177 / 2.71	2.31 / 0.132	9.71 / 0.16
Manganese	0.05	2.21 / 0.188	0.045 / 0.035	0.291 / 0.06
Arsenic	0.025	0.081 / <0.003	<0.003 / <0.003	<0.003 / <0.003
Barium	1	1.78 / 0.46	0.059 / 0.035	0.226 / 0.073

All samples exceeded the Ontario Drinking Water Quality Standards (ODWQS) for total hardness (100 mg/L) with values ranging from 193 mg/L to 716 mg/L. Hardness in groundwater is caused by dissolved calcium and magnesium and is typically a result of the geologic material of the aquifer. Hardness is an aesthetic parameter and can be treated with a variety of residential systems including water softeners.

Turbidity in excess of 5 NTU can be seen by the naked eye as cloudy and as such the ODWQS for turbidity and colour is 5 NTU. Exceedances of colour and turbidity in the un-filtered sample are likely related to the elevated levels of minerals such as iron, manganese and calcium. Colour and turbidity are expected to improve with additional well development. The lower turbidity and colour values obtained at all wells after

6 hours of pumping offer confirmation that additional pumping is effective in reducing the levels of these parameters.

The ODWQS aesthetic objective for sodium is 200 mg/L however when levels exceed 20 mg/L it is recommended that the health department be notified if the users of the well are on sodium restricted diets. Elevated sodium and chloride can occur naturally as a result of the geologic composition of the aquifer material. Elevated levels of sodium were reported at TW2 and TW3 and may be naturally associated with mineralization from the bedrock. It is recommended that additional sampling be undertaken after wells have been further developed to evaluate the sodium concentrations.

Aluminum concentrations exceeded the ODWQS in five of the six samples ranging from 0.078 mg/L to 34 mg/L. At all test wells the levels of aluminum decreased with pumping. Elevated aluminum levels may reflect the presence of alumino-silicate clay particles in the groundwater sample. Alumino-silicate clay particles occur naturally in most geologic formations. The ODWQS for aluminum of 0.1 mg/L is an operational guideline and does not pose any threat to health.

Iron concentrations in the test wells ranged from 0.132 mg/L to 177 mg/L. The ODWQS aesthetic objective for iron is 0.3 mg/L. At all the test wells iron decreased in the 6 hour sample compared to the 1 hour sample. Iron occurs naturally in sand sediments and elevated levels are common in aquifers across the province. Iron is an aesthetic objective, which means that it may impair the taste, smell or colour of the water or interfere with good water quality control practices. Aesthetic objectives do not pose any health threats.

Manganese levels in groundwater may be related to shallow soil conditions. They also are naturally occurring minerals in many bedrock aquifers. Manganese is present in some ground waters because of chemically reducing underground conditions coupled with manganese mineral deposits. The ODWQS aesthetic objective for manganese is 0.05 mg/L. Manganese can stain laundry and fixtures black and may cause undesirable taste as high concentrations.

There was an exceedance for arsenic and an exceedance for barium in the 1 hour sample from TW1. The sample also had very high iron, manganese and calcium. After pumping for 5 more hours there were no longer an exceedance.

Overall, the water quality analyses indicate that the water is generally of suitable quality for domestic purposes and that treatment may be required to deal with hardness. The water shows indicators of being naturally mineralized and long-term development and pumping of wells is expected to result in improved water quality and less issues with aesthetic parameters.

4.4 Infiltration Testing

Infiltration testing was completed in October 2020 at three locations across the subject lands. The locations of the infiltration tests are shown on Figure 2 and are identified as IT-1, IT-2 and IT-3. The results of the infiltration tests are provided in Appendix G. The infiltration rate was determined by plotting infiltration per hour versus elapsed time and then averaging the values where the curve begins to stabilize. The infiltration rate is determined based on the curves where a stabilized rate has been obtained. A summary of the infiltration rates is provided in Table 6.

Table 6: Infiltration Testing Results

Location	Soil Type	Infiltration Rate (mm/hour)
IT-1	Sandy Silt/Silty Sand	63.1
IT-2	Sand	180
IT-3	Sand, trace silt	49.4

The testing indicates that the infiltration rates of the soils on the subject lands range from 49.4 mm to 180 mm per hour. These infiltration rates suggest that the soils on the subject lands are suitable for use in support of on-site wastewater systems.

5.0 Septic Suitability Assessment

The lots will be serviced with on-site sewage disposal systems. To examine the effects of the proposed septic systems, a nitrate impact assessment based on the MECP D-5-4 (MOE, 1996) has been completed. The procedure involves a three-step assessment process including:

Step One – Lot Size Considerations – D-5-4 indicates that a hydrogeological assessment may not be required for developments consisting of lots greater than one hectare, as long as it can be demonstrated that the area is not hydrogeological sensitive. The proposed lots range in size from 0.4 ha to 0.8 ha with an average lot size of 0.59 ha. This approach is therefore not applicable.

Step Two – System Isolation Considerations – Developments can be considered low risk where it can be demonstrated that sewage effluent is hydrogeologically isolated from existing or potential supply aquifers. As discussed in Section 5.0, the subsurface is underlain by an unconfined surficial aquifer (perched system) overlaying a regional bedrock aquifer. Due to the coarse-grained nature of the surficial sediments the sewage effluent would not be hydrogeological isolated from underlying aquifers and this approach is also not applicable.

Step Three – Contaminant Attenuation Considerations – Since it cannot be demonstrated that the sewage effluent is hydrogeologically isolated from potential supply aquifers a predictive assessment (residential developments) was completed.

The predictive assessment was completed using the assumptions provided in D-5-4. The calculation assumes 1,000 L/day of flow per residential lot, 0.250 m of infiltration and effluent nitrate concentrations of 40 mg/L, which is consistent with effluent expected from conventional septic tank/leaching bed systems without additional treatment or denitrification. The infiltration value of 250 mm was used based upon the rationale provided in Section 22.5 in the MOE's 2008 "*Design Guidelines for Sewage Works*". A calculation worksheet detailing the predictive assessment is provided in Appendix H.

The calculations indicated that the effluent from 14 systems would result in a nitrate loading concentration of 6.7 mg/L at the boundary of the subject lands which is below the ODWQS of 10 mg/L. Therefore, conventional septic tank/leaching bed systems are sufficient to meet the requirements of the D-5-4. It is recommended that leaching beds be located to maximize separation distances between individual systems and downgradient property boundaries. Fill- based (raised) leaching beds may be required on some lots to maintain minimum, mandatory vertical separation distances from the bottom of the trench to the seasonally high groundwater table.

6.0 Development Considerations

6.1 Source Water Protection

The subject lands are located within the Severn Sound Source Water Protection Area and are subject to policies under the South Georgian Bay Lake Simcoe Source Protection Plan. Policies in a SPP can apply to vulnerable areas defined under the Clean Water Act including wellhead protection areas (WHPA), highly vulnerable aquifers (HVA) and significant groundwater recharge areas (SGRAs). The subject lands are not located within a WHPA but are partially within a SGRA and HVA (Figure 10). The South Georgian Bay Lake Simcoe SPP does not have policies that apply to SGRAs or HVAs, therefore there are no policies in the SPP that apply to the subject lands.

6.1.1 Wellhead Protection Areas

Wellhead protection areas are areas where water travels through the ground to a municipal well. The areas are determined based on the time of travel for groundwater to reach the municipal well and include a WHPA-A (100 m radius around well), a 2 year time of travel zone (WHPA-B), a 5 year time of travel zone (WHPA-C) and a 25 year time of travel zone (WHPA-D). The subject lands are not located within a wellhead protection area. The closest municipal well is in Coldwater, approximately 3.9 km south of the subject lands. The wellhead protection area for the Coldwater well is shown on Figure 11.

6.1.2 Significant Groundwater Recharge Areas

Significant Groundwater Recharge Areas (SGRAs) can be described as areas that can effectively move water from the surface through the unsaturated soil zone to replenish available groundwater resources. SGRAs were mapped by the Source Water Protection Assessment Report (LSRCA, 2015) as a requirement of the Clean Water Act, 2006 and based on guidance provided by the MECP. The delineation of these areas was completed using numerical models and analyses that included the evaluations of numerous factors including precipitation, temperature and other climate data along with land use, soil type, topography and vegetation to predict groundwater recharge, runoff and evapotranspiration. SGRAs represent areas where the annual recharge rate is greater than 115% of the average recharge of 164 mm/year across the Lake Simcoe watershed (or greater than the threshold recharge rate of 189 mm/year) (LSRCA, 2015). The subject lands are located partially within a significant groundwater recharge area (Figure 10) (LSRCA, 2015). As noted in Section 6.1 above, there are no policies for SGRAs that apply to the subject lands.

6.1.3 Highly Vulnerable Aquifers

Highly vulnerable aquifers (HVAs) are aquifers that are more susceptible to contamination. Aquifer vulnerability refers to the susceptibility of the aquifer to potential contamination. The vulnerability of an aquifer is dependent upon the depth to the water table (for unconfined aquifers) or to the depth of the aquifer (for confined aquifers) and the type of soil above the water table or aquifer. Aquifer vulnerability mapping was completed as part of the Severn Sound Source Protection Area Assessment Report (South Georgian Bay Lake Simcoe Source Protection Region, 2015). Areas with high vulnerability were identified as Highly Vulnerable Aquifers (HVA). As shown on Figure 10, southern portion and northeast part of the subject lands are located within an HVA. As noted in Section 6.1 above, there are no policies for HVAs that apply to the subject lands.

6.2 Well Decommissioning

Prior to or during construction, it is necessary to ensure that all inactive wells within the development footprint have been located and properly decommissioned by a licensed water well contractor according to Ontario Regulation 903. This regulation applies private domestic wells and to the groundwater observation well installed for this study unless they are maintained throughout the construction for monitoring purposes.

7.0 References

Armstrong et. al., 2007. Paleozoic Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 219.

Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario, Third Edition; Ontario Geological Survey, Special Volume 2, 270p. Accompanied by Map 2715.

Ontario Ministry of the Environment, Conservation and Parks, Water Well Records.

Ontario Ministry of the Environment, D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment, August 1996.

OGS, 2003. Surficial Geology of Southern Ontario, Ontario Geological Survey, Miscellaneous Release – Data 128. Scale 1:50,000.

Soil Eng., 2019. Environmental Subsurface Investigation, Existing Property, 2970 Fesserton Sideroad, Township of Severn. Soil Engineers Ltd., May 29, 2019.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Figures

LEGEND

SUBJECT LANDS

0 500 1,000 1,500 2,000

Metres

N

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

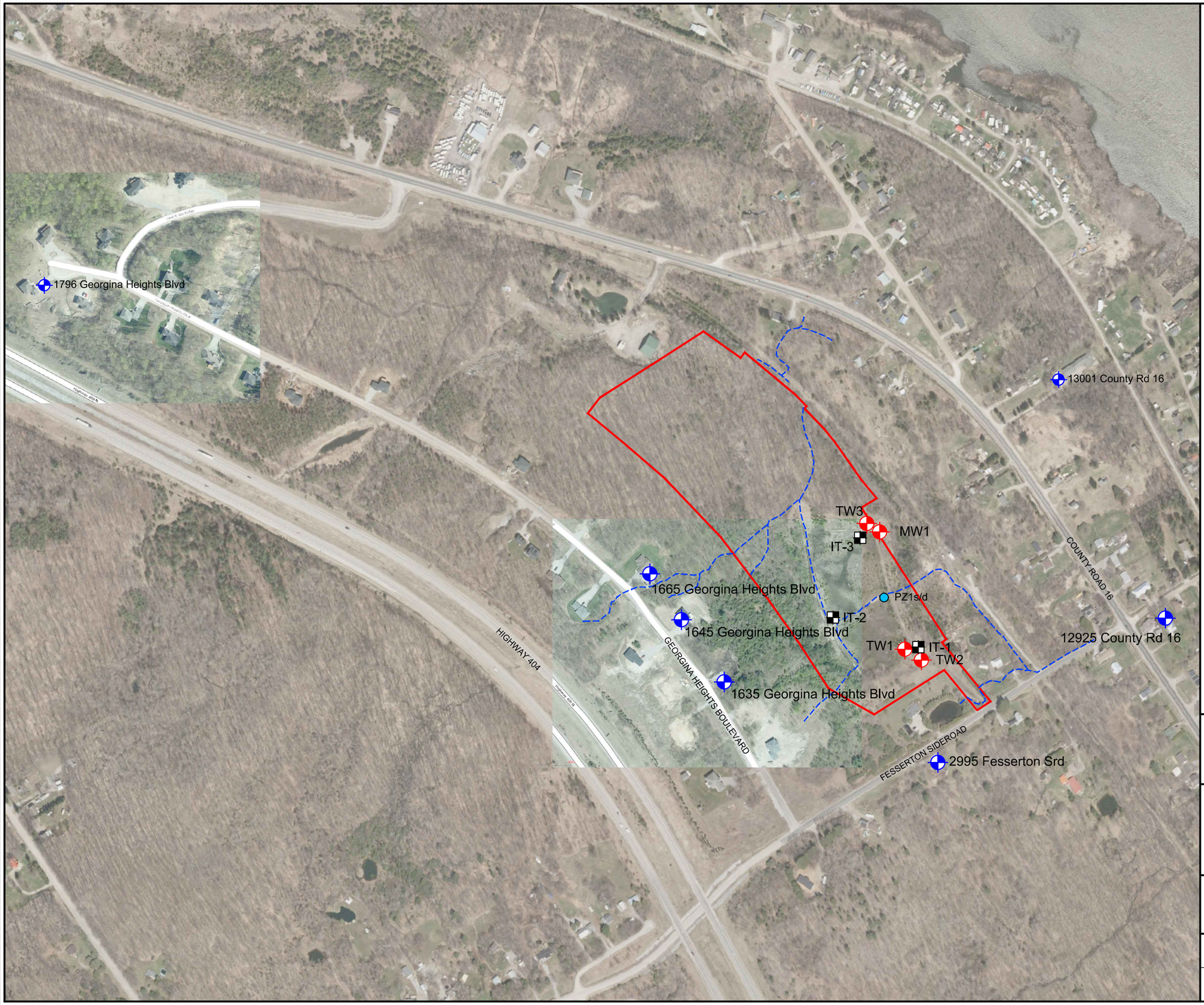
BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title:

SITE LOCATION

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	1
Scale		Project No.	
1:30,000		300050086.0000	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 Site Location.mxd



LEGEND

- SUBJECT LANDS
- DRAINAGE FEATURE (AZIMUTH, 2020)
- MONITORING / TEST WELL (ALLAN WRIGHT WATER WELLS, 2020)
- PRIVATE RESIDENCE WELL
- INFILTRATION TEST LOCATION

N

0 50 100 200 300 400

Metres

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

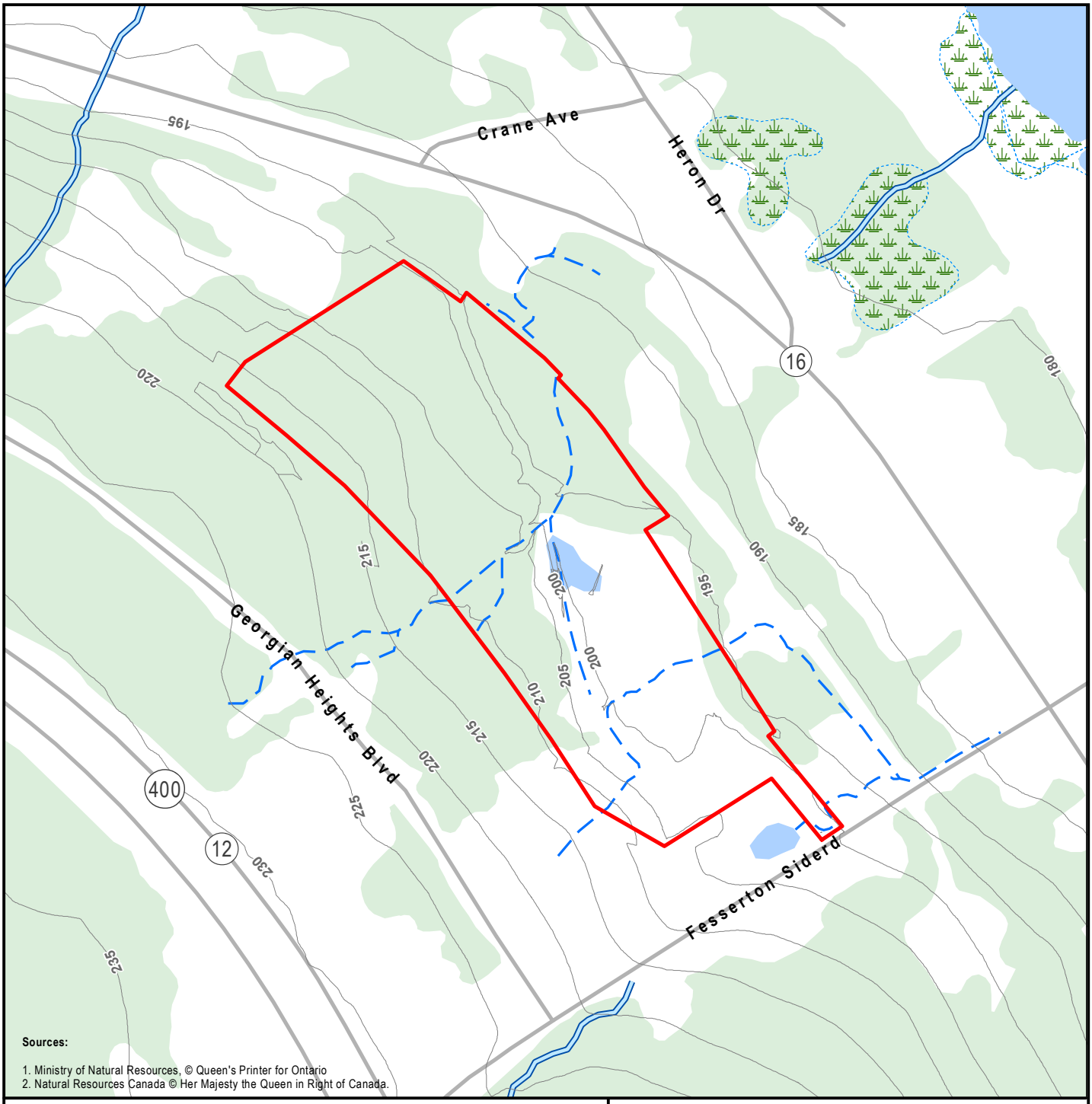
BLOCK 18 FESSERTON
HYDROGEOLOGIACL ASSESSMENT

Figure Title

MONITORING LOCATIONS

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	2
Scale		Project No.	
1:5,000		300050086	

File Name:Nigel/Shared Work Areas/050086 Fesserton/02_Production/ 050086 HG Study Drawing Set.dwg Date Plotted: January 29, 2021 - 2:02 PM



Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

LEGEND

- SUBJECT LANDS
- WATERCOURSE
- DRAINAGE FEATURE (AZIMUTH 2020)
- CONTOUR (1m intervals - masl)
- ROADWAY
- OPEN WATER
- WETLAND
- WOODED AREA

0 50 100 150 200 250 300
Metres

N

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

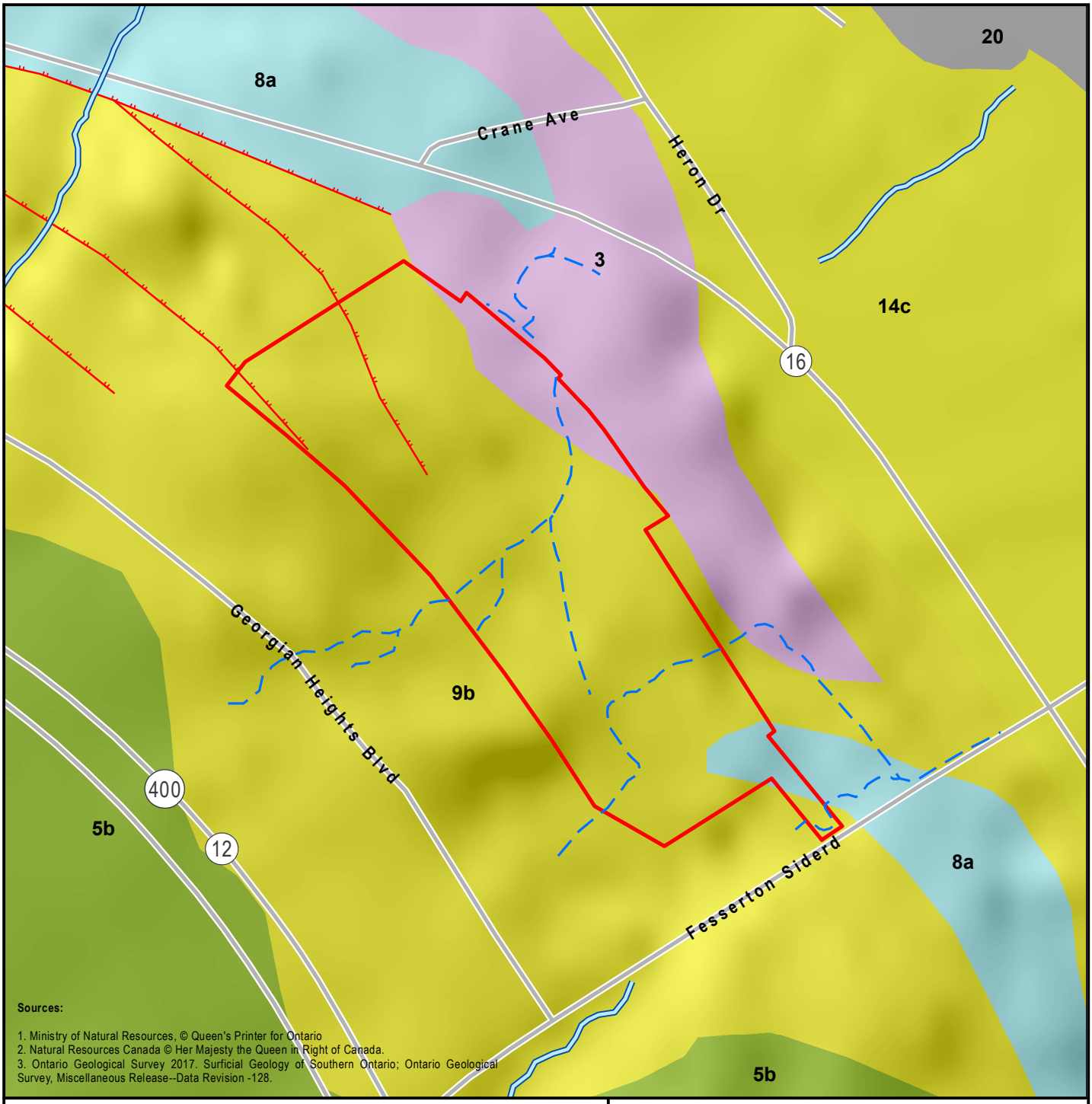
BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title:

TOPOGRAPHY AND DRAINAGE

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	3
Scale		Project No.	
1:5,000		300050086.0000	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 Topographt & Drainage.mxd



Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Ontario Geological Survey 2017. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data Revision -128.

LEGEND

- SUBJECT LANDS
- 3: Paleozoic bedrock
- 5b: Till: Stone-poor, carbonate-derived silty to sandy till
- 8a: Fine-textured glaciolacustrine deposits: Massive-well laminated
- 9b: Coarse-textured glaciolacustrine deposits: Littoral-foreshore deposits
- 14c: Coarse-textured lacustrine deposits: Foreshore-basinal deposits
- 20: Organic deposits
- DRAINAGE FEATURE (AZIMUTH 2020)
- ROADWAY
- WATERCOURSE
- Bluff

0 50 100 150 200 250 300
Metres

N

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title:

SURFICIAL GEOLOGY

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	4
Scale		Project No.	
1:5,000		300050086.0000	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 Surficial Geology.mxd

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
1. Ontario Geological Survey 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release–Data 207.

LEGEND

- SUBJECT LANDS
- ROADWAY
- Karst: Known Area

MIDDLE ORDOVICIAN - 54 Limestone, dolostone, shale, arkose, sandstone

- 54a Ottawa Gp.; Simcoe Gp.; Shadow Lake Fm.

0 50 100 150 200 250 300
Metres

N

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title:

BEDROCK GEOLOGY

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	5
Scale		Project No.	
1:5,000		300050086.0000	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 Bedrock Geology.mxd

LEGEND

- SUBJECT LANDS
- DRAINAGE FEATURE (AZIMUTH, 2020)
- MONITORING / TEST WELL (ALLAN WRIGHT WATER WELLS, 2020)
- PRIVATE RESIDENCE WELL
- BOREHOLE (SOIL ENG., 2019)
- MECP WELL RECORD LOCATION
- TEST PIT
- A A' CROSS-SECTION LOCATION KEY

N

0 60 120 180 240
Metres

BURNSIDE

Client / Report

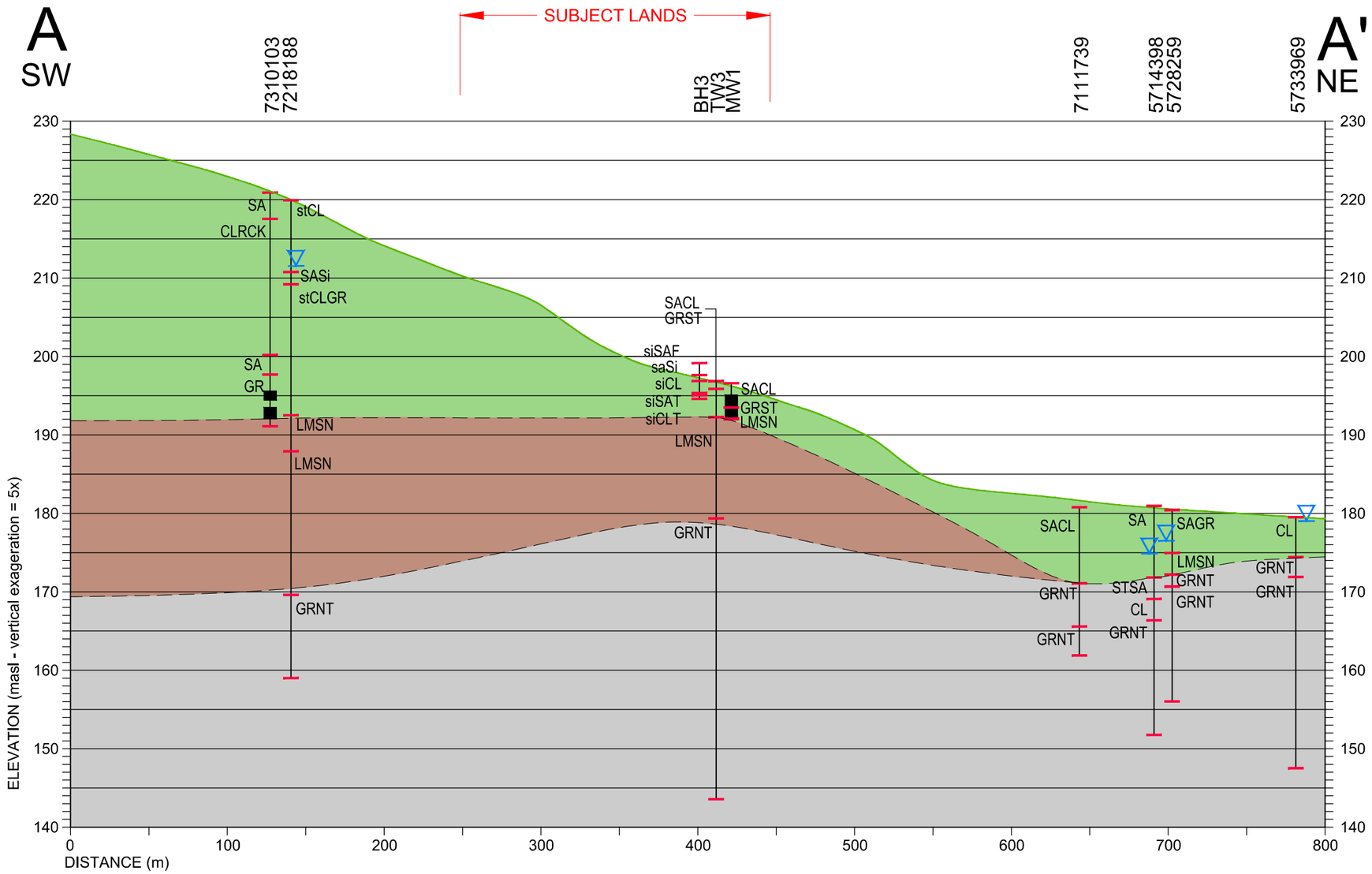
2801829 ONTARIO INC.
FESSERTON, ONTARIO
BLOCK 18 FESSERTON
HYDROGEOLOGIACL ASSESSMENT

Figure Title

BOREHOLE, WELL AND CROSS-SECTION LOCATION PLAN

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	6
Scale		Project No.	
1:7,500		300050086	

File Name:Nigel/Shared Work Areas/050086 Fesserton/02_Production/ 050086 HG Study Drawing Set.dwg Date Plotted: January 29, 2021 - 2:03 PM



LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

STATIC WATER LEVEL (MECP WELL RECORD)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
F	FILL
T	TILL
HPAN	HARDPAN
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
ST	STONES
RCK	ROCK
LSMN	LIMESTONE
GRNT	GRANITE

INTERPRETED STRATIGRAPHY

SAND / SILT / CLAY

LIMESTONE BEDROCK

GRANITE BEDROCK

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

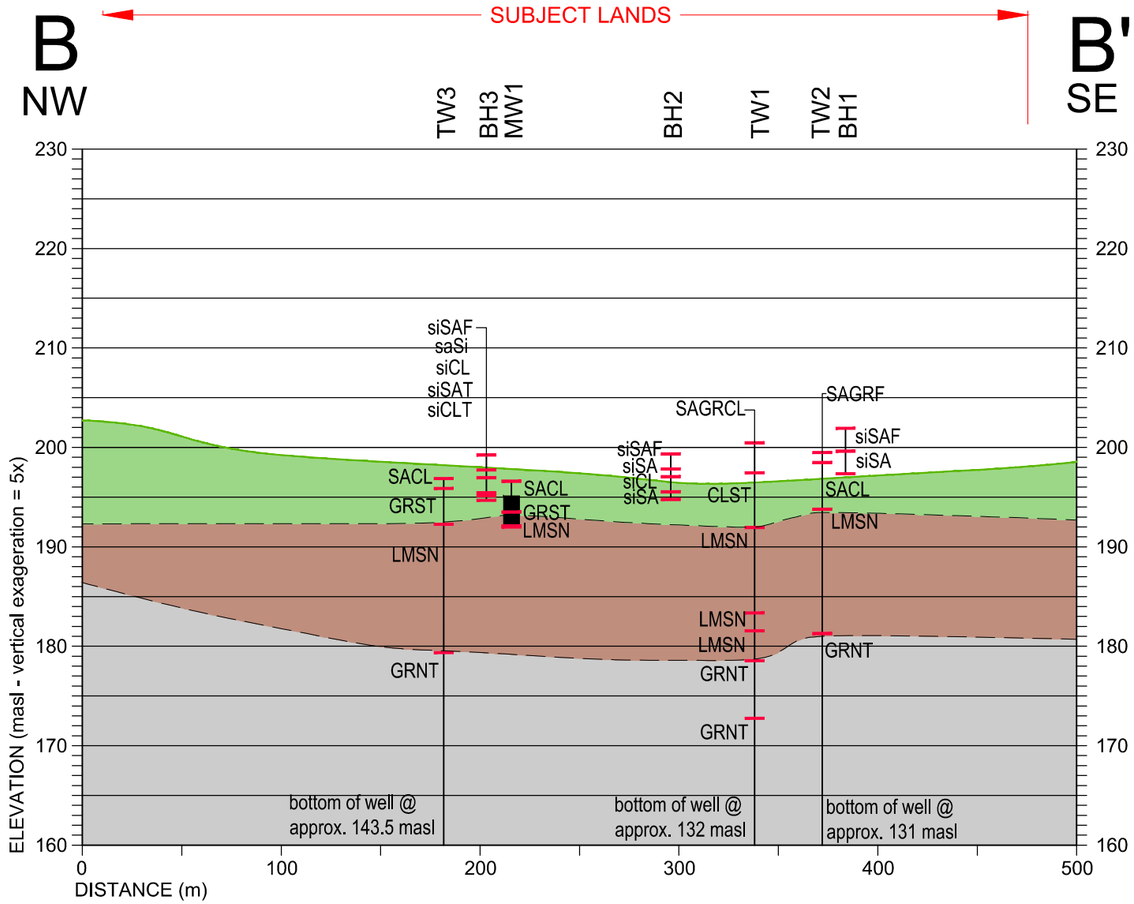
BLOCK 18 FESSERTON
HYDROGEOLOGIACL ASSESSMENT

Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION A-A'

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	7
Scale		Project No.	
1:3,000		300050086	

File Name:Nigel/Shared Work Areas/050086 Fesserton/02_Production/ 050086 HG Study Drawing Set.dwg Date Plotted: January 29, 2021 - 2:04 PM



LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

STATIC WATER LEVEL (MECP WELL RECORD)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
F	FILL
T	TILL
HPAN	HARDPAN
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
ST	STONES
RCK	ROCK
LSMN	LIMESTONE
GRNT	GRANITE

----- INTERPRETED STRATIGRAPHY

SAND / SILT / CLAY

LIMESTONE BEDROCK

GRANITE BEDROCK

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

BLOCK 18 FESSERTON
HYDROGEOLOGIACL ASSESSMENT

Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION B-B'

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	**8**
Scale		Project No.	
1:3,000		300050086	

File Name:Nigel/Shared Work Areas/050086 Fesserton/02_Production/ 050086 HG Study Drawing Set.dwg Date Plotted: January 29, 2021 - 2:05 PM

LEGEND

- SUBJECT LANDS
- BUFFER (500m)

MECP WELL USE:

- WATER SUPPLY
- OBSERVATION WELL
- UNKNOWN

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

N

0 100 200 300 400

Metres

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

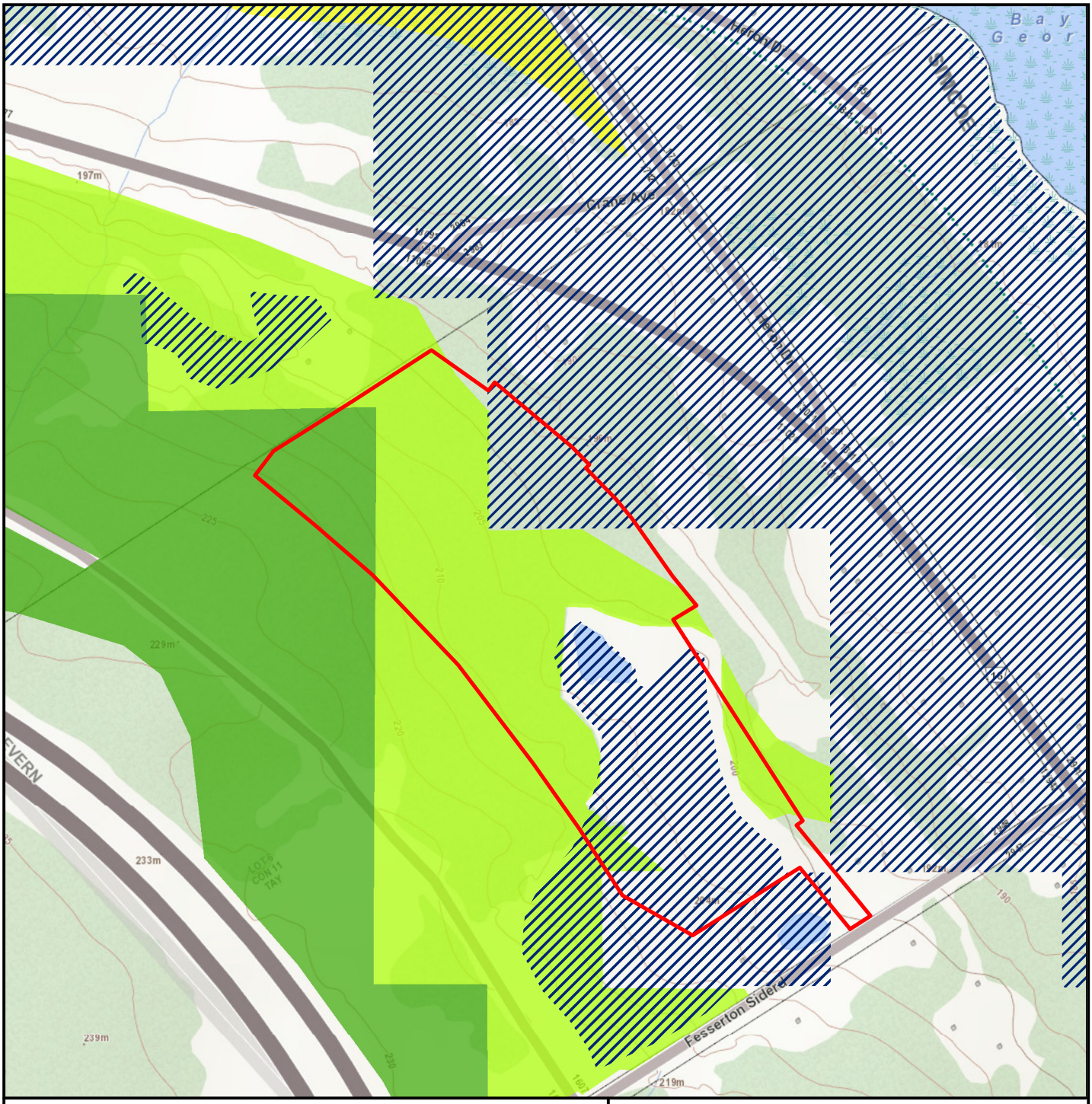
BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title

MECP WATER WELL RECORDS

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	9
Scale		Project No.	
1:6,000		300050086	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 MECP Well Locations.mxd



LEGEND

- SUBJECT LANDS
- HIGHLY VULNERABLE AQUIFER AREAS

SIGNIFICANT GROUNDWATER RECHARGE

- SGRA - 6 (HIGH)
- SGRA - 4 (MEDIUM)
- SGRA - 2 (LOW)

0 50 100 150 200 250 300
Metres

N

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

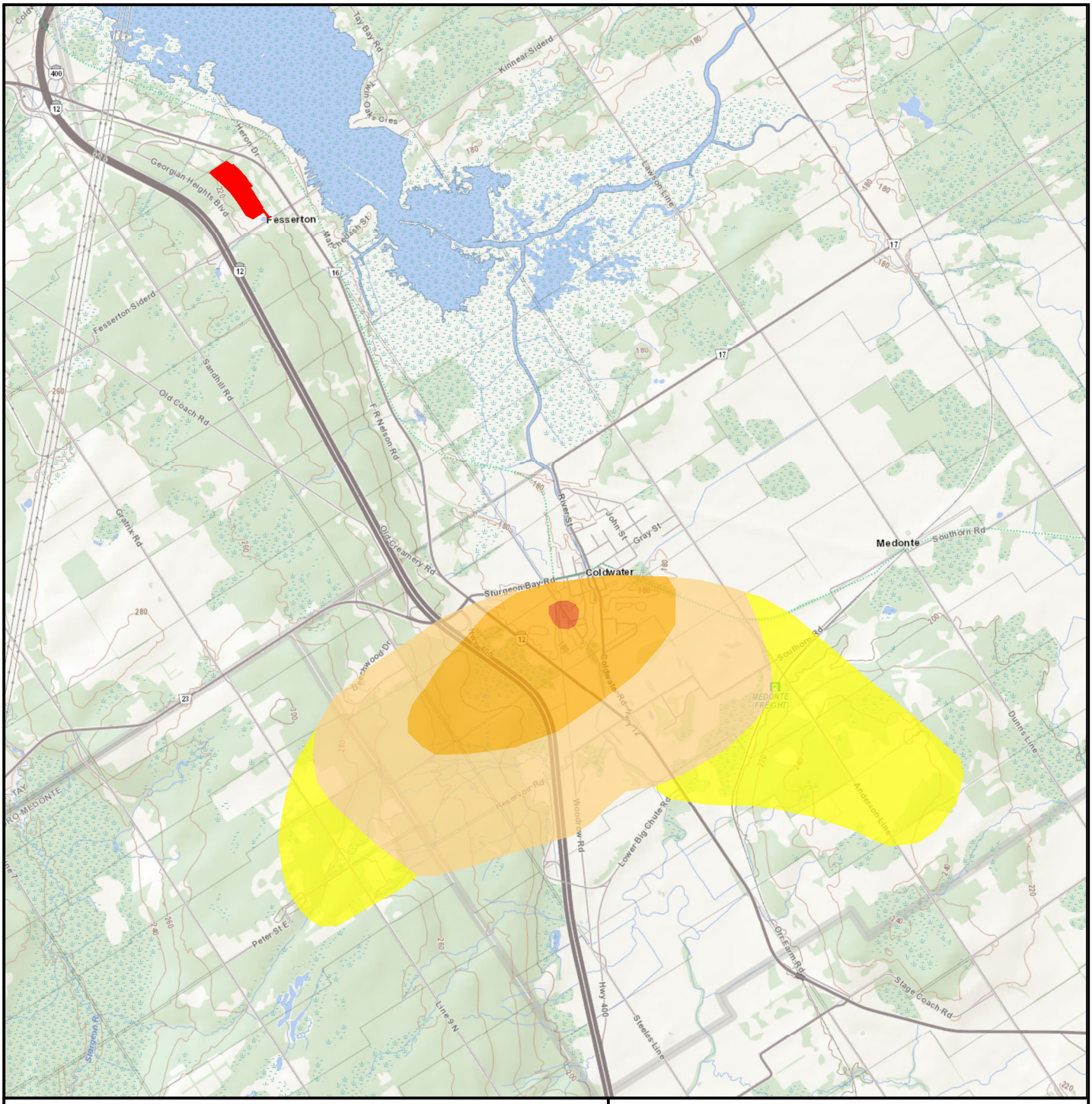
BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title:

VULNERABLE AREAS

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	10
Scale		Project No.	
1:5,000		300050086.0000	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 Vulnerable Areas.mxd



LEGEND

- SUBJECT LANDS

WELL HEAD PROTECTION

- WHPA A - 100m
- WHPA B - 2 YEAR ZONE
- WHPA C - 5 YEAR ZONE
- WHPA D - 25 YEAR ZONE

0 500 1,000 1,500 2,000 2,500 3,000

Metres

N

BURNSIDE

Client / Report

2801829 ONTARIO INC.
FESSERTON, ONTARIO

BLOCK 18 FESSERTON
HYDROGEOLOGICAL ASSESSMENT

Figure Title:

WELLHEAD PROTECTION AREAS

Drawn	Checked	Date	Figure No.
SK	SC	JANUARY 2021	11
Scale		Project No.	
1:50,000		300050086.0000	

File Path: Nigel/Shared Work Areas/050086 Fesserton/06_GIS/050086 Wellhead Protection Areas.mxd

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

MECP Water Well Records

Water Well Records

Friday, October 09, 2020
11:48:41 AM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
ORILLIA TOWNSHIP 12 006	17 604597 4955114 W	2008/08 5528	6.09 5.90	UT 0059	15/17/9/1:	DO		7111739 (Z92471) A044285	GREY SAND CLAY 0032 RED GRNT 0050 BLCK GRNT 0062
TAY TOWNSHIP	17 604366 4954528 W	2018/04 3413	6		35/0//2:	DO		7310106 (Z276250)	BRWN SAND HARD 0009 GREY CLAY 0027 BRWN SAND HARD 0038 GREY CLAY 0086 BRWN GRVL HARD 0095
TAY TOWNSHIP	17 604033 4954925 W	2018/02 3413	6		/574/0/4:	DO		7310105 (Z251389) A240063	BRWN CLAY SOFT 0010 BLUE CLAY ROCK HARD 0060 BLUE CLAY SOFT 0067 BLUE CLAY ROCK HARD 0074 GREY SAND FSND 0080 BLUE CLAY HARD 0093 GREY GRVL 0107 RED HARD 0576
TAY TOWNSHIP	17 604330 4954585 W	2018/03 3413	6		136/180/6/5:	DO		7310104 (Z276253) A240057	BRWN SAND HARD 0009 GREY SAND CLAY 0034 BLUE CLAY STNS HARD 0097 BRWN SAND HARD 0102 BRWN GRVL CLAY HARD 0106 ROCK HARD 0620
TAY TOWNSHIP	17 604206 4954763 W	2018/03 3413	6		0/90/6/24:	DO	0083 4 0090 5	7310103 (Z276252) A240068	BRWN SAND HARD 0011 BLUE CLAY ROCK HARD 0068 BRWN SAND HARD 0076 BLUE GRVL HARD 0098
TAY TOWNSHIP	17 603711 4955241 W	2018/04 3413	6 5		/94/5/2:	PS	0070 11	7310102 (Z276249) A240066	GREY CLAY SAND 0050 BRWN SAND MSND 0084 GREY SAND 0096
TAY TOWNSHIP	17 603865 4954909 W	2017/07 3413	6		94/200/5/2:			7298508 (Z251384) A220816	BRWN CSND 0008 GREY CLAY ROCK HARD 0052 BRWN MSND 0058 GREY CLAY HARD 0114 GREY ROCK HARD 0396
TAY TOWNSHIP	17 604095 4955339 W	2006/02 1366	6.25 5.96	FR 0330	45/46/5/1:	DO		7162619 (Z130040) A114667	BRWN SAND FILL 0012 GREY LMSN 0090 BLCK GRNT 0340
TAY TOWNSHIP	17 604033 4954966 W	3413	6		77/94/4/3:	DO	0093 4	7258991 (Z202137) A166209	BLCK LOAM 0005 BRWN CLAY SOFT 0034 GREY CLAY HARD 0070 BRWN SAND 0072 GREY CLAY 0092 BRWN GRVL 0097 GREY CLAY
TAY TOWNSHIP	17 603910 4955179 W	3413	6		56/68/5/60:	DO	0067 6	7258992 (Z202140) A177288	BRWN SAND 0003 BLUE CLAY SOFT 0021 BLUE SAND 0046 BLUE CLAY HARD 0048 BRWN SAND 0073 BLUE CLAY
TAY TOWNSHIP	17 603790 4955192 W	2016/11 3413	6	FR FR FR	/390/4/4:	DO		7278732 (Z251398) A220857	BRWN CLAY SAND MGRD 0028 BLUE CLAY HARD 0043 BRWN SAND CGRD 0078 GREY CLAY STNS HARD 0090 BRWN SAND MGRD 0097 ROCK HARD 0440
TAY TOWNSHIP 11 007	17 603690 4955298 L	1920	5 5	FR 0145	8/8/12/1:0	DO		5724166 (23289)	GREY CLAY SAND 0008 BLCK GRNT 0150
TAY TOWNSHIP 12 005	17 604848 4954745 W	2005/06 1851	6.25 5.5	FR 0025 0085	/60/3/2:0	DO	0021 5	5739996 (Z25003) A024329	BRWN SAND 0008 GREY MUCK 0019 GRNT FCRD 0025 BLCK GRNT 0085

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TAY TOWNSHIP 12 016	17 604852 4955112 W	2005/08 5224	6.30	FR 0115	///:	DO		5739963 (Z31996) A029753	BLCK LOAM SAND 0005 GREY CLAY 0033 BLCK GRNT ROCK 0120
TAY TOWNSHIP CON 11	17 603796 4955192 W	2017/01 3413	6	FR	/240/30/2:10	DO		7289115 (Z251396) A220835	BRWN SAND CSND 0008 BRWN CLAY SOFT 0020 BRWN SAND CLAY LYRD 0048 BRWN SAND MSND 0075 GREY SAND CLAY 0092 GREY ROCK FCRD 0098 GREY ROCK HARD 0296
TAY TOWNSHIP CON 11	17 604297 4954650 W	2018/12 7663	6.11 5	FR 0026	2/56/5/1:	DO	0026 4	7324779 (Z296727) A256065	GREY SAND CLAY 0005 BRWN SAND 0015 GREY CLAY 0024 GREY SAND GRVL 0030 GREY CLAY ROCK 0056
TAY TOWNSHIP CON 11	17 603892 4954974 W	2017/07 3413	6		44/74/10/2:	DO	0072 3	7297176 (Z251382) A220842	GREY CLAY STNS HARD 0056 GREY SAND MGRD 0068 BRWN SAND CGRD 0075
TAY TOWNSHIP CON 11 005	17 604780 4954476 W	1988/07 1920	5 5	FR 0130	85/85/8/12:0	DO		5724168 (23272)	BRWN SAND CLAY 0060 BLCK GRNT 0140
TAY TOWNSHIP CON 11 005	17 605000 4954398 W	1986/12 2652	6	FR 0120	/165/2/1:0	PS		5721545 (NA)	BRWN SAND BLDR 0024 BLCK GRNT QTZ 0165
TAY TOWNSHIP CON 11 005	17 604914 4954574 W	1976/09 4407	6	FR 0039	18/80/1/:	DO		5713917 ()	GREY HPAN BLDR 0023 GREY LMSN 0039 BLCK GRNT 0080
TAY TOWNSHIP CON 11 005	17 604381 4954418 W	2015/11 5528	6.09 5.51	UT 0085	54/72/10/1:0	DO	0088 4	7253698 (Z212581) A153218	BRWN SAND 0010 BRWN CLAY STNS TILL 0022 GREY STNS GRVL 0054 GREY CLAY 0082 BRWN SAND GRVL 0092
TAY TOWNSHIP CON 11 005	17 603709 4955083 W	3413	6		81/290/2/3:	DO		7258989 (Z202138) A177289	BRWN SAND CSND 0015 BLUE CLAY STNS HARD 0125 GREY ROCK HARD 0297
TAY TOWNSHIP CON 11 005	17 604488 4954510 W	1990/08 2652	6	FR 0072	45//3/1:30	DO		5727196 (65549)	BRWN SAND BLDR 0009 GREY CLAY 0027 BRWN SAND 0030 GREY HPAN 0072 BRWN SAND GRVL 0084
TAY TOWNSHIP CON 11 005	17 604826 4954641 W	1989/08 1920	4 4	FR 0070	12/12/10/2:0	DO		5726213 (49369)	LOAM 0015 GRNT 0080
TAY TOWNSHIP CON 11 006	17 604450 4955269 W	1990/09 6174	6	FR 0130	10/100/8/1:30	DO		5727514 (74301)	BLCK SAND GRVL BLDR 0008 BLUE LMSN SOFT 0016 RED GRNT SOFT 0135
TAY TOWNSHIP CON 11 006	17 604040 4954376 W	1962/08 2512	5	FR 0054	40/54/2/1:30	DO		5704023 ()	MSND 0004 HPAN BLDR 0032 BLDR 0040 GRVL BLDR 0054
TAY TOWNSHIP CON 11 006	17 604510 4955168 W	1992/04 5224	6	FR 0230	37/230/5/1:0	DO		5729168 (110784)	GREY LMSN 0042 BLCK GRNT 0072 BLCK GRNT HARD 0230
TAY TOWNSHIP CON 11 006	17 604102 4954928 W	1995/06 2652	6	FR 0084	44/47/12/1:0	DO	0089 4	5731656 (141119)	BRWN SAND BLDR 0037 GREY HPAN 0061 BRWN SAND GRVL 0096
TAY TOWNSHIP CON 11 006	17 604114 4954424 W	1978/04 2652	6	FR 0051	/43/12/2:0	DO	0046 7	5715278 ()	BRWN LOAM BLDR OBDN 0018 BRWN CGVL 0053
TAY TOWNSHIP CON 11 006	17 604720 4954910 W	1990/06 2652	6	FR 0034	19//25/2:0	DO		5726875 (65528)	BRWN LOAM 0004 GREY SAND 0034 BRWN GRVL 0038

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TAY TOWNSHIP CON 11 006	17 604362 4954552 W	1988/02 1366	6	FR 0092	3/65/15/1:15	CO		5722982 (20505)	BRWN SAND 0010 GREY GRVL BLDR CMTD 0033 GREY GRVL CMTD 0038 GREY CLAY FGVL 0044 GREY CLAY 0046 GREY CLAY 0065 GREY SAND GRVL 0073 GREY GRVL CMTD 0092
TAY TOWNSHIP CON 11 006	17 604013 4954887 W	2009/01 5224	6	FR 0130	60/300/7/1:			7127603 (Z095237) A073608	BRWN SAND FILL BLDR 0005 BRWN CLAY SILT STNY 0065 GREY CLAY 0095 GREY SAND SILT 0110 LMSN GRVL 0118 GREY LMSN ROCK 0150 BLCK GRNT ROCK 0190 GREY GRNT ROCK 0320
TAY TOWNSHIP CON 11 006	17 604033 4954966 W	2016/11 3413	6	FR	/79/8/2:	DO	0076 4	7278734 (Z251397) A220858	BRWN CLAY SAND SOFT 0010 GREY CLAY STNS HARD 0074 BRWN SAND CGRD 0080
TAY TOWNSHIP CON 11 006	17 603659 4955108 W	3413	6		81/283/3/2:	DO		7258990 (Z202139) A166205	BRWN SAND 0010 BRWN CLAY 0030 BLUE CLAY 0037 BRWN SAND 0045 BLUE CLAY STNS 0119 BLUE SAND 0125 GREY ROCK 0297
TAY TOWNSHIP CON 11 006	17 604315 4954571 W	2015/06 2801						7245434 (Z174092) A	
TAY TOWNSHIP CON 11 006	17 604274 4954572 W	2009/01 1312	6.25	FR 0035	9/9/10/1:0	DO	0035 5	7139143 (Z095491) A070745	BRWN SAND STNS 0010 BRWN CLAY SAND 0035 BRWN GRVL 0040
TAY TOWNSHIP CON 11 006	17 604314 4954524 W	1976/10 4816	6	FR 0060	23/50/5/2:0	DO	0052 4	5713883 ()	CLAY STNS SNDY 0019 GREY CLAY 0042 SAND FGRD 0047 CSND 0061 CLAY 0065 SAND GRVL CLAY 0078
TAY TOWNSHIP CON 11 006	17 604635 4954787 W	2002/09 5224	6 6	FR 0132	35/120/40/1:0	DO		5737311 (237656)	BRWN SAND STNY 0003 BRWN CLAY STNY 0011 GREY LMSN ROCK 0040 BRWN SHLE ROCK 0075 BRWN GRNT ROCK 0125 BRWN GRNT ROCK 0132
TAY TOWNSHIP CON 11 006	17 604529 4954734 W	2009/04 5528	6.09 5.90	UT 0203 UT 0064	76/108/4/6:0	DO		7125829 (Z92504) A070521	BRWN SAND GRVL CLAY 0010 GREY CLAY STNS 0028 GREY LMSN 0056 RED LMSN 0062 GREN LMSN 0072 RED GRNT 0091 BLCK GRNT 0206 RED GRNT 0216 BLCK GRNT 0224
TAY TOWNSHIP CON 11 006	17 604179 4954827 W	2013/11 5224	6	FR 0095	28/195/5/1:	DO		7218188 (Z179136) A047397	BRWN CLAY STNY 0030 BRWN SAND SILT 0035 GREY CLAY GRVL STNY 0090 GREY LMSN FCRD 0105 GREY LMSN ROCK 0165 BLCK GRNT ROCK 0200
TAY TOWNSHIP CON 11 007	17 604114 4955364 W	1971/07 4816	6 6	UK 0152	28/107/7/28:0	DO		5708153 ()	CLAY SAND STNS 0003 LMSN 0039 GRNT 0155
TAY TOWNSHIP CON 11 007	17 603690 4955298 L	1993/08 5224	6	FR 0099	70/99/14/3:0	DO	0099 4	5730119 (133416)	BRWN SAND BLDR 0030 GREY CLAY 0055 GREY SAND CLAY 0075 GRVL 0093 BRWN SAND 0103
TAY TOWNSHIP CON 11 007	17 604032 4955207 W	1993/07 5224	6	FR 0210	90/200/13/2:0	DO		5730118 (133409)	BRWN SAND CLAY 0020 GREY HPAN 0035 BRWN GRVL 0047 GREY HPAN 0058 GREY LMSN 0070 BRWN GRNT 0088 GREY GRNT 0200 BLCK GRNT 0210
TAY TOWNSHIP CON 11 007	17 603950 4955409 W	1988/12 1366	6	FR 0098	26//15/1:0	DO		5724515 (38870)	BRWN SAND 0002 GREY LMSN 0065 BLCK GRNT 0120
TAY TOWNSHIP CON 11 007	17 604130 4955293 W	2003/02 1366	6 5	FR 0178	//50/1:0	CO		5737632 (230602)	BRWN FILL 0004 GREY LMSN 0060 GREY GRNT 0200
TAY TOWNSHIP CON 11 022	17 603739 4955102 W	3413	6		143/350/2/4:30	DO		7278730 (Z245149) A140681	BLCK LOAM 0001 BRWN SAND CGRD 0011 GREY CLAY STNS MGRD 0113 ROCK HARD 0360

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TAY TOWNSHIP CON 11 024	17 603666 4955162 W	2016/12 3413	6	FR	/104/5/3:	DO	0098 7	7278733 (Z251399) A215362	BRWN SAND MGRD 0010 GREY CLAY MGRD 0032 BRWN SAND MGRD 0040 GREY CLAY HARD 0068 GREY CLAY SAND MGRD 0097 BRWN SAND MGRD 0105
TAY TOWNSHIP CON 11 024	17 603935 4954999 W	2016/11 3413	6		/243/3/2:	DO		7278731 (Z230292) A201827	BRWN CLAY SOFT 0008 GREY CLAY MGRD 0057 BLUE SAND MGRD 0062 BLUE SAND FGRD 0078 GREY CLAY STNS HARD 0114 GREY ROCK HARD 0276
TAY TOWNSHIP CON 12 005	17 605064 4954494 W	1990/09 2652	6	FR 0092	12//18/2:30	DO		5727455 (65530)	BRWN SAND 0018 GREY MUCK 0035 BLCK GRNT 0097
TAY TOWNSHIP CON 12 005	17 604828 4954798 W	1994/07 5224	6	FR 0022	16/60/15/1:0	DO		5730887 (139970)	GREY CLAY SAND 0018 BRWN GRNT 0021 BRWN GRNT FCRD 0023 GRNT 0060
TAY TOWNSHIP CON 12 006	17 604714 4955024 W	1977/04 2614	5	FR 0087	20/75/5/2:0	DO		5714398 ()	BRWN SAND 0030 STNS SAND 0039 GREY CLAY 0048 BLCK GRNT HARD 0095
TAY TOWNSHIP CON 12 006	17 604864 4955074 W	1983/06 1920	4 4	FR 0112	3/12/12/2:0	DO		5719322 ()	SAND 0015 GRNT 0120
TAY TOWNSHIP CON 12 006	17 604684 4955080 W	1988/07 1920	5 5	FR 0038 FR 0095 FR 0128	13/90/2/2:0	DO		5724167 (23260)	GREY CLAY SAND 0010 BLCK GRNT 0150
TAY TOWNSHIP CON 12 006	17 604888 4955061 W	1988/05 1920	5 5	FR 0053	3/3/20/1:0	DO		5723358 (15144)	BRWN SAND CLAY 0022 GREY GRNT 0070
TAY TOWNSHIP CON 12 006	17 604776 4954883 W	1988/08 1920	5	FR 0059	20/20/12/1:0	DO		5724169 (23266)	BRWN SAND CLAY 0060
TAY TOWNSHIP CON 12 006	17 604528 4955246 W	1991/06 6174	6	FR 0145	12/125/8/2:0	DO		5728199 (47989)	BLCK SAND 0026 GREY LMSN 0032 BLCK GRNT 0155
TAY TOWNSHIP CON 12 006	17 604684 4955080 W	1990/08 6174	6	FR 0075	13/13/12/1:30	DO		5728259 (47990)	BLCK SAND GRVL 0018 GREY LMSN 0027 BRWN GRNT 0032 BLCK GRNT 0080
TAY TOWNSHIP CON 12 006	17 604881 4954825 W	1995/11 5224	6 6	FR 0230	11/230/30/1:0	DO		5731916 (163493)	BRWN FSND 0042 BRWN GRNT ROCK 0160 BRWN GRNT ROCK SOFT 0180 BLCK GRNT ROCK HARD 0230
TAY TOWNSHIP CON 12 006	17 604750 4955127 L	1998/11 5224	6 6	FR 0025 FR 0095	1/100/6/1:0	DO		5733969 (192312)	GREY CLAY SOFT 0017 RED GRNT SOFT 0025 BLCK GRNT HARD ROCK 0105
TAY TOWNSHIP CON 12 006	17 604746 4955126 L	2002/06 5224	6 6	FR	18/50/3/1:0	DO		5737041 (237617)	BRWN CLAY SAND STNY 0033 BLCK GRNT ROCK 0050
TAY TOWNSHIP CON 12 006	17 604896 4954988 W	2019/06 5224	6	FR 0080	0/22/10/2:30	DO		7340591 (Z309701) A267017	BRWN SAND 0003 GREY SAND 0008 GREY CLAY LOAM 0052 BLCK GRNT ROCK 0080
TAY TOWNSHIP CON 12 006	17 604746 4955127 L	2002/12 7074	6	FR 0106 FR 0109	/12/15/2:0	DO	0106 6	5737560 (249926)	GREY CLAY STNS 0063 GREY GRVL 0065 GREY CLAY STNS 0106 BRWN SAND 0107 GREY CLAY 0109 BRWN SAND 0111
TAY TOWNSHIP CON 12 006	17 604904 4954959 W	2007/04 7074	6.25	0090	4/72/7/2:0	DO		7048339 (Z24573) A023938	BRWN MSND 0005 GREY CLAY 0056 GRNT 0078 GRNT 0090

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
TAY TOWNSHIP CON 12 007	17 604466 4955362 W	1988/12 5224	6	FR 0079	10/79/10/2:30	PS		5724473 (50103)	BLCK SAND 0003 BLCK LOAM 0005 BRWN SAND 0015 BRWN CLAY 0025 GREY CLAY 0045 HPAN 0068 BLCK GRNT 0079
TAY TOWNSHIP CON 12 007	17 604472 4955356 W	1992/03 5224	6	FR 0170	7/205/10/1:30	DO		5729069 (110775)	BLCK GRNT 0040 GREY GRNT 0205
TAY TOWNSHIP CON 12 007	17 604529 4955220 W	2000/11 7107	6	FR 0073	14/40/12/1:30	DO		5736084 (222407)	BRWN SAND 0012 BRWN SAND CLAY 0068 RED GRNT 0075

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix B

Well and Borehole Logs

TW1

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: [X] Metric [ ] Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A 070521

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	
SAMUEL	RASETA CONSTRUCTION.		[ ] Well Constructed by Well Owner

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
3-200 MEMORIAL AVE	ORILLIA	ON	L3V 5X6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2976 FESSERTON S.R.	SEVERN EAST HALF	L6	11 BLOCK 18

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE	FESSERTON.	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	604529	4954734	51M-917	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND GRAVEL	CLAY LAYERS		0	3.0
GREY	CLAY	STONES		3.0	8.5
GREY	LIMESTONE			8.5	17.1
RED	LIMESTONE			17.1	18.9
GREEN	LIMESTONE			18.9	21.9
RED	GRANITE			21.9	27.7
BLACK	GRANITE			27.7	62.8
RED	GRANITE			62.8	65.8
BLACK	GRANITE			65.8	68.3

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	8.4	BENTONITE GROUT	400 Ltr.

Method of Construction

[ ] Cable Tool [X] Rotary (Conventional) [ ] Rotary (Reverse) [ ] Boring [ ] Air percussion [ ] Other, *specify*
[ ] Diamond [ ] Jetting [ ] Driving [ ] Digging

Well Use

[ ] Public [X] Domestic [ ] Livestock [ ] Irrigation [ ] Industrial [ ] Other, *specify*
[ ] Commercial [ ] Municipal [ ] Test Hole [ ] Cooling & Air Conditioning
[ ] Not used [ ] Dewatering [ ] Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15.5	STEEL	1188	+.5	9.1
15 cm	OPEN HOLE		9.1	68.3

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	
62 m	[ ] Fresh [X] Untested [ ] Gas [ ] Other, *specify*	
19.5 m	[ ] Fresh [X] Untested [ ] Gas [ ] Other, *specify*	
(m/ft)	[ ] Fresh [ ] Untested [ ] Gas [ ] Other, *specify*	

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	8.4	26
8.4	68.3	15

Results of Well Yield Testing

After test of well yield, water was: [X] Clear and sand free [ ] Other, *specify*

If pumping discontinued, give reason: —

Pump intake set at (m/ft): 64 m

Pumping rate (l/min / GPM): 18 L/m

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping (m/ft): 32.90

If flowing give rate (l/min / GPM): —

Recommended pump depth (m/ft):

Recommended pump rate (l/min / GPM):

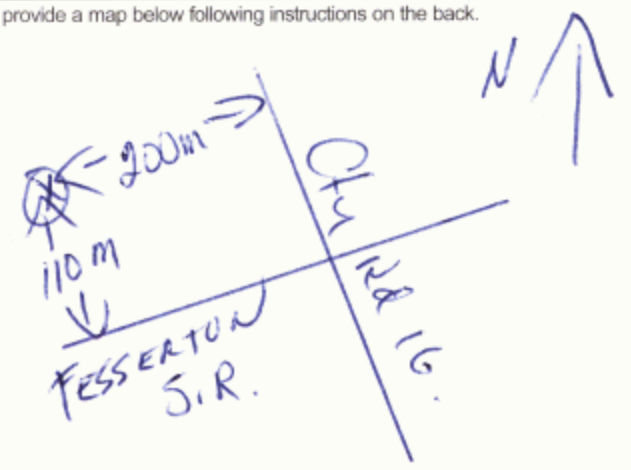
Well production (l/min / GPM):

Disinfected? [X] Yes [ ] No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		23.29m		
1	24.29		1	31.42
2	24.99		2	30.61
3	25.46		3	29.98
4	25.97		4	29.43
5	26.40		5	28.88
10	27.99		10	26.90
15	29.20		15	25.64
20	29.84		20	24.91
25	30.38		25	24.45
30	30.79		30	24.24
40	31.34		40	24.02
50	31.67		50	23.93
60	31.93		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
ALAN WRIGHT WATER WELLS	5528

Business Address (Street Number/Name)	Municipality
4121 HWY 93	HILLSDALE

Province	Postal Code	Business E-mail Address
ON	L0L1V0	awww@bellnet.ca.

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
7058353646	GAVIN WRIGHT

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2976	Alan	

Well owner's information package delivered: [ ] Yes [X] No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2009 04 10

Ministry Use Only

Audit No. Z 92504

JUL 17 2009 Received

0506E (12/2007)

Ministry's Copy

© Queen's Printer for Ontario, 2007

TW2

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: [X] Metric [ ] Imperial

Well Tag No. (Place Sticker and/or Print Below): Tag#:A287874

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	[ ] Well Constructed by Well Owner
MORTGAGE	FUNDING		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
129 DUNLOP ST E	BARRIE	ON	L4M1A6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2970 FESSERTON S.R.	SEVERN	6	11 BLOCK 18

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE	FESSERTON	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	604539	4954711	WELL #2	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND	GRAVEL FILL		0	1.0
BROWN	SAND	CLAY		1.0	5.7
GREY	LIMESTONE			5.7	18.2
BLACK	GRANITE	RED LAYERS		18.2	68.3

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	6m	BENTONITE GROUT	350Lbs.

Method of Construction

[ ] Cable Tool [ ] Diamond
[X] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[ ] Other, specify

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15.5	STEEL	.188	+.7	6.0
15	OPEN HOLE		6.0	68.3

Status of Well

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

Construction Record - Screen

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

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Hole Diameter Depth To	Diameter (cm/in)
54 (m/ft) [ ] Gas	[X] Untested [ ] Fresh [ ] Other, specify	0	6m	26
(m/ft) [ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify	6	68.3	15
(m/ft) [ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify			

Results of Well Yield Testing

After test of well yield, water was:
[X] Clear and sand free
[ ] Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 60 m.

Pumping rate (l/min / GPM): 19 L/min

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping (m/ft): 43.39m

If flowing give rate (l/min / GPM): —

Recommended pump depth (m/ft): 60 m

Recommended pump rate (l/min / GPM): 20 L/m.

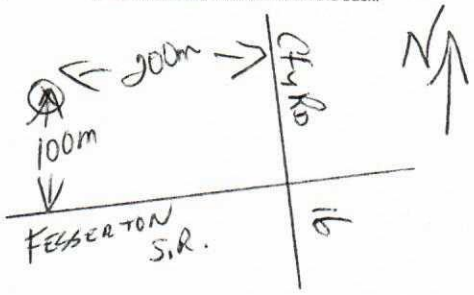
Well production (l/min / GPM):

Disinfected? [X] Yes [ ] No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		23.49		
1		24.92	1	42.52
2		25.99	2	41.68
3		24.93	3	40.85
4		27.85	4	40.06
5		28.62	5	39.32
10		32.02	10	35.90
15		34.65	15	33.10
20		36.77	20	30.91
25		28.54	25	29.24
30		40.10	30	27.99
40		40.79	40	26.40
50		41.22	50	25.59
60		41.58	60	25.15

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
ALLAN WRIGHT WATER WELLS	5528

Business Address (Street Number/Name)	Municipality
4121 Hwy 93	HILLSDALE

Province	Postal Code	Business E-mail Address
ON	L0L1V0	awww@bellnetica.

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
7058353646	WRIGHT GAVIN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted (Y Y Y Y M M D D)
8976	Allan	

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
[X] Yes [ ] No	2020 10 21	Audit No. Z287450
	Date Work Completed: 2020 10 20	Received

0506E (2014/11)

Ministry's Copy

© Queen's Printer for Ontario, 2014

TW3

Ontario — Ministry of the Environment and Climate Change

Well Ta... (Use Print Below) Tag#:A287875

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: [X] Metric [ ] Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	[ ] Well Constructed by Well Owner
MORTGAGE	FUNDING		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
129 DUNLOP ST E	BARRIE	ON	L4M 1A6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2970 FESSERTON S.R.	SEVERN	6	11 BLOCK 18

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE	FESSERTON	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	604466	4954893	WELL #3	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND	CLAY LAYERS		0	3.1
BROWN	GRAVEL	STONES		3.1	4.6
GREY	LIMESTONE			4.6	17.5
BLACK	GRANITE	RED LAYERS.		17.5	53.3

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	8	BENTONITE GROUT	350LTR.

Method of Construction

[ ] Cable Tool [ ] Diamond
[X] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[ ] Other, specify

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
15.5	STEEL	.188	+.7	8.m
15	OPEN HOLE		8.0	53.3

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Hole Diameter Depth To	Diameter (cm/in)
51 (m) [ ] Gas	[ ] Fresh [X] Untested [ ] Other, specify	0	8.	26
(m/ft) [ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify	8	53.3	15
(m/ft) [ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify			

Results of Well Yield Testing

After test of well yield, water was:
[X] Clear and sand free
[ ] Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 50 m

Pumping rate (l/min / GPM): 30L/m

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping (m/ft): 27.92 m

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

Recommended pump depth (m/ft): 50 m

Recommended pump rate (l/min / GPM): 40L/m

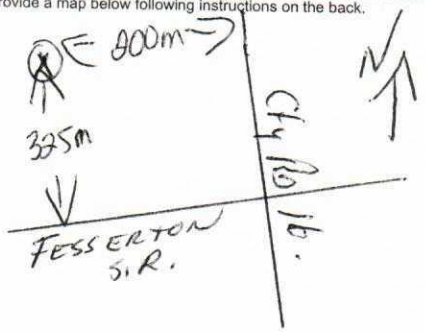
Well production (l/min / GPM):

Disinfected? [X] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	20.90		
1	21.96	1	26.51
2	22.55	2	25.32
3	22.88	3	24.39
4	23.10	4	23.66
5	23.16	5	23.12
10	23.39	10	22.09
15	23.47	15	21.88
20	23.80	20	21.77
25	24.32	25	21.69
30	24.51	30	21.64
40	24.71	40	21.54
50	24.46	50	21.48
60	27.00	60	21.43

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
ALLAN WRIGHT WATER WELLS	5528

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
4121 Hwy 93	ALLISDALE	ON	L0L 1N0	awww@bellnet.ca.

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2058355646	WRIGHT GAVIN	2976		Y Y Y Y M M D D

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
[X] Yes [ ] No	2020 10 21	Audit No. Z287451
	Date Work Completed: 2020 10 20	Received

0506E (2014/11)

Ministry's Copy

© Queen's Printer for Ontario, 2014

MW1

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: [X] Metric [ ] Imperial

Well Tag No. *(Place Sticker and/or Print Below)* Tag#:A287876

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	[ ] Well Constructed by Well Owner
MORTGAGE	FUNDING		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
129 DUNLOP ST E	BARRIE	ON	L4M 1A6	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2970 FESSERTON S.R.	SEVERN	6	11 BLOCK 18

County/District/Municipality	City/Town/Village	Province	Postal Code
SIMCOE	FESSERTON.	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	604484	4954883		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN	SAND	CLAY LAYERS		0	3.1
BROWN	GRAVEL	STONES.		3.1	4.5
GREY	LIMESTONE			4.5	4.6

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	1.5m	BENTONITE GROUT	80 KG.

Method of Construction

[ ] Cable Tool [ ] Diamond
[X] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[ ] Other, specify

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
5cm	PVC	sch 40	+.7	1.5

Status of Well

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

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
5	PVC sch 40	.010	1.5	4.5

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Other, specify
4.5	[ ]	[ ] Fresh [X] Untested	
	[ ]	[ ] Fresh [ ] Untested	
	[ ]	[ ] Fresh [ ] Untested	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	4.6	16

Results of Well Yield Testing

After test of well yield, water was:
[ ] Clear and sand free
[X] Other, specify Cloudy

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM) 1 L/MIN

Duration of pumping 1 hrs + 0 min

Final water level end of pumping (m/ft) 4.6 m

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

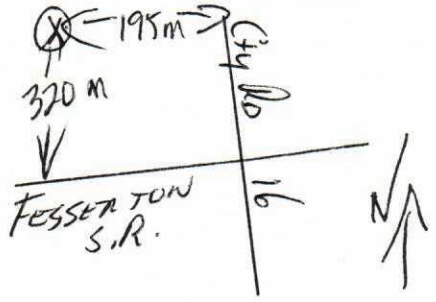
Well production (l/min / GPM)

Disinfected? [X] Yes [ ] No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		1.23m		
1			1	
2			2	
3			3	
4			4	
5			5	
10	4.6		10	
15			15	
20			20	
25			25	
30	4.6		30	
40			40	
50			50	
60	4.6		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
ALLAN WRIGHT WATER WELLS	5528

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
4121 Hwy 93	HILLSDALE	ON	L0L 1V0	awww@bellnet.ca.

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
705 835 5646	WRIGHT GAVIN	2976		

Well owner's information package delivered	Date Package Delivered	Date Work Completed
[ ] Yes [X] No		2020 10 20

Ministry Use Only

Audit No. Z287452

Received

0506E (2014/11)

Ministry's Copy

JOB NO.: 1808-E102

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Existing Property

METHOD OF BORING: Flight Auger

PROJECT LOCATION: 2970 Fesserton Sideroad
Township of Severn

DRILLING DATE: December 3, 2018

El. (masl) / Depth (mbgs)	SOIL DESCRIPTION	SAMPLES Number	Type	Gas Reading	Depth Scale (mbgs)	Combustible Headspace (ppm) 20 60 100 140 180	REMARKS	WATER LEVEL
202.00	Ground Surface							
0.00 / 201.80	**20 cm TOPSOIL**	1A	DO	5	0	5		
0.20	Brown, moist to wet — some organics **SILTY SAND, Fill** some gravel	1B	DO	5		5		
		2	DO	10	1	10		
	— some gravel — — — moist wet	3	DO	10	2	10	BH1/3: PHCs	
199.71 / 2.29	Brown, wet **SILTY SAND**	4A	DO	10		10		
		4B	DO	5		5		
		5	DO	30	3	30		
	— — — — a trace of gravel	6	DO	20	4	20		
197.42 / 4.57	END OF BOREHOLE				5			
					6			

W.L @ 0.61 mbgs Upon Completion

Soil Engineers Ltd.

JOB NO.: 1808-E102

LOG OF BOREHOLE NO.: 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Existing Property

METHOD OF BORING: Flight Auger

PROJECT LOCATION: 2970 Fesserton Sideroad
Township of Severn

DRILLING DATE: December 3, 2018

El. (masl) / Depth (mbgs)	SOIL DESCRIPTION	SAMPLES Number	Type	Gas Reading	Depth Scale (mbgs)	Combustible Headspace (ppm) 20 60 100 140 180	REMARKS	WATER LEVEL
199.57	Ground Surface							
0.00	**20 cm TOPSOIL**	1A	DO	0	0	0		
0.20	Brown to dark brown, some organics moist to wet **SILTY SAND, Fill** a trace of garvel	1B	DO	5		5	BH2/1B: PAHs	
		2	DO	5	1	5		
198.05								
1.52	Grey, wet **SILTY SAND** a trace of gravel	3	DO	85	2	85		
197.28								
2.29	Brown, moist **SILTY CLAY** some gravel	4	DO	10		10		
		5	DO	15	3	15		
195.76								
3.81	Brownish-grey, moist **SILTY SAND** some gravel	6	DO	30	4	30		
195.00								
4.57	END OF BOREHOLE				5			
					6			

W.L @ 0.61 mbgs Upon Completion

Soil Engineers Ltd.

JOB NO.: 1808-E102

LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Existing Property

METHOD OF BORING: Flight Auger

PROJECT LOCATION: 2970 Fesserton Sideroad
Township of Severn

DRILLING DATE: December 3, 2018

El. (masl) / Depth (mbgs)	SOIL DESCRIPTION	SAMPLES Number	Type	Gas Reading	Depth Scale (mbgs)	Combustible Headspace (ppm) 20 60 100 140 180	REMARKS	WATER LEVEL
199.14	Ground Surface							
0.00	Brown, moist to wet **SILTY SAND, Fill** a trace of organics	1	DO	5	0	5		
		2	DO	45	1	45	BH3/2: VOCs	
197.61 1.52	Brown, moist to wet **SANDY SILT** a trace of clay	3	DO	15	2	15		
196.85 2.29	Brown, moist **SILTY CLAY** a trace of sand	4	DO	5		5		
	brown / grey	5	DO	5	3	5		
195.33 3.81	Brown, moist to wet	6A	DO	50	4	50		
195.02 4.11	**SILTY SAND, Till** a trace of gravel Brown, dry	6B	DO	35		35		
194.56 4.57	**SILTY CLAY, Till** some gravel END OF BOREHOLE				5			
					6			W.L @ 0.61 mbgs Upon Completion

Soil Engineers Ltd.

JOB NO.: 1808-E102

LOG OF BOREHOLE NO.: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Existing Property

METHOD OF BORING: Flight Auger

PROJECT LOCATION: 2970 Fesserton Sideroad
Township of Severn

DRILLING DATE: December 3, 2018

El. (masl) / Depth (mbgs)	SOIL DESCRIPTION	SAMPLES Number	Type	Gas Reading	Depth Scale (mbgs)	Combustible Headspace (ppm) 20 60 100 140 180	REMARKS	WATER LEVEL
201.68	Ground Surface							
0.00	Brown, moist to wet **SILTY CLAY, Fill** some sand and gravel some organics brown, moist grey, wet	1	DO	35	0	35		
		2	DO	5	1	5		
200.16 1.52	Brown, moist to wet **SILTY SAND, Fill** a trace of clay	3	DO	5		5		
199.39 2.29	Grey, moist **SANDY SILT**	4	DO	45	2	45	BH4/4: VOCs	
198.63 3.05	Grey, moist **SILT**	5	DO	40	3	40		
198.02 3.66	Brown, moist **SILTY SAND**	6	DO	80	4	80		
4.57	END OF BOREHOLE				5			
					6			

W.L @ 1.22 mbgs Upon Completion

Soil Engineers Ltd.

JOB NO.: 1808-E102

LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Existing Property

METHOD OF BORING: Flight Auger

PROJECT LOCATION: 2970 Fesserton Sideroad
Township of Severn

DRILLING DATE: December 3, 2018

El. (masl) / Depth (mbgs)	SOIL DESCRIPTION	SAMPLES Number	Type	Gas Reading	Depth Scale (mbgs)	Combustible Headspace (ppm) 20 60 100 140 180	REMARKS	WATER LEVEL
203.87	Ground Surface							
0.00 / 203.67	**20 cm TOPSOIL**	1A	DO	0	0	0		
0.20	Dark brown, moist — some organics **SILTY SAND TO SAND, Fill** some gravel	1B	DO	5		5		
	— clay granuls	2	DO	5	1	5	BH5/2: PAHs	
		3	DO	0		0	BH5/3: Metal and Inorganics	
	— reddish	4A	DO	75	2	75		
		4B	DO	15		15		▼
200.87 / 3.00	Brown, wet **SILTY CLAY, Till** some sand and gravel	5	DO	35	3	35		W.L @ 2.74 mbgs Upon Completion
200.06 / 3.81	Grey, wet **SAND** silt seams and layers	6	DO	30	4	30		
199.29 / 4.57	END OF BOREHOLE				5			
					6			

Soil Engineers Ltd.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Well Survey

R.J. Burnside & Associates Limited 292 Speedvale Avenue West Unit 20 Guelph ON N1H 1C4 CANADA
telephone (519) 823-4995 **fax** (519) 836-5477 **web** www.rjburnside.com

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

Memorandum

Date: October 28, 2020 **Project No.:** 300050086.0000

Project Name: Private Water Well Survey - Block 18 Fesserton

Client Name: Mortgage Funding

A private well survey was completed by R.J. Burnside & Associates Limited (Burnside) as part of hydrogeological assessment for a proposed development at Block 18 in Fesserton, Ontario (subject lands). The survey was completed to document existing groundwater use in the area of the subject lands. The survey was also used to identify potential private wells for monitoring during water well testing on the subject lands. This memorandum documents the scope of work and results of the private/residential well survey.

1 Scope of Work

The scope of work for the well survey included:

- A desktop review of Ministry of the Environment, Conservation and Parks (MECP) water well records within 500 m of the subject lands.
- Preparing notification letters and survey forms to each property within 500 m of subject lands.
- Completing a door-to-door well survey of properties within an approximate 500 m radius of the subject lands. Participation in the well survey was voluntary.
- Preparation of summary of well survey results.

1.0 Private/Residential Well Survey Results

A review of MECP water well records within 500 m of the subject lands was completed to identify private water supply wells. The records are provided in Appendix A of the main Hydrogeological report. The search identified 64 private water supply well records. Of the 64 water supply wells, 43 of the wells are completed in the bedrock at depths ranging from 15.2 m to 189 m and 21 of the wells were overburden wells with depths ranging from 11.6 m to 33.8 m.

The door-to-door well survey of properties within approximately 500 m of the subject lands was completed by Burnside staff on September 18 and 21, 2020. A total of 107 properties were visited during the survey. A notification letter, survey form and a paid postage return envelope were delivered to each property that was visited. If the homeowner was home, the well survey

was completed in person. If the homeowner was not home, the survey was left along with a letter explaining the purpose of the survey and providing instructions for returning the completed form. Table C-1 provides the details collected from the survey responses.

A summary of the survey is provided below:

- A total of 107 residences were visited during the survey.
- Interviews with 9 residents were completed during the survey and 19 surveys were received later by mail. Two residences contacted Burnside via telephone.
- A total of 30 responses were received out of the 107 properties surveyed.
- The survey identified 29 drilled wells and one dug well. Reported well depths ranged from 18 m to 122 m (60 feet to 400 feet).
- There were four properties that indicated that their well had water quantity issues.
- Most properties surveyed used some type of treatment including water softeners, filters, iron blaster, reverse osmosis, and UV light.

SC:JD:cl

Enclosure(s) Table C-1: Well Survey Results

Table C-1: Well Survey Results

MECP Well #	Address	Well Type	Well Depth	Interest in Monitoring Program?
7258989	1736 Georgian Heights Blvd	drilled	~100ft	No
7258992	1776 Georgian Heights Blvd	drilled	-	No
	1705 Heron Dr	drilled	60ft	no
	12874 County Rd 16	dug	-	Yes
5713917	12896 County Rd 16	dug	35ft	yes
5739996	12929 County Rd 16	drilled	68ft	yes
	12979 County Rd 16	drilled	60ft	Yes
	13001 County Rd 16	drilled	-	Yes
7245434	1616 Georgian Heights Blvd	drilled		yes
	1635 Georgian Heights Blvd	drilled	87ft	Yes
7310103	1645 Georgian Heights Blvd	drilled	87ft	yes
	1646 Georgian Heights Blvd	drilled		yes
	1656 Georgian Heights Blvd	drilled	~140ft	yes
5731656	1665 Georgian Heights Blvd	drilled	>500ft	Yes
A240063	1675 Georgian Heights Blvd	drilled	~600ft	Yes
7278731	1695 Georgian Heights Blvd	drilled	276ft	yes
7297176	1706 Georgian Heights	drilled	~360ft	yes
A190464	1715 Georgian Heights	drilled		Yes
7298508	1716 Georgian Heights	drilled	400ft	yes
	1725 Georgian Heights	drilled	400ft	Yes
A256039	1726 Georgian Heights	drilled		Yes
7278732	1739 Georgian Heights Blvd	drilled	-	Yes
	1755 Georgian Heights Blvd	drilled		Yes
	1796 Georgian Heights Blvd	drilled	120ft	Yes
7111739	1697 Heron Drive	drilled	~80-90ft	yes
5727514	1738 Heron Dr	drilled	-	Yes
	2995 Fesserton S.R	drilled	112ft	Yes
	2959 Crane Ave	drilled	~300ft	yes
	2974 Crane Ave	drilled	39.5m	yes

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix D

Groundwater Levels

Table D-1
Groundwater Levels

	Well Depth (mbgs)	Ground Surface Elevation (masl)	2-Oct-20		5-Oct-20		9-Oct-20		12-Nov-20		7-Dec-20	
			Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
TW1	68.30	201.26	na	na	20.09	181.17	21.88	179.38	20.14	181.12	18.57	182.69
TW2	68.30	201.00	na	na	23.01	177.99	23.14	177.86	23.03	177.97	22.77	178.23
TW3	53.30	198.00	20.12	177.88	20.35	177.65	na	na	20.19	177.81	20.38	177.62
MW1	4.57	199.00	0.26	198.74	na	na	0.59	198.41	1.13	197.87	dry	dry
PZ1s	1.23	199.00	na	na	0.01	198.99	0.03	198.97	0.05	198.95	0.03	198.97
PZ1d	1.90	199.00	na	na	-0.10	199.10	-0.08	199.08	-0.06	199.06	-0.07	199.07

Notes

mbgs - meters below ground surface

masl - metres above sea level

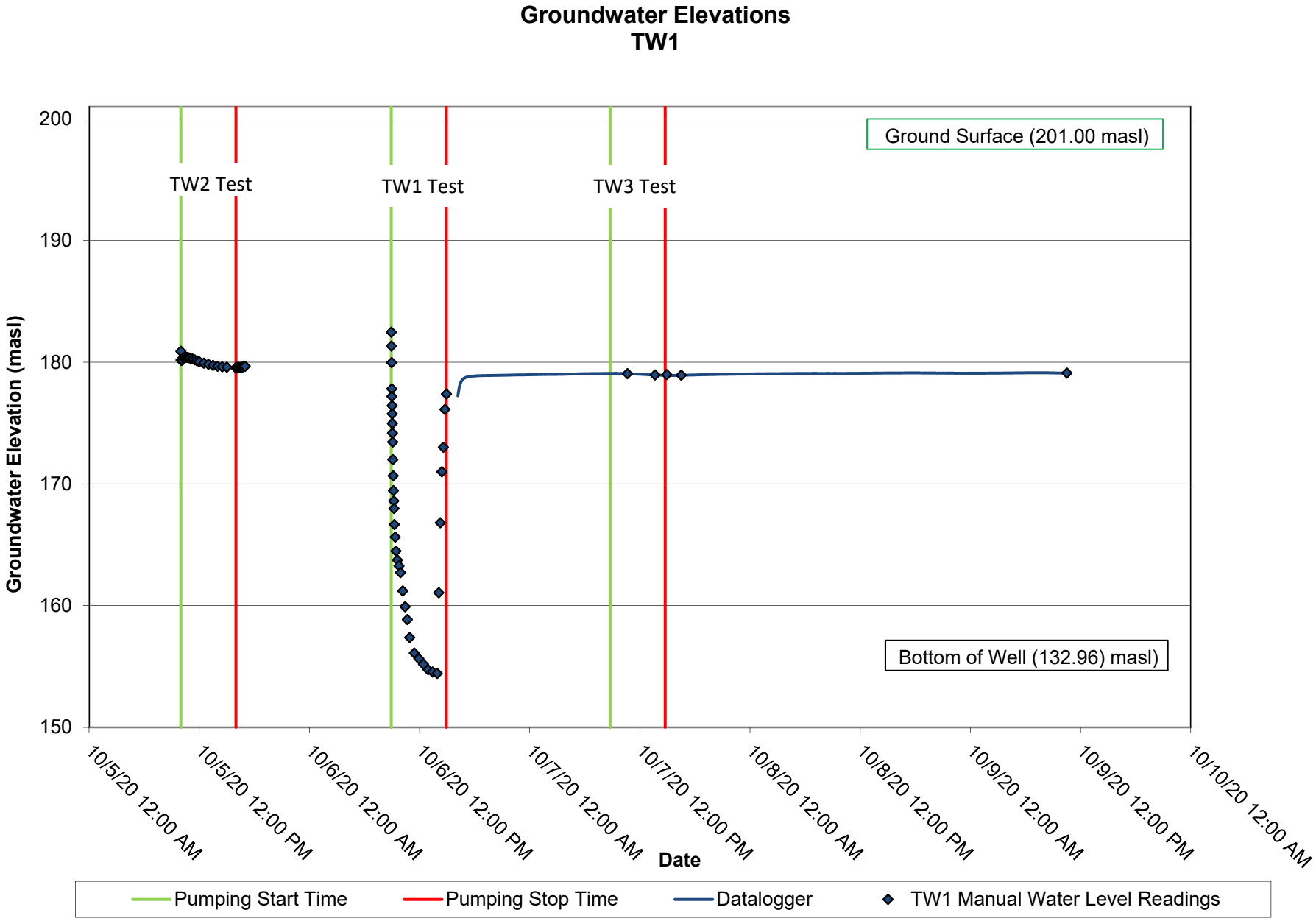
na - indicates data not available

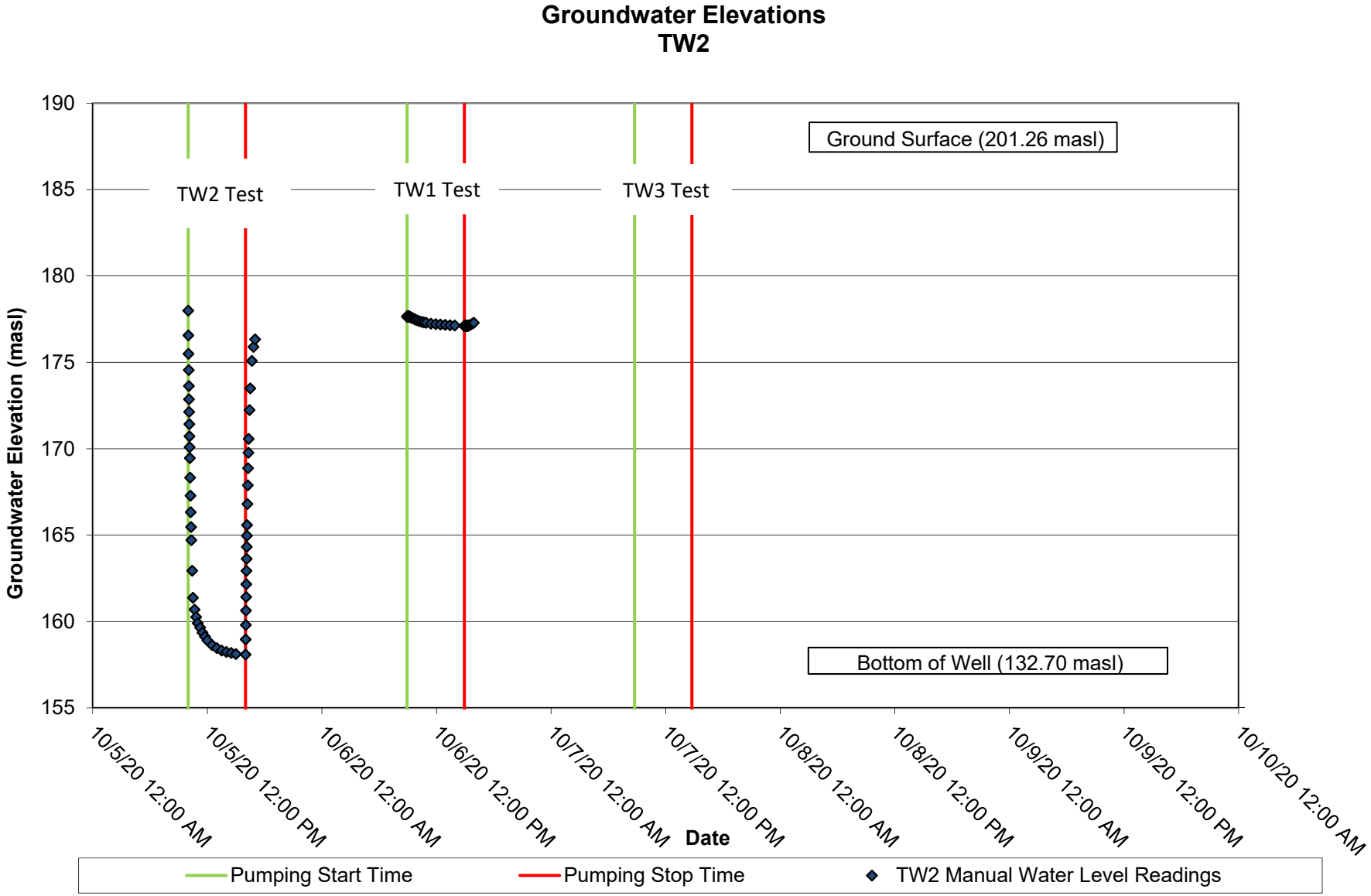
BURNSIDE

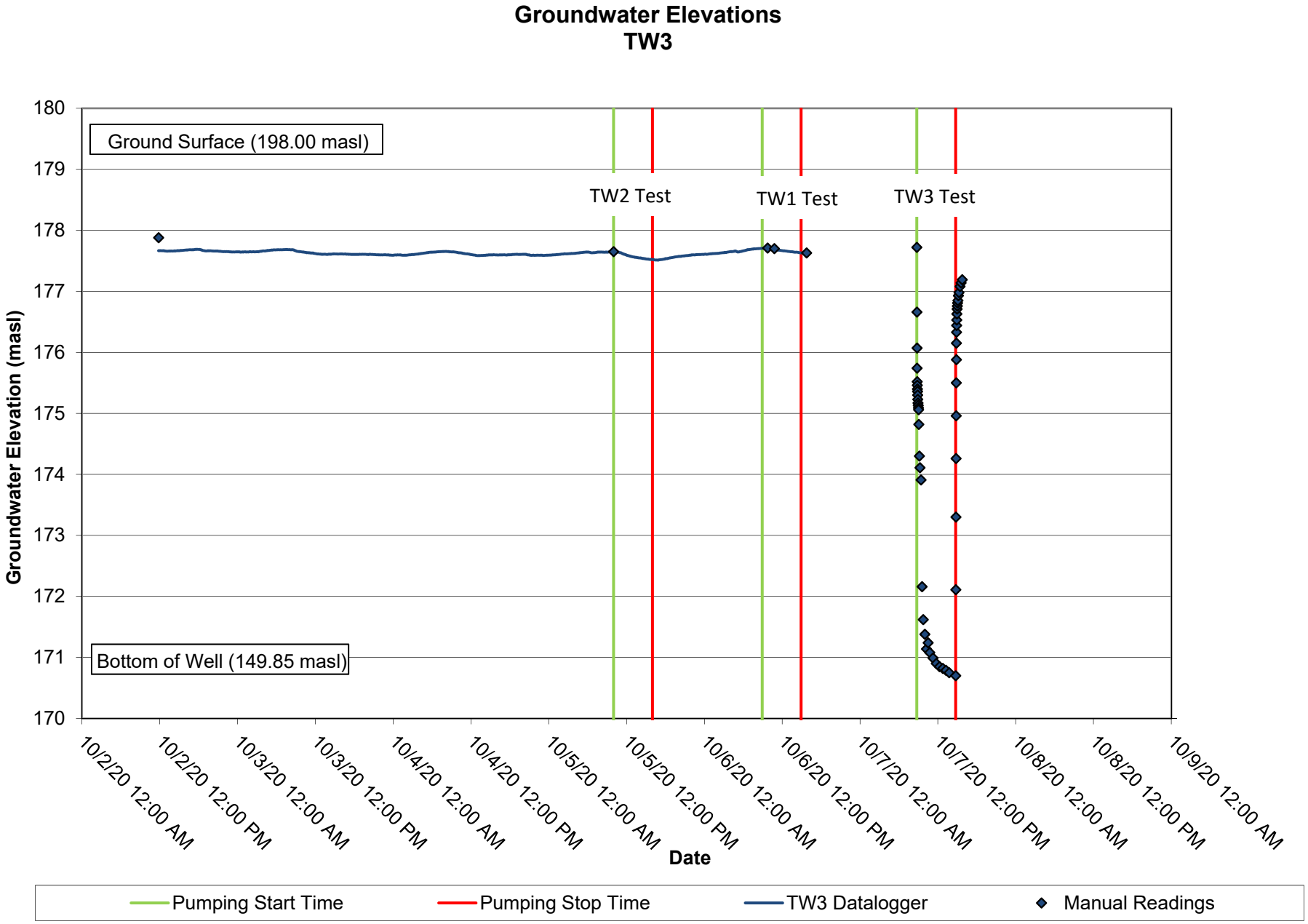
[THE DIFFERENCE IS OUR PEOPLE]

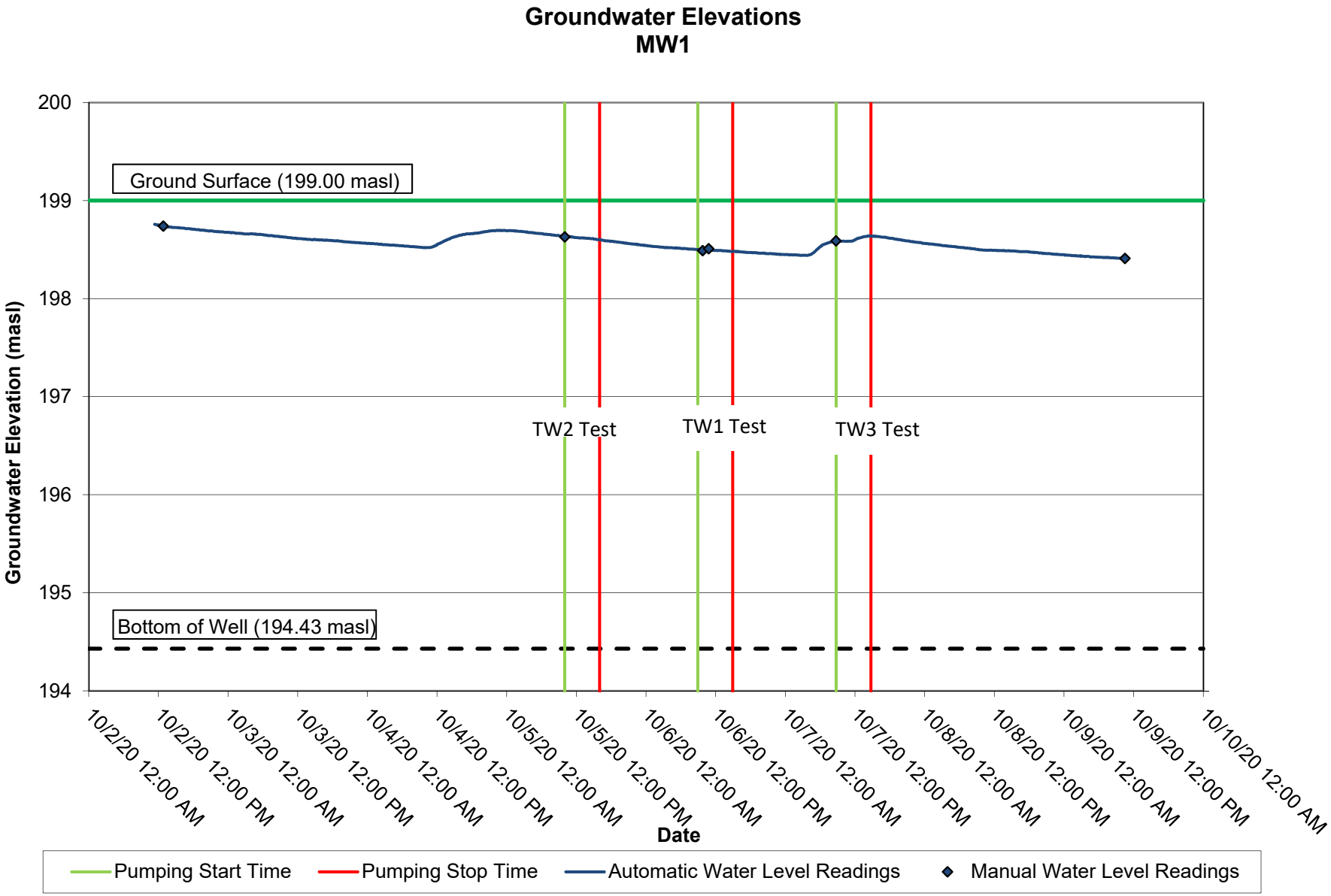
Appendix E

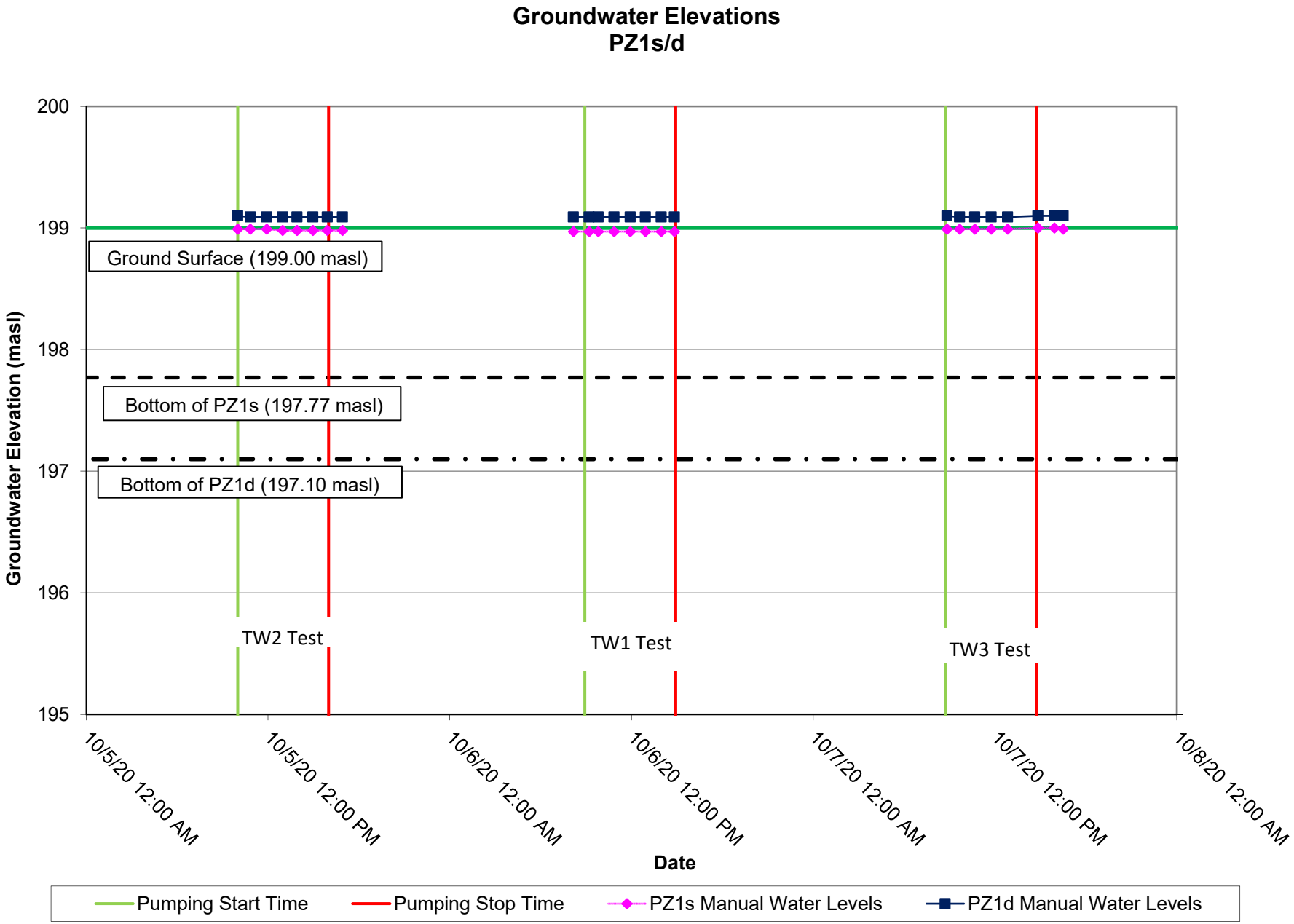
Pumping Test

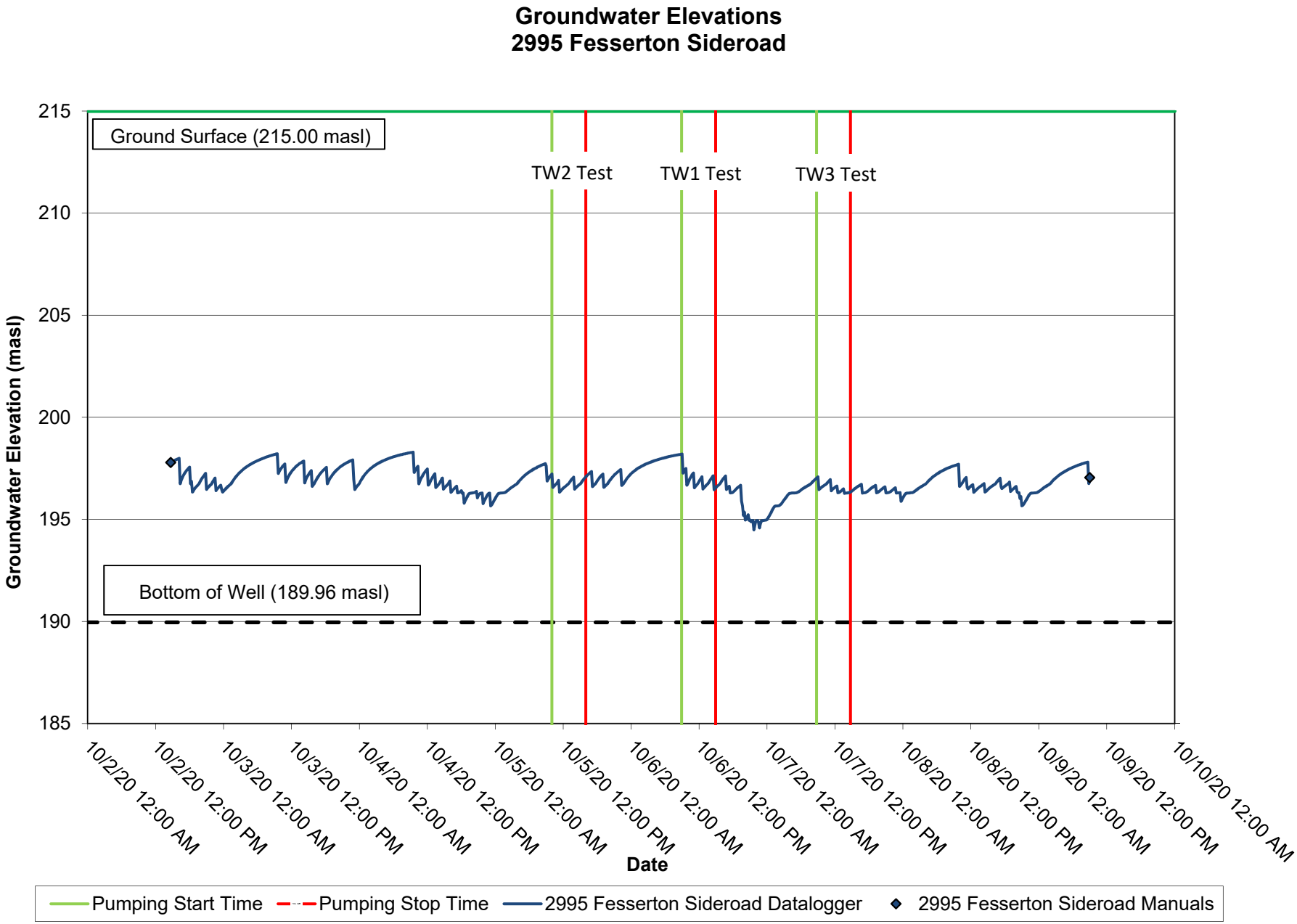

Groundwater Elevations
TW1
Ground Surface (201.00 masl)
TW2 Test
TW1 Test
TW3 Test
Bottom of Well (132.96) masl)
Groundwater Elevation (masl)
200
190
180
170
160
150
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
10/8/20 12:00 PM
10/9/20 12:00 AM
10/9/20 12:00 PM
10/10/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
Datalogger
TW1 Manual Water Level Readings

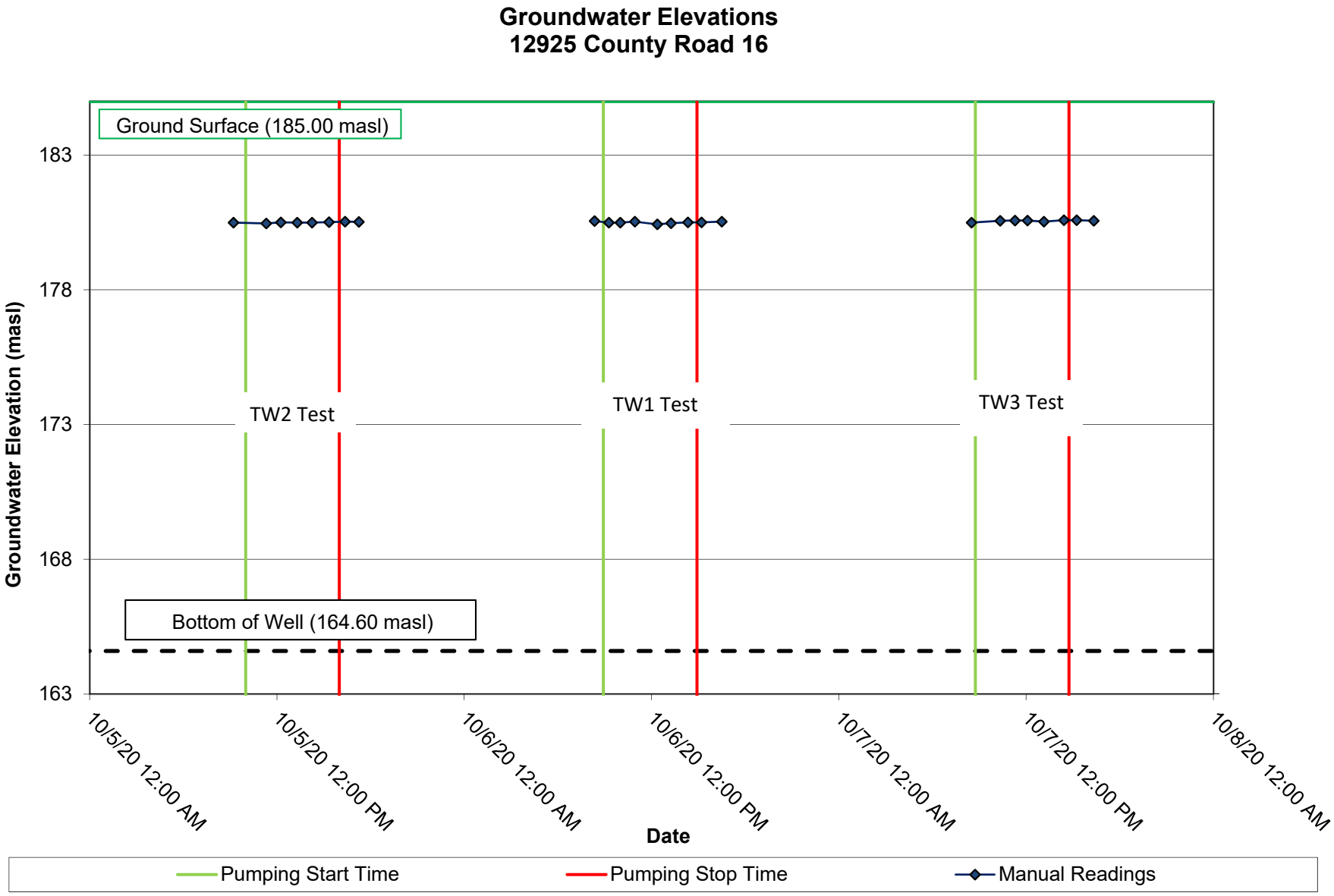

Groundwater Elevations
TW2
190
185
180
175
170
165
160
155
Groundwater Elevation (masl)
TW2 Test
TW1 Test
TW3 Test
Ground Surface (201.26 masl)
Bottom of Well (132.70 masl)
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
10/8/20 12:00 PM
10/9/20 12:00 AM
10/9/20 12:00 PM
10/10/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
TW2 Manual Water Level Readings

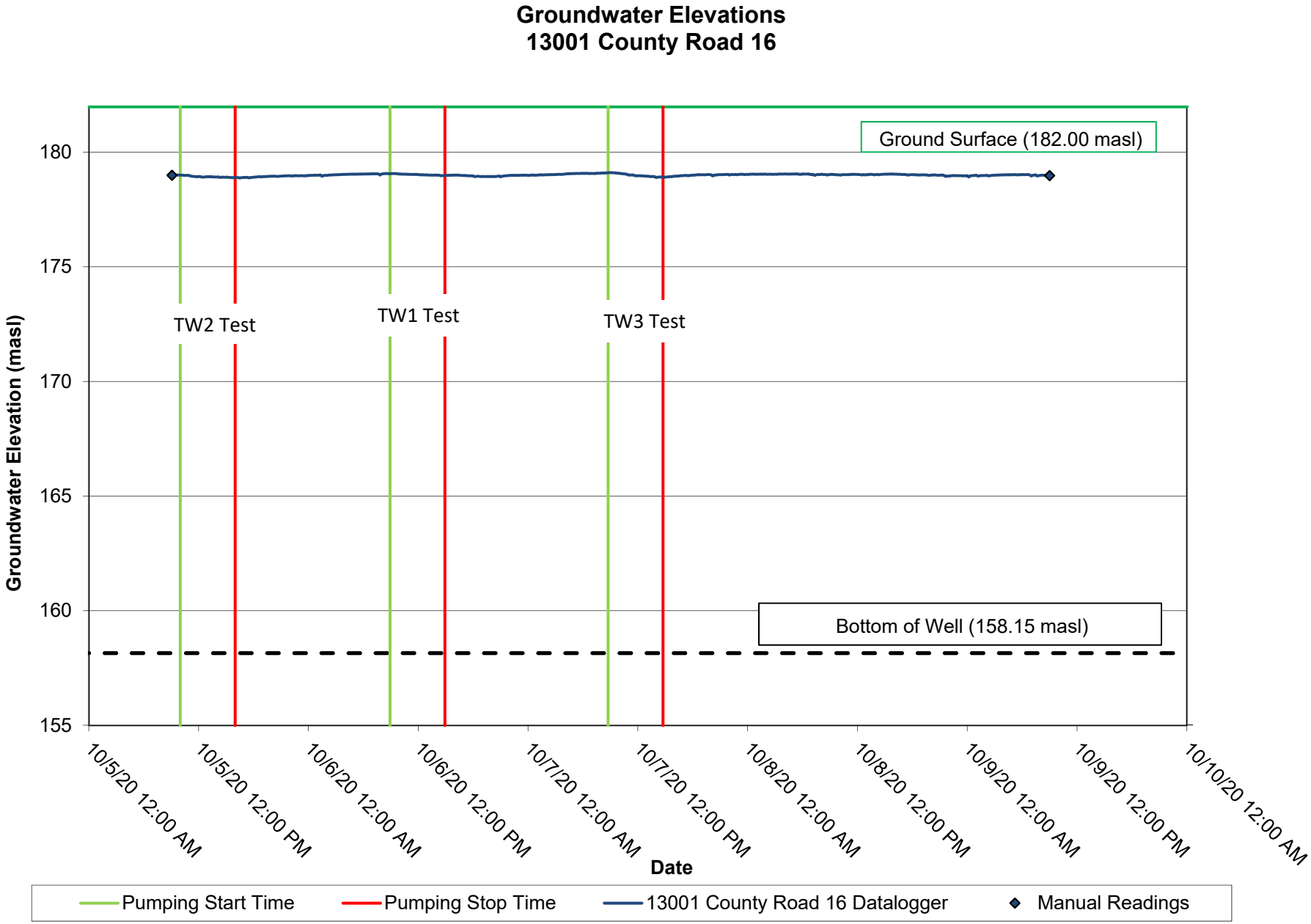

Groundwater Elevations
TW3
Ground Surface (198.00 masl)
Bottom of Well (149.85 masl)
TW2 Test
TW1 Test
TW3 Test
Groundwater Elevation (masl)
180
179
178
177
176
175
174
173
172
171
170
10/2/20 12:00 AM
10/2/20 12:00 PM
10/3/20 12:00 AM
10/3/20 12:00 PM
10/4/20 12:00 AM
10/4/20 12:00 PM
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
10/8/20 12:00 PM
10/9/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
TW3 Datalogger
Manual Readings


Groundwater Elevations
MW1
Groundwater Elevation (masl)
200
199
198
197
196
195
194
Ground Surface (199.00 masl)
Bottom of Well (194.43 masl)
TW2 Test
TW1 Test
TW3 Test
10/2/20 12:00 AM
10/2/20 12:00 PM
10/3/20 12:00 AM
10/3/20 12:00 PM
10/4/20 12:00 AM
10/4/20 12:00 PM
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
10/8/20 12:00 PM
10/9/20 12:00 AM
10/9/20 12:00 PM
10/10/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
Automatic Water Level Readings
Manual Water Level Readings

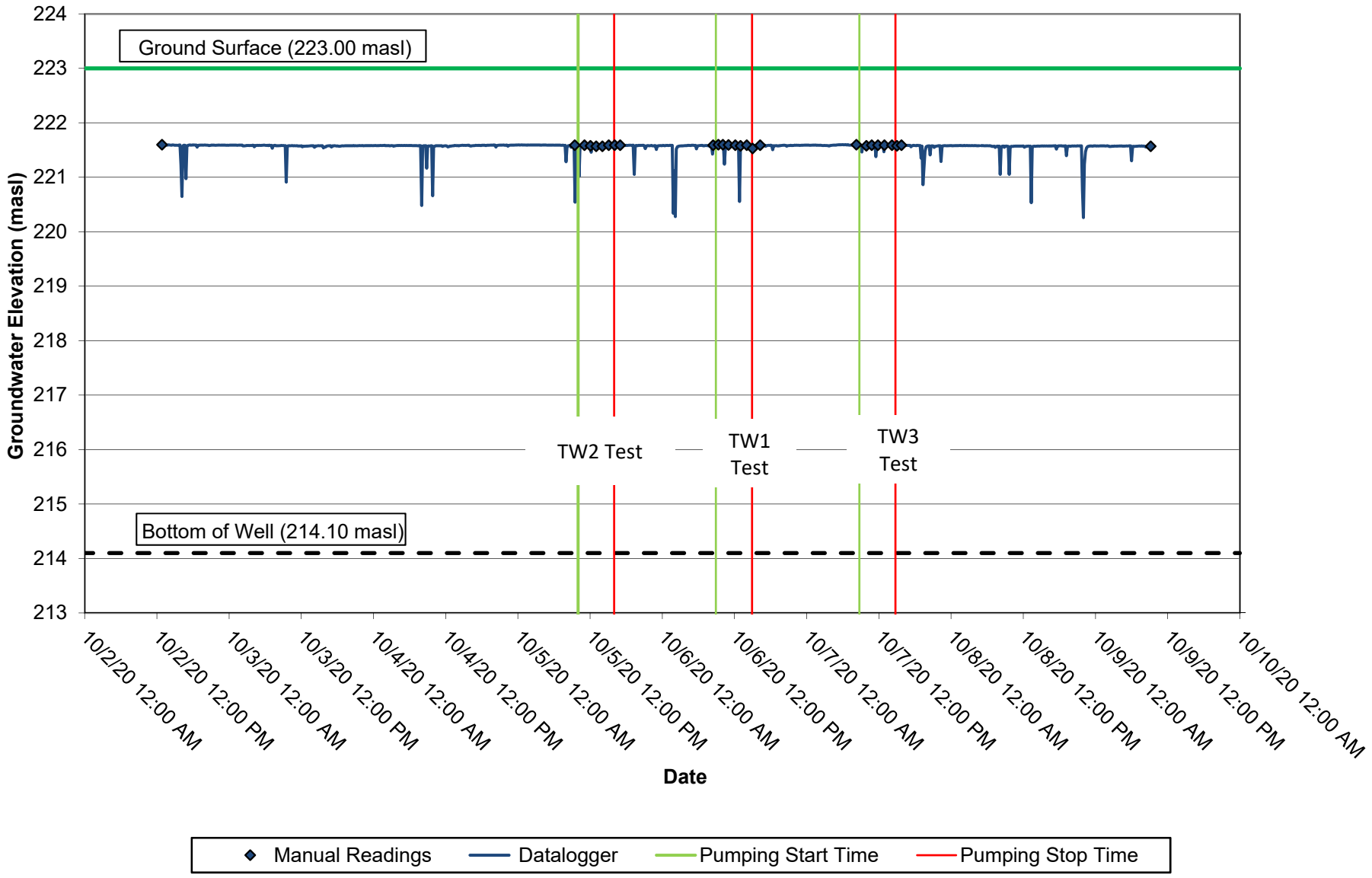

Groundwater Elevations
PZ1s/d
200
199
198
197
196
195
Groundwater Elevation (masl)
Ground Surface (199.00 masl)
Bottom of PZ1s (197.77 masl)
Bottom of PZ1d (197.10 masl)
TW2 Test
TW1 Test
TW3 Test
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
PZ1s Manual Water Levels
PZ1d Manual Water Levels

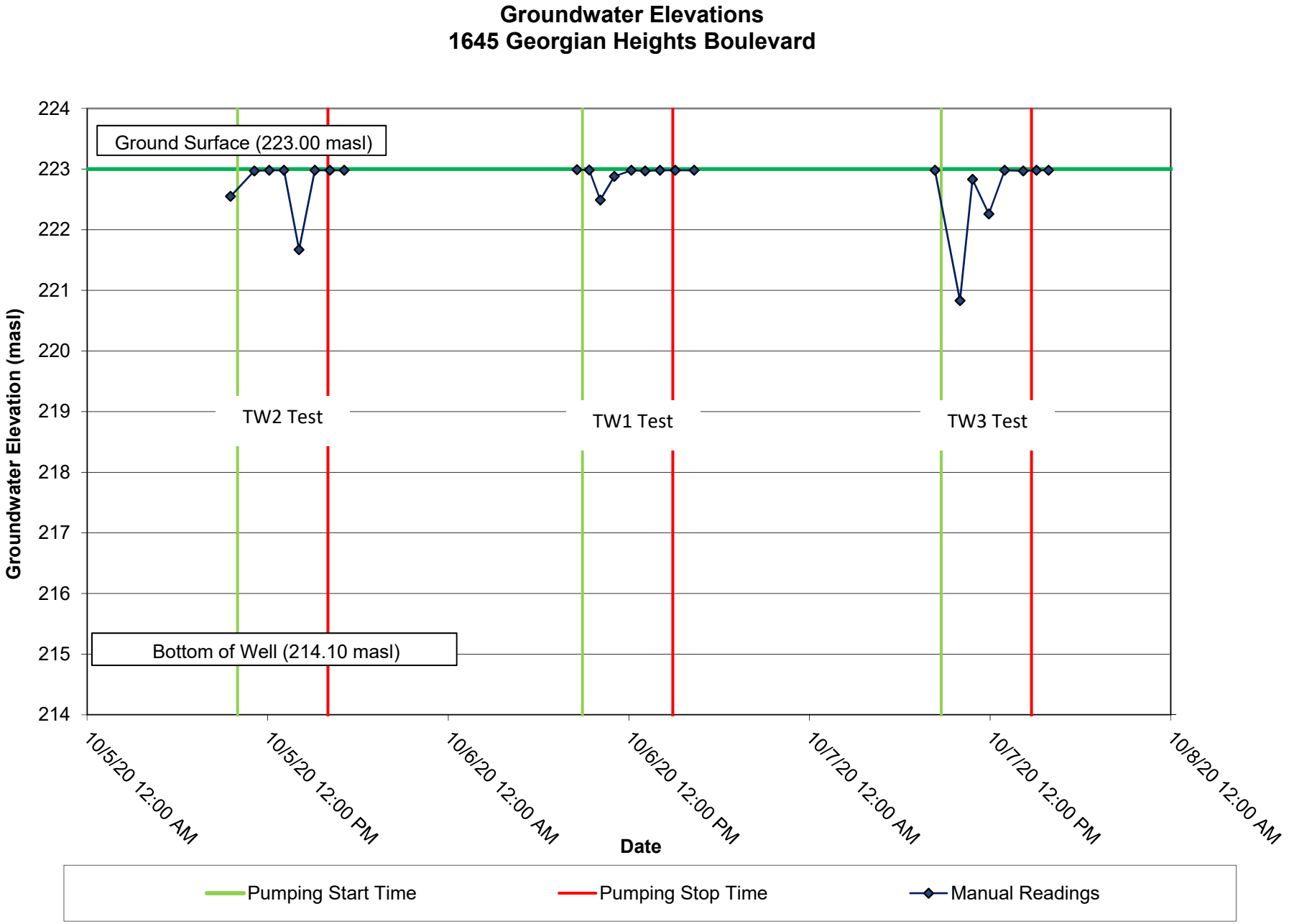

Groundwater Elevations
2995 Fesserton Sideroad
Ground Surface (215.00 masl)
Bottom of Well (189.96 masl)
TW2 Test
TW1 Test
TW3 Test
Groundwater Elevation (masl)
215
210
205
200
195
190
185
10/2/20 12:00 AM
10/2/20 12:00 PM
10/3/20 12:00 AM
10/3/20 12:00 PM
10/4/20 12:00 AM
10/4/20 12:00 PM
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
10/8/20 12:00 PM
10/9/20 12:00 AM
10/9/20 12:00 PM
10/10/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
2995 Fesserton Sideroad Datalogger
2995 Fesserton Sideroad Manuals

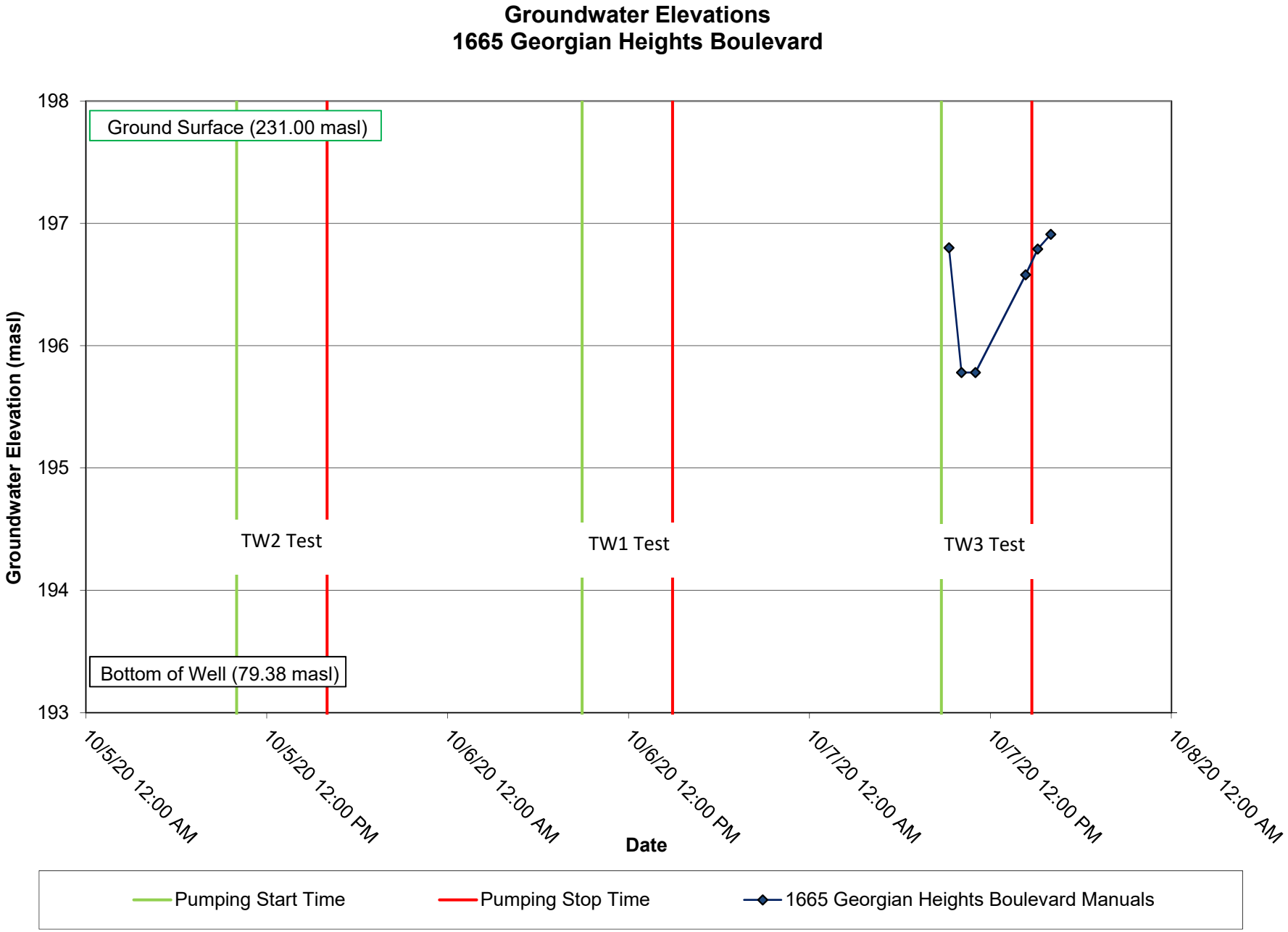

Groundwater Elevations
12925 County Road 16
Ground Surface (185.00 masl)
183
178
173
168
163
Groundwater Elevation (masl)
TW2 Test
TW1 Test
TW3 Test
Bottom of Well (164.60 masl)
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
Manual Readings

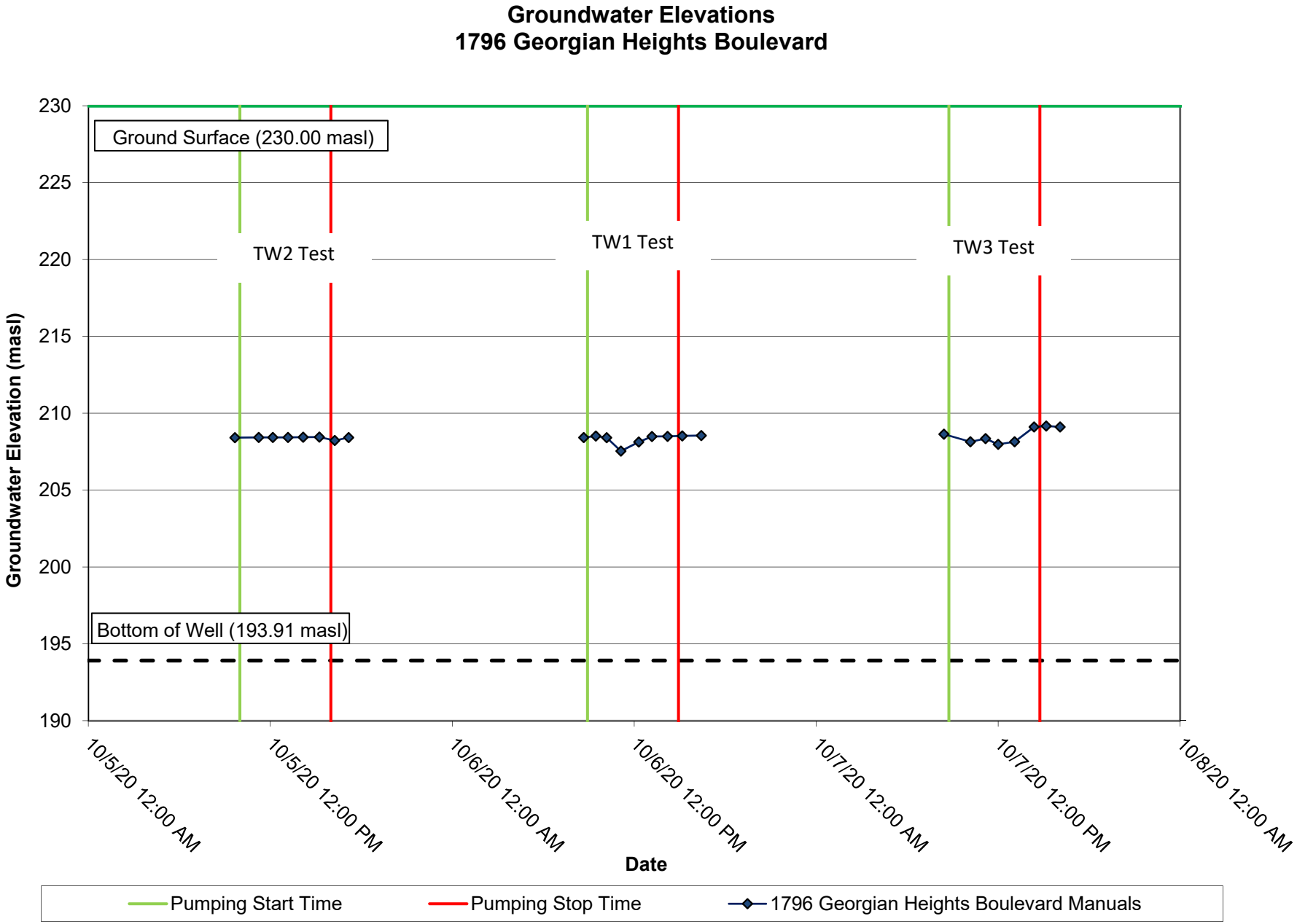

Groundwater Elevations
13001 County Road 16
Ground Surface (182.00 masl)
TW2 Test
TW1 Test
TW3 Test
Bottom of Well (158.15 masl)
Groundwater Elevation (masl)
180
175
170
165
160
155
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
10/8/20 12:00 PM
10/9/20 12:00 AM
10/9/20 12:00 PM
10/10/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
13001 County Road 16 Datalogger
Manual Readings

Groundwater Elevations
1635 Georgian Heights Boulevard




Groundwater Elevations
1645 Georgian Heights Boulevard
Groundwater Elevation (masl)
224
223
222
221
220
219
218
217
216
215
214
Ground Surface (223.00 masl)
Bottom of Well (214.10 masl)
TW2 Test
TW1 Test
TW3 Test
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
Manual Readings


Groundwater Elevations
1665 Georgian Heights Boulevard
Ground Surface (231.00 masl)
Bottom of Well (79.38 masl)
TW2 Test
TW1 Test
TW3 Test
Groundwater Elevation (masl)
198
197
196
195
194
193
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
1665 Georgian Heights Boulevard Manuals


Groundwater Elevations
1796 Georgian Heights Boulevard
Ground Surface (230.00 masl)
Bottom of Well (193.91 masl)
TW2 Test
TW1 Test
TW3 Test
Groundwater Elevation (masl)
230
225
220
215
210
205
200
195
190
10/5/20 12:00 AM
10/5/20 12:00 PM
10/6/20 12:00 AM
10/6/20 12:00 PM
10/7/20 12:00 AM
10/7/20 12:00 PM
10/8/20 12:00 AM
Date
Pumping Start Time
Pumping Stop Time
1796 Georgian Heights Boulevard Manuals

BURNSIDE

Pumping Test - Water Level Data

Project: Fesserton Hydrogeological Assessment

Number: 300050086.0000

Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW1	Pumping Well: TW1
Test Conducted by: AWWW	Test Date: 10/6/2020	Discharge: variable, average rate 0.225 [l/s]
Observation Well: TW1	Static Water Level [m]: 19.00	Radial Distance to PW [m]: -

	Time [min]	Water Level [m]	Drawdown [m]
1	1	20.15	1.15
2	2	21.50	2.50
3	4	23.66	4.66
4	5	24.28	5.28
5	6	25.04	6.04
6	7	25.71	6.71
7	8	26.51	7.51
8	9	27.30	8.30
9	10	28.04	9.04
10	12	29.48	10.48
11	14	30.80	11.80
12	16	32.02	13.02
13	18	32.88	13.88
14	20	33.49	14.49
15	25	34.81	15.81
16	30	35.85	16.85
17	40	36.99	17.99
18	50	37.73	18.73
19	60	38.21	19.21
20	75	38.76	19.76
21	90	40.27	21.27
22	105	41.57	22.57
23	120	42.62	23.62
24	150	44.09	25.09
25	180	45.37	26.37
26	210	45.84	26.84
27	240	46.29	27.29
28	270	46.74	27.74
29	300	46.93	27.93
30	360	47.05	28.05

BURNSIDE

Pumping Test - Discharge Data

Project: Fesserton Hydrogeological Assessment

Number: 300050086.0000

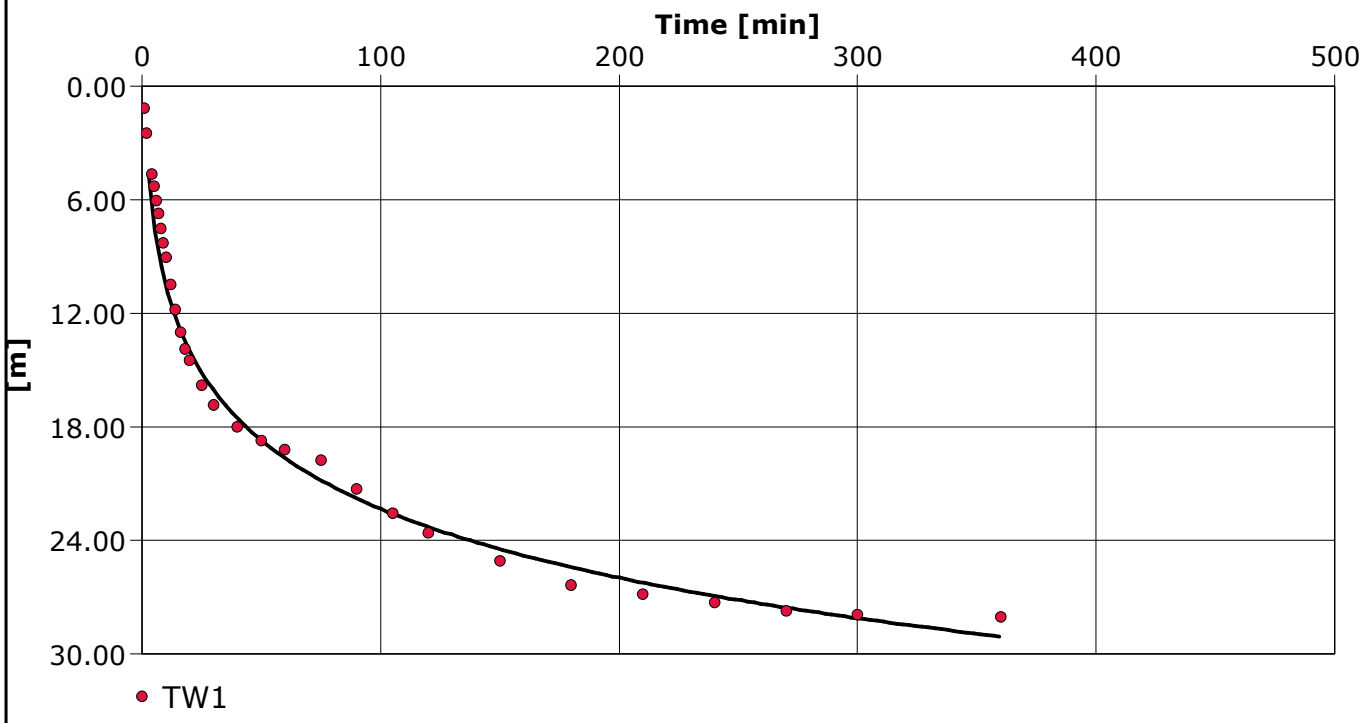
Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW1	Pumping Well: TW1
Test Conducted by: AWWW	Test Date: 10/6/2020	Discharge: variable, average rate 0.225 [l/s]
Observation Well: TW1		Radial Distance to PW [m]: -

	Time [min]	Discharge [l/s]
1	360	0.225

BURNSIDE	**Pumping Test Analysis Report**
	Project: Fesserton Hydrogeological Assessment
	Number: 300050086.0000
	Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW1	Pumping Well: TW1
Test Conducted by: AWWW		Test Date: 10/6/2020
Analysis Performed by: DS	TW1	Analysis Date: 10/23/2020
Aquifer Thickness:	Discharge: variable, average rate 0.225 [l/s]	



Calculation using Theis

Observation Well	Transmissivity [m²/s]	Storage coefficient	Radial Distance to PW [m]	
TW1	3.38×10^{-6}	1.20×10^{-1}	0.08	

BURNSIDE

Pumping Test - Water Level Data

Project: Fesserton Hydrogeological Assessment

Number: 300050086.0000

Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW2	Pumping Well: TW2
Test Conducted by: AWWW	Test Date: 10/5/2020	Discharge: variable, average rate 0.32 [l/s]
Observation Well: TW2	Static Water Level [m]: 23.49	Radial Distance to PW [m]: -

	Time [min]	Water Level [m]	Drawdown [m]
1	1	24.92	1.43
2	2	25.99	2.50
3	3	26.93	3.44
4	4	27.85	4.36
5	5	28.62	5.13
6	6	29.35	5.86
7	7	30.06	6.57
8	8	30.76	7.27
9	9	31.39	7.90
10	10	32.02	8.53
11	12	33.15	9.66
12	14	34.20	10.71
13	16	35.15	11.66
14	18	36.01	12.52
15	20	36.77	13.28
16	25	38.54	15.05
17	30	40.10	16.61
18	40	40.79	17.30
19	50	41.22	17.73
20	60	41.58	18.09
21	75	41.83	18.34
22	90	42.12	18.63
23	105	42.35	18.86
24	120	42.57	19.08
25	150	42.85	19.36
26	180	43.02	19.53
27	210	43.16	19.67
28	240	43.24	19.75
29	270	43.30	19.81
30	300	43.36	19.87
31	360	43.39	19.90

BURNSIDE

Pumping Test - Discharge Data

Project: Fesserton Hydrogeological Assessment

Number: 300050086.0000

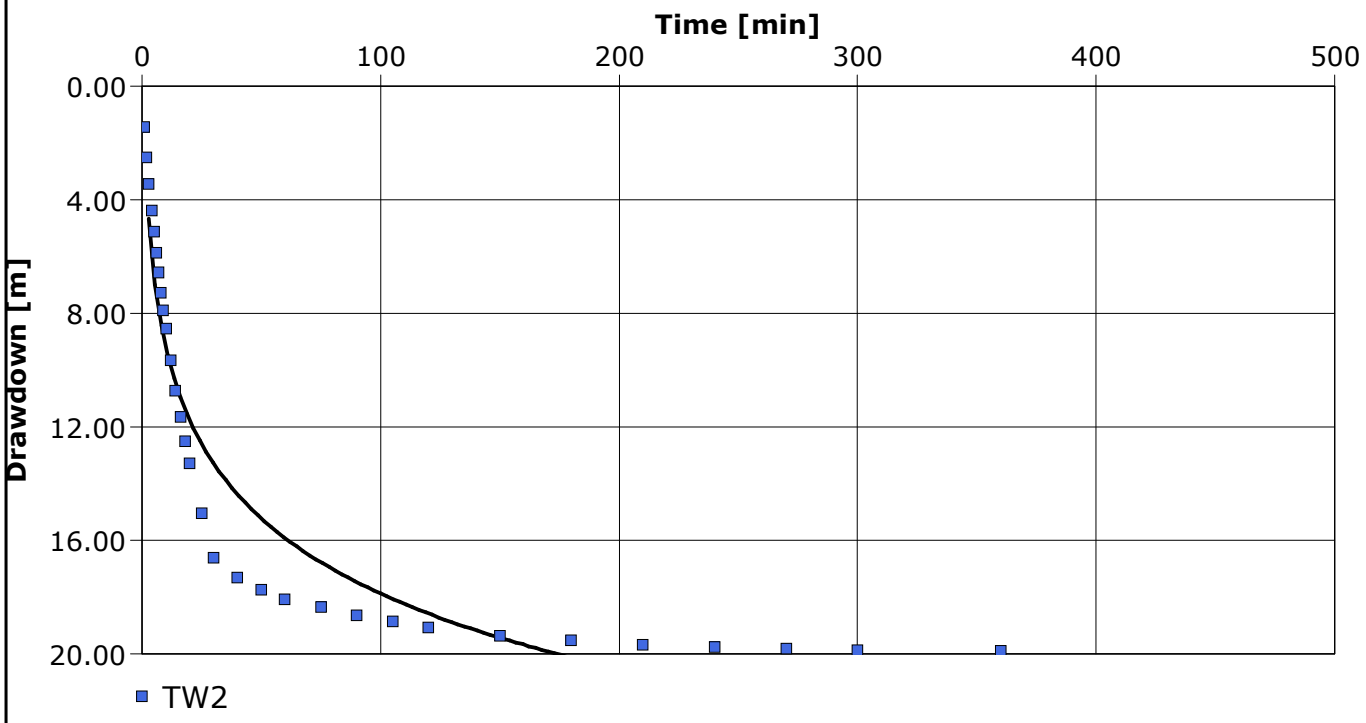
Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW2	Pumping Well: TW2
Test Conducted by: AWWW	Test Date: 10/5/2020	Discharge: variable, average rate 0.32 [l/s]
Observation Well: TW2		Radial Distance to PW [m]: -

	Time [min]	Discharge [l/s]
1	360	0.32

BURNSIDE	**Pumping Test Analysis Report**
	Project: Fesserton Hydrogeological Assessment
	Number: 300050086.0000
	Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW2	Pumping Well: TW2
Test Conducted by: AWWW		Test Date: 10/5/2020
Analysis Performed by: DS	TW2 Analysis	Analysis Date: 10/23/2020
Aquifer Thickness:	Discharge: variable, average rate 0.32 [l/s]	



Calculation using Theis

Observation Well	Transmissivity [m²/s]	Storage coefficient	Radial Distance to PW [m]	
TW2	6.61×10^{-6}	2.17×10^{2}	0.00	

BURNSIDE

Pumping Test - Water Level Data

Project: Fesserton Hydrogeological Assessment

Number: 300050086.0000

Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW3	Pumping Well: TW3
Test Conducted by: AWWW	Test Date: 10/7/2020	Discharge: variable, average rate 0.4472 [l/s]
Observation Well: TW3	Static Water Level [m]: 20.90	Radial Distance to PW [m]: -

	Time [s]	Water Level [m]	Drawdown [m]
1	1	21.96	1.06
2	2	22.55	1.65
3	3	22.88	1.98
4	4	23.10	2.20
5	5	23.16	2.26
6	6	23.22	2.32
7	7	23.26	2.36
8	8	23.32	2.42
9	10	23.39	2.49
10	12	23.45	2.55
11	14	23.49	2.59
12	16	23.53	2.63
13	18	23.56	2.66
14	20	23.80	2.90
15	25	24.32	3.42
16	30	24.51	3.61
17	40	24.71	3.81
18	50	26.46	5.56
19	60	27.00	6.10
20	75	27.24	6.34
21	90	27.48	6.58
22	105	27.38	6.48
23	120	27.54	6.64
24	150	27.63	6.73
25	180	27.72	6.82
26	210	27.77	6.87
27	240	27.80	6.90
28	270	27.83	6.93
29	300	27.87	6.97
30	360	27.92	7.02

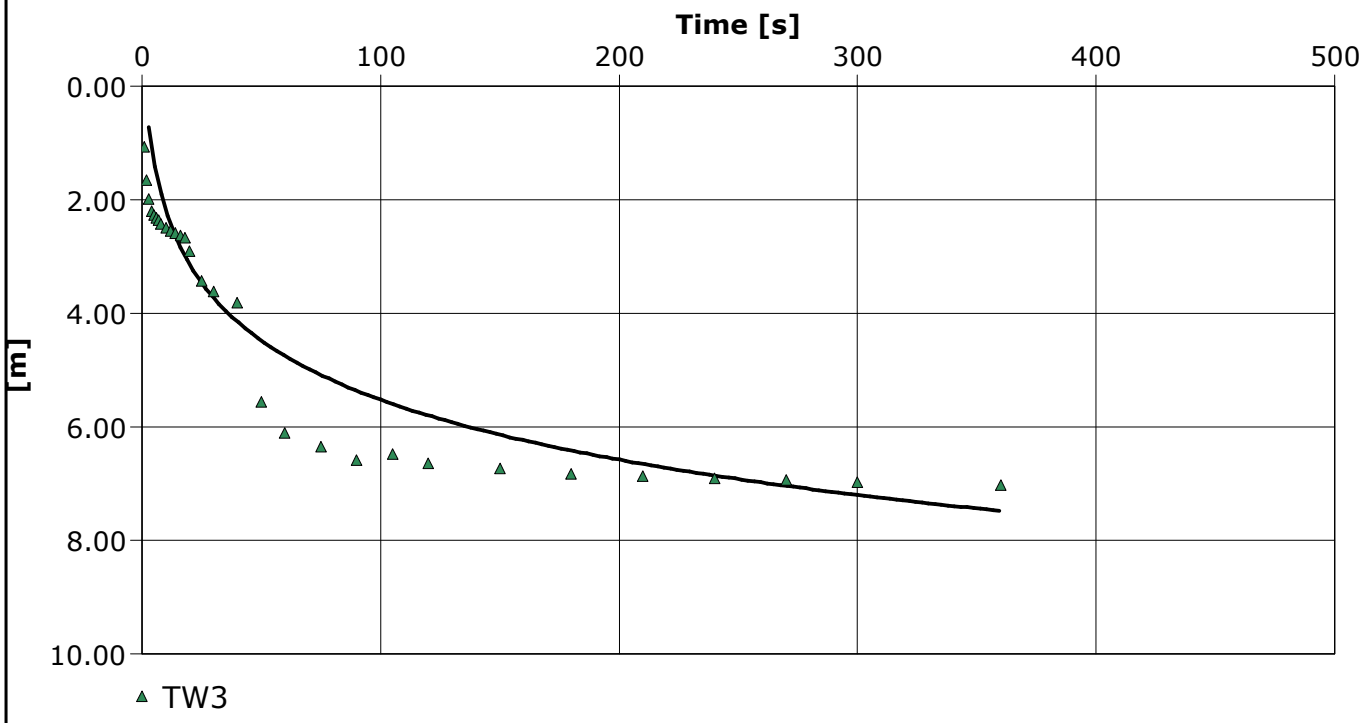
BURNSIDE	**Pumping Test - Discharge Data**	Page 1 of 1
	Project: Fesserton Hydrogeological Assessment	
	Number: 300050086.0000	
	Client: Mortgage Funding	

Location: Fesserton	Pumping Test: TW3	Pumping Well: TW3
Test Conducted by: AWWW	Test Date: 10/7/2020	Discharge: variable, average rate 0.4472 [l/s]
Observation Well: TW3		Radial Distance to PW [m]: -

	Time [s]	Discharge [l/s]
1	3	0.32
2	18	0.36
3	50	0.50

BURNSIDE	**Pumping Test Analysis Report**
	Project: Fesserton Hydrogeological Assessment
	Number: 300050086.0000
	Client: Mortgage Funding

Location: Fesserton	Pumping Test: TW3	Pumping Well: TW3
Test Conducted by: AWWW		Test Date: 10/7/2020
Analysis Performed by:	TW3	Analysis Date: 10/23/2020
Aquifer Thickness:	Discharge: variable, average rate 0.4472 [l/s]	



Calculation using Theis

Observation Well	Transmissivity [m²/s]	Storage coefficient	Radial Distance to PW [m]	
TW3	2.31×10^{-5}	3.67×10^{1}	0.00	

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix F

Water Quality

Table F-1
Groundwater Quality

Monitoring Well				TW1		TW2		TW3	
Date Sampled				05-Oct-20		06-Oct-20		7-Oct-20	
Parameter	Unit	RDL	ODWQS	1 hr	6 hr	1 hr	6 hr	1 hr	6 hr
Electrical Conductivity	µS/cm	2		673	781	587	581	717	962
pH	pH Units	NA	(6.5-8.5)	8.01	7.97	7.75	7.73	8.08	7.88
Total Hardness (as CaCO3)	mg/L	0.5	(80-100)	**235**	**193**	**716**	**340**	**515**	**382**
Total Dissolved Solids	mg/L	20	500	466	**548**	400	384	448	**630**
Alkalinity (as CaCO3)	mg/L	5	(30-500)	183	211	303	311	240	215
Fluoride	mg/L	0.05	1.5	0.62	0.98	0.22	0.28	0.21	<0.05
Chloride	mg/L	0.20	250	10.4	19	21.4	21.5	11.8	14.6
Nitrate as N	mg/L	0.10	10.0	0.11	<0.10	0.06	<0.05	<0.10	<0.25
Nitrite as N	mg/L	0.10	1.0	<0.10	<0.10	<0.05	<0.05	<0.10	<0.25
Bromide	mg/L	0.10		<0.10	<0.10	<0.05	<0.05	<0.10	<0.25
Sulphate	mg/L	0.50	500	225	236	62.2	51.8	180	354
Ortho Phosphate as P	mg/L	0.20		<0.20	<0.20	<0.10	<0.10	<0.20	<0.50
Reactive Silica	mg/L	0.05		11.2	11.6	17.9	17.2	15.6	13.9
Ammonia as N	mg/L	0.02		0.18	0.14	0.16	<0.02	0.14	0.23
Total Phosphorus	mg/L	0.02		0.03	<0.02	2.36	0.02	0.29	<0.02
Total Organic Carbon	mg/L	0.5		1.1	1.4	15.4	1.9	1	0.9
Colour	TCU	2.5	5	**312**	**15.3**	**18300**	**182**	**1340**	**21.4**
Turbidity	NTU	0.5	5	**42.9**	3.4	**3870**	**24.5**	**263**	3.4
Total Calcium	mg/L	0.05		57.3	47.74	182.21	91.39	134.12	92.9
Total Magnesium	mg/L	0.05		22.41	17.96	63.5	27.14	43.65	36.33
Total Potassium	mg/L	0.05		3.09	2.32	14.89	3.27	6.23	3.02
Total Sodium	mg/L	0.05	20 (200)	**69.71**	**112.31**	15.11	15.94	**37.29**	**75.6**
Total Aluminum	mg/L	0.010	0.1	**2.04**	0.078	**34**	**0.523**	**7.96**	**0.157**
Total Antimony	mg/L	0.003	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Total Arsenic	mg/L	0.003	0.025	<0.003	<0.003	**0.081**	<0.003	<0.003	<0.003
Total Barium	mg/L	0.002	1	0.059	0.035	**1.78**	0.46	0.226	0.073
Total Beryllium	mg/L	0.001		<0.001	<0.001	0.002	<0.001	<0.001	<0.001
Total Boron	mg/L	0.020	5	0.744	1.46	0.24	0.173	0.347	1.08
Total Cadmium	mg/L	0.001	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Chromium	mg/L	0.003	0.05	0.006	<0.003	0.076	<0.003	0.036	<0.003
Total Cobalt	mg/L	0.001		<0.001	<0.001	0.021	<0.001	0.005	<0.001
Total Copper	mg/L	0.003	1	<0.003	<0.003	0.076	<0.003	0.014	<0.003
Total Iron	mg/L	0.010	0.3	**2.31**	0.132	**177**	**2.71**	**9.71**	0.16
Total Lead	mg/L	0.001	0.01	<0.001	<0.001	0.009	<0.001	0.004	<0.001
Total Manganese	mg/L	0.002	0.05	0.045	0.035	**2.21**	**0.188**	**0.291**	**0.06**
Total Mercury	mg/L	0.0001	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Molybdenum	mg/L	0.002		0.005	0.004	0.003	<0.002	<0.002	<0.002
Total Nickel	mg/L	0.003		0.005	<0.003	0.042	0.003	0.021	<0.003
Total Selenium	mg/L	0.004	0.01	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Total Silver	mg/L	0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Strontium	mg/L	0.010		5.06	3.19	8.23	7.19	3.12	3.28
Total Thallium	mg/L	0.006		<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Total Tin	mg/L	0.002		<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Titanium	mg/L	0.002		0.097	0.005	2.56	0.038	0.505	0.01
Total Tungsten	mg/L	0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total Uranium	mg/L	0.002	0.02	0.005	<0.002	<0.002	<0.002	0.009	0.004
Total Vanadium	mg/L	0.002	3	0.009	<0.002	0.097	<0.002	0.026	0.003
Total Zinc	mg/L	0.005	5	0.008	<0.005	0.104	0.007	0.026	<0.005
Total Zirconium	mg/L	0.004		<0.004	<0.004	0.028	<0.004	<0.004	<0.004

ODWQS - Ontario Drinking Water Quality Standards

RDL - Reported Detection Limit

Bold indicates an exceedence of the ODWQS

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix G

Infiltration Testing

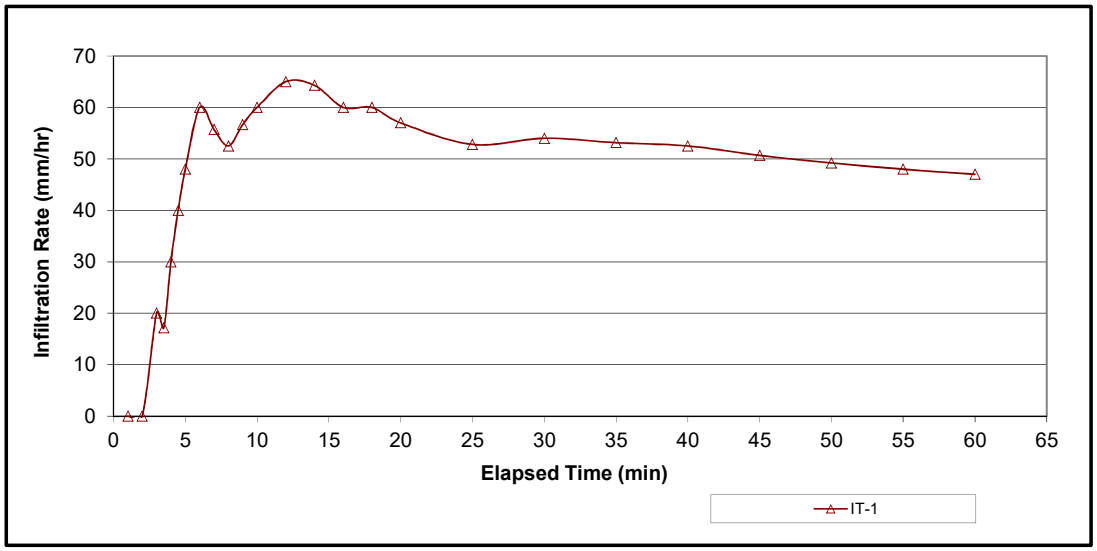
Infiltration Test - IT-1

Location: South of TW2 (Refer to Figure 2)
Instrument: Turf Tech Infiltrometer
Date: 10/9/2020

Depth: Ground surface
Soil Description: dark brown, Sandy silt,/Silty sand, damp to wet, well graded, occasional cobbles

Elapsed Time min	Elapsed Time hour	Readings mm	Infiltration mm	Infiltration Rate mm/min	Infiltration Rate mm/h	Infiltration Rate mm/day
0	0	0	0	0	0	0
1	0.02	0	0	0.00	0.00	0.00
2	0.03	0	0	0.00	0.00	0.00
3	0.05	1	1	0.33	20.00	480.00
3.5	0.06	1	1	0.29	17.14	411.43
4	0.07	2	2	0.50	30.00	720.00
4.5	0.08	3	3	0.67	40.00	960.00
5	0.08	4	4	0.80	48.00	1152.00
6	0.10	6	6	1.00	60.00	1440.00
7	0.12	7	6.5	0.93	55.71	1337.14
8	0.13	7	7	0.88	52.50	1260.00
9	0.15	9	8.5	0.94	56.67	1360.00
10	0.17	10	10	1.00	60.00	1440.00
12	0.20	13	13	1.08	65.00	1560.00
14	0.23	15	15	1.07	64.29	1542.86
16	0.27	16	16	1.00	60.00	1440.00
18	0.30	18	18	1.00	60.00	1440.00
20	0.33	19	19	0.95	57.00	1368.00
25	0.42	22	22	0.88	52.80	1267.20
30	0.50	27	27	0.90	54.00	1296.00
35	0.58	31	31	0.89	53.14	1275.43
40	0.67	35	35	0.88	52.50	1260.00
45	0.75	38	38	0.84	50.67	1216.00
50	0.83	41	41	0.82	49.20	1180.80
55	0.92	44	44	0.80	48.00	1152.00
60	1.00	47	47	0.78	47.00	1128.00
			Average	**0.81**	**49**	**976**
			Infiltration Rate*	1.05	63.1	1154

*Using last 3-4 readings



Infiltration Test - IT-2

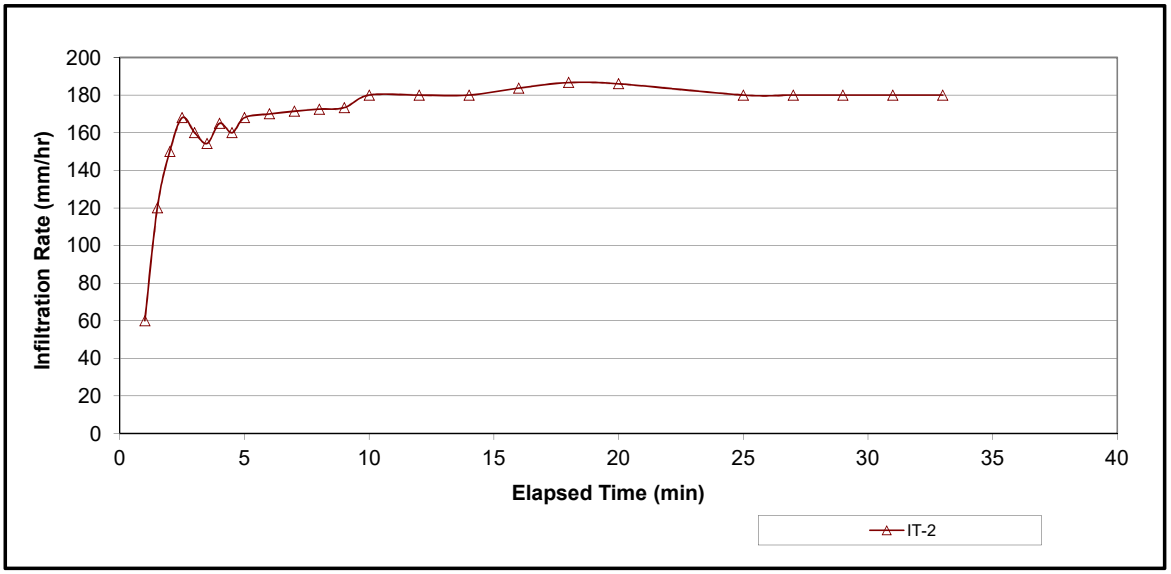
Location: Refer to Figure 2
Instrument: Turf Tech Infiltrometer
Date: 10/9/2020

Depth: Ground surface
Soil Description: light brown, Sand, wet, loose, friable, uniform

Elapsed Time min	Elapsed Time hour	Readings mm	Infiltration mm	Infiltration Rate mm/min	Infiltration Rate mm/h	Infiltration Rate mm/day
0	0	0	0	0	0	0
1	0.02	1	1	1.00	60.00	1440.00
1.5	0.03	3	3	2.00	120.00	2880.00
2	0.03	5	5	2.50	150.00	3600.00
2.5	0.04	7	7	2.80	168.00	4032.00
3	0.05	8	8	2.67	160.00	3840.00
3.5	0.06	9	9	2.57	154.29	3702.86
4	0.07	11	11	2.75	165.00	3960.00
4.5	0.08	12	12	2.67	160.00	3840.00
5	0.08	14	14	2.80	168.00	4032.00
6	0.10	17	17	2.83	170.00	4080.00
7	0.12	20	20	2.86	171.43	4114.29
8	0.13	23	23	2.88	172.50	4140.00
9	0.15	26	26	2.89	173.33	4160.00
10	0.17	30	30	3.00	180.00	4320.00
12	0.20	36	36	3.00	180.00	4320.00
14	0.23	42	42	3.00	180.00	4320.00
16	0.27	49	49	3.06	183.75	4410.00
18	0.30	56	56	3.11	186.67	4480.00
20	0.33	62	62	3.10	186.00	4464.00
25	0.42	75	75	3.00	180.00	4320.00
27	0.45	81	81	3.00	180.00	4320.00
29	0.48	87	87	3.00	180.00	4320.00
31	0.52	93	93	3.00	180.00	4320.00
33	0.55	99	99	3.00	180.00	4320.00
			Average	**3.00**	**180**	**3724**

Infiltration Rate*	3.00	180.0	4320

*Using last 3-4 readings



Infiltration Test - IT-3

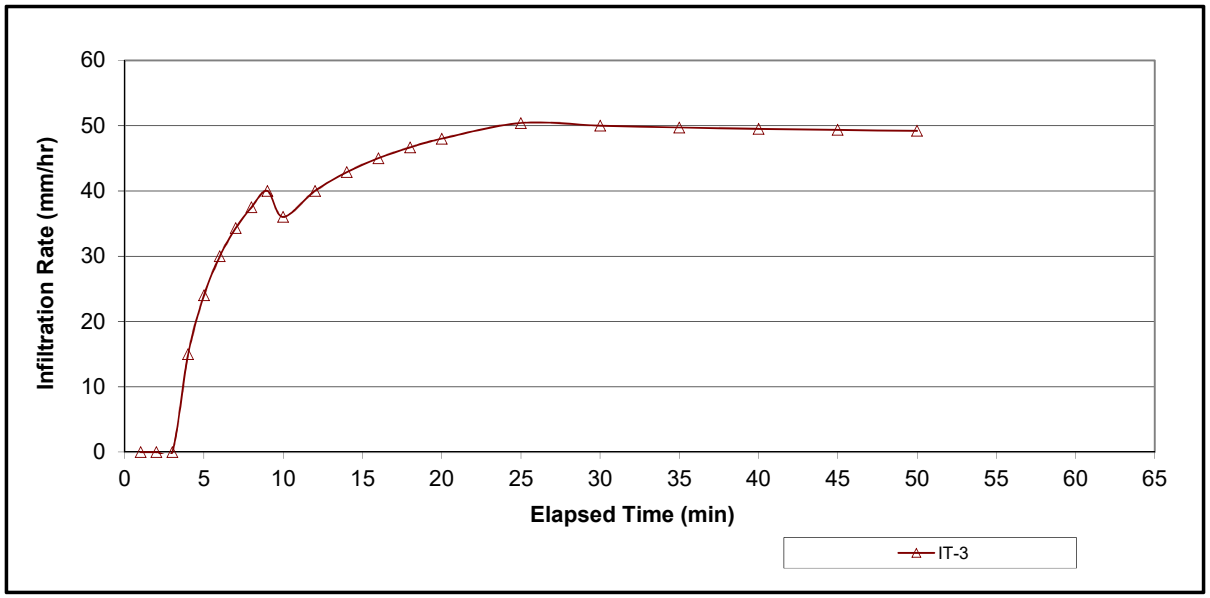
Location: Near TW3 (refer to Figure 2)
Instrument: Turf Tech Infiltrometer
Date: 10/9/2020

Depth: Ground surface
Soil Description: light brown, Sand, trace silt, occasional gravel, wet to saturated, loose, friable

Elapsed Time min	Elapsed Time hour	Readings mm	Infiltration mm	Infiltration Rate mm/min	Infiltration Rate mm/h	Infiltration Rate mm/day
0	0	0	0	0	0	0
1	0.02	0	0	0.00	0.00	0.00
2	0.03	0	0	0.00	0.00	0.00
3	0.05	0	0	0.00	0.00	0.00
4	0.07	1	1	0.25	15.00	360.00
5	0.08	2	2	0.40	24.00	576.00
6	0.10	3	3	0.50	30.00	720.00
7	0.12	4	4	0.57	34.29	822.86
8	0.13	5	5	0.63	37.50	900.00
9	0.15	6	6	0.67	40.00	960.00
10	0.17	6	6	0.60	36.00	864.00
12	0.20	8	8	0.67	40.00	960.00
14	0.23	10	10	0.71	42.86	1028.57
16	0.27	12	12	0.75	45.00	1080.00
18	0.30	14	14	0.78	46.67	1120.00
20	0.33	16	16	0.80	48.00	1152.00
25	0.42	21	21	0.84	50.40	1209.60
30	0.50	25	25	0.83	50.00	1200.00
35	0.58	29	29	0.83	49.71	1193.14
40	0.67	33	33	0.83	49.50	1188.00
45	0.75	37	37	0.82	49.33	1184.00
50	0.83	41	41	0.82	49.20	1180.80
			Average	**0.82**	**49**	**636**

Infiltration Rate*	0.82	49.4	1186

*Using last 3-4 readings



BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix H

Septic Suitability Calculations

Appendix H

Block 18 Fesserton
MOE Mass Balance Equation
Nitrate Loading Calculations

Qt Ct = Qe Ce + Qi Ci

Where:

Qe	5110	**m^3/year**	Sewage Effluent Volume
Qi	25575	**m^3/year**	Infiltration Volume = (recharge * study area)
Qt	30685	**m^3/year**	Total Volume
Ce	40000	**mg/m^3**	Concentration of sewage effluent
Ci	100	**mg/m^3**	Concentration of precipitation

Ct = (QeCe+QiCi)/Qt

QeCe	204400000	**mg/year**
QiCi	2557500	**mg/year**

Ct =	6745	**mg/m^3**	Concentration of nitrate after dilution
	6.74	**mg/L**	

Input Parameters

1000	**L/day**	Daily Flow Rate per Lot (L/day)
14		Number of Lots
102300	**m2**	Dilution Area (Property Area)
250	**mm/year**	Recharge
40	**mg/L**	Concentration of sewage effluent
0.1	**mg/L**	Concentration of precipitation

R.J. Burnside & Associates Limited