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**A REPORT TO  
MILLFORD DEVELOPMENT LIMITED**

**A SOURCE WATER PROTECTION  
RISK ASSESSMENT AND RISK MANAGEMENT PLAN**

**PROPOSED RESIDENTIAL DEVELOPMENT**

**55 EAGLE STREET  
TOWN OF NEWMARKET**

**REFERENCE NO. 2003-W045**

**UPDATE OF REPORT FROM 2014 (SEL Ref 1312-W005)  
FEBRUARY 2021**

**DISTRIBUTION**

3 Copies - Millford Development Limited  
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Reference No. 2003-W045

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## 1.0 **EXECUTIVE SUMMARY**

Soil Engineers Ltd. was retained by Millford Development Limited to conduct a Risk Assessment and Risk Management Plan for a property located east of Yonge Street, on the north side of Eagle Street, in the Town of Newmarket. The proposed development consists of an irregularly-shaped property located at 55 Eagle Street in the Town of Newmarket. A residential development is proposed for construction at the site.

The purpose of this evaluation is to provide information regarding the hydrogeologic considerations for proposed development of the property, and to develop a Risk Assessment and Risk Management and Mitigation Plan to assess potential impacts to the local water supply aquifer and to the adjacent municipal supply well, located north of the subject site.

The following summarizes the results of the updated hydrogeologic investigation:

- The local area is characterized by 6 major stratigraphic units, as follows:
  - Upper Newmarket Till (aquitard) – Extends to a depth of approximately 10 metres below ground surface (mbgs).
  - Inter-Newmarket Sediments (aquifer) – Extends to a depth of approximately 35 mbgs.
  - Lower Newmarket Till (aquitard) – Extends to a depth of approximately 55 mbgs.
  - Thorncliffe Formation (aquifer) – Extends to a depth of approximately 80 mbgs. York Region Municipal Wells 1 and 2 are installed and screened in this unit.
  - Sunnybrook Drift (aquitard) – consists only of a thin confining layer below the Thorncliffe Formation.



- Scarborough Formation (aquifer) – extends to bedrock at a depth of 120 mbgs. The adjacent municipal well (15) is Screened in this stratum.
- The subject property lies within the 2-year capture zone for Newmarket Municipal Well 15. Newmarket Municipal Wells No.'s 1 and 2 which are also located within 1 km of the subject property. These wells provide potable water supply for the municipal system.
- Historical and future groundwater quality impacts at from the subject property include the application of road de-icing salts at the developed site, and the presence of sanitary sewers and pipes beneath the subject property. The risk level associated with these threats is considered to be low. This low potential threat is based on the large vertical separation depth between any on-site uses and potential impacts and the municipal water supply aquifer. The low permeability for the shallow on-site subsoils provides hydraulic isolation of the shallow groundwater from the intermediate and deep regional aquifer units where the production wells are screened reduces the risk level associated with these potential impacts.
- Construction dewatering and temporary aquifer depressurization may be required at the site. These are not considered to pose a threat to water quantity in the municipal production wells which are screened in a deeper aquifer unit. Hydraulic testing has been conducted (Reference No. 1102-W017, dated April 2011) in advance of any dewatering that may be required during underground services construction.



## 2.0 **INTRODUCTION**

Soil Engineers Ltd. was retained by Millford Development Limited to conduct a Risk Assessment and Risk Management Plan for a subject property, located east of Yonge Street, on the north side of Eagle Street, in the Town of Newmarket. The proposed development consists of an irregularly-shaped property located at 55 Eagle Street in the Town of Newmarket, as shown in Drawing No. 1. A residential development is proposed for construction at the site. It will comprise 73 townhouse units, comprise of 7 townhouse blocks within the eastern portion of the site, and a two 6-unit town house blocks and a 15-unit townhouse block within the western section of the subject site having above ground parking facilities. In total the 73 townhouse units will be constructed at the site.

Stormwater management for proposed development will involve implementation of an underground storm water holding tank and an associated oil grit separator.

The purpose of this evaluation is to provide a Risk Assessment and Risk Management Plan regarding potential impacts, to the local water supply aquifer and to the adjacent municipal supply well(s) based on the proposed development plan. Specifically, the report provides the following:

- A description of the hydrogeologic setting and a summary of the existing soil and groundwater conditions beneath the subject site.
- Identification of any sensitive hydrogeologic features on, or within close proximity to the subject site.
- Assessment for construction dewatering needs for site development with an impact assessment to municipal water supply aquifer along with recommendation to mitigate potential adverse impacts if applicable.
- Requirements and design measures which can be used to maintain the groundwater function at the site.
- An assessment of potential adverse affects to the nearby municipal well and source aquifer, including proposed mitigation measures which can be implemented to mitigate potential impacts.
- A detailed pre- and post-development water balance water budget for the site was conducted in 2011 which was updated in 2020.





## 2.1 Site Description

Information pertaining to the subject site is tabulated in Table 1.

**Table 1 - Site Information**

<b>Municipal Address</b>	55 EAGLE STREET, TOWN OF NEWMARKET
<b>Property Identification Number (PIN)</b>	03598-0309
<b>Property Description from the Parcel Register</b>	PT LOTS 2 & 3, PL 49 PTS 1, 2, 3 & 4, 65R27436, EXCEPT PTS 1, 2, 3, 4, 5, 6, 7, 65R30328; NEWMARKET; CONFIRMED TO SOUTHERLY LIMIT OF PTS 1 & 2, 65R27436 BA236; S/T EASE OVER PT 2, 65R27436 AS IN B43032B
<b>Tax Assessment Number from the Deed</b>	2401040220010040000
<b>UTM Coordinates</b>	17 T 622133.90 m E 4878238.65 m N
<b>Site Area</b>	4.89 ha (12.1 ac)
<b>Contact Information</b>	Frank Orsi, 905-778-1818

## 2.2 Contact Information

Our initial source water protection report was commissioned to provide information used in developing a Risk Assessment and Risk Management Plan regarding potential impacts to the local water supply aquifer and to the adjacent municipal supply wells, in accordance with our proposal dated July 3, 2013, and approved on November 29, 2013 by Ms. Angela Orsi of Millford Development Limited. An update to the source water protection report was commissioned in 2020 by Frank Orsi of Millford Development Limited, in from a Proposal dated March 9, 2020.

The information for our client and the site owner is provided below:



Millford Development Limited  
P.O. Box 215  
Newmarket, Ontario  
L5Y 4X1

Attention: Mr. Frank Orsi

### 2.3 Risk Management Plan Objectives

The objective of this report is to identify, assess, and develop a Risk Management Plan pertaining to the current and the proposed uses for the site. These risks will be evaluated with respect to potential impacts to the wellhead protection zones of municipal wells adjacent to the site and the York Region drinking water resource as a whole.

### 2.4 Scope of Work

The scope of work for this report consists of the following:

- Review of site plans and background reports to develop a description of the subject site and its hydrogeological setting, as per York Region requirements;
- Obtain and review an EcoLog ERIS report covering the subject site, conduct a site reconnaissance to identify Areas of Potential Environmental Concern (APECs) as summarized by the EcoLog ERIS Report and existing reports, and confirm APECs based on a review of all available information;
- Interpret the localized hydro-geostratigraphic subsoil strata sequence based on the collected information, illustrating the interpreted hydrogeostratigraphic site setting in relation to the municipal wells located north of the subject site;
- Categorize existing site risks as per the Clean Water Act (CWA) threats information format and, as related to the York Region official plan policies, summarize historical, current and proposed land use risk threats;
- Identification of vulnerable areas in terms of potential threats to the potable aquifer, and identify probable and potential anthropogenic pathways to the potable aquifer. Review of logs and screen depths for municipal wells north of the subject site, and compare to the interpreted hydrostratigraphic cross-sections and the identified wellhead protection zones surrounding the municipal wells. Review and summarize nearby municipal well head protection and vulnerability mapping. Summarize



potential threats and risks in terms of hydrogeostratigraphy in relation to municipal well screen and water intake intervals within the potable aquifer at depth;

- Prepare a summary of existing and potential risks to drinking water (potable aquifer), categorize potential threats based on a rating system ranging from low to medium to high, and identify actual existing risks and potential risks based on the proposed land uses as per the CWA requirements;
- Assess preliminary construction dewatering needs for the subject site and proposed development based on a review of available geotechnical/hydrogeological reports, and provide an opinion on potential well interference and disruption of the municipal well supply during construction and from potential long-term foundation drainage need for the developed site;
- Development of a conceptual emergency action plan to mitigate or contain man-made threats to groundwater resources, such as chemical/fuel/sewage spillage, etc.; and
- Develop proposed guidelines for best management practices regarding chemical/fuel/sewage storage, salt storage, including secondary spill containment structures and proposed de-icing practices, for the developed site, and provide related recommendations for proposed stormwater management and underground servicing, if applicable.



### 3.0 **SITE DESCRIPTION**

#### 3.1 **Site Location and Description**

The subject site is part of Lot 93, Concession 1 East of Yonge Street located within the urban area of the Town of Newmarket. The site location is shown on Drawing No. 1. The subject property is roughly rectangular in shape where it encompasses an area of approximate 4.89 ha (12.1 ac). The site is located on the north side of Eagle Street, between Yonge Street and Carol Avenue at the municipal address of 55 Eagle Street. The subject site is bounded by Eagle Street to the south, commercial properties to the west, and residential properties to the north and east. The property is currently a vacant lot with naturally vegetated areas. A natural watercourse bisects the northern part of the subject site. The regional topography is relatively flat, descending gently towards the northeast flat flood plain that contains Western Creek, a tributary of the East Holland River, that drains northwards into Lake Simcoe.

#### 3.2 **Proposed Site Development (Servicing and Excavation)**

The proposed project will comprise 73 townhouse units with associated above ground parking facilities, and on-site stormwater management facilities.

##### Type of Servicing

The subject site is not currently connected to the Town of Newmarket municipal services. However, the proposed development will be provided with municipal water and sewage and storm water services and access roadways meeting urban standards.



Construction/Site Disturbance Activities

In order to achieve the proposed development plan, it is expected that the subsoil will be disturbed during the construction process (i.e., during underground utility installation, excavation for foundations and stormwater management facility).

The proposed development plan is included on Drawing No. 3.



## 4.0 **REGIONAL SETTING**

### 4.1 **Regional Physiography**

The subject site is located within a developed commercial/residential area of the Town of Newmarket. The surrounding area is occupied by existing commercial businesses (i.e., automotive servicing and veterinary services), gasoline stations and established residential subdivisions.

According to the geological and physiographic mapping available for the area, the subject site is located within the Schomberg Lake (glacial) plain physiographic region, where partially eroded glacial drift has removed and filled, in places, with lacustrine clay, silt and sand deposits (based on Soil Engineers Ltd. Report Reference No. 0409-S004, dated October 2004). The subject site is located in the East Holland River Sub-watershed of the Lake Simcoe Watershed. Regional groundwater is expected to flow in a north-easterly direction, towards Lake Simcoe.

The Ministry of the Environment Climate and Parks (MECP) well records for the subject site indicate the presence of an unconfined shallow aquifer unit, consisting of clay, sand and till exists approximately 6.0 m below the existing ground level.

The majority of the water wells in the area are installed in the intermediate or deep aquifer units, including 2 York Region municipal supply wells that are located north of the subject site.



#### 4.2 **Regional Geology**

Based on published geological information mapping of the subject site, the native surface soil at and beneath the subject site comprises the Newmarket Till unit, which consists of fine-textured, glaciolacustrine deposits of silt and clay with minor sand and gravel. The underlying bedrock comprises shale and limestone of the Simcoe Group. The top bedrock is found at an approximate depth of 150 mbgs.

#### 4.3 **Regional Hydrogeology**

The regional hydrogeologic setting was assessed based on information provided by the Region of York and the MECP water well records available for the local area. Based on these sources of information, the local area is characterized by 6 major overburden stratigraphic units:

- Newmarket Till and Schomberg Clay Plains (aquitard) – The upper soil materials contain sandy silt to silt till and glaciolacustrine silt and clays. The Newmarket Till acts as a regional aquitard separating the Oak Ridges Moraine Aquifer from the underlying Thorncliffe Aquifer. The till deposit varies between 20 to 30 m but can exceed 60 m in thickness.
- Thorncliffe Formation (aquifer) – The Thorncliffe Formation consists of glaciofluvial and lacustrine deposits containing sand, silt, clay and gravel deposits. The Thorncliffe Formation deposit varies between 10 to 30 m in thickness and acts as an aquifer.
- Sunnybrook Drift (aquitard) – The Sunnybrook Drift, which underlies the Thorncliffe Formation, is a glacial and lacustrine deposit consisting of clast-poor silt and clay. The Sunnybrook Drift deposit is generally less than 10 to 20 m thick, although locally it can reach a thickness of 30 m, and is a regionally extensive aquitard. The Scarborough Formation deposit underlies the Sunnybrook Drift.



- Scarborough Formation (aquifer) – The Scarborough Formation consists of stratified fine silts and clays to sand deposits in a deltaic sequence, which extends down to bedrock to an approximate depth of 120 mbgs.
- Bedrock – The bedrock consists of limestone and shale, deposited on the Canadian Shield, known as the Simcoe Group.

#### 4.4 Climate

The subject site is located in the Southern Ontario climatic region known as the Simcoe and Kawartha Lakes Region. The following general climate data were obtained from Canadian Climate Normals Data from the Environment Canada online database and outlined in Table 2. Average climate data was taken from the Bradford Muck Research Facility (Station ID 6150863) for the period 1971-2000.

**Table 2 - Climate**

<b>Mean Daily Temperature</b>	<b>Annual Total Precipitation</b>	<b>Mean Annual Actual Evapotranspiration</b>	<b>Mean Annual Water Surplus</b>
6.98 °C	815.4 mm	550 mm	265.4 mm

Rainfall exceeding evapotranspiration is the typical climate for Southern Ontario.

#### 4.5 Groundwater Resources

Records of water wells were reviewed regarding the subject site and the surrounding areas within a radius of 250 m from the perimeter boundaries of the subject site to determine the local groundwater levels and well uses. According to the MECP Well Records, there are 10 wells within 250 m of the site. Table 3 provides a summary of the MECP well record review. Records contained in previous the EcoLog ERIS Report (2013), indicate the presence of 10 water wells located on the subject site and the surrounding areas within a 250 m radius of the subject site boundary. The locations of the





wells are plotted in Drawing No. 4. The Well Records are presented in Appendix 'A', in the EcoLog ERIS Report. We also conducted a search of the MECP Well Records through the MECP. The well records are presented in Appendix 'A'. The well information and conditions from the MECP well record search is provided in Table 3.

**Table 3 - Well Records Summary**

<b>Total Number of Wells</b>	10
<b>Number of Wells Completed in Bedrock</b>	0
<b>Number of Wells Completed in Overburden</b>	10
<b>Depth Ranges</b>	Less than 15 m – 4 15 m to 30 m – 0 30 m to 45 m – 1 Greater than 45 m – 4 Unknown – 1
<b>Water Use</b>	Domestic – 1 Livestock – 0 Not Used – 5 Municipal – 4
<b>Water Quality</b>	Fresh – 7 Unknown – 3
<b>Range of Reported Pumping Rates</b>	0 to 19 Lpm (0 to 5 gpm) – 1 19 to 38 Lpm (5 to 10 gpm) – 0 38 to 57 Lpm (10 to 15 gpm) – 0 57 to 76 Lpm (15 to 20 gpm) – 0 > 76 Lpm (> 20 gpm) – 4 Unknown or Dry – 5
<b>Range of Yields</b>	15 to 2270 Lpm (4 to 600 gpm)

\* gpm = gallons per minute, Lpm = Litres per minute

The well records indicate that there is a shallow sand zone near the surface as well as a deeper confined aquifer system in the surrounding area. There are no records to indicate the presence of artesian or flowing wells in the immediate area.



## 5.0 **LOCAL SETTING**

### 5.1 **Above-Ground Characterization**

#### 5.1.2 **Site Topography and Drainage**

The subject site comprises gently sloping land which descends, gently towards the northeast to the valley bordering the northern limits of the site. The bank height varies from 2.5± to 8.5± m and slopes down to a relatively flat flood plain that contains Western Creek, a tributary of the East Holland River. The flat portion of the creek bank is most prominent towards the centre and east part of the site where the creek bank has developed into a meander belt. The meander belt is subject to periodic flooding. The adjacent lands are existing residential and commercial properties.

The Town of Newmarket is currently supplied by a series of municipal wells, many of them being drilled and completed in the Yonge Street Aquifer unit at depth. The subject site is located within a well protection area associated with the municipal wells in Newmarket. York Region currently manages the municipal wells and associated water supplied to The Town of Newmarket. Development policies are in place for all new developments to address the planning policies associated with the well head protection areas associated with the municipal wells.

#### 5.1.3 **Site Inspection to Address Hydrologic Features**

A site inspection was conducted on August 23, 2010. The inspection included an assessment of the following:

- The presence of closed drainage features, depressions or karst areas which may allow for ponding and significant or enhanced infiltration of water.



- Assessment of the presence of phreatophytic vegetation which may indicate seasonally high groundwater levels and/or groundwater discharge and seepage. The site is generally a vacant, vegetated field. Western Creek traverses the northern part of the site. Trees are located in the northwest corner of the site.

Further site visits were conducted in Spring 2020 to record the groundwater levels and during Fall 2020 as part of the Environmental Assessments completed for the site.

## 5.2 **Below-Ground Characterization**

### 5.2.1 **Results of Subsurface Investigation**

Twelve boreholes (denoted as BH 1 to BH 12) were drilled to depths ranging from 4.9 to 12.7 mbgs were performed on September 21 and 22, 2004, at the locations shown on Drawing No. 3. The holes were advanced at intervals to the sampling depths by a track-mounted, continuous-flight power-auger machine equipped for soil sampling. The stratigraphy encountered in the boreholes is outlined below. In addition, 6 boreholes were drilled to depths ranging from 3.5 to 15.7 m, between February 24 and March I, 2011, at the locations shown on the Borehole and Monitoring Well Location Plan and Subsurface Profile, Drawing No. 3. The 2011 boreholes were numbered using the 100-series in order to differentiate them from the previous boreholes drilled in 2004 and 2009. The most recent boreholes and monitoring wells were drilled and installed in November 2020 and were identified as the 200 series of boreholes and monitoring wells. Drawing 3-1 shows the locations of the 200 series boreholes and Monitoring wells which were installed as part of an updated Phase 2 Environmental assessment for the site (SEL Ref 2007-E048). The borehole logs for the new monitoring wells are included in this Phase 2 ESA report.



A description of the subsoil findings from the previous subsurface investigations is provided as follows.

#### **5.2.1.1 Surficial Topsoil and Topsoil Fill**

The surficial topsoil and topsoil fill layers for all boreholes range in thickness from 15 to 70 cm, and a second layer of topsoil, 30 cm, 70 cm and 80 cm thick, was found underlying the earth fill in BHs 7, 11 and 12, respectively. The topsoil and topsoil fill are dark brown in colour, indicating that they contain appreciable amounts of roots and humus. Earth fill materials underlie the topsoil layer.

#### **5.2.1.2 Earth Fill Materials**

The earth fill underlies the topsoil fill layer; it measures  $2.1\pm$  to  $3.4\pm$  m in thickness and it is amorphous. It consists mainly of silty clay and some silty sand with variable amounts of roots and topsoil inclusions. Boreholes where fill was encountered included BHs 6, 7, 11 and 12.

#### **5.2.1.3 Charcoal Remains**

A layer of charcoal remains, 60 cm thick, was encountered in BH 4 beneath the earth fill horizon. The charcoal is black in colour and consists of burnt organic fibrous plant material.



#### 5.2.1.4 Sandy Silt Till and Silty Sand Till

The sandy silt till dominates the subsoil stratigraphy beneath the subject site having occasional layers of silty sand till. The tills occur in all boreholes except BHs 7, 8 and 12. They consist of a random mixture of particle sizes ranging from clay to gravel, with the silt and sand being the predominant fractions. The materials are heterogeneous in structure, indicating that they are glacial till deposits. The tills contain occasional sand and silt seams and lenses. Occasional large stones were encountered during the previous borehole drilling programs.



#### 5.2.1.5 Silty Clay

The silty clay was encountered beneath the topsoil and original topsoil layers in BHs 3, 5, 7, 8, 9 and 12. The silty clay has a varved structure that indicates that it is a lacustrine deposit. It contains traces of sand and gravel.

#### 5.2.1.6 Silty Clay Till

The clay till was contacted in BHs 7 and 11. It is heterogeneous and amorphous in structure, indicating that it is a glacial deposit. At one location, the clay till was embedded in the silty clay stratum. It contains some sand to being sandy with a trace to some gravel.

#### 5.2.1.7 Sandy Silt and Silt

The sandy silt deposits were encountered in BHs 5 and 12. They were encountered below the silty clay layers at depths of 2.1 m and 3.0 mbgs. The silt in BH 12 contains some clay and traces of sand and gravel while the sandy silt in BH 5 contains traces of clay and occasional silt seams.

#### 5.2.1.8 Fine to Coarse Sand

The sand was contacted in BHs 2 and 3. It was encountered in the lower stratigraphy of the site underlying the sandy silt till and silty sand till deposits at depths of 10.0 m and 11.6 mbgs. It contains some silt and a trace of clay and gravel.

Complete borehole logs and the results of the soil grain size analyses are included in Appendix 'C'.



### 5.2.2 **Bedrock**

Bedrock was not encountered in any of the boreholes drilled at the subject site. Based on information obtained from the Region of York, the bedrock consists of limestone and shale, deposited above the Canadian Shield, known as the Simcoe Group, at a depth of approximately 150 mbgs.

### **On-site Groundwater Levels and Groundwater Flow**

Observations pertaining to the depth of the groundwater level and caving were made in the open boreholes immediately after the completion of drilling, and these are noted on the accompanying borehole logs (Appendix 'C').

Groundwater levels were recorded on September 21, 2004 during the drilling of boreholes for our geotechnical investigation. The resulting water levels are shown in Table 4, and the borehole locations are noted on Drawing No. 4.

**Table 4 - Groundwater Elevations Measured**

<b>BH Identification</b>	<b>Groundwater Elevation (m)</b>
BH1	257.2
BH2	260.2
BH3	258.2
BH4	258.9
BH5	254.8
BH6	NA
BH7	250.8
BH8	NA
BH9	NA

**Table 4 - Groundwater Elevations Measured (cont'd)**

<b>BH Identification</b>	<b>Groundwater Elevation (m)</b>
BH10	NA
BH11	252.6
BH12	257.0

It should be noted that the groundwater levels noted above may fluctuate seasonally depending on the amount of precipitation and surface runoff. Shallow groundwater flow is directed towards the watercourse traversing the centre of the subject site. The maximum horizontal hydraulic gradient over the site was assessed at 0.05.

The records for the follow up groundwater level measurement for Spring 2020 at the existing monitoring wells and late Fall 2020 for the new monitoring wells are provided in Table 5 which follows.



**Table 5 Groundwater Level Measurements**

Well ID		March 23, 2020	April 22, 2020	May 25, 2020	June 19, 2020	December 4, 2020
BH/MW 101	mbgs	2.14	2.95	3.85	4.30	na
	masl	263.46	262.65	261.75	261.30	na
BH/MW 102	mbgs	1.54	2.97	2.16	2.46	na
	masl	259.26	257.83	258.64	258.34	na
BH/MW 103	mbgs	2.96	3.01	3.37	3.62	na
	masl	255.04	254.44	254.63	254.38	na
BH/MW 104	mbgs	2.98	3.32	3.96	4.38	na
	masl	258.22	257.88	257.24	256.82	na
BH/MW 106S	mbgs	0.08	0.28	0.50	0.75	na
	masl	253.12	252.92	252.70	252.45	na
BH/MW 106D	mbgs	0.20	0.41	0.59	0.86	na
	masl	254.14	253.89	253.71	253.44	na
MW 201	mbgs	na	na	na	na	5.39
	masl	na	na	na	na	261.71
MW 202	mbgs	na	na	na	na	5.09
	masl	na	na	na	na	263.61
MW 206	mbgs	na	na	na	na	2.97
	masl	na	na	na	na	255.53
MW 207	mbgs	na	na	na	na	3.30
	masl	na	na	na	na	256.00

mbgs: metres below ground surface

masl : metres above sea level

– not available



## 6.0 Municipal Well

According to the review of well records (Table 3) for the area 4 municipal wells are located within 250 m of the subject site

Information pertaining to the closest nearby municipal wells, located north of the subject site are summarized in table 5

**Table 6 - Municipal Wells Details**

<b>Municipal Well ID/Well Tag No.</b>	<b>Depth of Well (m)</b>	<b>East (m)</b>	<b>North (m)</b>	<b>Aquifer ID</b>	<b>Aquifer Type</b>	<b>Well Screen Interval (m)</b>	<b>Bottom of Well Screen Elevation (mbgs)</b>
(Newmarket Well No. 1)	91.90	621924.3	4878475	Yonge Street Aquifer (Thorncliffe Formation)	Confined	84.3 to 91.90	91.90
(Newmarket Well No. 2)	94.18	621908.1	4878545	Yonge Street Aquifer (Thorncliffe Formation)	Confined	86.2 to 94.2	94.20

\* The above-mentioned coordinates are adopted from the MECP database

### 6.1 Hydrogeological Setting For Municipal Wells

Most of the wells in Newmarket are near the margins of a major north-south tunnel channel, but the wells penetrate the thick Newmarket Till unit. Three of the wells are screened in the Scarborough Formation and two are screened in the Thorncliffe Formation (No.'s 1 and No.'s 2 -Table 4). The sandy Oak Ridges Aquifer Complex (ORAC) sediments overlying the Newmarket Till unit vary greatly in thickness, ranging from less than 5 m to more than 20 m thick. The underlying Thorncliffe formation is described as a deep confined aquifer beneath this portion of Newmarket.



The “Yonge Street Aquifer” is part of a larger regional flow system that is locally influenced by a combination of three geologic features, including topographic basin, tunnel channel and a bedrock valley. The topographic basin cuts into the underlying ORM deposits and the associated streams (tributaries of the East Holland River) also induce groundwater flow to the municipal well from outside of the basin. The tunnel channel cross connects the aquifer zones, both vertically and horizontally, increasing the effective transmissivity in the vicinity of several of the Yonge Street area municipal production wells. Finally, the underlying bedrock valley further extends the zone of influence from the deeper (Scarborough Formation) screened production wells along the valley axis, which is oriented approximately northeast to southwest. Aurora and Newmarket’s groundwater water system and aquifer lies within a large tunnel channel, where the associated coarse granular aquifer subsoil deposits are overlain by fine grained glacio-lacustrine sediments and possibly thin clay till units - the Kettleby Till which is mapped at or near the ground surface. The channel fill sediments consist mainly of silt and sandy silt, underlain by fine sand and gravel (Lakes Simcoe and Couchiching-Black River SPA Part 1 2014 Updated Assessment Report, Chapter 13, Regional Municipality of York).

## 6.2 **Risk Setting For Municipal Wells**

The subject site is within the WHPA -A zone relative to the Wells No.’s 1 and 2. The subject site is within 100 m of the municipal wells. The subject site area has a high vulnerability score of 10 relative to Wells No.’s 1 and 2, ranging from a potential low or moderate threat from pathogens, and low to moderate threat from chemicals. The subject site area is in WHPA-C with respect to dense non- aqueous phase chemicals (DNAPLS) with an expected travel time of 5 years. The imperviousness for the general area is listed as ranging from 8% to <80%.



## 7.0 **Review of Previous Reports**

### 7.1 **Review of Previous Environmental Reports**

#### *Previous or Current Environmental Risk Assessment Report*

Soil Engineers Ltd. is not aware of any Environmental Risk Assessment completed for the subject site

A Phase II Environmental Site assessment is currently being updated for the subject Site.

A summary of the updated Phase I ESA (SEL Ref No. Reference No. 2007-E048, dated September, 2020) the findings are listed below. The previous Phase I ESA was conducted under the CSA Standards Z768-01 and the updated Phase I ESA was completed as per O. Reg 154/03 standards as amended

- Possible fill of unknown quality within the envelope of the former building on the subject site.
- Fill materials of unknown quality, including charcoal remains, are present on the site, as disclosed by our geotechnical investigation.
- Gas stations are located within 300 m of the subject site.
- Automotive repair facilities are located within 500 m of the subject site.

A previous, Limited Phase II Environmental Site Assessment, SEL Reference No. 0907-E017, dated December 18, 2009 was carried out for the subject site. An updated Phase II ESA was prepared in September 2020 (SEL Ref No. 2007-E048). It was prepared in accordance with O. Reg. 154/03, as amended. The subsurface investigation for the previous Phase II ESA was conducted along the south limits of the site. The previous investigation involved the drilling of 2 boreholes and 2 test pit excavations. Two (2) monitoring wells were installed during this investigation. Fill material was noted in the soil samples. Soil and groundwater samples were collected and submitted for chemical



analysis to characterize the environmental conditions of the subject site. Findings from the previous Phase II ESA are summarized as follows.

As part of the previous Phase II ESA, an EcoLog Environmental Risk Information Service (ERIS) Ltd. report was acquired which compiles information from both government and private databases of interest to the environmental field. An EcoLog ERIS Report 20131205063 was prepared for the subject site on December 16, 2013, which is presented in Appendix 'A' with a detailed summary of the Ecolog Eris Report findings are documented in the previous Phase II ESA.

An updated Phase II ESA was recommended for completion at the subject site and it was completed in late 2020. It concludes that the site meets applicable environmental standards, and is suitable for development with no further investigations being needed.

## 8.0 **RISK ASSESSMENT**

### *Anthropogenic Transport Pathways*

Wells and underground services represent potential transport pathways for contamination. The proposed development will be provided full municipal underground services meeting urban standards. There are records for 4 municipal wells and 1 domestic water supply well within, 250 m of the site based on review of the MECP Well Records. Table 5 above provides a description of the closest nearby municipal wells relative to the subject site.

No significant anthropogenic transport pathways were identified during investigations conducted on the subject property. The subject site currently does not have any underground services. Furthermore, the boreholes installed in 2004 were properly decommissioned with bentonite seals. There are no deep sewers, basements, sumps or other penetrations of the confining layer above the aquifer units. The 2011 Monitoring



well network is still in place on site with six existing monitoring wells used for groundwater level monitoring. New monitoring wells were proposed for the follow up Phase II ESA. All of the monitoring wells will be decommissioned once the site is approved for development.

### ***Threat Assessment Analysis on the Subject Site***

A threat assessment analysis review was conducted for the subject site and for proposed development. There is a low potential impact associated with the proposed development with respect to source water quality relative to the nearby municipal wells. Review of the development plan indicates that proposed development will comprise a townhouse development with 73 proposed townhouse units. A summary of potential threats associated with the proposed development is summarized below:

- Construction dewatering takes shallow groundwater without returning the water taken from the shallow groundwater aquifer. Subsoil underlying the subject site consists of silt, silty clay, sand silt till and silty sand till, having low to moderate anticipated seepage rates into open excavations below the water table. As such, there is a low potential risk associated with any construction dewatering program. Minimal amounts of shallow groundwater may be taken during construction, with any anticipated groundwater taking being temporary or brief in duration. As such minimal to negligible impacts are anticipated to the nearby municipal well.
- Paving of roads and building of townhouse units will decrease the site's recharge rate. The subject site is currently undeveloped. Furthermore, the existing lower permeable silt and silty clay subsoil will not transmit substantial surface water recharge the underlying municipal aquifer quickly. Therefore, any potential risk associated with the proposed new residential development is considered low in this regard.
- Handling and storage of road salt for de-icing over the winter time could increase



the concentration of the sodium chloride recharging the municipal aquifer; however, using alternative, de-icing methods such as Calcium Magnesium Acetate, which has a low environmental impact, or implementing road design that minimizes salt application, could be considered for the new development. Given that the site will be paved, where minimal recharge to the aquifer is anticipated, potential use of de-icing salt and associated impacts is anticipated to be low to negligible.

- The location of the subject site relative to the Wellhead Protection Area, Drawings No. 5-1 and 5-2 indicates that the subject site is located within the 0-2 years travel time zone for Newmarket Well No's 1 and 2. This area is considered within the WHPA- A zone where the handling and storage of household hazardous waste disposal, maintaining of a fuel oil tank and septic systems, maintaining or not decommissioning a well increases the risk for contaminating the aquifer for this zone; however, the proposed development will be connected to the Town of Newmarket /Region of York water supply and sanitary sewer system. Since the site will entail residential land use, no industrial chemicals are anticipated which are restricted for WHPA A zone. Use or storage of the above-mentioned chemicals at the developed site is not anticipated and would be restricted under the current planning policy.
- Stormwater generated at the developed site will undergo pre treatment on site using an oil/grit separator to reduce levels of phosphorus prior to its disposal to the municipal system.



## 8.1 **Identification of Vulnerable Areas**

According to the Regional Municipality of York, the subject site is located in 0 to active zone wellhead protection area. The concerns to the wells in the 0 to 2 year active zone are from bacteria and viruses from human and animal wastes, and hazardous chemicals.

The subject property is located, approximately 2.3 km east of the Oak Ridges Moraine and is not located within the Oak Ridges Moraine Conservation Plan Area.





## 8.2 **Identification of Prescribed Drinking Water Threats**

The Clean Water Act, 2006, prescribes a number of land-uses that are considered to be drinking water threats. The items applicable to the subject property are listed, along with a qualitative evaluation of the threat level as listed below.

- Registered Tanks (UST's) within 250 m of the Subject Site.

Based on a review of records, we have identified several USTs associated with commercial gasoline service stations within 250 m the subject site. All these tanks are located at hydraulically up-gradient locations of the municipal wells. This is a potential threat to the drinking water conditions at the subject site. It should be noted that, due to the relative distance, potential contamination is not expected to be brought to the subject site via precipitation runoff. However, there is the potential that it could be brought to the site via leaching or groundwater migration. It should be noted that given the low permeable shallow till soils at the subject site, the potential for contaminant transport to the site via leaching through soil is considered low.

### Waste Generators within 250 m of the Subject Site

Based on a review of records, waste generators were located within 250 m from the subject site. Generally, waste generators are noted as they produce waste materials which are deemed a potential environmental concern by the MECP. Therefore, the close proximity of a waste generator to the subject site can result in potentially contaminating substances being brought to the site via leaching or precipitation runoff. As some of the registered waste generators are located hydraulically up-gradient from the subject site, there is the potential for materials of concern to be brought to the subject site.



Other than these 2 items, we have not identified any other potential drinking water threats. The summary is presented in Tables 6 and 7.

**Table 6 - Threats Assessment Summary**

<b>Identified Prescribed Drinking Water Threat</b>	<b>Description of the Drinking Water Threat</b>	<b>Wellhead Protection Area Zone</b>	<b>Distance From Municipal Well</b>	<b>Type of Assessment Conducted</b>	<b>Qualitative Rating of the Drinking Water Threat</b>
An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body	Construction Dewatering	B	400 m	Well Interference Assessment	Low
An activity that reduces the recharge of an aquifer	Site Paving	C	400 m	Water Balance Analysis Mitigation Plan; LID's to be Implemented	Low

**Table 7 - Threat Assessment for Proposed Future Land Use (After Site Development)**

	<b>Possible Threat to Drinking Water</b>
SWM Facility (LID Exfiltration Tank)	Low
Chemical Storage Potential Household Usage	Low
Salt/Fertilizer/Pesticides – Potential Household Usages	Low
Fuel Storage Tanks – Not anticipated	Low

## 7.0 SUMMARY AND CONCLUSIONS

Soil Engineers Ltd. was retained by Millford Development Limited to conduct a hydrogeologic investigation and Risk Management Plan for a property located at 55 Eagle Street in the Town of Newmarket. A 73 unit townhouse development is intended for construction at the subject site.

The following summarizes the results of the hydrogeologic investigation:

- The local area is characterized by 6 major stratigraphic units, as follows:
  - Upper Newmarket Till (aquitard) – to a depth of approximately 10 mbgs.
  - Inter-Newmarket Sediments (aquifer) – to a depth of approximately 35 mbgs.
  - Lower Newmarket Till (aquitard) – to a depth of approximately 55 mbgs.
  - Thorncliffe Formation (aquifer) – to a depth of approximately 80 mbgs. York Region Municipal Wells 1 and 2 are installed in this unit.
  - Sunnybrook Drift (aquitard) – consists only of a thin confining layer.
  - Scarborough Formation (aquifer) – extends to bedrock at 120 mbgs. The adjacent municipal well (15) is installed in this stratum.



- The subject property lies within the 2-year capture zone for two of the Newmarket Municipal wells which are also located within 1 km of the subject property. These wells provide potable water supply from the municipal system.
- Historical and future groundwater quality impacts at the property could be attributed from application of road salt, and the presence of sanitary sewers and pipes and a proposed stormwater management facility on the property. The risk level associated with these threats is considered to be low. This is based on the large vertical separation between the on-site uses and any associated impacts and the underlying municipal water supply aquifer. The low permeability for the shallow on-site subsoils, and the via a low permeable aquitard which encompasses the shallow subsoil units and its associated shallow groundwater are hydraulically isolated above the underlying intermediate and deep regional aquifers where the municipal production wells are screened.
- Risk Management Measures are recommended for any proposed storage of road de-icing salt within dry enclosures is recommended within the new development.
- Construction dewatering, if required for underground servicing, will be minimal and restricted to occasional removal of groundwater seepage collected within housing and servicing excavations at low anticipated dewatering volumes, likely below the MECP threshold limits for requiring a PTTW. An Environmental Activity Sector Registry (EASR) approval for proposed groundwater taking for construction may be required and could address any removal of accumulated runoff within construction excavations for town-housing blocks and within associated underground services trenches during construction. Any intake from any temporary construction dewatering to remove groundwater seepage will be substantially above the anticipated intake depth for the nearby municipal wells; therefore, no interference to the municipal wells is anticipated from any proposed construction dewatering.

## 8.0 REQUIREMENTS FOR SITE DESIGN



The following recommendations are presented with respect to the requirements for further study, or design input which will be required as the final design and development for the property occurs.

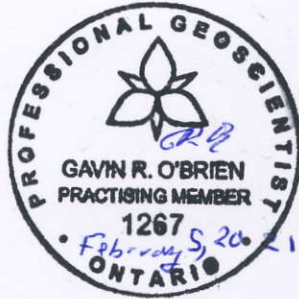
- i. Construction for the proposed town-housing units and associated underground services will be temporary and may involve low volume groundwater taking over a short duration. Any dewatering to facilitate construction is not anticipated to interfere with the nearby municipal wells.
- ii. Underground services construction for the new development should consider trench plugs if a potential exists to promote groundwater seepage to depth. A hydrogeological cross section should be prepared for servicing alignments once their final designs are provided to determine if trench plugs are required.
- iii. All wells located on the property must be properly decommissioned prior to site development. A well decommissioning report should be prepared and filed with the Region and MECP by licensed contractors in accordance with O. Regulation 903.
- iv. The potential drinking water quality and quantity threats summary for the development should be updated as the development proceeds. Where required, detailed risk management plans, monitoring plans and contingency plans may need to be prepared. Based on the current configuration of the development, there will be no significant requirement for risk management monitoring or contingency plans.
- vi. A stormwater management facility has been proposed for this development. Proposed Low Impact Development (LID) infrastructure as part of the storm water management plan will assist in offsetting the infiltration deficit for the developed site relative to the undeveloped site. Given the low permeability for the surface soils on the site, limited groundwater recharge exists for the undeveloped site which will not significantly change after site development. Based on the currently proposed



site development, no significant impact to groundwater recharge or function is anticipated.

**SOIL ENGINEERS LTD.**

Gavin O'Brien, M.Sc., P. Geo.  
GO:dd





# ***Soil Engineers Ltd.***

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## **DRAWINGS**

**REFERENCE NO. 2003-W045**



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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Approximate Boundary of Subject Site

Watercourse

Major Road

Local Road

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**Soil Engineers Ltd.**

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Title: Site Location Plan

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Project:  
Hydrogeological Assessment  
Proposed Residential Development  
55 Eagle Street  
Town of Newmarket

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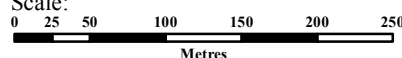
Reference No. 2003-W045

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Date: November 25, 2020

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Scale:



Metres

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Drawing No. 1

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Source: Ministry of Natural Resources and Forestry  
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Source: Ministry of Natural Resources and Forestry  
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- Approximate Boundary of Subject Site
- Borehole (Ref. No. 0409-S004) - Report Dated October 2004
- Borehole (Ref. No. 0907-E017) - Report Dated December 21, 2009
- + Borehole with Monitoring Well
- Watercourse
- Local Road

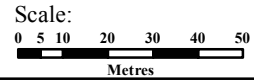


**Title: Borehole and Monitoring Well Location Plan**

**Project:**  
Hydrogeological Assessment  
Proposed Residential Development  
55 Eagle Street  
Town of Newmarket

Reference No. 2003-W045

Date: November 25, 2020



Drawing No. 2





- Subject Site
  - Borehole
  - Borehole with Monitoring Well
  - /  Waterbody
  - Major Road
  - Local Road
- Areas of Potential Environmental Concern (APEC)**
- APEC 1
  - APEC 2
  - APEC 3
  - APEC 4



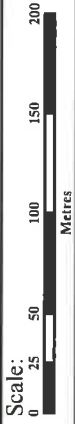
**Soil Engineers Ltd.**

Title: Sampling Location Plan

Project:  
Proposed Residential Development  
55 Eagle Street  
Town of Newmarket

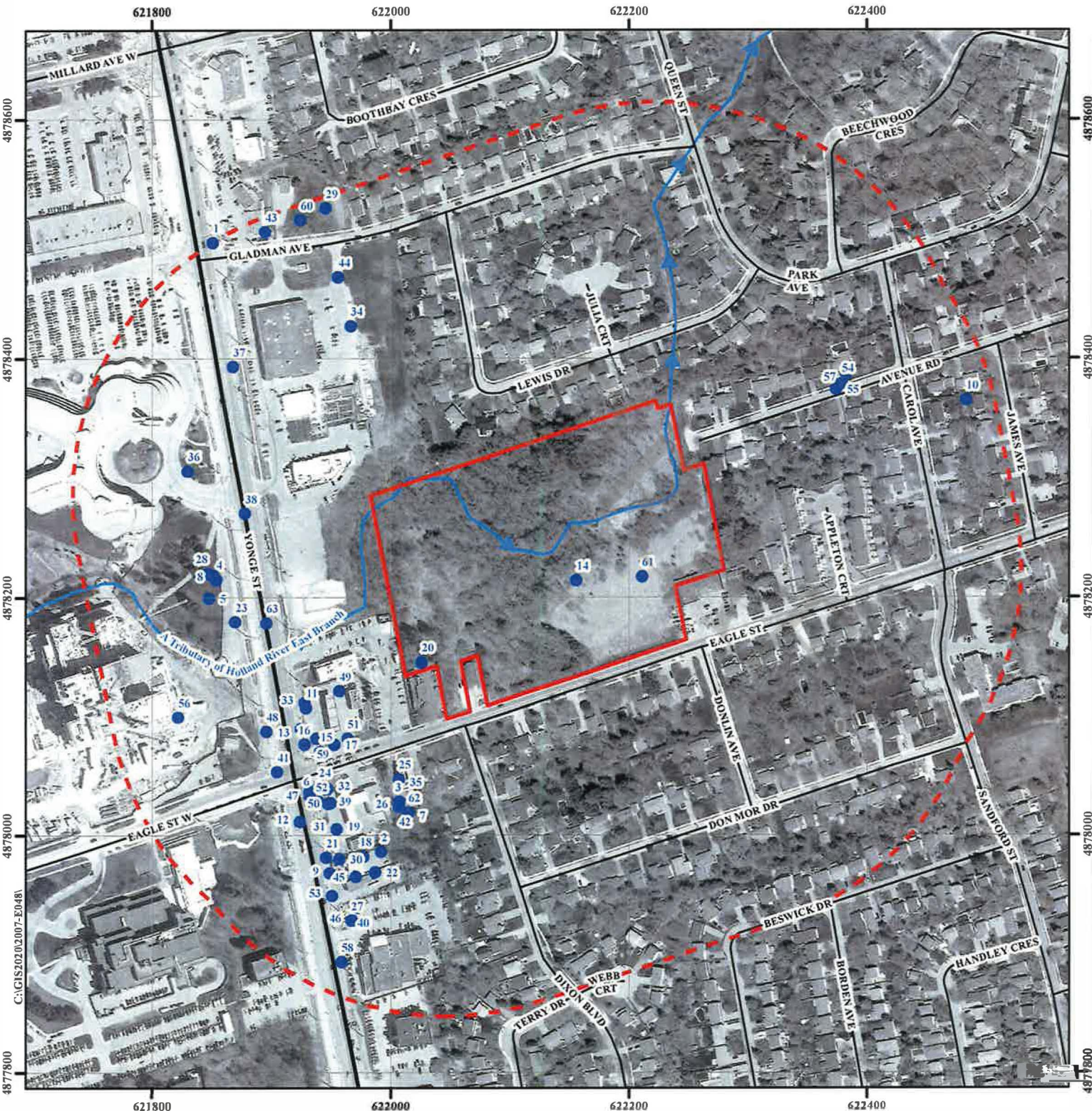
Reference No. 2007-E048

Date: December 11, 2020










Drawing No. **3-1**


Source: Water Course, Ontario Ministry of Natural Resources and Forestry, 2020  
 © Queen's Printer for Ontario, 2020  
 Source: Water Course, Ontario Ministry of Natural Resources and Forestry, 2020  
 © Queen's Printer for Ontario, 2020




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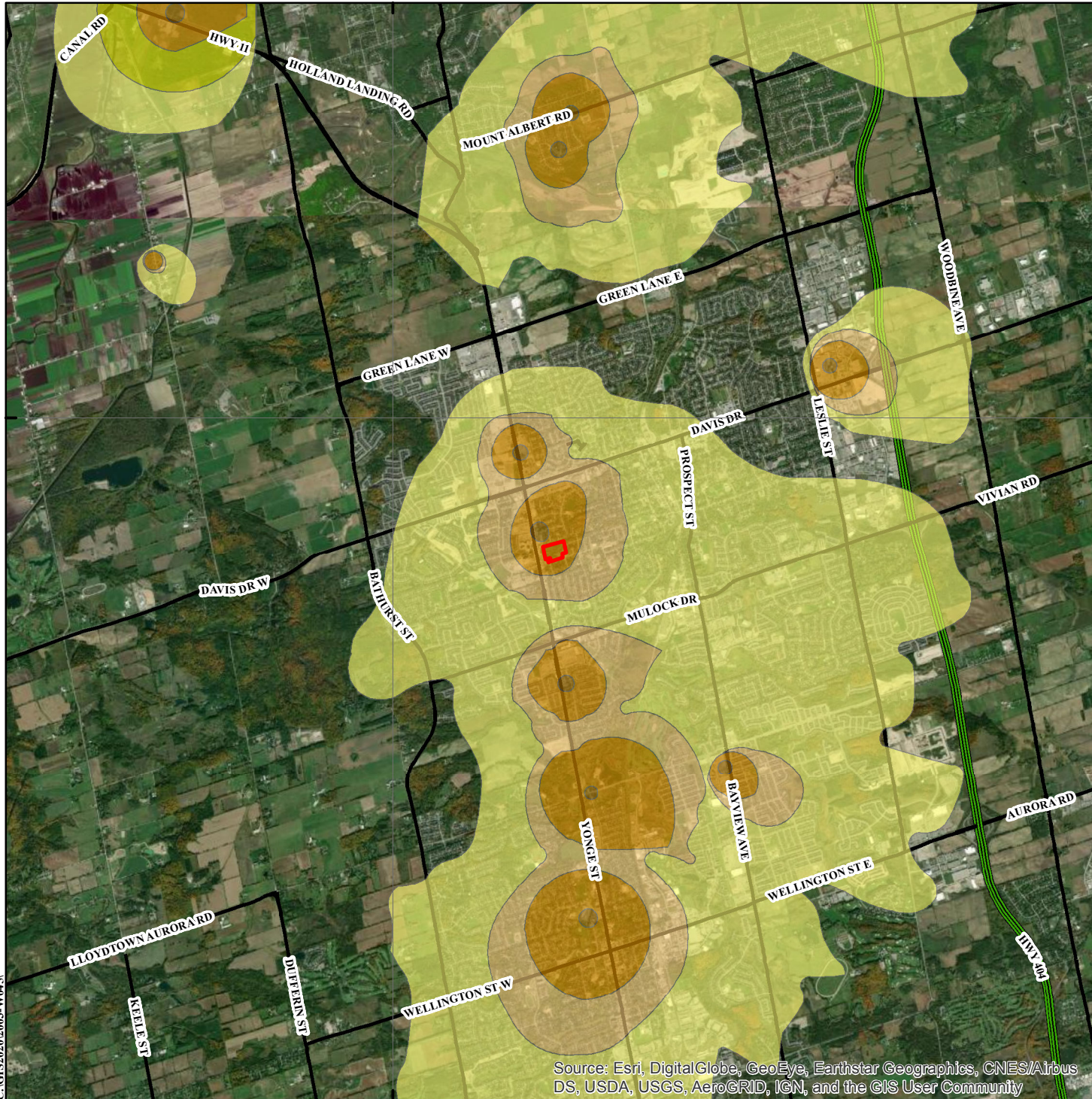


-  Subject Site
-  Phase One Study
-  Water Well Location from MECP Well Help Desk
-  Waterbody
-  Major Road
-  Local Road


*Soil Engineers Ltd.*


Title: MECP Well Records
Project: Proposed Residential Development 55 Eagle Street Town of Newmarket
Reference No. 2007-E048
Date: July 17, 2020
Scale: 
Drawing 4

Source: Ministry of Natural Resources and Forestry  
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





Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



 Approximate Boundary of Subject Site

**Wellhead Protection Area**

-  A
-  B
-  C
-  C1
-  D

-  Expressway/Freeway
-  Major Road

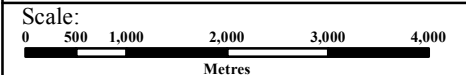


Title: Well Head Protection Area Plan

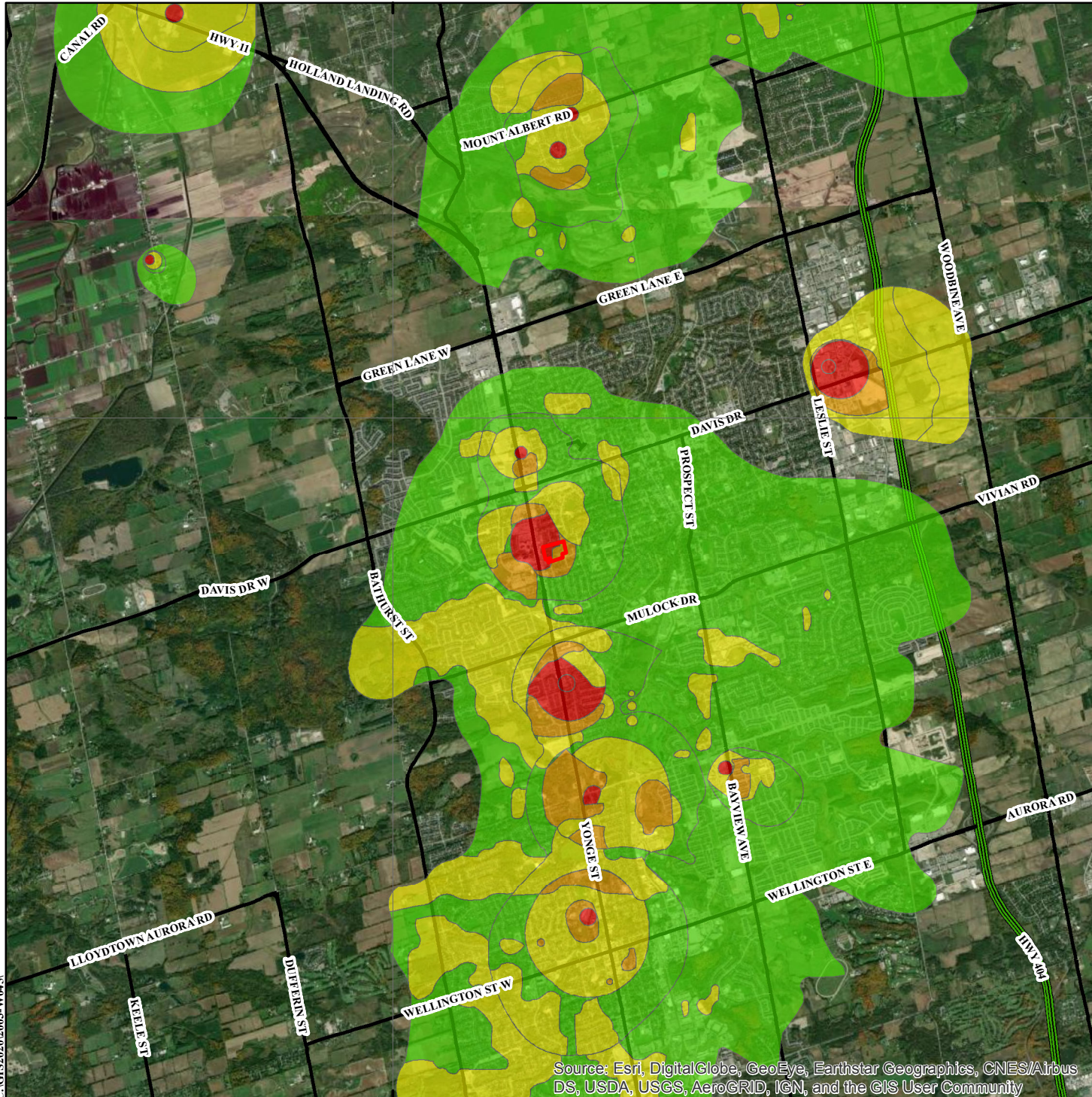
Project:  
Hydrogeological Assessment  
Proposed Residential Development  
55 Eagle Street  
Town of Newmarket


Reference No. 2003-W045

Date: November 25, 2020



Drawing No. 5-1






- Approximate Boundary of Subject Site

**Vulnerability Score**

- 2
- 4
- 8
- 10

- Expressway/Freeway
- Major Road

---

 **Soil Engineers Ltd.**

Title: Well Head Protection Area Plan  
- Vulnerability Score

Project:  
Hydrogeological Assessment  
Proposed Residential Development  
55 Eagle Street  
Town of Newmarket

---

Reference No. 2003-W045

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Date: November 25, 2020

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Scale:  
0 500 1,000 2,000 3,000 4,000  
Metres

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Drawing No. 5-2

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



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## APPENDIX 'A'

### MECP WELL RECORDS

REFERENCE NO. 2007-E048

GIS_ID	WELL_ID	HOLE_ID	X	Y	ELEVATION	FINAL_STAT	USE_1	USE_2	DATE_COMP	WATER_FND	STATIC_LEV	DEPTH_FROM	DEPTH_TO	SCREEN_TOP	SCREEN_END	DEPTH	METHOD_CON	OTHER METH
1	7210847	1004626643	621850.9998	4878497	271.557373	0	Test Hole	Monitoring	2013-10-16	0	0	0.3048	4.572056	7.62009	7.6	Rotary (Convent.)		
2	7311271	1007056977	621991.9997	487985.999	0	Test Hole	Test Hole	Monitoring	2018-04-24	0	0	4.2673	1.219215	4.26725	4.3	Other Method	DIRECT METHOD	
3	6904195	10494916	622007.6004	4878028	270.684328	Test Hole	Not Use		1958-11-21	101.5	0	0	0	0	132.9	Jetting		
4	7201126	1004273410	6218154	4878214.999	264.892578	Observation Wells			2013-03-22	53.341	0	0	54.865	53.34065	54.8647	54.9	Rotary (Air)	
5	7265137	1006067161	621848.0004	4878199	264.40216	Monitoring and Test Hole	Monitoring and Test Hole		2016-05-20	0	0	0	0	0	0	0	Rotary (Convent.)	DIRECT PUSH
6	7210850	1004626652	621932.0003	4878032.999	269.750457	Monitoring and Test Hole	Monitoring and Test Hole		2013-10-11	0	0	3.048	0.304804	6.09607	6.1	Rotary (Convent.)		
7	7232436	1005238518	622015.0003	4878019	270.904988	Observation Wells	Monitoring		2014-11-03	0	0	7.6	4.6	7.6	7.6	Boring		
8	7246780	1005611499	621852.0004	4878218	284.953338	Observation Wells			2015-08-06	0	10.668	0	10.668	10.66813	9.14411	10.7		
9	7243995	1005450055	621949.0003	4879768	272.034667	0			2015-05-26	0	0	0	0	0	0	0		
10	6907460	10498155	622463.5998	4878365	254.786687	Water Supply	Domestic		1950-05-08	39.624	4.6	0	0	39.62448	40.8437	40.8	Jetting	
11	7221094	1004792899	621929.0001	4878107	265.130981	Monitoring and Test Hole	Monitoring and Test Hole		2014-04-16	0	0	5.4865	2.43843	5.48647	5.5	Direct Push		
12	7243993	1005450049	621923.9999	4878011	270.427856	0			2015-05-27	0	0	0	0	0	0	6.3		
13	7244005	1005450185	621925.0002	4878089	266.728118	0			2015-05-26	0	0	0	0	0	0	6.5		
14	7163458	1003512472	622155.9998	4878214	261.260894	Monitoring and Test Hole	Monitoring and Test Hole		2011-03-01	0	0	7.6201	4.572056	7.62009	7.6	Direct Push		
15	7221084	1004792541	621941.0003	4878070	268.271301	Monitoring and Test Hole	Monitoring and Test Hole		2015-05-26	0	0	0	0	0	0	6.5		
16	7244004	1005450182	621928.0004	4878076	267.791534	0			2015-05-26	0	0	0	0	0	0	6.1	Boring	
17	7265653	1006078578	621953.0003	4878076	268.097778	Observation Wells	Monitoring		2016-05-12	0	0	6.0961	3.048037	6.09607	6.1	Other Method	DIRECT PUSH	
18	7311270	1007056974	621976.9997	4877982	0	Observation Wells	Test Hole	Monitoring	2018-04-24	0	0	4.5721	1.524019	4.57206	4.6	Other Method	DIRECT PUSH	
19	7221011	1004790605	621954.9997	4878005	270.541748	Test Hole	Monitoring and Test Hole		2014-04-22	0	0	6.0961	3.048037	6.09607	6.1	Direct Push		
20	7132692	1002766670	622026.0001	4878145	267.065979	Monitoring and Test Hole	Monitoring and Test Hole		2009-09-29	0	0	6.0961	3.048037	6.09607	6.1	Other Method	DIRECT PUSH	
21	7244000	1005450170	621946	4877981	271.518829	0			2015-05-26	0	0	0	0	0	0	5.9		
22	7311273	1007056983	621986.9996	4877969	0	Observation Wells	Test Hole	Monitoring	2018-04-24	0	0	4.5721	1.524019	4.57206	4.6	Other Method	DIRECT PUSH	
23	7216499	1004711046	621870.0001	4878179	264.0242	Monitoring and Test Hole	Monitoring and Test Hole		2013-09-09	6.0961	0	0	6.0961	4.572056	6.09607	6.1	Rotary (Convent.)	
24	7210851	1004626655	621939.9998	4878040	269.558013	Monitoring and Test Hole	Monitoring and Test Hole		2013-10-11	0	0	2.4384	3.048037	6.09607	6.1	Rotary (Convent.)		
25	7252930	1005815342	622007.0003	4878046.999	270.311981	Abandoned-Other			2015-10-19	0	0	7.6	0	0	0	0		
26	7252931	1005815345	622007.0003	4878024	270.769066	Abandoned-Other			2015-10-19	0	0	7.6	0	0	0	0		
27	7243992	1005450046	621967.0004	4877928	273.318328	0			2015-05-26	0	0	0	0	0	0	0		
28	7200127	1004273413	621846.9997	4878220	265.094411	Observation Wells	Monitoring		2015-05-26	0	0	96.013	0	96.0137	92.9651	96	Rotary (Air)	
29	6904204	10494925	621949.0003	4878526	267.250946	Water Supply	Municipal		1966-10-04	86.869	24.4	0	0	86.25945	94.1843	96.3	Rotary (Reverse.)	
30	7243998	1005450188	621927.9998	4878111	264.675415	0			2015-05-26	0	0	0	0	0	0	6.4		
31	7221010	1004790571	621944.9997	4878005	270.541748	Test Hole	Monitoring and Test Hole		2014-04-23	0	0	6.0961	3.048037	6.09607	6.1	Direct Push		
32	7243996	1005450058	621947.0002	4878039	269.614695	0			2015-05-26	0	0	0	0	0	0	6.3		
33	7244008	1005450194	621868.0001	4878302.999	270.158508	0			2015-05-26	0	0	0	0	0	0	0		
34	6904203	10494924	621927.9998	4878111	264.675415	Test Hole	Not Use		1965-12-05	0	0	0	0	0	0	102.1	Rotary (Convent.)	
35	7232437	1005238521	622007	4878046.999	275.832397	Observation Wells	Monitoring		2014-11-03	0	0	7.6	4.6	7.6	7.6	Boring		
36	7330984	1007419903	621829.9999	4878306	0	0			2018-02-10	0	0	0	0	0	0	0		
37	7244008	1005450194	621868.0001	4878302.999	270.158508	0			2015-05-26	0	0	0	0	0	0	0		
38	7244007	1005450191	621877.9998	4878270	266.802032	Monitoring and Test Hole	Monitoring and Test Hole		2014-04-16	0	0	4.2673	2.133626	4.26725	4.6	Direct Push		
39	7221093	1004792436	621967.9997	4877928	273.310241	Monitoring and Test Hole	Monitoring and Test Hole		2014-10-06	0	0	0	0	0	0	0		
40	7265005	1006223451	621972	4877939	272.970214	0			2015-05-26	0	0	0	0	0	0	0		
41	7042864	11765289	6219105	4878053	268.976196	Observation Wells	Not Use		2007-03-29	0	0	5.1	3.6	5.1	5.1	Other Method		
42	7232438	1005238524	622007.0003	4878024	270.769066	Observation Wells	Monitoring		2014-11-03	0	0	7.6	4.6	7.6	7.6	Boring		
43	7129493	1002718673	621895.0004	4878505.999	270.068664	Observation Wells	Monitoring		2008-07-23	0	0	6.0961	3.048037	6.09607	6.1	Boring		
44	7257305	1005878842	621955.9998	4878468	266.742675	0			2015-12-15	0	0	0	0	0	0	0		
45	7311272	1007056980	621971.0002	4877965	0	Observation Wells	Test Hole		2018-04-24	0	0	5.1817	2.133626	5.18166	5.2	Other Method	DIRECT PUSH	
46	7221083	1004792436	621967.9997	4877928	273.310241	Monitoring and Test Hole	Monitoring and Test Hole		2014-04-16	0	0	4.5721	1.524019	4.57206	4.6	Direct Push		
47	7243997	1005450061	621932.0002	4878035.999	269.681396	0			2015-05-26	0	0	0	0	0	0	6.2		
48	7244002	1005450176	621895.9998	4878087	266.647308	0			2015-05-26	0	0	0	0	0	0	8.2		
49	7265652	1006078575	621986.9998	4878121	264.444305	Observation Wells	Monitoring		2015-05-12	0	0	6.0961	3.048037	6.09607	6.1	Boring		
50	7243999	1005450167	621950.0003	4878027	269.89562	0			2015-05-26	0	0	0	0	0	0	6.4		
51	7265654	1006078581	621964.0002	4878081	268.038665	Observation Wells	Monitoring		2015-05-12	0	0	7.6201	4.572056	7.62009	7.6	Boring		
52	7244001	1005450173	621940.0003	4878028	269.791639	0			2015-05-26	0	0	0	0	0	0	6.7		
53	7243994	1005450052	621950.9998	4877949	272.765258	Test Hole	Monitoring and Test Hole		2010-04-06	0	0	4.57	1.22	4.57	0	6.3		
54	7144313	1003305474	622379.0002	4878379	252.506698	Test Hole	Monitoring and Test Hole		2010-04-06	0	0	4.57	1.22	4.57	0	6.3		
55	7144313	1003305465	622374.0001	4878373.999	252.506698	Test Hole	Monitoring and Test Hole		2010-04-06	0	0	4.57	1.22	4.57	0	6.3		
56	7279733	1006344514	621822	4878099	266.116973	Test Hole	Monitoring and Test Hole		2016-12-06	0	0	0	0	0	0	0		
57	7144313	1003305483	622382.9997	4878387	252.506698	Test Hole	Monitoring and Test Hole		2010-04-06	0	0	4.57	1.22	4.57	0	6.3		
58	7243991	1005450043	621958.9996	4877893	274.197387	0			2015-05-26	0	0	0	0	0	0	5.9		
59	7265655	1006078584	621938.0002	4879081	267.465148	Observation Wells	Monitoring		2016-05-12	0	0	6.0961	3.048037	6.09607	6.1	Boring		
60	6904189	10494910	621924.5997	4879516	268.838562	Test Hole	Municipal		1956-06-05	0	13.7	0	0	0	0	138.4	Cable Tool	
61	7132693	1002766682	622115.0001	4878217	259.499694	Monitoring and Test Hole	Monitoring and Test Hole		2009-09-29	0	0	6.0961	3.048037	6.09607	6.1	Other Method	DIRECT PUSH	
62	7252929	1005815339	622015.0003	4878019	270.904988	Abandoned-Other			2015-10-19	0	0	7.6	0	0	0	0		
63	7244003	1005450179	621895.9998	4878178	265.296142	0			2015-05-26	0	0	0	0	0	0	8.2		