

July 26, 2021

Project No. 12-1186-0047 (6000)

**Ms. Farrah Ward, P.Eng.**

Claremont Developments Inc.  
3190 Steeles Avenue East, Suite 300  
Markham, Ontario  
L3R 1G9

**WATER LEVEL DATA ASSESSMENT FOR WETLAND FRAGMENT  
OPEN SPACE BLOCK 77, PROPOSED RESIDENTIAL SUBDIVISION  
5113 OLD BROCK ROAD, CLAREMONT, CITY OF PICKERING, ONTARIO**

Dear Ms. Ward,

**Background**

Golder Associates Ltd. (Golder) was retained by Claremont Developments Inc. (CDI) to carry out a preliminary hydrogeological investigation for a proposed 71-lot residential subdivision at 5113 Old Brock Road (Site) in the Hamlet of Claremont, City of Pickering, Ontario. A copy of the Draft Plan of Subdivision (Malone Givens Parsons Ltd., Revised March 1, 2018) for the proposed development is attached. The results of the investigation were presented in the following report:

- Golder Associates Ltd., July 2021. *Preliminary Hydrogeological Investigation, Proposed Residential Subdivision, 5113 Old Brock Road, Hamlet of Claremont, Pickering, Ontario*. Reference No. 12-1186-0047. (Golder 2021).

This letter should be read in conjunction with the above-referenced report. The purpose of the preliminary hydrogeological investigation was to characterize the subsurface conditions at the Site and prepare a pre-development and post-development water balance based on the development concept. The water balance was used to assess the potential hydrogeological impacts of the proposed development, including potential hydrogeological impacts to Key Hydrologic Features within the area of influence of the development, as discussed in Section 26 of the *Oak Ridges Moraine Conservation Plan* (2017).

As discussed in the Golder 2021 report, Beacon Environmental (Beacon) has carried out a natural heritage evaluation of the Site (Beacon, July 2021, *Natural Heritage Evaluation, 5113 Old Brock Road, Hamlet of Claremont, City of Pickering*. Reference No. 221308). In Section 4.2.3 of their report Beacon indicates the presence of a small wetland/marsh community at the southern-most end of the Site, to the northwest of Brock Road at Central Street, in Open Space Block 77 (see the attached Draft Plan). For the purpose of our reporting, this was referred to as Wetland 3. The location of the vegetation communities present in Wetland 3 is shown on the attached figure taken from the Beacon report (*Existing Conditions, Figure 2*). Based on topographic mapping

and field visits conducted by Beacon there is no watercourse connecting to Wetland 3. It is understood from Beacon that this area is considered to be a low quality wetland fragment. Beacon reports no indications of groundwater in the wetland fragment from a natural heritage perspective. Information available from the Ontario Ministry of Natural Resources and Forestry indicates that the low quality wetland fragment on Open Space Block 77 is not mapped as part of the Natural Heritage System nor as a Provincially Significant Wetland<sup>1</sup>.

This letter presents an assessment of the water level monitoring within Wetland 3 to September 2018 to assess if the wetland fragment is subject to the *Oak Ridges Moraine Conservation Plan* (2017). This letter also provides additional comment on the results of the water balance assessment as presented in the Golder 2021 report.

### Water Level Monitoring Summary

As discussed in the Golder 2021 report in Section 3.1, a shallow piezometer and staff gauge pair (i.e., P3/SG3) were installed by hand on December 6, 2017 at one location in the Wetland 3 area. The location of the piezometer/staff gauge pair was selected in the field by Beacon and Golder staff and is shown on Figure 1 (attached). Piezometer P3 was installed to a depth of approximately 1.66 m below grade (elevation 266.26 m above sea level (asl)), and a bentonite seal was placed adjacent to the upper portion of the riser. An automatic data logger was installed in piezometer P3 and a second logger was mounted to an adjacent staff gauge, SG3, to automatically record water level data. The SG3 logger sensor was affixed to the staff gauge and approximately aligned to the grade elevation to record any potential water ponding at ground surface. A barometric pressure logger was also installed at the Site, and the logger data presented herein have been corrected for barometric pressure.

The locations and elevations of the ground surface, top of piezometer, and top of staff gauge were surveyed by Rady-Pentek & Edwards Surveying Ltd. on July 19, 2018, and the coordinates were provided to Golder. The survey data have been referenced to a geodetic datum.

The data from the loggers were downloaded on or about March 6, June 19 and August 29, 2018, and the available logger data are presented on Figure 2 (attached). The available manual data and field observations are presented in Table 1 (attached), and are also shown on Figure 2. Total daily precipitation, daily rainfall, and maximum daily temperature data from Environment Canada's Buttonville A climate station (ID 6157012) are also shown on Figure 2.

The following summary of the water level data is provided. The ground surface at staff gauge SG3 is at an approximate elevation of 267.87 masl. The piezometric head at the screened interval in piezometer P3 ranged from approximately elevation 267.98 masl on February 20 and April 16, 2018 (i.e., 0.12 m above grade), to below the logger sensor elevation of approximately 266.55 masl (i.e., greater than 1.32 m below grade) between July 11 to 16, 2018. A seasonal decline in groundwater levels was observed in May through mid-July in response to warmer climatic conditions. A good correlation between groundwater level increases and precipitation events is observed.

As shown in Table 1, no ponded water was observed at the P3/SG3 location at the time of installation on December 6 and 7, 2017. Snow was observed at ground surface at the P3/SG3 location in January and March 2018. No ponded water was observed at the P3/SG3 location on any of the monitoring events (i.e., March 6, June 19, August 29 or September 21, 2018) although moist soil conditions were reported during the August and

<sup>1</sup> [http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR\\_NHLUPS\\_NaturalHeritage&viewer=NaturalHeritage&locale=en-US](http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US)

September monitoring events. No obvious overland flow was observed from the south end of the Wetland 3 area on March 2 or September 21, 2018. Ponded water was observed in the north road-side drainage ditch on Central Street adjacent to the Wetland 3 area on March 2, 2018, but it was dry on September 21, 2018.

During the August 29, 2018 logger download it was discovered that the SG3 logger had malfunctioned, and no data from the SG3 logger was recoverable after June 19, 2018. Reviewing the SG3 logger data from the time of installation to June 19, 2018, it is interpreted by Golder that no standing water was recorded by the staff gauge up to June 19, 2018, as shown on Figure 2. This is consistent with Golder's field observations. The loggers were replaced for continued monitoring on September 21, 2018.

## Assessment

Section 3 (1) of the *Oak Ridges Moraine Conservation Plan* (ORMCP 2017), defines (p.23) a wetland as "... land such as a swamp, marsh, bog or fen... that (a) is seasonally or permanently covered by shallow water or has the water table close to or at the surface".

The above water level data confirm that the water table is close to or at the ground surface at the P3/SG3 location. The above data indicate that while the piezometric head in the piezometer P3 location was at times above grade, it did not result in free groundwater discharge at the P3/SG3 location, and no ponded water was recorded. The presence of seasonal above-grade heads at P3 indicates a seasonal upward vertical hydraulic gradient. The presence of the shallow water table is expected to contribute to moist soil conditions in Wetland 3, and the groundwater conditions are interpreted to be a result of the recharge of incident precipitation in the hydraulically upgradient area north of Wetland 3.

ORMCP (2017) indicates that wetlands with a size of less than 0.5 ha in area are excluded from the policies of the ORMCP if it can be demonstrated that the wetland feature "does not constitute or provide one or more the following features or functions:"

- "Permanent or intermittent surface water connection between the wetlands and an adjacent key hydrologic feature";

The available water level data from P3 indicates a seasonally upward hydraulic gradient. However, the collective data from P3/SG3 do not indicate that these groundwater conditions resulted in intermittent or permanent free flowing or ponded water at the ground surface during the monitoring period. No obvious overland discharge was observed from the south end of the Wetland 3 area by Golder on March 2 or September 21, 2018.

Based on Golder's previous work, the closest Key Hydrologic Feature to Wetland 3 is Mitchell Creek. The flow path for run-off from the Wetland 3 area is expected to be approximately 1.4 km of road-side drainage ditching mainly along Brock Road. In this regard, a Key Hydrologic Feature is not located adjacent to Wetland 3.

- "Significant recharge to the underlying aquifer (generally considered to be any small wetland underlain by at least 3 metres of mineral soil having a hydraulic conductivity of  $10^{-4}$  cm/s or more); or"

The vertical hydraulic gradient at P3/SG3 is expected to be seasonally upward. The recharge of any incident precipitation is not expected to occur when groundwater levels are at or near ground surface, or to be

significant at times of upward vertical gradients. In this way, significant recharge is not expected in the Wetland 3 area.

Indications of sandy soils were encountered below thin surficial silty clay during the manual installation of piezometer P3, although detailed soil sampling was not facilitated by the piezometer installation method. The surficial soils encountered at the 19 borehole locations drilled on the Site as part of Golder's combined geotechnical and hydrogeological investigation were comprised of thin (i.e., average thickness of 0.9 m, ranging up to 1.8 m in thickness) clayey silt, silt, and sandy silt, which were underlain by the predominant glacial till soils, all of which have an estimated hydraulic conductivity of less than  $10^{-4}$  cm/s. Based on the available subsurface data at the Site, it is not likely that 3 m of mineral soil with a hydraulic conductivity of  $10^{-4}$  cm/s or more is present in the Wetland 3 area.

Accordingly, the available information does not suggest that the conditions in Wetland 3 result in significant groundwater recharge to a shallow aquifer.

- "Direct hydraulic connections between the wetland and an underlying aquifer (e.g., along fracture zone or granular soil conduits)";

As discussed in the preceding bullet point, the presence of a 3 m thick aquifer is not expected to underlie Wetland 3, and there is no information to suggest that the Wetland 3 feature provides a significant groundwater recharge function.

The predominant soil type at the Site is glacial till, which can be fractured. To assess a potential discharge function associated with potential till fractures, a review of the adjacent water well records was carried out.

- Two water well records (4601778 and 1913850) are reported or inferred to be associated with a shallow bored well at the west adjacent property to the Wetland 3 area. The soil conditions are reported as 3.0 m of clay underlain by glacial till to the terminal depth of 9.8 m, with a static water level of 3.0 m below grade. This information does not suggest the presence of flowing artesian conditions or of an associated sandy aquifer.
- One water well record (1907795) is reported in the location of the south adjacent residence to the Wetland 3 area. The soil conditions are reported as 32.0 m of glacial till underlain by gravelly sand to the terminal depth of 34.1 m, with a static water level of 23.2 m below grade. The data indicate that the piezometric head in the confined aquifer at this location is well below grade, and therefore the near surface groundwater levels and seasonal upward gradient at piezometer P3 are not an expression of the piezometric head in the confined aquifer via fractures in the till unit or otherwise.

The water levels in piezometer P3 are not interpreted to show the influence of pumping activities at any private wells that may remain active in the area, and instead show a strong correlation to climatic effects.

In these ways, the available data do not indicate a direct hydraulic connection between Wetland 3 and an underlying aquifer.

In summary, the available water level monitoring data from piezometer/staff gauge pair P3/SG3 do not indicate, from a hydrogeological perspective, that Wetland 3 exhibits any of the three above-stated features or functions that would qualify it as a wetland subject to the Oak Ridges Moraine Conservation Plan.

## Recommendations

The Golder 2021 report indicates, at Section 5.0, that:

*“The annual quantity and temporal distribution of surface water runoff to the wetland fragment at the south end of the Site in Open Space Block 77 (Wetland 3) will be altered due to changes in land use and catchment area. On average, there will be less runoff to the wetland fragment, particularly during winter and spring (December to May). The storm drainage plan proposed by SCS diverts all runoff from Catchments 205, 215 and 216 to the wetland in Open Space Block 77 in order to increase post-development runoff contributions to Wetland 3. With the diversion of this flow, average annual runoff to Wetland 3 will decrease by approximately 20% relative to pre-development conditions, as shown in Table 9. This may result in a noticeable reduction in runoff to this wetland fragment.”*

*“... 9% reduction in the average annual infiltration rate is estimated for the Wetland 3 catchment area. Variations of 10% or less are generally considered to be a balance of pre- and post-development conditions. However, the presence of the southern SWMP in Block 74 has the potential to impact groundwater levels in the vicinity of the pond and is not quantified by the water balance estimate described above. The permanent pool elevation of the SWMP is understood to be 263.5 masl, which is below measured groundwater levels at monitoring wells BH17-18 and BH17-19 and which ranged from 267.3 masl to 269.7 masl on the dates measured. As a result, it is expected that groundwater contributions from the Site (in an upgradient direction from the SWMP) will be largely intercepted by the SWMP, which is situated between the residential lots and Wetland 3. Given the low hydraulic conductivity of the glacial till unit, the potential zone of influence of the dewatering effect is expected to be limited, and in the order of 20 m, and would not extend into Open Space Block 77 due to the presence of the 30 m open space buffer (i.e., Block 78). To reduce the potential for groundwater level lowering within Block 78 open space buffer, it is recommended that a low-permeability cut-off wall be installed at the east-west aligned boundary between Blocks 74 and 78, through the thin surficial sandy silt soils that have been in the area, and keyed approximately 2 m into the top of the glacial till unit.”*

The above water level monitoring data at the P3/SG3 location are interpreted to indicate that a seasonal upward hydraulic gradient and groundwater levels at or near ground surface result from the infiltration of incident precipitation in the upland area of the Site within the Wetland 3 catchment area. As discussed above, no evidence of groundwater discharge resulting in intermittent or permanent free flowing or ponded water was recorded at the P3/SG3 location.

If Wetland 3 is to be retained, it continues to be recommended that a low-permeability cut off wall partially between Blocks 74 and 78 be installed to limit potential drawdown effects that may be caused by the proposed storm water management pond to the north of Wetland 3. Further, it continues to be recommended to maximize run-off contributions to Open Space Block 77 (e.g., from Catchments 205, 215 and 216). It is recommended to discharge this water in a diffuse manner to provide water inputs to the wetland, and to off-set to the extent practical the reduction in groundwater flow from upgradient lands that is expected from the presence of the proposed storm water management pond.

## Limitations

The factual data, interpretations and recommendations contained in this letter pertain to a specific project as described in the letter and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, or if the project is not initiated within eighteen months of the date of the letter, Golder should be given an opportunity to confirm that the recommendations are still valid. In addition, this letter

should be read in conjunction with the *"Important Information and Limitations of This Report"*, included in Golder's previous reports for this project, which provide data used in the preparation of this letter. The reader's attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report.

### Closure

We trust this submission meets your current requirements. Please contact the undersigned with any questions.

Yours truly,

**Golder Associates Ltd.**



Joel Gopaul, B.A.Sc.  
Geo-Environmental Consultant



Chris Kozuskanich, P.Geo.  
Associate, Senior Hydrogeologist



CMK/MK/SDK/JJG/sv

CC: Beacon Environmental

Attachments: Draft Plan of Subdivision, Malone Givens Parsons, rev. March 1, 2018  
Figure 1 – Site Location Plan  
Beacon Environmental, *copy of* Existing Conditions, Figure 2  
Figure 2 – Water Levels and Daily Precipitation  
Table 1 – Piezometer and Staff Gauge Data

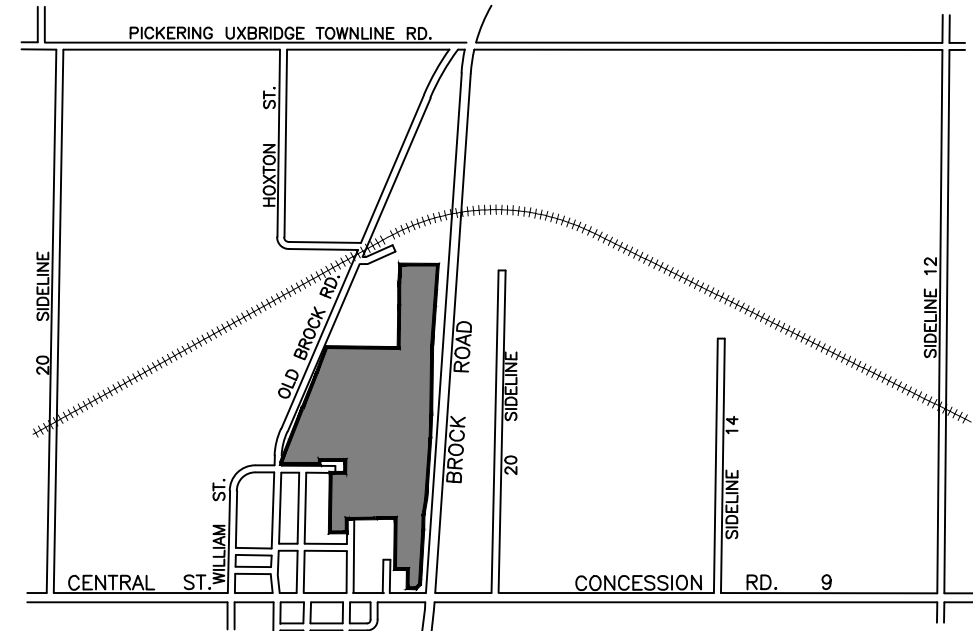




Draft Plan of Subdivision  
21T-

Part of Lots 17 & 18, Concession 9  
Lots 47 & 48, Registered Plan No. 12  
(Geographic Township of Pickering)  
City of Pickering  
Regional Municipality of Durham

Key Plan



SUBJECT LANDS

Schedule of Land Use

Lot/Block	Land Use	Units	Area(ha)
1-70	Estate Residential Lots	70	22.98
71	Existing Residential	1	0.58
72	Park		1.70
73-74	SWM Pond		3.32
75-77	Open Space		4.24
78-79	30m Open Space Buffers		0.84
80	Noise Attenuation		0.89
81-82	Road Widening		0.09
83-85	to be conveyed to adjacent lot		0.33
Roads	Streets A-D (20m R.O.W.)	1.605m	3.21
Total		71	38.18

NOTES

All measurements are in metres.  
All elevations refer to Geodetic Datum.  
All corner roundings are 5.0mR, unless otherwise stated.

Owner's Authorization

I, \_\_\_\_\_, hereby  
authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of  
Subdivision to the Town of Pickering.

Date: \_\_\_\_\_

Surveyor's Certificate

I hereby certify that the boundaries of the land to be subdivided and their  
relationship to the adjoining properties are correctly shown on this Draft Plan.

Date: \_\_\_\_\_

Additional Information

As required under section 51(17) of the Planning Act (R.S.O. 1990 C.P. 13)  
a), e), f), j) As shown on Draft Plan.  
b), g) As shown on Draft and Key Plans.  
c) As shown on Key Plan.  
d) Residential.  
h), k) Municipal services to be provided.  
i) Silt Loam soil.  
l) As shown on Draft Plan.  
Note: Contours relate to Canadian Geodetic Datum.



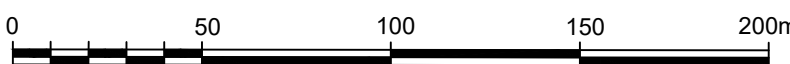
140 Renfrew Drive, Suite 201  
Markham, Ontario, L3R 6B3  
Tel. (905) 513-0170  
Fax. (905) 513-0177

Project No. 12-2110

Date: January 31, 2018

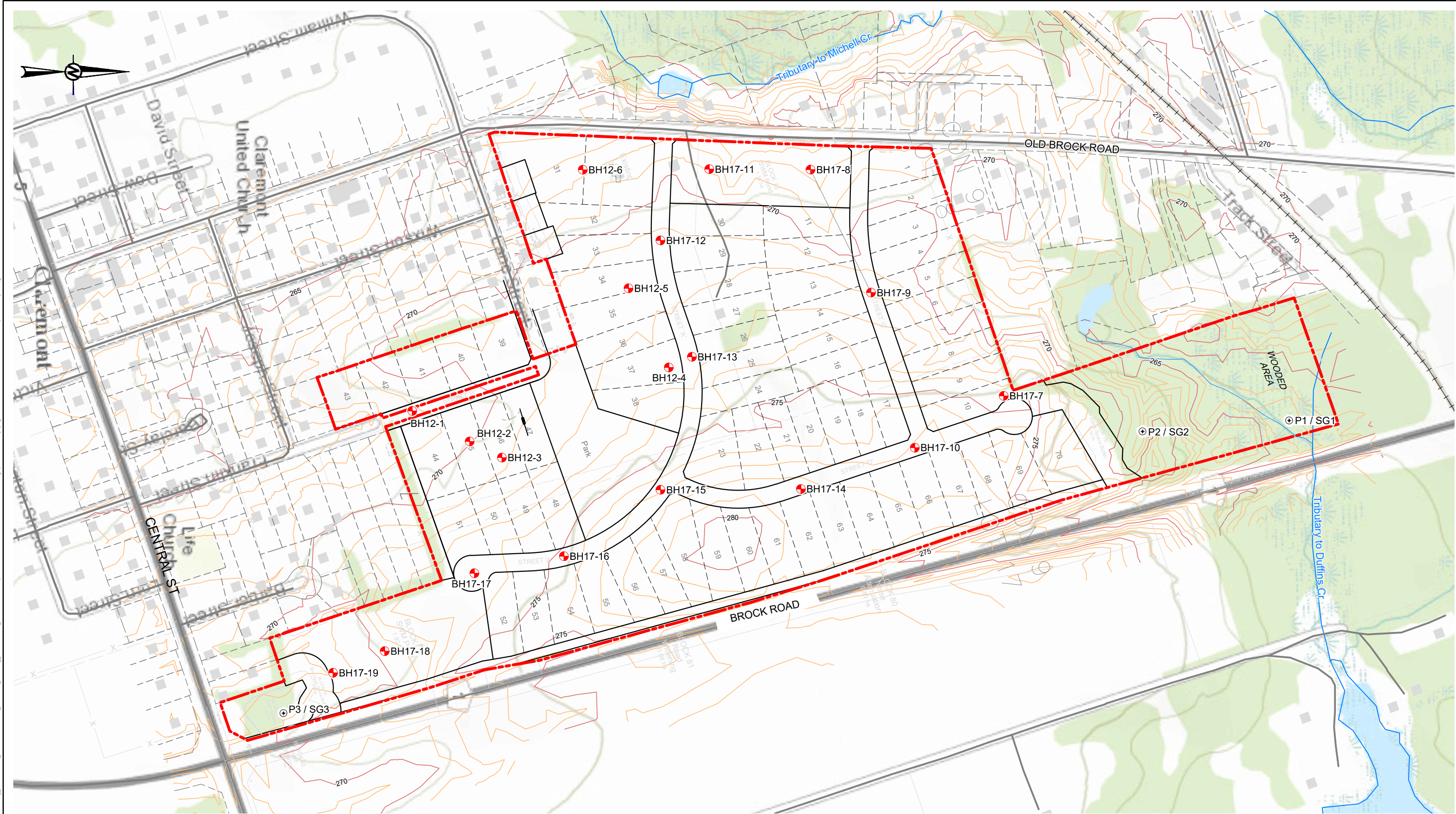
Revised: March 1, 2018

Scale:



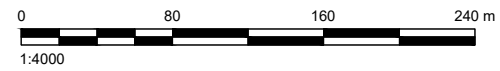


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- LEGEND:**
- Property Line
  - Borehole or Observation Well
  - Piezometer and Staff Gauge

- NOTES:**
- Datum UTM NAD 83 Zone 17
- REFERENCES:**
- LIO Terrain Base Mapping, Queen's Printer 2017
  - Draft Plan & Site Topographic Mapping Provided by Malone Given Parsons, February 2018



CLIENT  
CLAREMONT DEVELOPMENTS INC.

CONSULTANT



YYYY-MM-DD	2018-09-21
DESIGNED	---
PREPARED	JPR
REVIEWED	---
APPROVED	CMK

PROJECT  
WATER LEVEL DATA ASSESSMENT  
PROPOSED RESIDENTIAL DEVELOPMENT  
5113 OLD BROCK ROAD, CLAREMONT

TITLE  
**SITE LOCATION MAP**

PROJECT NO.  
1211860047

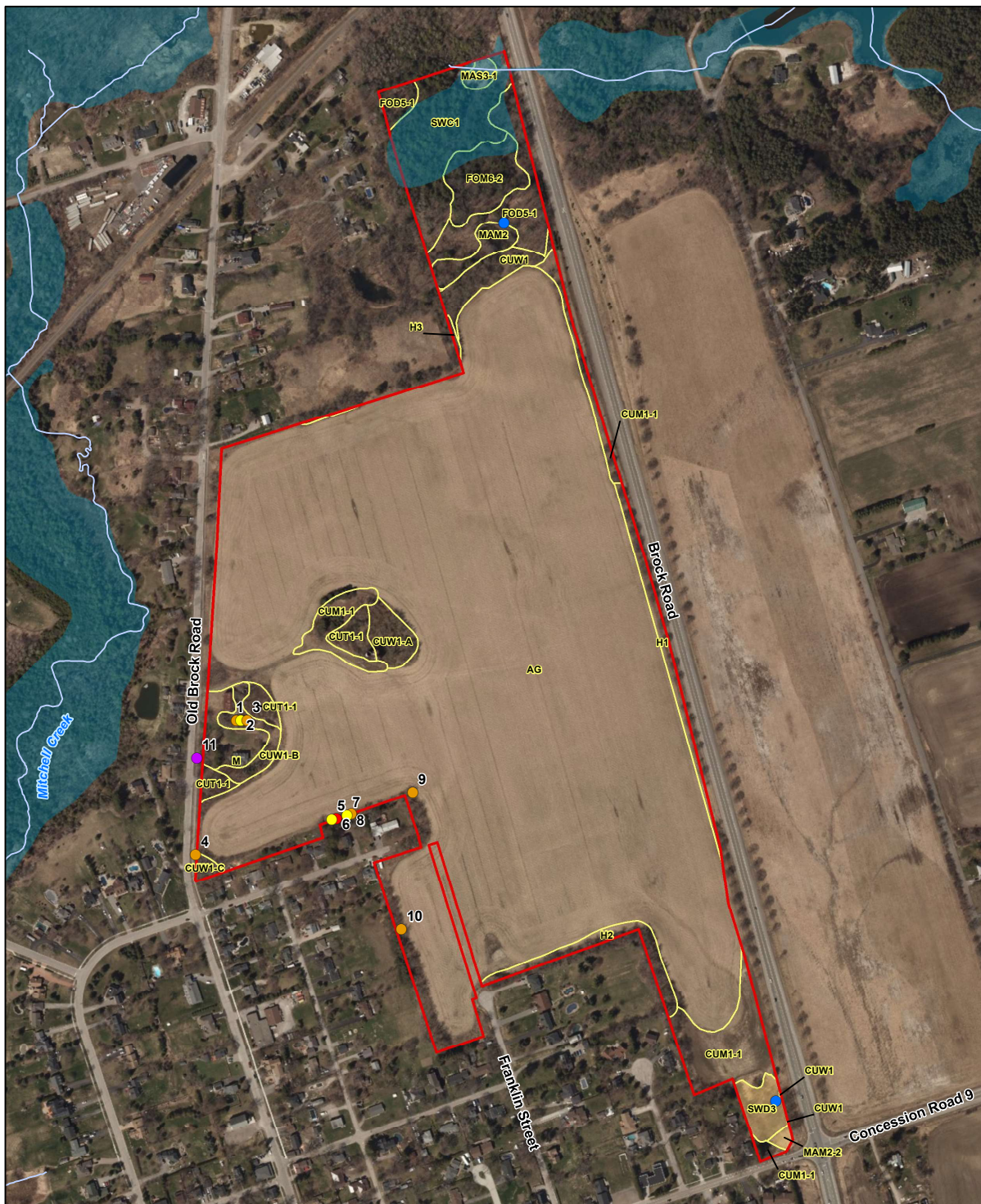
CONTROL  
0005

REV.  
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FIGURE  
**1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B





### Legend

- Subject Property
- ELC Communities
- Amphibian Survey Locations
- Watercourse (MNRFP 2021)
- Provincially Significant Wetland (MNRFP 2021)
- Unevaluated Wetland
- Butternut (2018)**
- Non-Retainable (Category 1)
- Retainable (Category 2)
- Potentially Archivable (Category 3)
- Cultivated

ELC Code	ELC Vegetation Type
AG	Agriculture - Row Crops
CUM1-1	Dry-Moist Old Field Meadow
CUT1-1	Sumac Cultural Thicket
CUW1	Cultural Woodland
H	Hedgerow
FODS-1	Dry-Fresh Sugar Maple Deciduous Forest
FOM6-2	Fresh-Moist Hemlock-Hardwood Mixed Forest
SWD3	Maple Mineral Deciduous Swamp
SWC1	White Cedar Mineral/Coniferous Swamp
M	Manicured
MAM2-2	Reed/Canary Grass Mineral Meadow Marsh
MAM2	Mineral Meadow Marsh
MAS3-1	Cattail Organic Shallow Marsh

### Existing Conditions

### Figure 2

Claremont Developments Inc.

UTM Zone 17 N, NAD 83

First Base Solutions  
Web Mapping Service 2020

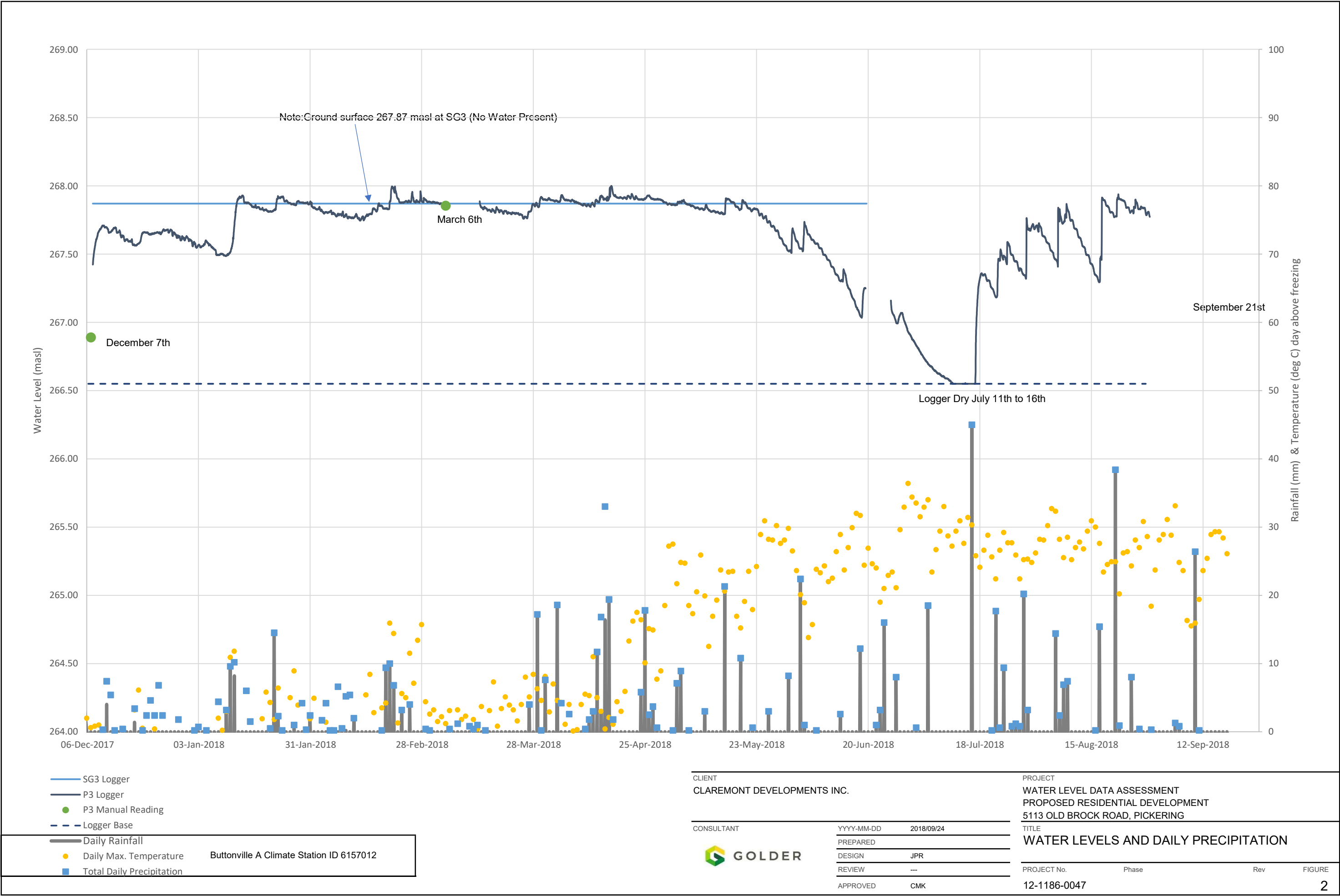
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Project 221308  
July 2021



**Table 1: Piezometer and Staff Gauge Data**

Proposed Residential Subdivision, 5113 Old Brock Road, Claremont, City of Pickering, ON

Location	Ground Surface Elev.	Measuring Point Elev.	Top of Staff Gauge Elev.	6-Dec-2017*		7-Dec-2017		18-Jan-2018		23-Jan-2018		6-Mar-2018		29-Aug-2018		21-Sep-2018	
	(masl)	(masl)	(masl)	(mbgs)	(masl)	(mbgs)	(masl)	(mbgs)	(masl)	(mbgs)	(masl)	(mbgs)	(masl)	(mbgs)	(masl)	(mbgs)	(masl)
SG3	267.87	-	268.87	NSW	NSW	-	-	snow at grade		snow at grade		NSW	NSW	NSW	NSW	NSW	NSW
P3	267.92	268.66	-	1.14	266.78	1.03	266.89	logger frozen in casing		logger frozen in casing		0.06	267.86	-	-	0.69	267.23

**Notes:**

Elevations based on survey coordinates provided by Rady-Pentek &amp; Edwards, July 19, 2018 field data

Measuring Point Elev. = top of piezometer P3 casing

\* = at the time of piezometer P3 installation

masl = metres above sea level

mbgs = metres below ground surface

NSW = no standing water

- = no data available