



December 9, 2021

Our File: 221396

Jim McLaughlin
6180 Line 5 Minto
Palmerston ON N0G 2P0

Via E-mail

Re: Preliminary Hydrogeological Assessment for
Servicing of Trailer Pads at 184678 Grey Road 9,
Township of Southgate

Dear Mr. McLaughlin,

GM BluePlan Engineering Limited (GMBP) have been retained by yourself (the "Client") to provide hydrogeological services to support the arrangement of municipal approvals for the addition of private-use recreational amenities to the property at 184678 Grey Road 9, Township of Southgate (the Site). The Site is also described as Parts of Lots 26 and 27, Concession 15, Geographic Township of Egremont.

This hydrogeological study is intended to determine the feasibility of private servicing (i.e., private water well and private on-site sewage system) for the proposed project.

PROPOSED PROJECT

The Site is a rural property approximately 65 hectares in size and is mainly under agricultural use. Figure 1 shows the location of the Site in the sub-regional context and Figure 2 shows an aerial view of the Site.

The proposed project involves the construction of six serviced trailer pads (i.e., for recreational vehicles) and a cabin. The trailer pads and the cabin will be serviced privately for water (i.e., water well) and sewage (i.e., on-site sewage system). The general area where these works will be constructed is shown on Figure 2 (i.e., the "Proposed Project Area"). Additional detail showing the layout of the proposed project is shown in the site plan figure provided by Cuesta Planning (see Enclosure A).

Sewage servicing will be required to dispose of an estimated sewage generation rate of 3,650 L/d. This estimate is based on the following sewage generation rates available from Part 8 of the *Ontario Building Code*:

- 425 L/unit/day for serviced recreational vehicles (i.e., for the trailer pads)
- 1,100 L/day for a two-bedroom dwelling (i.e., for the cabin)

For water servicing, it will be assumed that the daily water demand will be equal to the estimated sewage generation rate: 3,650 L/d.

The objective of this hydrogeological assessment is to determine whether the local hydrogeological system is capable of supporting the proposed usage.

GEOLOGICAL SETTING

Physiographic mapping (Chapman & Putnam, 2007) indicates that the Site lies within the Horseshoe Moraines physiographic region, which is characterized by hummocky and ridged landscapes as well as pitted terraces and swampy valley floors (Chapman & Putnam, 1984). The Site lies across two physiographic landforms, with drumlinized till plains covering the western part of the Site and till moraines covering the eastern part of the Site, including the proposed project area (Chapman & Putnam, 2007).

The surficial geology of the Site is mainly till deposits in the northern and southwestern parts of the Site and ice-contact stratified drift in the southeastern part of the Site: a ribbon of coarse ice-contact stratified drift extends across the northern part of the Site and through the proposed project area (Ontario Geological Survey, 2010). Figure 3 shows the distribution of surficial geological materials in relation to the Site and proposed project area.

Soil survey mapping (Agriculture Canada, 1979) indicates that the soils of the Site are mainly Donnybrook sandy loam and Listowel silt loam. Both of these soil types appear to intersect the proposed project area as well. The Donnybrook sandy loam is described as having good drainage and moderately gravelly to very gravelly texture. The Listowel silt loam is described as having imperfect drainage and being “slightly stony” (Agriculture Canada, 1979).

The bedrock in the vicinity of the Site is that of the Guelph Formation (Ontario Geological Survey, 2011), which is mainly composed of dolostone and limestone. The Guelph Formation is a regionally-significant aquifer and is understood to be highly productive, capable of providing water for municipal water systems such as the City of Guelph. A well record attributed to the Site (Well ID 2503180, see Enclosure B) indicates that bedrock lies approximately 21 m below ground surface (70').

Topographically, the ground surface of the Site is flat to undulating. In the vicinity of the proposed project area is a pond which occupies part of a low-lying area in the northern part of the Site. Surface water drainage in the local area is generally toward the pond, whose outlet drains in a westerly direction. This outlet stream eventually discharges to Norman Reeves Creek, which lies approximately 6 km west of the Site (Ministry of the Environment, Conservation and Parks, 2021).

The direction of groundwater flow in the vicinity of the proposed project area is interpreted to be generally northward toward the pond.

SERVICING CONSIDERATIONS

On-Site Sewage Systems: Nitrogen Attenuation

The primary concern related to the development and operation of on-site sewage systems is the effect that these systems may have on the concentration of nitrate in local groundwater. The proposed development must ensure that its sewage management does not negatively impact groundwater quality and preclude its use for other purposes or by other (i.e., off-site) users. The most prevalent use for groundwater use is domestic consumption and so typically this means that a given development must not result in nitrate concentrations of 10 mg/L (per Ontario Drinking Water Standards) in the groundwater going off Site.

Generally speaking, for residential developments, *Procedure D-5-4* (MECP, 1996a), indicates that a property that is more than 1 hectare in size does not require a detailed assessment with respect to nitrogen attenuation unless there is a particularly sensitive receptor within the scope of the project. Though the proposed project may not be a residential development, it is a relatively low intensity land use and there do not appear to be sensitive receptors in the area. For example, the water well records in the area generally appear to be deep bedrock wells (see Table 1).

Furthermore, though the quantity of sewage generated by the proposed project (3,650 L/d) is somewhat larger than a typical residence (2,000 L/d for a four-bedroom house), the size of the property is proportionally much larger.

It is therefore interpreted that the intensity of development is low enough that nitrogen from the on-site sewage system will be sufficiently attenuated and will not result in impacts to local receptors.

On-Site Sewage Systems: Septic System Sizing

Another aspect of sewage servicing that must be considered is whether there is sufficient space on the property to construct an appropriately-designed septic system.

Again, due to the large size of the property, we have identified no obstacle to the construction of a suitable on-site sewage system designed in accordance with the *Ontario Building Code*.

Private Well and Water Supply

The local Guelph Formation (bedrock) aquifer has been well-studied and is understood to generally be among the highest-yielding formations for water production in southern Ontario (Singer, 2003). The mean transmissivity of the Guelph Formation is 12.1 m²/d, indicating good water-yielding capacity (Singer, 2003).

Generally, the water quality in the Guelph Formation is suitable for domestic usage but typically exhibits some parameters in exceedance of aesthetic objectives of the Ontario Drinking Water Standards, such as hardness and iron.

To provide additional information about the local aquifers, a search of the MECP water well records database was conducted to identify well records that are attributed to locations within 500 m of the Site. Figure 4 shows the layout of the water well records within the 500-m buffer. A summary of information from these water well records is provided in Table 1.

A total of four well records were identified in the search. All of the wells were bedrock wells used for domestic and/or livestock purposes. The pumping test information recorded on the well records indicates capacity that would be sufficient for domestic usage. Three of the well records indicates pumping for a duration greater than 120 minutes and for rates exceeding 25 L/min. The fourth well record indicates pumping for a duration of 60 minutes at a rate of 36.4 L/min.

The Client has also provided a water well record attributed to a well that has been constructed for the purposes of servicing the proposed project. This well record (Tag Number A071555, see Enclosure B) does not appear in the MECP water well record database: it is suspected that the data has not yet been entered and mapped by the MECP. The total depth and depth to bedrock of this well were recorded as 44.51 mbgs and 14.63 mbgs, respectively. The pumping test data provided on the record indicates substantial capacity, with only about 4 m of drawdown after 1 hour of pumping at 68.1 L/min. The volume of water pumped during the pumping test for this well (4,080 L) exceeds the estimated daily water demand for the proposed project (i.e., 3,650 L).

The available pumping test data corroborates that the Guelph Formation is a competent aquifer for domestic purposes. It is expected that the water demand of proposed project can be met by the well provided (i.e., Tag Number A071555).

Due to the relatively low intensity of the proposed project and the distance from other water users, no impacts are expected due to the water usage from the proposed project.

This preliminary assessment has not included review of the condition, type of construction, supply or water quality of any existing well on-Site.

RECOMMENDATIONS

Following review of the proposed project and the hydrogeological information regarding the Site, we make the following recommendations regarding the proposed project:

- that the proposed project be provided with private servicing for sewage;

- that the on-site sewage system constructed to provide servicing for the proposed project be constructed in accordance with the *Ontario Building Code* and in respect of all offsets (e.g. from wells, surface water bodies, structures, and property lines) as specified therein;
- that the proposed project be provided with private servicing for water using a bedrock well; and
- that the bedrock well constructed to provide servicing for the proposed project be constructed in accordance with *Ontario Regulation 903*.

CONCLUSION

A preliminary hydrogeological assessment has been completed with respect to a private-use recreational area proposed for the property at 184678 Grey Road 9, Township of Southgate. The proposed project involves the construction of six trailer pads and a cabin, all privately serviced for water and sewage.

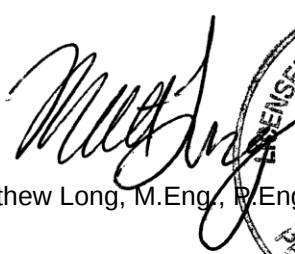
The findings of the assessment indicate that:

- given the property size, the required nitrogen attenuation can be achieved for the proposed project;
- sewage servicing through the use of on-site sewage systems is considered feasible for the proposed development;
- on-site sewage systems may be conventional Class 4 systems (i.e. septic tank and tile bed), though the type of tile bed constructed may depend on the soil and groundwater conditions encountered at the location of installation;
- sufficient groundwater supply is expected to be available from the bedrock aquifer below the Site;
- the hydrogeological conditions generally support the proposed project and servicing scheme; and
- the proposed project can be provided with private water and sewage services without impacting the other local water users or the environment.

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in black ink, appearing to read 'Matthew Long', is written over a circular professional engineer's stamp. The stamp contains the text 'LICENSED PROFESSIONAL ENGINEER', 'M. R. LONG', '100228503', and 'PROVINCE OF ONTARIO'. A date stamp '9 Dec 2021' is also visible within the stamp.

Matthew Long, M.Eng., P.Eng.

Enclosures:

Figures

Figure 1: Site Location

Figure 2: Site Layout

Figure 3: Surficial Geology

Figure 4: Water Well Records

Tables

Table 1: Summary of Water Well Record Information

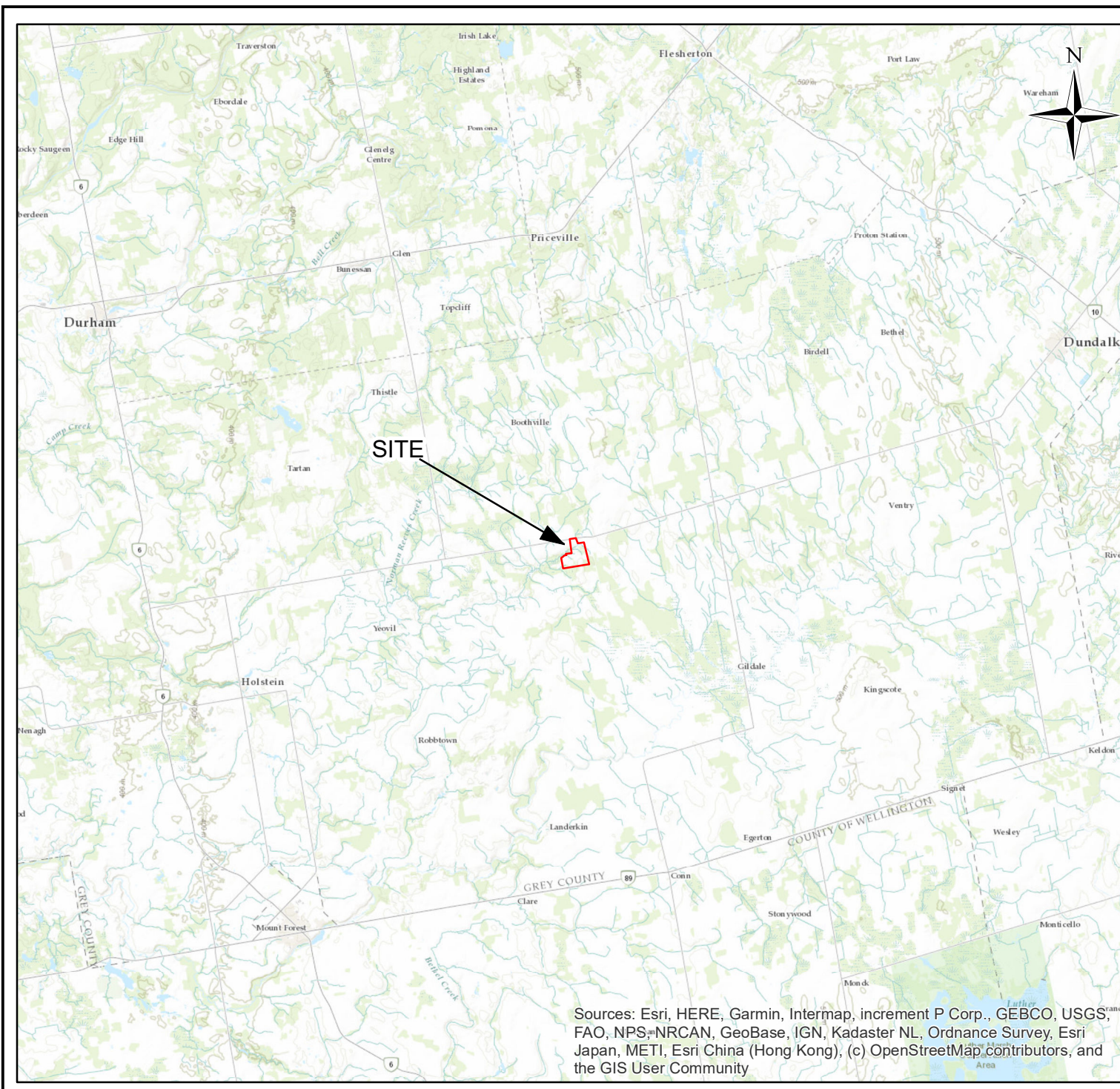
Enclosure A: Site Plan of Proposed Project

Enclosure B: Well Records for Wells On-Site

REFERENCES

- Agriculture Canada. (1979). Soils of Grey County (South Sheet), Ontario from Soil Survey Report No. 17.
- Chapman, L., & Putnam, D. (1984). *Physiography of Southern Ontario 3rd Edition*. Ministry of Natural Resources, Ontario.
- Chapman, L., & Putnam, D. (2007). Physiography of Southern Ontario Miscellaneous Release--Data 228. Ontario Geological Survey.
- MECP. (1996a). *D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment*. (Ontario Ministry of the Environment, Conservation and Parks) Retrieved from Government of Ontario: <https://www.ontario.ca/page/d-5-4-individual-site-sewage-systems-water-quality-impact-risk-assessment>
- MECP. (1996b). *D-5-5 Private Wells: Water Supply Assessment*. (Ontario Ministry of the Environment, Conservation and Parks) Retrieved from Government of Ontario: <https://www.ontario.ca/page/d-5-5-private-wells-water-supply-assessment>
- Ministry of the Environment, Conservation and Parks. (2021). *Source Protection Information Atlas*.
- Ontario Geological Survey. (2010). Surficial geology of southern Ontario; Ontario Geological Survey Miscellaneous Release--Data 128 - Revised.
- Ontario Geological Survey. (2011). 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release---Data 126-Revision 1.
- Singer, S. C. (2003). *The Hydrogeology of Southern Ontario, 2nd Edition*. Toronto: Ontario Ministry of the Environment.

FIGURES



Project: 221396
Hydrogeological
Assessment for
Servicing
184678 Grey Road 9
Township of Southgate

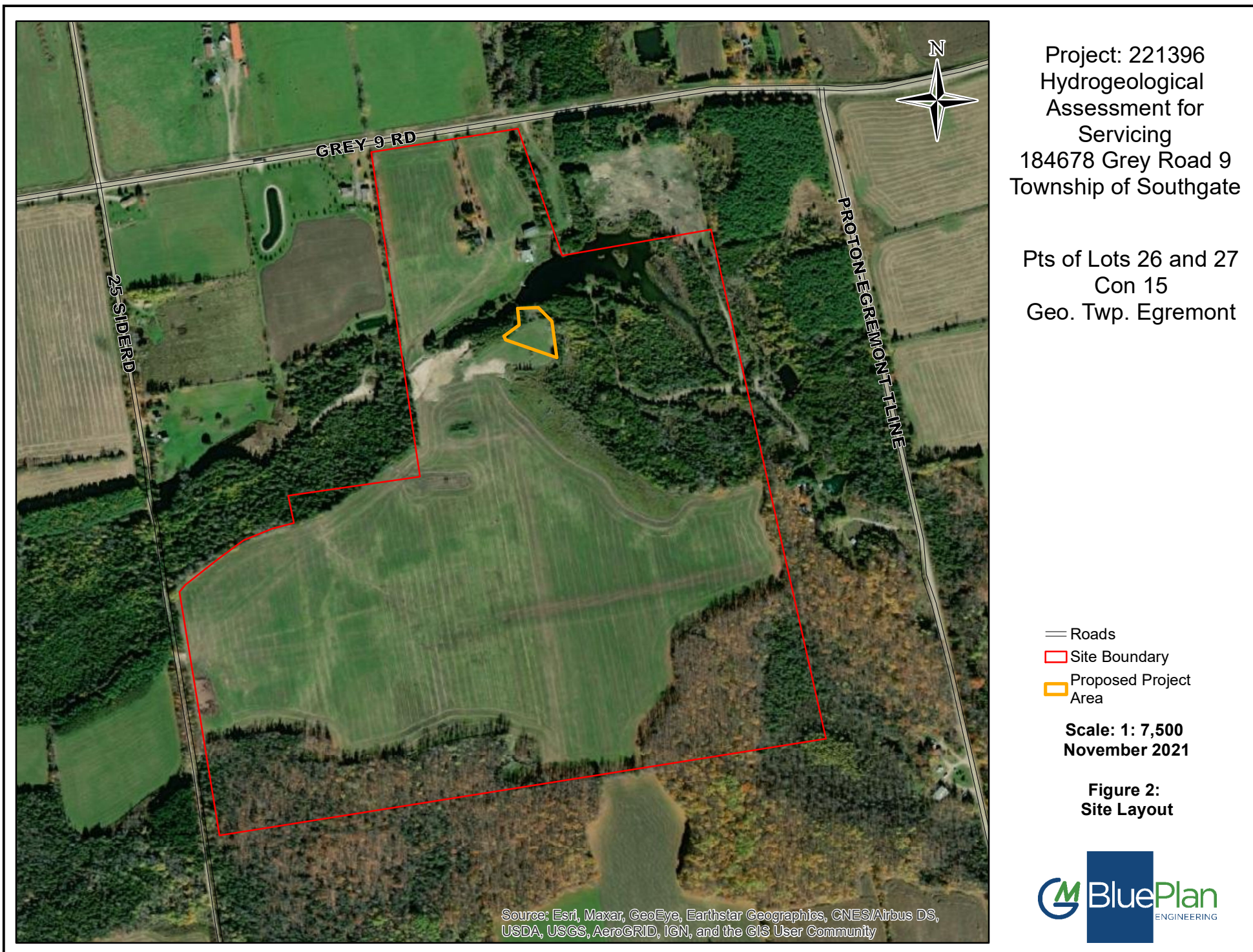
Pts of Lots 26 and 27
Con 15
Geo. Twp. Egremont

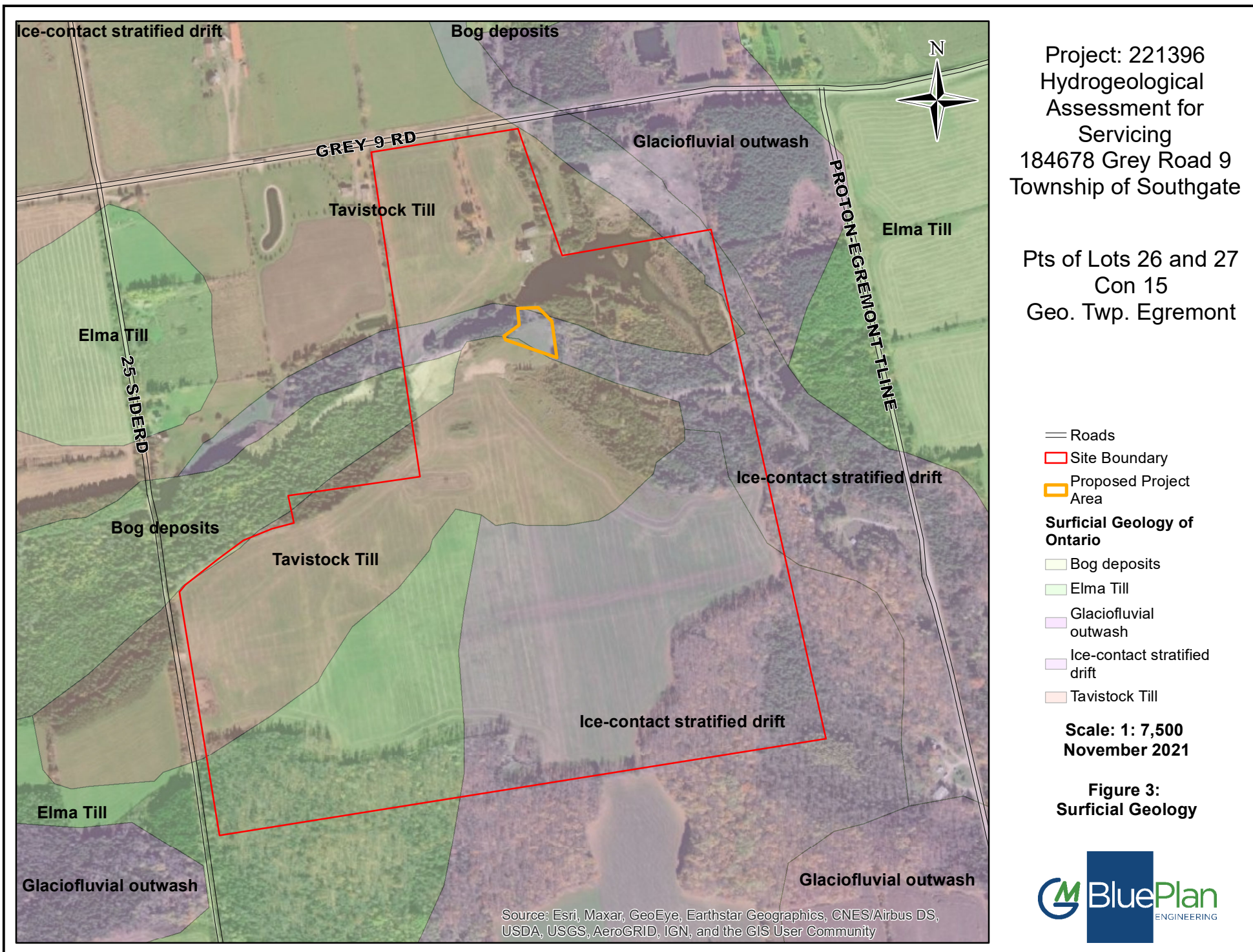
 Site Boundary

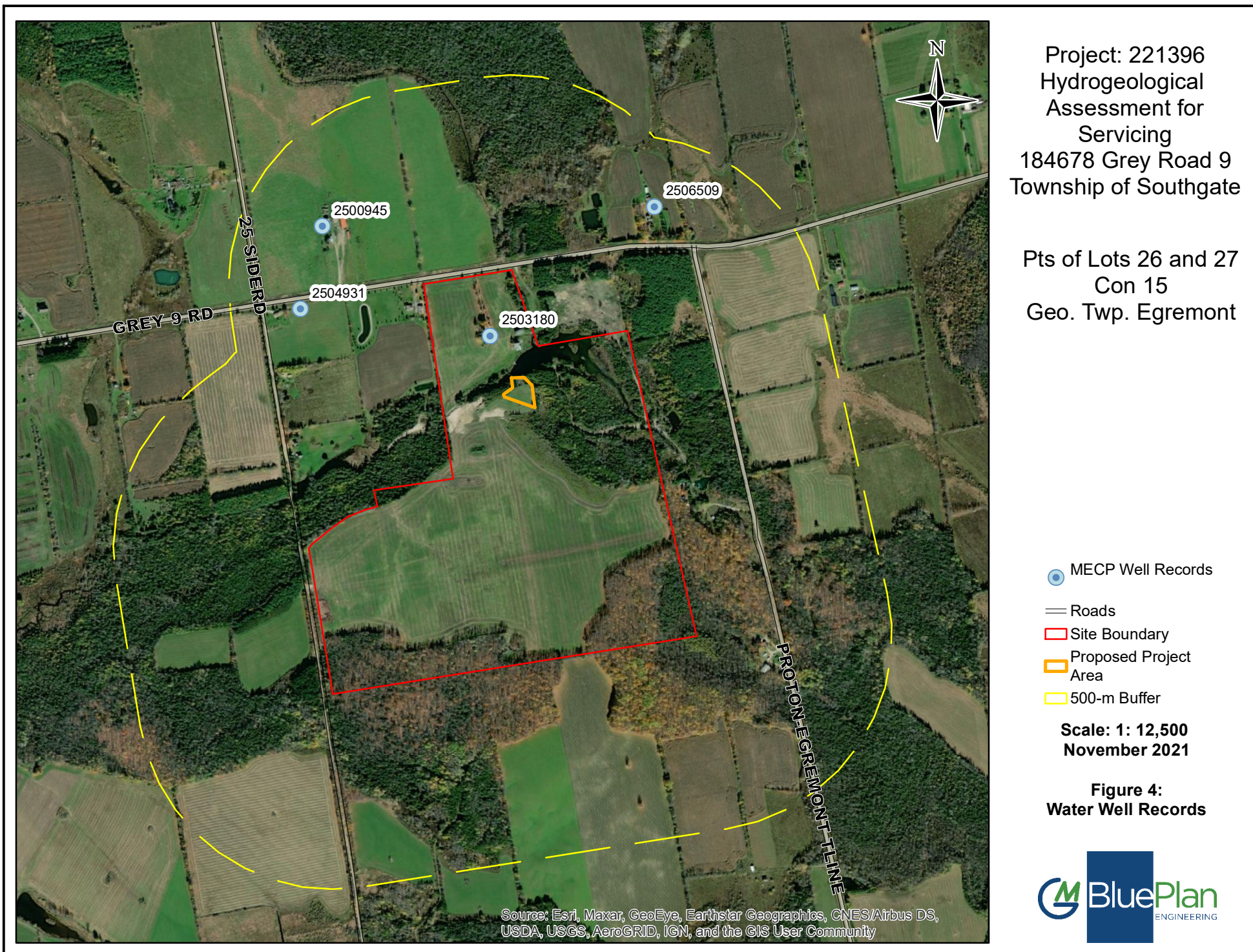
Scale: 1: 200,000
November 2021

**Figure 1:
Site Location**

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community







TABLES

221369 - Hydrogeological Assessment for Servicing
184678 Grey Road 9
Township of Southgate

TABLE 1: SUMMARY OF WATER WELL RECORD INFORMATION

WELL ID	LOT	CON	GEO. TOWNSHIP	EASTING	NORTHING	USAGE	WELL TYPE	STATIC WATER LEVEL	TOTAL DEPTH	DEPTH TO BEDROCK	PUMPING RATE	PUMPING DURATION
								(mbgs)	(mbgs)	(mbgs)	(L/min)	(min)
2500945	26	16	EGREMONT	530764	4883773	Domestic	Bedrock	15.2	44.8	37.2	45.5	300
2503180	27	15	EGREMONT	531194	4883493	Domestic	Bedrock	4.9	48.8	21.3	36.4	180
2504931	26	15	EGREMONT	530708	4883561	Domestic	Bedrock	6.4	54.9	25.6	36.4	60
2506509	27	16	EGREMONT	531614	4883823	Domestic	Bedrock	6.1	30.5	25.0	27.3	720

**ENCLOSURE A:
SITE PLAN OF PROPOSED PROJECT**



184678 Grey Road 9
CON 15 S PT LOT 26 W PT LOT;27
Township of Southgate
Grey County

Legend

-  Septic Bed
-  Concrete Pads
-  Shower Area
-  Hunting Cabin
-  Out Building
-  Gasoline Tank
-  Fire Pit
-  Water and Electrical Hookup
-  Septic Hookup
-  Septic Tank Lids

* measurements are approximate



978 First Avenue West (519) 372-9790 e-mail: cuesta@cuestaplanning.com
Owen Sound, Ontario Fax: (519) 372-9953
N4K 4K5 1-800-653-7692

Dwn. By:	Date Printed:
R. Kochuta	June 21, 2021
File:	Project Name:
Pond View	Pond View

ENCLOSURE B:
WELL RECORDS FOR ON-SITE WELLS



WATER WELL RECORD

41A/2K/A

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED

2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11

12503180

MUNICIP.

CON.

25005

10

15

COUNTY OR DISTRICT

GREY

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE

EGREMONT

SECTION, BLOCK, TRACT, SURVEY, ETC.

16

XV

LOT

25-27

DATE COMPLETED

DAY 10 MO. MAR. YR. 70

UNDALIK P.R.I.

883270

4

1550

5

22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET	
				FROM	TO
BLACK	TOP SOIL			0	2
BROWN	BOULDERS	GRAVEL		3	45
"	GRAVEL	CLAY		45	50
"	GRAVEL	BOULDERS		50	65
"	SAND	TINE		65	70
"	(HARD)	ROCK		70	160

31

0002802

004561311

005061195

004561113

0070608

0160620

32

41

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER			
10-13	1 ☒ FRESH	3 ☐ SULPHUR	14	
	2 ☐ SALTY	4 ☐ MINERAL		
15-18	1 ☒ FRESH	3 ☐ SULPHUR	19	
	2 ☐ SALTY	4 ☐ MINERAL		
20-23	1 ☒ FRESH	3 ☐ SULPHUR	24	
	2 ☐ SALTY	4 ☐ MINERAL		
25-28	1 ☐ FRESH	3 ☐ SULPHUR	29	
	2 ☐ SALTY	4 ☐ MINERAL		
30-33	1 ☐ FRESH	3 ☐ SULPHUR	34	
	2 ☐ SALTY	4 ☐ MINERAL		

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET	
			FROM	TO
10-11	1 ☒ STEEL	12		13-16
	2 ☐ GALVANIZED			
	3 ☐ CONCRETE			
	4 ☐ OPEN HOLE			
17-18	1 ☒ GALVANIZED	19		20-23
	2 ☐ CONCRETE			
	3 ☐ OPEN HOLE			
24-25	1 ☐ STEEL	26		27-30
	2 ☐ GALVANIZED			
	3 ☐ CONCRETE			
	4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	31-33	DIAMETER	34-38	LENGTH	39-40
MATERIAL AND TYPE		INCHES		FEET	
		DEPTH TO TOP OF SCREEN		41-44	
				80	

61 PLUGGING & SEALING RECORD

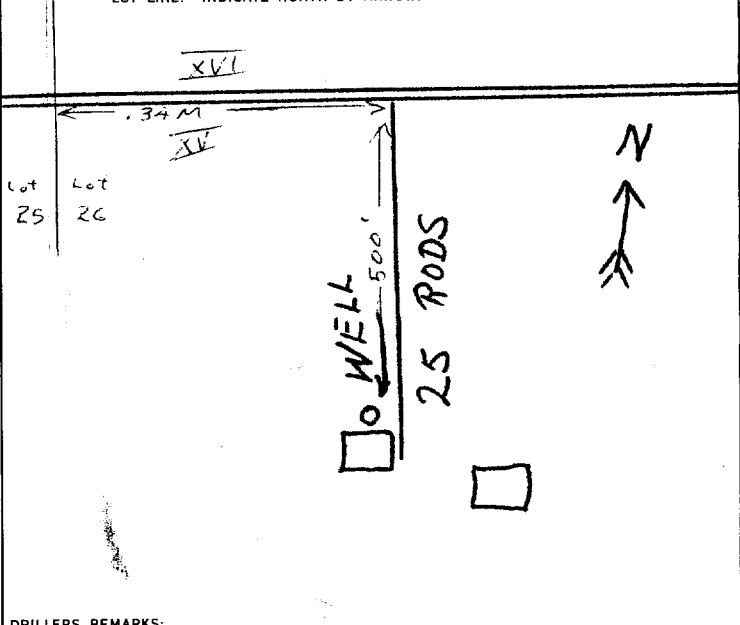
DEPTH SET AT - FEET		MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
FROM	TO	
10-13	14-17	
18-21	22-25	
26-29	30-33	

71

PUMPING TEST METHOD		10	PUMPING RATE	11-14	DURATION OF PUMPING
1 ☐ PUMP	2 ☒ BAILER				15-16 HOURS
19-21	22-24	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
016	075	075	075	075	075
IF FLOWING, GIVE RATE					
RECOMMENDED PUMP TYPE					
☐ SHALLOW	☒ DEEP				
50-53	000-1				

LOCATION OF WELL

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



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

CONTRACTOR	NAME OF WELL CONTRACTOR	LICENCE NUMBER
	DURHAM DRILLING & ENTLTD.	1804
ADDRESS		
DURHAM ONT. Box 299		
NAME OF DRILLER OR BORER		
ED HOTCHKISS		
SIGNATURE OF CONTRACTOR		
P. E. Schuster		
SUBMISSION DATE		
DAY 10 MO. MAR. YR. 70		

OFFICE USE ONLY	DATA SOURCE	59 CONTRACTOR	59-62	DATE RECEIVED	63-68	80
	1	1804		050670		
	DATE OF INSPECTION		INSPECTOR			
			P/L			
	REMARKS:					
	SSS					

Measurements recorded in: ☒ Metric ☐ Imperial

Page 1 of 1

Well Owner's Information

First Name JD	Last Name / Organization McLaughlin	E-mail Address JD@2100	☐ Well Constructed by Well Owner	
Mailing Address (Street Number/Name) 6100	Municipality Minto	Province ON	Postal Code N0G 1Z0	Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name)				Township	Lot	Concession	
				Normanby	18	2 GRW	
County/District/Municipality				City/Town/Village	Province		Postal Code
Grey					Ontario		
UTM Coordinates		Zone	Easting	Northing	Municipal Plan and Sublot Number		Other
NAD		8	3	175312619	4893355		

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	To
Brown	Gravel	Sand		0	3.35
Brown	Sand	Gravel		3.35	8.84
Gray	Clay	Silt, Gravel		8.84	14.63
Brown	Limestone			14.63	44.51
60	20	10			
65	25	15			
70	30	20			
75	40	25			
80	50	20			
		40			

Depth Set at (m/ft)		Annular Space	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
From	To			
0	6.1		Bontite	0.20
11.0				
12.0				
13			90% = 51	

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

Construction Record - Casing					Status of Well
Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)		☒ Water Supply ☐ Replacement Well ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply
			From	To	
15.24	Steel	0.477	0.477	16.77	
15.24	Open		16.77	24.51	
43.0					
50.0					

Construction Record - Screen					
Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/f)		
			From	To	
					☐ Abandoned, Poor Water Quality
					☐ Abandoned, other, specify _____
					☐ Other, specify _____

Water Details		Hole Diameter	
Water found at Depth	Kind of Water: ☐ Fresh ☒ Untested	Depth (m/ft)	Diameter (cm/in)
3993 (m/ft) ☐ Gas	☐ Other, specify	From	To

Results of Well Yield Testing

After test of well yield, water was:		Draw Down		Recovery	
☐ Clear and sand free ☐ Other, specify _____		Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
If pumping discontinued, give reason:		Static Level	0.14		
Pump intake set at (m/ft)		1	1.32	1	2.43
Pumping rate (l/min / GPM)		2	1.44	2	2.43
Duration of pumping		3	2.10	3	2.13
Final water level end of pumping (m/ft)		4		4	1.90
If flowing give rate (l/min / GPM)		5		5	1.68
Recommended pump depth (m/ft)		10	3.28	10	1.16
Recommended pump rate (l/min / GPM)		15	3.55	15	0.92
Well production (l/min / GPM)		20	3.70	20	0.77
Disinfected?		25	3.93	25	0.70
☒ Yes ☐ No		30	3.93	30	0.64
		40	4.03	40	0.55
		50	4.13	50	
		60	4.21	60	

Map of Well Location

Please provide a map below following instructions on the back.

