TDC Terra-Dynamics Consulting Inc.
432 Niagara Street, Unit 2 St. Catharines, ON L2M 4W3

July 12, 2024

2812978 Ontario Inc.
c/o Hassan Kurabi
4360 Beacon Lane
Mississauga, ON L5C 4J8

Re: Hydrogeological Study –4838 Sherkston Road, Port Colborne, ON

Dear Mr. Kurabi,

1.0 Introduction, Background Information and Purpose

Terra-Dynamics Consulting Inc. (Terra-Dynamics) was retained to complete a hydrogeological study to support three residential consents (or severances), of 4838 Sherkston Road, Hamlet of Sherkston, Port Colborne (the Site, Figure 1). The three proposed residential lots (Parts 1, 2 and 3) range in size from 0.58 hectares (1.43 acre) to 0.65 hectares (1.61 acres) (Suda & Maleszyk Surveying Inc., 2024, Appendix D, Figure 2). It is our understanding that two additional consents will be generated, a fourth consent (Part 4) of 0.10 hectares (0.24 acres) along the western boundary of the Part 3 residential consent, and a fifth consent (Part 5), a lot of 1.89 hectares (4.67 acres) fronting on Highway 3, that is outside of the Hamlet boundary and is proposed to be classified as Agricultural Purposes Only (APO) (Figure 2). It is also our understanding that Part 4 will be owned by the new residential Part 3 and will be used as a right of way easement for Part 5.

The hydrogeological study assessed the risk to groundwater supplies from the new private sewage systems as a requirement of the City of Port Colborne and Niagara Region (City of Port Colborne, 2022), with applicable official plan policies listed below.

1. City of Port Colborne Section 3.4.4 Consents to Sever (City of Port Colborne, 2017):

   For multiple residential development proposals of three lots the minimum lot size shall be 1 hectare unless it is determined through a hydrogeological study that a smaller lot size will adequately support private water and sewage systems and protect surface and ground water features.

2. Niagara Official Plan Policy 4.1.9.2(b) [Niagara Region, 2022]:

   …the minimum size of the proposed and retained lots shall each be 1 hectare unless it is determined through a hydrogeological study, that considers potential cumulative impacts, that a smaller size lot will adequately accommodate private water and sewage treatment facilities for long-term operation but not be less than 0.4 hectares…

As the three new residential consents can be provided potable water via cisterns, this study does not include a water supply assessment (MECP, 1996b). This requires a development agreement on the future lots for water supply by cistern.

2.0 Methodology

The following methodologies were used to investigate the Sherkston Road Site:

A. Submission of a Hydrogeological Study Terms of Reference to Niagara Region and the City of Port Colborne

B. Evaluation of Ministry of the Environment, Conservation and Parks (MECP) water well records located within 250 metres of the Site.

C. A site visit was completed to inspect the site conditions. This included, (i) soil-probing by hand-auger at four locations to determine shallow soil conditions, (ii) laboratory grain-size analysis of one sample representative of the soils on-site, (iii) collection of a general water quality sample from the existing on-site well (iv) mapping of the approximate location of the on-site existing septic system.

D. A water well and septic system survey questionnaire, and explanation letter pertaining to the need for the survey, was delivered to the developed parcels within 100 m of the Site. This was primarily to map existing water supplies and sewage infrastructure that may exert building code set-backs which must be conformed to during a site design process.

E. Assessment of the Site's geologic and hydrogeologic setting both in regional, and local context, to assess the aquifer's vulnerability. A hydrogeologic cross-section was prepared through the Site to summarize the physical setting.

F. The potential sewage impacts to the groundwater system and private wells were completed. The assessment used Provincial Procedure D-5-4 (MECP, 1996).

Terra-Dynamics Consulting Inc. began the assessment once confirmation of the appropriateness of the Terms of Reference was received from the City of Port Colborne and Niagara Region via email (2024).

3.0 Ministry of Environment, Conservation and Parks (MECP) Water Well Records

MECP Water Well Records within 250 m of the Site were reviewed and nine (9) records were identified (Figure 2), one of which was a well decommissioning record from 2011 (MECP, 2023) (Appendix A). It should be noted that despite being located on the site on MECP mapping, water well records (WWR) 6600766, 6600767, and 6600768, 6603708 are not displayed as such in Figure 2. Based on the maps located on the corresponding water well logs, these wells have been misplotted on the MECP mapping. Also, WWR 6600769 and 6604208 were adjusted to more accurate locations based on the maps located on the water well logs. Proposed severance Part 1 contains a large diameter (0.90 m) dug supply well that has no corresponding water well record. This on-site dug well was used as the primary source of water for the residency prior to vacancy (Figures 2 and 3). No additional wells were observed during the on-site visit on January 23, 2024.

Table 2 summarizes the information provided by the nine water well records within 250 metres of the site, as well as three additional records used for the hydrogeological cross-section. Nearby wells were constructed between 1948 and 2023. The water well contractors recorded the wells as being installed in

flint (i.e. chert) and limestone bedrock, and well depths ranged from 8.2 to 32.0 metres but were on average 15.1 metres. The depth to bedrock (i.e., the overburden thickness) ranged from 2.7 to 12.8 metres but was on average 6.4 metres. Bedrock aquifer static water level depths were recorded as being both (a) above the top of bedrock at eight wells, and (b) below the top of bedrock at three wells, with a median groundwater depth of 4.3 metres below ground surface (m BGS). The bedrock aquifer appears confined by the overlying clay as shown by the static water levels above the top of the bedrock (Figure 4). Water well contractor water quality observations labelled five wells as fresh, and five wells as sulphurous. Sulphurous water is a common observation for bedrock wells in this area (WHI, 2005).

Most wells within a 250-metre buffer area of the Site have casings less than 6 metres in length (20 feet) corresponding with the depth to bedrock (Table 2). Water wells with casing lengths less than 6 metres (20 feet) are classified as shallow wells which require a minimum set-back of 30 metres (100 feet) (Sharaf, 2013) from potential sources of contaminants (MECP, 2009) such as sewage effluent distribution piping or septic leaching beds.

Within the proposed consents, on Part 1 (in the southern part) of the Site, is a dug well. It is not displayed in Table 2 due to unknown construction and may pre-date the filing of water well records with the province (Figure 2). Based on the construction and the measured depth of 7.4 metres, the dug well likely extends to bedrock. Given that the dug well's walls may not be sealed to 6 m, a minimum 15-metre set-back from septic tanks and a minimum 30-metre set-back from distribution piping for septic systems are required from this well. This set-back would apply to new septic beds (Part 2 and 3), and the existing, or if required new, septic bed on Part 1 (Figure 3). It is our understanding that the Niagara Region requires the exact location of the septic bed to be mapped by a qualified professional to ensure that the proper set-back requirements are met. This dug well was the only well identified that would place a building code constraint on the location of future septic beds. However, future water supply cisterns must be 15 m from sewage system components as well.

4.0 Water Well Survey Results

Water well surveys (Appendix B) were mailed out on January 5, 2024 to the eight (8) parcels within 100 m of the area proposed for development (Figure 2). The results are summarized below in Table 3.

Table 3: Summary of Water Well Survey Results

Address	Comments
4750 Sherkston Road	No Response
4791 Sherkston Road	Water supply by cistern
4821 Sherkston Road	No Response
4839 Sherkston Road	No Response
4891 Sherkston Road	No Response
900 Empire Road	No Response
910 Empire Road	No Response
970 Empire Road	No Response

5.0 Physical Setting

The ground surface of the Site is fairly flat ranging from 185-187 metres above sea level (m ASL) sloping gently to the north (Figure 3). The southern portion of the property is higher and is regionally mapped as being associated with the Crystal Beach Moraine (Feenstra, 1984). The only nearby mapped watercourses are not on-site and are the drainage ditches along the roads that border the property (NPCA,2017b). During the site visit on January 23, 2024, no other watercourses were identified.

5.1 Soils

The soils are mapped as a combination Oneida Soil-Red Washed Phase in the southern portion, and Chinguacousy Red Phase in the northern portion (Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA), 1989). The Oneida is regionally mapped as being associated with the Crystal Beach Moraine (Feenstra, 1984). The Chinguacousy is regionally mapped as being associated with the Haldiman Clay Plain (Chapman and Putnam, 1984). Figure 5 below displays the Fort Erie Moraine, which was formed through a similar deposition method as the Crystal Beach Moraine (Feenstra, 1981).

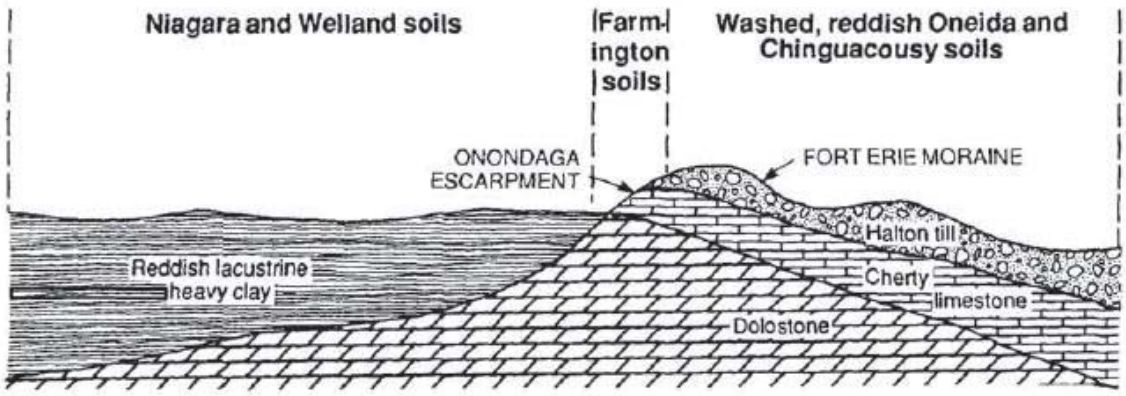


Figure 5 – Schematic cross-section showing the relationship of soils and geology along the Fort Erie Moraine.

Onedia Soil- Red Washed Phase are associated with glacial till and are moderately well drained. Chinguacousy Red Phase soils are associated with glaciolacustrine deep water silty clays and are imperfectly drained. The hydrologic soil group for the Onedia Soil- Red Washed Phase are group C and Chinguacousy Red Phase soils are group C-D (Table 4). No tile drainage is mapped at the Site (OMAFRA, 2023).

Table 4 - Hydrologic Soil Groups (USDA, 1986)

HSG Group	Soil description
A	sand, loamy sand or sandy loam
B	silt loam or loam
C	sandy clay loam
D	clay loam, silty clay loam, sandy clay, silty clay or clay

5.2 Overburden Geology

The surficial geology is regionally mapped as silty clay in the southern portion of the Site, which covers the majority of the three consents. This silty clay is associated with the Halton Till and the previously mentioned and regionally mapped Crystal Beach Moraine. The northern portion of the Site is regionally mapped as being the Haldimand Clay Plain (Chapman and Putnam, 1984) with the surficial geology mapped as silty clay and classified as glaciolacustrine deeper water clay and silt (Feenstra, 1984). Four on-site hand augers were completed to a depth of 1 meter on each Consent (Figure 2). All four hand auger holes showed a similar composition with the following approximate depths: organic rich dark brown topsoil 0-0.25 m, 0.25-0.60 m silt with some fine sand, 0.60-1.0 m brown clay. The soil samples were collected in the C horizon which based on regional mapping for the Onedia Soil- Red Washed Phase and Chinguacousy Red Phase soils are 0.75 m and 0.60 m respectively (OMAFRA, 1989).

Figure 4 (Cross section A-A') displays the site-specific geologic cross-section constructed using nearby water well records. The geologic section shows that the silty clay overburden thickens to the northwest and thins to the southeast, however, the thickness of silty clay is between 7.5 to 8.6 metres in the existing and proposed areas for sewage disposal servicing of Consents 1, 2 and 3. Cross section A-A' agrees with our interpretation of the on-site dug well being completed to about bedrock, as well as the regional surficial geology mapping which depicts shallower overburden to the southeast where bedrock is at or near the surface (Feenstra 1984).

5.3 Bedrock Geology

The bedrock in the southern portion of the Site is mapped as Onondaga Formation limestone, specifically the Edgecliff Member which can be described as cherty, fossiliferous, locally argillaceous limestone (OGS, 2017). In the northern portion of the Site, bedrock is mapped as the Bois-Blanc formation, which also can be described as cherty, fossiliferous, locally argillaceous limestone (OGS, 2017).

5.4 Hydrogeologic Setting

5.4.1 Overburden Aquitard

The surficial silty clay is an overburden aquitard with an expected similar geology to BH41-NP-2015 completed by the Ontario Geological Survey (OGS) (Burt, 2023, Appendix E). The hydraulic conductivity of a typical silty clay aquitard is expected to be $7x10^{-7}$ m/s, or less (GLL, 1987) and as an aquitard it consists of "*horizons that will not transmit appreciable quantities of water*" (GLL, 1987).

Four shallow soil samples were collected from the Site using a hand-auger during the January 23, 2024 site visit (Figure 3, Section 5.2). One of these samples, HA-103, which was collected from a depth of 0.80-0.90 m BGS, was submitted for laboratory grain-size analyses (Appendix D). The Excel-tool HydrogeoSieveXL (Devlin, 2015) was used to process the grain-size analyses to provide a shallow soil hydraulic conductivity estimate of $6x10^{-11}$ m/s for HA-103 (Appendix D). In addition to the on-site soil sample, an additional soil sample from the neighbouring property to the east completed by WSP in 2020, TP-18-2, at a depth of 0.30-1.98 m was also analyzed to further classify the hydraulic conductivity

of local soils. The shallow soil hydraulic conductivity estimate was $4x10^{-9}$ m/s for TP-18-2 (Devlin, 2015). Both of these results are within published ranges for clay (Fetter, 1995).

The hydrogeologic section prepared for the Site shows between 7.5 to 8.6 metres of clay aquitard underlying the Site and protecting the bedrock aquifer (Figure 4).

Gartner Lee Limited (1987) provided a good description of the expected water table conditions within the overburden aquitard:

> "*Detailed studies indicate that the water table fluctuates over the weathered/fractured upper two to three metres of the glaciolacustrine silts and clays comprising the overburden aquitard…flow in this shallow zone responds to daily climatic changes such that, during precipitation, the open fractures from weathering will quickly fill with water. The bulk of the discharge will then occur locally in swales that carry intermittent surface water …. The remainder will go to depth to recharge the ground water system.*"

Groundwater flow in the overburden aquitard is expected to follow topography given the low permeability of the aquitard (Haitjema and Mitchell-Bruker, 2005).

The vertical groundwater gradient is interpreted as downwards from a comparison of the on-site dug well and nearby Water Well Record A324370 (Figure 4).

5.4.2 Bedrock Aquifer

The underlying bedrock is the location water supply aquifer for private wells (Section 3). The water table at the Site is approximately 181 to 181.5 m ASL, with groundwater flow to the southwest (Figure 2, WHI, 2005). This was calculated from water well records less than 15 m deep. The regional potentiometric surface as mapped by Waterloo Hydrogeologic Inc. also displays a groundwater flow direction of southwest (WHI, 2005).

5.4.3 Confined Bedrock Aquifer Conceptual Model

The Section 5.0 information is summarized in the schematic below, as a conceptual model for the assessment of potential sewage system impacts to groundwater and private wells (Figure 6).

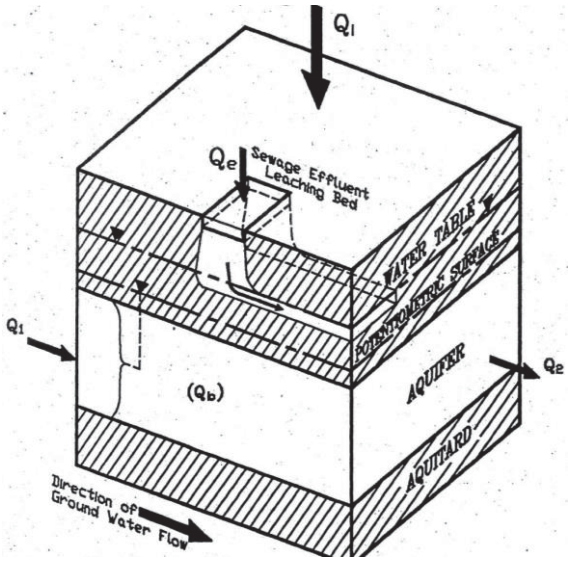


Figure 6 - Confined Aquifer Impact Assessment Subsurface Sewage System (MECP, 1995)

5.5 Aquifer Vulnerability

The Site is underlain by a low permeability overburden aquitard of approximately 7.5-8.6 metres which protects the underlying bedrock aquifer as described below and shown in cross-section (Figure 4). The Site was regionally mapped as having a high intrinsic susceptibility to groundwater contamination (WHI, 2005) and regionally mapped as a Highly Vulnerable Aquifer (HVA) by the Niagara Peninsula Source Protection Authority (NPSPA, 2013). However, based on our updated hydrogeological analyses, the proposed consents are not an HVA, our updated hydrogeological analyses included additional water wells not included in the original WHI (2005) interpretation. Based on a conservative 7 metres of clay overburden and the low hydraulic conductivity, this site has a medium groundwater vulnerability using the Aquifer Vulnerability Index (AVI) with an aquifer vulnerability score of 56, within the medium vulnerability range of 30-80 (MECP, 2006).

5.6 Groundwater Quality

A raw groundwater sample was collected on January 23, 2024, from the on-site dug well following the purging of the well for two hours until the field parameters stabilized. The laboratory report of the bedrock groundwater quality is presented in Appendix D and the results are summarized in Table 1 and compared to the Ontario Drinking-Water Quality Standards (ODWS), Objectives and Guidelines (MECP, 2003/2020).

The health-related Maximum Acceptable Criterion (MAC) for total coliform was exceeded, however, E.Coli was not detected. Total coliform in the absence of E.Coli can be naturally occurring and not mammal related, an example of this is originating from iron bacteria (Atherholt and Procopio, 2017). Hardness, turbidity, and organic nitrogen were also found above the aesthetic objectives and operational guidelines which are non-health related.

The nitrate concentration, was low at 0.12 nitrate as nitrogen mg/L, this is well below the maximum acceptable criterion ODWS of 10 as N mg/L.

6.0 Assessment of Potential Sewage Impacts

Provincial Procedure D-5-4 (MECP, 1996) provides an assessment process for assessing the groundwater impact potential of private sewage systems. The purpose of the assessment process "*is to ensure that the combined effluent discharges from all the individual on-site sewage systems in a development will have a minimal effect on the groundwater and the present or potential use of the adjacent property"* (MECP, 1996).

This assessment process involves two main steps: (i) consideration of system isolation and (ii) contaminant attenuation, as visualized below in Figure 7.

6.1 System Isolation

> *"Developments will normally be considered as low risk where it can be demonstrated that sewage effluent is hydrogeologically isolated from … supply aquifer(s)"* (MECP, 1996a).

The overburden aquitard has a sufficiently low hydraulic conductivity (Section 5.4.1), and local mapping of the aquitard thickness shows over 7 metres of material at the Site (Figure 4) extending over 100 metres from the Site.

Consequently, private sewage servicing of the proposed development is (i) a low risk to the bedrock aquifer, and (ii) a low risk bedrock water supply wells with 6 metres of casing, because the Site is hydrogeologically isolated from the aquifer. This conclusion is based on the following:

- The bedrock aquifer has been shown to have medium intrinsic susceptibility due to overburden thickness and a low hydraulic conductivity; and
- The thickness and extent of the underlying aquitard is approximately 7 m or greater.

As there is sufficient documentation of these conditions at the Site, no new collection of geologic information is recommended.

Further responding to the guidance of Provincial Procedure D-5-4 under Step 2, future sewage effluent will infiltrate into the surficial clay and silty clay soils, become anaerobic, and consequently denitrify (Robertson et al, 1996).

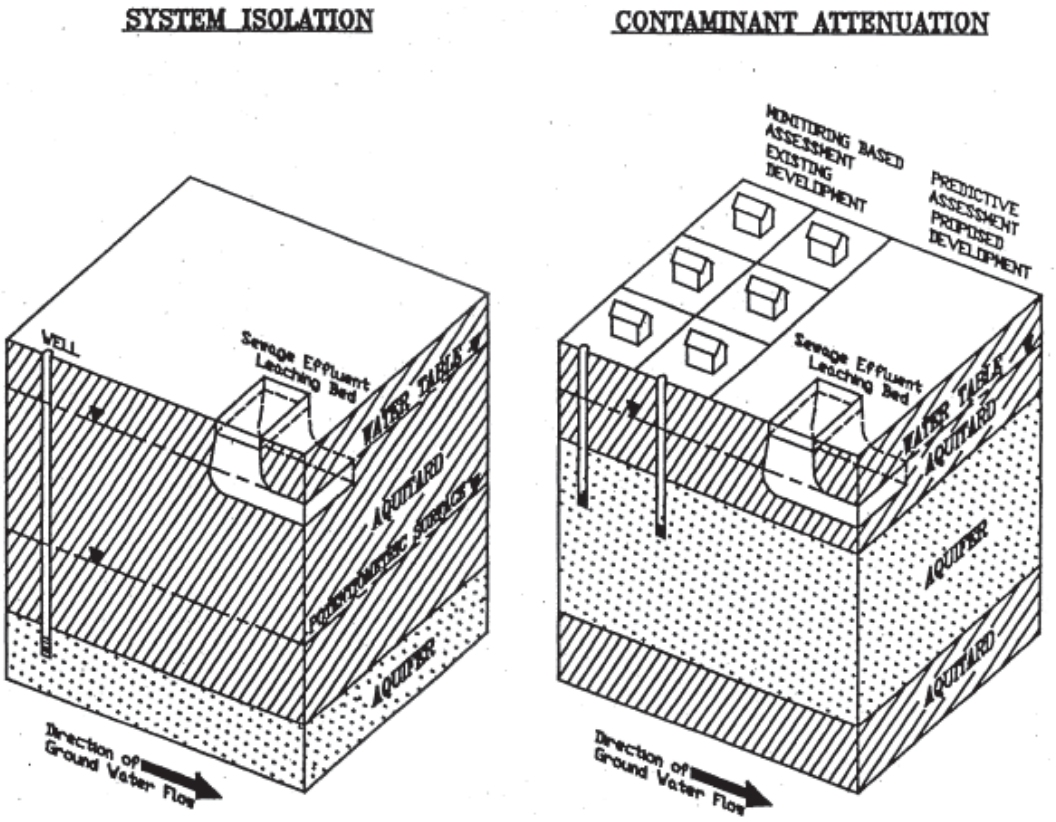


Figure 7 – Water Quality Assessment Process (MECP, 1995)

As no sewage effluent will enter the water supply aquifer, "*the lot density of the proposed development may be dictated by… the need for sewage system replacement areas… and by the minimum distances… as defined by Ontario Regulations...*" (MECP, 1996). In this case that density is a minimum of 4,047 m^2 or 1.0 acre (Niagara Region,2022).

Consequently, no Step 3 contamination attenuation calculations are required to be completed, because:

> "*…where it has been demonstrated that the sewage effluent will not enter supply aquifers, the lot density of the proposed development may be dictated by factors such as the need for sewage system replacement areas, and by the minimum distances between individual on-site beds and wells* (or cisterns)*, as defined by Ontario Regulations*…" (MECP, 1996)

6.2 Sewage System Effluent Disposal Location Considerations

Sewage system effluent disposal locations (e.g. raised leaching or filter bed) should be a minimum of 15 m from the future water supply cisterns and sewage disposal systems, and 30 m from the existing dug water well if kept for future use.

7.0 Summary

The proposed lot areas are sufficient (Figure 3) and can be safely serviced by private sewage systems with the implementation of the following recommendations:

1. Lots on private sewage systems and cisterns may be sustainability created on lot areas of 4,047 m^2 (1 acre) as long as Ontario Building Code set-backs are met;

2. The design of the Site layout can be completed during the Building Permit stage and will need to ensure all required set-backs are met;

3. A development agreement should be completed with the City of Port Colborne indicating the future water supply will be a cistern(s) for Parts 2 and 3;

4. If the dug well is kept as a water supply for Part 1, it should be equipped with equivalent treatment for Groundwater Under the Direct Influence of Surface Water (GUDI), otherwise a development agreement should be completed with the City of Port Colborne indicating the future water supply will be a cistern and the dug well decommissioned by a licensed water well contractor; and

5. If any additional on-site wells are identified during construction, they should be decommissioned by a licensed water well contractor.

The proposed lot areas are sufficient and can be safely serviced by private sewage systems with the implementation of the above recommendations.

We trust this information is sufficient to your present needs. Please do not hesitate to contact the undersigned if you have any questions.

Yours truly,

TERRA-DYNAMICS CONSULTING INC.

Briar MacIntyre, B.Sc., P.Geo.
Environmental Geologist

Jayme D. Campbell, P.Eng.
Senior Water Resource Engineer

Attachments
Figure 1 – Location of Site
Figure 2 – Regional Setting
Figure 3 – Site Setting
Figure 4- Hydrogeologic Cross-Section A-A'

Appendix A –Water Well Records
Appendix B- Water Well and Septic System Survey and Responses
Appendix C - Hydraulic Conductivity Analyses
Appendix D – Laboratory Analyses
Appendix E- Supporting Information

8.0 References

AquaResource Inc. and Niagara Peninsula Conservation Authority, 2009. Water Availability Study for the Lake Erie North Shore Watershed Plan Area, Niagara Peninsula Source Protection Area.

Armstrong, D.K. 2017. Paleozoic geology of the Welland–Fort Erie area, southern Ontario; Ontario Geological Survey, Preliminary Map P .3811, scale 1:50 000.

Burt, A.K., 2020. Results of the 2014-2017 drilling programs on the Niagara Peninsula: Graphic logs, descriptions and analytical data; Ontario Geological Survey, Miscellaneous Release – Data 383.

Burt, A.K., 2023. Re: Crystal Beach Moraine, Email from A. Burt (Quaternary Geoscientist, Ontario Geological Survey) to Jayme Campbell (Terra-Dynamics Consulting Inc.).

Chapman, L.J., and Putnam, D.F., 1984. The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2, 270 p.

Devlin, J.F., 2015. HydrogeoSieveXL: an Excel-based tool to estimate hydraulic conductivity from grain-size analysis.

Feenstra, B.H. 1984. Quaternary Geology of the Niagara-Welland Area; Ontario Geological Survey, Map 2396, Quaternary Geology Series, Scale 1:50 000, Geology 1969-1972

Gartner Lee Limited (GLL), 1987. *Water Resources of the Niagara Frontier and the Welland River Drainage Basin*. Prepared for the Ontario Ministry of the Environment.

Haitjema, H.M. and Mitchell-Bruker, S., 2005. Are Water Tables a Subdued Replica of the Topography?, Vol. 43, No.6 – GROUND WATER, pg. 781-786.

Ministry of the Environment, Conservation and Parks, 2024. https://www.ontario.ca/page/map-well-records.

Ministry of the Environment (Conservation and Parks), 1996a. Procedure D-5-4, Technical Guideline for Individual On-site Sewage Systems: Water Quality Impact Assessment.

Ministry of the Environment (Conservation and Parks), 1996b. Procedure D-5-5, Technical Guideline for Private Wells: Water Supply Assessment

Ministry of the Environment and Energy (Conservation and Parks), 1995. MOEE Hydrogeological Technical Information Requirements for Land Development Applications.

Niagara Peninsula Conservation Authority (NPCA), 2017a. *Niagara Peninsula Source Protection Area, Section 36 Workplan Proposal, Final Report.* Prepared for the Ministry of the Environment and Climate Change.

Niagara Peninsula Conservation Authority, 2020. Ground surface contours.

Niagara Peninsula Conservation Authority, 2009. *Groundwater Vulnerability Analysis.* Prepared for the Niagara Peninsula Source Protection Authority.

Niagara Peninsula Conservation Authority. 2005. NPCA Groundwater Study. Report prepared by Waterloo Hydrogeologic Inc.

Niagara Peninsula Source Protection Authority (NPSPA), 2013. Updated Assessment Report.

Niagara Region, 2024. Re: Proposed Hydrogeology Study Terms of Reference, Email from P. Lambert (Director of Infrastructure Planning & Development Engineering) to Jayme Campbell (Terra-Dynamics Consulting Inc.).

Niagara Region, 2022. Niagara Official Plan.

Ontario Geological Survey (OGS), 2017. Paleozoic Geology, Welland-Fort Erie Area, Southern Ontario. Map P.3811.

Ontario Geological Survey, 2003. Surficial geology of southern Ontario. Miscellaneous Release Data – 128. Project Summary and Technical Document, 53 pp.

Ontario Ministry of Agriculture, Food and Rural Affairs, 2022. AgMaps
https://www.gisapplication.lrc.gov.on.ca/AIA/index.html?viewer=AIA.AIA&locale=en-US

City of Port Colborne, 2024. Record of Pre-Consultation, September 8, 2022, Property Address: 4838 Sherkston Rd.

City of Port Colborne, 2017. City of Port Colborne Official Plan.

Sharaf, A., 2013. On-site Sewage Systems, Code Reference Series, contains Building Code Act, 1992 and relevant portions of O.Reg.332/12.

Suda and Maleszyk Surverying Inc., 2024. 4838 Sherkston Rd, Port Colborne, Ontario Site Plan, June 18, 2024.

United States Department of Agriculture (USDA), 1986. Urban Hydrology for Small Watersheds.

WSP, 2020. Hydrogeologic Study (REV.1), 970 Empire Road, Sherkston, Port Colborne, Ontario.

Table 1 - Private Well Groundwater Quality Results

Sample ID				4838 Sherkston (Dug Well)
Sample Date		ODWS		23-Jan-24
Analysis	**Units**	MAC	AO/OG	
Total Coliform	cfu/100mL	0	---	**32**
E. Coli	cfu/100mL	0	---	0
Heterotrophic Plate Count (HPC)	cfu/1mL	---		620
UV Transmittance	%T	---	---	84.9
Alkalinity	mg/L as CaCO3	---	30-500	341
Bicarbonate	mg/L as CaCO3	---	---	341
Carbonate	mg/L as CaCO3	---	---	< 2
Conductivity	uS/cm	---	---	651
pH	No unit	---	6.5-8.5	7.97
Total Suspended Solids	mg/L	---	---	3
Turbidity	NTU	1	5	**1.1**
Organic Nitrogen	mg/L	---	0.15	**0.26**
Total Kjeldahl Nitrogen (N)	as N mg/L	---	---	0.27
Ammonia+Ammonium (N)	as N mg/L	---	---	< 0.04
Dissolved Organic Carbon	mg/L	---	5	3
Total Organic Carbon	mg/L	---	---	3
Chloride	mg/L	---	250	12
Fluoride	mg/L	1.5	---	0.17
Bromide	mg/L	---	---	< 0.3
Nitrite (as N)	as N mg/L	1	---	< 0.03
Nitrate (as N)	as N mg/L	10	---	0.12
Sulphate	mg/L	---	500	23
Sulphide	mg/L	---	0.05	< 0.02
4AAP-Phenolics	mg/L	---	---	< 0.002
Mercury (total)	mg/L	0.001	---	< 0.00001
Hardness	mg/L as CaCO3	---	80-100	**337**
Aluminum (total)	mg/L	---	0.1	0.042
Arsenic (total)	mg/L	0.01	---	0.0004
Boron (total)	mg/L	5	---	0.041
Barium (total)	mg/L	1	---	0.0491
Beryllium (total)	mg/L	---	---	< 0.000007
Bismuth (total)	mg/L	---	---	< 0.00001
Cobalt (total)	mg/L	---	---	0.000038
Calcium (total)	mg/L	---	---	97.0
Cadmium (total)	mg/L	0.005	---	0.000039
Copper (total)	mg/L	---	1	0.0227
Chromium (total)	mg/L	0.05	---	0.00406
Iron (total)	mg/L	---	0.3	0.065
Potassium (total)	mg/L	---	---	1.18
Magnesium (total)	mg/L	---	---	23.1
Manganese (total)	mg/L	---	0.05	0.00662
Molybdenum (total)	mg/L	---	---	0.00162
Nickel (total)	mg/L	---	---	0.0003
Sodium (total)	mg/L	20*	200	9.04
Phosphorus (total)	mg/L	---	---	0.033
Lead (total)	mg/L	0.01	---	0.00053
Silicon (total)	mg/L	---	---	5.51
Silver (total)	mg/L	---	---	< 0.00005
Strontium (total)	mg/L	---	---	1.42
Thallium (total)	mg/L	---	---	< 0.000005
Tin (total)	mg/L	---	---	0.00425
Titanium (total)	mg/L	---	---	0.00101
Antimony (total)	mg/L	0.006	---	< 0.0009
Selenium (total)	mg/L	0.05	---	0.00099
Uranium (total)	mg/L	0.02	---	0.00112
Vanadium (total)	mg/L	---	---	0.00054
Zinc (total)	mg/L	---	5	0.011

Table 2. Ministry of the Environment, Conservation and Parks (MECP) Water Well Information System (WWIS) Well Records

WWIS	Year Constructed	Bedrock Depth (mBGS)	Static Water Level (mBGS)	Finished Well Depth (mBGS)	Depth into Bedrock (m)	Water Quality	Casing Length (m)	Purpose	Geologic Log Summary
6600744	1948	4.3	4.6	8.2	3.9	Fresh, hard	4.3	Domestic	Sand (0-4.3m), Flint Rock (4.3-8.2m)
6600745	1948	5.5	3.0	9.4	3.9	Fresh	NA	Livestock	Clay (0-5.5m), Flint Rock (5.5- 9.4m)
6600749	1952	7.3	6.1	14.9	7.6	Mineral, Sulphur	7.3	Domestic	Clay loam (0-7.3m), Flint Rock (7.3-14.9m)
6600755	1954	5.8	4.6	11.6	5.8	Fresh	5.8	Domestic	Clay (0-5.8m), Flint Rock(5.8- 11.6m)
6600769	1961	2.7	3.7	11.0	8.3	Fresh, Slight Sulphur	4.3	Motel	Clay (0-2.7m), Limestone (2.7-11.0m)
6603000	1974	3.4	9.1	20.4	17.0	Sulphur	3.4	Domestic	Clay (0-3.4m), Limestone (3.4-20.4m)
6604208	1995	3.7	2.4	15.8	12.1	Fresh	3.7	Domestic	Clay (0-3.7m), Limestone (3.7-15.8m)
A324370	2023	7.0	3.4	32.0	25.0	Untested	7.0	Domestic	Clay (0-7.0m), Limestone (7.0-32.0m)
6602546*	1970	12.8	4.9	16.8	4.0	Sulphur	12.8	Domestic	Clay(0-12.8m), Limestone (12.8-16.8m)
7189558*	2012	11.9	4.0	15.5	3.7	Sulphur	12.0	Domestic	Clay (0-11.9m), Limestone (11.9-15.5m)
7267714*	2016	6.4	4.3	11.0	4.6	Fresh	6.7	Domestic	Clay(0-6.1m), Gravel (6.1-6.4m), Limestone (6.4-11.0m)
7170837	2011	NA	NA	NA	NA	NA	NA	NA	Abandonment
Average		6.4	4.5	15.1	8.7				
MEDIAN		5.8	4.3	14.9	5.8				

Note: * Denotes Water Well Records included based on use in the Hydrogeologic Cross Section A-A'

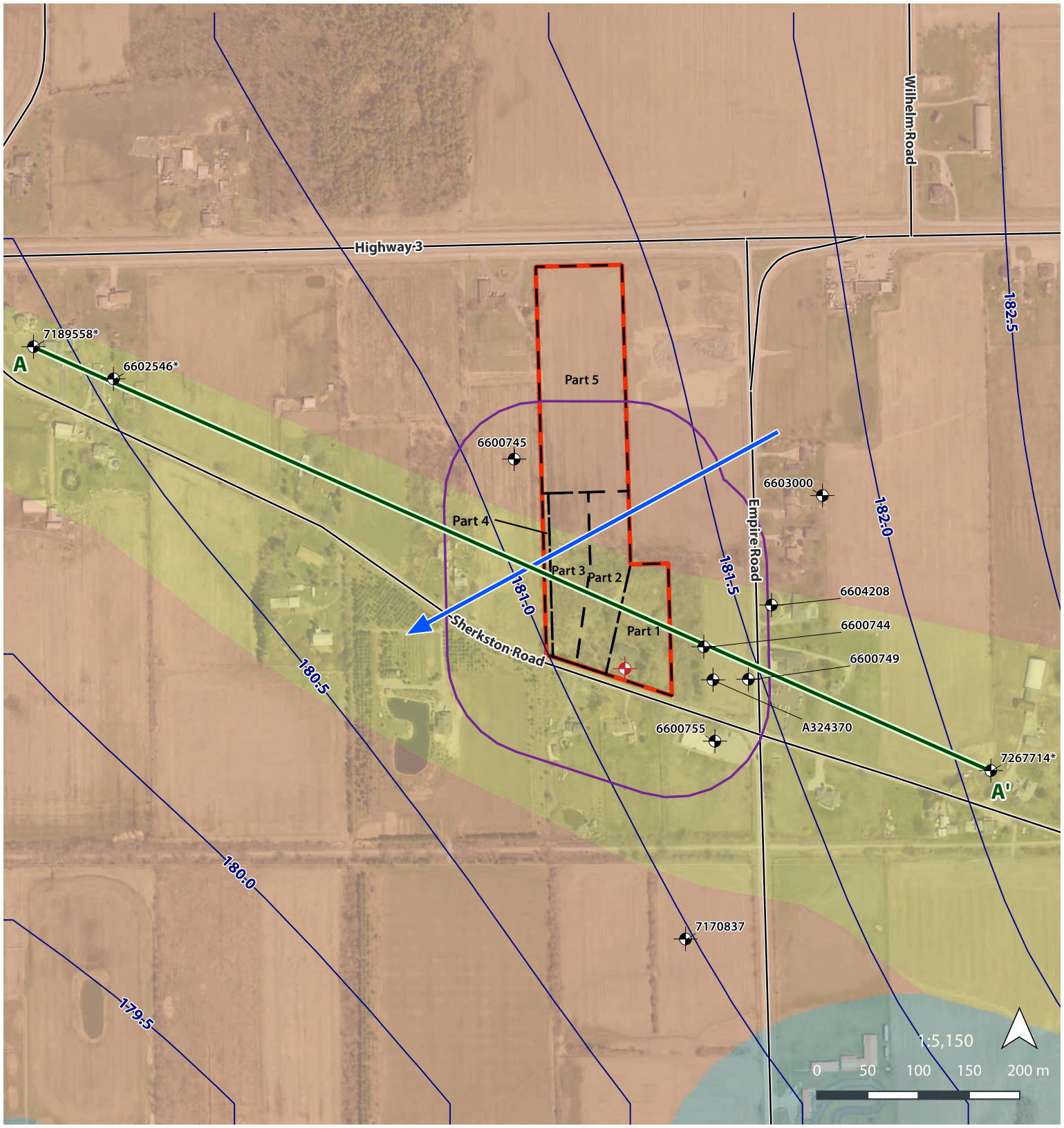
Location of Site

Hydrogeological Study
4838 Sherkston Road, Port Colborne, ON

TDC Terra-Dynamics Consulting Inc.

Prepared For: 2812978 Ontario Inc.

Figure 1



MECP Water Well Record Within 250m of Site

On-Site Dug Well

Regional Water Table mASL (NPCA 2005)

General Groundwater Flow Direction

Line of Hydrogeologic Cross-Section A-A'

100m Buffer for Water Well Survey

Site Boundary

Proposed Consents

Regional Surficial Geology

Clay

Paleozoic Bedrock

Silty Clay

* *Well locations included for cross-section*

References: Ministry of Environment, Conservation and Parks: Drilled Water Wells, 2023. Ontario. Ontario Geological Survey: Surficial Geology. Niagara Region: Orthoimagery, 2018. Niagara Peninsula Conservation Authority: Potentiometric Surface Groundwater Contours, 2005.

Map Date: 2024-06-27 D:\TerraDynamics\Projects\4838 Sherkston\Project Files\Figure 2 - Regional Setting.qgz

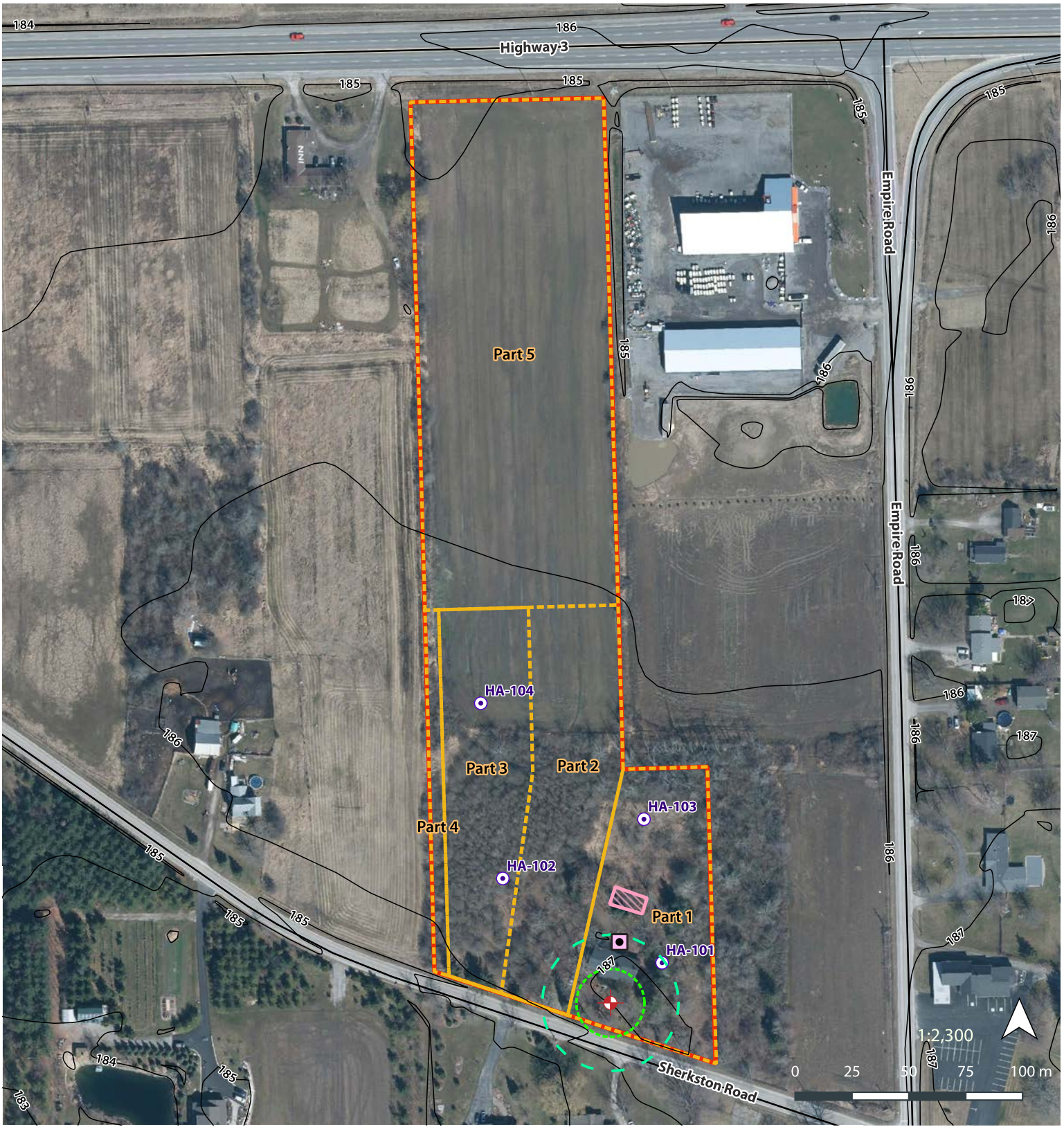
Regional Setting

Hydrogeological Study
4838 Sherkston Road, Port Colborne, ON

Terra-Dynamics Consulting Inc.

Prepared for:
2812978 Ontario Inc.

Figure 2



- On-Site Dug Well
- Hand Auger Hole
- Ground Surface Contour (1m)
- Site Boundary
- Proposed Consents
- 15m Buffer of On-Site Dug Well
- 30m Buffer of On-Site Dug Well
- Septic Tank
- Septic Bed

* Location Provided by Client

References: Niagara Region: Orthoimagery, 2020. Niagara Peninsula Conservation Authority: Ground Surface Contours.

Map Date: 2024-06-27 D:\TerraDynamics\Projects\4838 Sherkston\Project Files\Figure 3 - Site Setting.qgz

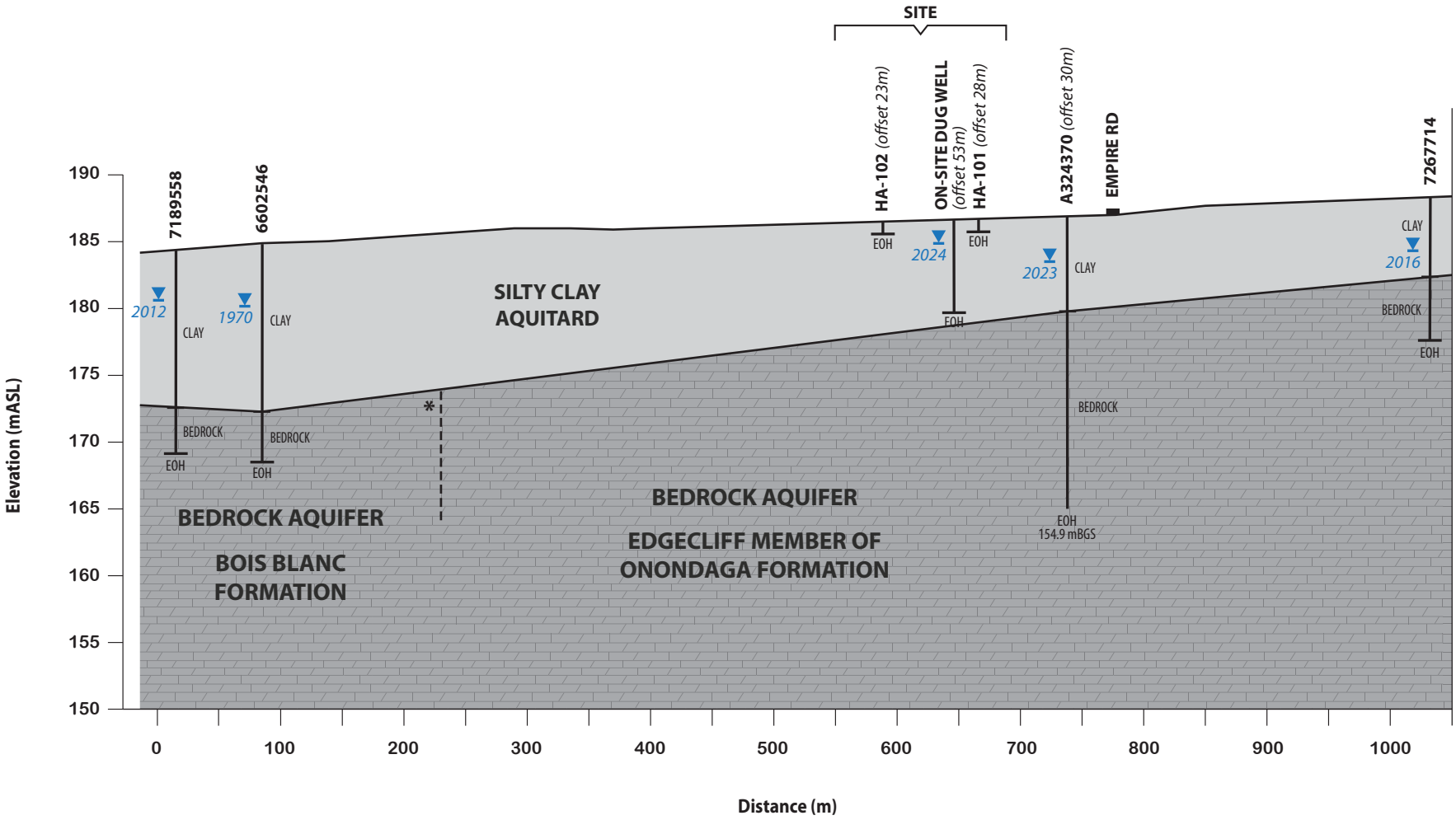
Site Setting

Hydrogeological Study
4838 Sherkston Road, Port Colborne, ON

Terra-Dynamics Consulting Inc.

Prepared for:
2812978 Ontario Inc.

Figure 3



▼ **Water Level**

EOH **End of Hole**

* *Armstrong, D.K. 2017. Paleozoic geology of the Welland–Fort Erie area, southern Ontario; Ontario Geological Survey, Preliminary Map P .3811, scale 1:50 000.*

See Figure 2 for line of cross-section

Hydrogeologic Cross-Section A-A'

Hydrogeological Study
4838 Sherkston Road, Port Colborne, ON

Terra-Dynamics Consulting Inc.

Prepared For: 2812978 Ontario Inc.

Figure 4

D:\TerraDynamics\Projects\4838 Sherkston\Project Files\Figure 4 - Cross Section A-A'.ai

February 11, 2024

Appendix A

Water Well Records

UTM [ ] Z [ ] E
[ ] R [ ] N

Elev. [ ] Datum [ ]

Basin [ ]

The Ontario Water Resources Commission Act

WATER WELL RECORD

GROUND WATER BRANCH No. 76
SEP 12 1961
PORT COLBORNE
ONTARIO WATER RESOURCES COMMISSION

County or District Welland Township, Village, Town or City [redacted]

Con. 24 Lot Part 5 Date completed 26 (day) July (month) 61 (year)

[redacted] ress RR 1 Ridgeway

Casing and Screen Record

Inside diameter of casing ~~Clay~~ 6"
Total length of casing 14 ft.
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 6"

Pumping Test

Static level 12 ft.
Test-pumping rate 20 G.P.M.
Pumping level 12 ft
Duration of test pumping 1½ hrs
Water clear or cloudy at end of test clear
Recommended pumping rate 20 G.P.M.
with pump setting of 20 feet below ground surface

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Water Record: Depth(s) at which water(s) found	Water Record: Kind of water (fresh, salty, sulphur)
Clay	0	9		
Loose Stone	9	36	32-36	slight flow
				slight flow

For what purpose(s) is the water to be used? Motel

Is well on upland, in valley, or on hillside? upland

Drilling or Boring Firm Raymond J. Schooley

Address RR 3 Port Colborne

Licence Number 204

Name of Driller or Borer same

Address

Date July 28/61

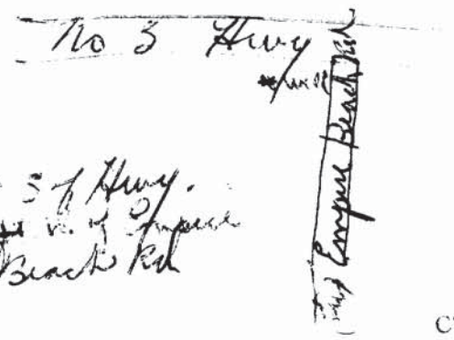
Raymond Schooley
(Signature of Licensed Drilling or Boring Contractor)

Form 7 15M Sets 60-5930

OWRC COPY

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



CSS.58

30 L/14 g

The Ontario Water Resources Commission Act

WATER WELL RECORD

Water management in Ontario

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

11 | 6602546 | MUNICIP. 66003 | CON. CON | 91

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Welland	Humberstone (Port Colborne Con 1)	I	006

[redacted] R.R. #1 Sherkston — DATE COMPLETED: DAY 04 MO. 08 YR. 70

RC. 4 | ELEVATION 0610 | RC. 4 | BASIN CODE 23

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
brown	clay	gravel	dense	0	20
gray	clay		dense	20	35
brown	clay	sand	dense	35	41·9
gray	limestone		layered	41·9	55

31 | 0020 | 0035 | 0042 | 0055

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0050	1 ☐ FRESH 2 ☐ SALTY 3 ☒ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
~~6~~ 06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	~~42~~ 0042
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		42	~~55~~ 0055
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

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

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER | PUMPING RATE: 0002 GPM. | DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
016 FEET	~~055~~ FEET		025 FEET	019 FEET	016 FEET	016 FEET

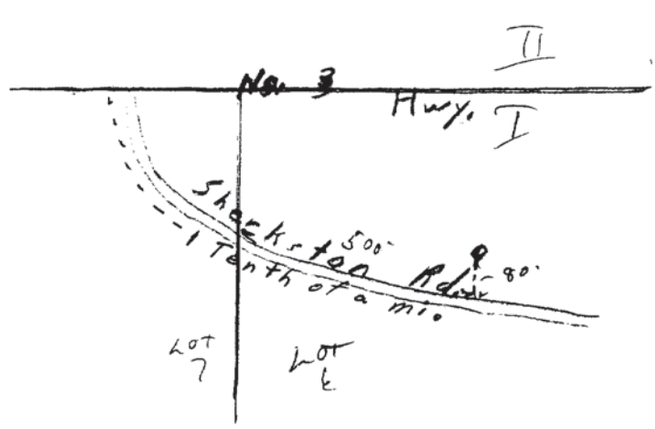
IF FLOWING, GIVE RATE: GPM. | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 054 FEET | RECOMMENDED PUMPING RATE: ~~11~~ 0002 GPM.

50-53 .000 1/ GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

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



DRILLERS REMARKS:

FINAL STATUS OF WELL

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

WATER USE 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Donald Merritt | LICENCE NUMBER: 3640

ADDRESS: RR#1 Smithville

NAME OF DRILLER OR BORER: Donald Merritt | LICENCE NUMBER: 3640

SIGNATURE OF CONTRACTOR: Donald Merritt | SUBMISSION DATE: DAY ____ MO. Sept. YR. 70

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 3640 | DATE RECEIVED: 02 1070

DATE OF INSPECTION: 11, 5, 70 | INSPECTOR: J. C.

REMARKS:

CSS.S8

OWRC COPY

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

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

11 | 0003000 | MUNICIP. 66003 | CON. CON | 20 | 11 | 4G | 0.1

COUNTY OR DISTRICT: Welland
TOWNSHIP, ~~BOROUGH, CITY, TOWN, VILLAGE~~: Port Colborne
CON., BLOCK, TRACT, SURVEY, ETC.: HUMBERSTONE CON 1
LOT: 004
[redacted]
Sugarloaf Road 98
DATE COMPLETED: DAY 26 MO 09 YR 74
RC | ELEVATION | RC | BASIN CODE | II | III | IV
4150045 4 616 4 23 JUN 15, 1977 283

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Clay		Packed	0	11'
Grey	Limestone	Flint		11'	67'

31 | 0011605 | 0067215
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
066	1 ☐ FRESH 3 ☑ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0011
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE		11	0067
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

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

71 PUMPING TEST

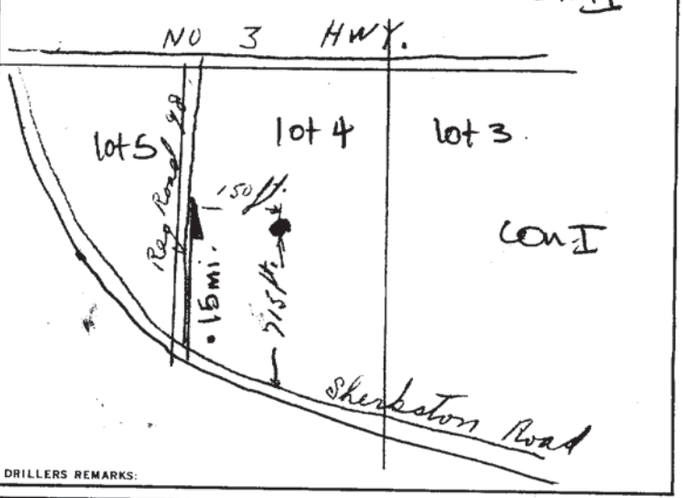
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER
PUMPING RATE: 0012 GPM
DURATION OF PUMPING: ____ HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☑ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
030 FEET	067 FEET		037 FEET	030 FEET	— FEET	— FEET

IF FLOWING, GIVE RATE: ____ GPM
PUMP INTAKE SET AT: ____ FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 065 FEET
RECOMMENDED PUMPING RATE: 0002 GPM
____ GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 5250

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



DRILLERS REMARKS:

FINAL STATUS OF WELL 1

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

WATER USE 01

1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 1

1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Wayne R. McCaffrey Enterprises — LICENCE NUMBER: 3571
ADDRESS: RR # 1 Sherkston
NAME OF DRILLER OR BORER: Leroy Kramer — LICENCE NUMBER: 3210
SIGNATURE OF CONTRACTOR: Wayne R. McCaffrey — SUBMISSION DATE: DAY 25 MO. 9 YR. 74

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 3571 | DATE RECEIVED: 011174
DATE OF INSPECTION: ____ | INSPECTOR: ____
REMARKS: CSS.S8
P 15
WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

WELLAND

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

11

6604208

MUNICIP. 66003 CON. CON 01

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON	BLOCK, TRACT, SURVEY, ETC	LOT
[redacted]	GENEAY		1	4

DATE COMPLETED: DAY 05 MO 07 YR 95

[redacted] EMPIRE RD

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BLACK	TOPSOIL		PACKED	0	2
BROWN	CLAY	COARSE GRAVEL	PACKED	2	12
GREY	LIMESTONE		LAYERED	12	52

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
12	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
26	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
46	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 5/8	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	1.88	0	12
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		12	52
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
	INCHES	FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	2 GPM	1 HOURS 30 MINS

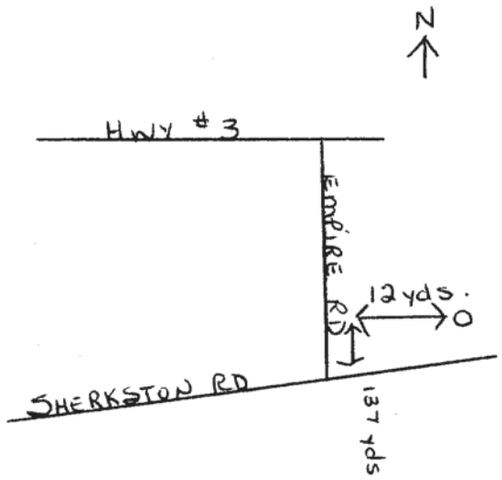
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☒ RECOVERY)	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
8 FEET	50 FEET		16 FEET	13 FEET	13 FEET	13 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	FEET	GPM

LOCATION OF WELL

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



DRILLERS REMARKS: 134504

FINAL STATUS OF WELL	WATER USE	METHOD OF CONSTRUCTION
1 ☒ WATER SUPPLY	1 ☒ DOMESTIC	1 ☒ CABLE TOOL
2 ☐ OBSERVATION WELL	2 ☐ STOCK	2 ☐ ROTARY (CONVENTIONAL)
3 ☐ TEST HOLE	3 ☐ IRRIGATION	3 ☐ ROTARY (REVERSE)
4 ☐ RECHARGE WELL	4 ☐ INDUSTRIAL	4 ☐ ROTARY (AIR)
5 ☐ ABANDONED, INSUFFICIENT SUPPLY	☐ OTHER	5 ☐ AIR PERCUSSION
6 ☐ ABANDONED, POOR QUALITY	5 ☐ COMMERCIAL	6 ☐ BORING
7 ☐ UNFINISHED	6 ☐ MUNICIPAL	7 ☐ DIAMOND
☐ DEWATERING	7 ☐ PUBLIC SUPPLY	8 ☐ JETTING
	8 ☐ COOLING OR AIR CONDITIONING	9 ☐ DRIVING
	9 ☐ NOT USED	☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR	WELL CONTRACTOR'S LICENCE NUMBER
KEN SCHOOLEY	4795
ADDRESS: RR#1 PORT COLBORNE	
NAME OF WELL TECHNICIAN: KEN SCHOOLEY	WELL TECHNICIAN'S LICENCE NUMBER: T-0351
SIGNATURE OF TECHNICIAN/CONTRACTOR: Ken Schooley	SUBMISSION DATE: DAY 22 MO 07 YR 95

OFFICE USE ONLY

DATA SOURCE	CONTRACTOR	DATE RECEIVED
	4795	AUG 15 1995
DATE OF INSPECTION	INSPECTOR	
REMARKS: CSS.ES		

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☑ Metric ☐ Imperial

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

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	City of Port Colborne	darlenesuddard@portcolborne.ca	

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
66 Charlotte St.	Port Colborne	ON	L3K1C8	9058352900

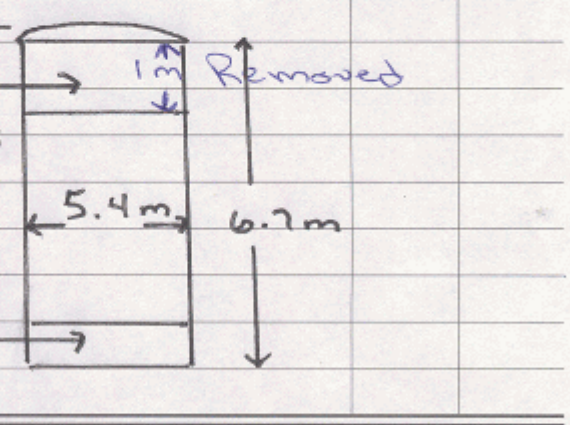
Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
4891 Sherkston Road	Humberstone	5	1

County/District/Municipality	City/Town/Village	Province	Postal Code
City of Port Colborne	Sherkston	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	652259	4749831		

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
Well	Abondonment	Topsoil 7 yards 3 Seed 25 Bags 318 Heleping			

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.3	Topsoil	7 yards
.3	.9	3/8 Hole plug	25 Bags
.9	5.79	3/4 clear stone	20 Tonnes

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	6.7	5.4m

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

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

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

Recommended pump depth *(m/ft)*

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

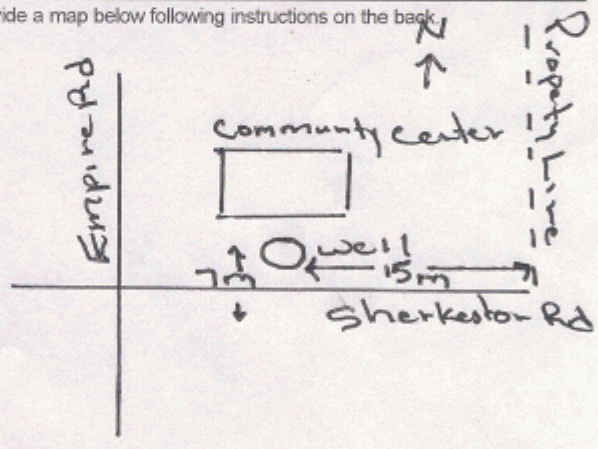
Well production *(l/min / GPM)*

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			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.
Circle Eddy's Drilling	7294

Business Address (Street Number/Name)	Municipality
108 Queen st South Thorold	Mingra

Province	Postal Code	Business E-mail Address
Ontario	L2V3N9	

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9052275472	Gladitsky Edward

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T-2099	Edward Gladitsky	2011 09 18

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2011 09 16	2011 09 03

Ministry Use Only

Audit No. z131254

Received NOV 01 2011

0506E (2007/12) © Queen's Printer for Ontario, 2007

Ministry's Copy

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well (Sticker and/or Print Below) **A 091769**

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Address of Well Location (Street Number/Name)	Township	Lot	Concession
RR#1 4518 SHERKSTON RD	SHERKSTON	6	1

County/District/Municipality	City/Town/Village	Province	Postal Code
NIAGARA	SHERKSTON	Ontario	L0S 1R0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	651616	4750413		

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	CLAY		PACKED	0	30
BROWN	CLAY	FINE GRAVEL	PACKED	30	39
GREY	LIMESTONE		LAYERED	39	51

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	20	BENTONITE	35 gal.

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 5/8"	STEEL	1.88	0	39'6"
6	OPEN HOLE		39'6"	51

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
49 (m/ft) ☐ Gas	☑ Other, specify SULPHUR	0	20	8"
(m/ft) ☐ Gas	☐ Other, specify			
(m/ft) ☐ Gas	☐ Other, specify			

(Kind of Water: ☐ Fresh ☐ Untested)

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 40

Pumping rate (l/min / GPM): 16

Duration of pumping: 6 hrs + 0 min

Final water level end of pumping (m/ft): 36

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

Recommended pump depth (m/ft): 45

Recommended pump rate (l/min / GPM):

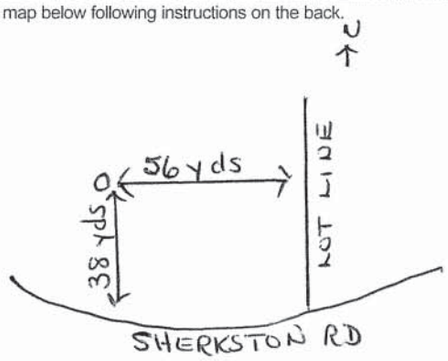
Well production (l/min / GPM): 16

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	13			36'2"
1	17'6"		1	27'8"
2	20'1"		2	26'5"
3	22'5"		3	25'4"
4	24'3"		4	24'9"
5	25'7"		5	24'3"
10	28'		10	23'1"
15	29'9"		15	21'10"
20	31'4"		20	21'7"
25	32'6"		25	20'5"
30	33'1"		30	20'3"
40	34'5"		40	19'6"
50	35'7"		50	18'9"
60	36'2"		60	18'4"

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.
SCHOOLEY WATER WELL DRILLING & SERVICE	4795

Business Address (Street Number/Name)	Municipality
2387 HOUSE ROAD	NIAGARA

Province	Postal Code	Business E-mail Address
ON	L0S 1S0	aschooley@bell.net

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9053820720	SCHOOLEY KEN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0351		20121010

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	20121009	20100005

Ministry Use Only

Audit No. Z105937

Received OCT 15 2012

0506E (12/2007) — Ministry's Copy

© Queen's Printer for Ontario, 2007

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

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

Tag#: A193290

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
	R J Farms		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
5080 Sherkston Rd	Niagara	ON	L0S1R0	9058948869

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
5080 Sherkston Rd	Sherkston		

County/District/Municipality	City/Town/Village	Province	Postal Code
Niagara	Sherkston	Ontario	L0S1R0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	0652564	7499977		

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	DIRT		LOOSE	0	2
BROWN	CLAY		LOOSE	2	6
BROWN	CLAY		PACKED	6	20
GREY	COARSE GRAVEL		LOOSE	20	21
GREY	LIMESTONE		LAYERED	21	36

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)
20	0	BENTONITE	35 gal

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 5/8	STEEL	1.88	0	22
6	OPEN HOLE		22	36

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
34	☑ Fresh ☐ Untested	☐	☐
	☐ Fresh ☐ Untested	☐	☐
	☐ Fresh ☐ Untested	☐	☐

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	20	8

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 34

Pumping rate (l/min / GPM): 16

Duration of pumping: 4 hrs + 0 min

Final water level end of pumping (m/ft): 25'9"

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

Recommended pump depth (m/ft): 33

Recommended pump rate (l/min / GPM):

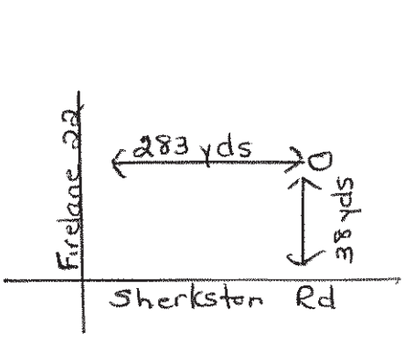
Well production (l/min / GPM): 16

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		14		25'9"
1	1	18'	1	22'5"
2	2	19'2"	2	21'6"
3	3	21'4"	3	21'2"
4	4	21'9"	4	20'10"
5	5	22'5"	5	20'6"
10	10	22'9"	10	20'1"
15	15	23'4"	15	19'8"
20	20	24'3"	20	19'2"
25	25	24'10"	25	18'8"
30	30	25'1"	30	18'2"
40	40	25'9"	40	18'
50	50	25'9"	50	17'7"
60	60	25'9"	60	17'4"

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.
Schooley Water Well Drilling	4795

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
2387 House Rd	Stevensville	ON	L0S1S0	aschooley@bell.net

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
9053820720	Schooley, Ken	0351	Ken Schooley	20160719

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	20160719	20160711

Ministry Use Only

Audit No Z220594

Received JUL 25 2016

0506E (2014/11)

Ministry's Copy

© Queen's Printer for Ontario, 2014

Ontario — Ministry of the Environment, Conservation and Parks

Well ... Below)

Tag#:A324370

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☑ Well Constructed by Well Owner
Lisa Marie	Cuoto		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
900 Empire Rd	Port Colborne	Ontario	L0S1R0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
900 Empire Rd	Sherbrooke	Pt Lots	Conl

County/District/Municipality	City/Town/Village	Province	Postal Code
	Port Colborne	Ontario	L0S1R0

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	631619	4751020		

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	Topsoil		unconsolidated	0	2'
Grey	clay		soft	2'	23'
Grey	stone		fractured	23'	90'
Black	Flint		fractured	90'	105'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	20	Bentonite	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6.25	Steel	188	+16"	23'
6.25	Open		23'	105'

Construction Record - Screen

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

Status of Well

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

Water Details

Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☑ Untested ☐ Other, specify
97		
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	20	10"
20	105	6.25

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft): 100'

Pumping rate (l/min / GPM): 10gpm

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 31.7

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

Recommended pump depth (m/ft): 100'

Recommended pump rate (l/min/GPM): 15-20gpm

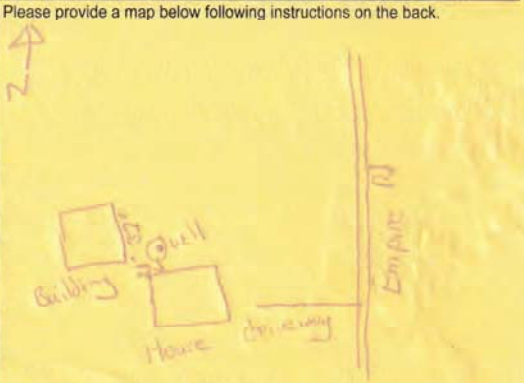
Well production (l/min/GPM): >10gpm

Disinfected? ☑ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level		11'		31.7
1		14.8'	1	27.3
2		17.3'	2	24.2
3		20.1	3	21.9
4		22.9	4	19.3
5		24.5	5	17.9
10		30.6	10	16.4
15		31.7	15	15.1
20		31.7	20	13.9
25		31.7	25	11.3
30		31.7	30	11'
40		31.7	40	11'
50		31.7	50	11'
60		31.7	60	11'

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.
Ted van der Zalm Well Drilling	7111

Business Address (Street Number/Name)	Municipality
840 Concession 2 Rd	Niagara on the Lake

Province	Postal Code	Business E-mail Address
Ontario	L0S1J0	tedvanderzalmwelldrilling.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
289 686 7193	van der Zalm, Nathaniel

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
31915		2023/11/09

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2023/11/09

Ministry Use Only

Audit No. Z371743

Received

0506E (2020/06) © Queen's Printer for Ontario, 2020

Contractor's Copy

Form No. 2 1M-Jan. 1947-(A3601)

UTM Z E

9 R N

Elev. 9 R 0613

Basin 23

63

ONTARIO

The Well Drillers Act

Department of Mines, Province of Ontario

66 No. 744

RECEIVED
MAR 30 1948
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

Water Well Record

[redacted] City Port Colborne

[redacted] stone) Con. 1 Lot 5 Pt. Lot

[redacted] Colborne Acres 1/2 acre

[redacted] luding pump) $94.00

Pipe and Casing Record

Casing diameter(s) 6"

Length(s) of casing(s) 14'

Length of screen

Type of screen

Type of pump

Capacity of pump

Depth of pump setting

Pumping Test

Date

Developed Capacity

Duration of Test

Pumping Rate

Drawdown

Static level of completed well 15'

Is well a gravel-wall type?

Water Record

Kind (fresh or mineral) fresh

Quality (hard, soft, contains iron, sulphur etc.) hard

Appearance (clear, cloudy, coloured) clear

For what purpose(s) is the water to be used? Household

How far is well from possible source of contamination? none near

What is source of contamination?

Enclose a copy of any mineral analysis that has been made of water

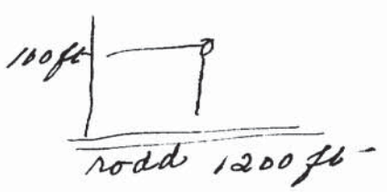
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
~~15~~ 27'	good	12'

Well Log

Drift and Bedrock Record	From	To
	0 ft.	ft.
Sand	0	14'
Flint rock		13'
Sand 0'–14'		
Flint-Rock 14'–27'		

Location of Well

In diagram below show distances of well from road and **lot** line



Situation: Is well on upland, in valley, or on hillside? upland

Drilling Firm A. W. Eaton

Address 630 Elm St Humberstone

Recorded by Self Address

Date March 17-1948 Licence Number 207

CSS.S8

UTM | | Z | | | | | | | E
| 9 | R | | | | | | | | N
Elev. | 9 | R | 06 | 12
Basin | 23 | | | |

36

66 No. 745

ONTARIO

The Well Drillers Act

Department of Mines, Province of Ontario

RECEIVED
JUN 15 1948
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

Water Well Record

[redacted] Port Colborne

...arbarosa Con. 1 Lot 5 & 6 Pt. Lot .....

...enhorst Acres 5-5

Date Completed June 10 Cost of Well (not including pump) 85-00

Pipe and Casing Record

Casing diameter(s) 6"
Length(s) of casing(s)
Length of screen
Type of screen
Type of pump
Capacity of pump
Depth of pump setting

Pumping Test

Date
Developed Capacity
Duration of Test
Pumping Rate
Drawdown
Static level of completed well 10'
Is well a gravel-wall type?

Water Record

Kind (fresh or mineral) fresh Contains Gypsum
Quality (hard, soft, contains iron, sulphur etc.) Sulphur
Appearance (clear, cloudy, coloured) Clear
For what purpose(s) is the water to be used? Stock
How far is well from possible source of contamination?
What is source of contamination?
Enclose a copy of any mineral analysis that has been made of water

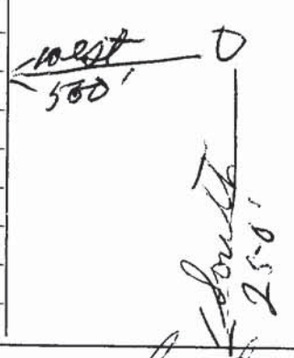
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
1st 31	fresh	21

Well Log

Drift and Bedrock Record	From	To
13 feet surface	0 ft.	ft.
18 feet flint Rock		
31		

Location of Well

In diagram below show distances of well from road and **lot** line



Situation: Is well on upland, in valley, or on hillside? Level

Drilling Firm Frank Kelly

Address Port Colborne

Recorded by ..... Address .....

Date June 12 Licence Number 252 CSS.S8

UTM Z E
R N
Elev. R 0615
Basin 23

ONTARIO

The Well Drillers Act
Department of Mines, Province of Ontario

66 No 749

Water Well Record

PORT COLBORNE

[redacted], ~~Village, Town or City~~ (Humberstone Twp.)
~~own or City~~) Sherkston, Ont.
Date Completed 14 (day) Aug (month) 1952 (year) Cost of Well (excluding pump) 196.00

Pipe and Casing Record

Casing diameter(s) 6"
Length(s) of casing(s) 24 ft
Type of screen —
Length of screen —
Distance from top of screen to ground level —
Is well a gravel-wall type? —

Pumping Test

Date Aug. 14
Static level 30 ft
Pumping level 20 ft
Pumping rate 3 gal. per min.
Duration of test 1/2 hour
Distance from cylinder or bowls to ground level —

Water Record

Kind (fresh or mineral) Mineral
Quality (hard, soft, contains iron, sulphur, etc.) Sulphur
Appearance (clear, cloudy, coloured) clear
For what purpose(s) is the water to be used? domestic
How far is well from possible source of contamination? —
What is the source of contamination? —
Enclose a copy of any mineral analysis that has been made of water —

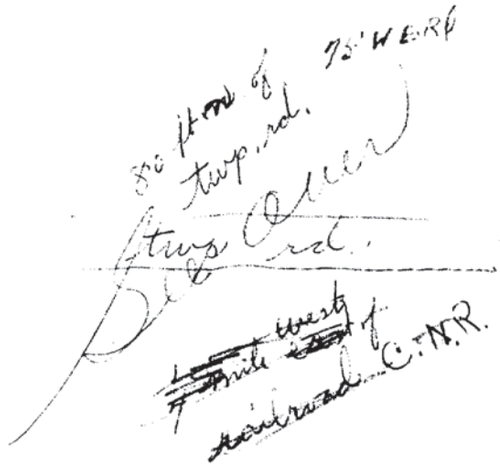
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
49 ft	Sand	29 ft
	Supply	

Well Log

Overburden and Bedrock Record	From	To
clay loam	0 ft.	24 ft.
Flint	24 ft	49 ft

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Situation: Is well on upland, in valley, or on hillside? upland
Drilling Firm Raymond Schooley
Address R. 3 Pt. Colborne
Name of Driller Raymond Schooley Address R. 3 Pt. Colborne
Date Aug. 25/52 Licence Number 362

Raymond Schooley
Signature of Licensee

FORM 5

CSS.S8

UTM Z E
R N
Elev. R 0 6 6
Basin 2 3

ONTARIO

The Water-well Drillers Act, 1954
Department of Mines

66 No. 755

RECEIVED
DEC - 1954
GEOLOGICAL BRANCH
DEPARTMENT of MINES

Water-Well Record

County or Territorial District ..... Welland ..... ~~Township, Village, Town or City~~ ..... (Humberstone) PORT COLBORNE

[redacted] n Village, Town or City) .....

Address ..... Sherkston Ontario

(day) (month) (year)

Pipe and Casing Record

Casing diameter(s) 5 5/8
Length(s) ..... 19 ft.
Type of screen .....
Length of screen .....

Pumping Test

Static level ..... 15 ft.
Pumping rate ..... 5 gal per min
Pumping level ..... 15 ft.
Duration of test ..... 20 minutes

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, or sulphur)
Clay	0	19	38 ft.	23 ft.	fresh
Flint	19	38			~~sulphur~~

Water Record

For what purpose(s) is the water to be used? Domestic

Is water clear or cloudy? clearing

Is well on upland, in valley, or on hillside? Hillside

Drilling firm ..... Knoll & Hallberg

Address ..... R. R. 1 Port Colborne

Name of Driller ..... Leonard Hallberg

Address ..... R.R.1 Port Colborne

Licence Number 738

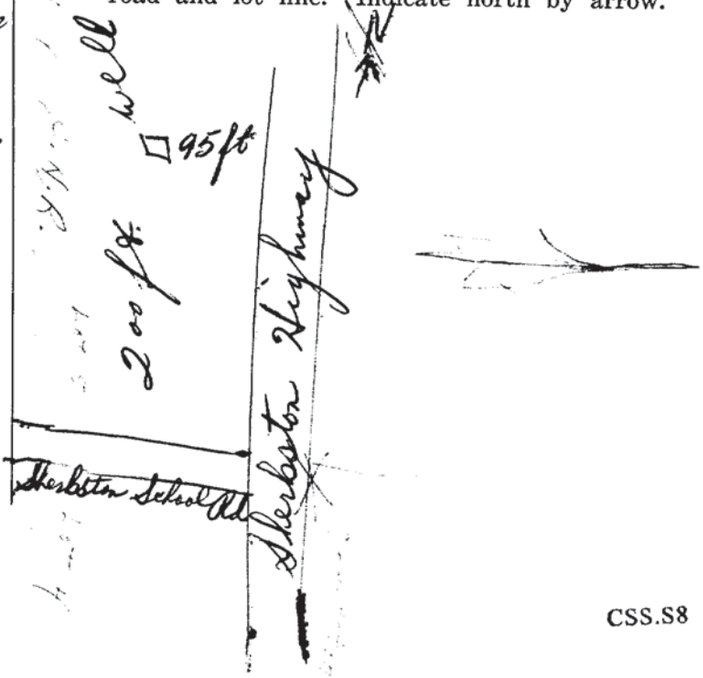
I certify that the foregoing statements of fact are true.

Date Dec 3 ..... Leonard Hallberg

Signature of Licensee

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 5

CSS.S8

Appendix B

Water Well and Septic System Survey and Survey Reponses

Terra-Dynamics Consulting Inc.
432 Niagara Street, Unit 2 St. Catharines, ON L2M 4W3

January, 2024

Dear Resident:

On behalf of Mr. Hassan Kurabi, Terra-Dynamics Consulting Inc. is completing a water well and septic system survey as part of a Hydrogeological Study of 4838 Sherkston Road, Port Colborne. This is a survey of properties in the vicinity of 4838 Sherkston Road, as shown on the attached map (Site). We are seeking to map nearby private wells in order to ensure protection of water quantity and quality as part of future residential development. This well and septic system survey is a recommended part of a hydrogeologic, or groundwater, study of the subject lands which informs water supplies and septic system designs and locations. This is a standard questionnaire for properties on private services.

The purpose of this survey is to collect information on private or residential water wells, cisterns and septic systems within approximately 100 metres of the Site (as shown by the outline on the attached map). **Participation is voluntary.** Participation involves completing the attached questionnaire on municipal, well and/or cistern use, groundwater quantity, quality and your septic system. Please complete it as best as you can. Please fill out the questionnaire and mail it back to Terra-Dynamics Consulting Inc. in the self-addressed and stamped envelope. The information you provide will be summarized in our report and personal information (e.g. name, address, etc.) will be kept confidential and will not be included in our report.

If you have any questions about the questionnaire, please contact Briar MacIntyre at 905-906-2311 or via email at bmacintyre@terra-dynamics.com.

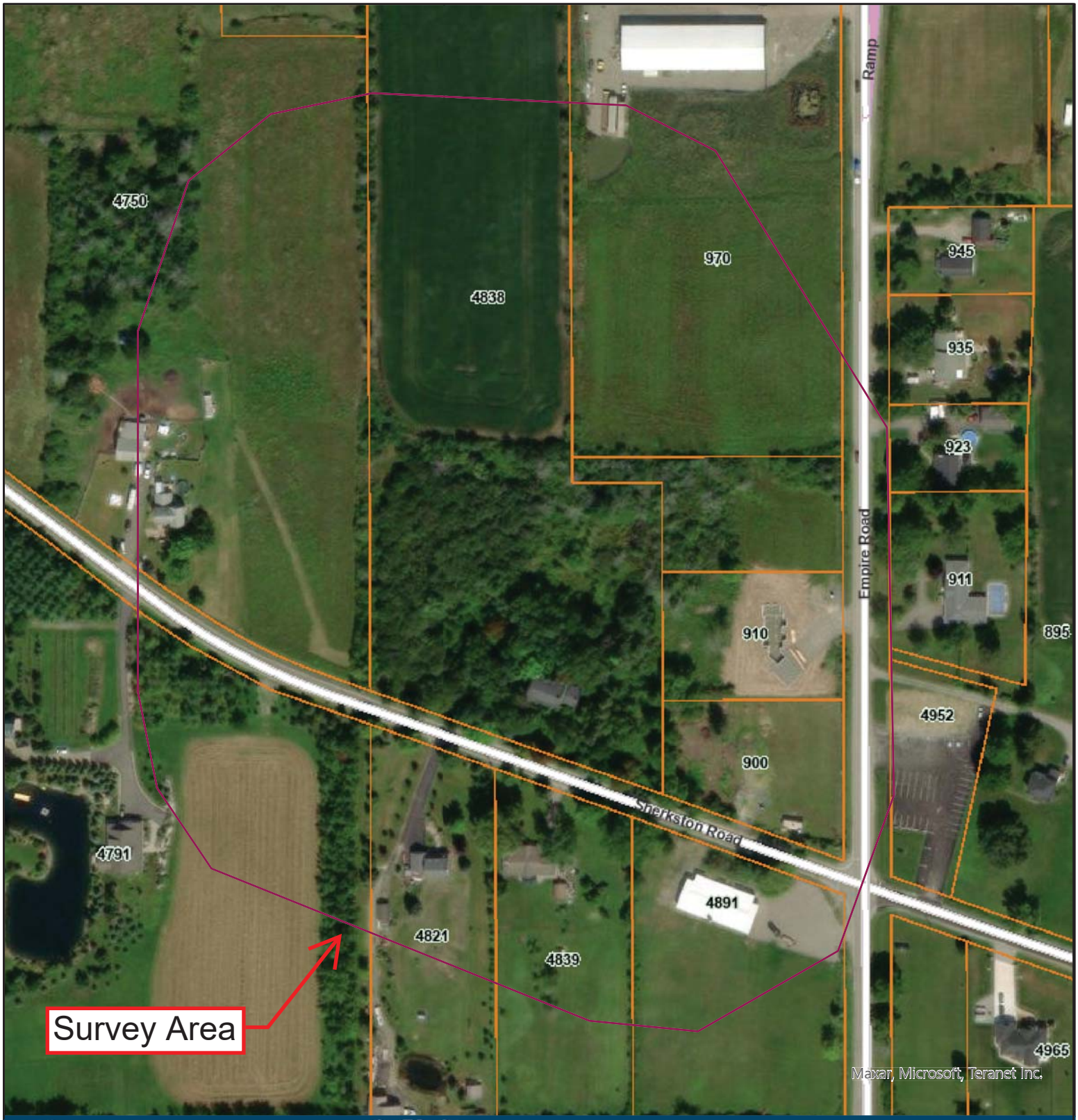
Thank you in advance for your assistance.

Yours truly,

TERRA-DYNAMICS CONSULTING INC.

Briar MacIntyre

Briar MacIntyre, P.Geo.
Environmental Geologist



Niagara Region NAVIGATOR

Niagara Navigator

Legend

100m_Line

Address Points

Water Well and Septic System Survey Area - 100 m from 4838 Sherkston Road

0 0.03 0.05 0.1 0.15 0.2 km

Date: 2024-01-04 Time: 2:44 PM

© 2023 Niagara Region and its suppliers. Projection is UTM, NAD 83, Zone 17. The Niagara Region makes no representations or warranties whatsoever, either expressed or implied, as to the accuracy, completeness, reliability,currency or otherwise of the information shown on this map.

Terra-Dynamics Consulting Inc.
432 Niagara Street, Unit 2 St. Catharines, ON L2M 4W3

WATER WELL SURVEY FORM

Date:_____

Contact Person:_____

Property Address:_____

Telephone: _____

Email (if further information requested): _____

1.0 GENERAL QUESTIONS

Do you know your drinking water source? Please circle one or more of the following three options:

1.Well (20+ feet casing) 2.Shallow Well (less than 20 feet of casing)
3.Cistern 4. Municipal

Further comments:

_____

_____

Use page 3 or a separate sheet of paper for additional comments.

If your water supply is from a cistern, the rest of the questions do not apply. If you have both a cistern and a well, please complete the well questionnaire (Section 2.0 or 3.0). Please let us know where your place is located either on the supplied map or the area for a sketch on the second last page of this form. Please mail the completed form back to Terra-Dynamics in the provided envelope. Thank you for your assistance.

- If you have a drilled deep well (20+ feet of casing) please complete Sections 2 & 4
- If you have a shallow well (less than 20 feet of casing), please complete Sections 3&4

2.0 DRILLED WELL (greater than 20 feet of casing)

How deep is your well?_____

Is your well drilled into rock?_____What is the well casing diameter?_____

Do you know when your well was drilled?_____

Do you know the name of the well driller?_____

905-646-7931 Fax: 905-935-0397 www.terra-dynamics.com

Do you have a well log? (i.e. a description of the geology encountered when drilling your well and if yes, can you supply a copy or write down the information in the Comments Section).

_____

What is the use of your well water? (i.e. drinking water for house, garden irrigation, etc.)

_____

Has your well ever run dry? _____

Do you experience problems with taste, colour or odour? (if yes, please explain).

_____

Do you have any water purification systems for your well water? (i.e. water softeners, UV Light for bacteria, Sulphur/Iron Filter for odour or staining, etc.).

_____

Do you perform regular maintenance on your well? (i.e. pump service, silt removal, etc.)

_____

3.0 SHALLOW WELL (less than 20 feet of casing)

What is the well casing material and diameter? _____

What is the expected age of the well? _____

How deep is the well? _____

Does you utilize a jet pump or a submersible pump?_____

Is there problems with water quality (colour, odour, etc.)? Yes_____ No_____

If yes, please explain_____

Do you have any water purification systems for your dug well water? (i.e. water softeners, UV Light for bacteria, Sulphur/Iron Filter for odour or staining, etc.).

_____

Have you ever experienced freeze-up during the winter?_____

What is the use of your shallow dug well water? (i.e. drinking water for house, irrigation, etc.)

_____

Has your dug well ever run dry?

_____

Do you perform regular maintenance on your pump? (i.e. pump service, silt removal)

_____

Additional comments:_____

4.0 LOCATION MAP

Can you please draw a sketch map of the location of your well(s), septic tank and sewage bed on your property (please show the location relative to buildings and roads).

SKETCH MAP OF WELL(S) and SEWAGE SYSTEM LOCATIONS

Other Comments: (Use a separate sheet, if required)

Please mail the completed form back to Terra-Dynamics in the provided envelope.
Thank you for your help.

Briar MacIntyre, P. Geo., Environmental Geologist
432 Niagara Street, Unit 2, St. Catharines, ON L2M 4W3
905-906-2311

Terra-Dynamics Consulting Inc.
432 Niagara Street, Unit 2 St. Catharines, ON L2M 4W3

WATER WELL SURVEY FORM

Date: Jan 10, 2024

Contact Person: [redacted]

Property Address: 4791 Sherkston Rd

Telephone: [redacted]

Email (if further information requested): [redacted]

1.0 GENERAL QUESTIONS

Do you know your drinking water source? Please circle one or more of the following three options:

1.Well (20+ feet casing) 2.Shallow Well (less than 20 feet of casing)
3.Cistern 4. Municipal

Further comments: Water truck delivery - water source - Port Colborne

Use page 3 or a separate sheet of paper for additional comments.

If your water supply is from a cistern, the rest of the questions do not apply. If you have both a cistern and a well, please complete the well questionnaire (Section 2.0 or 3.0). Please let us know where your place is located either on the supplied map or the area for a sketch on the second last page of this form. Please mail the completed form back to Terra-Dynamics in the provided envelope. Thank you for your assistance.

- If you have a drilled deep well (20+ feet of casing) please complete Sections 2 & 4
- If you have a shallow well (less than 20 feet of casing), please complete Sections 3&4

2.0 DRILLED WELL (greater than 20 feet of casing)

How deep is your well?_____

Is your well drilled into rock?_____What is the well casing diameter?_____

Do you know when your well was drilled?_____

Do you know the name of the well driller?_____

905-646-7931 Fax: 905-935-0397 www.terra-dynamics.com

Do you have a well log? (i.e. a description of the geology encountered when drilling your well and if yes, can you supply a copy or write down the information in the Comments Section).

_____

What is the use of your well water? (i.e. drinking water for house, garden irrigation, etc.)

_____

Has your well ever run dry? _____

Do you experience problems with taste, colour or odour? (if yes, please explain).

_____

Do you have any water purification systems for your well water? (i.e. water softeners, UV Light for bacteria, Sulphur/Iron Filter for odour or staining, etc.).

_____

Do you perform regular maintenance on your well? (i.e. pump service, silt removal, etc.)

_____

3.0 SHALLOW WELL (less than 20 feet of casing)

What is the well casing material and diameter? _____

What is the expected age of the well? _____

How deep is the well? _____

Does you utilize a jet pump or a submersible pump?_____

Is there problems with water quality (colour, odour, etc.)? Yes_____ No_____

If yes, please explain_____

Do you have any water purification systems for your dug well water? (i.e. water softeners, UV Light for bacteria, Sulphur/Iron Filter for odour or staining, etc.).

_____

Have you ever experienced freeze-up during the winter?_____

What is the use of your shallow dug well water? (i.e. drinking water for house, irrigation, etc.)

_____

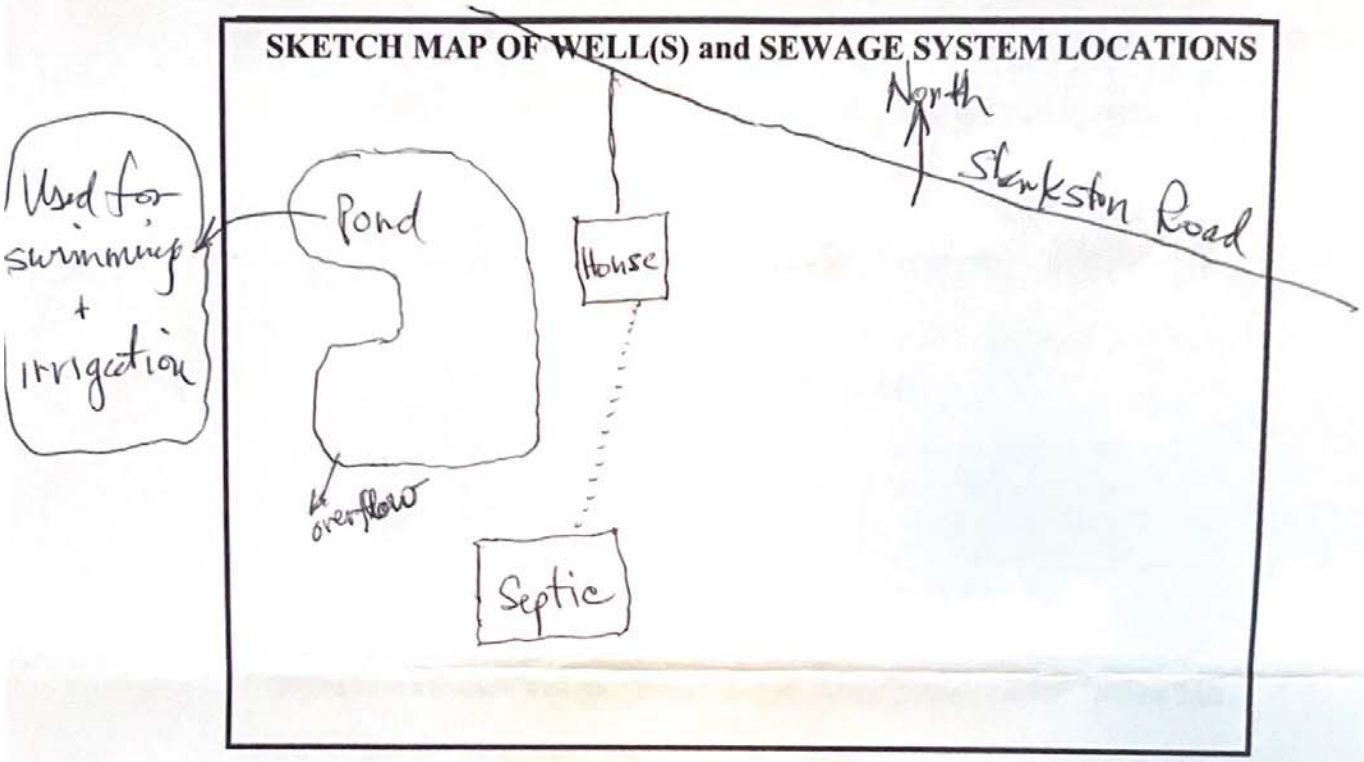
Has your dug well ever run dry?

Do you perform regular maintenance on your pump? (i.e. pump service, silt removal)

Additional comments:

4.0 LOCATION MAP

Can you please draw a sketch map of the location of your well(s), septic tank and sewage bed on your property (please show the location relative to buildings and roads).



Other Comments: (Use a separate sheet, if required)

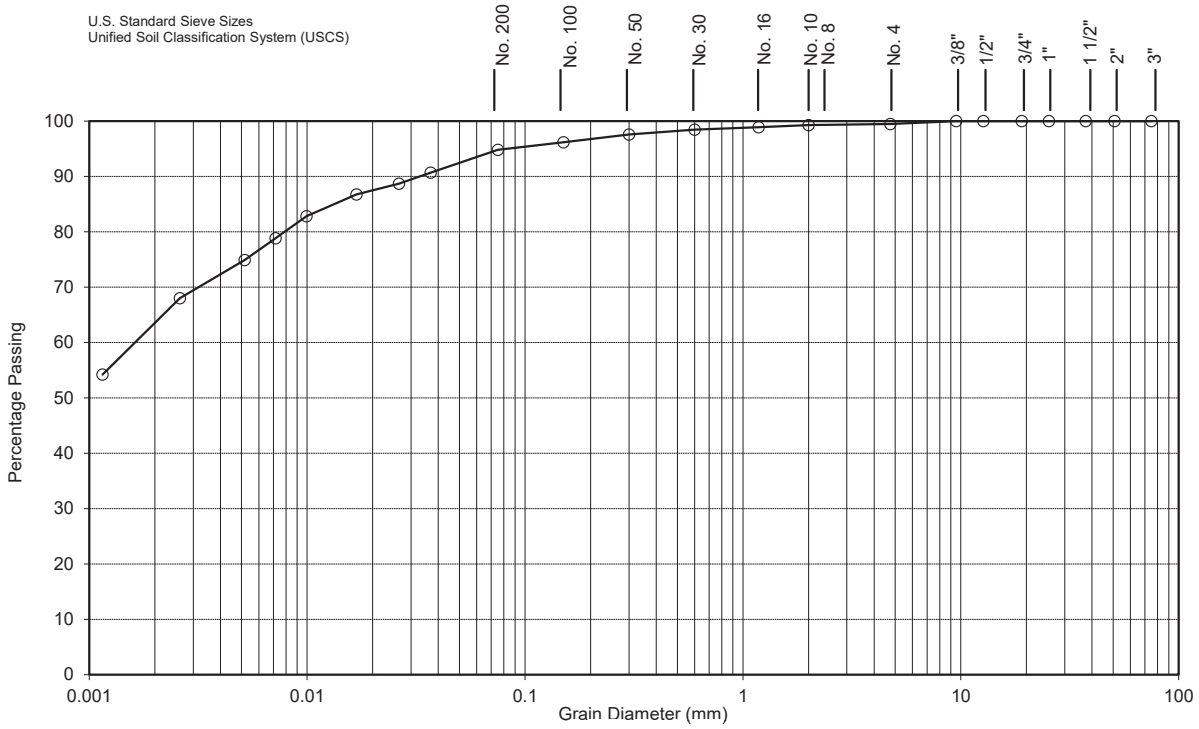
Please mail the completed form back to Terra-Dynamics in the provided envelope.
Thank you for your help.

Jayme D. Campbell, P. Eng., Senior Water Resource Engineer
432 Niagara Street, Unit 2, St. Catharines, ON L2M 4W3
905-906-2311

Appendix C

Hydraulic Conductivity Analyses

Mechanical & Hydrometer Analyses



CLAY	SILT	FINE	MEDIUM	COARSE	FINE	COARSE
		SAND			GRAVEL	

Lab No.:	**24-053-G**	Notes: Sampled on January 23 @ 10 AM			
Borehole No.:					
Sample No.:	**HA-103**				
CLAY [%]:	**63**	Soil Description:	**Reddish Brown Silty Clay w/ a trace of Sand**		
SILT [%]:	**32**		**C.L. - Silty clays to M.L. - Inorganic silts and very fine sands**		
SAND [%]:	**5**				
GRAVEL [%]:	**0**	Estimated Infiltration Rate [mm/hr] :	**< 5**	Estimated Permeability, k [cm/s]	**10^{-8}**
D_{10} (Effective Diam. in mm):	**0.0001**	Coefficient of Uniformity C_U:	**17.0**	Coefficient of Curvature C_C:	**0.5**

SOIL-MAT ENGINEERS & CONSULTANTS LTD.

4838 Sherkston Road, Sherkston ON

February 2024	**Grain Size Analysis No. 1**	**Project No.: SM 230001-T**

K from Grain Size Analysis Report

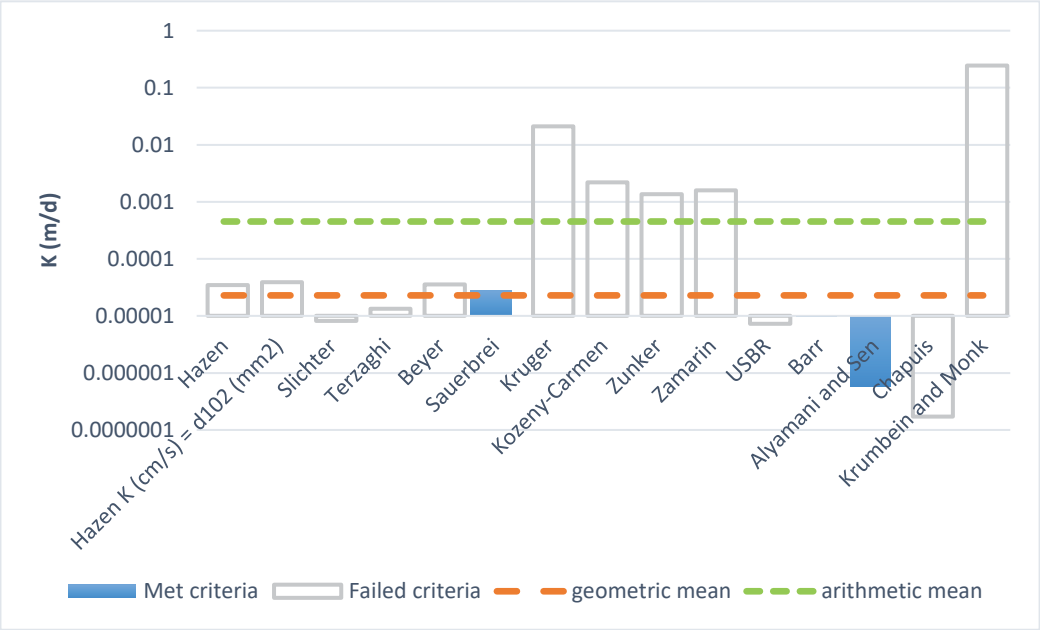
Date: 30-Jan-24

Sample Name: HA-103, 4838 Sherkston Rd, 2024-01-23

Mass Sample (g): 208.5

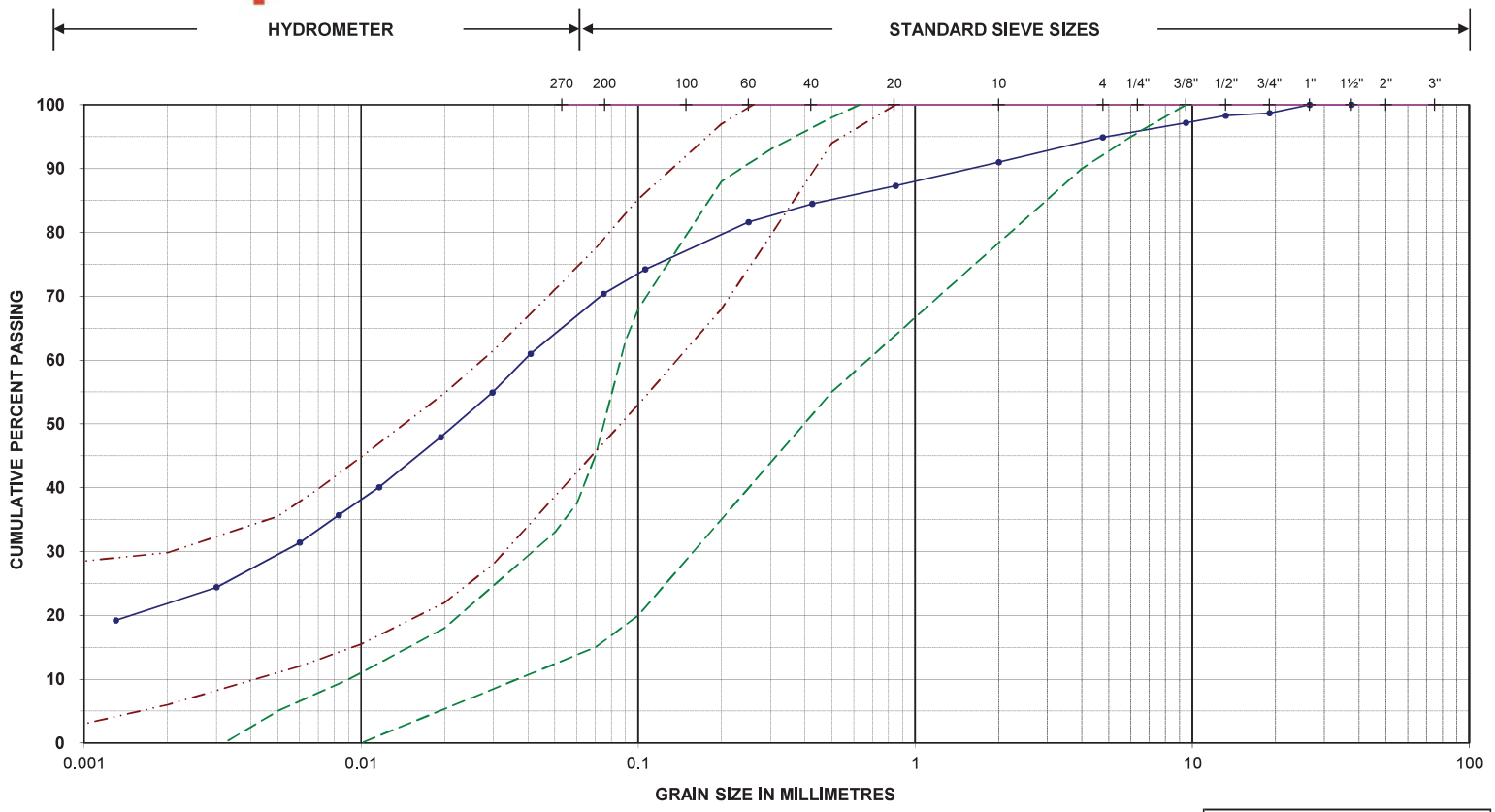
T (oC) 20

Poorly sorted clay with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	.401E-07	.401E-09	0.00	
Hazen K (cm/s) = d_{10} (mm)	.451E-07	.451E-09	0.00	
Slichter	.946E-08	.946E-10	0.00	
Terzaghi	.155E-07	.155E-09	0.00	
Beyer	.414E-07	.414E-09	0.00	
Sauerbrei	.317E-07	.317E-09	0.00	
Kruger	.242E-04	.242E-06	0.02	
Kozeny-Carmen	.254E-05	.254E-07	0.00	
Zunker	.157E-05	.157E-07	0.00	
Zamarin	.183E-05	.183E-07	0.00	
USBR	.837E-08	.837E-10	0.00	
Barr	.112E-07	.112E-09	0.00	
Alyamani and Sen	.678E-09	.678E-11	0.00	
Chapuis	.199E-09	.199E-11	0.00	
Krumbein and Monk	.284E-03	.284E-05	0.25	
Shepherd	.205E-05	.205E-07	0.00	
geometric mean	6.E-09	6.E-11	0.00	
arithmetic mean	1.E-08	1.E-10	0.00	

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

GRAVEL	5	%
SAND	24	%
SILT	49	%
CLAY	22	%

---------- sm envelope T = 8 - 20 min/cm

- - - - - - ml envelope T = 20 - 50 min/cm

Estimated T = 45 min/cm

Sandy Clayey Silt, Trace Gravel

Project Name: 970 Empire Road

Location ID.: TP18-2

Project No.: 181-16552-00

Sample No./Depth: SS2 / 0.30 m to 1.98 m

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
26.5 mm	100.0	0.850 mm	87.3	0.041	61.0
13.2 mm	98.3	0.425 mm	84.5	0.019	47.9
9.50 mm	97.2	0.250 mm	81.6	0.008	35.7
4.75 mm	94.9	0.106 mm	74.2	0.003	24.4
2.00 mm	91.0	0.075 mm	70.4	0.001	19.2

K from Grain Size Analysis Report

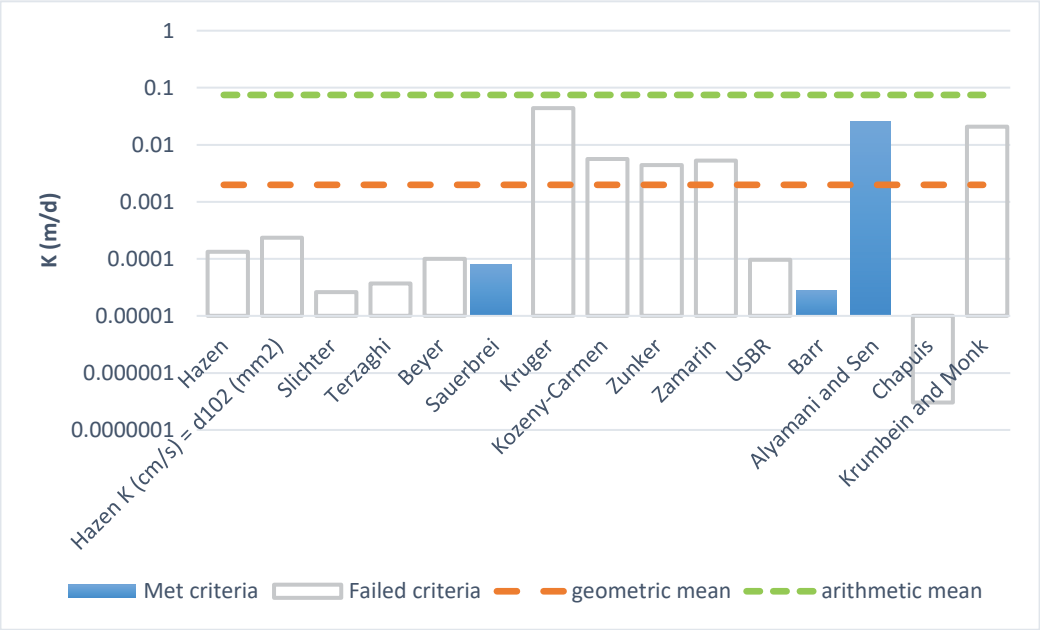
Date: 30-Jan-24

Sample Name: TP 18-2, WSP 970 Empire Road, 2018-12-18

Mass Sample (g): 100

T (oC) 20

Poorly sorted sandy silt with fines



Estimation of Hydraulic Conductivity	cm/s	m/s	m/d	de
Hazen	.154E-06	.154E-08	0.00	
Hazen K (cm/s) = d_{10} (mm)	.271E-06	.271E-08	0.00	
Slichter	.302E-07	.302E-09	0.00	
Terzaghi	.430E-07	.430E-09	0.00	
Beyer	.115E-06	.115E-08	0.00	
Sauerbrei	.919E-07	.919E-09	0.00	
Kruger	.507E-04	.507E-06	0.04	
Kozeny-Carmen	.651E-05	.651E-07	0.01	
Zunker	.507E-05	.507E-07	0.00	
Zamarin	.612E-05	.612E-07	0.01	
USBR	.111E-06	.111E-08	0.00	
Barr	.324E-07	.324E-09	0.00	
Alyamani and Sen	.295E-04	.295E-06	0.03	
Chapuis	.353E-09	.353E-11	0.00	
Krumbein and Monk	.239E-04	.239E-06	0.02	
Shepherd	.316E-03	.316E-05	0.27	
geometric mean	4.E-07	4.E-09	0.00	
arithmetic mean	1.E-05	1.E-07	0.01	

Appendix D

Laboratory Analyses

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

08-February-2024

Terra-Dynamics Consulting Inc.
Attn : David Slaine

432 Niagara Street, Unit 2
St. Catharines, ON
L2M 4W3, Canada

Phone: 905-646-7931
Fax:

Date Rec. : 24 January 2024
LR Report: **CA13711-JAN24**
Reference: 4838 Sherkston

Copy: #2

CERTIFICATE OF ANALYSIS

Final Report - Revised

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: MAC	6: AO/OG	7: 4838 Sherkston (Dug Well)
Sample Date & Time							23-Jan-24 13:00
Temp Upon Receipt [°C]	---	---	---	---	---	---	8.0
Total Coliform [cfu/100mL]	24-Jan-24	14:10	26-Jan-24	13:44	0	---	32
E.coli [cfu/100mL]	24-Jan-24	14:10	26-Jan-24	13:44	0	---	0
HPC [cfu/1mL]	24-Jan-24	14:10	26-Jan-24	13:44	---		620
UV Transmittance [%T]	29-Jan-24	14:07	30-Jan-24	10:00	---	---	84.9
Alkalinity [mg/L as CaCO3]	24-Jan-24	15:24	25-Jan-24	11:01	---	30-500	341
HCO3 [mg/L as CaCO3]	24-Jan-24	15:24	25-Jan-24	11:01	---	---	341
CO3 [mg/L as CaCO3]	24-Jan-24	15:24	25-Jan-24	11:01	---	---	< 2
OH [mg/L as CaCO3]	24-Jan-24	15:24	25-Jan-24	11:01			< 2
Colour [TCU]	25-Jan-24	09:10	26-Jan-24	09:34	---	5	6
Conductivity [uS/cm]	24-Jan-24	15:24	25-Jan-24	11:01	---	---	651
pH [No unit]	24-Jan-24	15:24	25-Jan-24	11:01	---	6.5-8.5	7.97
TSS [mg/L]	24-Jan-24	13:59	25-Jan-24	13:19	---	---	3
Turbidity [NTU]	24-Jan-24	19:55	25-Jan-24	09:06	1	5	1.1
Organic N [mg/L]	24-Jan-24	16:57	29-Jan-24	08:54	---	0.15	0.26
TKN [as N mg/L]	24-Jan-24	16:57	29-Jan-24	08:54	---	---	0.27
NH3+NH4 [as N mg/L]	24-Jan-24	18:29	25-Jan-24	14:00	---	---	< 0.04

OnLine LIMS

0003615347

Results relate only to the sample tested. Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA13711-JAN24**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: MAC	6: AO/OG	7: 4838 Sherkston (Dug Well)
DOC [mg/L]	25-Jan-24	07:55	25-Jan-24	16:35	---	5	3
TOC [mg/L]	25-Jan-24	07:55	25-Jan-24	16:35	---	---	3
Cl [mg/L]	25-Jan-24	16:42	26-Jan-24	18:44	---	250	12
F [mg/L]	25-Jan-24	11:52	26-Jan-24	09:17	1.5	---	0.17
Br [mg/L]	25-Jan-24	10:27	26-Jan-24	17:57	---	---	< 0.3
NO2 [as N mg/L]	25-Jan-24	10:27	26-Jan-24	17:57	1	---	< 0.03
NO3 [as N mg/L]	25-Jan-24	10:27	26-Jan-24	17:57	10	---	0.12
SO4 [mg/L]	25-Jan-24	16:40	26-Jan-24	18:44	---	500	23
Sulphide [mg/L]	26-Jan-24	10:20	26-Jan-24	14:25	---	0.05	< 0.02
4AAP-Phenolics [mg/L]	25-Jan-24	13:19	26-Jan-24	10:18	---	---	< 0.002
Hg (tot) [mg/L]	25-Jan-24	20:55	29-Jan-24	10:36	0.001	---	< 0.00001
Hardness [mg/L as CaCO3]	25-Jan-24	10:31	26-Jan-24	16:58	---	80-100	337
Al (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	0.1	0.042
As (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.01	---	0.0004
B (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	5	---	0.041
Ba (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	1	---	0.0491
Be (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	< 0.000007
Bi (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	< 0.00001
Co (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.000038
Ca (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	97.0
Cd (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.005	---	0.000039
Cu (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	1	0.0227
Cr (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.05	---	0.00406
Fe (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	0.3	0.065
K (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	1.18
Mg (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	23.1
Mn (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	0.05	0.00662
Mo (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.00162
Ni (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.0003
Na (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	20*	200	9.04
P (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.033
Pb (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.01	---	0.00053
Si (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	5.51

OnLine LIMS

000361534 7

Results relate only to the sample tested. Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA13711-JAN24**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: MAC	6: AO/OG	7: 4838 Sherkston (Dug Well)
Ag (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	< 0.00005
Sr (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	1.42
Tl (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	< 0.000005
Sn (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.00425
Ti (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.00101
Sb (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.006	---	< 0.0009
Se (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.05	---	0.00099
U (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	0.02	---	0.00112
V (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	---	0.00054
Zn (tot) [mg/L]	25-Jan-24	10:31	26-Jan-24	16:58	---	5	0.011
Cation Sum [meq/L]	05-Feb-24	---	05-Feb-24		---	---	7.20
Anion Sum [meq/L]	05-Feb-24	---	05-Feb-24	---	---	---	7.64
Anion-Cation Balance [% difference]	05-Feb-24	---	05-Feb-24	---	---	---	-2.92
Ion Ratio [none]	05-Feb-24	---	05-Feb-24	---	---	---	0.94
TDS (calculated) [mg/L]	05-Feb-24	---	05-Feb-24	---	---	---	370
Conductivity (calc) [uS/cm]	05-Feb-24	---	05-Feb-24	---	---	---	742
Langelier's Index [@ 4° C]	05-Feb-24	---	05-Feb-24	---	---	---	0.53
Saturation pH [pHs @ 4°C]	05-Feb-24	---	05-Feb-24	---	---	---	7.44

Corrected Sample ID, per client

MAC - Maximum Acceptable Concentration
AO/OG - Aesthetic Objective / Operational Guideline
NR - Not reportable under applicable Provincial drinking water regulations as per client.

Alisha Kelly, B.Sc.,
Project Specialist,
Environment, Health & Safety

OnLine LIMS

000361534?

Results relate only to the sample tested. Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

Appendix E

Supporting Information

THE KING'S HIGHWAY No. 3 (WIDTH VARIES)

HIGHWAY PLAN BB60189

84.97±

NORTHEAST CORNER LOT 5, CONCESSION 1

" RESIDENTIAL "

" COMMERCIAL "

PART 5
AREA= 18,884.20 SQ. M.±

222.48±

222.07±

" VACANT "

HUMBERSTONE

TOWNSHIP OF

PART LOT 5, CONCESSION 1, PLAN 59R-6988

" FIELD/RESIDENTIAL "

45.47±

NORTHERLY LIMIT OF HAMBLET RESIDENTIAL ZONE

39.47±

39.47±

6.00±

73.42±

72.28±

CONCESSION 1

LOT 5,

PART 3
AREA= 5828.9 SQ. M.±

PART 2
AREA= 6481.7 SQ. M.±

37.34±

160.05±

162.15±

WESTERLY LIMIT OF HAMBLET RESIDENTIAL ZONE

HAMBLET RESIDENTIAL ZONE

PART 4
AREA= 966.6 SQ. M.±

98.18±

111.40±

86.6±

AREA= 6229.8 SQ. M.±
PART 1

130.76±

PART 3 PART 2 PART 1 59R-16613

" RESIDENTIAL "

6.36±

24.38±

4.2±

32.02±

EXISTING DWELLING No. 4838

21.42±

30.74±

30.74±

68.31±

129.80±

SHERKSTON (WIDTH VARIES) ROAD

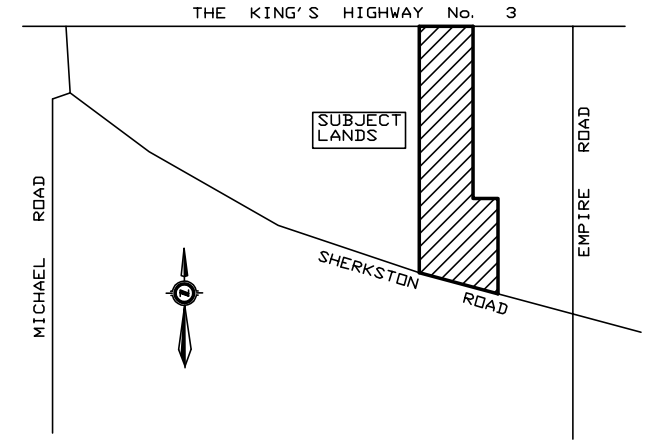
GIVEN ROAD

EMPIRE (20.12 WIDE) ROAD

(ROAD ALLOWANCE BETWEEN LOTS 4 AND 5)

NOTE:
PARTS 3 AND 4 TO MERGE AS ONE PARCEL
PART 4 TO BE SUBJECT TO A RIGHT-OF-WAY FOR PART 5

CITY OF PORT COLBORNE



KEY PLAN: NOT TO SCALE

COMMITTEE OF ADJUSTMENT APPLICATION

PART OF LOT 21, CONCESSION 5

GEOGRAPHIC TOWNSHIP OF HUMBERSTONE

IN THE

CITY OF PORT COLBORNE

SCALE: 1 : 2000

50 40 30 20 10 0 50 100
METRES

2024

CAUTION: THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED FOR ANY OTHER PURPOSE EXCEPT AS STATED IN THE TITLE BLOCK

THIS SKETCH IS NOT VALID UNLESS EMBOSSED BY A SURVEYOR'S SEAL.

PHILIP S. SUDA O.L.S. DATE

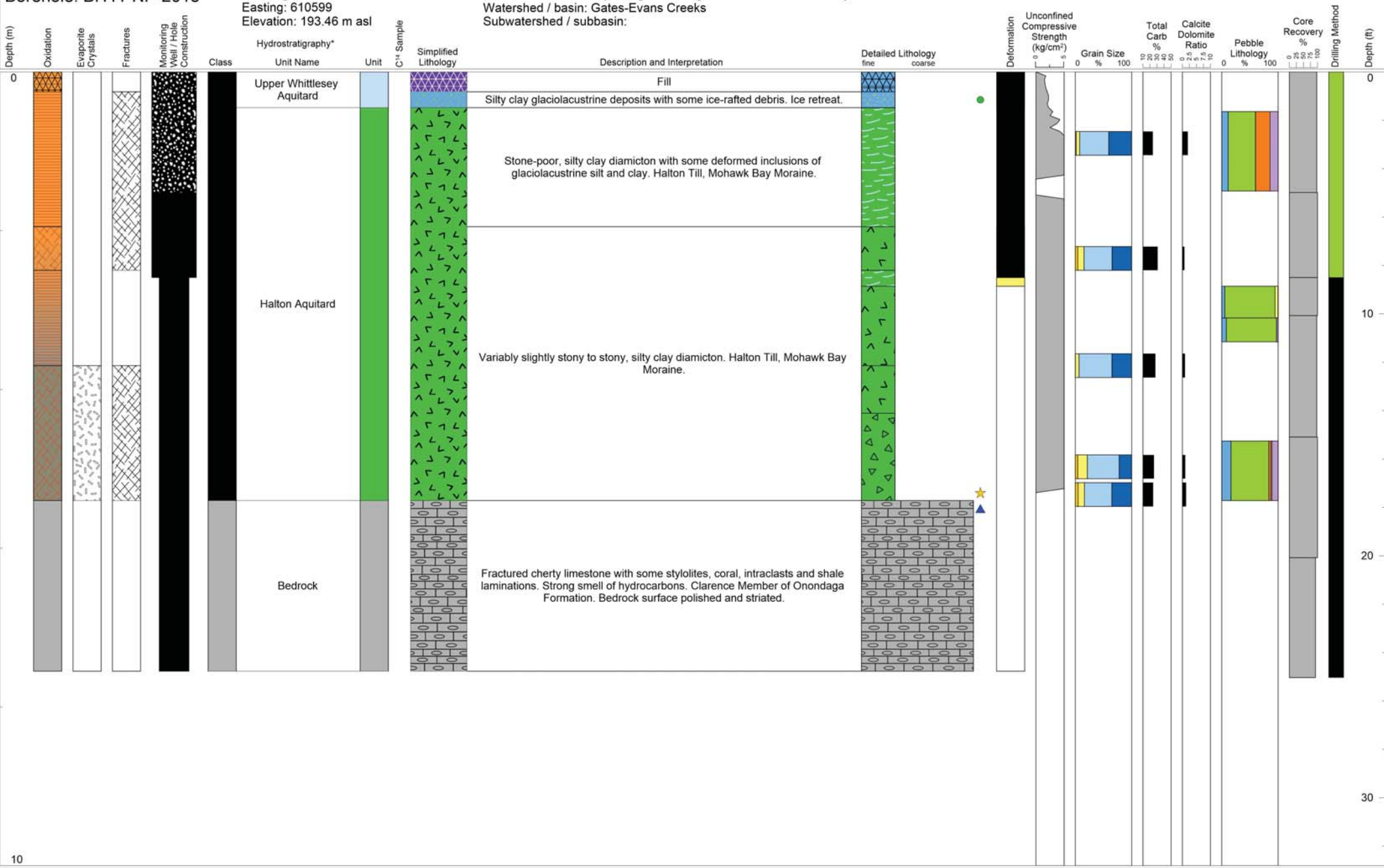
SUDA & MALESZYK SURVEYING INC.
ONTARIO LAND SURVEYORS
26 EAST MAIN STREET, SUITE 2
WELLAND, ONTARIO L3B 3W3
TEL: (905) 732-7651

FILE: 22-110 JOB No: 6610

Borehole: BH41-NP-2015

Northing: 4747285
Easting: 610599
Elevation: 193.46 m asl

Conservation Authority: Long Point Region Conservation Authority
Watershed / basin: Gates-Evans Creeks
Subwatershed / subbasin:



Oxidation
- Fill
- Oxidized
- Reduced
- Coarse layers oxidized
- Fracture planes oxidized
- Bedrock

Evaporite Crystals
- Macroscopic crystals in sediment
- Macroscopic crystals in bedrock
- Not observed

Fractures
- Fractures/desiccation cracks in sediment
- Fractures in bedrock
- Not observed

Well Construction
- Riser
- Screen
- Benseal - bentonite
- Concrete
- Quickgrout - bentonite grout
- Holeplug - bentonite chips
- Sand pack

Class
- Aquifer / potential Aquifer
- Aquitard
- Bedrock

*Hydrostratigraphic units are intended to reflect regional-scale sediment packages that will be modeled in three dimensions. The units are time-transgressive and may group lithologic packages.

Lithology
- No recovery
- Clay
- Clayey silt, silty clay
- Silt
- Fine sand to silt
- Fine to medium sand
- Medium to coarse sand
- Sand and gravel
- Gravel
- Sand and gravel with some silt/clay in matrix
- Clayey silt to clayey diamicton
- Sandy to silty diamicton
- Fill

- Fill
- Rhythmically bedded
- Interbedded
- Fragmented beds, intraclasts
- Ripples
- Cross-beds
- Grit
- Slightly to somewhat stony
- Stony to very stony
- Diamicton and other debris

- Rubble, fractured rock
- Ordovician bedrock
- Silurian bedrock
- Devonian bedrock

Symbols
- Rare ice-rafted debris
- Striated bedrock
- Polished bedrock
- Organic material
- Cold core
- Trace fossils
- Radiocarbon (C^{14}) date

Deformation
- Disturbed or low recovery intervals
- Not observed
- Slight
- Moderate
- High

Grain Size
- Coarse to medium sand
- Fine to very fine sand
- Silt
- Clay

Pebble Lithology
- Limestone
- Dolostone
- Sandstone
- Shale
- Chert, evaporite
- Precambrian

Drilling Method
- Hollow-stem auger
- PQ coring
- Split spoon
- Tricone
- Hydrovac