Hydrogeological Investigation
Proposed residential Development
Part of Lot 17, Concession 8,

Township of West Lincoln, Ontario

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1 Introduction

Englobe Corp. (Englobe) was retained by Upper Canada Consultants to complete a hydrogeological investigation for a proposed residential severance for a 4.23-hectare (10.45 acres) lot with the legal description of Part Lot 17 Concession 8, in the Township of West Lincoln. This report has been updated based on the current site plan DWG. No. 19126-DP issues by Upper Canada Consultants, dated March 15, 2024. It is proposed to develop a 3.15 ha (7.78 acre) parcel for development for a residential subdivision consisting of six single detached residential lots with a remnant lands covering 1.08 ha (2.67 acres).

Under the current site plan, it is proposed to develop the property with six detached residential lots (2.72 ha) ranging in size from 0.40 ha to 0.56 ha (1,0 acre to 1.4 acres) with a storm water management block (0.14 ha), reserve lands (0.01 ha), and an internal ROW (0.28 ha). Under the current development plan, it is proposed to develop proposed residential lots with two storey detached residential dwellings with a building footprint covering 185 m^2. The proposed residential development is to be privately serviced with individual water supply wells and/or cisterns and subsurface sewage disposal.

The hydrogeological investigation was completed evaluate subsurface conditions including the shallow soil and groundwater conditions with regards to private sewage servicing. A septic impact assessment was competed to confirm the proposed residential lot size are self sufficient and to evaluate potential impacts to shallow groundwater.

2 Scope of Work

The following tasks were completed as part of the Hydrogeological Investigation:

- *Background Review* – A review of available information was conducted, including geological and hydrogeological mapping, aerial photography, topographic mapping and well records on file with the Ministry of the Environment Conservation and Parks (MECP) completed within a 500 m radius of the site.

- *Private Well Survey* – A private well survey was completed for properties located within a 500 m radius of the site. The well survey was completed to determine the location, construction details and operational history of private wells in the vicinity of the site. Water quality was completed for microbiological analysis, metals and general inorganics with results being compared to the Ontario Drinking Water Quality Standards, Objectives and Guidelines (ODWSOG) where permission was granted by the property owner.

- *Subsurface Investigation* – Seven test pits were completed across the site to evaluate shallow soil and groundwater conditions. Soil samples were collected for further laboratory analysis to assess percolation rates for shallow soils at the site.

- *Site Servicing Assessment* – Based on the results of the private well survey and subsurface investigation, the feasibility of private servicing including potable groundwater supply wells and subsurface sewage disposal were evaluated given the proposed development plan.

3 Background

3.1 Official Plan Designation and Regulated Areas

The Site is located within the Niagara Peninsula Source Water Protection Area. The Site does not fall within a Wellhead Protection Area (WHPA) or Intake Protection Zone (IPZ). WHPAs and IPZs were not identified within a 500 m radius of the Site. Under the Township of West Lincoln Official Plan the following site designations are considered applicable:

- Schedule A (Municipal Structure - The proposed development is located within a hamlet settlement area; remnant lands fall outside of the hamlet settlement area.
- Schedule B-3 (Land Use) – The proposed development is located within a hamlet settlement area.
- Schedule C-1 and C-2 (Natural Heritage System) - The proposed development is located within a hamlet settlement area and is not located within the proximity of a Provincially Significant Wetland, Greenbelt Natural Heritage System, Area of Natural or Scientific Interest, or Floodplain.
- Schedule C-5 (Aggregate and Petroleum Resources) – The proposed development falls within an area of potential aggregate resources.
- Schedule D-3 (Hamlet Boundaries) – The proposed development falls within the hamlet boundaries for Regional Road 12.

On review of the Ministry of the Environment Conservation and Parks (MECP) Source Protection Information Atlas the Site is not located within a Highly Vulnerable Aquifer (HVA) of Significant Groundwater Recharge Area (SGRA). The Site does not fall within a well head protection zone or within an issue contributing area. A tributary of the Twenty Mile Creek crosses the northern portion of the severed lands which falls within lands regulated by the Niagara Peninsula Conservation Authority (NPCA).

3.2 Site Description and Servicing

The site is identified under the legal description as Part of Lot 17, Concession 8, in the Township of West Lincoln, Ontario. The site is located immediately east of Grimsby Road, approximately 150 metres north of Highway 20 in West Lincoln, Ontario as indicated on the attached **Figure 1**. The site consists of an irregularly shaped parcel of land covering an area of approximately 4.23 hectares (10.45 acres). The site currently consists of an agricultural field surrounded by privately serviced rural residential dwellings and agricultural lands. Surrounding properties are privately serviced with individual wells or cisterns and subsurface sewage disposal systems.

It is currently proposed to develop a 3.15-hectare portion of the Site with 1.08-hectares remaining as remnant lands. The area proposed for development is to be developed with six detached residential lots, with a SWM block, and ROW. It is proposed to develop each residential lot with a four-bedroom, two-storey residence with a building envelope of approximately 185 m^2. It is anticipated that each lot will be developed with a four bedroom privately serviced residential dwelling. The proposed draft plan of subdivision is provided in **Appendix A**.

3.3 Topography and Surface Drainage

The site consists of relatively flat lands which gradually slopes to the south and southeast towards Twenty Mile Creek. Topographic mapping for the vicinity of the site indicates that the site lies at an elevation of approximately 195 m above sea level (masl). Topographic variations at the site are expected to be between 1 to 2 m in elevation.

Surface water runoff and shallow groundwater flow are anticipated to be in a south/southeast direction. The nearest identified surface water feature is Twenty Mile Creek located approximately 400 m south of the site. Twenty Mile Creek drains towards the east and north into Jordan Harbour and Lake Ontario located approximately 19 kilometres northeast of the site.

3.4 Local Geology and Hydrogeology

The site is located on the upper section of the Niagara Escarpment within the physiographic region identified as the Haldimand Clay Plain. Overburden at the subject site consists of glaciolacustrine deposits of silt and clay with minor sand. Thickness of overburden in the vicinity of the site is documented to be on the order of 6 to 12 m below ground level (mbgl). Bedrock underlying the site is comprised limestone, dolostone and shale of the Lockport Formation. This unit is made up of several subgroups, such as the Cataract and Clinton Groups, which are comprised of dolostone and shale.

Shallow groundwater is anticipated to follow topography and is expected to be directed to the east/southeast towards Twenty Mile Creek. Groundwater flows within bedrock are expected to the north towards the Niagara Escarpment located approximately 7 km north of the site. Groundwater is expected within the overburden several metres below existing grades.

Local stratigraphy and hydrogeology were further assessed through a review of the Ministry of the Environment Conservation and Parks online well record database. Well records within a 500 m radius of the Site were reviewed and locations are indicated on the attached **Figure 3**, with well record details provided in **Table 1**. A summary of well records is provided below:

Summary of MECP Well Records

Total Number of wells	42
Completed Within the overburden	2 (5%)
Bedrock Well	40 (95%)
Well Depth	
Less than 10.7 m below grade	7
10.7 - 13.7 m below grade	24
Greater than 13.7 m below grade	11
Average Well Depth	12.5 m
Well Use	
Domestic/Stock	27 (66%)
Commercial	2 (4%)
Monitoring/Test	2 (4%)
Agricultural	11 (26%)
Well Yield	
Less Than 18.9 L/min (<5 GPM)	1 (2%)
22.5 - 37.8 L/min (5 - 10 GPM)	15 (35%)
41.6 L/min - 76 L/min (11 - 20 GPM)	20 (49%)
Greater than 76 L/min (>20 GPM)	4 (10%)
No Data	2 (4%)

Wells within the study area are primarily completed within bedrock to depths less than 7.6 m to 27.4 m (25 to 90 feet) and are commonly used for domestic and agricultural purposes. Well yields are typically reported between 18.9 L/min (5 GPM) and 76 L/min (20 GPM), which is considered sufficient for domestic purposes. A summary of well records within the study area are provided in the attached **Table 1**. Well record locations are shown on the attached **Figure 2**.

3.5 Private Well Survey

A private well survey was completed for properties located within a 500 m radius of the Site. In total 47 properties were visited as part of the well survey. Of the properties surveyed, a response was received from 35 property owners, who participated in the well survey. It was identified that the most properties surrounding the site are serviced using cisterns which are regularly filled. Of the properties surveyed the following sources of potable water were noted:

Summary of Private Well Survey

Total Number of Residents Surveyed	Using Supply Well	Using Cistern with Trucked Water
Rural Residential	1	26
Rural Commercial	1	5
Agricultural/Livestock	2	0

One residence reported a groundwater supply well in operation. The well was reported to be used for residential purposes excluding potable supply. Potable water is brought purchased for residential use. One business reported using well water for lunchroom taps and bathrooms. Twenty-six households and five businesses purchase water to fill an on-site cistern. Two property owners utilize wells for farming purposes but maintain cisterns for household use. Of the 47 properties visited 12 did not respond to the survey. Three household residents indicated that a well was present on the property, but not in use due to poor quality. It is expected that wells listed under the MECP well record database that private wells have been decommissioned due to inadequate groundwater quality for residential supply.

A summary of the results of the well survey is provided in the attached **Table 2** and well survey locations are indicated on the attached **Figure 4**. A copy of the letter distributed to properties included within the private well survey and a blank well survey form are provided in the attached **Appendix C**.

3.6 Results of Subsurface Investigation

A subsurface investigation was completed at the site by Englobe on February 13, 2020. Seven test pits were completed across the site to depths of approximately 3.0 m below grade to investigate shallow soil and groundwater conditions. The excavation of test pits was carried out by a backhoe contractor and were supervised and logged by Englobe field staff. Representative soil samples were collected from open test pits for confirmation of soil type by the project engineer and for further laboratory testing consisting of laboratory grain size analysis. Test pit logs and the results of grain size analysis are provided in the attached **Appendix B**. Test pit locations are indicated on the attached **Figure 3**. The general soil conditions encountered in completed test pits are summarized in the sections below.

3.6.1 Topsoil

A layer of topsoil was encountered at the surface of the test pit. Topsoil thickness was observed between 150 mm up to 300 mm in some locations. It should be noted that topsoil thickness provided as part of the subsurface investigation should not be used to determine volumes of topsoil at the site for stripping and grading purposes.

3.6.2 Clayey Silt to Silty Clay

Soils underlying topsoil deposits consisted predominately of clayey silt to silty clay to the completed depths of test pits. Clayey silt to silty clay deposits were grey/brown in colouration with trace deposits of sand in areas. Deposits of clayey silt to silty clay were noted to become dense at depths of approximately 2.5 m below the existing ground surface.

Representative soil samples from shallow depths were obtained for laboratory testing for soil grain size analysis to assess percolation rates of the shallow native subgrade. The results of grain size analysis are summarized in the following table:

Summary of Grain Size Analysis – Sandy Silt and Clay

Sample ID	Sample Depth (mbgs)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Soil Classification
BH1 Sa 1	1.2	0	2	30	68	Silty Clay
BH3 Sa 1	0.7	0	4	30	66	Silty Clay
BH6 Sa1	0.7	0	1	31	68	Silty Clay

Based on the results of soil grain size analysis soil present at the site was classified under the unified soil classification system as O.L. (Organic silts, organic silty clays of low plasticity) with an estimated percolation rate from 20 to over 50 min/cm based on clay content as detailed in the Ministry of Municipal Affairs and Housing (MMAH) Supplementary Standard to the Ontario Building Code SB-6 (2012). Clay content within evaluated samples ranged from 66 to 68% of the total mass of the analyzed sample. Percolation rates were considered at a conservative rate of greater than 50 min/cm.

3.6.3 Groundwater Levels

The test pits were left open for a short duration following completion to document soil conditions. Test pits TP1 to TP3 and TP5 to TP7 were observed to have seeps and pooling groundwater at the bottom of the pit. Test pit TP4 was observed to be open and dry upon completion. Seepage was observed along the walls of the test pit at depths between 1.8 m and 2.5 m below grades.

3.7 Results of Groundwater Sampling

Water quality sampling was completed for private wells located at 7226 and 7378 Highway 20 on December 9, 2019. Water quality samples were obtained directly from a tap within each barn. Water quality sampling was completed for the private well located at 2942 Grimsby Road on December 23, 2019. Water quality samples were obtained directly from a tap outside a shed at the rear of the property. On all occasions, the tap was allowed to run for a period of five minutes to remove any standing water from the piping. Water samples were taken in laboratory supplied bottles appropriate for the completed analysis. Bottles were

stored in a cooler on ice for transport to Agat Laboratories, a CALA-accredited third-party laboratory in Mississauga, Ontario for analysis.

It should be noted that water quality samples were obtained from a point bypassing any water quality treatment systems which may be in use for the residence. Water quality summarized below would be indicative of the raw water quality from the private water supply wells. The results of water quality analysis were compared to the Ontario Drinking Water Standards, Objectives and Guidelines (ODWSOG). Exceedances of the ODWSOG are summarized in the table below:

Summary of Water Quality Exceedances

Parameter	Unit	OWDSOG		7226 Highway 20	7378 Highway 20	2942 Grimsby Road
		MAC	AO/OG			
Total Dissolved Solids	mg/L		500	3370	2020	1260
Total Hardness	mg/L		80-100	2150	885	877
Chloride	mg/L		250	-	811	-
Sulphate	mg/L		500	1890		593
Total Organic Carbon	mg/L		5.0	5.1	-	-
Colour	TCU		5	189	-	368
Turbidity	NTU		5	15.1	-	61.3
Iron	mg/L		0.3	3.66	-	12.7
Manganese	mg/L		0.05	0.215	0.133	0.252
Total Coliforms	CFU/100 mL	0		NDOGT	NDOGT	ND

TCU – True Colour Units
NTU – Nephelometric Turbidity Units
CFU – Colony Forming Units
NDOGT – No Data; Overgrowth with Target
ND – Not Detected
ODWSOG MAC – Ontario Drinking Water Standards Maximum Acceptable Concentration
ODWSOG AO/OG – Ontario Drinking Water Standards Aesthetic Objective/Operational Guideline

The full results of the analyses are summarized in the attached **Table 3** and in the laboratory certificates of analysis provided in the attached **Appendix D**.

In general, groundwater quality in the area is poor with several exceedances of operational guidelines and aesthetic objectives. These exceedances impart objectionable taste, odour and colouration to groundwater supplies. Bacteria were also noted within collected samples. It is anticipated that bacterial presence is primarily due to well inactivity and poor maintenance. Bacterial contamination of groundwater at depth is not expected due to overlying low permeability soils.

Based on the water quality analysis and the results of the private well survey it is recommended to service the proposed residential lots using cisterns. It is expected that groundwater supply wells will yield poor quality with regards to aesthetic objectives and operational guidelines for domestic supply. Exceedances of the ODWSOG aesthetic objectives for hardness are not considered to be reasonably treatable.

4 Hydrogeological Assessment

4.1 Summary of Hydrogeological Conditions

The following summarizes the site conditions encountered as part of the completed site investigations:

- Seven test pits were completed at the site to assess soil and groundwater conditions. Soils at the site generally consisted of topsoil overlying clayey silt to silty clay. The test pits were completed to an approximate depth of 3.0 m below existing grades.

- Shallow groundwater is expected to follow topography and be directed to the south towards Twenty Mile Creek. Shallow groundwater levels are expected within several metres below existing grades.

- Six of the completed test pits were observed to have groundwater pooling at the base and seeps along the walls upon completion. Test pit four was observed to be dry and open upon completion. Seeping observed in the walls of the test pits was found at depths between 1.8 m and 2.5 m below grades.

- Laboratory grain size analyses were completed for representative soil samples obtained from three test pits. Percolation rates are expected at rates greater than 50 min/cm based on a review of the 2012 MMAH Supplementary Standard SB-6, as incorporated by the Ontario Building Code.

- A private well survey was completed for properties within a 500 m radius of the Site. It was found that most surrounding properties utilize cisterns for potable water supply. Private wells were not reported to provide potable supply.

- Water quality sampling was completed for private wells where permission was granted by the property owner. Results indicated non-detectable concentrations of nitrate and nitrite within private wells at 2942 Grimsby Road (50 m west of the site) and 7226 Highway 20 (located approximately 200 m south of the site). Nitrate concentrations of 6.2 mg/L were reported for the private well at 7378 Highway 20 located approximately 300 m southwest of the site. Septic impacts on underlying groundwater are not expected in the vicinity of the site.

Based on the water quality analysis and the results of the private well survey it is recommended to service the proposed residential lots using cisterns. It is expected that groundwater supply wells will yield poor quality with regards to aesthetic objectives and operational guidelines for domestic supply. Exceedances of the ODWSOG aesthetic objectives and operational guideline are not considered to be reasonably treatable.

4.2 Sewage Impact Assessment

The impact of proposed private subsurface sewage disposal beds was evaluated following the approach provided within the Ministry of the Environment Procedure D-5-4 (Technical Guideline for Individual On-Site

Sewage Systems: Water Quality Risk Assessment, August 1996). The risk assessment was based on soil and groundwater conditions observed within completed test pits and information obtained as part of the private well survey and MECP well record review.

Background nitrate concentrations in shallow ground water were evaluated as part of the completed private well sampling. The following table summarizes the measured concentration of nitrates in ground water surrounding the site:

Summary of Background Nitrate Concentrations

Private Well Location	Well Depth	Nitrate (mg/L)	Distance from Site
7226 Highway 20	Unknown	<1.0	200 m south
7378 Highway 20	Unknown	6.2	300 m southwest
2942 Grimsby Road	14.5 m	<0.25	50 m west

Nitrate in ground water was noted for the well located at the municipal address of 7378 Highway 20 at a concentration of 6.2 mg/L. The private well in closest proximity to the site at 2942 Grimsby Road showed non-detectable levels of nitrate within ground water. Groundwater flow is expected to the south/southeast, with upgradient lands consisting of agricultural fields, situated outside of the hamlet settlement area. Significant background nitrate concentrations for the site are not expected.

4.2.1 Nitrate Impact Assessment

Soil conditions at the site consisted primarily of silty clay becoming dense to the completed depths of investigation at approximately 3.0 m below existing grades. Ground water seepage was noted at depths between 1.8 m and 2.5 m below existing grades. Potable water for surrounding private land uses is primarily supplied by cisterns filled with trucked water supplies. The proposed residential lots are recommended to be serviced using cisterns. Private supply wells, where installed, typically are completed within shale bedrock at depths greater than 7.6 m (25 feet). Wells are of low quality and are not used to provide potable water.

Hydrogeologically sensitive features including karstic areas, fractured of exposed bedrock exposed at surface, areas of thin soil cover and areas of highly permeable soils were not noted at the site and surrounding vicinity (i.e. within a 500 m radius of the site). The Site is not identified within a Significant Groundwater Recharge Area (SGRA) or Highly Vulnerable Aquifer (HVA). The most probable receiver for sewage effluent is considered the underlying bedrock aquifer with a vertical separation of approximately 10 m. Ground water discharge to surface water in the vicinity of the site is not expected due to the low permeability of soils present. It is expected that effluent plumes will be dispersed and of limited lateral extent within shallow soils to the south/southwest of the leaching bed areas.

Notwithstanding the above the following methodology was used to assess the potential increase in nitrates within shallow ground water at the downgradient property boundary for each of the six proposed residential lots, given the minimum proposed lot size of 0.40 hectares:

$$\frac{Q \times N}{(A \times I) + Q}$$

Where: Q is the daily average flow sewage flow rate (1,000 L/day as per D-5-4 Section 5.6.2 (a) or 365 m^3/yr)
N is the nitrate loading for a conventional Class IV sewage system (40 mg/L)
A is the minimum lot area for proposed residential lots (4,000 m^2)

I is the infiltration rate of underlying native silty clay soils (0.125 m/yr)

The maximum permissible concentration of nitrate in ground water at the down-gradient property boundary is considered at 10 mg/L corresponding to the health-related maximum acceptable concentration (MAC) guideline within the Ontario Drinking Water Standards. The resultant expected nitrate increase in shallow ground water is calculated at 16.9 mg/L for a conventional system. Given this outcome the pre-treatment of sewage will be required to meet acceptable concentrations of nitrate within shallow ground water at the down-gradient property boundary (i.e. tertiary treatment of effluent).

4.2.2 Tertiary treatment Requirements

Given the proposed lot sizes indicated on the draft pan of subdivision to meet a nitrate increase at the down-gradient property boundary of 10 mg/L treatment of sewage effluent will be required. To meet groundwater quality targets with respect to nitrate it is expected that standard treatment systems capable of upwards of 50% nitrate removal (20 mg/L) would be required, which would result in an expected increase in nitrate at the downgradient property boundary of approximately 8.4 mg/L. It is anticipated that nitrate impacts would be within an acceptable level provided OBC approved tertiary treatment systems are used to pre-treat sewage effluent discharge to subsurface sewage disposal beds.

4.3 Preliminary Leaching Bed Design

Preliminary leaching bed design including the required minimum leaching bed area was evaluated based on the observed shallow soil and groundwater conditions at the site. The sewage design flows for the proposed residential dwellings were determined based on values listed within Table 8.2.1.3.A of the Ontario Building Code (OBC) for residential occupancies. The proposed dwellings are anticipated to consist of a four-bedroom residence (2,000 L/day peak daily flow rate) with floor area of approximately 370 m^2 (two-storey residence with 185 m^2 footprint) (additional 1,700 L/day flows given additional 100 L/day per 10 m^2 of additional floor space over 200 m^2, not exceeding 400 m^2). Peak daily sewage flow rates for the purpose of septic system design are expected at 3,700 L/day.

Preliminary leaching bed design options were developed for the site based on the following technical considerations:

Native Soil	Clay and Silt
Unified Soil Classification	O.L.
Estimated Percolation Rate	Greater than 50 min/cm
Depth to Groundwater	Approximately 2.0 m below grade
Type of Sewage System	Fill based absorption trenches (Raised leaching bed)
Design Flow	3,700 L/day

Based on the above design considerations the following septic leaching bed sizing considerations are provided:

4.3.1 Fill Based Absorption Trenches

4.3.1.1 Bed Sizing

Where native soils consist of materials with percolation rates of 50 min/cm or greater, a raised leaching bed is recommended. The leaching bed would be constructed overlying engineered fill (sand) not less than 250 mm in thickness, extending 15 m in the downgradient direction (expected south of the site towards Twenty Mile Creek). The absorption trenches are to be not less than 900 mm above soil with a percolation time more than 50 minutes. It is expected that the leaching bed would be required to be raised a minimum of 900 mm above existing grades.

Where a conventional Class IV leaching bed with treatment system is constructed, the total length of distribution pipe required is determined as follows:

$$L = QT/300$$

Where; L is total length of distribution pipe in metres;
Q is the total daily design sanitary sewage flow (3,700 L/day); and,
T is the design percolation time (50 min/cm).

The total length of distribution pipes required for a Class IV leaching bed with treatment unit given the observed shallow soil conditions at the site is expected at approximately 620 m. Distribution pipe length is not to exceed 30 m in length and spaced a minimum distance of 1.6 m between runs. Given the total length of leaching required for the anticipated design sewage flow rates, the leaching bed is expected to consist of 21 runs of tile 30 m in length covering a total area of approximately 960 m^2 (30 m by 32 m).

The fill area is to be sloped a maximum of four horizontal units for each vertical unit for an additional 3.6 m on each side. A sand mantle would be required to extend a minimum of 15 m down-gradient of the leaching bed (south) for a fill-based area covering 2,046 m^2 (30 m + 15 m + 7.2 m by 32 m + 7.2 m)

4.3.1.2 Loading Rates

Fill based absorption trenches are to be designed such that the loading rates for soils with percolation rates greater than 50 min/cm do not exceed 4 L per m^2 per day (as per Table 8.7.4.1.A of the OBC). Given the expected daily sewage flow rate of 3,700 L/day and the leaching bed area of 960 m^2, loading rates for proposed leaching beds are expected at 3.9 L/m^2/day. Loading rates are expected to be acceptable and sewage breakouts are not expected provided the sand mantel is extended in the down-gradient direction as specified in Section 8.7.4.2 Subsection (1b) of the OBC.

It should be noted that the above estimated percolation rates used for the preliminary design of the septic leaching bed were based on sieve and hydrometer testing completed for shallow soils at the site at test pit locations TP1, TP3 and TP6. The requirement for fill-based absorption trenches should be confirmed at each lot prior to construction. The above design is considered as a worst case and represents the expected maximum area required for the considered sewage flows.

4.3.2 Filter Bed

Filter beds are considered a viable option for use for sewage disposal for each proposed residential lot given a sewage flow rate of 3,700 L/day. The base of the filter bed shall extend to a thickness of at least 250 mm over an area meeting the following requirements:

A=QT/850

Where: A is the area of contact between the base of the filter media and native soil;
Q is the total daily design sanitary sewage flows (3,700 L/day); and,
T is the lesser of 50 and the percolation rate of the underlying soil (50 min/cm).

The resulting filter bed area was calculated at 220 m^2. The effective area of the surface of the filter medium in each filter bed shall not be more than 50 m^2 with a loading rate not exceeding 100 L/m^2 per day where a treatment unit meeting OBC requirements is utilized. Given these requirements the filter bed for each lot would be divided into five separate 44 m^2 adjacent beds.

The filter medium shall consist of clean sand to a minimum depth of 750 mm, with the stone layer not less than 900 mm above a soil with a percolation time more than 50 minutes. It is expected that the filter bed would be raised a minimum of 900 mm above existing grades. The expected base area for fill is expected to cover an area of approximately 560 m^2, given five area beds with 6.6 m by 6.6 m dimensions with fill sloped 1H:4V extending 7.2 m from filter beds.

4.3.3 Shallow Buried Trench

Consideration has been provided for the requirements necessary for a sewage disposal system consisting of a shallow buried trench. Given that percolations rates are expected greater than 50 min/cm the length of a shallow buried trench would be required at a minimum length of 100 m. In-situ testing would be required at the location of a shallow buried trench to confirm percolation times for native soils do not exceed 125 minutes. It is expected that shallow buried trenches would consist of four runs or 25 m length distribution pipe with minimum 2 m spacing between runs.

Given the low permeability soils present it is recommended to construct a system comprising of shallow buried trenches on a filter bed consisting of clean sand. The coverage area for the clean sand should follow that of a filter bed discussed in Section 4.3.2 above. The contact area for the filter bed should cover a minimum area of 220 m^2 with an even distribution of distribution pipe over this area for adequate loading. It is expected that the shallow buried trenches would be raised a minimum of 250 mm above existing grades.

4.3.4 Design Considerations

The raised area bed for the proposed residential dwelling should be constructed in accordance with the OBC guidelines as follows:

- The distribution piping is to be uniform in length and evenly spaced within the surface of the filter medium (sand layer) to which the effluent is applied.
- All leaching bed fill added shall be stabilized against erosion
- The sides of the added leaching bed fill shall be sloped to ensure stability but shall not be steeper than one unit vertical for every four units horizontally.

The septic tanks for each proposed residential dwelling should be constructed in accordance with the OBC guidelines as follows:

- Septic tank shall be greater of the minimum capacity of 3,600 L or two times the daily design flow for residential occupancies. For the proposed dwellings, the minimum septic tank volume is considered at 7,400 L.
- The septic tank should be completed such that there is a minimum of two compartments. The first compartment should consist of a minimum volume of 1.3 times the daily sanitary sewage flow at a minimum volume of 4,810 L with the second compartment at a volume of 2,590 L (minimum 50% volume of the first compartment).

It is anticipated that setback requirements for the sewage disposal system can be met. Setback requirements for the septic tank and distribution pipe are further discussed in Section 4.4 below.

4.4 Leaching Bed Setback Requirements

It should be noted that for raised leaching beds setback limits are to be increased by twice the height that the leaching bed is raised above the original grade (i.e. raising the leaching bed by 600 mm in thickness will increase setbacks by 1.2 m).

The following setbacks must be observed when siting septic leaching fields and tanks:

- Septic tank not closer than:
  - 1.5 m to any structure;
  - 3.0 m to the property line;
  - 15 m to surface water body or well.
- Distribution pipe not closer than:
  - 5 m to any structure;
  - 3 m to the property line;
  - 5 m between distribution pipes of leaching beds;
  - 15 m to surface water body or a well with a watertight casing to a depth of at least 6 m;
  - 30 m to any other well.

For the purposes of leaching bed design, it was assumed that cisterns are to be installed at the six severed properties. A well survey completed within 500 m of the site indicated that most surrounding residences utilize a cistern for household and business purposes. It is anticipated that private wells surrounding the site fall outside of the required setback limits defined above.

Given the sizing requirements for septic systems discussed in Section 4.3 above and the setback limits required for fill-based systems the following table provides a summary of the expected minimum tile bed envelope required per lot for sewage disposal systems:

Summary of Required Septic Envelope

System Type	Bed Area	Mantle Required	Height Raised	Area Requirement	Additional Setback Requirement
Fill Based Absorption Trenches	960 m^2	Yes (15 m)	900 mm	2,085 m^2	1.8 m
Filter Bed	220 m^2	No	900 mm	876 m^2	1.8 m
Shallow Buried Trenches	150 m^2	No	250 mm	220 m^2	0.5 m

Given proposed residential lot sizes are proposed between 4,000 m^2 and 5,600 m^2 it is anticipated that lot sizes will be sufficient to allow for private servicing provided cisterns are utilized for potable water supply. It should be noted that the above design is based on sewage flows from a four-bedroom residence with floor area of 370 m^2, assuming a maximum of 20 fixture units. Lot layout should be reviewed once residence size and layout has been finalized given the above preliminary tile bed design.

It is expected that if there is a requirement for sufficient reserve area for replacement of the sewage disposal bed that an option utilizing a smaller area requirement such as an area bed or shallow buried trenches will be required for proposed residential lots, or that the fill-based absorption trenches would be replaced in place of the failed system.

5 Conclusions and Recommendations

The following summarizes the results of field investigations for the site completed as part of this hydrogeological investigation:

1. The site comprises a total site area of approximately 4.23 hectares (10.45 acres). It is proposed to develop a 3.15-hectare parcel of the subject lands for a residential subdivision consisting of six detached residential lots between 0.40 ha to 0.56 ha in area, with remaining 1.08-hectares consisting of remnant lands.

2. Seven shallow test pits were completed at the site to assess shallow soil and groundwater conditions. Soils at the site were observed to consist of topsoil overlying clayey silt to silty clay. All test pits were completed to approximately 3.0 m below existing grades.

3. Shallow groundwater is expected to follow topography and be directed to the south towards Twenty Mile Creek. Shallow groundwater levels are expected within several metres below existing grades.

4. Six of the completed test pits were observed to have groundwater seepage and groundwater pooling upon completion. Test pit four was observed to be dry and open upon completion. Seepage was observed at depths between 1.8 m and 2.5 m below grades.

5. Laboratory grain size analyses were completed for representative soil samples obtained from three test pits with soils classified as silty clay. Percolation rates are expected at rates greater than 50 min/cm based on a review of the 2012 MMAH Supplementary Standard SB-6, as incorporated by the Ontario Building Code.

6. A private well survey was completed for properties within a 500 m radius of the site. It was found that most wells in the vicinity of the site are no longer in use with potable water supply using cisterns with purchased water. Of the private groundwater supply wells identified groundwater was not reported to be used for potable supply.

7. Water quality sampling was completed for private wells where permission was granted by the property owner. Results indicated non-detectable concentrations of nitrate and nitrite within private wells at 2942 Grimsby Road (50 m west of the site) and 7226 Highway 20 (located approximately 200 m south of the site). Nitrate concentrations of 6.2 mg/L were reported for the private well at 7378 Highway 20 located approximately 300 m southwest of the site. Septic impacts on underlying groundwater are not expected in the vicinity of the site.

8. Aesthetic objectives and operational guidelines exceedances were noted for total dissolved solids, hardness, chloride, turbidity, colour, total organic carbon, total iron, and total manganese. Based on the water quality analysis and the results of the private well survey it is recommended to service the proposed residential lots using cisterns.

Based on the above investigation the following summarizes the conclusions and recommendations of this investigation:

1. Nitrate impact assessment for a conventional Class IV sewage system was calculated at 16.9 mg/L at the down-gradient property boundary, given a lot covering an area of 4,000 m^2. Given the proposed density of residential lots, the use of tertiary treatment systems capable of a 50% reduction of nitrate will be required.

2. Sewage flows for the proposed development were determined based on daily design sewage flows for proposed uses found within the Ontario Building Code. It was assumed that residential dwellings will consist of four bedrooms, with floor area of 370 m^2, and 20 fixture units, with peak sewage design flows of 3,700 L/day.

3. It is anticipated that a fill-based absorption trench system with treatment will consist of a minimum distribution pipe length of 620 m. It is anticipated that the leaching bed would consist of 21 runs of 30 m pipe for a leaching bed area of approximately 960 m^2 (30 m by 32 m with setback requirements) and incorporate a 15 m mantle extending down-gradient to the bed. The fill-based absorption trench system would be raised a minimum of 900 mm above native soils with a percolation time greater than 50 minutes.

4. A filter bed would require a basal area of 220 m^2 divided into five separate 44 m^2 adjacent beds. The filter medium shall consist of clean sand to a minimum depth of 750 mm, with the stone layer not less than 900 mm above a soil with a percolation time more than 50 minutes. It is expected that the filter bed would be raised a minimum of 900 mm above existing grades.

5. The length of a shallow buried trench would be required at a minimum length of 100 m. In-situ testing would be required at the location of a shallow buried trench to confirm percolation times for native soils do not exceed 125 minutes. It is expected that shallow buried trenches would consist of four runs or 25 m length distribution pipe with minimum 2 m spacing between runs. Given the low permeability soils present it is recommended to construct a system comprising of shallow buried trenches on a filter bed consisting of clean sand with a basal area of 220 m^2 with an even distribution of distribution pipe over this area for adequate loading. It is expected that the shallow buried trenches would be raised a minimum of 250 mm above existing grades.

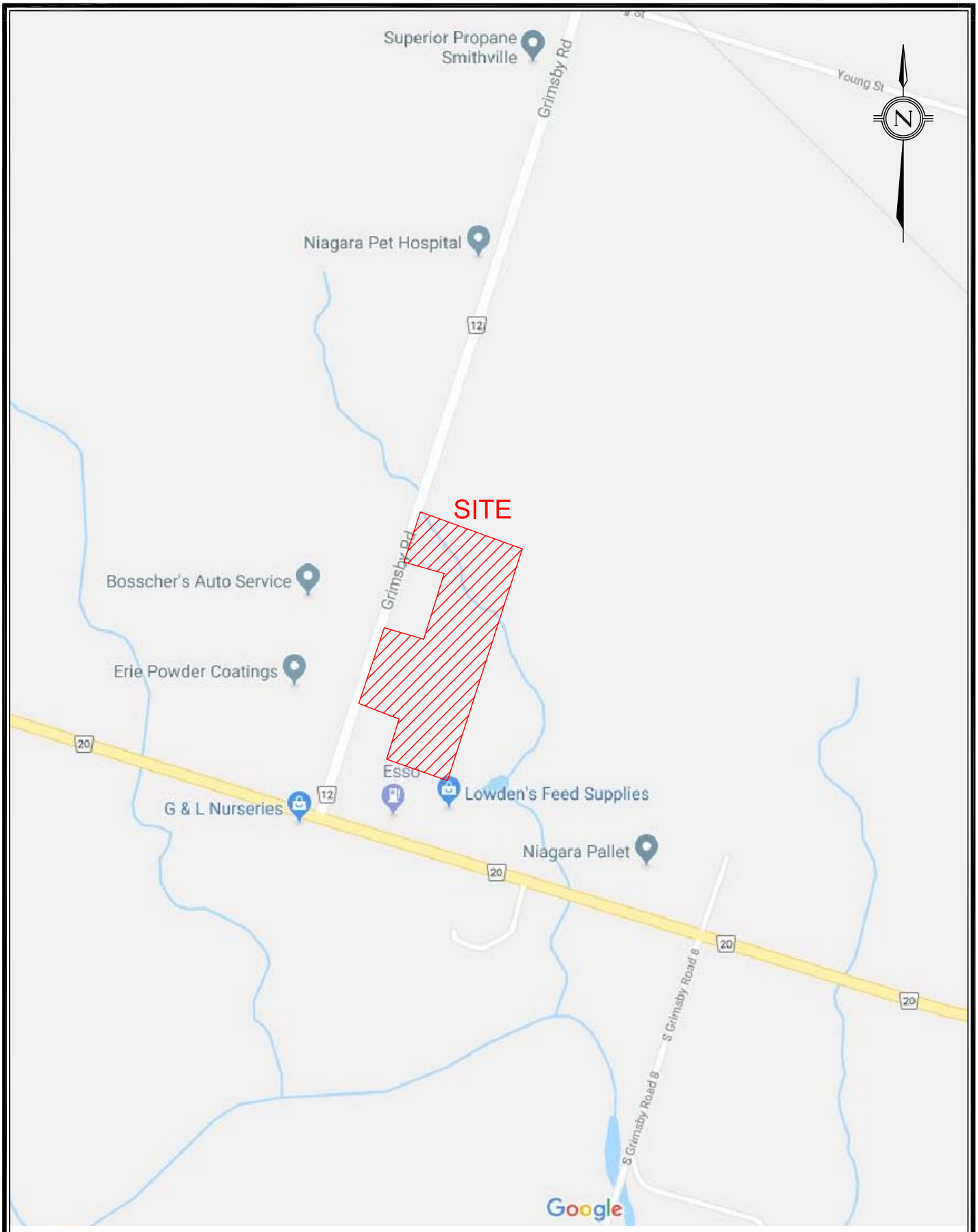
6. The septic tank volume would be required at twice the daily design flow at a capacity of 7,400 L. The septic tank is recommended to consist of two compartments with the first compartment at 1.3 times the daily design flow at a volume of 4,810 L with the second compartment at a volume of 2,590 L.

7. Based on the expected sewage flow rates the area required for a subsurface disposal bed is expected between 2,085 m^2 to 220 m^2. Given proposed residential lot sizes are proposed between 4,000 m^2 and 5,600 m^2 (1.0 to 1.4 acres) it is anticipated that lot sizes will be sufficient to allow for private servicing provided cisterns are utilized for potable water supply.

8. It is expected that if there is a requirement for sufficient reserve area for replacement of the sewage disposal bed that an option utilizing a smaller area requirement such as an area bed or shallow buried trenches will be required for proposed residential lots, or that the fill-based absorption trenches would be replaced in place of the failed system.

Figures

ENGLOBE



Terraprobe
903 Barton Street - Unit 22, Stoney Creek, Ontario, L8E 5R7
Tel: (905) 643-7560, Fax: (905) 643-7559

Title:	SITE LOCATION PLAN
File No.	7-19-0159-46

FIGURE : 1

LEGEND

MECP WELL Location

Terraprobe
903 Barton Street - Unit 22, Stoney Creek, Ontario, L8E 5R7
Tel: (905) 643-7560, Fax: (905) 643-7559

Title: MECP WELL RECORD LOCATION PLAN

File No. 7-19-0159-46

FIGURE : 2

LEGEND

TP1 Test Pit Location

Terraprobe
903 Barton Street - Unit 22, Stoney Creek, Ontario, L8E 5R7
Tel: (905) 643-7560, Fax: (905) 643-7559

Title: TEST PIT LOCATION PLAN

File No. 7-19-0159-46

FIGURE : 3

LEGEND

● Well Survey Location

Terraprobe
903 Barton Street - Unit 22, Stoney Creek, Ontario, L8E 5R7
Tel: (905) 643-7560, Fax: (905) 643-7559

Title: WELL SURVEY LOCATION PLAN

File No. 7-19-0159-46

FIGURE : 4

Tables

ENGLOBE

TABLE 1: SUMMARY OF MECP WELL RECORDS
PROPOSED RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

Map ID	Well ID	Easting	Northing	Year	Water (ft bgl)	Pumping (US GPM)	Type	Stratigraphy (Depth in Feet)
1	7243103	614909	4774976	2015			Monitoring	Black fill (0-2) Brown clay (2-13) Grey clay (13-24)
2	3801593	614902	4775001	1954	26	28	Commercial	Clay (0-22) Shale (22-24) Escarpment rock (24-33) Gravel and mud seems (33-34) Bedrock (34-42)
3	3801596	614916	4775007	1959	22	16	Domestic	Clay (0-24) Shale (24-26)Bedrock (26-42)
4	3802512	614916	4775021	1975	25	10	Domestic	Brown clay (0-16) Grey clay (16-35) Grey shale with gravel (35-38) Grey limestone (38-52)
5	3801562	614861	4775068	1952	20	36	Agricultural	Clay with boulders (0-38) Bedrock (38-46)
6	3801597	614875	4775075	1959	10	28	Domestic	Clay (0-27) Limestone (27-35)
7	3801598	614874	4775142	1960	22	10	Domestic	Clay (0-23) Limestone (23-42)
8	3803633	614736	4775228	1993	12	7	Domestic	Brown Clay (0-15) Brown stones with clay (15-19) Brown limestone (19-48)
9	3803636	614726	4775227	1993	12	7	Domestic	Brown Clay (0-15) Brown stones with clay (15-19) Brown limestone (19-48)
10	3801611	614857	4775277	1958	18	5	Domestic	Clay (0-19) bedrock (19-48)
11	3801609	614857	4775284	1957	14	20	Domestic	Blue clay (0-21) Gravel (21-22)Bedrock (22-37)
12	3801610	614857	4775284	1957	14	20	Domestic	Blue clay (0-21) Gravel (21-22) Grey Bedrock (22-39)

TABLE 1: SUMMARY OF MECP WELL RECORDS
PROPOSED RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

Map ID	Well ID	Easting	Northing	Year	Water (ft bgl)	Pumping (US GPM)	Type	Stratigraphy (Depth in Feet)
13	3801605	614862	4775319	1954	8	18	Domestic	Clay (0-18) Shale (18-20) Bedrock (20-29)
14	3801606	614862	4775319	1955	16	18	Domestic	Clay (0-22) Shale (22-23) Bedrock (23-25)
15	3801613	614871	4775339	1958	28	7	Domestic	Clay (0-20) Bedrock (20-42)
16	3801595	615000	4775436	1959	24	10	Domestic	Clay (0-21) Bedrock
17	3803277	615178	4775404	1988	17	15	Domestic	Grey limestone (34-41)
18	3803929	615316	4775471	2000	16	5	Commercial	Brown clay (0-20) Brown escarpment rock (20-27) Brown limestone (27-39)
19	3801600	614997	4775564	1966	20	10	Agricultural	Blue clay (0-26) Limestone (26-40)
20	3801601	614972	4775590	1952	4	24	Domestic	Clay (0-16) Bedrock (16-34)
21	3801612	614922	4775589	1958	16	16	Domestic	Clay (0-19) Bedrock (19-35)
22	3801614	614941	4775740	1963	20	0.5	Domestic	Blue clay (0-18) Grey Limestone (18-35)
23	3801604	615042	4775821	1953	16	16	Domestic	Clay with boulders (0-18) Bedrock (18-38)
24	3801603	615056	4775856	1953	14	13	Domestic	Clay with boulders (0-16) Bedrock (16-37)
25	3801602	615061	4775877	1953	15	8	Domestic	Clay with boulders (0-17) Dolomite (17-36)
26	3801594	615113	4775959	1956	14	16	Domestic	Clay (0-16) Shale (16-22) Bedrock (22-44)
27	7177018	615300	4774972	2012			Test	Grey gravel (0-2) Brown silt with clay (2-6) Brown clay (6-16) Grey and red clay (16-20)
28	3801592	615502	4774816	1960	16	15	Domestic	Clay (0-40) Shale (40-42)
29	3801680	615293	4774820	1954	18	11	Domestic	Clay (0-33) Bedrock (33-38)

TABLE 1: SUMMARY OF MECP WELL RECORDS
PROPOSED RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

Map ID	Well ID	Easting	Northing	Year	Water (ft bgl)	Pumping (US GPM)	Type	Stratigraphy (Depth in Feet)
30	3801790	615238	4774658	1968	14	10	Domestic	Brown clay (0-15) Blue clay (15-30) Grey limestone (30-40)
31	3803063	614815	4774478	1984	20	14	Agricultural	Brown clay (0-25) Brown clay with gravel (25-30) Brown limestone (30-38)
32	3801681	614712	4774960	1953	6	7	Commercial	Clay (0-12) Gravel with boulders (12-16) Bedrock (16-34)
33	3803260	614299	4774826	1988	20	16	Agricultural	Brown clay (0-9) Grey limestone (9-60)
34	3803261	614299	4774826	1988	20	15	Domestic	Grey limestone (28-45)
35	3801685	614281	4774957	1966	16	18	Industrial	Grey clay (0-13) Grey shale (13-18) Bedrock (18-90)
36	3801684	614280	4774979	1956	14	13	Domestic	Clay (0-14) Shale (14-16) Bedrock (16-37)
37	3801683	614313	4775098	1952	20	10	Domestic	Clay (0-14) Bedrock(14-30)
38	7143354	614328	4775239	2010	19	6	Agricultural	Brown clay (0-13) Brown clay with stones (13-18) Brown limestone (18-23) Brown limestone (24-50)
39	7175942	614328	4775239	2010	19	6	Agricultural	Brown clay (0-13) Brown clay with stones (13-18) Brown limestone (18-23) Brown limestone (24-50)
40	3803102	614473	4775165	1985	23	16	Agricultural	Brown clay (0-12) Brown shale (12-16) Brown limestone (16-48)
41	3801616	614222	4775220	1951	10	16	Agricultural	Brown clay (0-14) Grey shale (14-18) Grey limestone (18-44)
42	3803838	614498	4775702	1988	12	20	Agricultural	Brown clay (0-1) Grey clay (1-18) Grey clay (with boulders (18-252) Bedrock (22-60)

TABLE 2: SUMMARY OF PRIVATE WELL SURVEY
RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

ADDRESS	NAME	WELL TYPE	WATER LEVEL (mbgl)	WELL DEPTH (mbgl)	TREATMENT SYSTEMS	WELL USE	WELL DEMAND	COMMENTS
Grimsby Road (Highway 12)								
2901 Grimsby Road	Napa Auto Parts	Cistern						Business fills cistern for water supply.
2907 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply
2915 Grimsby Road	Unknown							No response, letter was left in mailbox.
2925 Grimsby Road	Unknown	Cistern						Property had a well several years ago. Property owner had the well decomissioned and a cistern installed.
2926 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply
2942 Grimsby Road	Fred & Joyce Bosschers	Drilled	Unknown	14.5	None	Agricultural	None	Household fills cistern for water supply. Well is used for landscaping - well used to irrigation of 6 acres of cropland from 2005-2009
2946 Grimsby Road	Unknown	Cistern						Business fills cistern for water supply.
2949 Grimsby Road	Unknown	Cistern						Household reported to fill a cistern for water supply according to neighbour. No response, letter was left in mailbox.
2950 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply
2954 Grimsby Road	Unknown							No response, letter was left in mailbox.
2955 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply

TABLE 2: SUMMARY OF PRIVATE WELL SURVEY
RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

ADDRESS	NAME	WELL TYPE	WATER LEVEL (mbgl)	WELL DEPTH (mbgl)	TREATMENT SYSTEMS	WELL USE	WELL DEMAND	COMMENTS
2957 Grimsby Road	Unknown	Cistern						Household reported to fill a cistern for water supply according to neighbour. No response, letter was left in mailbox.
2958 Grimsby Road	Unknown							No response, letter was left in mailbox.
2966 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply
2968 Grimsby Road	Unknown							No response, letter was left in mailbox.
2974 Grimsby Road	Unknown							No response, letter was left in mailbox.
2980 Grimsby Road	Unknown							No response, letter was left in mailbox.
2981 Grimsby Road	Unknown							No response, letter was left in mailbox.
2986 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply.
2990 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply. One well, buried at the front of the property. Not accessable. Currently not used.
2996 Grimsby Road	Unknown							No response, letter was left in mailbox.
3024 Grimsby Road	Unknown							No response, letter was left in mailbox.
3026 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply.
3032 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply.

TABLE 2: SUMMARY OF PRIVATE WELL SURVEY
RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

ADDRESS	NAME	WELL TYPE	WATER LEVEL (mbgl)	WELL DEPTH (mbgl)	TREATMENT SYSTEMS	WELL USE	WELL DEMAND	COMMENTS
3042 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply. Three wells on property. One at side of the house has been filled in. One near garage is a dug well; is caving in and collects rainwater. One in field at back of house; drilled to approximately 200 feet, but not currently in use.
3046 Grimsby Road	Unknown							No response, letter was left in mailbox.
3053 Grimsby Road	Unknown	Cistern						Household fills cistern for water supply.
Highway 20								
7224 Highway 20	Unknown	Cistern						Household fills cistern for water supply.
7226 Highway 20	Gary Davis	Drilled	Unknown	Unknown	None	Agricultural	11 cattle & a few chickens	Household fills cistern for water supply. Well water is used for farming purposes only. Good quantity of water. Poor quality of water. Heavy iron staining, hardness and sulphur.
7228 Highway 20	Unknown	Cistern						Household fills cistern for water supply.
7269 Highway 20	Lowden's Feed Supply	Cistern						Household fills cistern for water supply.
7283 Highway 20	Esso Gas Station & Chesters Chicken	Cistern						Household fills cistern for water supply.
7294 Highway 20	G&L Nursuries	Cistern						Household fills cistern for water supply.
7315 Highway 20	A. Van Egmond	Cistern						Business fills cistern for water supply.
7318 Highway 20	Unknown							No response, letter was left in mailbox.

TABLE 2: SUMMARY OF PRIVATE WELL SURVEY
RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

ADDRESS	NAME	WELL TYPE	WATER LEVEL (mbgl)	WELL DEPTH (mbgl)	TREATMENT SYSTEMS	WELL USE	WELL DEMAND	COMMENTS
7324 Highway 20	Unknown	Cistern						Household fills cistern for water supply.
7325 Highway 20	Unknown	Cistern						Household fills cistern for water supply.
7334 Highway 20	Unknown	Cistern						Household fills cistern for water supply.
7378 Highway 20	Julia & Martin Nurmi	Drilled	Unknown	Unknown	Softener for household	Household and farm	3 people 2 horses	Household use for everything except drinkning. Residents fill water containers for drinking within the city.
7423 Highway 20	Unknown	Cistern						Household fills cistern for water supply.
South Grimsby Road 8								
2856 S. Grimsby Road 8	Unknown	Cistern						Household fills cistern for water supply.
2870 S. Grimsby Road 8	Unknown							No response, letter was left in mailbox.
2878 S. Grimsby Road 8	Unknown	Cistern						Household fills cistern for water supply.
2892 S. Garimsby Road 8	Unknown	Cistern						Household fills cistern for water supply.
2906 S. Grimsby Road 8 (Niagara Pallet)	Fred Vrugteveen	Drilled	Unknown	Unknown	Filtration for iron and sulphur	Bathroom sink and toilets	Unknown	Well use for bathroom sink and toilet. Was unable to take water level or chemistry because well has an older cap with rusted bolts. Filtration system is hooked up directly to intake line.
2920 S. Grimsby Road 8	Unknown							No response, letter was left in mailbox.
2930 S. Grimsby Road 8	Unknown							No response, letter was left in mailbox.

TABLE 3: SUMMARY OF WATER QUALITY ANALYSIS
RESIDENTIAL SEVERANCE
GRIMSBY ROAD
WEST LINCOLN, ONTARIO

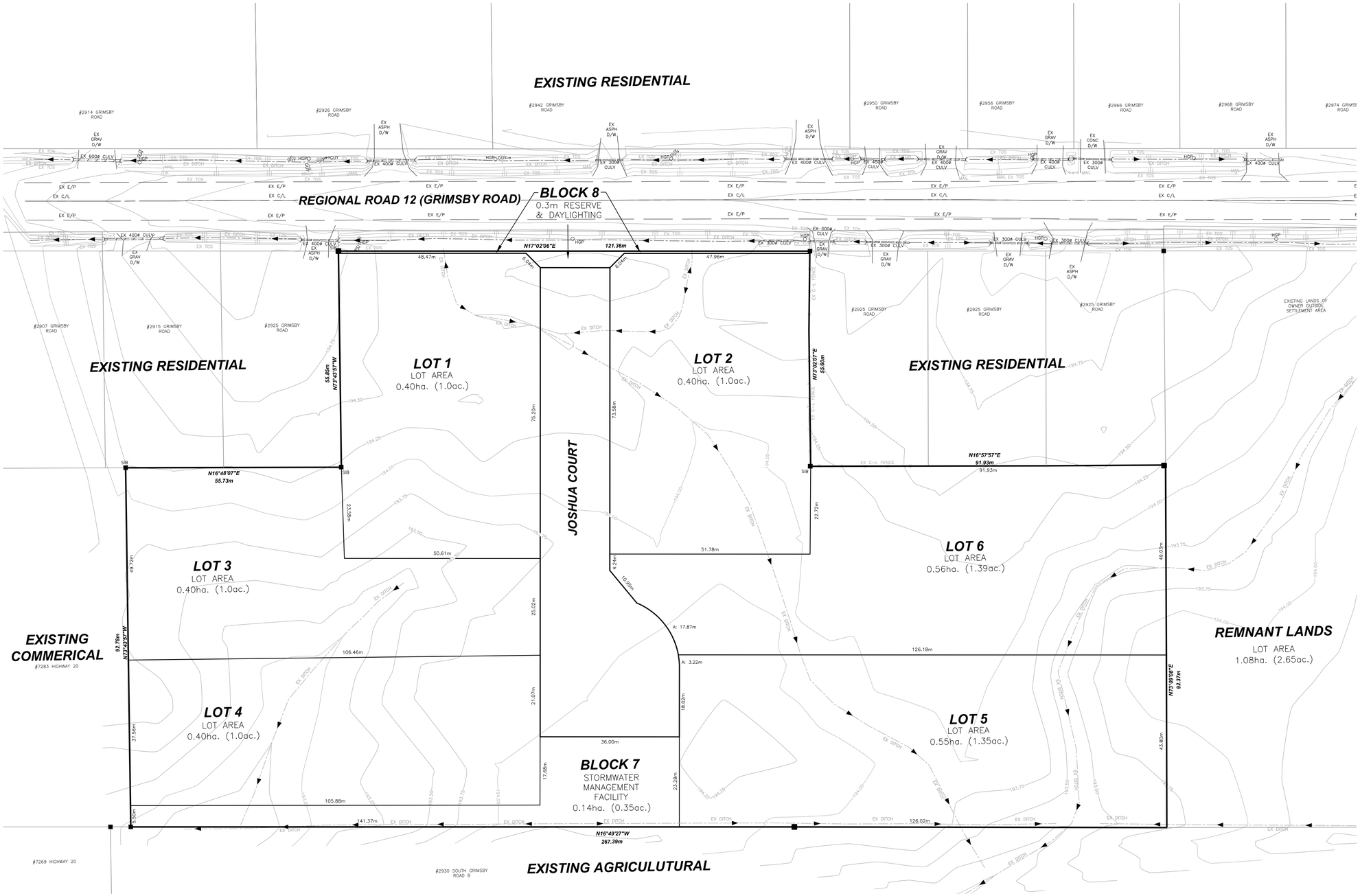
	Unit	ODWSOG MAC	ODWS AO/OG	7226 HWY 20	7378 HWY 20	2942 Grimsby Rd
09-Dec-19						
23-Dec-19						
GENERAL PARAMETERS						
Electrical Conductivity	uS/cm			3340	3140	1430
pH	pH Units		6.5 - 8.5	7.60	7.64	7.51
Total Dissolved Solids	mg/L		500	3370	2020	1260
Total Hardness (as CaCO3)	mg/L		80 - 100	2150	885	877
Alkalinity (as CaCO3)	mg/L		30 - 500	441	273	468
Fluoride	mg/L	1.5		<0.1	<1.0	<0.25
Chloride	mg/L		250	47.2	811	25.40
Bromide	mg/L			<1.0	<1.0	<0.25
Nitrate as N	mg/L	10.0		<1.0	6.2	<0.25
Nitrite as N	mg/L	1.0		<1.0	<1.0	<0.25
Sulphate	mg/L		500	1890	105.0	593
Ortho phosphate as P	mg/L			<2.0	<2.0	<0.50
Total Phosphorus	mg/L			0.21	0.04	0.09
Ammonia as N	mg/L			0.17	<0.02	0.31
Total Organic Carbon	mg/L		5	5.1	2.0	4.2
Reactive Silica	mg/L			15.3	11.4	14.2
Colour	TCU		5	189	<5	368
Turbidity	NTU		5	15.1	0.7	61.3
Calcium	mg/L			234.0	194.0	165.0
Magnesium	mg/L			381.0	97.3	113.0
Sodium	mg/L		200	98.7	194.00	58.50
Potassium	mg/L			6.60	3.97	2.53
METALS						
Aluminum	mg/L		0.1	0.011	0.007	0.012
Antimony	mg/L	0.006		<0.003	<0.003	<0.003
Arsenic	mg/L	0.01		<0.003	<0.003	0.01
Barium	mg/L	1		0.032	0.200	0.160
Beryllium	mg/L			<0.001	<0.001	<0.001
Boron	mg/L	5		0.066	0.044	0.019
Cadmium	mg/L	0.005		<0.001	0.002	<0.001
Chromium	mg/L	0.05		<0.003	<0.003	<0.003
Cobalt	mg/L			<0.001	<0.001	<0.001
Copper	mg/L		1	<0.003	0.004	<0.003
Iron	mg/L		0.3	3.7	0.1	12.7
Lead	mg/L	0.01		0.001	0.002	0.005
Manganese	mg/L		0.05	0.22	0.13	0.25
Mercury	mg/L	0.001		<0.0001	<0.0001	<0.0001
Molybdenum	mg/L			<0.002	<0.002	0.002
Nickel	mg/L			<0.003	<0.003	<0.003
Selenium	mg/L	0.05		<0.004	<0.004	<0.004
Silver	mg/L			<0.002	<0.002	<0.002
Strontium	mg/L			1.860	0.815	0.461
Thallium	mg/L			<0.006	<0.006	<0.006
Titanium	mg/L			0.023	0.002	0.006
Tungsten	mg/L			<0.010	<0.010	<0.010
Uranium	mg/L	0.02		0.004	0.002	0.003
Vanadium	mg/L			<0.002	<0.002	<0.002
Zinc	mg/L		5	0.051	0.585	0.177
Zirconium	mg/L			<0.004	<0.004	<0.004
MICROBIOLOGICAL ANALYSIS						
Escherichia coli	CFU/100mL	0		NDOGT	NDOGT	ND
Total Coliforms	CFU/100mL	0		NDOGT	NDOGT	ND

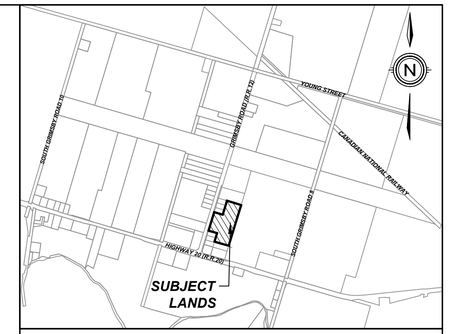
ODWS MAC - Ontario Drinking Water Standards and Operation Guidelines Maximum Acceptable Concentration
ODWS AO/OG - Ontario Drinking Water Standards Aesthetic Objective/Operational Guideline
NTU - Nephelometric Turbidity Units
CFU - Colony Forming Units
TCU - True Colour Units
ND - Not Detected

Appendix A
Draft Plan of Subdivision

ENGLOBE

JOSHUA COURT
TOWNSHIP OF WEST LINCOLN





KEY PLAN
N.T.S.

DRAFT PLAN OF SUBDIVISION

LEGAL DESCRIPTION

SOUTH GRIMSBY CONCESSION 8; PART LOTS 16 &17

OWNER'S CERTIFICATE

BEING THE REGISTERED OWNER, I HEREBY AUTHORIZE UPPER CANADA CONSULTANTS TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF WEST LINCOLN FOR APPROVAL.

RVL CONTRACTING DATE

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED ARE CORRECTLY SHOWN.

SURVEYOR'S NAME DATE

REQUIREMENTS OF SECTION 51(17) OF THE PLANNING ACT

a) SEE PLAN
b) SEE PLAN
c) SEE PLAN
d) RESIDENTIAL
e) SEE PLAN
f) SEE PLAN
g) SEE PLAN
h) WATER CISTERNS
i) SILTY CLAY
j) SEE PLAN
k) PRIVATE
l) SEE PLAN

LAND USE SCHEDULE

LAND USE	LOT/BLOCK	# OF UNITS	AREA(ha)	AREA(%)
SINGLE FAMILY RESIDENTIAL	LOT 1–6	6	2.72	86.35
STORMWATER MGMT FACILITY	BLOCK 7		0.14	4.44
0.3m RESERVE & DAYLIGHTING	BLOCK 8		0.01	0.32
ROADWAY			0.28	8.89
TOTAL		6	3.15	100.00

DEVELOPABLE AREA = 3.13ha (EXCLUDES DAYLIGHTING and 0.3m RESERVE)
DEVELOPABLE DENSITY = 1.92 units/ha

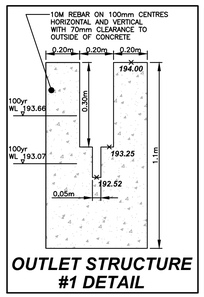
.	.	.	.
.	.	.	.
0	ISSUED FOR APPROVAL		Z.C
#	REVISION	DATE	INIT

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

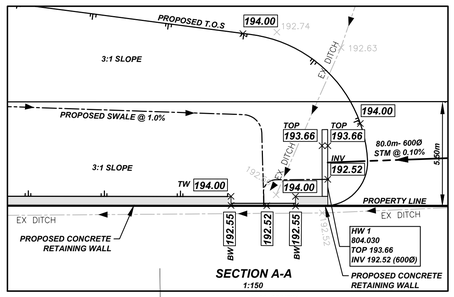
DRAWING TITLE
DRAFT PLAN OF SUBDIVISION

DRAFTING	Z.C
DATE	MARCH 15, 2024
PRINTED	MARCH 15, 2024
SCALE	1:500
DWG No.	REV
19126-DP	**0**

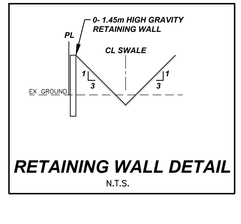
DRAWING FILE: F:\19126\Engineering\19126-BASE_ZC.dwg PLOTTED: Mar 15, 2024 – 1:12pm PLOTTED BY: zach



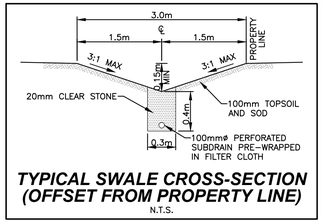
OUTLET STRUCTURE #1 DETAIL



SECTION A-A
1:150



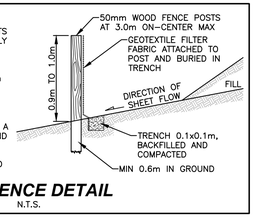
RETAINING WALL DETAIL
N.T.S.



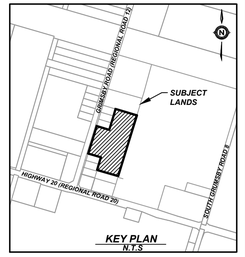
TYPICAL SWALE CROSS-SECTION (OFFSET FROM PROPERTY LINE)
N.T.S.

NOTES:

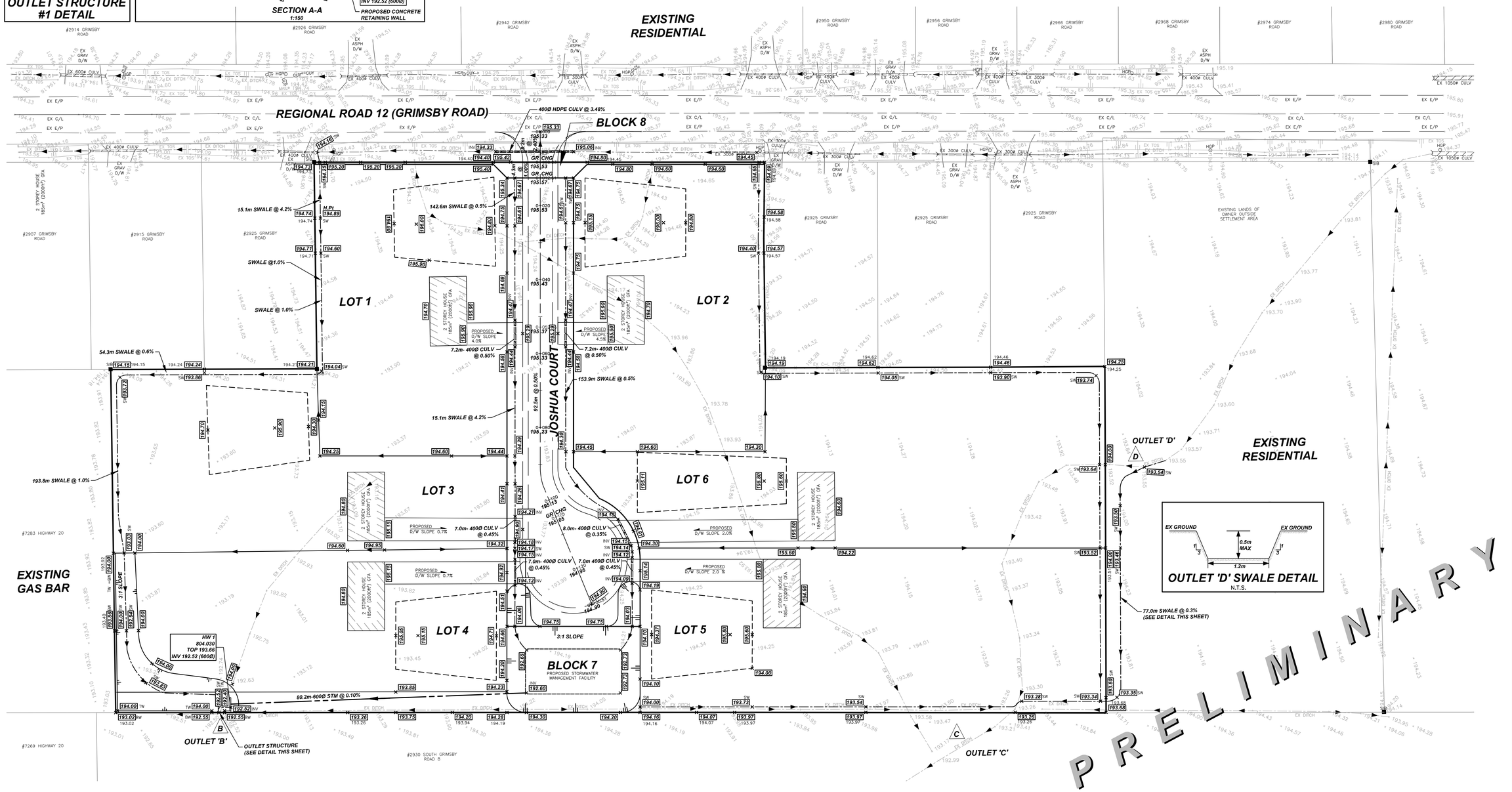
1. THIS TYPE OF FILTER BARRIER CONSISTS OF GEOTEXTILE FILTER FABRIC SECURELY ATTACHED ON THE UPSTREAM SIDE.
2. SILT FENCES SHOULD BE USED ONLY FOR INTERCEPTING SHEET FLOWS OF DRAINAGE AREA NO LONGER THAN 30m AND NO STEEPER THAN 2:1.
3. THE FENCE HEIGHT SHOULD BE 0.9m TO 1.0m AND THE LENGTH APPROX. 30m PER 1000m² OF DRAINAGE AREA.
4. THE FABRIC IS TO BE RECESSED INTO A TRENCH 0.1m x 0.1m, BACKFILLED, AND COMPACTED.
5. FENCE POST SHOULD BE SPACED NO MORE THAN 3.0m APART AND SET INTO THE GROUND AT LEAST 0.6m.



SILT FENCE DETAIL
N.T.S.



KEY PLAN
N.T.S



OUTLET 'D' SWALE DETAIL
N.T.S.

NOTES:

1. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.
3. ALL CONSTRUCTION MUST COMPLY WITH THE NIAGARA PENINSULA STANDARD CONTRACT DOCUMENT.

#	REVISION	DATE	INIT
0	ISSUED FOR REVIEW		Z.C

DRAFTING	Z.C
DESIGN	J.S
CHECKED BY	J.S
APPROVED BY	J.S

West Lincoln
Your Future Naturally

UPPER CANADA CONSULTANTS
ENGINEERS / PLANNERS

JOSHUA COURT SUBDIVISION
WEST LINCOLN

SITE GRADING PLAN

CONSULTANT FILE No.	19126
DATE	2024-03-14
PRINTED	2024-03-14
SCALE	1:500 m
REF No.	
DWG No.	19126-SGP
REV	0

DRAWING FILE: F:\19126\Engineering\19126-BASE_ZC.dwg PLOTTED: Mar 14, 2024 - 1:45pm PLOTTED BY: zachb

Appendix B
Test Pit Logs and Grain Size Analysis

ENGLOBE

LOG OF TEST PIT 1

Terraprobe

Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	SAMPLES Number	SAMPLES Type	Elevation Scale (m)	Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Unstabilized Water Level	Lab Data and Comments
0.0		**GROUND SURFACE**					○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160	Plastic Limit / Natural Water Content / Liquid Limit; PL MC LL; 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		200mm **TOPSOIL**									
	0.2	**SILTY CLAY**, trace sand, trace organics, iron staining, grey / brown									
0.5				1	GS						0 2 30 68
1.0											
1.5				2	GS					▽	
2.0											
2.5		...becoming dense									
3.0				3	GS						
	3.4	**END OF TEST PIT**									

Unstabilized water level measured at 2.2m below grade; test pit was open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj

Terraprobe

LOG OF TEST PIT 2

Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	Elevation Scale (m)	Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Unstabilized Water Level	Lab Data and Comments
		GROUND SURFACE					○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160	Plastic Limit / Natural Water Content / Liquid Limit; PL MC LL; 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0.0		150mm **TOPSOIL**									
	0.2	**CLAYEY SILT**, trace sand, trace organics, iron staining, grey / brown		1	GS						
0.5											
1.0											
1.5											
				2	GS					▽	
2.0											
	2.1	**SILTY CLAY**, trace sand, dense, grey / brown									
2.5											
				3	GS						
3.0											
	3.1	**END OF TEST PIT**									

Unstabilized water level measured at 1.8m below grade; test pit was open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj

LOG OF TEST PIT 3

Terraprobe

Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	Elevation Scale (m)	Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Unstabilized Water Level	Lab Data and Comments
		GROUND SURFACE					Unconfined ○ Pocket Penetrometer ● Field Vane + Lab Vane ■ 40 80 120 160	Plastic Limit / Natural Water Content / Liquid Limit PL MC LL 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0.0		150mm **TOPSOIL**									
	0.2	**SILTY CLAY**, trace sand, trace organics, grey / brown		1	GS						0 4 30 66
				2	GS						
1.0											
1.5				3	GS						
2.0											
2.5	2.5	**CLAYEY SILT**, trace sand, dense, grey / brown		4	GS					▽	
3.0											
	3.2	**END OF TEST PIT**									

Unstabilized water level measured at 2.5m below grade; test pit was open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj

LOG OF TEST PIT 4

Terraprobe

Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	Elevation Scale (m)
0.0		**GROUND SURFACE**				
		300mm **TOPSOIL**				
	0.3	**SILTY CLAY**, trace organics, grey / brown		1	GS	
0.5						
		...trace boulders and sand				
1.0						
1.5						
				2	GS	
2.0		...becoming dense				
2.5						
3.0				3	GS	
	3.2	**END OF TEST PIT**				

Undrained Shear Strength (kPa): ○ Unconfined, ● Pocket Penetrometer, + Field Vane, ■ Lab Vane — 40, 80, 120, 160

Moisture / Plasticity: Plastic Limit (PL) 10 — Natural Water Content (MC) 20 — Liquid Limit (LL) 30

Headspace Vapour (ppm)

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT): GR SA SI CL

Test pit was dry and open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj

Terraprobe

LOG OF TEST PIT 5

Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	SAMPLES Number	SAMPLES Type	Elevation Scale (m)	Undrained Shear Strength (kPa): ○ Unconfined, ● Pocket Penetrometer, + Field Vane, ■ Lab Vane (40 80 120 160)	Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit (PL MC LL; 10 20 30)	Headspace Vapour (ppm)	Unstabilized Water Level	Lab Data and Comments / GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0.0		**GROUND SURFACE**									
		200mm **TOPSOIL**									
	0.2	**SILTY CLAY**, trace sand, grey / brown		1	GS						
0.5											
1.0											
1.5											
2.0				2	GS						
2.5		...becoming dense								▽	
				3	GS						
3.0											
	3.1	**END OF TEST PIT**									

Unstabilized water level measured at 2.5m below grade; test pit was open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj

Terraprobe

LOG OF TEST PIT 6

Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	Elevation Scale (m)	Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Unstabilized Water Level	Lab Data and Comments
		GROUND SURFACE					○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160	Plastic Limit / Natural Water Content / Liquid Limit; PL MC LL; 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
0.0		150mm **TOPSOIL**									
	0.2	**SILTY CLAY**, grey / brown		1	GS						0 1 31 68
0.5											
1.0											
1.5											
2.0				2	GS						
2.5		...becoming dense									
				3	GS						
3.0	3.1	**END OF TEST PIT**									

Test pit was dry and open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj

LOG OF TEST PIT 7

Terraprobe

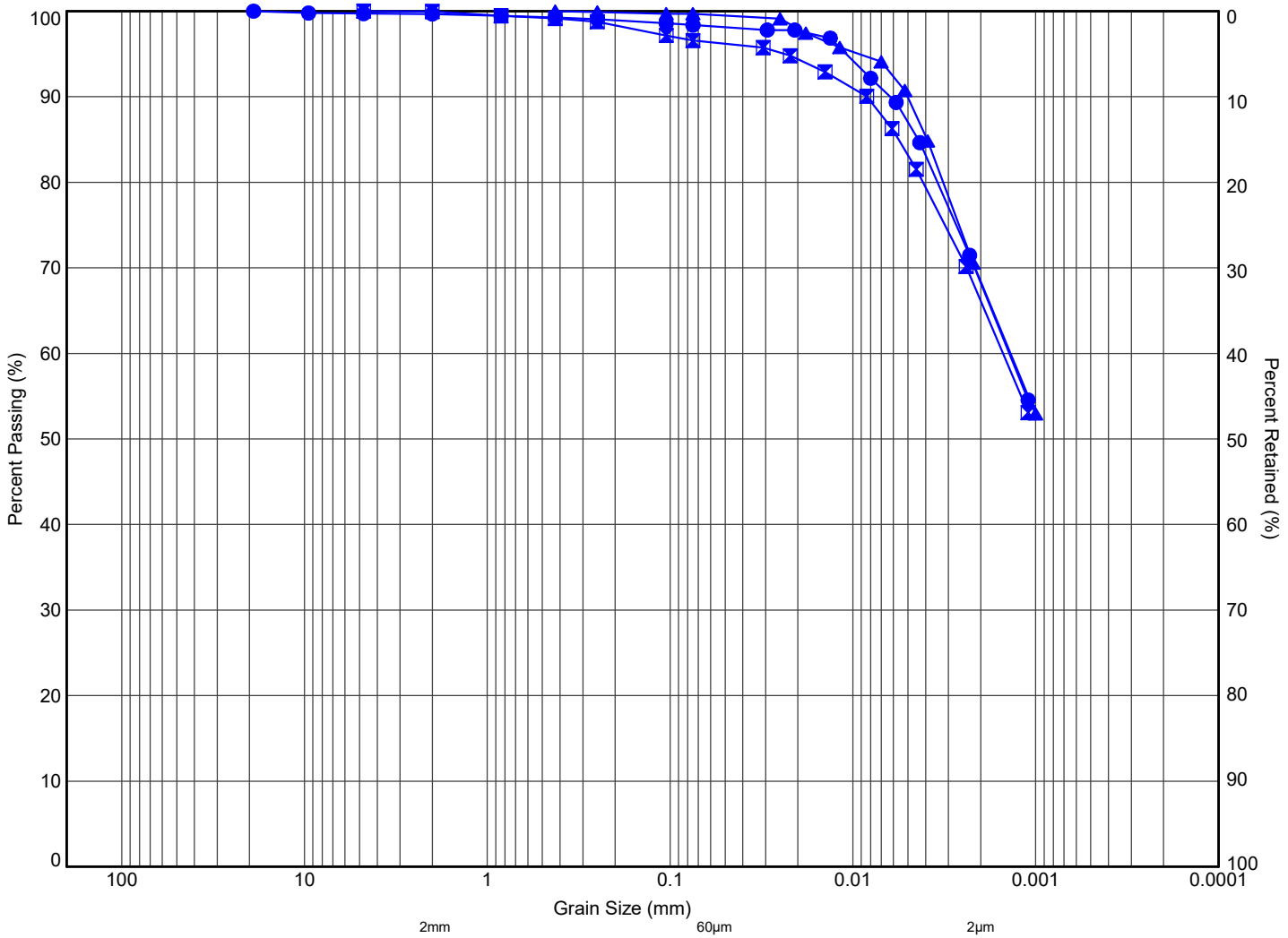
Project No.	: 7-19-0159-46	Client	: RVL Contracting	Originated by	: AB
Date started	: January 13, 2020	Project	: Regional Road 12	Compiled by	: PR
Sheet No.	: 1 of 1	Location	: Hamlet West Lincoln, Ontario	Checked by	: PR

Position :
Elevation Datum : Geodetic
Rig type : Backhoe
Drilling Method :

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	SAMPLES Number	SAMPLES Type	Elevation Scale (m)	Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Unstabilized Water Level	Lab Data and Comments
0.0		**GROUND SURFACE**					○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160	Plastic Limit / Natural Water Content / Liquid Limit; PL MC LL; 10 20 30			GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		150mm **TOPSOIL**									
	0.2	**SILTY CLAY**, trace sand, trace organics, iron staining, grey / brown		1	GS						
0.5											
1.0											
				2	GS						
1.5		...becoming dense									
2.0										▽	
2.5											
3.0											
				3	GS						
	3.4	**END OF TEST PIT**									

Unstabilized water level measured at 2.0m below grade; test pit was open upon completion of excavation.

file: 7-19-0159-46 - rr12 hamlet.gpj



MIT SYSTEM	COBBLES	GRAVEL			SAND			SILT	CLAY
		COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE		

MIT SYSTEM

	Hole ID	Sample	Depth (m)	Elev. (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	*(Fines, %)*
●	**1**	GS1	1.2		0	2	30	68	
⊠	**3**	GS1	0.7		0	4	30	66	
▲	**6**	GS1	0.7		0	1	31	68	

Terraprobe
903 Barton Street, Unit 22, Stoney Creek ON L8E 5P5
(905) 643-7560

Title: **GRAIN SIZE DISTRIBUTION**

File No.: **7-19-0159-46**

Appendix C
Well Survey Materials

ENGLOBE

Terraprobe
Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

December 18, 2019

File No. 7-19-0159-46
Stoney Creek Office

RE: PRIVATE WELL SURVEY
HYDROGEOLOGICAL STUDY – ENVIRONMENTAL ASSESSMENT
GRIMSBY ROAD RESIDENTIAL SEVERENCE
PART OF LOT 17, CONCESSION 8
TOWNSHIP OF WEST LINCOLN

Dear Resident/Property Owner:

Terraprobe was retained by RVL Contracting to complete a well survey for residences within a 500 m radius of the above property. The subject property is comprised of an irregular parcel of land covering an area of approximately 8.1 acres (3.3 hectares) located east of Grimsby Road approximately 175 m north of Regional Road 20. The site is currently undeveloped and consists of an agricultural field. It is proposed to sever the property to create seven residential lots between 1.0 to 1.3 acres in size. The proposed residential lots are to be serviced with private water supply wells and septic tile beds on a proposed cul-de-sac road.

This well survey is being completed to determine the locations of private supply wells surrounding the subject property and to obtain information to the construction details and operational history of water supply wells surrounding the subject property. Baseline water level measurements and water quality sampling will be completed where private wells are accessible and permission is granted by property owners to document the existing condition and quality of ground water in the vicinity of the site prior to development.

As part of the well survey, a representative of Terraprobe has visited your home to complete a brief questionnaire regarding the operating history and construction details of your well. This letter was left because you were not present when our representative visited your home. The information we hope to obtain will include:

1. The location of well(s) and septic bed, if known;
2. The depth, diameter and construction details of the well(s);
3. The pump type and depth, and any water treatment systems in use;
4. Information regarding the past performance of the well(s) (i.e. water quality and yield).

As part of the well survey Terraprobe is collecting water quality samples and will measure and document the ground water level and well depth should wells be accessible. This information will be used to provide a baseline assessment of

ground water conditions surrounding the site. Water quality sampling will be submitted to a third party accredited laboratory for analysis. All results will be made available to residents at no cost.

Should you be interested in participating the private well survey please contact Paul Raepple of Terraprobe at (905) 643-7560, or by email at praepple@terraprobe.ca. Any questions you may have regarding the well survey and monitoring program can be answered at that time. A copy of the completed questionnaire can be provided to you upon your request. We encourage participation in the survey so that a detailed inventory of private wells and background water quality and ground water levels in the vicinity of the proposed residential development can be compiled and assessed in advance of the proposed works.

We understand that your participation in this survey is voluntary; however your co-operation is greatly appreciated. Thank you for your consideration of our private well survey.

Yours truly,
Terraprobe Inc.

Paul Raepple, P.Geo.

Terraprobe

Private Well Survey

PROJECT No.

I.D. No. _____

OWNER _____ ORIGINAL OWNER _____

ADDRESS _____

LOT/CONC./TWP. _____ PHONE _____

DATE

_____

_____

_____

WELL DETAILS

TYPE _____ DIAMETER _____

CASING _____ SCREEN _____

PUMP TYPE & DEPTH _____

WATER TREATMENT _____

DATE CONSTRUCTED _____

DEPTH _____ Meas/Stated

WATER LEVEL _____ b.m.p.

STICK-UP _____ a.g.l.

INSPECTION NOTES :

_____

_____

_____

_____

_____

_____

_____

_____

WELL USE

WELL USE _____

No. OF RESIDENTS _____

WATER QUALITY _____

WATER QUANTITY _____

EVER BOUGHT WATER? _____

WHEN? WHY? _____

PREVIOUS PROBLEMS WITH WELL (WHEN?)

_____

_____

_____

_____

_____

COMMENTS:

_____

_____

_____

_____

WELL CONSTRUCTION

WELL LOCATION / SEPTIC

NOTES:

GEODeTIC ELEVATION: _____

MOE WELL No.: _____

OWNER: _____

ENGINEER: _____

PERMISSION TO SURVEY WELL: _____

Appendix D
Laboratory Certificates of Analysis

ENGLOBE

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPROBE INC
903 Barton Street
Stoney Creek, ON L8E5P5
(905) 643-7560

ATTENTION TO: Paul Raepple

PROJECT: 7-19-0159-46

AGAT WORK ORDER: 19H554047

MICROBIOLOGY ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

WATER ANALYSIS REVIEWED BY: Jacky Zhu, Spectroscopy Technician

DATE REPORTED: Dec 16, 2019

PAGES (INCLUDING COVER): 11

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

Total Coliforms & E. Coli (Using MI Agar)

DATE RECEIVED: 2019-12-09

DATE REPORTED: 2019-12-16

				SAMPLE DESCRIPTION:	7226	7378
				SAMPLE TYPE:	Water	Water
				DATE SAMPLED:	2019-12-09	2019-12-09
Parameter	Unit	G / S	RDL		787674	787820
Escherichia coli	CFU/100mL		1		NDOGT	NDOGT
Total Coliforms	CFU/100mL		1		NDOGT	NDOGT

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

787674-787820 NDOGT - No Data; Overgrown with Target, refers to over-crowding microbial growth.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Vivine Basily

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - Drinking Water (mg/L)

DATE RECEIVED: 2019-12-09

DATE REPORTED: 2019-12-16

		SAMPLE DESCRIPTION:		7226	7378
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-12-09	2019-12-09
Parameter	Unit	G / S	RDL	787674	787820
Electrical Conductivity	µS/cm		2	3340	3140
pH	pH Units		NA	7.60	7.64
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	2150	885
Total Dissolved Solids	mg/L		20	3370	2020
Alkalinity (as CaCO3)	mg/L		5	441	273
Fluoride	mg/L	1.5	1.0	<1.0	<1.0
Chloride	mg/L		2.0	47.2	811
Nitrate as N	mg/L	10.0	1.0	<1.0	6.2
Nitrite as N	mg/L	1.0	1.0	<1.0	<1.0
Bromide	mg/L		1.0	<1.0	<1.0
Sulphate	mg/L		2.0	1890	105
Ortho Phosphate as P	mg/L		2.0	<2.0	<2.0
Reactive Silica	mg/L		0.05	15.3	11.4
Ammonia + Ammonium as N	mg/L		0.02	0.17	<0.02
Total Phosphorus	mg/L		0.02	0.21	0.04
Total Organic Carbon	mg/L		0.5	5.1	2.0
Colour	Apparent CU		5	189	<5
Turbidity	NTU		0.5	15.1	0.7
Total Calcium	mg/L		0.25	234	194
Total Magnesium	mg/L		0.25	381	97.3
Total Sodium	mg/L	20	0.25	98.7	194
Total Potassium	mg/L		0.25	6.60	3.97
Total Aluminum	mg/L		0.004	0.011	0.007
Total Antimony	mg/L	0.006	0.003	<0.003	<0.003
Total Arsenic	mg/L	0.01	0.003	<0.003	<0.003
Total Barium	mg/L	1	0.002	0.032	0.200
Total Beryllium	mg/L		0.001	<0.001	<0.001
Total Boron	mg/L	5	0.010	0.066	0.044
Total Cadmium	mg/L	0.005	0.001	<0.001	0.002

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - Drinking Water (mg/L)

DATE RECEIVED: 2019-12-09

DATE REPORTED: 2019-12-16

		SAMPLE DESCRIPTION:		7226	7378
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2019-12-09	2019-12-09
Parameter	Unit	G / S	RDL	787674	787820
Total Chromium	mg/L	0.05	0.003	<0.003	<0.003
Total Cobalt	mg/L		0.001	<0.001	<0.001
Total Copper	mg/L		0.003	<0.003	0.004
Total Iron	mg/L		0.010	3.66	0.117
Total Lead	mg/L	0.01	0.001	0.001	0.002
Total Manganese	mg/L		0.002	0.215	0.133
Total Mercury	mg/L	0.001	0.0001	<0.0001	<0.0001
Total Molybdenum	mg/L		0.002	<0.002	<0.002
Total Nickel	mg/L		0.003	<0.003	<0.003
Total Selenium	mg/L	0.05	0.004	<0.004	<0.004
Total Silver	mg/L		0.002	<0.002	<0.002
Total Strontium	mg/L		0.005	1.86	0.815
Total Thallium	mg/L		0.006	<0.006	<0.006
Total Titanium	mg/L		0.002	0.023	0.002
Total Tungsten	mg/L		0.010	<0.010	<0.010
Total Uranium	mg/L	0.02	0.002	0.004	0.002
Total Vanadium	mg/L		0.002	<0.002	<0.002
Total Zinc	mg/L		0.005	0.051	0.585
Total Zirconium	mg/L		0.004	<0.004	<0.004

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

787674-787820 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

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CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
787674	7226	O.Reg.169/03(mg/L)	Water Quality Assessment - Drinking Water (mg/L)	Total Sodium	mg/L	20	98.7
787820	7378	O.Reg.169/03(mg/L)	Water Quality Assessment - Drinking Water (mg/L)	Total Sodium	mg/L	20	194

AGAT Laboratories

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Quality Assurance

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

Microbiology Analysis

RPT Date: Dec 16, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Coliforms & E. Coli (Using MI Agar)															
Escherichia coli	787674	787674	NDOGT	NDOGT	NA	< 1									
Total Coliforms	787674	787674	NDOGT	NDOGT	NA	< 1									

Comments: NDOGT - No Data; Overgrown with Target, refers to over-crowding microbial growth.NA - % RPD Not Applicable.

Certified By: Nivine Basily

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Quality Assurance

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Dec 16, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - Drinking Water (mg/L)															
Electrical Conductivity	755648		673	669	0.6%	< 2	96%	80%	120%						
pH	786414		7.98	8.06	1.0%	NA	100%	90%	110%						
Total Dissolved Solids	787674	787674	3370	3470	2.9%	< 20	102%	80%	120%						
Alkalinity (as CaCO3)	786414		86	86	0.0%	< 5	97%	80%	120%						
Fluoride	783952		<0.25	<0.25	NA	< 0.05	106%	90%	110%	104%	90%	110%	101%	85%	115%
Chloride	783952		26.0	25.3	2.7%	< 0.10	91%	90%	110%	99%	90%	110%	104%	85%	115%
Nitrate as N	783952		1.12	1.09	2.7%	< 0.05	95%	90%	110%	98%	90%	110%	103%	85%	115%
Nitrite as N	783952		<0.25	<0.25	NA	< 0.05	NA	90%	110%	102%	90%	110%	100%	85%	115%
Bromide	783952		<0.25	<0.25	NA	< 0.05	104%	90%	110%	93%	90%	110%	102%	85%	115%
Sulphate	783952		362	352	2.8%	< 0.10	99%	90%	110%	100%	90%	110%	103%	85%	115%
Ortho Phosphate as P	783952		<0.50	<0.50	NA	< 0.10	95%	90%	110%	97%	90%	110%	94%	80%	120%
Reactive Silica	787674	787674	15.3	15.3	0.0%	< 0.05	102%	90%	110%	106%	90%	110%	90%	80%	120%
Ammonia + Ammonium as N	787674	787674	0.17	0.16	6.1%	< 0.02	100%	90%	110%	102%	90%	110%	99%	70%	130%
Total Phosphorus	787674	787674	0.21	0.22	4.7%	< 0.02	92%	90%	110%	92%	90%	110%	106%	80%	120%
Total Organic Carbon	787674	787674	5.1	5.2	1.9%	< 0.5	101%	90%	110%	103%	90%	110%	96%	80%	120%
Colour	787674	787674	189	189	0.0%	< 5	99%	90%	110%						
Turbidity	787325		<0.5	<0.5	NA	< 0.5	98%	90%	110%						
Total Calcium	787674	787674	234	236	0.9%	< 0.05	96%	90%	110%	96%	90%	110%	88%	70%	130%
Total Magnesium	787674	787674	381	384	0.8%	< 0.05	98%	90%	110%	97%	90%	110%	90%	70%	130%
Total Sodium	787674	787674	98.7	99.8	1.1%	< 0.05	100%	90%	110%	99%	90%	110%	92%	70%	130%
Total Potassium	787674	787674	6.60	6.64	0.6%	< 0.05	99%	90%	110%	99%	90%	110%	93%	70%	130%
Total Aluminum	787674	787674	0.011	0.010	NA	< 0.004	100%	90%	110%	99%	90%	110%	92%	70%	130%
Total Antimony	787674	787674	<0.003	<0.003	NA	< 0.003	98%	90%	110%	91%	90%	110%	87%	70%	130%
Total Arsenic	787674	787674	<0.003	<0.003	NA	< 0.003	102%	90%	110%	98%	90%	110%	97%	70%	130%
Total Barium	787674	787674	0.032	0.033	3.1%	< 0.002	95%	90%	110%	97%	90%	110%	94%	70%	130%
Total Beryllium	787674	787674	<0.001	<0.001	NA	< 0.001	100%	90%	110%	98%	90%	110%	92%	70%	130%
Total Boron	787674	787674	0.066	0.071	7.3%	< 0.010	102%	90%	110%	102%	90%	110%	97%	70%	130%
Total Cadmium	787674	787674	<0.001	<0.001	NA	< 0.001	100%	90%	110%	98%	90%	110%	109%	70%	130%
Total Chromium	787674	787674	<0.003	<0.003	NA	< 0.003	98%	90%	110%	98%	90%	110%	95%	70%	130%
Total Cobalt	787674	787674	<0.001	<0.001	NA	< 0.001	94%	90%	110%	94%	90%	110%	90%	70%	130%
Total Copper	787674	787674	<0.003	<0.003	NA	< 0.003	101%	90%	110%	103%	90%	110%	86%	70%	130%
Total Iron	787674	787674	3.66	3.72	1.6%	< 0.010	104%	90%	110%	107%	90%	110%	82%	70%	130%
Total Lead	787674	787674	0.001	<0.001	NA	< 0.001	92%	90%	110%	92%	90%	110%	91%	70%	130%
Total Manganese	787674	787674	0.215	0.220	2.3%	< 0.002	97%	90%	110%	97%	90%	110%	90%	70%	130%
Total Mercury	787674	787674	<0.0001	<0.0001	NA	< 0.0001	104%	90%	110%	104%	80%	120%	99%	80%	120%
Total Molybdenum	787674	787674	<0.002	<0.002	NA	< 0.002	101%	90%	110%	99%	90%	110%	105%	70%	130%
Total Nickel	787674	787674	<0.003	<0.003	NA	< 0.003	105%	90%	110%	104%	90%	110%	92%	70%	130%
Total Selenium	787674	787674	<0.004	<0.004	NA	< 0.004	98%	90%	110%	94%	90%	110%	102%	70%	130%
Total Silver	787674	787674	<0.002	<0.002	NA	< 0.002	102%	90%	110%	103%	90%	110%	101%	70%	130%

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Quality Assurance

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Dec 16, 2019

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Strontium	787674	787674	1.86	1.91	2.7%	< 0.005	95%	90%	110%	93%	90%	110%	87%	70%	130%
Total Thallium	787674	787674	<0.006	<0.006	NA	< 0.006	96%	90%	110%	102%	90%	110%	90%	70%	130%
Total Titanium	787674	787674	0.023	0.024	4.3%	< 0.002	99%	90%	110%	97%	90%	110%	98%	70%	130%
Total Tungsten	787674	787674	<0.010	<0.010	NA	< 0.010	96%	90%	110%	94%	90%	110%	98%	70%	130%
Total Uranium	787674	787674	0.004	0.005	NA	< 0.002	96%	90%	110%	91%	90%	110%	98%	70%	130%
Total Vanadium	787674	787674	<0.002	<0.002	NA	< 0.002	94%	90%	110%	93%	90%	110%	96%	70%	130%
Total Zinc	787674	787674	0.051	0.051	0.0%	< 0.005	98%	90%	110%	96%	90%	110%	87%	70%	130%
Total Zirconium	787674	787674	<0.004	<0.004	NA	< 0.004	95%	90%	110%	93%	90%	110%	98%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

AGAT Laboratories
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Method Summary

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration

AGAT Laboratories

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Method Summary

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H554047

PROJECT: 7-19-0159-46

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6016	SM 2510 B	EC METER
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3) (Calculated)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6070	QuickChem 10-114-27-1-A & SM 4500 Si-F	LACHAT FIA
Ammonia + Ammonium as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 C	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Total Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
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Short Holding Time

P: 905.712.5100 • F: 905.712.5122 • TF: 1.800.856.6261

Drinking Water Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (complete notes)
Arrival Temperature: 9.2, 9.0, 9.4
AGAT Job Number: 19H554047
Notes: 6, 6.4, 6.8
On ice → 1 large cooler

Client Information

Company: Terraprobe Inc
Contact: Paul Raepple
Address: 903 Burton St
Stoney Creek, ON,
Phone: 905-643-7460 Fax:
PO #:
Client Project #: 7-19-0159-46
AGAT Quotation #:

Report Information

1. Name: Paul Raepple
Email: praepple@terraprobe.ca
2. Name:
Email:

Report Format

☑ Single Sample per page
☐ Multiple Samples per page

Facility Type (Check all that are applicable)

☐ Large OR ☑ Small
☑ Residential OR ☐ Non-Residential
☐ Municipal OR ☐ Non-Municipal

+ Water Type (Specify in column below)

Raw (R), Treated (TR), Distribution (D), Tap (TP) Private Well (P)

Turnaround Time Required (TAT) *

Regular TAT	7 to 14 business days	☐	Sch 23/24 only
	5 to 7 business days	☑	
Rush TAT (please provide prior notification)	3 to 4 business days	☐	**Rush surcharges apply**
	2 business days	☐	
	1 business days	☐	

Date Required (Rush surcharges may apply):

Requirements (Check one)

☐ O. Regulation 170 ☑ Not Applicable
☐ O. Regulation 243 ☐ Other (Please Specify)
☐ O. Regulation 318/319

IS THIS WATER BEING CONSUMED BY HUMANS? ☐ Yes ☑ No
DO THE RESULTS REQUIRE REPORTING TO THE MOECC'S DWIS OR MOH'S LRMA? ☐ Yes ☑ No
RAW WATER SAMPLES - CONSUMED BY HUMANS? ☐ Yes ☑ No

CLIENT IS RESPONSIBLE TO COMPLETE AND SUBMIT LAB SERVICE NOTIFICATION (LSN) FORM TO THE MOECC/PHU. FAILURE TO DO SO MAY DELAY REPORTING.
"NOTIFICATION INFORMATION" MUST BE COMPLETE BELOW UPON SUBMISSION OF SAMPLES. LABORATORY ANALYSIS WILL NOT COMMENCE UNTIL ALL INFORMATION HAS BEEN PROVIDED.

SAMPLE IDENTIFICATION/LOCATION	DATE SAMPLED	TIME SAMPLED	WATER TYPE *	# OF CONTAINERS	CHLORINE RESIDUAL (incl. Units)	STANDING	FLUSHED	COMMENTS/STANDING TIME (IN MINUTES)	Inorganics (Sch. 23)	Organics (Sch. 24)	Lead	Fluoride	Sodium	Turbidity	Nitrate, Nitrite	Trihalomethanes	E.coli, Total Coliforms	W&A
7226	Dec 9/19	1:30pm	P	7			✓	Not filtered with Preservative									✓	✓
7378	Dec 9/19	1:00pm	P	7			✓	Not filtered with Preservative									✓	✓

Samples Taken By (Print Name and Sign):

* TAT is exclusive of weekends and statutory holidays. Prior arrangements must be made with the laboratory in order to submit Microbiology samples on Fridays

NOTIFICATION INFORMATION - (required to report adverse results as per the *Safe Drinking Water Act*) - **Laboratory analysis will not commence until all information is received.**

INFORMATION FOR ADVERSE REPORTING			MEDICAL OFFICER OF HEALTH (MOH)	
Waterworks Name:	Phone:	Fax:	Region:	
MOECC# (ie: Waterworks #):	After Hours Phone: Non Reportable		PHU Contact:	
Contact:	Address/Location (if different from client above)		Phone:	Fax:
Email:			Email:	

	Date/Time		Date/Time
Samples Relinquished By (Print Name and Sign): Amanda Burden	Dec 9/19 @4pm	Samples Received By (Print Name and Sign): Chris Tabone	Dec 9/19 4:00pm
Samples Relinquished By (Print Name and Sign): Daniella Jaic	Dec 10/19	Samples Received By (Print Name and Sign): John Chyopha	Dec 10 11:20
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign): John Chyopha	Dec 10

Print Copy - Client
Yellow/Golden Copy - AGAT
White Copy - AGAT

Page 1 of 1

N°: DW 57170

Document #: DW-78-1512.009

Date Revised: March 6, 2015

AGAT Laboratories

5835 COOPERS AVENUE
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FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: TERRAPROBE INC
903 Barton Street
Stoney Creek, ON L8E5P5
(905) 643-7560

ATTENTION TO: Paul Raepple

PROJECT:

AGAT WORK ORDER: 19H558965

MICROBIOLOGY ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Jan 02, 2020

PAGES (INCLUDING COVER): 11

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 19H558965

PROJECT:

CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:Amanda B.

Total Coliforms & E. Coli (Using MI Agar)

DATE RECEIVED: 2019-12-23

DATE REPORTED: 2020-01-02

			SAMPLE DESCRIPTION:	2942
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2019-12-23
Parameter	Unit	G / S	RDL	827036
Escherichia coli	CFU/100mL		1	ND
Total Coliforms	CFU/100mL		1	ND

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

827036 If RDL >1 indicates dilutions of the sample.
ND - Not Detected.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Vivine Basily

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 19H558965

PROJECT:

CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:Amanda B.

Water Quality Assessment - Drinking Water (mg/L)

DATE RECEIVED: 2019-12-23

DATE REPORTED: 2020-01-02

		SAMPLE DESCRIPTION:		2942
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-12-23
Parameter	Unit	G / S	RDL	827036
Electrical Conductivity	µS/cm		2	1430
pH	pH Units		NA	7.51
Total Hardness (as CaCO3) (Calculated)	mg/L		0.5	877
Total Dissolved Solids	mg/L		20	1260
Alkalinity (as CaCO3)	mg/L		5	468
Fluoride	mg/L	1.5	0.25	<0.25
Chloride	mg/L		0.50	25.4
Nitrate as N	mg/L	10.0	0.25	<0.25
Nitrite as N	mg/L	1.0	0.25	<0.25
Bromide	mg/L		0.25	<0.25
Sulphate	mg/L		1.0	593
Ortho Phosphate as P	mg/L		0.50	<0.50
Reactive Silica	mg/L		0.05	14.2
Ammonia + Ammonium as N	mg/L		0.02	0.31
Total Phosphorus	mg/L		0.02	0.09
Total Organic Carbon	mg/L		0.5	4.2
Colour	Apparent CU		5	368
Turbidity	NTU		0.5	61.3
Total Calcium	mg/L		0.10	165
Total Magnesium	mg/L		0.10	113
Total Sodium	mg/L	20	0.10	58.5
Total Potassium	mg/L		0.10	2.53
Total Aluminum	mg/L		0.004	0.012
Total Antimony	mg/L	0.006	0.003	<0.003
Total Arsenic	mg/L	0.01	0.003	0.011
Total Barium	mg/L	1	0.002	0.160
Total Beryllium	mg/L		0.001	<0.001
Total Boron	mg/L	5	0.010	0.019
Total Cadmium	mg/L	0.005	0.001	<0.001

Certified By: Vivine Basily

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Certificate of Analysis

AGAT WORK ORDER: 19H558965

PROJECT:

CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:Amanda B.

Water Quality Assessment - Drinking Water (mg/L)

DATE RECEIVED: 2019-12-23

DATE REPORTED: 2020-01-02

		SAMPLE DESCRIPTION:		2942
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2019-12-23
Parameter	Unit	G / S	RDL	827036
Total Chromium	mg/L	0.05	0.003	<0.003
Total Cobalt	mg/L		0.001	<0.001
Total Copper	mg/L		0.003	<0.003
Total Iron	mg/L		0.010	12.7
Total Lead	mg/L	0.01	0.001	0.005
Total Manganese	mg/L		0.002	0.252
Total Mercury	mg/L	0.001	0.0001	<0.0001
Total Molybdenum	mg/L		0.002	0.002
Total Nickel	mg/L		0.003	<0.003
Total Selenium	mg/L	0.05	0.004	<0.004
Total Silver	mg/L		0.002	<0.002
Total Strontium	mg/L		0.005	0.461
Total Thallium	mg/L		0.006	<0.006
Total Titanium	mg/L		0.002	0.006
Total Tungsten	mg/L		0.010	<0.010
Total Uranium	mg/L	0.02	0.002	0.003
Total Vanadium	mg/L		0.002	<0.002
Total Zinc	mg/L		0.005	0.177
Total Zirconium	mg/L		0.004	<0.004

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to Ontario Drinking Water Quality Standards. Na value is derived from O. Reg. 248
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

827036 Elevated RDL indicates the degree of sample dilution prior to the analysis in order to keep analytes within the calibration range of the instrument and to reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Divine Basily

AGAT Laboratories

Guideline Violation

AGAT WORK ORDER: 19H558965

PROJECT:

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MISSISSAUGA, ONTARIO
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CLIENT NAME: TERRAPROBE INC

ATTENTION TO: Paul Raepple

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
827036	2942	O.Reg.169/03(mg/L)	Water Quality Assessment - Drinking Water (mg/L)	Total Arsenic	mg/L	0.01	0.011
827036	2942	O.Reg.169/03(mg/L)	Water Quality Assessment - Drinking Water (mg/L)	Total Sodium	mg/L	20	58.5

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Quality Assurance

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H558965

PROJECT:

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:Amanda B.

Microbiology Analysis

RPT Date: Jan 02, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Coliforms & E. Coli (Using MI Agar)															
Escherichia coli	829053		ND	ND	NA	< 1									
Total Coliforms	829053		ND	ND	NA	< 1									

Comments: ND - Not Detected, NA - % RPD Not Applicable.

Certified By: Divine Basily

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Quality Assurance

CLIENT NAME: TERRAPROBE INC
PROJECT:
SAMPLING SITE:

AGAT WORK ORDER: 19H558965
ATTENTION TO: Paul Raepple
SAMPLED BY:Amanda B.

Water Analysis

RPT Date: Jan 02, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - Drinking Water (mg/L)															
Electrical Conductivity	808116		71	74	4.1%	< 2	99%	80%	120%						
pH	827036	827036	7.51	7.50	0.1%	NA	100%	90%	110%						
Total Dissolved Solids	827036	827036	1260	1260	0.0%	< 20	102%	80%	120%						
Alkalinity (as CaCO3)	827036	827036	468	472	0.9%	< 5	98%	80%	120%						
Fluoride	829448		<0.25	<0.25	NA	< 0.05	102%	90%	110%	105%	90%	110%	108%	85%	115%
Chloride	829448		27.5	27.5	0.0%	< 0.10	92%	90%	110%	105%	90%	110%	106%	85%	115%
Nitrate as N	829448		<0.25	<0.25	NA	< 0.05	96%	90%	110%	107%	90%	110%	108%	85%	115%
Nitrite as N	829448		<0.25	<0.25	NA	< 0.05	94%	90%	110%	98%	90%	110%	110%	85%	115%
Bromide	829448		<0.25	<0.25	NA	< 0.05	109%	90%	110%	103%	90%	110%	99%	85%	115%
Sulphate	829448		68.5	70.2	2.5%	< 0.10	99%	90%	110%	107%	90%	110%	109%	85%	115%
Ortho Phosphate as P	829448		<0.50	<0.50	NA	< 0.10	97%	90%	110%	102%	90%	110%	107%	80%	120%
Reactive Silica	835449		9.00	8.94	0.7%	< 0.05	103%	90%	110%	103%	90%	110%	99%	80%	120%
Ammonia + Ammonium as N	827036	827036	0.31	0.31	0.0%	< 0.02	96%	90%	110%	101%	90%	110%	98%	70%	130%
Total Phosphorus	827036	827036	0.09	0.09	NA	< 0.02	105%	90%	110%	101%	90%	110%	97%	80%	120%
Total Organic Carbon	827036		4.2	4.4	4.7%	< 0.5	100%	90%	110%	108%	90%	110%	97%	80%	120%
Colour	835320		17	17	NA	< 5	104%	90%	110%						
Turbidity	820444		0.5	0.5	NA	< 0.5	100%	90%	110%						
Total Calcium	835320		152	153	0.7%	< 0.05	96%	90%	110%	99%	90%	110%	94%	70%	130%
Total Magnesium	835320		20.4	21.3	4.3%	< 0.05	94%	90%	110%	96%	90%	110%	92%	70%	130%
Total Sodium	835320		16.8	17.6	4.7%	< 0.05	97%	90%	110%	101%	90%	110%	96%	70%	130%
Total Potassium	835320		1.00	0.93	7.3%	< 0.05	94%	90%	110%	97%	90%	110%	94%	70%	130%
Total Aluminum	820444		0.059	0.059	0.0%	< 0.004	101%	90%	110%	105%	90%	110%	100%	70%	130%
Total Antimony	820444		<0.003	<0.003	NA	< 0.003	105%	90%	110%	95%	90%	110%	90%	70%	130%
Total Arsenic	820444		<0.003	<0.003	NA	< 0.003	103%	90%	110%	102%	90%	110%	98%	70%	130%
Total Barium	820444		0.012	0.012	0.0%	< 0.002	99%	90%	110%	100%	90%	110%	98%	70%	130%
Total Beryllium	820444		<0.001	<0.001	NA	< 0.001	102%	90%	110%	103%	90%	110%	100%	70%	130%
Total Boron	820444		<0.010	<0.010	NA	< 0.010	104%	90%	110%	105%	90%	110%	100%	70%	130%
Total Cadmium	820444		<0.001	<0.001	NA	< 0.001	103%	90%	110%	105%	90%	110%	99%	70%	130%
Total Chromium	820444		<0.003	<0.003	NA	< 0.003	102%	90%	110%	105%	90%	110%	102%	70%	130%
Total Cobalt	820444		<0.001	<0.001	NA	< 0.001	97%	90%	110%	102%	90%	110%	99%	70%	130%
Total Copper	820444		0.119	0.119	0.0%	< 0.003	103%	90%	110%	106%	90%	110%	101%	70%	130%
Total Iron	820444		<0.010	<0.010	NA	< 0.010	99%	90%	110%	106%	90%	110%	109%	70%	130%
Total Lead	820444		<0.001	<0.001	NA	< 0.001	101%	90%	110%	105%	90%	110%	100%	70%	130%
Total Manganese	820444		<0.002	<0.002	NA	< 0.002	96%	90%	110%	100%	90%	110%	97%	70%	130%
Total Mercury	827036	827036	<0.0001	<0.0001	NA	< 0.0001	99%	90%	110%	100%	80%	120%	94%	80%	120%
Total Molybdenum	820444		<0.002	<0.002	NA	< 0.002	102%	90%	110%	103%	90%	110%	99%	70%	130%
Total Nickel	820444		<0.003	<0.003	NA	< 0.003	106%	90%	110%	108%	90%	110%	105%	70%	130%
Total Selenium	820444		<0.004	<0.004	NA	< 0.004	102%	90%	110%	100%	90%	110%	95%	70%	130%
Total Silver	820444		<0.002	<0.002	NA	< 0.002	106%	90%	110%	110%	90%	110%	113%	70%	130%

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Quality Assurance

CLIENT NAME: TERRAPROBE INC
PROJECT:
SAMPLING SITE:

AGAT WORK ORDER: 19H558965
ATTENTION TO: Paul Raepple
SAMPLED BY:Amanda B.

Water Analysis (Continued)

RPT Date: Jan 02, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Strontium	820444		0.041	0.041	0.0%	< 0.005	99%	90%	110%	101%	90%	110%	98%	70%	130%
Total Thallium	820444		<0.006	<0.006	NA	< 0.006	104%	90%	110%	104%	90%	110%	100%	70%	130%
Total Titanium	820444		<0.002	<0.002	NA	< 0.002	95%	90%	110%	98%	90%	110%	97%	70%	130%
Total Tungsten	820444		<0.010	<0.010	NA	< 0.010	98%	90%	110%	105%	90%	110%	99%	70%	130%
Total Uranium	820444		<0.002	<0.002	NA	< 0.002	95%	90%	110%	99%	90%	110%	96%	70%	130%
Total Vanadium	820444		<0.002	<0.002	NA	< 0.002	95%	90%	110%	98%	90%	110%	97%	70%	130%
Total Zinc	820444		<0.005	<0.005	NA	< 0.005	100%	90%	110%	102%	90%	110%	97%	70%	130%
Total Zirconium	820444		<0.004	<0.004	NA	< 0.004	97%	90%	110%	98%	90%	110%	95%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Nivine Basily

AGAT Laboratories

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Method Summary

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H558965

PROJECT:

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:Amanda B.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Escherichia coli	MIC-93-7010	EPA 1604	Membrane Filtration
Total Coliforms	MIC-93-7010	EPA 1604	Membrane Filtration

AGAT Laboratories

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Method Summary

CLIENT NAME: TERRAPROBE INC

AGAT WORK ORDER: 19H558965

PROJECT:

ATTENTION TO: Paul Raepple

SAMPLING SITE:

SAMPLED BY:Amanda B.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6016	SM 2510 B	EC METER
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Hardness (as CaCO3) (Calculated)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6070	QuickChem 10-114-27-1-A & SM 4500 Si-F	LACHAT FIA
Ammonia + Ammonium as N	INOR-93-6059	SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 C	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Total Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Total Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Total Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
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L4Z 1Y2

P: 905.712.5100 • F: 905.712.5122 • TF: 1.800.856.6261

Drinking Water Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (complete notes)
Arrival Temperature: 12.8 12.5 12.2
AGAT Job Number: 19H558965
Notes: 10.9, 10, 9.8 ON ICE

Client Information

Company: Terraprobe Inc
Contact: Paul Raepple
Address: 903 Barton Ave Unit 22
Stoney Creek L8E 5P5
Phone: 905-643-7560 Fax:
PO #:
Client Project #: 7-19-0159-46
AGAT Quotation #:

Report Information

1. Name: Paul Raepple
Email: praepple@terraprobe.ca
2. Name:
Email:

Report Format

☐ Single Sample per page
☑ Multiple Samples per page

Facility Type *(Check all that are applicable)*

☑ Large OR ☑ Small
☑ Residential OR ☐ Non-Residential
☐ Municipal OR ☐ Non-Municipal

+ Water Type *(Specify in column below)*

Raw (R), Treated (TR), Distribution (D), Tap (TP) Private Well (P)

Turnaround Time Required (TAT) *

Regular TAT	7 to 14 business days	☐	Sch 23/24 only
	5 to 7 business days	☑	
Rush TAT (please provide prior notification)	3 to 4 business days	☐	**Rush surcharges apply**
	2 business days	☐	
	1 business days	☐	

Date Required (Rush surcharges may apply):

Requirements *(Check one)*

☐ O. Regulation 170 ☐ Not Applicable
☐ O. Regulation 243 ☐ Other *(Please Specify)*
☐ O. Regulation 318/319

IS THIS WATER BEING CONSUMED BY HUMANS? ☐ Yes ☑ No
DO THE RESULTS REQUIRE REPORTING TO THE MOECC'S DWIS OR MOH'S LRMA? ☐ Yes ☑ No
RAW WATER SAMPLES - CONSUMED BY HUMANS? ☐ Yes ☑ No

CLIENT IS RESPONSIBLE TO COMPLETE AND SUBMIT LAB SERVICE NOTIFICATION (LSN) FORM TO THE MOECC/PHU. FAILURE TO DO SO MAY DELAY REPORTING.
"NOTIFICATION INFORMATION" MUST BE COMPLETE BELOW UPON SUBMISSION OF SAMPLES. LABORATORY ANALYSIS WILL NOT COMMENCE UNTIL ALL INFORMATION HAS BEEN PROVIDED.

SAMPLE IDENTIFICATION/LOCATION	DATE SAMPLED	TIME SAMPLED	WATER TYPE *	# OF CONTAINERS	CHLORINE RESIDUAL (incl. Units)	STANDING	FLUSHED	COMMENTS/STANDING TIME (IN MINUTES)	Inorganics (Sch. 23)	Organics (Sch. 24)	Lead	Fluoride	Sodium	Turbidity	Nitrate, Nitrite	Trihalomethanes	E.coli, Total Coliforms	OWQA
2942	Dec 23/19	1000am	R	7			✓	Metals with preservative not filtered.									✓	✓

Samples Taken By (Print Name and Sign):

* TAT is exclusive of weekends and statutory holidays. Prior arrangements must be made with the laboratory in order to submit Microbiology samples on Fridays

NOTIFICATION INFORMATION - (required to report adverse results as per the *Safe Drinking Water Act*) - **Laboratory analysis will not commence until all information is received.**

INFORMATION FOR ADVERSE REPORTING			MEDICAL OFFICER OF HEALTH (MOH)	
Waterworks Name:	Phone:	Fax:	Region:	
MOECC# (ie: Waterworks #):	After Hours Phone: Non Reportable		PHU Contact:	
Contact:	Address/Location (if different from client above)		Phone:	Fax:
Email:			Email:	

Samples Relinquished By (Print Name and Sign): Amanda Burden	Date/Time: Dec/23/2019	Samples Received By (Print Name and Sign): Daniella Jaic	Date/Time: Dec 23/19 11:30am	Pink Copy - Client Yellow/Golden Copy - AGAT White Copy - AGAT	Page 1 of 1
Samples Relinquished By (Print Name and Sign): Daniella Jaic Dec 23/19	Date/Time	Samples Received By (Print Name and Sign): John Chypyha	Date/Time: Dec 23 2:15		N°: DW 57171
Samples Relinquished By (Print Name and Sign): John Chypyha	Date/Time	Samples Received By (Print Name and Sign): John Chypyha	Date/Time: Dec 23		