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Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Retaining Wall Design

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Vittorio Santaguida
1767 Fisher Avenue
Ottawa, ON
K2C 1Y1

Attention: **Vittorio Santaguida**

Subject: **Hydrogeological Assessment and Terrain Analyses**
240 Westbrook Road
Ottawa, Ontario

INTRODUCTION

Further to your request, Paterson Group has conducted a Potable Water Supply Assessment in support of a one storey slab-on-grade commercial structure on the subject site located at 240 Westbrook Road, Ottawa, Ontario. The purpose of these works has been to determine the suitability of the water supply aquifer underlying the site to service the auto care garage.

DESCRIPTION OF PROPOSED PROPERTY

The subject site is currently occupied by a slab on grade auto care garage and associated infrastructure. The ground surface at the subject site is generally flat, with a drainage ditch located in front of the property along Westbrook Road.

The subject site is bordered to the north, east and west by commercial buildings, and to the south by Westbrook Road followed by commercial buildings. The site is zoned RG4, which is Rural General Industrial Zone with specified conditions. The surrounding properties are all zoned RG4.

The onsite drilled well will not be used as a drinking water supply. Washrooms will not be publicly accessible with signs posted to indicate it is a non-potable source. Potable water will be provided in a water cooler.

FIELDWORK PROGRAM

As a means to demonstrate the adequacy of the aquifer underlying the subject lands, with respect to water quality and quantity, a new drilled test well was constructed and tested. The new drilled well, referred to as TW1, has a well ID of A274198. TW1 has a 150 mm diameter steel casing extending to a depth of 11.6 m below the ground surface (bgs). The total depth of the well was indicated to be 54.9 m. According to the well record, limestone bedrock was recorded at a depth of approximately 2.1 m bgs. Based upon available geological mapping, the drift thickness varies from 0 to 1 m bgs.

The new drilled well is located in the southeastern portion of the property. Refer to attached Paterson Drawing PH3871-1 - Sewage System Layout Plan for the approximate well location. When the well was installed, the new drilled well was fully accessible with the 150 mm diameter steel casing extending 0.49 m above the existing ground surface. The well stick-up meets the minimum height requirement as per Ontario Regulation 903.

As a means to evaluate the water supply aquifer intercepted by the well, the well was subjected to an 8-hour constant rate pumping test. The pumping test was conducted on September 19, 2019 under the full-time supervision of Paterson personnel.

A submersible pump was provided by Air Rock Drilling Co. (Air Rock) for the 8 hour pumping test. A licensed water well technician (Air Rock) was retained to complete the necessary plumbing related activities. A discharge hose assembly with a gate valve was connected to the rented pump. The discharge line was placed at a sufficient distance to ensure that the discharge water was being directed away from the well. Upon completion of the test, the pump was removed and the well was disinfected by Air Rock.

The pumping test was carried out at a pumping rate of 23 L/min for a duration of 8 hours. During the pumping test, the pumping rate was periodically measured using the timed volume correlation method. The pump rate was maintained within 5% of the selected pump rate. The static water level was recorded manually and an electronic datalogger (VanEssen TD-Diver) was installed in the test well prior to the start of the pumping test. The data logger recorded water levels at 30 second intervals. In addition, manual water level readings were taken at periodic intervals during the test.

Recovery data was collected from the well following the completion of the pumping. The well was noted to have achieved 95% recovery approximately 28 hours and 38 minutes after the completion of the pumping. The recovery data demonstrated aquifer connectivity to other wells in the area, resulting in a longer than expected recovery time.

Groundwater samples were collected at 4 hours and 8 hours after the start of pumping. Prior to collection of the groundwater samples, the free chlorine residual was verified to be non-detectable. The water samples were submitted for comprehensive testing of

bacteriological, chemical and physical water quality parameters consistent with the standard ‘Subdivision Supply’ suite of parameters.

All samples were collected unfiltered and unchlorinated and were placed directly into clean bottles supplied by the analytical laboratory. Samples were placed immediately into a cooler with ice and were transported directly to the Eurofins laboratory in Ottawa. All samples were received by the laboratory within 24 hours of collection.

A series of field tests of the pumped water were carried out at the well head during the 8 hour pumping test. The parameters tested at the well head included: pH, total dissolved solids, conductivity, turbidity and temperature.

A raw water-sample was collected from the well by the owner on July 17, 2023 and submitted to Eurofins laboratory for analysis. The results of the pumping test and well owner sample geochemistry are presented in Table 2 below.

AQUIFER ANALYSIS

Water Quantity

Pumping test data was analyzed using AquiferTest Pro (v. 2016.1) aquifer analysis software package by Schlumberger Water Services. Drawdown data was measured using an electronic water level tape and an electronic datalogger unit.

TABLE 1:SUMMARY OF WATER SUPPLY AQUIFER CHARACTERISTICS OF TW1

AQUIFER PARAMETER	RESULT OF ANALYSIS
Transmissivity (m^2/day)	5.3
Pumping Rate (L/min)	23
Pre-test Static Water Level (m)	11.0
Post-test Water level (m)	Max - 14.8, End - 14.7
Available Drawdown (m)	43.8
% Drawdown During Pumping Test	8.6
Specific Capacity (L/min/m drawdown)	6.1

The drawdown data was analyzed using the Theis (Theis, 1935) methods of analysis. Aquifer transmissivity is estimated to be approximately 5.3 m^2/day. As demonstrated by the measured values, the water level in the well was increasing variably as the pumping test was performed. As the water level increased variably during the constant pumping portion of the test, it is expected that the aquifer which TW1 accesses is connected with other wells in the area. The water level variations are within the expected commercial operating hours in the immediate surrounding vicinity of the subject site.

The pumping test results show that TW1 has a high yield to support the water demands for the building. Overall maximum drawdown at a constant pumping rate for a period of 8 hrs was approximately 3.8 m at 7 hours and 27 min. The final drawdown at the end of the 8 hour pumping test was 3.7 m (8 % of the available drawdown). 95% recovery was achieved approximately 28 hours and 38 minutes after the end of pumping. The total volume of water pumped during the 8 hour pumping event was approximately 11,040 L. This is approximately three times the maximum total daily design volume of water required to support the proposed industrial building (maximum 3,300 L/day discussed below).

The suitability of the aquifer to supply the existing auto care garage was assessed using the methodology provided in Ministry of the Environment, Conservation and Parks (MECP) Procedure D-5-5 (1996).

Based on the information summarized in Table 1, it is readily apparent that the new water

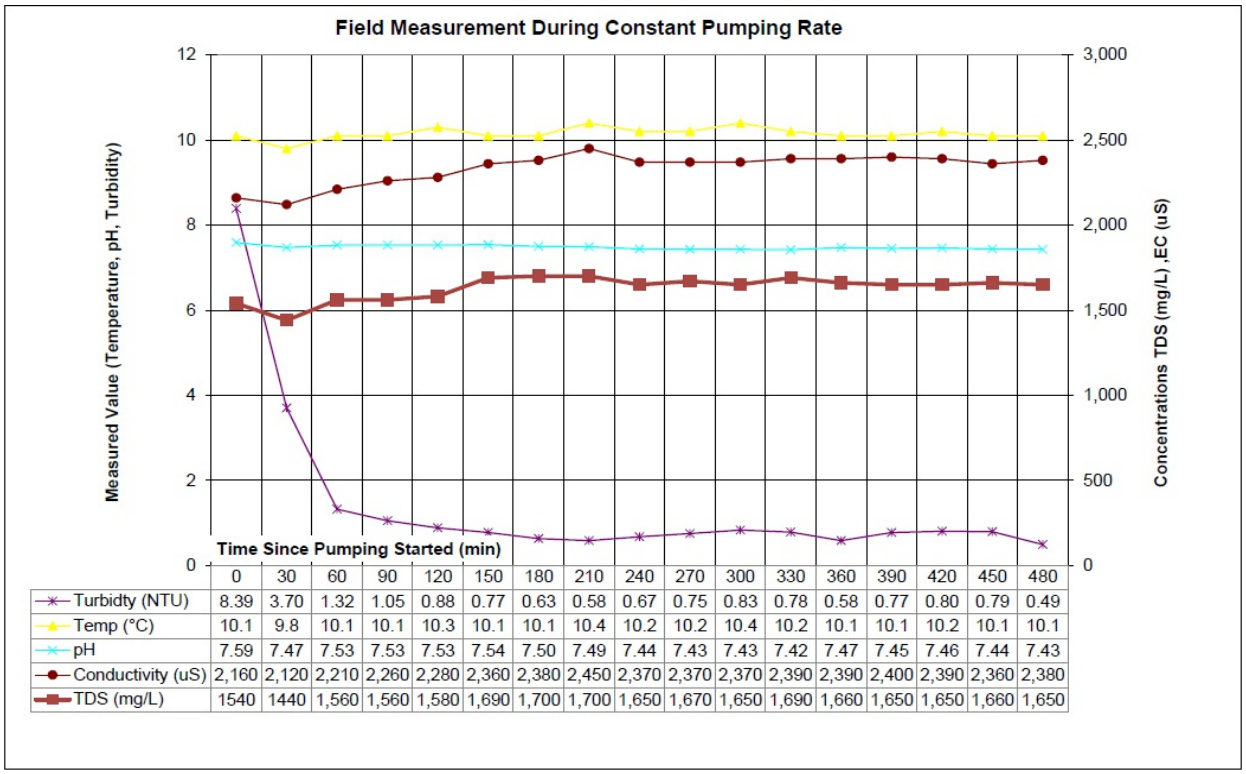
supply well has intercepted an adequately strong water supply aquifer which has sufficient quantity to service the existing building under typical usage.

Given the analyses presented and summarized above, it is our opinion that there is an adequate supply of water to service the proposed commercial building on the property in addition to the neighboring buildings whose wells may intercept the same water supply aquifer. Surrounding Water Well Records (WWR's) found on the MECP WWR mapping database are attached to this report.

Water Quality

Field Data

Turbidity, electrical conductivity, total dissolved solids (TDS), pH and temperature were measured at the wellhead during the pumping test. The measurements and time intervals for each of these parameters are summarized on the graphical representation below. In addition, a Hach Pocket Colorimeter II chlorine reader was used to measure the free chlorine residual level. No chlorine residual was detected in the discharge water prior to the collection of the water samples.



Time Since Pumping Started (min)	0	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450	480
Turbidty (NTU)	8.39	3.70	1.32	1.05	0.88	0.77	0.63	0.58	0.67	0.75	0.83	0.78	0.58	0.77	0.80	0.79	0.49
Temp (°C)	10.1	9.8	10.1	10.1	10.3	10.1	10.1	10.4	10.2	10.2	10.4	10.2	10.1	10.1	10.2	10.1	10.1
pH	7.59	7.47	7.53	7.53	7.53	7.54	7.50	7.49	7.44	7.43	7.43	7.42	7.47	7.45	7.46	7.44	7.43
Conductivity (uS)	2,160	2,120	2,210	2,260	2,280	2,360	2,380	2,450	2,370	2,370	2,370	2,390	2,390	2,400	2,390	2,360	2,380
TDS (mg/L)	1540	1440	1,560	1,560	1,580	1,690	1,700	1,700	1,650	1,670	1,650	1,690	1,660	1,650	1,650	1,660	1,650

Laboratory Data

The laboratory water quality obtained from the pumping test of TW1 is provided in Table 2 below and the laboratory analyses reports can be found attached.

TABLE 2: GROUNDWATER GEOCHEMISTRY (TW1)						
PARAMETER	UNITS	ODWS		TW1		
		LIMIT	TYPE	GW1 (4 hr) 9/19/2019	GW2 (8 hr) 9/19/2019	17-Jul-23 7/17/2023
MICROBIOLOGICAL						
Escherichia Coli (E.Coli)	ct/100mL	0	MAC	0	0	-
Total Coliforms	ct/100mL	0	MAC	0	0	-
GENERAL CHEMICAL - HEALTH RELATED						
Fluoride	mg/L	1.5(2.4)	MAC	<0.10	<0.10	0.28
N-NO2 (Nitrite)	mg/L	1	MAC	<0.10	<0.10	-
N-NO3 (Nitrate)	mg/L	10	MAC	<0.10	<0.10	<0.10
Turbidity (Laboratory)	NTU	1.0 (5.0)	MAC/AO	0.8	0.9	-
Turbidity (Field)	NTU	1.0 (5.0)	MAC/AO	0.7	0.5	-
N-NH3 (Ammonia)	mg/L	-	-	0.36	0.36	-
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.5	-
GENERAL CHEMICAL - AESTHETIC RELATED						
Hardness (as CaCO3)	mg/L	100	OG	744	737	518
Ion Balance	unitless	-	-	0.98	0.94	0.97
Total Dissolved Solids	mg/L	500	AO	1,800	1,810	-
Alkalinity (as CaCO3)	mg/L	500	OG	329	321	383
Chloride	mg/L	250	AO	550	578	441
Colour	TCU	5	AO	<2	2	-
Conductivity	uS/cm	-	-	2,440	2,430	2,060
pH	unitless	6.5-8.5	AO	8.56	8.51	7.66
Sulphide	mg/L	0.05	AO	<0.01	0.02	-
Sulphate	mg/L	500	AO	99	100	74
Calcium	mg/L	-	-	204	201	133
Iron	mg/L	0.3	AO	0.23	0.23	0.17
Potassium	mg/L	-	-	10	10	8
Magnesium	mg/L	-	-	57	57	45
Manganese	mg/L	0.05	AO	0.04	0.04	-
Sodium	mg/L	200	AO	199	194	243
Phenols	mg/L	-	-	<0.001	<0.001	-
Tannin & Lignin	mg/L	-	-	<0.1	<0.1	-
Dissolved Organic Carbon	mg/L	5	AO	3.2	3.1	-

1. ODWS identifies the following types of parameters:
   MAC=Maximum Allowable Concentration
   AO = Aesthetic Objective
   OG= Operational Guideline
2. Shaded Concentration Indicates an Exceedance of the ODWS Objective

The bacteriological test results (Certificate of Analysis - Report No. 1917214 and No. 1917213) indicated that the test sample at the 4 and 8 hour interval were non-detect (0 ct/100 mL) for E.Coli and Total Coliforms.

The water quality of the subject water supply well meets all the Ontario Drinking Water Standards maximum acceptable concentrations (MAC). Furthermore, the water meets all of the aesthetic objectives (AO) and operational guidelines (OG) with the exception of the following:

- ❏ Chloride
- ❏ Hardness (As $CaCO_3$)
- ❏ pH
- ❏ TDS
- ❏ Sodium

Exceedances of the above parameters are not uncommon of the water supply in the subject aquifer. Each of these groundwater parameters are discussed in detail below.

Groundwater obtained from TW1 will only be used as a non-potable source.

Chloride

Chloride, an aesthetic parameter, was detected in the laboratory results at a concentration of 550, 578 and 441 mg/L, with the results exceeding the Ontario Drinking Water Standards, Objectives, and Guidelines (ODWSOG) Maximum Concentration Considered Reasonably Treatable (MCCRT) of 250 mg/L.

As the water is to be used only for toilet flushing and hand washing (i.e. not a drinking water source), the chloride exceedance is considered appropriate for the current usage despite being above the value 250 mg/L MCCRT value.

Corrosion was reviewed for impact to the distribution system, however, the Langelier Saturation Index calculation provided a value of 0.7 which indicates that the water was non-corrosive. Modern day distribution systems typically consist of pex piping and limit corrosive exposure.

Hardness as $CaCO_3$

Hardness, expressed as calcium carbonate, an operational guideline, does not appear in the ODWSOG. Rather, it appears in the Technical Support Documents for Ontario Drinking Water Standards, Objectives and Guidelines as a parameter with an operational guideline of 100 mg/L. At the measured concentration of 744, 737 and 518 mg/L, the water is considered to be very hard. The Technical Support Document for the ODWS states that

water with hardness in excess of 500 mg/L may be unacceptable for most domestic purposes, however, no maximum treatable value was provided.

The Langelier Saturation Index (Langelier, 1936) is used to predict the calcium carbonate stability of water. It indicates whether the calcium carbonate will precipitate, dissolve, or be in equilibrium with water. The results of the Langelier calculation (LSI = 0.7) indicate the water is super saturated and tends to precipitate a scale layer of calcium carbonate (scale forming but non-corrosive). See Langelier Saturation Index Calculation attached for calculation details. The water is to be used only for a non-potable source and palatability is not a issue. It is recommended that the hardness concentration be treated using conventional water softener technologies to reduce scaling.

As the groundwater will not be used for drinking purposes, and is not for domestic use, the hardness concentration is considered acceptable.

pH

Drinking water with a pH level above 8.5 indicates that a high level of alkalinity minerals are present. While high alkalinity does not pose a health risk, it can cause aesthetic problems, as well as possible scaling in plumbing. As the pH level exceeds the ODWSOG guidelines, corrosion is not likely. Further development of the well resulted in a pH value of 7.66 in the sample taken by the owner on July 17, 2023. The result of 7.66 is within the ODWS Guidelines.

The Langelier Saturation Index calculation indicated that the water is super saturated and tends to precipitate a layer of calcium carbonate (scale forming but non-corrosive). MECP Procedure D-5-5 does not specify a maximum treatable limit.

TDS

Total dissolved solids (TDS) refers to the concentration of inorganic substances dissolved in water. The main constituents are typically chloride, sulphates, calcium, magnesium and bicarbonates. Water with a TDS concentration above 500 mg/L of TDS may not palatable. Procedure D-5-5 does not provide a ‘treatability limit’ for TDS, but it does require written rationale that corrosion, encrustation, or taste problems will not occur.

The Langelier Saturation Index (Langelier, 1936) is used to predict the calcium carbonate stability of water. It indicates whether the calcium carbonate will precipitate, dissolve, or be in equilibrium with the water. The results of the Langelier calculation (LSI = 0.7) indicate the water is super saturated and tends to precipitate a scale layer of calcium carbonate (scale forming but non-corrosive). See Langelier Saturation Index Calculation attached for calculation details. The LSI is close to a neutral balance, but leans towards being scale-forming. A water softener may be used to reduce precipitate, if desired, to reduce potential

scaling.

The water is to be used only for a non-potable source and palatability is not a issue.

Sodium

Sodium is an aesthetic parameter, and was detected in the test samples at a concentration of 199, 194 and 243 mg/L, which is above the ODWSOG AO and MCCRT of 200 mg/L. Sodium is a unique water quality parameter in that it has a cautionary limit of 20 mg/L for health related purposes. It is a requirement of the ODWSOG that the Medical Officer of Health be notified of the water quality results where sodium is present in concentrations exceeding 20 mg/L and it is intended for consumption. The purpose of this is such that the information can be disseminated to local physicians for their use in the treatment of individuals requiring reduced sodium dietary needs.

As TW1 will not be used as a potable source and will not be consumed, the AO and MCCRT exceedance will not be an issue.

TERRAIN ANALYSIS

Hydrogeological Pre-consultation

Paterson personnel contacted the City's Hydrogeologist on August 22, 2019 to request if the City will be requiring a Nitrate Impact Assessment for the subject site. The City Hydrogeologist indicated that *"In this instance, you should have some narrative in your hydrogeological report outlining how the geological setting (soils, GW flow, etc.) and the additional mitigation measures will protect the well on site and also adjacent wells from adverse impacts from the sewage system. Please note that this is the minimum required as per the Official Plan. You will not have to follow the three steps in Procedure D-5-4, although you will be expected to address hydrogeological sensitivity."*

As such, the information requested by the City Hydrogeologist has been provided below.

Surficial Geology

A series of test pits were put down on the subject parcel to delineate the subsurface soil conditions as part of the geotechnical investigation completed by Paterson, report number PG5084 dated Oct 7, 2019. On September 20, 2019, three test pits were put down on the property for the design of the proposed slab on grade commercial structure and associated sewage system. The location of the test pits on the property are delineated on the Test Hole Location Plan, Drawing No. PG5084-1, attached.

The test pit locations were recorded and the subsurface conditions, including the soil morphology and depth to the groundwater table (if encountered), were carefully observed and recorded. The soils encountered were classified texturally in the field, and later reviewed in the laboratory.

The subsurface profile consisted of topsoil extending to depths of 0.4 to 0.6 m from ground surface. The topsoil generally consisted of a topsoil with trace rootlets and gravel. Underlying the topsoil across the site was a glacial till layer composed of a grey silty sand, trace to some gravel, with additional trace cobbles and boulders in TP3. Groundwater was determined to be between 1.1 to 1.2 m depth at the time of excavation. Practical refusal to excavation occurred at depths ranging from 0.8 m to 1.8 m.

Reference should be made to the test pit logs appended to this report for the details of the soil profiles encountered at each test hole location. The client should be aware that any information pertaining to soils and all sections are furnished as a matter of general information only and test pit descriptions are not be interpreted as descriptive of conditions at locations other than those described by the test pits themselves.

Hydrogeological Sensitivity of the Site

The subject site is bordered by commercial lots on the north, east and west side, and by Westbrook Road followed by more commercial properties to the south. The adjacent properties are serviced by private wells and septic systems.

Based upon our field investigation, the overburden ranges from approximately 0.8 to 1.8 m depth at the test pit locations. The overburden soils are recorded to consist of topsoil overlying a glacial till comprised of a grey silty sand, trace to some gravel. Some cobbles and boulders were found in the till in the test pit on the south end of the site.

As the proposed site has bedrock within 2 m of the ground surface, the site is considered hydrogeologically sensitive. The minimum well casing depth has been doubled as a mitigation measure for the hydrogeological sensitivity.

The topography of the site is generally flat, with a drainage ditch located south of the property line along Westbrook Road. The inferred direction of flow of the overburden aquifer is expected to travel to the south. There are no downgradient visible wells or mapped WWR's in the immediate vicinity of the proposed septic bed in this direction.

To corroborate our position in this matter, the water quality of the bedrock aquifer targeted as the preferred water supply aquifer for the development, shows no indications of surface impacts from sewage system effluent. This is especially telling, considering the long term established operation of nearby sewage systems within the area.

Lot Development Plan

A slab on grade commercial structure has been constructed on the central to east side of the property. The location of the building and sewage system design can be found on the attached plan, PH3871-1(Rev.1) - Sewage System Layout Plan. It illustrates that the proposed design layout is adequate to accommodate the associated private services and meet all the regulated separation criteria.

Sewage System Design

In order to minimize the risk of long-term contamination of services, a minimum horizontal separation distance of 15 metres is required between the onsite drilled well and the closest distribution pipe or septic tank of the onsite sewage system. This separation distance shall be increased according to the OBC requirements for beds constructed above the original ground surface. In consideration of the proposed location of the septic area, the existing wells, the proximity of the neighbouring sewage systems and wells with respect to the proposed sewage system, the minimum regulatory separation distances can be attained on the subject property.

Proposed Sewage System

Due to site constraints, a Waterloo Biofilter Tertiary Treatment System with a shallow buried trench leaching bed has been designed for the site. The tertiary treatment system requires a maintenance contract with annual testing.

Total Daily Design Sewage Flow

The Total Daily Design Sanitary Sewage Flow (TDDSSF) was calculated and approved by the Ottawa Septic System Office (OSSO) using three loading bays (at 150 L/day each = 450 L/day) and three water closets (at 950 L/day each = 2,850 L/day) for a total TDDSF

of 3,300 L/day. Typical industrial developments will have lower actual loading compared to the conservative design loads as per the Ontario Building Code.

Discussion

The conditions presented by the City of Ottawas Hydrogeological reviewer are addressed by doubling the minimum amount of casing required by O.Reg 903 and having tertiary treatment in the sewage system so that regular maintenance will be required and will be enforced by the OSSO. Furthermore, by restricting the well use to hand-washing / toilet flushing only, potential impacts to human health are removed. By completing these actions, potential impacts from the sewage system are considered to be mitigated.

CONCLUSIONS

Based on the information contained within the body of this report, the following conclusions can be drawn:

1. The onsite water supply, TW1, will be used as a non-drinkable water source only.
2. The water supply aquifer intercepted by the existing well is considered to be adequate to support the water quantity demands for the slab on grade commercial building.
3. The preferred water supply aquifer intercepted by TW1 contains a water supply that is not drinkable, and contains only elevated concentrations of chloride, hardness, TDS, sodium, and pH. All of the parameters can be treated with current readily available water conditioning equipment.
4. A commercial grade water softener is recommended to facilitate the removal of the hardness concentrations.
5. The results of the water supply assessment have provided satisfactory evidence that the water supply aquifer underlying the subject site can support the slab on grade commercial building from a quantity perspective. As the well will be used as a non-potable water supply, the quality of the groundwater is adequate for the proposed usage of hand-washing / toilet flushing.
6. Due to hydrogeological sensitivity, any future onsite wells must be designed to have double the minimum casing length required by O.Reg 903.
7. The subject site is sufficient in size to accommodate a new sewage system and meet all the regulatory separation criteria. Additionally, a tertiary treatment system has been designed for the site to provide enhanced levels of treatment and requires an annual maintenance contract.
8. The results of the site suitability study have provided satisfactory evidence that the subject site can support the commercial development with respect to water quality, quantity and sewage system placement provided that the groundwater is only used as a non-potable supply.

We trust that this satisfies your present requirements. Should you have any questions regarding this submission, please do not hesitate to contact the undersigned.

Yours truly,

PATERSON GROUP INC.



Erik Ardley, P.Geo.



Michael S. Killam, P.Eng.



Attachments:

- ❑ Key Plan
- ❑ MECP Water Well Record's
- ❑ Eurofins Certificate of Analysis
- ❑ AquiferTest Pro - Pumping Test Analysis Reports
- ❑ Langelier Saturation Index Calculation
- ❑ PG5084: Soil Profiles
- ❑ Paterson Drawing PG5084-1 - Test Hole Location Plan
- ❑ Paterson Drawing PH3871-1-REV.1
- ❑ Paterson Drawing PH3871-2-REV.1

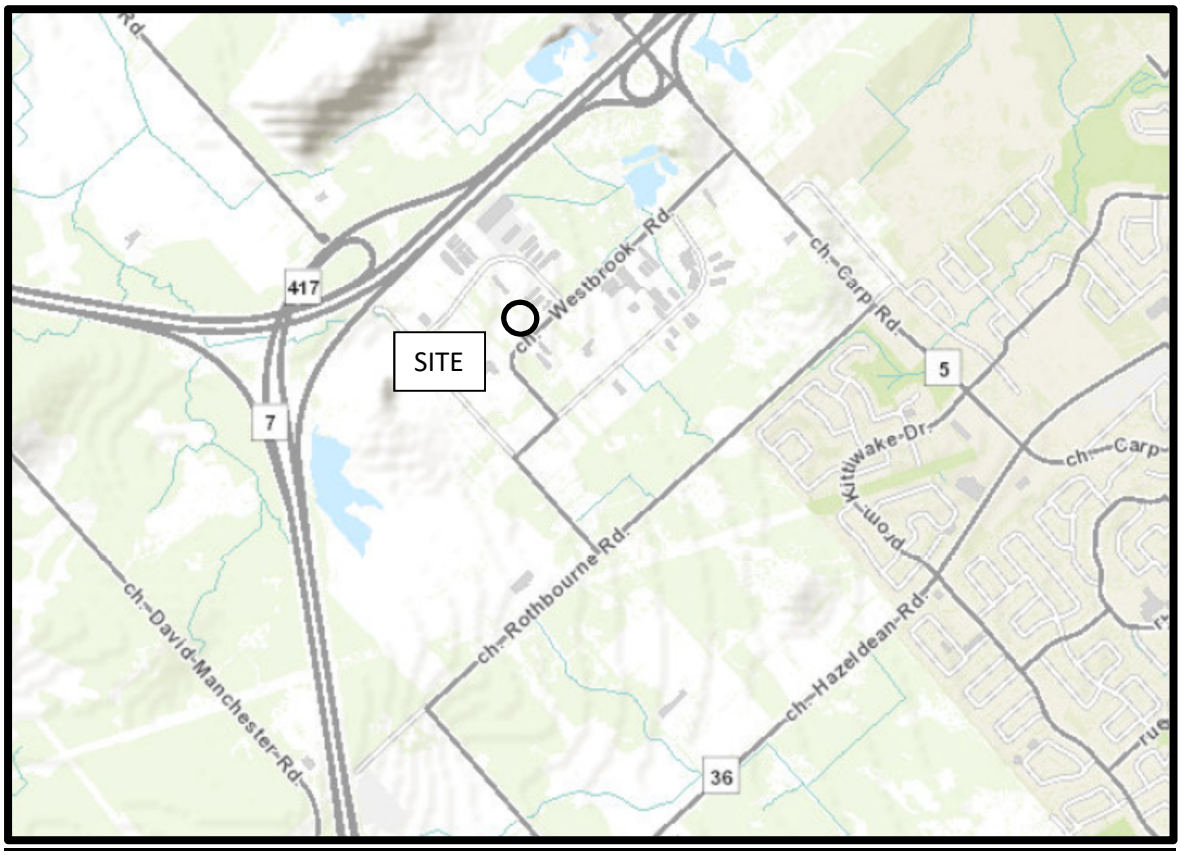


FIGURE 1

KEY PLAN

TW1

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☒ Imperial

Tag#: A274198 (Print Below) A274198

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	V.Santaguida Construction Ltd.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1767 Fisher Avenue	Ottawa	ON	K2C 1Y1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
240 Westbrook Road	West Carleton	2	3

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

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	18	424563	5013614	Plan 4M-300 Pt Blk 3.	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Sand	& Boulders		0	7
Grey	Limestone			7	120
Grey & White	Limestone			120	174
Grey & White	Limestone			174	180

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
38	28	Neat cement	9.36
28	0	Bentonite slurry	21

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4"	Steel	.188"	+2'	38'
6"	Open Hole		38'	180'

Status of Well

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

Construction Record - Screen

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

Water Details

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

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	38'	9 3/4"
38'	180'	6"

Well Contractor and Well Technician Information

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

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
6659 Franktown Road	Richmond	ON	K0A 2Z0	air-rock@sympatico.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted (Y Y Y Y M M D D)
6138882170	Hanna, Jeremy	T3852		2019 09 30

Results of Well Yield Testing

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

If pumping discontinued, give reason: X

Pump intake set at (m/ft): 160

Pumping rate (l/min / GPM): 6

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 80'

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

Recommended pump depth (m/ft): 160'

Recommended pump rate (l/min / GPM): 6

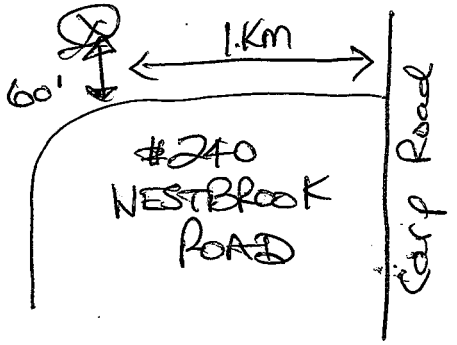
Well production (l/min / GPM): 6

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	36.9'		80'
1	44.1	1	64.2
2	47.1	2	59.2
3	49.7	3	55
4	51.9	4	51.4
5	53.8	5	48.2
10	60.9	10	45
15	65.7	15	41.9
20	69.1	20	39
25	71.6	25	37
30	73.6	30	36.12
40	79	40	36.9
50	79.6'	50	36.9
60	80'	60	36.9"

Map of Well Location

Please provide a map below following instructions on the back. (N)



Comments: 1/2HP-7GPM Set 160 FT

Well owner's information package delivered	Date Package Delivered (Y Y Y Y M M D D)	Ministry Use Only
☒ Yes ☐ No	2019 09 13	Audit No. 316783
	Date Work Completed (Y Y Y Y M M D D): 2019 09 10	Received

0506E (2018/12) — Ministry's Copy

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Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 1522535 — MUNICIP 1,5,0,0,5 — CON.

COUNTY OR DISTRICT: OTTAWA-CARLETON
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: TWP OF WEST CARLETON (HUNTLEY)
CON., BLOCK, TRACT, SURVEY, ETC.: CONCESSION 3
LOT: 2
[redacted] WALGREEN RD, CARP, ONT.
DATE COMPLETED: DAY 19 MO 07 YR 88
RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
GREY	LIMESTONE	GREY-GREEN SHALE SILTSTONE		0	148

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
106	1 ☒ FRESH 2 ☐ SALTY 3 ☒ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
142	1 ☒ FRESH 2 ☐ SALTY 3 ☒ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	21
6"	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		21	148
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	21	CEMENT GROUT (Pressure grouted) (10" Hole to 21')

71 PUMPING TEST

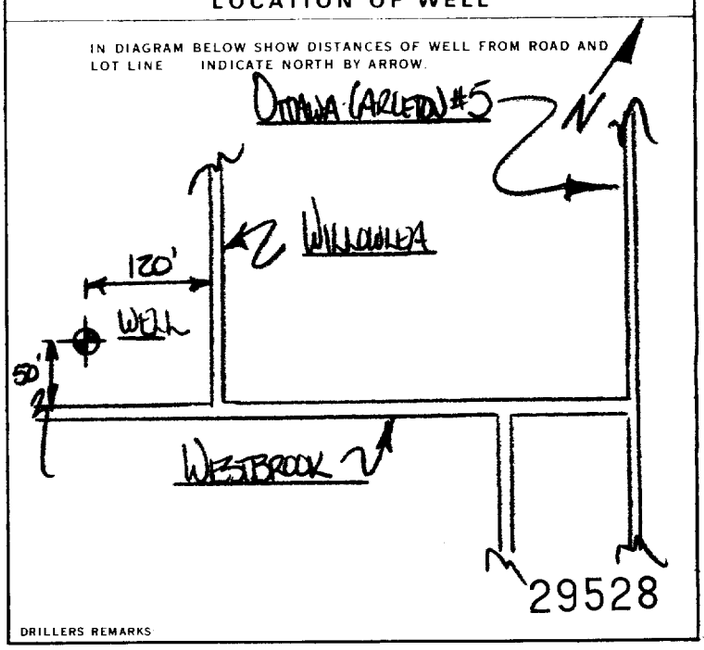
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER (AIR)
PUMPING RATE: 20 GPM
DURATION OF PUMPING: 1 HOURS 15 MINS

STATIC LEVEL	WATER LEVEL - END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
22 FEET	135 FEET		65 FEET	135 FEET	135 FEET	135 FEET

IF FLOWING GIVE RATE: — GPM
PUMP INTAKE SET AT: 135 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: INJECTION 100 FEET
RECOMMENDED PUMPING RATE: INJECTION 10 GPM

LOCATION OF WELL

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



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED 9 ☐ DEWATERING

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: STANTON DRILLING INC
WELL CONTRACTOR'S LICENCE NUMBER: 4875
ADDRESS: BOX 429, GREELY, ONT.
NAME OF WELL TECHNICIAN: PETER JA STANTON
WELL TECHNICIAN'S LICENCE NUMBER: T0086
SIGNATURE OF TECHNICIAN/CONTRACTOR:
SUBMISSION DATE: DAY 02 MO 08 YR 88

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE: CONTRACTOR 4875 — DATE RECEIVED: AUG 18 1988
DATE OF INSPECTION: — INSPECTOR:
REMARKS:

FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

11 — 1522536 — MUNICIP 15005 — CON.

COUNTY OR DISTRICT: OTTAWA-CARLETON
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: TWP OF WEST CARLETON (HUNTLEY)
CON. BLOCK, TRACT, SURVEY, ETC: CONCESSION 3
LOT: 2
[redacted] WALGREEN RD, CARP, ONT.
DATE COMPLETED: DAY 18 MO 07 YR 88
RC — ELEVATION — RC — BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
GREY	LIMESTONE	GREY-GREEN SHALE SILTSTONE		0	148

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
104	1 ☒ FRESH 2 ☐ SALTY — 3 ☒ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
140	1 ☒ FRESH 2 ☐ SALTY — 3 ☒ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY — 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	.188	0	21
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE 5 ☐ PLASTIC		21	148
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN (FEET)

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	21	CEMENT GROUT (Pressure grouted) (10" Hole to 21)

71 PUMPING TEST

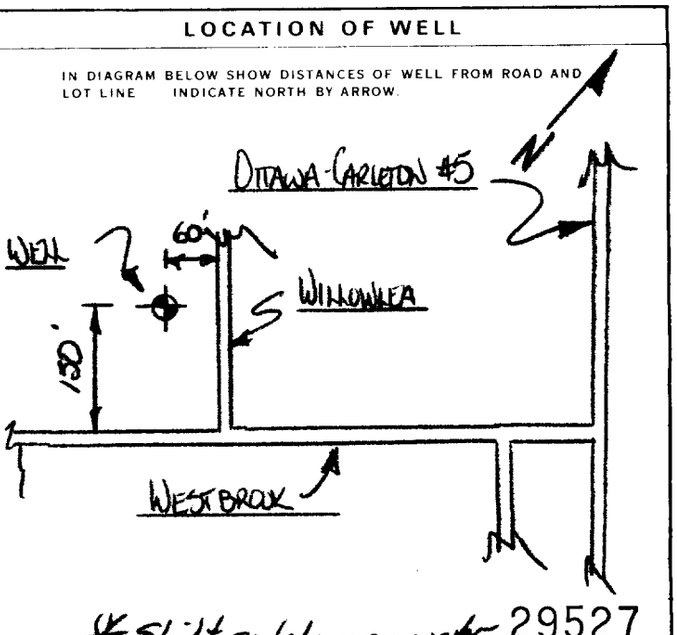
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER — (AIR)
PUMPING RATE: 30 GPM
DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
22 FEET	135 FEET	135 FEET	135 FEET	135 FEET	135 FEET

IF FLOWING GIVE RATE: — GPM
PUMP INTAKE SET AT: 135 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 100 FEET
RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

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



DRILLERS REMARKS: * Slight sulphur on water 29527

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED; 9 ☐ DEWATERING

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: STANTON DRILLING INC
WELL CONTRACTOR'S LICENCE NUMBER: 4875
ADDRESS: BOX 429, GREELY, ONT.
NAME OF WELL TECHNICIAN: PETER J A STANTON
WELL TECHNICIAN'S LICENCE NUMBER: T-0086
SIGNATURE OF TECHNICIAN/CONTRACTOR:
SUBMISSION DATE: DAY 02 MO 08 YR 88

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 4875
DATE RECEIVED: AUG 18 1988
DATE OF INSPECTION
INSPECTOR
REMARKS

CRS. BS

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FORM NO. 0506 (11/86) FORM 9

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

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

1523562 MUNICIP. 1505 CON. CON BLOCK 3 03

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [redacted] CARLETON-HUNTLEY
CON. BLOCK, TRACT, SURVEY, ETC.: 3
LOT: Part 2
DATE COMPLETED: DAY 5 MO 6 YR 89
[redacted] SPADINA
ELEVATION: OTTAWA ONT.
RECORD: R19289

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
GREY	STONE'S	SAND LOOSE ROCK	LOOSE	0'	6'
GREY	LIMESTONE		HARD	6'	90'
GREY BLACK	LIMESTONE		POROUS	90'	140'

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
136	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼"	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	1.88	0'	22'
6'			22'	140'
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

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

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
0	21'	TYPE 10 PORTLAND

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☐ PUMP 2 ☒ BAILER	7 GPM	2 HOURS ___ MINS

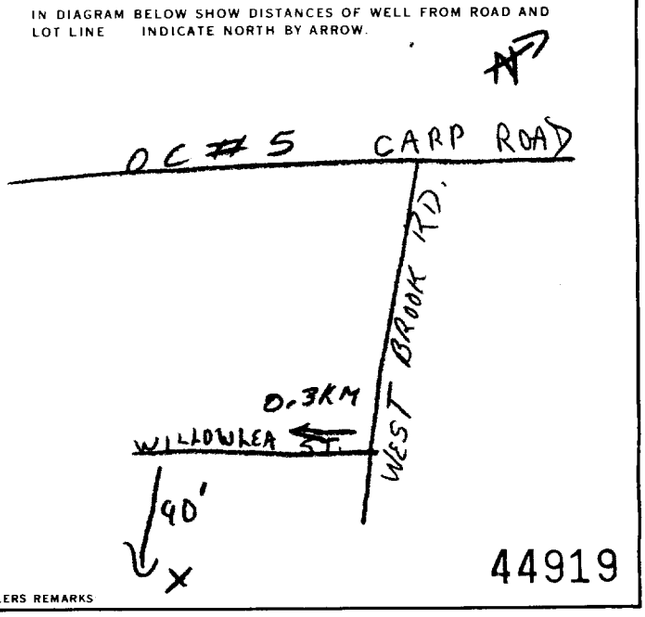
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING (1 ☐ PUMPING 2 ☐ RECOVERY)			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
14 FEET	90 FEET	90 FEET	90 FEET	90 FEET	90 FEET

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

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☒ DEEP	125 FEET	6 GPM

LOCATION OF WELL

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



44919

DRILLERS REMARKS

FINAL STATUS OF WELL

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

WATER USE

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

METHOD OF CONSTRUCTION

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

CONTRACTOR

NAME OF WELL CONTRACTOR: M. KAVANAGH & SON WELL DRILLING
WELL CONTRACTOR'S LICENCE NUMBER: 3142
ADDRESS: RR 2 CARLETON PLACE
NAME OF WELL TECHNICIAN: MICHAEL KAVANAGH
WELL TECHNICIAN'S LICENCE NUMBER: 88-133
SIGNATURE OF TECHNICIAN/CONTRACTOR: Michael Kavanagh
SUBMISSION DATE: DAY 10 MO 6 YR 89

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 3142
DATE RECEIVED: JUL 04 1989
DATE OF INSPECTION
INSPECTOR
REMARKS
CSSB

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario — Ministry of the Environment

Well Tag No. (Sticker and/or Plate) A 082416

A082416

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☒ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
V.	Santaguida Construction ltd.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1767 Fisher Ave	Ottawa	Ont	K2C 1Y1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
#103 Willowlea	Huntley	2	3

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

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	18	424550	5013701	PLAN 4R-5951 (Part Block 2) S/L 3+4	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	- Rocky fill			0	21'
	- Grey Shale Limestone			21'	147'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
21'	0	Neat Cement Slurry	4.68

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6"	Steel	.188"	+2'	21'
6"	Open hole		21'	147'

Status of Well

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

Construction Record - Screen

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	147'	6"/8"

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify*
NOT TESTED

If pumping discontinued, give reason:

Pump intake set at (m/ft) 135

Pumping rate (l/min / GPM) 20

Duration of pumping 1 hrs + 0 min

Final water level end of pumping (m/ft) 46'1"

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft) 1/2 HP 120'

Recommended pump rate (l/min / GPM) 20

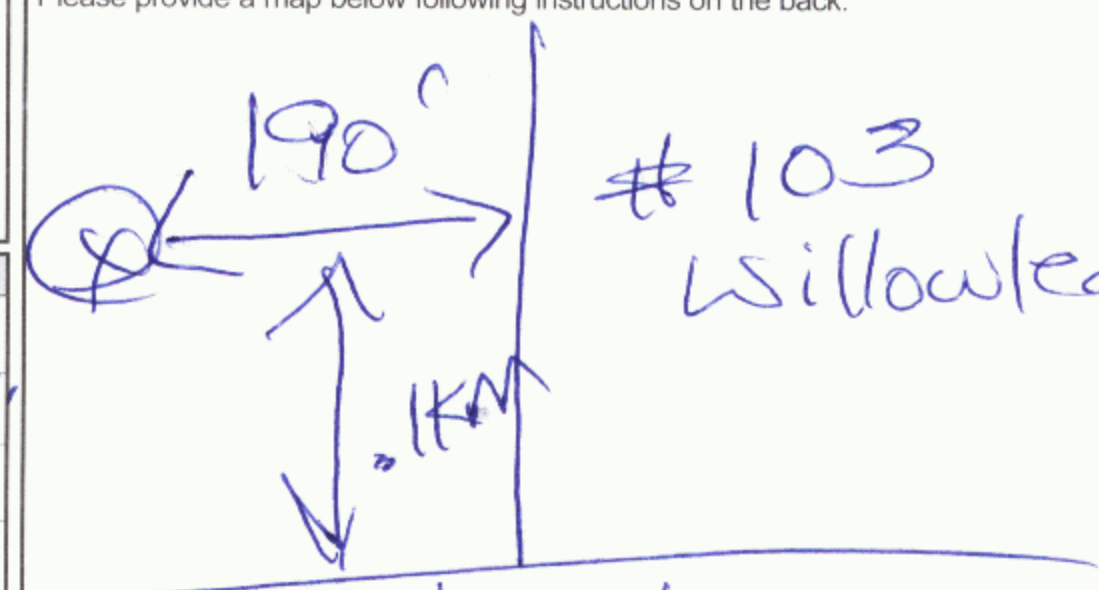
Well production (l/min / GPM) 20

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	32'7"		46'1"
1	39'2"	1	35'8"
2	41'1"	2	34'6"
3	42'2"	3	33'4"
4	42'9"	4	32'7"
5	43'	5	
10	44'	10	
15	44'4"	15	
20	44'9"	20	
25	45'1"	25	
30	45'4"	30	
40	45'6"	40	
50	45'8"	50	
60	46'1"	60	

Map of Well Location

Please provide a map below following instructions on the back.



Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
A1 Rock Drilling Co LTD	1119

Business Address (Street Number/Name)	Municipality
RR#1	Richmond

Province	Postal Code	Business E-mail Address
ONT	K0A2Z0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6138382170	Hogan Dan

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
T3058		20090727

Comments:

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☒ Yes ☐ No	20090619	20090619

Ministry Use Only

Audit No. Z 94703

AUG 06 2009 Received

0506E (12/2007)

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Certificate of Analysis

eurofins | Environment Testing

Client: Paterson Group
154 Colonnade Rd. South
Nepean, ON
K2E 7T7
Attention: Mr. Erik Ardley
PO#: 26905
Invoice to: Paterson Group

Report Number: 1917213
Date Submitted: 2019-09-19
Date Reported: 2019-09-25
Project: PH 3871
COC #: 849222

				Lab I.D.	1454856
				Sample Matrix	GW
				Sample Type	
				Sampling Date	2019-09-19
				Sample I.D.	TW1-GW1
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Anions	Cl	1	mg/L	AO 250	550*
	F	0.10	mg/L	MAC 1.5	<0.10
	N-NO2	0.10	mg/L	MAC 1.0	<0.10
	N-NO3	0.10	mg/L	MAC 10.0	<0.10
	SO4	1	mg/L	AO 500	99
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 500	329
	Colour	2	TCU	AO 5	<2
	Conductivity	5	uS/cm		2440
	pH	1.00		6.5-8.5	8.56*
	S2-	0.01	mg/L	AO 0.05	<0.01
	TDS	10	mg/L	AO 500	1800*
	Turbidity	0.1	NTU	AO 5.0	0.8
Hardness	Hardness as CaCO3	1	mg/L	OG 100	744*
Indices/Calc	Ion Balance	0.01			0.98
Metals	Ca	1	mg/L		204
	Fe	0.03	mg/L	AO 0.3	0.23
	K	1	mg/L		10
	Mg	1	mg/L		57
	Mn	0.01	mg/L	AO 0.05	0.04
	Na	2	mg/L	AO 200	199
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Total Coliforms	0	ct/100mL	MAC 0	0
Others	DOC	0.5	mg/L	AO 5	3.2
Subcontract-Inorg	N-NH3	0.01	mg/L		0.36
	Phenols	0.001	mg/L		<0.001

Guideline = ODWSOG *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

eurofins | Environment Testing

Client: Paterson Group
154 Colonnade Rd. South
Nepean, ON
K2E 7T7
Attention: Mr. Erik Ardley
PO#: 26905
Invoice to: Paterson Group

Report Number: 1917213
Date Submitted: 2019-09-19
Date Reported: 2019-09-25
Project: PH 3871
COC #: 849222

Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1454856 GW 2019-09-19 TW1-GW1
Subcontract-Inorg	Tannin & Lignin	0.1	mg/L		<0.1
	Total Kjeldahl Nitrogen	0.1	mg/L		0.5

Guideline = ODWSOG *** = Guideline Exceedence**

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Certificate of Analysis

eurofins | Environment Testing

Client: Paterson Group
154 Colonnade Rd. South
Nepean, ON
K2E 7T7
Attention: Mr. Erik Ardley
PO#: 26905
Invoice to: Paterson Group

Report Number: 1917214
Date Submitted: 2019-09-19
Date Reported: 2019-09-25
Project: PH 3871
COC #: 849222

				Lab I.D.	1454857
				Sample Matrix	GW
				Sample Type	
				Sampling Date	2019-09-19
				Sample I.D.	TW1-GW2
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Anions	Cl	1	mg/L	AO 250	578*
	F	0.10	mg/L	MAC 1.5	<0.10
	N-NO2	0.10	mg/L	MAC 1.0	<0.10
	N-NO3	0.10	mg/L	MAC 10.0	<0.10
	SO4	1	mg/L	AO 500	100
General Chemistry	Alkalinity as CaCO3	5	mg/L	OG 500	321
	Colour	2	TCU	AO 5	2
	Conductivity	5	uS/cm		2430
	pH	1.00		6.5-8.5	8.51*
	S2-	0.01	mg/L	AO 0.05	0.02
	TDS	10	mg/L	AO 500	1810*
	Turbidity	0.1	NTU	AO 5.0	0.9
Hardness	Hardness as CaCO3	1	mg/L	OG 100	737*
Indices/Calc	Ion Balance	0.01			0.94
Metals	Ca	1	mg/L		201
	Fe	0.03	mg/L	AO 0.3	0.23
	K	1	mg/L		10
	Mg	1	mg/L		57
	Mn	0.01	mg/L	AO 0.05	0.04
	Na	2	mg/L	AO 200	194
Microbiology	Escherichia Coli	0	ct/100mL	MAC 0	0
	Total Coliforms	0	ct/100mL	MAC 0	0
Others	DOC	0.5	mg/L	AO 5	3.1
Subcontract-Inorg	N-NH3	0.01	mg/L		0.36
	Phenols	0.001	mg/L		<0.001

Guideline = ODWSOG *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

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Client: Paterson Group
154 Colonnade Rd. South
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Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.
					1454857 GW 2019-09-19 TW1-GW2
Subcontract-Inorg	Tannin & Lignin	0.1	mg/L		<0.1
	Total Kjeldahl Nitrogen	0.1	mg/L		0.5

Guideline = ODWSOG *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Project : 240 Westbrook

Reception Date: 2023-07-17

					Eurofins Sample No :	7077573				
					Matrix :	Drinking water				
					Sampling Date :	2023-07-17				
					Client Sample Identification :	July 17				
Anions	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Chloride	0.5	mg/L	250			441				
Nitrate (as Nitrogen)	0.1	mg/L	10.0			<0.1				
Sulphate	1	mg/L	500			74				

					Eurofins Sample No :	7077573				
					Matrix :	Drinking water				
					Sampling Date :	2023-07-17				
					Client Sample Identification :	July 17				
Calculations	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Hardness as CaCO3 (Calculation)	1	mg/L	80-100			518				
Ion Balance (Calculation)^	0.1					0.97				

					Eurofins Sample No :	7077573				
					Matrix :	Drinking water				
					Sampling Date :	2023-07-17				
					Client Sample Identification :	July 17				
General Chemistry	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Alkalinity (as CaCO3)	5	mg/L	500			383				
Conductivity @ 25°C	5	µS/cm				2060				
Fluoride	0.1	mg/L	1.5			0.28				
pH @ 25°C	1		6.5-8.5			7.66				

					Eurofins Sample No :	7077573				
					Matrix :	Drinking water				
					Sampling Date :	2023-07-17				
					Client Sample Identification :	July 17				
Metals	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Metals Scan (Water, ICP/MS)										
Iron	0.03	mg/L	0.3			0.17				
Manganese	0.01	mg/L	0.05			0.03				

This certificate of analysis corrects and replaces any previous version. The analysis results refer only to what was provided for testing.
This certificate shall not be reproduced except in full, without the written approval of Eurofins Environment Testing Canada Inc.
Method references and/or additional QA/QC information available on request.

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Project : 240 Westbrook

Reception Date: 2023-07-17

						Eurofins Sample No :	**7077573**			
						Matrix :	Drinking water			
						Sampling Date :	2023-07-17			
						Client Sample Identification :	July 17			
Metals, Water, ICP/OES	**RL**	**Unit**	**Criteria**							
			A	**B**	**C**					
Metals Scan (Water, ICP/OES)										
Calcium	1	mg/L				133				
Magnesium	1	mg/L				45				
Potassium	1	mg/L				8				
Sodium	1	mg/L	200			243				

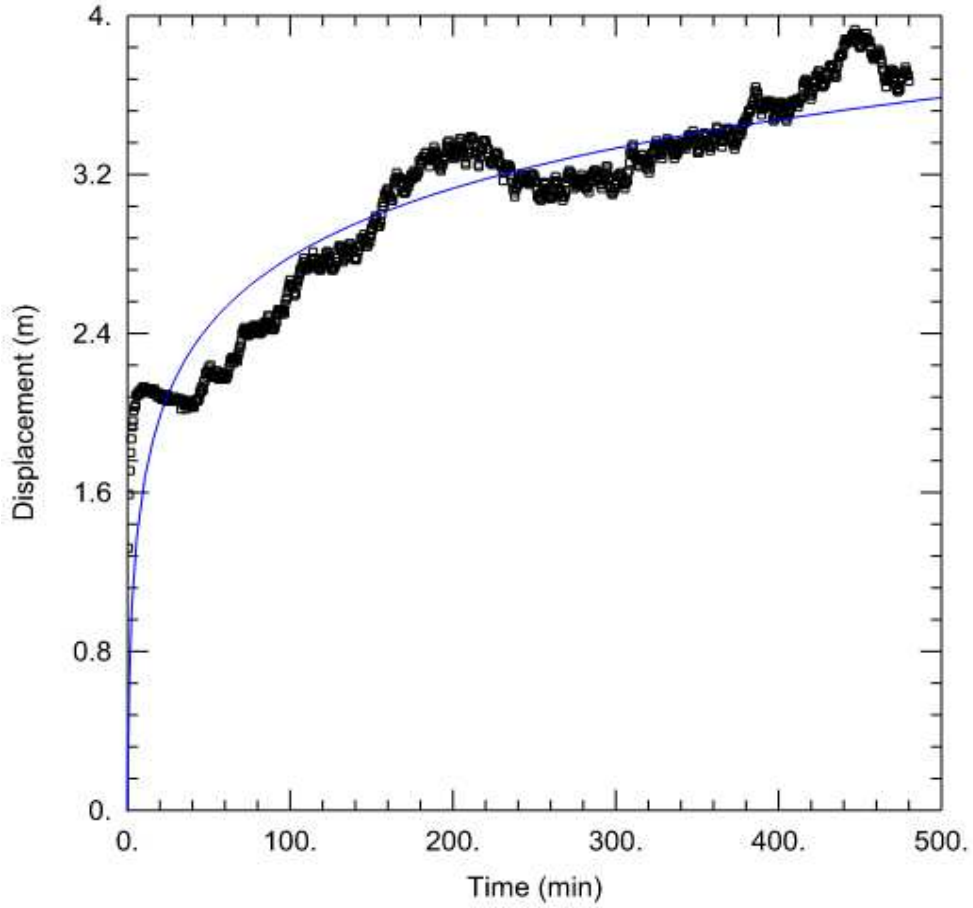
Approved by : R. Zafari

Raheleh Zafari,
Ottawa, Environmental Chemist, PhD

This certificate of analysis corrects and replaces any previous version. The analysis results refer only to what was provided for testing.
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Method references and/or additional QA/QC information available on request.

Pumping Test Analysis Report

File No.	PH3871	Well ID:	TW1
Date:	September 19, 2019	Solution Method:	**Theis**
Client:	Vittorio Santaguida	Transmissitivity (m2/day):	5.273
Site Address:	240 Westbrook Rd, Ottawa	Storativity	0.5437
Project:	Auto Care Garage	Discharge Rate (L/min)	23
		Analysis performed by:	EA



patersongroup

240 Westbrook Road

PH3871

TW1 inputs

pH	7.66	A	0.23
TDS	1810	B	2.38
Hardness	518	C	2.31
Alkalinity	383	D	2.58
Temp.	10.1		
		pHs =	7.008788238

Langelier Saturation Index (LSI) Calculation

(Langelier, 1936)

LSI = pH - pHs

pHs = (9.3 + A + B) - (C + D)

Where:

A = (Log10 [TDS] - 1) / 10

B = -13.12 x Log10 (oC + 273) + 34.55

C = Log10 [Ca2+ as CaCO3] - 0.4

D = Log10 [alkalinity as CaCO3]

LSI = 0.7

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

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
240 Westbrook Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5084

REMARKS

HOLE NO. TP 1

BORINGS BY Backhoe **DATE** 2019 September 20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	130.32	20 40 60 80	
TOPSOIL: Brown silty sand, trace rootlets, gravel									
0.41									
GLACIAL TILL: Grey silty sand, trace to some gravel									
0.76									
End of Test Pit Practical refusal to excavation on bedrock surface at 0.76m depth. (TP dry upon completion)								20 40 60 80 100 Shear Strength (kPa) ▲ Undisturbed △ Remoulded	

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
240 Westbrook Road
Ottawa, Ontario

DATUM Geodetic

FILE NO. PG5084

REMARKS

HOLE NO. TP 2

BORINGS BY Backhoe **DATE** 2019 September 20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	130.26	20 40 60 80	
TOPSOIL: Brown silty sand, trace to some rootlets, gravel									
0.56									
GLACIAL TILL: Grey silty sand, trace to some gravel						1	129.26		▽
1.22									
End of Test Pit Practical refusal to excavation on bedrock surface at 1.22m depth. (GWL @ 1.1m depth based on field observations)								20 40 60 80 100 **Shear Strength (kPa)** ▲ Undisturbed △ Remoulded	

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
240 Westbrook Road
Ottawa, Ontario

DATUM Geodetic

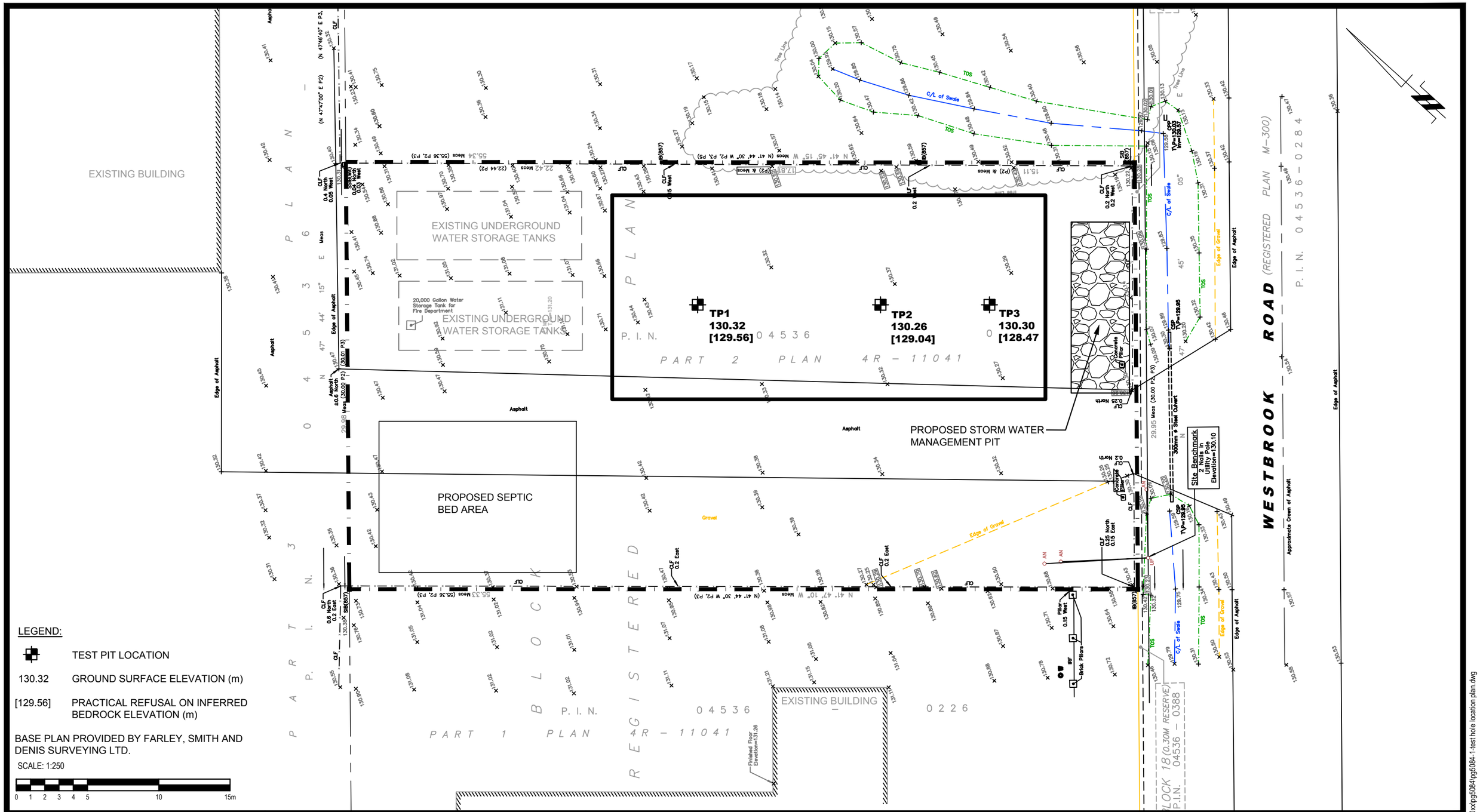
FILE NO. PG5084

REMARKS

HOLE NO. TP 3

BORINGS BY Backhoe **DATE** 2019 September 20

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	130.30	20 40 60 80	
TOPSOIL: Brown silty sand, trace to some roots									
0.60									
GLACIAL TILL: Grey silty sand, trace to some gravel, cobbles, boulders						1	129.30		▽
1.83									
End of Test Pit Practical refusal to excavation on bedrock surface at 1.83m depth. (GWL @ 1.2m depth based on field observations)								20 40 60 80 100 **Shear Strength (kPa)** ▲ Undisturbed △ Remoulded	



LEGEND:

- TEST PIT LOCATION
- 130.32 GROUND SURFACE ELEVATION (m)
- [129.56] PRACTICAL REFUSAL ON INFERRED BEDROCK ELEVATION (m)

BASE PLAN PROVIDED BY FARLEY, SMITH AND DENIS SURVEYING LTD.

SCALE: 1:250

0 1 2 3 4 5 10 15m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

MR. VITTORIO SANTAGUIDA

GEOTECHNICAL INVESTIGATION
240 WESTBROOK ROAD

OTTAWA, ONTARIO

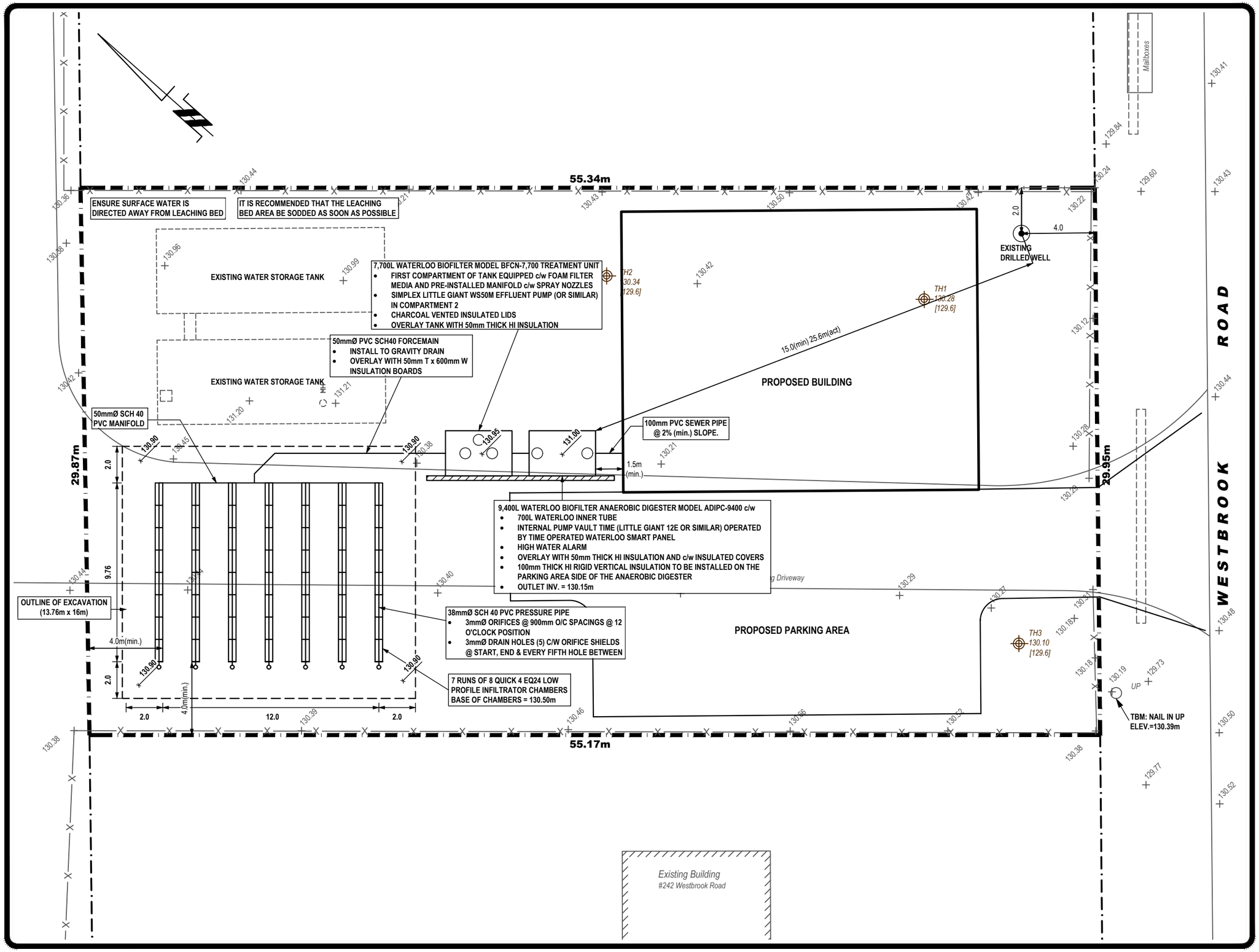
Title:

TEST HOLE LOCATION PLAN

Scale: 1:250	Date: 10/2019
Drawn by: YA	Report No.: PG5084-1
Checked by: NG	Dwg. No.: PG5084-1
Approved by: SD	Revision No.:

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11x17



LEGEND:

⊕	Test Hole Location
x 100.99	Existing Ground Surface Elev. (m)
x 102.30	Proposed Ground Surface Elev. (m)
[129.00]	Inferred Bedrock Elev. (m)
T/C	Top of Foundation Wall
	Existing Structure
	Proposed Structure
	Existing Tree

BENCHMARK INFORMATION:

TBM: Top of Nail in Utility Pole Near Southwest Corner of Subject Lot (See Plan)
Assumed Elevation = 130.39m

REFERENCE:

Base Plan and Topographic Information obtained from Site Plan, Project Information - Dwg. A-100, dated May 21, 2021, by Atelier 292 Architect Inc.

25/01/22	Revised to Suit Latest Architectural Plans	1
15/10/19	Issued for Preliminary Review	0
DD/MM/YY	DESCRIPTION	REV.

Consultant:

patersongroup
consulting engineers

Client:

VITTORI SANTAGUIDA

Project:

PROPOSED COMMERCIAL BUILDING
240 WESTBROOK ROAD
OTTAWA (CARP), ONTARIO

Drawing:

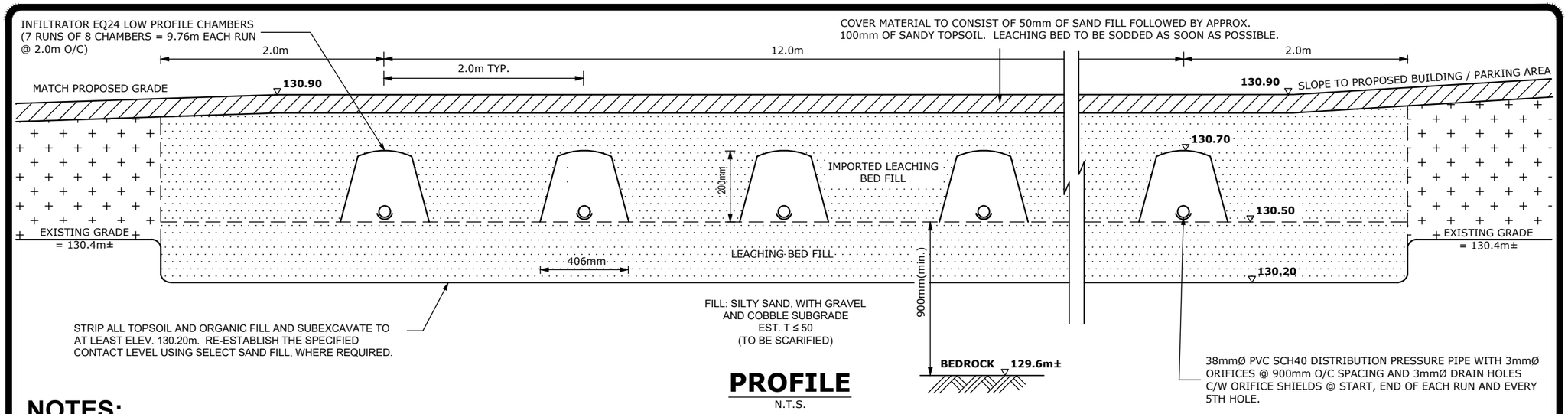
SEWAGE SYSTEM LAYOUT PLAN

Scale: 1:200	Drawn by: HV
Date: 01/2022	Checked by: MK

Drawing No.:

PH3871-1(rev.1)

p:\autocad drawings\hydrogeology\ph38xx\ph3871-1(rev.1).dwg



PROFILE
N.T.S.

NOTES:

1) ESTIMATE OF DAILY SEWAGE FLOW (Q)

IT IS PROPOSED THAT A NEW CLASS 4 SEWAGE SYSTEM BE INSTALLED TO SERVICE THE SEWAGE FLOWS ASSOCIATED WITH A PROPOSED WAREHOUSE BUILDING. THE PROPOSED SEWAGE FLOWS ARE AS FOLLOWS:

WORKSHOP/GARAGE SPACE:	3 WATERCLOSET x 950 L	= 2,850 L
	3 LOADING BAYS x 150 L	= 450 L
TOTAL ESTIMATED DAILY SEWAGE FLOW		= 3,300 L

DESIGN DAILY SEWAGE FLOW (Q) = 3,300 L

2) SOIL CONDITIONS

SOILS INFORMATION GATHERED BY PATERSON GROUP INC. ON JULY 30, 2019.

TH 1, ELEV. 130.28m		TH 2, ELEV. 130.34m		TH 3, ELEV. 130.10m	
0-0.10	SANDY TOPSOIL	0-0.15	SANDY TOPSOIL	0-0.05	GRAVEL
0.10-0.75	FILL: SILTY SAND TR. GR	0.15-0.74	FILL: FINE SAND	0.05-0.17	FILL: SILTY SAND WITH GR.
0.75	REFUSAL ON INFERRED BEDROCK		TRACE SILTY	0.17-0.59	FILL: FINE SAND TR. SILT
		0.74	REFUSAL ON INF. BEDROCK	0.59	REFUSAL ON INF. BEDROCK
-TH DRY UPON COMPLETION		-TH DRY UPON COMPLETION		- TH DRY UPON COMPLETION	

3) ANAEROBIC DIGESTER

- IT IS RECOMMENDED THAT A SINGLE-COMPARTMENT 9,400L WATERLOO BIOFILTER ANAEROBIC DIGESTER MODEL AD-9,400 BE INSTALLED.
- INLET PIPE OF DIGESTER SHALL BE EQUIPPED WITH A 700L(min.) WATERLOO INNER TUBE.
- THE DIGESTER TANK SHALL BE PROVIDED WITH A MINIMUM OF 510 mm SOIL COVER.
- A POLYLOK RISER AND INSULATED COVER ASSEMBLY, WHICH EXTENDS TO THE GROUND SURFACE, SHALL BE INSTALLED OVER THE EACH OF THE TANK OPENINGS.
- THE TANK SHALL BE BEDDED ON A LAYER OF OPSS GRANULAR 'A' OF AT LEAST 150mm IN THICKNESS AND COMPACTED TO AT LEAST 95% OF SPMDD.
- TANKS SHALL BE CONNECTED USING SCH 40 PVC SEWER PIPE WITH WATERTIGHT CONNECTIONS (i.e. STAINLESS STEEL LINK SEALS OR OR APPROVED EQUAL).
- 600mmØ POLY RISER WITH INSULATED COVER SHALL BE INSTALLED OVER THE PRIMARY ACCESS OPENING IN THE TANK LID.
- FINAL GRADING SHALL BE SHAPED TO ENSURE THAT SURFACE WATER IS DIRECTED AWAY FROM ALL TANKS.
- FORCEMAIN TO CONSIST OF 50mmØ PVC SCH 40 PIPE.
- FORCEMAIN TO BE INSTALLED TO GRAVITY DRAIN TO THE TANK AND SHALL BE OVERLAIN WITH 50mm THICK BY 600mm WIDE INSULATION BOARDS.
- ALL PIPING TO BE GLUED.
- INTERNAL PUMP VAULT WITH A SIMPLEX TIME CONTROLLED EFFLUENT PUMP (LITTLE GIANT 12E OR SIMILAR EFFLUENT FILTER).
- PUMP RUN TIME TO BE CONFIRMED IN THE FIELD.
- A CONTROL SWITCH SHALL OVERRIDE THE TIMER TO MAINTAIN THE LIQUID LEVEL WITHIN THE WORKING CAPACITY OF THE TANK.
- ALL ELECTRICAL WORKS MUST BE CARRIED OUT BY A QUALIFIED ELECTRICAL CONTRACTOR IN ACCORDANCE TO THE LATEST CODES, BYLAWS AND REGULATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL NECESSARY ELECTRICAL PERMITS AND COORDINATE ALL ELECTRICAL INSPECTIONS.

4) TREATMENT UNIT

- THE TREATMENT UNIT SHALL CONSIST OF A 7,700L WATERLOO BIOFILTER MODEL BFCN7700 WASTEWATER TREATMENT.
- THE TREATMENT UNIT SHALL BE INSTALLED IN SERIES AND DOWNSTREAM FROM THE DIGESTER TANK.
- A 50mmØ SCH 40 PVC FORCEMAIN SHALL BE USED TO CARRY THE EFFLUENT FROM THE PUMP TANK IN THE ANAEROBIC DIGESTER TO THE BULK FILLED BIOFILTER IN THE FIRST COMPARTMENT OF THE TREATMENT UNIT. FORCEMAIN SHALL BE INSTALLED TO GRAVITY DRAIN TO PUMP VAULT.
- THE FIRST COMPARTMENT OF THE BIOFILTER TANK SHALL BE BULK FILLED WITH THE BIOFILTER MEDIUM.
- THE WASTEWATER FROM THE PUMP VAULT SHALL BE DOSED USING SPRAY NOZZLES OVER EACH OF THE BASKETS IN BIOFILTER TANK.
- THE SECOND COMPARTMENT OF THE TREATMENT UNIT SHALL BE EQUIPPED WITH A SIMPLEX EFFLUENT PUMP. THE FINAL TREATED EFFLUENT COLLECTS ON THE FLOOR OF THE SECOND COMPARTMENT AND THE EFFLUENT PUMP, DOSES THE LEACHING BED.
- THE PUMP DUTY CYCLE OF THE SECOND EFFLUENT PUMP SHALL BE SET AT 255L (138L DOSE + VOLUME TO CHARGE SYSTEM). THE TIMER SHALL OPERATE THE PUMP EVERY 60 MINUTES.
- MINIMUM RESIDUAL PRESSURE HEAD AT THE FURTHEST POINT FROM THE PUMP SHALL BE 600mm TO BE VERIFIED IN THE FIELD.
- THE TREATMENT UNIT SHALL BE PROVIDED WITH A MINIMUM OF 510 mm SOIL COVER AND OVERLAIN WITH 50mm THICK HI INSULATION BOARDS.
- A POLYLOK RISER AND CHARCOAL VENTED INSULATED COVER ASSEMBLY, WHICH EXTENDS TO THE GROUND SURFACE, SHALL BE INSTALLED OVER EACH OF THE TANK OPENINGS.

5) FORCEMAIN

- A 50mmØ SCH40 PVC FORCEMAIN SHALL BE USED TO CARRY THE EFFLUENT FROM THE TREATMENT UNIT TO THE LEACHING BED.
- THE FORCEMAIN SHALL BE INSTALLED TO GRAVITY DRAIN TO TREATMENT UNIT AND OVERLAIN WITH 50mm THICK BY 600mm WIDE RIGID INSULATION BOARDS.
- FORCEMAIN SHALL BE INSTALLED ON A 150mm THICK LAYER OF COMPACTED SAND BEDDING.

6) DISPOSAL FIELD

- THE DISPOSAL FIELD SHALL CONSIST OF SHALLOW BURIED TRENCHES USING QUICK 4 EQ24 LOW PROFILE INFILTRATOR CHAMBERS.
- SBT LENGTH REQUIRED = Q/50 = 3300/50 = 66 LINEAR METRES.
- USE 7 RUNS OF 8 CHAMBERS (9.76m LENGTH EACH RUN) FOR A TOTAL LENGTH OF 68.32 LINEAR METRES.
- REMOVE ALL EXISTING TOPSOIL AND ORGANIC FILL, AND SUBEXCAVATE TO AT LEAST ELEVATION 130.20m, WHICHEVER IS GREATER. ESTABLISH THE SPECIFIED CONTACT LEVEL WITH SELECT SAND FILL, WHERE REQUIRED.
- SCARIFY THE BASE AND SIDES OF EXCAVATED AREA USING A HAND RAKE. DO NOT WALK ON THE SCARIFIED SURFACES.
- ESTABLISH THE SPECIFIED CONTACT LEVEL, ELEV. 130.50m, WITH LEACHING BED FILL OVER THE APPROVED SUBGRADE SURFACE.
- LEACHING BED SAND FILL SHALL BE UNIFORM SAND WITH GRADING LIMITS SIMILAR TO 100% PASSING 13.2mm SIEVE, LESS THAN 5% PASSING 0.075mm SIEVE AND HAVING A PERCOLATION RATE OF 6 TO 8 min/cm.
- PREPARE THE 38mmØ PVC SCH 40 PRESSURE PIPE BY DRILLING 3mmØ HOLES @ 900mm SPACINGS ALONG THE TOP OF THE PIPE (I.E. 12 O'CLOCK POSITION). THE FIRST HOLE SHALL BE LOCATED 450mm FROM THE MANIFOLD.
- DRILL A 3mmØ (1/8"Ø) DRAIN HOLE NEAR THE START, END OF EACH RUN AND EVERY 5TH HOLE. THE DRAIN HOLES SHOULD BE LOCATED AT THE 6 O'CLOCK POSITION. AN ORIFICE SHIELD SHALL BE INSTALLED OVER EACH DRAIN HOLE.
- THE PRESSURE PIPE SHALL BE INSTALLED ONTO THE PREPARED SAND LAYER @ DESIGN ELEVATION AND IN THE CONFIGURATION AS SPECIFIED ON THE PLAN VIEW. PIPES SHALL REST ON ORIFICE SHIELDS.
- THE PRESSURE SYSTEM MUST BE TESTED AND SQUIRT HEIGHTS VERIFIED PRIOR TO INSTALLING THE CHAMBERS.
- RUN THE PRESSURE PIPE THROUGH THE END PLATE OF THE CHAMBER.
- PLACE THE FIRST CHAMBER OVER THE PIPE AND ENSURE THE HOLES IN THE PRESSURE PIPE ARE FACING UP (I.E. 12 O'CLOCK POSITION).
- INSERT THE END PLATE TO THE FIRST CHAMBER.
- CONNECT EACH SUBSEQUENT CHAMBER TO THE END OF THE PROCEEDING CHAMBER. ENSURE THAT THE CHAMBERS ARE PROPERLY INTERLOCKED AS PER MANUFACTURER'S REQUIREMENTS.
- ATTACH AN END PLATE TO THE END OF EACH CHAMBER RUN.
- TO ALLOW FOR SERVICING, IT IS RECOMMENDED THAT THE END OF EACH PRESSURE PIPE BE SLEEVED THROUGH THE END PLATE AND BE FITTED WITH A 38mmØ PVC LONG RADIUS 90° SWEEP C/W 1-38mmØ PVC FPT x SLIP FIT ADAPTER AND 1-MPT PVC END CAP, COVER CLEAN-OUT ASSEMBLY WITH 150mmØ IRRIGATION VALVE COVER (OR APPROVED EQUAL).
- BACKFILL THE CHAMBERS IN LIFTS, USING SELECT SAND FILL. BACKFILL MUST CONSIST OF SELECT SAND FILL FOLLOWED BY 100mm OF SANDY TOPSOIL IT IS RECOMMENDED THAT THE LEACHING BED AREA BE SODDED AS SOON AS POSSIBLE.
- START BACKFILLING AT THE JOINTS, COMPACT THE BACKFILL ALONG THE SIDE OF THE CHAMBERS BY WALKING ALONG THE EDGES OF THE TRENCHES.
- THE GROUND SURFACE OVER THE LEACHING BED SHOULD BE CROWNED TO SHED SURFACE WATER AND SODDED IMMEDIATELY.

7) MINIMUM CLEARANCE DISTANCE FROM LEACHING BED

- 4.0m FROM ANY PROPERTY LINE
- 6.0m FROM ANY STRUCTURE
- 16.0m FROM ANY DRILLED WELL
- 5.0m FROM ANY TREES UNLESS OTHERWISE APPROVED
- 5.0m FROM DRIVEWAY
- FIRE STORAGE TANKS EXEMPTED AS PER DISCUSSION WITH OSSO.

8) MINIMUM CLEARANCE DISTANCE FROM TANK(S)

- 1.5m FROM ANY STRUCTURE
- 15.0m FROM ANY DRILLED WELL
- 3.0m FROM ANY PROPERTY LINE

9) GENERAL

- POOLS AND ALL APPURTENANCES, SUCH AS FENCES, PATIOS, ETC. SHOULD BE LOCATED A MINIMUM OF 5m FROM THE DISTRIBUTION SYSTEM OF THE LEACHING BED AND OUTSIDE THE SAND AREA.
- THE BACKWASH WATERS FROM ANY HOUSEHOLD WATER TREATMENT UNIT, SUCH AS WATER SOFTENER, SHOULD NOT DISCHARGE INTO THE SEWAGE SYSTEM.
- CONTRACTOR SHALL BE QUALIFIED AND REGISTERED UNDER PART 8 OF THE ONTARIO BUILDING CODE.
- ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE LATEST BY-LAWS, CODES AND REGULATIONS.
- CONTRACTOR SHALL REVIEW DRAWINGS IN DETAIL AND SHALL INFORM THE CONSULTANT OF ANY ERRORS AND/OR OMISSIONS ON DESIGN DRAWINGS IMMEDIATELY.
- CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE AND PROTECT ALL EXISTING UNDERGROUND SERVICES.
- CONTRACTOR SHALL VISIT THE SITE AND REVIEW ALL DOCUMENTATION TO BECOME FAMILIAR WITH THE SITE AND SUBSURFACE SOIL CONDITIONS TO DETERMINE SUITABLE METHODS OF CONSTRUCTION.
- THE MANUFACTURER PROVIDES A LIMITED WARRANTY OF THE SYSTEM COMPONENTS. THE OWNER OF THE SYSTEM MUST SIGN A MAINTENANCE AGREEMENT WITH THE MANUFACTURER'S REPRESENTATIVE. THE HOMEOWNER IS RESPONSIBLE FOR THE ANNUAL FEES ASSOCIATED WITH THE MAINTENANCE.
- THE FIRM OF PATERSON GROUP INC. HAS PROVIDED DESIGN SERVICES ONLY FOR THE SUBJECT SEWAGE SYSTEM. THE DESIGN HAS BEEN CARRIED OUT IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINES AND OUR INTERPRETATION OF PART 8 OF THE ONTARIO BUILDING CODE.
- INSPECTIONS BY THE CONSULTANT DURING THE INSTALLATION OF THE SYSTEM IS A REQUIREMENT OF SOME REGULATING AUTHORITIES AND IS STRONGLY RECOMMENDED BY THIS FIRM.

25/01/22	Revised to Suit Latest Architectural Plans	1
15/10/19	Issued for Preliminary Review	0
DD/MM/YY	DESCRIPTION	REV.

Consultant:
patersongroup
consulting engineers

Client:
VITTORI SANTAGUIDA

Project:
PROPOSED COMMERCIAL BUILDING
240 WESTBROOK ROAD
OTTAWA (CARP), ONTARIO

Drawing:
SEWAGE SYSTEM LAYOUT PLAN

Scale: 1:200	Drawn by: HV
Date: 01/2022	Checked by: AD

Drawing No.:
PH3871-2(rev.1)

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